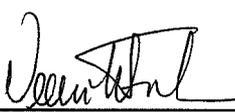
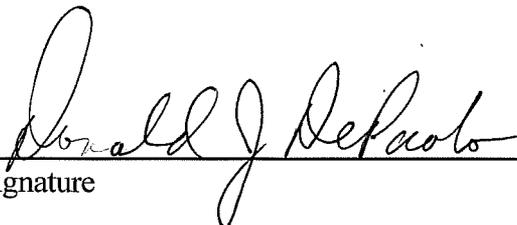


EARTH SCIENCES DIVISION

EH&S SELF-ASSESSMENT REPORT

JULY 1, 2007 – SEPTEMBER 30, 2008

Prepared By:	V. Fissekidou		12/4/08
	Name	Signature	Date
Approved By:	D. J. DePaolo		12/4/08
	Name	Signature	Date

Introduction

LBNL's Environment, Safety and Health (ES&H) Self-assessment Program provides the mechanism for assuring that Integrated Safety Management (ISM) is fully implemented and effective at all levels of Laboratory activities and operations. The process is designed to ensure that work at LBNL is conducted safely and with minimal adverse effects to employees, participating guests, and subcontractors, the public, and the environment. The Earth Sciences Division (ESD) ES&H Self-assessment Program is a formal, internal process used to evaluate the ESD ES&H programs, policies, and processes.

ESD performs fundamental and applied geosciences research related to subsurface energy resources, nuclear waste disposal, environmental restoration and ecology, and climate change. ESD maintains experimental (laboratory and field) and computational core-capabilities in hydrology, atmospheric and ocean sciences, petroleum and geothermal reservoir engineering, seismic and electromagnetic geophysics, isotope geochemistry, environmental microbiology and rock and soil physics.

Each ESD staff member belongs to a Department (Climate Science, Ecology, Geochemistry, Geophysics, and Hydrogeology) aligned with their professional expertise, which also serves as their administrative home. Department Heads are responsible for safety, staffing, promotions, performance evaluations, and training matters.

Research in ESD is conducted within six Programs (Climate and Carbon Sciences, Geologic Carbon Sequestration, Environmental Remediation and Water Resources, Energy Resources, Fundamental and Exploratory Research, and Nuclear Energy and Waste), which are aligned to the major DOE funding sources. Each Program is led by a Program Head. The ESD staff are assigned to work on one or more projects in these six Programs. Projects are led by one or more Principal Investigators (PIs), who typically develop the research proposal and obtain the funding contract. Employees typically work on more than one project during a fiscal year, and as a consequence often work under the direction of more than one PI.

A new ESD director was appointed in October 2007; the ESD director was the head of the ESD Isotope Geochemistry Center and he is a professor at UCB. The ESD ES&H activities have been strengthened by his commitment to safety and health through continuous communication of the requirements to senior ESD Management and walkthrough inspections. In fully supporting the ESD ES&H programs he appointed a new safety coordinator at a much higher support level (0.75 FTE).

The safety coordinator has been the Quality Assurance lead for the Nuclear Waste Program's Yucca Mountain and Office of Science and Technology Projects. The safety coordinator was trained as an auditor by the DOE Office of Quality Assurance and has over 12 year experience in QA implementation.

The ESD Organization Chart can be found at http://esd.lbl.gov/esd_organization.html. The Division Director, Department Heads, and Supervisors (which includes Program Heads, and PIs) are part of the formal line management chain, and they have the responsibility for adherence to all LBNL safety and health policies and safe work practices. Labspace Lead PIs (LLPIs) are assigned by the Department Heads and they are responsible for communicating and implementing safety regulations and resolution of all safety issues within the laboratory space. The Work leads are assigned by the line management to

assure that day-to-day work, operations, and activities in their assigned area(s) and activities are conducted safely and within established work authorizations.

I. FY07 ES&H ESD Self-assessment Effectiveness Review Results

Following the FY07 ES&H ESD Self-assessment, the LBNL Office of Contract Assurance (OCA) performed an effectiveness review of the process. The effectiveness review identified opportunities for improving the ES&H Division Self-assessment process and noteworthy practices. In order to broadly disseminate the OCA effectiveness review, the opportunities for improvement and noteworthy practices, the ESD safety coordinator presented the results of the ESD Self-assessment validation report in the safety committee meeting, and in an ESD all hands Town Hall meeting in March 2008.

A. DOE Reviews and Audits, Safety Inspections, Walkthrough, Self-assessment

As one of the LBNL scientific divisions, ESD participated in a number of DOE audits conducted at LBNL in FY08. A summary of these audits and their findings is presented below:

- (i) The Center of Disease Controls (CDC) periodic regulatory Facility Inspection prior to renewal of LBNL's Certificate of Registration under the select regulations (CDC 42CFR73 and USDA 9CFR121) was conducted on 1/19/08. No deficiencies were identified during this inspection and the CDC Inspectors reported that the select agent operation had good safety/security controls;
- (ii) The DOE Biological Safety Assessment took place on 3/10/08-3/12/08. A ESD issue related to lack of clearly labeling all instruments used for BL2 activities was identified and addressed as a institutional finding (CATS 5872-4);
- (iii) The DOE Radiological Facilities Inspection was conducted on 4/23/08-4/25/08, no issues specific to ESD facilities were identified;
- (iv) The DOE Office of Health Safety and Security (HSS) Review of Work Practices for Nanoscale Material Activities was conducted on 6/16/08-6/20/08. Two issues were identified (a) posting of the areas where nano-work is conducted and (b) clearly labeling all nano-material. These were included in the institutional findings (CATS 6195-5 and CATS 6195-7 respectively); and
- (v) The DOE BSO Verification and Validation (V&V) Effectiveness Review of selected LBNL corrective actions identified in the 2006 McCallum-Turner review was conducted on 9/29/08-10/9/08, this review found that ESD effectively completed the corrective actions and effectively implements the ESD ISM. The auditors also identified a noteworthy practice, the ESD inspection log of the labs, which is used to document the monthly LLPI walkthrough.

Any corrective actions related to these audits were promptly addressed as indicated in the CATS database.

Management of Environment, Safety and Health (MESH) Review

In August 2008, the LBNL Safety Review Committee (SRC) conducted a MESH review of ESD. The MESH review is a peer review that provides a perspective from the research and operations community on the state of ES&H in the assessed Division. The objective of the MESH Review is to evaluate the Division's management of environment, safety, and health in its operations and/or research, focusing on the implementation and effectiveness of the ESD Integrated Safety Management (ISM) Plan. The MESH Team included 3 SRC members. The MESH Team walked through ESD lab and office spaces and conducted interviews with ESD management and staff. The ESD safety coordinator provided documentation of ESD practices, incident reports and objective evidence of walkthroughs (i.e., completed checklists). It should be noted that the format of the MESH review was changed in FY08. ESD was not requested to provide any formal documentation of its ES&H practices; the team was provided the ESD ISM, FY07 ES&H ESD Self-assessment, and the OCA effectiveness review. The incident reports and everyday ESD ISM implementation processes were provided by the ESD safety coordinator. The MESH team lead was experienced in this process and knew what information he needed to evaluate the divisional practices and get a good perspective of the ISM implementation. The final MESH report has not yet been provided to ESD.

ESD Director's Walkthrough's

ESD implemented the walkthrough schedule as described in ESD ISM Rev7. The Division Director conducted his walkthrough in March-April 2008. The ESD ISM requires that the Division Director and/or Deputy Director inspect all ESD space (labs, shops and offices) at least once per year. The walkthrough results were reported to the department heads who were responsible for follow-up. The safety coordinator, ESH liaison and a DOE BSO representative participated in the walkthrough. Each employee was required to complete the ESH supervisors' checklist (<http://www.lbl.gov/ehs/safety/assets/docs/SafetyWalkaroundChecklist.pdf>) which was collected by the safety coordinator. Any issues identified were reviewed and entered in the CATS or completed with work requests.

In providing feedback, the DOE BSO representative documented his observations of the walkthrough on 3/28/08, as follows:

“The walk thorough was attended by Rob Connelly, Don DePaolo, Vivi Fissekidou, Ernie Majer, and Maryann Villavert from LBNL. This was one of the annual division director (Don) and deputy division director (Ernie) safety walkthroughs of building 90 office spaces to observe work, inspect the workplace, and talk with workers and support staff about the safe performance of work. Ergonomic issues, housekeeping and earthquake safety were discussed with the employees and the employees were given the opportunity to discuss any other safety concerns they had. Management did show an interest in employee safety during the walk through. I noted no deficiencies.” (Walkthrough #WALK-AKQ-3/28/2008-33876)

A second ESD director walkthrough was conducted, as requested by the LBNL management, in June 2008. The ESD Director, the department heads, safety coordinator, ESH liaison and a DOE BSO representative participated in the walkthrough. Each employee was required to complete the ESH supervisors' checklist which was collected by the safety coordinator. Any issues identified were reviewed and entered in the CATS or completed with work requests.

ESD has effectively implemented the ESD director's walkthrough requirement as required in the ESD ISM plan.

ESD Department Heads' Walkthroughs

A department heads' walkthrough was conducted throughout all ESD lab, shop and office space in January 2008. The safety coordinator, ESH liaison and a DOE BSO representative participated in the walkthrough. Each employee was required to complete the ESD checklist (http://www-esd.lbl.gov/ESDEHS/ESD_inspection_checklist_rev03.pdf) which was collected by the department head. The findings that required work orders were tracked and completed by the safety coordinator and business manager. Findings that required institutional attention were entered into CATS (5170- PA in 1108 does not work; 5177-improve ESD training; 5242-Backup generator failure in 70; 5271-Trauma kits with expired items; 5275-Saws not anchored/carts on wheels;)

The DOE BSO representative reported his observations from the Geochemistry department head's walkthrough on 2/7/08, as follows:

“Attended by Vivi Fissekidou, Mark Conrad, Rob Connelly and in most cases the occupant of the space being reviewed. We walked though 20 spaces and only a few minor concerns were identified. This was a management walk through to evaluate the overall safety of the facilities including ergonomics, earthquake safety, housekeeping, PPE, chemical storage and SAA compliance. Each occupant had completed a safety checklist to evaluate the safety of their spaces. In addition to the items on the checklist the lab also verified that the occupants did not have any ergo issues or other safety concerns.” (Walkthrough # WALK-AKQ-2/6/2008-31359)

During the Hydrogeology department head's walkthrough, one of the ESD Staff was nominated for a spot award for his effort to maintain his lab and meet all safety requirements. In conclusion, ESD has effectively implemented the ESD director's walkthrough requirement as required in the ESD ISM plan.

Lab-space Lead PI (LLPI) conducts a monthly inspection of the Labs and Shops

The ESD ISM requires that each LLPI conducts a monthly inspection of the lab space and documents it on the “ESD Inspection log” (available on the ESD ES&H page). The LLPIs are assigned by the Department Head and they are responsible for resolution of all safety issues within the laboratory space. The LLPIs roles and responsibilities are discussed in the ESD ISM. It should be noted that the DOE BSO V&V Effectiveness Review on 9/29/08-10/9/08, identified the monthly inspection of the lab space and the ESD Inspection log as a noteworthy practice.

In preparing for the annual self assessment, the safety coordinator visited a number of ESD labs to verify consistency of this requirement and evaluate the documentation. It was noted that not all LLPIs were consistently documenting the monthly lab walkthroughs. The results were discussed in the safety committee meeting and also presented in the October 2008 ESD all hands Town Hall meeting. The Department Heads will evaluate timely completion of the “ESD Inspection Log” during the department heads' walkthroughs.

In conclusion, ESD has effectively implemented the LLPI monthly inspection of their lab as required in the ESD ISM plan. An opportunity of improvement, fully documenting this activity, was identified and was communicated to the ESD LLPIs.

B. FY07 Self-assessment ESD safety program improvements and goals

ESD has had a strong ES&H program as identified during the DOE reviews and audits, safety inspections, walkthroughs, and the FY07 Self-assessment. The FY07 Self-assessment results were communicated to the staff by (a) providing a copy of the report to the ESD senior management (ESD Council) and safety committee members, (b) posting the report on the ESD ES&H website, and (c) presenting the findings in an all hands Town Hall meeting (March 2008). Additionally, consistent application of the requirements by all ESD participants will enhance and streamline the ISM documentation. The Job Hazard Analysis (JHA) and Training completion within the first 30 days of employment is now required (ESD ISM REV8) for all ESD staff and guests. Also in a continuous effort to ensure that new staff know the ISM requirements, the ESD safety coordinator will meet with all new ESD staff and guests to discuss the ESD ISM (ESD ISM REV8) and introduce the divisional practices. This has increased the ESD staff awareness and could also assist in preventing recurrence of adverse events and conditions.

FY07 Self-assessment findings

“ESD needs to improve its training completion rates. More involvement by supervisors is needed to ensure their staff is trained, with special attention to guests. Training needs to be an explicit performance criterion.”

This finding was entered into CATS (5138) for tracking and the ESD supervisors discussed training completion with the ESD staff during their mid-year performance evaluations. Safety Walkthrough training (EHS27) was scheduled specifically for ESD management, Lead Lab Space PIs and others, on 10/16/07. Additionally, the ESD director notified all ESD staff that training completion is a requirement for safely working in ESD office and lab areas. He reiterated the same message at the all hands Town Hall meetings (June 2008; October 2008). The ESD safety coordinator made it her priority to ensure that staff and guests completed all required training by (a) preparing a safety quarterly report for the ESD management that included incomplete JHQ/JHA and training for all staff and guests; (b) periodically providing a list of incomplete required training to all supervisors; and (c) contacting the employees directly and providing the links for online training and/or course schedules. Continuous education of the supervisors on the importance of training completion and the commitment of the ESD management shall ensure that the employees are completing their training in a timely fashion.

The JHA implementation has also helped supervisors understand and evaluate the employees' task hazards and training requirements. Even though the number of additional training courses required by the JHA implementation has increased, the FY08 ESD statistics improved significantly, i.e., on 9/27/07 the JHQ completion was 87% of ESD staff and guests and training completion was 86% (ESD ES&H report, dated 9/27/07), while on 9/30/08 the JHA completion of ESD staff and guests was 97% and training completion of 93% (ESD ES&H report, dated 10/03/08).

FY07 Self-assessment ESD Process Improvements:

- Revise ESD's ISM plan to address JHA; consistency with LBNL ISM; listing hazardous equipment
The ESD ISM (http://esd.lbl.gov/ESDEHS/safety_plan/ESD_ISM_PlanR8_signed.pdf) was revised in October 2008 to address JHA, the PUB 3000 changes, to include a list of the

controlled ESD safety documents, and be consistent with the LBNL ISM. The ESD ISM REV.8 was reviewed by the ES&H division. The ESD ISM will be revised the address the ES&H division comments.

Hazardous equipment, lab and field work equipment that are hazardous, but are not automatically identified by formal work authorization or procurement policies, and have specific requirements, including safety features, operator training and maintenance records, are discussed on the ESD ES&H web site (http://esd.lbl.gov/ESDEHS/Haz_Equip.pdf). The types of equipment are listed in the Hazard Management System (HMS) Database and are currently under review in preparation of the HSS audit. The list of ESD hazardous equipment was also updated during the lock out/tag out evaluation, conducted to identify equipment requiring lock out/tag implementation and rad device inventory.

- Communicate changes to ISM to ESD staff
As discussed above, the revised ESD ISM was distributed to the ESD management, and safety committee, posted on the ESD ES&H web site and presented in the June 2008 an all hands ESD meeting. Additionally, as a quick reference, the safety coordinator updated, distributed and posted on the main ESD offices and labs the one page summary of the requirements, ESD Health and Safety@a glance (http://esd.lbl.gov/ESDEHS/healthsafety@aglance_R3.pdf) and ISM@a glance (http://esd.lbl.gov/esdehs/ISM_aglance_R2.pdf).
- Institute Safety Walkthrough per ISM changes
The ISM walkthrough program by different levels of management was instituted throughout FY08
- Develop procedures to follow up on SRQs.
The Project/Facility Safety Review Questionnaire (SRQ) is prepared at proposal initiation, before the project is awarded, it allows the PI to identify the potential hazards associated with the project if it is funded and it is reviewed by the safety coordinator. There has been an on going discussion and evaluation of the SRQ process among the ESD Safety Manager, the ESD Sr. Resource Analyst and the Safety Coordinator. Since very often the proposal is not funded, it is not always feasible to institute controls. The safety coordinator is notified at the time the project is awarded but there are no formal processes in place. The PIs are also contacted about the status of their proposal. Additional time is needed to evaluate the process.
- Review settings of all copiers/printers for automatic double sided copies
All three (3) divisional copiers are automatically set to produce double-sided copies. The settings of the printers could not be automatically set to double-sided; these have to be manually set by the individual users.
- Implement energy efficiency on equipment and educate staff to turn off equipment when not in use
Energy efficient equipment are considered by the ESD PIs when they are procuring equipment. PIs have occasionally been notified that their computers should be turned off when not at work, or that the monitors should be turned off after hours. Continuous education on energy efficient equipment will be one of the main activities the safety coordinator identified for FY09.

The ESD procurement web site (currently under construction) will promote the purchase of Energy efficient equipment.

- Distribute Environmental Review Checklist broadly:

The Environmental Review Checklist was distributed to all administrative staff. An effort will be made to either distribute to all ESD employees in FY09 or incorporate some of its items into the ESD Self-assessment checklist which is distributed to all ESD staff and guests.

- Reconcile/update the Chemical Management Inventory:

There was a strong effort to update the chemical inventory in FY08. Reviewing and updating the Chemical Management System (CMS) database was one of the items identified in the “ESD Checklist” that was used for the Department Heads’ walkthrough

A CMS assessment using bar code scanner evaluated the chemical inventory in 70A-4413, 70A-4431, 70-141, 70-143, 70-143A and identified inconsistencies in the chemical containers and the database listings. As a result, the database was updated to reconcile inaccurate inventories. The LLPI in 70A-2255, with assistance from the CMS group, requisitioned legacy chemicals as hazardous waste. Chemicals belonging to past ESD staff were requisitioned as appropriate.

At a remodeled lab (70-158) the CMS update was one of the main activities; the CMS was updated for all chemicals found listed at that lab; chemicals belonging to past ESD staff were requisitioned as hazardous waste, while chemicals belonging to other ESD and/or LBNL staff were returned to the owner or requisitioned as hazardous waste. The clean up and remodeling of lab 70-166 also involved a major effort to requisition old chemicals.

The CMS was also updated in preparation for the MESH review. Continuous awareness of the requirements, updating the CMS when chemicals are moved to another location or requisitioned as hazardous waste, and the notification by the CMS database administrator that chemical owners have left the lab and their chemicals should be transferred to the supervisor’s or an active employee’s name should ensure that the chemical database will be up to date.

- Designate additional staff to ergo advocate training:

The safety coordinator was assigned to become an ERGO advocate; however, no new ERGO training was provided by the ES&H ERGO group in FY08. ESD is supported by an EH&S Division ERGO advocate. When the training is scheduled, ESD will reevaluate the ERGO needs of the staff and assign more ERGO advocates to be trained, as appropriate. Additionally, an ESD staff member, who was trained as an ERGO advocate, has returned from medical leave and she will be able to help the division.

The new LBNL ERGO training, EHS059, *Ergo Self-Assessment for Computer Users*, was initiated in March 2008. This is a very helpful preventive tool that helps the employees assess their workstation set-up and their postures/behaviors. All ESD staff and guests who spend on average over 4 hours per day working at a computer are required to take the training. This is also reflected in the group and individual JHAs. This new Ergo Self-Assessment is a very effective

tool, it has already identified a number of individuals in high risk who are evaluated and monitored regularly. The safety coordinator was trained in using this tool to monitor staff and guests.

- More time allocated to Division DSC

The ESD Safety Coordinator is appointed at 75% time; increased from 30% FTE previously.

In preparing for the FY08 Self-assessment, the ESD safety coordinator, with input from the ESD safety committee, prepared a list of questions about the ESD ES&H practices, concerns and opportunities for improvement and sent it to all ESD employees, and guests. The responses were summarized and discussed in the November 2008 Safety Committee meeting and they will be further evaluated and incorporated, as applicable, into the ESD ES&H practices.

FY08 Performance Measures

ISM CORE FUNCTION 1: DEFINE WORK

E1. Division revises division ISM plan to reflect a) ES&H policy changes (including Work Lead responsibilities), and b) updates to the Institutional ISM plan. Line management communicates updates to the plan to division personnel.

- Review our ISM Plan. Did we address all updates, as applicable?

The ESD safety coordinator updated the ESD ISM to reflect PUB-3000 and Institutional Integrated Safety Management System (ISMS) plan changes made subsequent to the last revision of the division ISM plan and through June 30, 2008.

The FY07 ESD ISM Rev.7, was very well written and communicated to the ESD staff. In the FY08 update, the main changes included discussion of PUB 3000 Chapter 25, *Machine Shop requirements* and the JHA requirements. Both changes had been implemented but not formally included in the ESD ISM. Additionally, the ISM institutes a required orientation for all new ESD staff and guests, discusses the Work lead role and responsibilities, includes biological authorizations, lock out/tag out process, nanomaterial work, lists the ESD controlled safety documents, replaces HEAR with HMS, and expands on the role of the ERGO advocate.

The ESD ISM Rev.8 was distributed for review to all members of the safety committee, and the ESD director and upon comment resolution it was approved and signed on October 2008. Since a commitment for using EH&S professionals is included in the ESD ISM, the ES&H Director was contacted to verify the EH&S level of support to ESD. ESD ISMREV.8 was reviewed by the ES&H division and it will be revised to address the comments.

- How did we communicate changes to our ISM plan to the entire division?

The ESD ISM was distributed to the ESD management and safety committee, posted on the ESD ES&H web site (http://esd.lbl.gov/ESDEHS/safety_plan/ESD_ISM_PlanR8_signed.pdf) and presented in an ESD all hands Town Hall meeting (October 2008). The one page summary of the requirements, ESD Health and Safety@aglance (http://esd.lbl.gov/ESDEHS/healthsafety@aglance_R3.pdf) and ISM@aglance (http://esd.lbl.gov/esdehs/ISM_aglance_R2.pdf) are also used as a quick reference and guide to the ISM implementation at ESD.

- How effective was this communication?

The ISM communication was effective; the ESD staff have become familiar with the ESD ISM requirements and its implementation. That was also noted during the ESD MESH review and the DOE BSO V&V audit.

Continuous communication of the ISM requirements at the ESD Town Hall meetings, the ISM@aglance (http://esd.lbl.gov/esdehs/ISM_aglance_R2.pdf) and level-1 emails, are used to notify the staff of the ISM changes. The ISM requirements are also discussed by the ESD director at the Division Council to reinforce line management responsibility, and by the ESD

department heads at department and group meetings. The ESD ISM Rev.8 requires that all new staff participate in an ESD orientation where the ESD safety coordinator will discuss the ISM and divisional processes in detail.

E2. Per the Lab-wide implementation schedule, division ensures workers have a current Individual Baseline Job Hazards Analysis (JHA), authorizing regular and routine work that he/she performs, and if necessary 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.

- Did we document our process for performing JHA's in our ISM Plan?

The ESD ISM Rev.8 formally discusses the JHA process. This process was initiated in the spring of 2008 when ESD identified 31 groups with similar activities and hazard controls. The EH&S SME met with the individual group owners and the safety coordinator to create the ESD group JHAs.

The JHA was introduced to all ESD staff at Town Hall meeting in June 2008. The ESD web (<http://www-esd.lbl.gov/ESDEHS/training.html>) listed the JHA requirements and instructions on how to complete it. The JHA completion was part of the staff Performance Review process. Guests JHA completion was also evaluated. The guests were either incorporated into an ESD group JHA or opted out based on their work location. All guests were notified that their association with ESD and access to LBNL would require JHA and training completion.

It was noted during the JHA implementation phase that the employees and the supervisors did not understand this new program. This process also took place during the summer months when a number of people are on travel on vacation, or fieldwork. Also the supervisors did not realize that during the JHA process the review and evaluate their employees hazards even though they may not face the same hazards at their tasks and that they formally authorize each employee to conduct work.

- What percentage of staff have a current Individual Baseline JHA?

The JHA was introduced to most of the ESD staff in June 2008. The process was tied to the FY08 PRD and by September 30, 2008, 97% of the ESD staff and guests working on site had completed their JHA. A number of guests working at other sites or visiting LBNL for meetings, consultations and seminars were opted out from the JHA.

- What percentage of required staff have a current Task-based JHA?

For ESD employees, the task-based JHA, i.e., a JHA specific to tasks that are unpredictable, short-term, or unusual in nature, would apply to offsite field activities. Currently, the ESD group JHAs identify the Offsite Safety Environmental Protection Plans (OSSEPPs) as the appropriate hazard analysis, controls, and work authorizations for field work. No task-based JHA has been developed for these activities. ESD has requested that ES&H develop an off-site JHA or more formally link the OSSEPPs hazards and training to the JHA.

What noteworthy accomplishments in the ISM core function *Define Work* did we achieve?

- The ESD Director supports the Division's safety program, and leads through articulating his ES&H vision and expectations at all divisional and department level gatherings and during walkthroughs. In FY08, the ESD Director encouraged staff to see safety as an integral part of the job requirement. He consistently communicated this message through the ESD weekly council meetings, in ESD Level 1 emails, and at Town Hall meetings.
- The ESD Director emphasized the use of safety glasses in the lab. ESD requires that all staff working in the labs wear safety glasses. All staff were notified that they can get prescription safety glasses free of charge at the medical center.
- The Geochemistry Department head distributes summaries of the weekly Division Council to all department members and requests input. He emphasizes safety as the first item in these communications.
- ES&H is a standing agenda item at quarterly Town Hall meetings, and the weekly Division Council meetings. The ESD Safety Coordinator participates at the Division Council meetings.
- The ESD Safety Coordinator submits a quarterly ES&H report to Division management and safety committee. This report summarizes the main ESD ES&H activities, incidents, authorization, training and JHA completion, OSSEPPS, ERGO evaluation and CATS. It is an effective tool for communicating the main safety issues to the division management.
- The ESD Director participates in the ESD Safety Committee meetings as his schedule permits. The Department Heads have been assigned permanent members of the ESD Safety Committee. This is included in the ESD ISM Rev.8.
- The ESD Health and Safety Web Page is continually updated and it is currently re-designed.
- The ESD Safety Coordinator is invited to Departmental meetings to present Health and Safety information.
- In order to understand the hazards of the Nanotechnology and communicate them to the ESD staff, the ESD Safety Coordinator attended a daylong seminar entitled, "EH&S Challenges of the Nanotechnology Revolution" on 8/6/08. This course was intended to introduce EH&S personnel, scientists and managers to the field of nanotechnology and review potential health, safety and environmental concerns associated with this field. The division director supports the safety coordinator's continuous education.

What opportunities for improvement in the ISM core function *Define Work* exist?

- Ensure that all new ESD supervisors understand the JHA and they ensure that the JHA is updated when the work scope changes.
- Ensure that all ESD guests working onsite have the appropriate, documented on the job training (OJT) to conduct their work safely. This ESD OJT is the informal training provided by the LLPIs

to staff working with specific equipment or procedures and it is under LLPI management control. The OJT is commonly practiced at different ESD labs but it is not usually formally documented.

- Work with the ESH division to develop task-based JHA for ESD off site field work.
- Implement the Subcontractors JHA program that was initiated by ESD on 10/31/08 and incorporate any pre-existing equipment service contracts.

ISM CORE FUNCTION 2: IDENTIFY HAZARDS

E3. Divisions review work activities to identify, analyze, and categorize hazards and environmental impacts for the associated work. Examples of hazard inventory include: Hazards Management System (HMS) database (or equivalent), project safety review, workspace safety review, Job Hazard Analyses (JHA), environmental review (NEPA/CEQA), and chemical inventory.

- Review division's hazard identification and inventory documentation.

The ESD ISM Plan specifies several processes to identify hazards, including the JHA, other Formal Work Authorizations as discussed in PUB3000, the Safety Review Questionnaire (SRQ), the OSSEPPs, and identification of hazards through the responsibilities of the LLPI.

The ESD Safety Coordinator maintains a list of ESD "hazardous" equipment (<http://www-esd.lbl.gov/ESDEHS/index.html>, "Hazardous Equipment Requirements") which is updated, incorporated into HMS database and will be fully tracked by the HMS database. This list also includes radiation producing equipment and equipment that require lockout/tag out procedures.

The formal authorizations are listed as an attachment in the quarterly ESD ES&H Reports and provided to the ESD management and safety committee. The authorizations are reviewed annually, and maintained by the EH&S division personnel. The ESD director reviews and approves all AHDs.

The Chemical Management system (CMS) Database is regularly reviewed by the safety coordinator. Lists of chemicals per lab were provided to LLPIs for review and update. In FY08 the CMS assessment identified and reconciled the chemical inventory in several ESD labs. A number of LLPIs have also requested the bar scanner to help them identify any inconsistencies in their lab chemical inventory. The CMS personnel continuously monitors the LBNL employment status of chemical owners and notifies the supervisor and safety coordinator when an employee resigned or retired.

- Did we review our work activities to identify, analyze, and categorize hazards consistent with Lab policy?

As mentioned above, the following processes are discussed in the ESD ISM and used to review work activities and to identify, analyze, and categorize hazards:

- (i) A Project/Facility Safety Review Questionnaire (SRQ) (<http://www-esd.lbl.gov/ESDEHS/safequest.html>) is completed by the PI as part of the proposal initiation form of every proposed project. The SRQ is reviewed by the ESD safety coordinator, and referred to EH&S subject matter experts, as appropriate.
- (ii) A site-specific OSSEPP (<http://www-esd.lbl.gov/ESDEHS/ossep.html>) is prepared by the PI before conducting offsite field work. The OSSEPP identifies hazards and defines measures to reduce risks. The site-specific OSSEPP is read and signed by all participants in the field project. It is reviewed by the ESD safety coordinator, who determines if Subject Matter Experts (SMEs) are also required to review the document.
- (iii) Every ESD lab has one designated LLPI who is responsible for overseeing safety and health issues in the specific lab (<http://www-esd.lbl.gov/ESDEHS/labsafety.html>). Any new work to be performed in a given lab must be discussed with the LLPI to identify hazards, and anyone working in a lab must meet with the LLPI before work commences.
- (iv) The ESD LLPI is required to review and update the HMS and CMS databases (an ESD Inspection Checklist item), and review the door signs identifying hazards has been included as an item in the ESD Inspection Checklist.
- (v) The ESD staff and safety coordinator contact the EH&S Liaison and respective SMEs for guidance on new work and hazard evaluation. During the review of formal authorizations the safety coordinator request additional reviews by the ES&H SME, as appropriate.

Additionally, the ESD safety coordinator is inviting the EH&S SMEs to the safety committee meetings to discuss new or updated PUB3000 and other institutional requirements (i.e., HMS, JHA, LOTO, SJHA.)

- Do we have a specific hazards review process described in our ISM plan? If so, did we follow this process?

All processes described above are discussed in the ESD ISM. These are well established ESD processes. The Department Heads participate in the bi-annual walkthroughs and discuss hazards with the staff including ergonomic set ups. Also the Department Heads participate in the safety committee where new activity hazards may be identified and discussed.

In FY08, electrical hazards have been identified institutionally as an important hazard. The EH&S SME was invited to help clarify the lock out/tag out requirements and identify equipment requiring lock out/tag out procedures. Additionally, ESD has initiated a process to identify and catalog electrical equipment that were developed to meet experimental conditions or modified from their original applications. Field equipment may also be modified when used in the field. Some of these are prototypes to be tested and modified to perform the task they were designed for or some other fail during the experiment and have to be serviced in the field. The PIs are meeting with the EH&S SME in order to evaluate their practices and take any additional training that would allow them to perform their work safely. These equipment need

to be tested and evaluated by the EH&S division; this is an institutional issue to be addressed by 2010.

The ES&H liaison also conducts "Hazard Assessment Survey Reports". These reports are prepared when a new hazard is identified, in FY08 all tasks involving nano-material were evaluated and a Hazard Assessment Report was prepared for nano-work. Additionally a Hazard Assessment Survey Report was conducted to evaluate the chemical and physical hazards that could affect Facilities or subcontractor personnel before and during lab remodeling activities.

- How do we ensure our inventory is comprehensive (i.e. did we include all of our workspaces)?
ESD evaluates and ensures that all workspaces are reviewed in the Division Director's annual walkthrough and the Department Head bi-annual walkthroughs. Each ESD lab is inspected monthly by the respective LLPI. Off-site work sites and work on the UC campus are not inspected during walkthroughs; these sites are operated under the site specific EH&S programs.

E4. Division participates in pollution prevention, energy conservation, recycling, and waste minimization programs, as appropriate for the environmental impact of their activities.

- Complete the Environmental Review Checklist (Attachment 1), or similar process.
The Environmental Review Checklist was completed by the ESD Business Manager and administrative staff. The ESD Business Manager created and posted signs near electrical switches in conference rooms (e.g., 90-1108), hallways (e.g., in front of 90-1165) and labs (e.g., 70-158) to remind personnel to turn off the lights when leaving the area. Additionally, before a major divisional walkthrough, the personnel are remind to salvage old equipment.
- What are our opportunities for improvement?
 - ESD needs to continue its efforts in educating the staff in pollution prevention, energy conservation, recycling, and waste minimization programs.
 - ESD needs to continue communicating to the staff the need to be turning off their equipment when are not needed.
 - The ESD LLPIs need to keep evaluating the chemicals they are using and try to minimize the use of toxic and hazardous chemicals when appropriate.

What noteworthy accomplishments in the ISM core function Identify Hazards did we achieve?

- They ESD staff are well informed of the requirements and have already proactively working with the EH&S staff to resolve issues like identifying and cataloging modified electrical equipment and recognizing the need for task-JHA for field work.
- The ESD staff were requested to participate in the first ISM survey; 11.5% (32 of 278) of the staff responded. The results were discussed in the safety committee and will further analyzed to implement processes as suggested.
- An ESD staff member identified a noteworthy practice the fact that the field staff have been conducting offsite work with no major incidents.
- DOE BSO V&V Effectiveness Review auditors identified a noteworthy practice, the ESD inspection log of the labs, which is used to document the monthly LLPI walkthrough.

- A list of ESD controlled safety documents is included in the ESD ISM Rev.8.

What opportunities for improvement in the ISM core function Identify Hazards exist?

- Continue educating the staff on the ISM requirements as they are updated to meet institutional changes.
- Ensure that all required activities are properly documented, i.e., the LLPI's walkthroughs should be always documented upon completion. The ESD ISM Rev.8, requires that the record will be collected by the safety coordinator at the end of the fiscal year to be included in the annual self assessment documentation.

ISM CORE FUNCTION 3: CONTROL HAZARDS

E5. Division ensures appropriate engineering and other safety/environmental controls are in place and properly maintained.

Examples of controls include, but are not limited to:

- *Guards, barriers and shields*
 - *Fume hoods, glove boxes, biosafety cabinets*
 - *Interlocks*
 - *Exhaust system filtration*
 - *Secondary spill containment*
 - *Personal protective equipment*
 - *In-lab alarm monitors*
 - *Stack emission monitors*
 - *Lockout/tagout*
 - *Ergonomic workstation modifications (furniture, equipment and/or accessories)*
 - *Manual material handling lift assist devices*
 - *Cranes and hoists*
- How do we determine the need for engineering and other safety/environmental controls? Is this process effective?
 - The ESD staff and safety coordinator contact the EH&S Liaison and respective EH&S SMEs for guidance on new work and hazard evaluation.
 - During the review of formal authorizations the safety coordinator request additional reviews by the EH&S SME, as appropriate.
 - The ESD safety coordinator is inviting the ES&H SMEs to the safety committee meetings to discuss new PUB3000 and other institutional requirements (i.e., HMS database, initial discussion of JHA, Lockout/tagout requirements, Subcontractors JHA.)
 - The EH&S Liaison has conducted a number of hazard assessment for on going ESD activities (i.e., nano work) where additional controls were identified, as appropriate.
 - The EH&S Ergonomics group has been supporting the ESD staff with required ergo evaluations of work stations.
 - Did we properly identify (with assistance from EH&S, as appropriate) engineering and other safety/environmental controls?

The LLPI is responsible for ensuring that all activities conducted within a lab are conducted safely. The EH&S SMEs are conducted to help evaluate the existing engineering controls.

- What actions(s) did we take to resolve deficiencies in this area, as applicable?
In FY08 no deficiencies were identified in this area.

E6. *Division ensures administrative controls are in place and maintained. Examples of administrative controls include: work authorizations (including but not limited to JHAs, AHDs, BUAs and RWAs), work permits (including but not limited to confined space, and energized electrical work), environmental permits, work procedures, and project safety reviews.*

- Did we review formally authorized work on schedule?
 - The ESD director annually reviews and approves all new or revised AHDs.
 - The JHAs are reviewed annually or when the work scope changes and approved by each supervisor. The JHA groups were developed for the main activities per department and main LLPIs. The group hazards and controls were defined by the LLPI for all staff working in his/her Lab or project.
 - The ESD safety coordinator checks the status of all Work Authorizations quarterly. All active ESD AHDs are listed on the quarterly ES&H report that is provided to the ESD management and safety committee. All AHDs have been converted to the electronic system.
 - The ESD staff worked closely with the ES&H SME to identify equipment requiring logout/tagout procedures.
 - The ES&H Liaison conducts a hazard survey for each remodeled ESD lab.
- How did we address changes in work scope?

The JHA process, implemented in FY08, will capture work scope changes. Changes in work scope are captured for new projects by means of the Safety Review Questionnaire. Changes in work scope for field (offsite) projects require revision of the OSSEPP. Changes in work scope in individual labs are captured in ESD inspection checklist item L3 “*Re-evaluate work for new hazards- are there new procedures, personnel or equip? Is HMS database current? Has equipment or apparatus been modified or adapted in any way that may not be in compliance or safe?*” The checklist is completed before the management walkthroughs. All new work in a lab must be discussed with the LLPI. All the above processes are described in ESD the ISM Plan.

- Are our processes to ensure administrative controls are in place and maintained consistent with our division ISM Plan?
All administrative controls, as discussed above, are consistent with the ESD ISM.

E7. *Division ensures 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.*

- Did we implement ergonomic safety policies and procedures as described in our ISM Plan?
It is the ESD policy that any ESD employee or guest can request an ergo evaluation. All employees have an evaluation when they begin work in ESD, following a move, or at the first sign of discomfort, regardless of whether or not they meet the 4 hour/day of computer work threshold used in the JHA. The ESD ISM Plan requires that all ESD staff, including guests, who perform computer-intensive work have to take the EHS059 *Ergo Self-assessment for Computer Users*, which replaced EHS0060, *Ergonomics for Computer Users*. Any staff who experience ergonomic discomfort should discuss it with their supervisor and request an ERGO evaluation of their work station. The Division funds ergonomic furniture when project funds are lacking. Multiple channels are used to communicate the ESD ergonomic program and policy, including the ESD Town Hall Meetings, the ESD ES&H website (http://www-esd.lbl.gov/ESDEHS/ergo_info.html) that describes the ESD ergonomic program and posts information from various sources – IT, EH&S (including the EH&S 1 minute 4 safety slides describing awkward positions, workload issues, guidelines for supervisors to check for early symptoms, and reminders to employees to report early signs). The website also includes ergonomic guidelines for laboratory and fieldwork.

In FY08 95% of ESD employees and guests (160 out of 168) completed the EHS059 training that was listed as required or recommended on their training profile. This training is required for all employees who mainly work in an office or who spend on average 4 hours per day working on a computer and ergonomics is the main hazard of their activity.

- How do we communicate the importance of early reporting of discomfort and workload management as strategies for preventing ergonomic injuries?
Continuous communication among the ESD supervisors, safety coordinator and the employees helps employees identify and discuss early discomfort. Workload management is discussed between supervisors and staff.
- What is our completion rate for required ergonomics training?
By the end of September 2008, 152 ESD staff and guests completed EHS059 that was either required or recommended on their training profile. Based on the individual responses, the computer program, Remedy Interactive categorized the staff as high risk (red), moderate risk (yellow) and low risk (green). Remedy Interactive identified 11 ESD staff members in the high risk category. These staff were visited by an EH&S ergonomist and they are monitored by the ESD safety coordinator and the ES&H ergonomist, Remedy Interactive identified 20 ESD staff members as moderate risk and 121 ESD staff as low risk. All staff are required to take EHS058 as a refresher training within a year of EHS059 completion.
- How timely are our ergonomic evaluations?
Every effort has been made to complete the ergonomic evaluations within 30 days. Delays in ergo completion may occur when the employee is testing and evaluating new ergonomic equipment. These are loaned by the Ergo group on a trial basis and when the employee is satisfied they are purchased and installed.

- Review of Ergo Advocate Program
ESD participates in the Ergo Advocate Program. One staff member is currently trained as an Ergo Advocate and the safety coordinator will take the training when it is offered. Additional ESD staff member may be assigned and trained when the training is offered. Currently, an EH&S ergonomist is assigned to support ESD.
- Review ergonomics database.
In FY08, 51 ergo evaluations that were conducted for ESD staff and guests; out of these 23 were completed; 5 were cancelled; 6 had Pending Action; 7 were recently assigned; 6 are in progress; and 4 are still unresolved.

The ESD Ergo evaluations were requested by the safety coordinator (12), by the employee (10), by the system as a result of an office/physical move (10), by the health services (6), by the Ergo advocate and/or ergonomist (5), by other/no requester listed (4), by the supervisor (1), and by SAAR (1).

What noteworthy accomplishments in the ISM core function *Control Hazards* did we achieve?

- The use of EHS059 identified a new employee as high risk and it prevented an ergonomic injury; his work station was evaluated and monitored until his risk level was lowered.

What opportunities for improvement in the ISM core function *Control Hazards* exist?

- The safety coordinator and other ESD staff members, as appropriate, should be trained as Ergo advocates when the training is offered.
- The safety coordinator should closely monitor the ergo evaluations that are open for more than 6 months and meet with the employee and the supervisor to access the pending issues.
- All ESD employees who telecommute should use EHS059 to evaluate their work station.

ISM CORE FUNCTION 4: PERFORM WORK

E8. Work is performed within the ES&H conditions and requirements specified by Lab policies and procedures. Performance criteria include work authorizations (including but not limited to JHAs, AHDs, BUAs, RWAs); work permits (including but not limited to confined space, energized electrical work); waste management criteria (SAAs, waste sampling, NCARs); and environmental permits and management criteria (resource conservation, pollution prevention and waste minimization).

- What are our formal work authorizations?
 - The JHA is the first formal authorization for conducting work.
 - ESD authorizes off-site work through the OSSEPPs which are prepared and reviewed prior to field work initiation and before any off-site activity.
 - At the time of the proposal submittal, the PI identifies the main hazards of the proposed work in the SRQ which is reviewed by the safety coordinator and evaluated periodically.
 - All active work authorizations are listed in the quarterly reports provided to the ESD management and safety committee. In FY08 ESD had the following authorizations:
 - AHD 3216 rev.3, HCl absorption oncapillary water Active

- AHD 2108 rev.3 Dynamic Light Scattering System
 - AHD 2105 rev.2 Single Location CO2 Saturation Monitoring
 - AHD 2046 rev.3 Gas Hydrates Experiment
 - AHD 3256 rev.1 Ammonia feed for ICPMS
 - 2103 DLS main laser –AHD 2108
 - LAS L032 due 2008/12
 - RWA 1107 II due 2009/03
 - RWA 1125 I due 2009/08
 - RWA 1154 I due 2009/05
 - SSA 140 II due 2008/07
 - X-Ray 7020 due 2009/06
 - LAS L007 due 2009/03
 - LAS L012 due 2009/03
 - LAS L014 due 2009/03
 - LAS L019 due 2009/03
 - LAS L028 due 2009/08
 - LAS L032 due 2008/12
 - BUA 53 Active, Authorization date 9/26/07
 - BUA 141 Active, Authorization date 5/30/07
 - BUA 179 Active, Authorization date 1/3/08
 - BUA 144 Active, Authorization date 12/6/07
 - BUN 182 Active, Authorization date 2/1/08
 - BUN 154 Active, Authorization date 11/13/06
 - BUN 119 Active, Authorization date 11/20/07
- All work authorizations undergo periodic review, by the PI and designated signature authorities per the schedule prescribed by the authorization program.
 - Identification of new work and hazards is an item on ESD's Inspection Checklist, used during the Department Head's and LLPI's walkaround.
- Did we perform work within the scope of our formal authorizations and hazardous work permits? How do we assure work is performed within scope?
 - All work authorizations undergo periodic review, by the PI and designated signature authorities per the schedule prescribed by the authorization program. The ESD EH&S Liaison coordinates the reviews of the AHDs and the safety coordinator is a required reviewer. The EH&S SME coordinates reviews of BUA, BUNs, RWAs, SSAs, etc.
 - Identification of new work and hazards is an item on ESD's Inspection Checklist, used during the Department Heads' and LLPI's walkaround.
- Did we complete and document on-the-job training as required by our formal work authorizations?

On the job training is documented as required by the specific authorization (i.e., X-Ray authorization, RWA, SSA etc.) The PI and/or appropriate EH&S group maintain and update the OJT records.

- How do we assess SAA compliance? What is our compliance rate?
 - The Waste Management Group leader walked through all ESD SSAs in January 2008 and she verified 100% compliance to the requirements.
 - All ESD SAAs are inspected quarterly by the Safety Coordinator and Waste Management Specialist, and DOE BSO representative. In FY08 the findings that were identified mainly included incomplete labels.
 - The Waste Management randomly samples waste that we requisition from SAAs, to verify that the characterization information on the red Hazardous Waste label is correct and this information is reported quarterly. Over the period 10/1/07-8/30/08, about 11 % of ESD waste was tested (481 container received, 50 were tested) and 98% passed (49 passed 1 failed).
 - A Waste Management Group QA Exception Report (QALog# E160) was issued on 5/27/08. The analysis detected hazardous constituents inconsistent with the reported waste characterization. A student working in the lab did not keep accurate waste accumulation log, resulting in an inaccurate listing of the waste in the requisition request. The QA Exception Report was discussed with the PI. The corrective actions included notification of the Division Director and Department Head were notified. The QA Exception Report was reviewed and discussed at a safety committee meeting.
 - During one of the safety coordinator's lab visits, it was identified that a waste container in a SAA exceeded the 6 month accumulation period identified in the ESD ISM. The corrective actions included (a) immediate requisition of the waste and (b) notification to the LLPI, supervisor, and Department Head.
 - SAAs are also inspected during the management safety walkthroughs, and by LLPIs; they are an item on the ESD inspection checklist.
 - The Waste Management will be collecting and disposing any small gas cylinders that contain unknown gas mixture and/or cannot be returned to the vendor. The ESD LLPIs are notified and we are in the process of compiling a list.
- Did we receive any notices of violation from external regulatory agencies? If so, did we implement corrective actions?
 - No notices of violation from external regulatory agencies was received by ESD

E9. Staff (including employees, participating guests, students and visitors) is properly trained.

- What percentage of our staff completed the JHQ in the past 12 months (in cases where the JHA process is not implemented)?
ESD fully implemented the JHA. No ESD staff or guest work under the JHQ.
- What is our required training completion rate?
In FY08 the ESD training statistics improved significantly, i.e., on 9/27/07 the ESD staff and guests training completion was 86% (ESD ES&H report, dated 9/27/07), while on 9/30/08 the training completion was 93% (ESD ES&H report, dated 10/03/08).

The training has been consistently reviewed and the results were communicated to the ESD management. A list of incomplete training is included in the ESD ES&H quarterly report

which is submitted to Division Council and safety committee. ESD Level 1 emails were distributed to remind supervisors and employees to complete their JHA and training, and to use the training profile in PRD discussions. The safety coordinator contacted individual supervisors to address staff JHA compliance and training requirements.

Increase in online training classes – particularly EHS010 and EHS059, EHS260 helped ESD in improving its training completion rate.

What noteworthy accomplishments in the ISM core function *Perform Work* did we achieve?

- Maintain the ESD has a 6 month limit on waste storage in an SAA, to ensure that no waste exceeds the LBNL time limit.

What opportunities for improvement in the ISM core function *Perform Work* exist?

- Ensure that all new LLPIs and SAA custodians are aware that ESD has a 6 month limit on waste requisition.
- All students producing hazardous waste need to be trained to maintain complete log of the hazardous constituents they generate.

ISM CORE FUNCTION 5: FEEDBACK AND IMPROVEMENT

E10. Division implements an effective safety walkaround program per the requirements of the Division ISM Plan. Ensure all personnel required to perform safety walkarounds, as defined in the Division ISM Plan, have completed EHS 27 Performing an Effective Safety Walkaround.

- Did we document walkaround requirements in our Division ISM Plan?
The ISM walkthrough program by different levels of management was instituted throughout FY08.
- Have all personnel required to perform safety walkarounds, as defined in the Division ISM Plan, completed EHS 27, "Performing Effective Safety Walkarounds"?
An EHS027 was scheduled for ESD management and LLPIs, additional training is offered by the EH&S division and new LLPIs have been notified to complete their training.
- Did personnel perform assigned walkarounds as scheduled? How were results recorded? Are results recorded consistent with the Division ISM Plan?
The ISM walkthroughs by different levels of management was instituted in FY08, the staff were required to complete a checklist which was collected by the division director or department head and maintained by the safety coordinator.
- Were all safety deficiencies not corrected on the spot documented? How?
Issues identified on the checklists were either corrected by the staff, entered into CATS or resolved through a work order. The safety coordinator has the main responsibility of entering issues in the CATS database, eventhough other administrative staff were instructed how to use the CATS database.

Occasionally, issues entered into CATS as institutional either dismissed or rolled into institutional corrective actions without any input from the initiator.

E11. Division performs a thorough review of all accidents, injuries, incidents, near misses and concerns according to Lab policy and the division's ISM plan. Corrective actions to prevent recurrence are identified, effectively implemented, and shared via the Lab's Lessons Learned and Best Practices database, as appropriate.

- Is our process for investigating staff injuries and accidents detailed in our ISM Plan?
The ESD ISM discusses the incident investigation process in accordance with LBNL requirements: for all ES&H incidents, safety coordinator supports the Supervisor and schedules a meeting with employee, supervisor, EH&S liaison, SMEs when needed, to understand causes and develop corrective actions. For recordable injuries, a tap-root analysis is performed, with an individual trained in tap-root analysis. ESD policy requires that the ESD Director is notified of all OSHA reportable incidents; the Department Heads of all injuries in their department; and Safety Committee reviews any incidents and the related corrective actions in their monthly meetings. The safety coordinator also discusses all incidents and corrective actions in the ESD Council meetings. The ESD ISM will be revised to require that the investigation of an incident will be completed with 7 calendar days as required by LBNL.
- Did we follow this process?
ESD has followed the process as discussed above. When the supervisor or the employee were not able to complete the incident review within the require time, the ES&H SME was notified of the reason and the expected time of the investigation completion.
- Review injury and accident reports (SAARs).
 - Four (4) OSHA Recordable Incidents:
 - (i) On 3/12/98, an employee stated that felt tingling sensation on fingers and hand/arm.
Action to prevent recurrence: Employee completed physicals therapy; tried new ergonomic chair and keyboard tray and advised to use the Remedy interactive program, take regular breaks and discuss/evaluate workload with supervisor. No recurrent incident with that employee. ESD encourages supervisors to monitor the work load of staff working mainly on the computer.
 - (ii) On 5/15/08, an employee arrived at work through parking lot between Bldg. 70 & 70A. She walked toward her office (bldg. 70A) and felt something hit the top of her head in the parking lot. She noticed that there was blood dripping down the side of her head and continued walking to her office. Called 911 and was transferred to Kaiser Oakland where she was treated and released. Received two stitches.
Action to prevent recurrence: Unknown cause of injury; wind blown object that was not identified. The root cause analysis did not identify any corrective actions.
 - (iii) On 6/16/08, an employee was carrying his food tray from the cafeteria patio back to the cafeteria, when he tripped causing him to fall to the ground and fractured his left wrist.
Action to prevent recurrence: A formal report from the EH&S division to DOE was submitted on 8/1/08. The report was prepared with input from the Facilities Division, ESD and EH&S. This was an institutional event that affected an ESD employee. No ESD Corrective actions were identified.

(iv) On 7/15/08, an employee was unchaining a gas cylinder from a cart, when the cylinder fell onto her left great toe and second toe causing bruising and swelling.

Action to prevent recurrence: The tank was taken out of service and the restraining chains were reconfigured to restrain each cylinder separately. A similar incident had happened at the Molecular Foundry a few years ago. A lessons learned should have been communicated to all LBNL staff and the restraining chains of the double cylinder carts should have been reconfigured at the time of the first incident.

- Eight (8) First Aid-Non recordable incidents:

(i) On 12/4/07, a guest student assistant lifted a 5 gallon bucket full of water and felt pain in his lower back.

Action to prevent recurrence: The experiment was modified to collect smaller amounts of liquids

(ii) On 12/20/07, an employee hurt his right knee as he stepped up onto the trailer platform where the generator sits.

Action to prevent recurrence: Re-evaluated the step stool used and purchased new one with shorter distance between the steps.

(iii) On 12/20/07, a contract employee who had recently moved to a new work area reported that his left wrist has been hurting after using his computer keyboard and mouse.

Action to prevent recurrence: Employee got recommended Ergo equipment and completed EHS059, the Ergo self-assessment training.

(iv) On 2/8/08, an employee after pipetting with a manual pipetter and "spent ~ 4 hours hybridizing micro arrays" in the lab, noticed pain in right forearm and index finger when pipetting.

Action to prevent recurrence: The ERGO program manager discussed the pipetting ergo issues and methods to avoid injuries at the monthly department meeting. New electronic pipettes were purchased and the staff were instructed to take frequent breaks.

(v) On 3/28/08, an employee was picking up a bucket from the bench and there must have been some glass on the bench; her right hand came in contact with the glass and she got a piece of glass in her right hand ring finger distal digit.

Action to prevent recurrence: Scrutinize countertop clean ups more carefully.

(vi) On 4/28/08, an employee stated both of his "buttock bones" hurt after prolonged sitting while working at the computer.

Action to prevent recurrence: Evaluated office space and chair.

(vii) On 5/6/08, an employee stated that she was attaching a new flexible metal hose to the liquid nitrogen tank and noticed that she had multiple metal fragments that were lodged in her skin.

Action to prevent recurrence: Purchase gloves that allow manual dexterity and protection.

(viii) On 8/1/08, an employee stated he has left wrist pain after using his computer keyboard.

Action to prevent recurrence: Ergonomic evaluation of the workstation, lower the workstation and purchase new split keyboard.

On 3/12/08, a scientist visiting the Earth Sciences Division unexpectedly passed away, on the second floor of Building 90. The staff provided CPR until the paramedics arrived and unsuccessfully tried to

revive him. The visiting scientist was not an ESD employee, so this incident was not included on the official reportable ESD incidents. A major issue identified during this incident was that when calling x7911 there is a period when there is no response on the line; that resulted on several attempts to redial the number because the staff thought that there was no connection and hung up. Another issue identified during this incident was that the medical kits in Bldg. 90 contained expired items (CATS 5271) and the staff were not aware of the medical kit location. The EH&S Director discussed the paramedic response time and the use of Automatic External Defibrillators (AEDs) at LBNL in the ESD council on 3/31/08. This incident and the identified issues were discussed on the ESD all hands Town Hall meeting. The LBNL Medical Officer also met with ESD staff and discussed the use of AEDs within LBNL, answered questions, listened to concerns and provided some education. No formal institutional policy changes resulted out of these discussion.

- How effective were our corrective actions?
The corrective actions as listed in the SAAR were effective and the issues were addressed timely. ESD Line management addressed all corrective actions timely.
- Did we share lessons learned with others via the Lab's Lessons Learned and Best Practices database? Did we apply any lessons learned from the Lessons Learned and Best Practices database that may help reduce injuries?
A lessons learned was initiated and distributed from the cylinder accident.

E12. ES&H deficiencies that cannot be resolved upon discovery are entered in CATS in a timely manner and tracked to resolution. Deficiencies include those from workspace inspections, Self-assessment activities, SAARs, Occurrence Reports, Non-compliance Tracking System Reports, environmental inspections, Division Self-assessment, EH&S technical reviews, Management of ES&H (MESH) Reviews, and external appraisals.

- How do we assure that deficiencies identified from workspace inspections, Self-assessment activities, SAARs, Occurrence Reports, Non-compliance Tracking System Reports, environmental inspections, Division Self-Assessment, EH&S technical reviews, Management of ES&H (MESH) Reviews, and external appraisals are entered in CATS in a timely manner?
Issues identified on the checklists where either corrected by the staff, entered into CATS or resolved through a work order. No CATS items were generated as part of the SAARs. The safety coordinator has the main responsibility of entering issues in the CATS database. The ESD director, as the safety coordinator's supervisor, is notified for all corrective actions initiated by the safety coordinator.
- How did we address opportunities for improvement identified in FY07 Self-assessment (division Self-assessment, MESH, ESH Technical Assurance)? A CATS report may suffice as a response.

CLOSED CATS

- Issue No. 5138: Institute the Safety Walkthrough program per ESD's revised ISM Plan.
- Issue No. 5177: ESD should improve its training completion rates.
- Issue No. 5241: Inadequate seismic bracing of equipment rack in lab 70-141.

- Issue No. 5242: The generator in building 70A must be reconfigured to run for more than a few minutes so that the emergency power stays active for a much longer period of time than it is currently provided .
- Issue No. 5270: The PA announcement of the 12kV Switching was not heard in the conference room 90-1108.
- Issue No. 5271: Two out of the three disaster trauma kits located in the first floor of Bldg 90 were inspected; both trauma kits contained expired InstaGlucose (Glucose Gel for Low Blood Pressure.)
- Issue No. 5275: Two portable saws, a cut off wheel saw and a chop saw, are not secured on the carts and the carts have no chocks or locks on the wheels.
- Issue No. 5280: in BLDG 14 three electrical panels PNL-003-14, PNL-004-14, and PNL-006-14 do not have clear marking on floor to indicate the required clearance
- Issue No. 5283: Due to the building's structural issues, there is a gap on the floor at the entrance of the building. This is a tripping hazard.
- Issue No. 5298: The drill-press GFCI outlet is a wall outlet type; however, it's connected to an extension cord and not used as a wall outlet.
- Issue No. 5394: The emergency eyewash and safety shower in 70A-2275 is overdue for its quarterly flushing by the Facilities personnel. Inspection tags must be filled out to document this activity.
- Issue No. 5395: The emergency eyewash and safety shower in 70-141 is overdue for its quarterly flushing by the Facilities personnel. Inspection tags must be filled out to document this activity.
- Issue No. 5404: Window blinds in rm 90-2128 do not work properly.

OPEN CATS

- Issue No. 4279: There was no pressure relief on the compressed gas systems located in the ante-room. System was designed by Facilities without pressure relief.
 - Issue No. 5468: The electrical panel PNL-116-70 is located on top of a bench, so the legally required clearance cannot be maintained.
- What is our CATS completion rate (regardless of schedule)?
 - CATS completion rate: 15 CATS items were generated and 13 have been closed.
 - CATS on-time completion rate 80% (does not include CATS that generated work orders).

What noteworthy accomplishments in the ISM core function *Feedback and Improvement* did we achieve?

- A DOE BSO representative is invited to the safety committee, ESD SAA quarterly walkthroughs, and ESD walkthroughs.
- The CDC review of the ESD work did not identify any deficiencies and found that our select agent operation had good safety/security controls, and we were well organized.
- The DOE BSO V&V audit found that ESD is effectively implements the ESD ISM and noted as a noteworthy practice the LLPI walkthrough.

What opportunities for improvement in the ISM core function *Feedback and Improvement* exist?

- More attention was given to communicating with SAA custodians during the quarterly SAA inspections, with positive results and improvement in the SAA compliance rate.
- The SAAR corrective actions will be evaluated, discussed with line management and entered into CATS as appropriate.
- Near miss database and formal communication is developed to track and distribute the information to the staff.

In conclusion, ESD has fully and successfully implemented the ISM plan. The ESD ISM requirements have been communicated throughout FY08 to the staff. The line management has been continuously evaluating the ISM process and opportunities of improvement and corrective actions are listed as part of the process evaluation and feedback