AFRD
Integrated Safety Management Plan
2007

Accelerator and Fusion Research Division
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AFRD ISM Plan Contents

Appendices

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.

1. Accountability

Division Director and Deputy

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 Director's general safety responsibilities are described in **PUB-3000, Section 1.3.2.4**. 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** (see Appendix 1) describing their personal commitment to assessing workplace safety conditions and communicating safety, and complete **ESH027** Performing an Effective Safety Walkaround by January 2008, or within 3 months of becoming a Director/Deputy.

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 described in **PUB-3000, Chapter 15** 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.

Program Heads

Program Heads are responsible for establishing, implementing, and maintaining effective ES&H procedures for their Programs and ensuring correction of ES&H deficiencies on a timely basis. In addition to their general responsibilities as Supervisors, all Program Heads are expected to:

- Provide **leadership** and encourage participation in the ES&H activities of their Program;
- **Communicate** regularly with their Program ES&H Coordinator and **maintain awareness** of their Program ES&H performance;

- Develop and implement a **Supervisor Safety Plan** (see Appendix 1) describing their commitment to personally **assess the safety** of their Program's workplace conditions and activities, including walkthroughs of spaces and observation of activities. [AFRD expectation: walkthrough of the Program spaces at least quarterly.]
- In the Supervisor Safety Plan, describe how they (1) **communicate safety information** to their Program and (2) **receive and address safety concerns** from their Program, and then follow this plan. [AFRD expectation: incorporation of safety discussions into regular meetings with groups and supervisors.]
- Ensure that qualified **Shop Managers** are designated for each shop, and that the Shop Manager's name and the **shop use policy** are posted at the entrance to each shop. (Engineering Division Machine Tool Services or EH&S Industrial Safety Group personnel are available to help AFRD Program Heads determine which individuals are qualified to serve as Shop Managers.) Program Heads **provide resources** to Shop Managers to maintain shop tools in good mechanical and operating condition, with all required guarding in place.

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. In addition, Group Leaders have the general responsibilities of Supervisors and Principal Investigators as described below.

Supervisors and Principal Investigators

All supervisors (including Principal Investigators, Group Leaders, and Program Heads) 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 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** (see Appendix 1) 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);

- Complete **ESH027** Performing an Effective Safety Walkaround by January 2008, or within 3 months of becoming a supervisor or PI;
- Ensure that findings from walkthroughs are either resolved immediately (during the walkthrough) or are entered into the Corrective Action Tracking System (**CATS)** database and closed in a timely manner;
- **Report safety concerns** needing Division or institutional attention to their Program 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 Job Hazards Questionnaire (**JHQ**) and review to ensure it includes the correct hazards. Ensure each new person is provided with emergency contact and response telephone numbers, and is familiarized with emergency evacuation procedures;
- Evaluate the **training** needs of assigned personnel annually and whenever their job hazards change;
- Verify that each assigned person (1) receives **on-the-job training** before being exposed to a hazard, (2) is appropriately **supervised** by a trained person until required training is completed, and (3) completes all required training for the hazards of the work within **90 days** of being exposed to the hazard;
- 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 the ES&H Administrator; and
- Participate in **reviews of any accidents or occurrences** involving assigned personnel as described in **PUB-3000, Section 5.1**. Ensure Supervisor's Accident Analysis Reports (SAARS) are completed promptly and accurately. Identify, enter into CATS, and perform appropriate corrective actions.
- Implement the **Job Hazards Analysis** requirements as described in **PUB-3000, Chapter 32** and further institutional guidance following completion of the pilot test.
- Enforce safe work practices in **machine shops** by assigned personnel who are qualified and approved by Shop Managers to use the tools.

Supervisors and Principal Investigators may assign Work Leads to assist them in directing, training, and assigning tasks to their assigned personnel. **Assignment of Work Lead responsibility to a matrixed employee requires the written approval of the matrixed employee's home division supervisor.** The supervisor retains ultimate responsibility for

ensuring their assigned personnel adhere to EH&S polices and to safe work practices. Supervisors and Principal Investigators are responsible for verification of the Work Lead's assurances that work is being conducted safely and within authorizations.

Work Leads

People who direct, train, and assign tasks to others for whom they are not the official designated supervisors are called "Work Leads". Typical examples of Work Lead roles at AFRD include Shop Managers overseeing people working in their shop, Principal Investigators directing matrixed technicians or collaborating researchers from other groups participating in their experiments, or an experienced Staff Scientist who is asked by the Principal Investigator to oversee continuing experimental activities while the Principal Investigator is on travel.

Work Leads have responsibility for assisting the supervisors in assuring the safety of those under their direction. Work Leads provides assurance to designated supervisors that day-to-day work, operations, and activities in their assigned area(s) and activities are conducted safely and within established work authorizations.

The responsibilities of Work Leads are as follows:

- **Maintain a safe workplace**. This includes maintaining good housekeeping to keep emergency egress routes open and reduce seismic hazards.
- **Report any deficiencies in hazard controls** to the supervisor or Principal Investigator responsible for the work. Report any facility-related problems to the Building Manager and the Work Request Center. **Inform personnel** working in the area about hazards through appropriate signage and/or instruction. **Stop work or implement additional controls** as needed to assure work can continue safely.
- Provide sufficient **observation of work activities** to assure that work is being conducted safely in accordance to work procedures and authorizations, and that controls (such as machine guards and Personnel Protective Equipment) are being used appropriately.

- **Inform the supervisors** of the workers and obtain their approval **before making any changes** in work assignments that will change the type of hazards or increase the level of hazard to which the workers may be exposed. Verify with the supervisors that the workers have completed required EH&S training courses to do the work.
- Assure that workers complete **on-the-job training** in safety and emergency procedures commensurate with their work assignments and document any on-the-job training given.
- **Inform the workers' supervisor promptly of any concerns** about worker s technical competence to perform the assigned work or safety performance that arise from observing work activities. If concerns are not satisfactorily resolved, raise the concern to the next higher level of management.
- Ensure that any **safety deficiencies** identified by the Work Lead or brought to his/her attention by the work group are entered into **CATS** (with Program ES&H Coordinator assistance, if needed).
- **Know** which **work authorizations** apply to the work. Read the work authorizations and ensure the conditions are understood. **Assure that work is performed within the lim**its of the work authorizations. **Report any plans to change** the types of hazards, increase the

level of hazards, change hazard controls, or change personnel to the supervisor or Principal Investigator responsible for the work and ensure the changes are authorized before they are implemented.

Work Leads who are Shop Managers, see also the section on Shop Managers under Special Duties below. Work Leads who are matrixed to another division, or oversee personnel from another division, see also the section on Matrixed Personnel below.

All AFRD Personnel

The general safety responsibilities of employees, contractors, and casual and participating visitors are described in **PUB-3000, Section 1.3.2.6**. Employee involvement and worker rights are described in **PUB-3000, Section 1.3.3**.

All AFRD personnel (including AFRD employees, matrixed employees, visitors, temporary employees, students, and participating guests) are assigned to a **QUEST**[1] 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. Advanced Light Source (ALS) Accelerator Physics personnel are assigned to ALS Division QUEST Circles. Each QUEST team has charge of self-assessment for the workspace of it members.

All AFRD personnel are encouraged to **report any workplace safety or environmental concerns** to their supervisor. **In the event of an emergency, personnel should take immediate steps to protect themselves and others and summon aid as described in PUB-3000, Section 5.1.1.2.** All accidents, on-site or off-site during official travel, must be reported to the supervisor and LBNL Health Services. Personnel participate in incident reviews as requested by the incident investigator. Personnel at the accident /incident scene are responsible for helping to **preserve the accident scene** by not moving items or initiating corrective actions prior to the investigation, except as immediately necessary to prevent further injury or render emergency assistance. All personnel are responsible for **stopping any work activity considered an imminent danger**, defined in **PUB-3000, Section 1.5** 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 the Corrective Action Tracking System (**CATS**).

All personnel are expected to take the initiative to **consult with their supervisor** and encouraged to consult with their Program ES&H Coordinator, AFRD ES&H Coordinator /Administrator, or appropriate EH&S personnel when safety-related assistance or advice is needed.

[1] **QUEST** is an integrated way to examine **QU**ality Assurance/Improvement and **E**nvironment, Safety, and Health through **S**elf-Assessment and **T**eamwork. It is described in the QUEST Program Guide.

Special Duties

Personnel may be assigned special safety functions by the Division Director or their Program Head, including:

Chemical Owners assist AFRD Line Management in ensuring the chemical inventory for their assigned area is maintained on the Chemical Management System, and that the chemicals are properly labeled and stored. They work with the EH&S Industrial Hygienists to assist Line Management in ensuring proper Personal Protective Equipment (PPE) is available to chemical users. AFRD Chemical Owners are expected to complete EHS0231 Compressed Gas and Cryogen Safety, EHS0346 Chemical Management System Web Application Training, EHS0348 Chemical Hygiene and Safety, and EHS0604 Hazardous Waste Generator.

Hazardous Waste Generators assist AFRD Line Management in maintaining Satellite Accumulation Areas in accordance with **PUB-3092**, Guidelines for Generators to Meet HWHF Acceptance Requirements for Hazardous, Radioactive, and Mixed Wastes at Berkeley Lab. Hazardous Waste Generators prepare and submit hazardous waste requisitions to EH&S for waste pick-up within prescribed time limits, and communicate with the Chemical Owners to ensure disposed containers are removed from the inventory. Hazardous Waste Generators are expected to complete EHS0348 Chemical Hygiene and Safety and EHS0604 Hazardous Waste Generator.

Shop Managers, as described in **PUB-3000, Section 25.4**, are a special type of **Work Lead** appointed by AFRD Program Heads to assist in monitoring work in AFRD shops. The Shop Manager must be a person who can, through experience, sufficient knowledge, or training, operate the equipment safely, and identify and mitigate hazards associated with the work performed in the shop. The Shop Manager:

- must have demonstrated experience in the safe operation of the equipment in the shop;
- must be capable of determining whether other personnel are competent and qualified to operate specific pieces of equipment in the shop;
- determines who may use the equipment, and how and when they may do so;
- ensures that only qualified people operate the equipment;
- assists home and matrixed supervisors of shop users in enforcing safe use of tools.

Building Managers and Emergency Teams

Roles and responsibilities of Building Managers and Assistant Building Managers are contained in the **Building Management Policy and Procedures**. Building Managers complete EHS0156 Building Manager Orientation.

Roles and responsibilities for Building Emergency Team leaders and team members are contained in the **Site-wide Building Emergency Plan**. All BET personnel must receive training in: First Aid Safety (EHS 116), Fire Extinguisher Safety (EHS 530), and Building Emergency Team (EHS 154). It is recommended (but not required) that they

also receive training in: Adult CPR (EHS 123), Earthquake/Wildland Fire Safety (EHS 135), and Building Emergency Team Seminars (EHS 155).

Contractor Oversight

Program Heads 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) Section 6.2.3.4** and **PUB-3000, Chapter 1, Section 1.3.7.1**. In accordance with **PUB-3000, Chapter 10, Section 10.2.3**,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

The general safety responsibilities for matrixed personnel are described in **PUB-3000, Section 1.3.2.7**.

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.

All supervisors and work leaders (home and matrixed division) of persons using machine shops must work with the Shop Managers to enforce the safe use of machine tools.

In accordance with **Regulations and Procedures Manual, Section 7.01D**, 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 (MOU). 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.

AFRD's ALS Accelerator Physics Program

AFRD's Advanced Light Source (ALS) Accelerator Physics Program personnel are matrixed to ALS Division and are 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 is invited to ALS Division Safety Committee meetings, and the ALS Division Safety Manager is invited to AFRD ES&H Operations Committee meetings.

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. For example, no persons under the age of 18 may operate any shop machinery or other dangerous power tools unless the work is part of a State-approved apprenticeship program. 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 attendance at conferences and meetings, such as laboratory, shop, industrial, or fieldwork. 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.

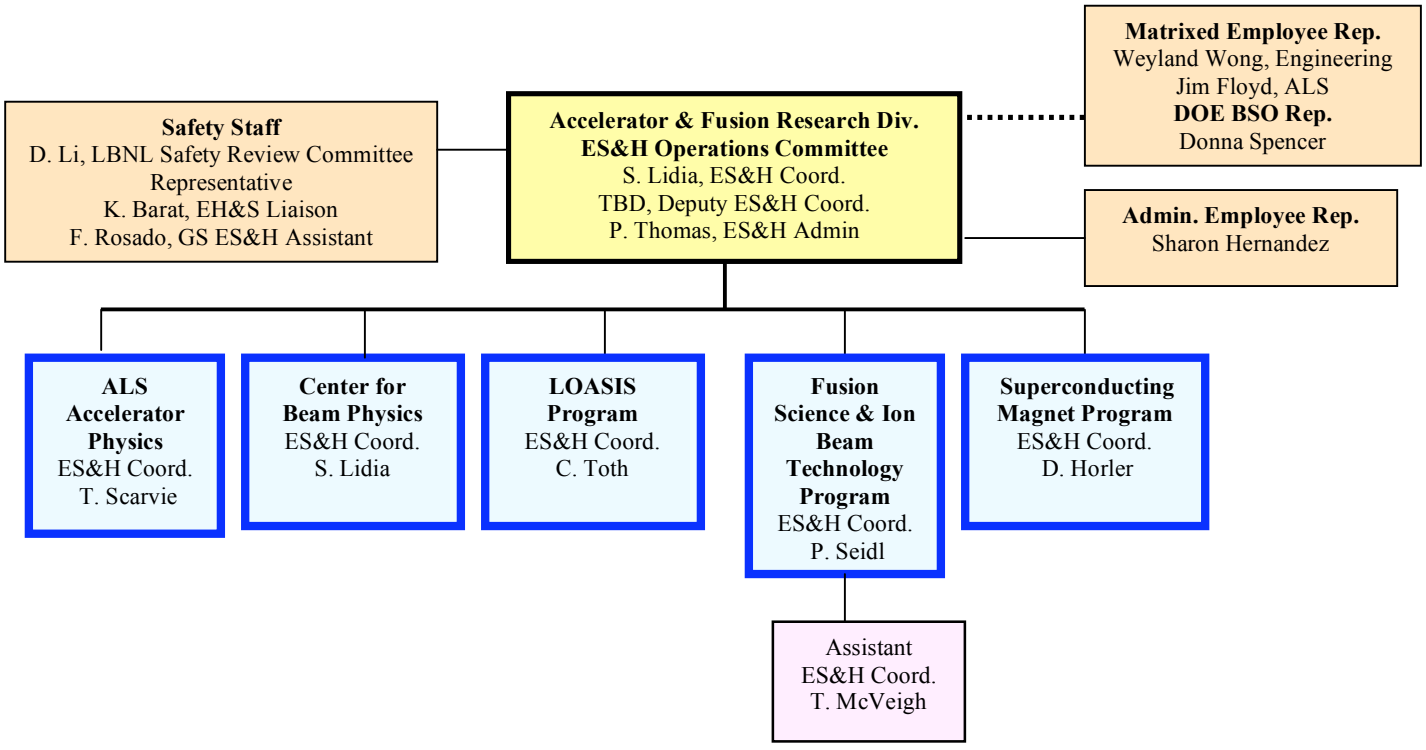
Heavy Ion Fusion Virtual National Laboratory

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 2.

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. **To maintain continuity of safety culture and knowledge, AFRD will rotate qualified people through a progression of term appointments from Program ES&H Coordinator to Deputy AFRD ES&H Coordinator and finally AFRD ES&H Coordinator.** The AFRD ES&H Operations Committee consists of the AFRD ES&H Coordinator, Deputy AFRD ES&H Coordinator, ES&H Administrator, and Program ES&H Coordinators. The EH&S Liaison, DOE BSO representative, 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.

Figure 1, AFRD ES&H Operations Committee



AFRD ES&H Coordinator The general safety responsibilities for a Division Safety Coordinator are described in **PUB-3000, Section 1.3.2.9**. 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 Subcommittee** 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 and other significant incidents 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, as described in **PUB-3000, Section 1.5**; 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 as described in **PUB-3000, Chapter 15**.

Deputy AFRD ES&H Coordinator One of the Program ES&H Coordinators is selected by the Division Director to serve as Deputy AFRD ES&H Coordinator for a term of one year. The Deputy backs up the AFRD ES&H Coordinator by performing duties as assigned; develops familiarity with division staff, work activities, and potential hazards; and completes training necessary to advance to the AFRD ES&H Coordinator position.

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 Subcommittee** 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 Division 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, and Satellite Accumulation Areas (SAAs);
- Acts as an **Ergonomics Advocate**, working the General Sciences ES&H Assistant and EH&S ergonomists to perform ergonomic evaluations and assist in resolution of action items;
- 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 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 Division and institutional 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, as described in **PUB-3000, Section 1.5**;
- 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, as described in **PUB-3000, Chapter 15**; 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.

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. Program ES&H Coordinators are expected to:

- Participate in **AFRD ES&H Operations Committee** activities;
- Inform the Committee of **planned activities** in their Program 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 ES&H performance, including JHQ/Training completion, CATS completion, and Supervisor Safety Plan implementation. **Communicate** relevant ES&H information to their Program Head, Principal Investigators, and other affected personnel.
- Work with their Program Head to **encourage improvement** in their Program's ES&H performance.

General Sciences ES&H Assistant The ES&H Assistant provides support to the Physics, Nuclear Sciences, and AFRD Safety Coordinators. For AFRD, the ES&H Assistant performs preventative **ergonomics evaluations** for personnel who are not currently experiencing discomfort, and also assists Chemical Owners in updating the **chemical inventory** on the Chemical Management System.

2. 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 ES&H Coordinators inform the Administrator of planned changes to work scope and associated hazards.

3. Operations and Work Authorization

Division, and Program 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. Work recognized as posing special hazards is planned and authorized as described in the LBNL **Integrated Safety Management Plan**, **PUB-3000, Chapter 6; Operating and Assurance Plan, Section 1.3**; and AFRD and Program procedures. 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.

Hazard Review

The hazards of new laboratory experiments and new fabrication or testing operations are analyzed in accordance with the AFRD Hazards, Equipment, and Authorizations Review form (see Appendix 3) to determine the work authorization(s) required.

Formal Authorizations

Work requiring a formal authorization, such as a Radiological Work Authorization, Sealed Source Authorization, or other ES&H permit or authorization will not be performed until the required authorization is obtained as described in **PUB-3000, Chapter 6**. The work must be performed in accordance with the authorization.

AFRD may draw upon the expertise of AFRD or matrixed personnel to strengthen our internal AHD review process. With the approval of their Program Head, the ES&H Coordinator may request that one or more staff or senior scientists and/or senior mechanical or electrical technicians external to the process being reviewed, but with appropriate experience in working with similar processes and hazards, serve as peer reviewers for an AHD. For new AHDs or major modifications, the ES&H Coordinator will lead the review, and may choose peer reviewers to assist. For renewals and minor modifications, the ES&H Coordinator will select 1-3 peer reviewers and may delegate leadership of the review to one of them. The peer reviewers will read the draft AHD, attend an on-site review arranged between the Principal Investigator and the ES&H Coordinator, and report their recommendations to the ES&H Coordinator. The ES&H Coordinator may electronically sign the AHD or elect to bring further issues to the attention of the Principal Investigator, and EH&S AHD Review Leader for resolution before the AHD is recommended for approval by the Division Director.

Line Management Authorizations

If the work poses significant hazards but 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 (see Appendix 3). The AFRD ES&H Coordinator will determine when a Line Management Authorization is required.

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 for m to approve start-up of the work.

General Duties

Routine 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 as required in the HEAR database.

Job Hazards Analysis

AFRD supervisors will implement the Job Hazards Analysis requirements described by **PUB 3000, Chapter 32** and any further institutional guidance following the pilot test, which will conclude on September 30, 2007. An **Individual Baseline JHA** will be developed for each worker, authorizing regular and routine work. In addition, every worker will have one or more current **Task-based JHA(s)** to authorize unpredictable, short-term, or unusual work that is not included in the Individual Baseline JHA. The JHAs must include all work that is more hazardous than that commonly performed by the general public, the control of which requires little or no guidance or training to perform the work safely. Each worker must complete his/her Individual Baseline JHA within 30 days of initial appointment to LBNL, and review/update Individual Baseline and Task-based JHAs at least annually from the date of authorization, and as the job changes significantly. If a worker does not have a JHA authorizing the work, he/she may perform work that has been analyzed for someone else, provided that he/she is supervised by that person, and that person has been authorized to perform the described work, and both adhere to the controls specified for that work.

4. 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, or Program Head 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 or Program Head 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.

5. Training

Each AFRD supervisor is responsible for ensuring that all assigned employees, students, visitors, and guests whose anticipated assignment with AFRD exceeds 30 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 30 days, particularly anyone doing laboratory or shop work. Personnel who have not completed all pertinent EH&S training requirements before performing work involving exposure to a hazard, may work for up to 90 calendar days if (1) the training is not required to be completed in advance by regulation or work authorization conditions, and (2) the work is authorized by the responsible Line Manager and performed in accordance to the requirements the Line Manager specifies, which typically include supervision and on-the-job training. 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 JHQ, 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 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 designated by the work authorization is responsible for ensuring that authorized personnel receive on-the-job training and sufficient supervision until they have completed required training.

6. 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.

7. 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
0.2 FTE Deputy 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 of the Safety Review Committee, and 1 day 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:
$\geq$ 4 hr/Program /month Program ES&H Coordinator duties
$\leq$ 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.

8. Validation, Feedback, and Improvement

AFRD has several integrated methods of assessing, validating, and improving the effectiveness of implementation of this Plan. AFRD Self-Assessment is an on-going, year-round process that includes:

- An annual **QUEST** self-assessment process involving all levels of AFRD personnel, described in detail in the **QUEST Program Guide**. The purpose of QUEST is to raise awareness of workplace safety hazards and encourage work group involvement in recognizing, reporting, and resolving issues.
- **Supervisor Safety Walkthroughs** and on-going communication and resolution of concerns by AFRD Line Management in accordance with their Supervisor Safety Plans. The purpose of a supervisor safety walkthroughs is to observe work, inspect the workplace, and talk with workers and support staff about the safe performance of work. The focus is on building teamwork, mutual understanding, and respect between leaders and those performing work. The communications element of the Supervisor Safety Plans builds on the QUEST efforts by providing opportunities for ongoing work group involvement.
- **Quarterly walkthroughs** by the AFRD ES&H Administrator, EH&S Liaison, and Program ES&H Coordinators. These walkthroughs focus on verification of CATS status and identification of additional deficiencies, while also providing opportunities for on-the-job coaching in compliance requirements and best practices.

Walkthrough and QUEST action items are entered by the finder and tracked to completion on the CATS database. Line Managers report their Supervisor Safety Plan activities quarterly to the AFRD ES&H Administrator. Action item completion status, trends, and root causes are summarized in the AFRD Self-Assessment Report. 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 5.

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 date signed
Accelerator and Fusion Research Division

EH&S Resource Commitment:

_____ _____
Howard Hatayama, Director date signed
Environment, Safety & Health Division

Accepted:

_____ _____
Steven Chu, Director date signed
E. O. Lawrence Berkeley National Laboratory

Appendix 1. Supervisor Safety Plan

AFRD SUPERVISOR SAFETY PLAN

Prepared by:_____ Accepted by:_____

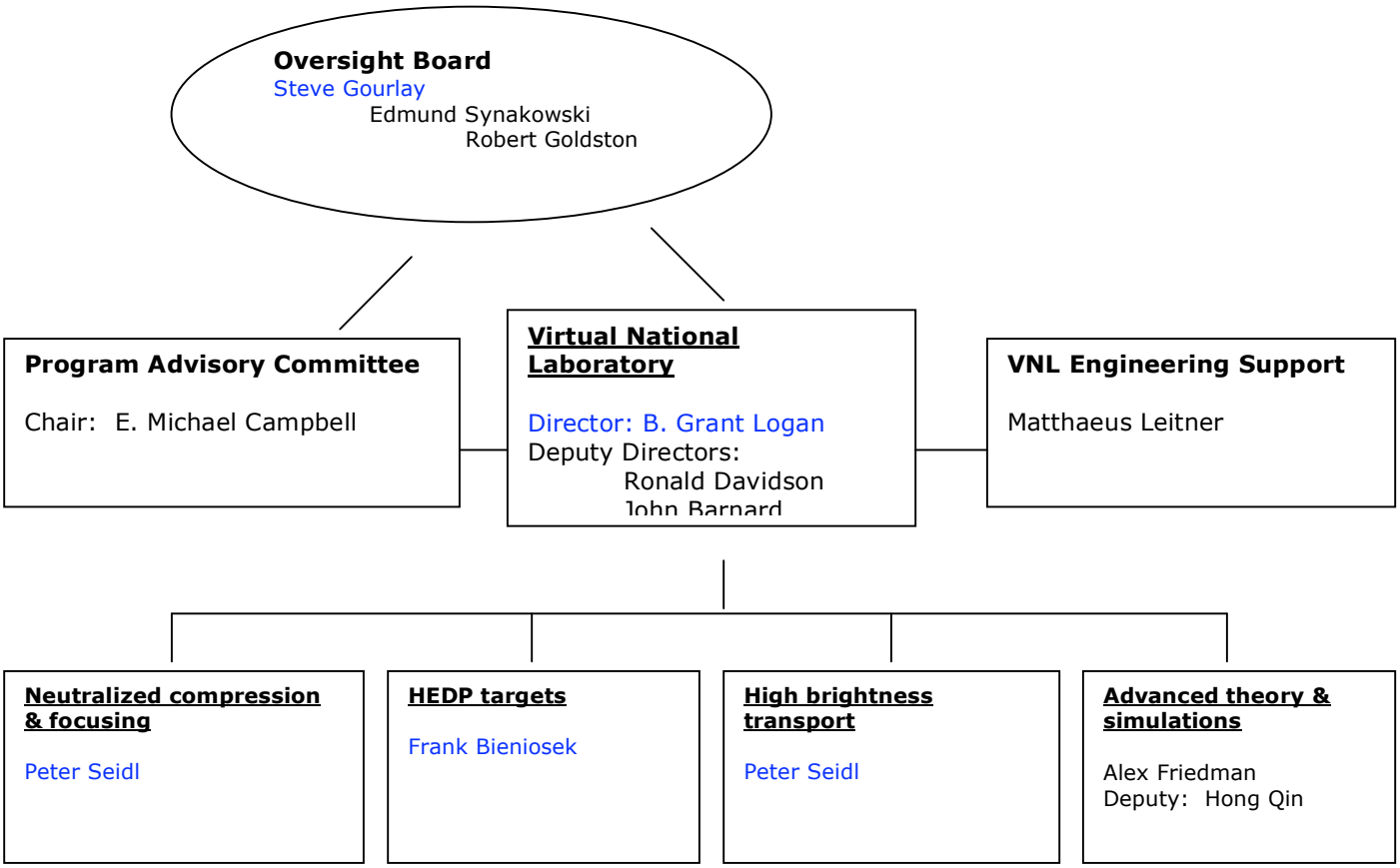
Supervisor name /date Program Head name/date

SELF-ASSESSMENT *Describe how you personally assess the safety of your group's workplace conditions and activities, including walkthroughs of spaces and observation of activities. [AFRD expectation: supervisor walkthrough at least quarterly]*

COMMUNICATIONS *Describe how you (1) communicate safety information to your group and (2) receive and address safety concerns from your 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.]*

APPENDIX 2. 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.

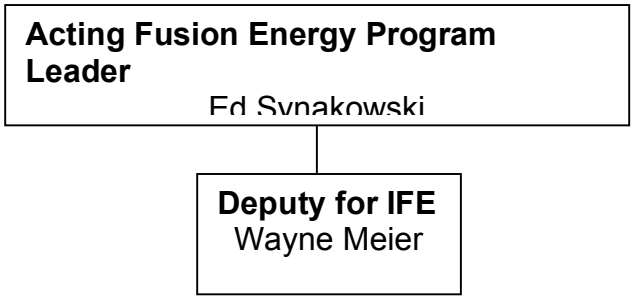
As part of this coordinated research effort, many VNL staff members spend a fraction of their time at the three laboratories, and use the facilities of the three laboratories at least occasionally. The general principle to be followed by HIF VNL staff in all activities is to follow the operational procedures 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) 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.***

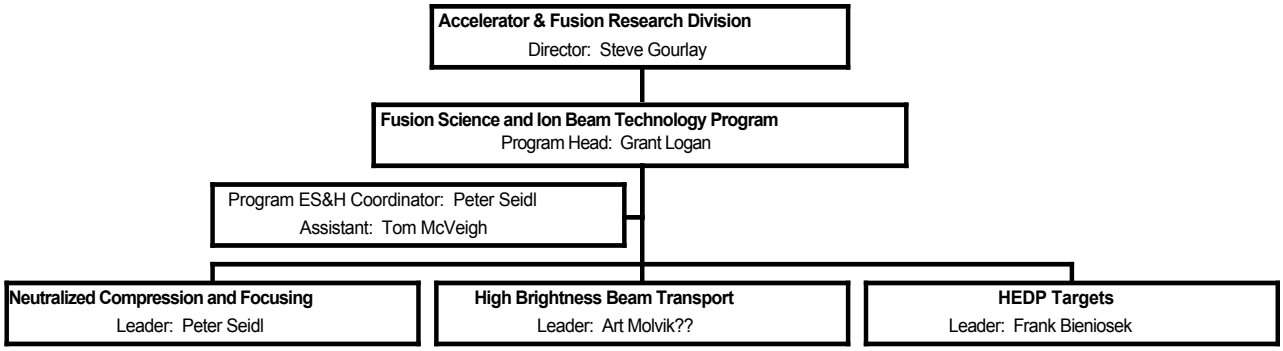
Figure B. LLNL HIF Organization



Work at LBNL

The Fusion Science and Ion Beam Technology Program Head is responsible for the safety of VNL work at LBNL. The Fusion Science and Ion Beam Technology 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. PUB-3000, Section 1.3.2 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.

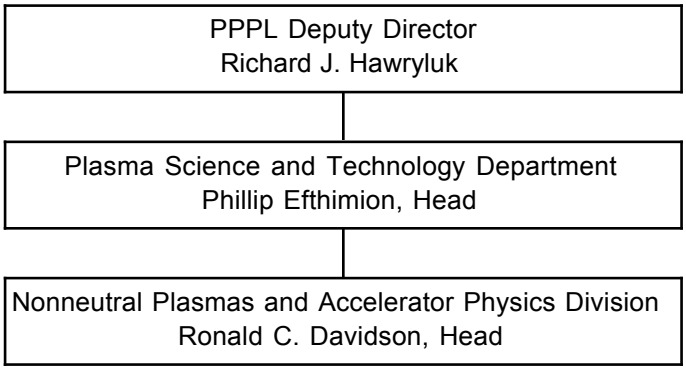
Figure C. LBNL HIF Organization



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) 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 3

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:
☐ Formal authorizations as listed below. I will obtain the required authorizations prior to beginning this work.
☐ Line Management authorization.
☐ No additional authorization. I have assigned people to do this work who have training and qualifications to do this work safely.
***Responsible Person (signature):** **Date:**

4. Hazard Information

Hazard	Hazard Present	Formal Authorization Needed	Trigger Level for Formal Authorization	Comments
Biohazards – pathogenic/opportunistic organisms, recombinant DNA, cell cultures, human blood or body fluids	☐	☐	*Registration, authorization* by the Institutional Biosafety Committee (IBC) required for all amounts	
Chemicals – office, cleaning, etc.	☐	n/a		
Chemicals – toxic, carcinogenic, reproductive toxin, sensitizer, corrosive	☐	☐	*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	☐	☐		
Compressed Gas – inert, non-hazardous			*Engineering Safety Note* and/or *Activity Hazard Document* required for: • Any pressure system with >75,000 lb-feet stored energy (not including cylinders); • Flammable >2 full size cylinders per room; • any pyrophoric, reactive or health hazard gases; or • any potential oxygen deficiency	
Compressed Gas – flammable, oxidizer				
Compressed Gas – pyrophoric, reactive, health hazard				
Cryogenics Usage	☐	☐	*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	☐	n/a		

Hazard	Hazard Present	Formal Authorization Needed	Trigger Level for Formal Authorization	Comments
Confined Space	☐	☐	*Confined Space Permit* 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	☐	☐	Depends upon specific permit; contact EH&S	
Ergonomic issues – lab/industrial	☐	n/a		
Hazardous Material Storage *> 55 gal*	☐	n/a		
Lasers	☐	☐	*Activity Hazard Document* required for Class 3b or 4	
Lead (shielding)	☐	☐	[depends upon why shielding is in place - see radioactive materials, below]	
Machine Tools	☐	n/a		
Non-Ionizing Radiation -- RF	☐	n/a		
Non-Ionizing Radiation -- Microwaves		n/a		
Non-Ionizing Radiation -- Magnetic Fields		n/a		
PCB-containing items > 500 ppm > 3 lbs.	☐	n/a		

Hazard	Hazard Present	Formal Authorization Needed	Trigger Level for Formal Authorization	Comments
Pressure (>150 psi or large volume)	☐	☐	*Engineering Safety Note* and *Activity Hazard Document* required for • Non-commercial or modified pressure vessel; • Stored energy greater than 75,000 ft-lb (not including gas cylinders); • Pressure >150 psig (gas) or 1500 psig (liquid); • Radioactive Contents	
Radiation – Ionizing Accelerator	☐	☐	*Activity Hazard Document* and *Radiological Work Authorization* required for all; *Safety Analysis Document* and *Accelerator Readiness Review* required if the accelerator creates a radiological area.	
Radiation – Ionizing Isotope	☐	☐	*Radiological Work Authorization* or *Radiological Work Permit* required for any amount	
Radiation – Ionizing Sealed Source	☐	☐	*Sealed Source Authorization* required for all amounts	
Radiation – Ionizing X-ray	☐	☐	*X-ray Authorization* required for X-ray machine	
Soldering	☐	n/a		
Silver Soldering	☐	n/a		
Thermal - e.g., oven, furnace, heat tape	☐	n/a		
Waste – hazardous, mixed or radioactive	☐	☐	*Satellite Accumulation Area* required for <55 gallons; *Waste Accumulation Area* required for >55 gallons	

Welding	□	□	*Burn Permit* (Fire Department0 required for open flame or arc	
Other Hazards	□	□	Depends upon other hazard; contact EH&S	

5. *Equipment Information*

Equipment	Check If Present	*Equipment Comments*
Autoclave	☐	
Biosafety Cabinet	☐	
Clean Room	☐	
Crane, Hoist	☐	
Eyewash / Safety Shower	☐	
Flammables Cabinet/Refrig.	☐	
Fume Hood	☐	
Glove Box	☐	
Local Exhaust System	☐	
Monitoring / Alarm System	☐	
Photoprocessing Equipment	☐	
Sonicator	☐	
Ultracentrifuge	☐	
Other		

6. *Environmental Performance*

Environmental Performance	Comments
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:_____

_____

____Authorized to Start Up _____

AFRD Line Manager sign/date

APPENDIX 4
Estimated EHS Support of AFRD From the EH&S Division

Function	FTE
Division Liaison Function	
Liaison -- AHD Reviews	.05
Liaison -- Inspections (IFA, SA, etc.)	.10
Liaison -- Consultations, meetings, etc.	.05
	.20
Other EH&S Support	
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	.02
	.27
Total	**.47**

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

APPENDIX 5. AFRD PY 2007 Self-Assessment Performance Measures

1. Define Work

Lab Expectations (for annual SA Report)	**AFRD Actions** (to implement expectations)	**Evidence** (for OCA validation)
E1. Revise Division ISM plan to reflect a) ES&H policy changes, and b) updates to the Institutional ISM plan. Line management communicates updates to the plan to division personnel.	E1.1 AFRD ES&H Coordinator and Administrator revise ISM Plan to reflect relevant changes to PUB-3000, as described in the "Guidance for Performing FY07 ES&H Division Self-Assessment. Attachment 1"and changes to division policy. E.1.2 Division Director sends annual safety memo to all Division employees and discusses ISM Plan changes at all-hands meeting. E1.3 ISM Plan changes are discussed at an AFRD ES&H Operations Committee meeting. E1.4 Updated AFRD ISM Plan is posted on AFRD website.	E1.1 Copy of signed and dated ISM Plan maintained in Division Office. E1.2 Copy of safety memo maintained in Division Office. E1.2 Copy of all-hands safety meeting agendas and attendance sheet maintained in Division office. E1.3 Operations Committee meeting minutes posted on AFRD website E1.4. ISM Plan posted on AFRD website

2. Identify Hazards

Lab Expectations (for annual SA Report)	**AFRD Actions** (to implement expectations)	**Evidence** (for OCA validation)
E2. Workspaces (including outside workspaces) are inspected/observed and evaluated on a regular basis.	E2.1 Division ES&H Administrator walks through all AFRD workspaces at least annually. AFRD ES&H Administrator enters deficiencies into CATS. E2.2 AFRD Supervisors prepare and implement a Supervisor Safety Plan, which describes their commitment to assessing workplace safety. Supervisors enter deficiencies in CATS E2.3 AFRD personnel participate in QUEST assessments as described in the QUEST Program Guide. Program ES&H Coordinators ensure deficiencies are entered into CATS.	E2.1 Walkthrough records maintained in Division Office. E2.2 Quarterly reports of Supervisor Safety Plan implementation maintained in Division Office. E2.3 QUEST Program Guide on AFRD website. QUEST assessment records maintained in Program offices. E2.1-3 CATS entries

E3. Divisions review work activities to identify, analyze, and categorize hazards and environmental impacts for the associated work. Examples of hazard inventory include: • HEAR database (or equivalent) • Project safety review • Workspace safety review • Job Hazard or Safety Analyses (JHA/JSA) • Environmental review (NEPA/CEQA) • Chemical inventory	E3.1 Principal Investigators or designated project participants complete formal authorizations for new work activities and modifications which add new hazards or increase the level of hazards above the thresholds indicated by the AFRD HEAR review form. E3.2 For all work requiring formal authorizations, required review and approvals will be obtained before start-up. The Division will review formal authorizations for active work annually or when changes in hazards or controls are anticipated. E3.3 Work that does not require formal work authorization but present hazards beyond routine are authorized by the AFRD Line Manager having responsibility for the work using the AFRD Line Management Authorization form. E3.4 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. E3.5 Routine work not requiring formal authorization or Line Management Authorization 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. E3.6 AFRD supervisors will implement the Job Hazard or Safety Analyses requirements as described by PUB 3000, Chapter 32 and further institutional guidance following the pilot test. E3.7 Designated Chemical Owners complete required	E3.1 and 3.2 Current AHDs are maintained on the AHD database and posted at the work area for all projects requiring AHDs. 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. E3.3 and 3.4 Line Management Authorization and Clean-up Plan records are maintained by the responsible Line Managers and available at the work locations. E3.5 Hazards inventory information is maintained on the HEAR database. Training profiles are maintained on the EH&S Training database. E3.6 Job Hazard or Safety Analyses will be maintained in accordance with LBNL requirements. E3.7 Training Group records in EH&S Training database and chemical inventory records in Chemical Management System database.

	training and maintain the chemical inventory for their area in the Chemical Management database.	
E4. Divisions review the environmental impact of their activities and participate in pollution prevention, energy conservation, recycling, and waste minimization programs.	E4. Supervisors complete at least 1 walkthrough of their work areas using the AFRD environmental checklist.	E4. Walkthrough reports and records maintained by supervisors.

3. Control Hazards

Lab Expectations (for annual SA Report)	**AFRD Actions** (to implement expectations)	**Evidence** (for OCA validation)
E5. Divisions ensure administrative controls are in place and maintained. Examples of administrative controls include: • Formal authorizations • Work procedures • Project safety reviews • Responsibilities for matrixed employees	E5.1 Line Management ensures administrative controls are in place and maintained. See also E3.	E5 Documentation of administrative controls maintained at applicable work sites. See also E3.
E6. Divisions ensure that ergonomic hazards (computer, laboratory, and material handling) are adequately controlled and that employees and line management are knowledgeable and engaged in this process, including the early reporting of ergonomic pain or discomfort (before an injury): Ergonomic issues/concerns/discomfort/ pain are reported promptly for immediate corrective action	E6.1 Workstation evaluations are required for new and relocated employees who work on computers >4 hours/day. E6.2 Line managers request ergonomic evaluations for personnel with ergonomic concerns. E6.3 Ergonomics evaluators ensure evaluations are performed within required time limits. E6.4 Line managers provide funding for ergonomic equipment identified in ergonomic evaluations and ensure corrective actions are completed and maintained. E6.5 Personnel complete ergonomics courses as required.	E6.1-6.4 Records of ergonomic evaluations maintained on EH&S ergonomics and training databases. E6.5 Ergonomics training records maintained on EH&S Training database.

4. Perform Work

Lab Expectations (for annual SA Report)	**AFRD Actions** (to implement expectations)	**Evidence** (for OCA validation)
E7. Work is performed within the ES&H conditions and requirements specified by Lab policies and procedures.	E7.1 Principal Investigators/Activity Supervisors ensure continuous compliance with the work scope and hazard controls specified in work authorizations. E7.2 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. E7.3 Supervisors identify hazards and take actions necessary to reduce the rate of accidents and occurrences. All personnel report accidents and occurrences as required by PUB-3000.	E7.1 Reports of noncompliance. E7.2 % compliance for SAAs determined by EH&S inspection; %QA waste samples and number of NCARs reported by EH&S waste management. E7.3 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. .
E8. Staff is properly trained.	E8.1 Division ES&H Administrator sends monthly JHQ and training status reports and training schedules to Program Safety Coordinators and Program Heads, who take action to encourage JHQ and training completion. E8.2 Supervisors review JHQs, Training Profiles and training records with employees at least annually during Performance Review period and when duties change significantly. E8.3 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	E8.1 and 8.2 JHQs, Training profiles and training completion rates maintained in EH&S training database. E8.3 Training records maintained on AHD database. Records of on-the-job training maintained by PI or Activity Supervisor.

	required by authorizations and maintain records of training.	
E9. Division ensures that student safety issues are effectively addressed.	E9.1 Student safety issues described in ISM Plan. E9.2 Students complete JHQs with the assistance of their mentors, and complete required training. E9.3 Mentors of students complete EHS024 ES&H for Mentors and Supervisors, or EHS026 ES&H for Supervisors, Managers, and PIs, per requirements of JHQ.	E9.1 AFRD ISM Plan posted on website E9.2-9.3 JHQ and training records maintained in EH&S Training database.

5. Feedback and Improvement

Lab Expectations (for annual SA Report)	**AFRD Actions** (to implement expectations)	**Evidence** (for OCA validation)
E10. ES&H deficiencies that cannot be resolved upon discovery are entered and tracked in CATS to resolution.	E10.1 Persons performing walkthroughs, inspections, or incident investigations ensure unresolved action items are entered into CATS. E10.2 Assigned Responsible Persons ensure CATS are closed in a timely manner. E10.3 AFRD ES&H Administrator checks open CATS items during quarterly walkthroughs, sends monthly status reports on open CATS to Program Heads and Program Safety Coordinators, who take action to encourage Responsible Persons to complete action items.	E10.1-10.3 CATS database records.
E11. Division employees report injuries and the division performs a thorough review of all staff injuries and accidents, including analysis of conditions that led to injury. Corrective actions to prevent recurrence are identified and effectively implemented.	E11.1 Supervisors ensure accident causes and corrective actions are effectively identified on SAARs. E11.2 Corrective actions identified on SAARs are implemented.	E11.1 SAARs maintained in EH&S database. E18.2 Completion status of SAARs-related CATS or ergonomics evaluation recommendations.