



**ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY**

**ENVIRONMENT, SAFETY & HEALTH
SELF-ASSESSMENT REPORT
FISCAL YEAR 2003**

**Environment, Health and Safety Division
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Executive Summary

All divisions at the Ernest Orlando Lawrence Berkeley National Laboratory (Berkeley Lab) are successfully maintaining and steadily improving their Integrated Safety Management (ISM) programs.

All divisions participate in the Division Self-Assessment annually. Management of Environment, Safety & Health (MESH) Reviews and Integrated Functional Appraisals (IFAs) are performed for each division on a triennial basis. This year, five divisions received MESH Reviews: Advanced Light Source (ALS), Directorate/Operations/Administrative Services Department, Environmental Energy Technologies (EETD), and Physical Biosciences (PBD). A scheduled MESH review of the Physics Division was not completed in time for inclusion in this report. Five divisions were subject to IFAs this Self-Assessment year: Chemical Sciences (CSD); Environment, Health & Safety (EH&S); Materials Sciences; Physics; and the Production Genomics Facility (PGF).

Noteworthy achievements in five divisions merit recognition. Results of the Division Self-Assessments demonstrate that the Accelerator and Fusion Research (AFRD), ALS, CSD, and Earth Sciences (ESD) divisions have near-perfect performance in the Perform Work metrics for FY03. In all four of these divisions, staff incurred no recordable or lost-worktime injuries, regularly completed required training, operated within authorization requirements, and properly managed waste. A fifth division, EETD, has achieved outstanding (green) ratings in all Division Self-Assessment metrics for four straight years. The safety programs of AFRD, ALS, CSD, ESD, and EETD are designed to address safety at the origin of work, control all hazards that result from this work, and mitigate safety deficiencies discovered during work activities and in staff workspaces. These programs result in safe division operations and workspaces. All five of these division safety programs have strong senior management support and robust workspace inspection activities focused on two areas: identifying workspace hazards and recording and resolving safety deficiencies.

The FY03 Self-Assessment process noted deficiencies that should be addressed institutionally. These opportunities for improvement are:

- **Laser safety.** The laser safety program must evaluate programmatic and technical issues noted during the reviews. Concerns include standards for laser interlocks, laser safety retraining, laser safety deficiencies, and review and maintenance of laser AHDs.
- **Formal authorizations.** The institutional Activity Hazard Document program needs improvement. Presently, divisions must inform the institutional AHD program (managed by the EH&S Division) when authorizations are renewed and updated. Therefore, the EH&S Division does not have an accurate and current inventory of all AHDs and has not appropriately reviewed all AHDs. Also, divisional managements are not aware of all formal authorizations.
- **Division injury and accident reduction programs.** Four of the unresolved FY02 Divisional Opportunities for Improvement concern high divisional injury and accident rates recorded during the FY02 Self-Assessment year. Although all four divisions (Engineering,

EH&S, Facilities, PGF) proactively implemented program improvements to address staff injuries, the injury rates for each division either increased or remained approximately the same. The EH&S Division should focus efforts on the conditions that result in chronic elevated staff injury rates in these four divisions.

Introduction

Berkeley Lab's environment, safety, and health (ES&H) Self-Assessment Program is a tool for ensuring that the precepts of Integrated Safety Management (ISM) are implemented institutionally and by all divisions. The Self-Assessment Program, managed by the Office of Assessment and Assurance (OAA), is an internal evaluation of all ES&H programs and systems at Berkeley Lab. The functions of the program are to ensure that work is conducted safely, with minimal negative impact to workers, the public, and the environment. The program is composed of four distinct assessments: the Division Self-Assessment, the Integrated Functional Appraisal (IFA), the Management of ES&H (MESH) review, and the Appendix F Self-Assessment.

The *Division Self-Assessment* uses the five core functions and seven guiding principles of ISM as the basis of evaluation. Performance indicators are selected as a measure of division efficacy in addressing the core functions and guiding principles, as well as in promoting compliance with applicable regulatory requirements. Performance indicators are developed by consensus with OAA, division representatives, and EH&S Division program managers. Line management of each division performs the Division Self-Assessment annually. The focus of the review is workplace safety.

The *Integrated Functional Appraisal* is an in-depth ES&H technical review of division work activities and operations. The focus of the IFA is on higher-hazard work, particularly work requiring formal authorizations. The assessment concentrates on adequacy of authorizations, effective control of hazards, balance of operation and safety priorities, and applicability of institutional standards and regulatory requirements. Another function of the IFA is to update the Hazards, Equipment, Authorizations, and Review (HEAR) database. The IFA is conducted by EH&S Division technical experts. Each division receives an IFA triennially.

The *MESH review* is an evaluation of division management of environment, safety, and health in its research and operations, focusing on implementation and effectiveness of the division's ISM plan. It is a peer review performed by members of Berkeley Lab's Safety Review Committee (SRC), with staff support from OAA. The SRC includes representation from each research and operation division at Berkeley Lab. Each division receives a MESH review every two to four years, depending on the results of the previous review.

Information obtained from the Division Self-Assessments, IFAs, and MESH reviews address performance requirements in the UC/DOE Contract 98 *Appendix F Self-Assessment*. The Division Self-Assessment performance criteria, in particular, are closely aligned with the performance objectives, criteria, and measurements (POCMs) of Appendix F. The Appendix F POCMs are based on the core functions and guiding principles of ISM. Additional information required for Appendix F is provided by EH&S Division functional managers. The Appendix F Report is prepared quarterly, with an annual report submitted at the close of the fiscal year. This assessment is the Department of Energy's primary mechanism for evaluating the Laboratory's contract performance for ISM.

Throughout the following discussion, the following abbreviations are used for certain Berkeley Lab divisions: AFRD (Accelerator and Fusion Research Division); ALS (Advanced Light Source); CSD (Chemical Sciences Division); EETD (Environmental Energy Technologies Division); EH&S (Environment, Health and Safety Division); ESD (Earth Sciences Division); LSD (Life Sciences Division); MSD (Material Sciences Division); NSD (Nuclear Science Division); PBD (Physical Biosciences Division); and PGF (Production Genomics Facility).

Division Self-Assessments

Performance Rating

Each division's ES&H performance rating is based on a color-coded system of determining whether each performance criterion and expectation is fully met, partially met, or marginally met. Points are assigned for the three performance gradients, and a percent performance is calculated for each performance indicator and for overall division performance. A green rating, which means division performance is excellent to outstanding for an expectation, is worth three points. A division is assigned two points for a yellow rating, which means it is partially meeting performance requirements for the metric. A red rating, which is worth one point, communicates that a division's performance is marginal for a performance indicator. Finally, a gray rating denotes that a performance metric is not applicable to the division. Rating determinations for each performance metric are detailed in Appendix B.

Overall Performance Results

All divisions have active and effective self-assessment programs. As demonstrated by the Division Self-Assessment performance, ISM is well implemented in all divisions. Divisions have integrated ES&H considerations into work planning. Divisions inspected almost all staff workspaces during the self-assessment year to identify existing hazards, modified hazards, and new hazards. Hazards are effectively controlled through engineering and administrative means. Work is performed safely. Feedback and improvement is robust in all divisions, largely due to the active involvement of senior and line management.

The Labwide performance ratings for each of the five ISM core functions are displayed on the following page. Divisions maintained the superior standard of performance demonstrated the last few years for the "Define Work," "Identify Hazards," "Control Hazards," and "Continuous Improvement" ISM core functions. The greatest improvement in Division Self-Assessment performance in FY03 is in the area of "Perform Work."

The Labwide performance rating for the Perform Work metrics is 95.7%, the highest score achieved under the current Division Self-Assessment methodology. Division improvement for the Perform Work metrics is largely due to more effective waste-management practices. Waste storage and characterization improved in the FY03 performance year. The other Perform Work measures remained largely consistent with the last couple of years. The performance scores for authorization compliance and injury and accident case rate (TRC) declined slightly, while the ratings for days away from work and restricted time (DART) case rate and training completion improved slightly.

Labwide Division ES&H Self-Assessment Performance Rating						
ISM-Based Performance Criteria	FY98 Performance Rating	FY99 Performance Rating	FY00 Performance Rating	FY01 Performance Rating	FY02 Performance Rating	FY03 Performance Rating
1. Define the scope of work.	91.7%	97.4%	99.5%	99.5%	99.0%	99.0%
2. Identify and analyze hazards.	95.8%	97.0%	100%	100%	99.0%	100%
3. Control the hazards.	91.0%	99.0%	100%	99.3%	98.6%	97.9%
4. Perform the work.	82.8%	87.3%	91.9%	95.4%	93.3%	95.7%
5. Feedback and improvements	89.9%	94.8%	98.4%	96.9%	98.6%	97.9%
Overall Performance Rating	90.2%	93.5%	96.5%	97.4%	96.2%	97.0%

Two favorable trends continued this performance year. Divisions are very diligent in inspecting workspaces and documenting existing hazards (e.g., radiological, chemical, ergonomic). A majority of divisions enter the inspection results into the Hazards, Equipment, Authorization, and Review (HEAR) database. A byproduct of these activities is that an accurate universal inventory of all Berkeley Lab workspace hazards is forming. Beyond providing assurance that hazards are identified, this inventory is an asset for emergency response activities, Facilities projects, and regulatory inspections.

A second noteworthy trend is that divisions are effectively recording safety deficiencies discovered during these inspections. Almost all divisions are using the Laboratory Corrective Action Tracking System (LCATS) to record findings and track them to resolution. In FY03, divisions recorded over 1,200 safety deficiencies (mostly low hazard) in LCATS, with over ninety percent of these findings closed on schedule. These activities result in a safer Berkeley Lab environment for all staff, visitors, and guests.

Best Practices

Noteworthy achievements in five divisions merit recognition. Four divisions (AFRD, ALS, CSD, and ESD) have near-perfect performance in the Perform Work metrics for FY03. In all four of these divisions, staff incurred no recordable or lost-worktime injuries, regularly completed required training, operated within authorization requirements, and properly managed waste. A fifth division, EETD, has achieved outstanding (green) ratings in all Division Self-Assessment metrics for four straight years. Noteworthy commonalities exist in these five divisional safety programs.

Senior division management plays an active role in the safety programs of all five divisions. The safety teams of both CSD and EETD include the Division Deputy. The CSD safety team meets bimonthly, while the EETD safety team meets quarterly. The self-assessment teams (QUEST teams) of both AFRD and ALS include the Division Directors, Division Deputies, and all senior managers. These managers participate in safety meetings and annual inspections with their QUEST teams. The ESD Division Director discusses safety at each Division-wide town hall meeting (three meetings in FY03) and participates in each Division Safety Committee meeting. Visible, active commitment to safety from the top levels of division management has multiple benefits. Most importantly, line managers are impressed with a high degree of safety awareness and, in turn, hold their staff responsible for safe work performance. When all staff is engaged, safety considerations are well integrated into work planning.

These divisions have very strong workspace inspection activities that are integral to their self-assessment programs. The inspections focus on two areas: identifying workspace hazards and recording and resolving safety deficiencies. The divisions all have accurate and current inventories of workspace hazards. This facilitates control of these hazards, documented in formal authorizations and the HEAR database. Secondly, these inspections discover many safety deficiencies in staff workspaces. All five divisions record findings in the LCATS database and are diligent in resolving the findings. AFRD, ALS, and ESD each recorded over two hundred deficiencies during FY03, resolving the vast majority within the targeted schedule.

The safety programs of AFRD, ALS, CSD, ESD, and EETD are designed to address safety at the origin of work, control all hazards that result from this work, and mitigate safety deficiencies discovered during work activities and in staff workspaces. This results in safe division operations and workspaces.

Lessons Learned

Labwide injury and accident rates have declined the past few Self-Assessment years. However, ergonomic-related injury and accident rates have risen over the same period. Most divisions are very proactive in addressing the ergonomic hazards of computer workstations, stressing staff training and workstation evaluations. Divisions are also considering the ergonomic hazards involved in physical labor, requiring staff who perform physical tasks to complete MoveSmart training.

Ergonomic hazards in laboratory environments are an emerging area of concern. Laboratory operations that pose significant ergonomic hazards are microscopy stations, biosafety cabinets, and pipette use. Some divisions have been proactive in addressing these hazards. For example, PBD and LSD have hosted commercial vendor presentations of ergonomically friendly laboratory equipment. However, other divisions have not properly considered these hazards. This has resulted in ergonomically deficient work environments and staff injuries.

Two examples of Berkeley Lab microscopy stations with significant ergonomic deficiencies follow.



This microscopy station lacks adequate seating and legroom.



This microscopy station is positioned at an awkward height, lacks armrests, and has inadequate seating.

Divisions with staff who use pipettes, microscopy stations, and biosafety cabinets should implement comprehensive approaches that include training to increase staff awareness (beyond computer workstations), engineering controls, and administrative controls. They must promote ergonomically friendly laboratory equipment and evaluate microscopy stations and biosafety cabinets for ergonomic hazards. Finally, division management must commit resources to facilitate ergonomically correct body positioning for staff using these instruments.

Performance Results by Criteria and Expectation

The divisions use the FY03 Self-Assessment performance criteria and expectations to evaluate the efficacy of their ES&H and ISM programs. Each division submits a Self-Assessment report that communicates the results of their evaluations. OAA reviews the reports and validates division performance in meetings with division representatives. The results of the reports and validation activities are summarized below, grouped by ISM core function. Noteworthy practices and opportunities for improvement for each division are provided in Appendix C.

Core Function 1: Define the Scope of Work

Performance Rating: 99.0 %

Divisions have integrated ES&H considerations into work planning. All divisions allocated resources, through manpower and funding, to address ES&H. ALS, Engineering, Nuclear Sciences, and Physics have dedicated accounts to address safety. Other divisions provide funding for waste disposal, seismic considerations, and staff personal protective equipment. All divisions provide funds to resolve workplace-safety deficiencies discovered during self-assessment activities. These findings are resolved through a combination of divisional and programmatic resources.

As divisions spend significant resources to mitigate ergonomic hazards, Berkeley Lab initiated a pilot program during the 2003 performance year to provide limited matching funds to three divisions (ESD, EETD, and LSD) to address ergonomic deficiencies.

Divisions have effective systems of communicating ES&H to all staff. Many divisions hold annual all-hands meetings to communicate safety issues. Most divisions have active safety committees, with minutes disseminated to safety representatives and their group leads. The division safety committees generally include representatives from all groups that work in Berkeley Lab space. PBD, which has a significant staff presence in UC Berkeley campus space, invites a campus EH&S liaison to Division Safety Committee meetings. Divisional subunits, such as departments and research groups, have meetings that include safety as an agenda item.

Senior and line managers actively participate in safety communication, which ensures that staff is engaged. Division directors communicate their commitment to ES&H by participating in all-hands meetings and sending division-wide safety-specific memoranda and e-mails. Division directors also emphasize safety to senior management in division council and group leader meetings. In several divisions, safety coordinators will attend these meetings when appropriate.

The Physics Division performed a management review in 2002 that identified opportunities to better incorporate ES&H in work planning. Among the corrective actions implemented in 2003 were an improved Division ES&H Web site and a more robust evaluation of safety performance in all employees' performance reviews.

Divisions are focusing on the safety of new employees. Some divisions have developed safety checklists that new employees are required to complete and review with their supervisors. Divisions use these checklists to supplement training required by the Berkeley Lab Job Hazard Questionnaire (JHQ).

Core Function 2: Identify and Analyze Hazards

Performance Rating: 100 %

Divisions inspect almost all Berkeley Lab space as part of self-assessment activities. Inspections are performed at least annually to identify existing hazards, modified hazards, and new hazards. Different strategies exist for inspecting workspaces. In most divisions, self-assessment teams, often consisting of the division safety coordinator and division safety committee representatives, inspect all staff workspaces. Senior managers from all divisions inspect a sampling of staff workspaces. Line managers, such as principal investigators and group leads, inspect their staff workspaces.

Divisions use the expertise of EH&S Division professionals to inspect higher-hazard operations, such as laser and radiological activities. Divisions also perform self-assessment inspections in conjunction with IFAs.

As a result of these inspections, divisions inventory their hazards. Several divisions use the HEAR database to record hazards. Other divisions inventory hazards by program and project and document these hazards on Project Safety Reviews or comparable documentation. Computing Sciences and the Laboratory Directorate focus on ergonomic hazards that are pervasive in their staff workspaces.

Physical Biosciences has an excellent process for identifying hazards. The safety planning team inspects all staff workspaces. In addition, all staff members inspect their personal workspaces. The Division Safety Coordinator meets with each principal investigator at least annually to identify hazards. Finally, group safety representatives discuss new hazards at safety committee meetings.

The ALS Beamline Review Committee performs a technical review of hazards when new projects are introduced.

Core Function 3: Control the Hazards

Performance Rating: 97.9 %

Divisions are effectively controlling hazards. Hazards are controlled through engineering and administrative means.

Divisions check engineering controls as part of self-assessment inspections. In addition, the EH&S Division has institutional programs to ensure that safety showers/eyewashes, fume hoods, gloveboxes, and biosafety cabinets are certified, calibrated, and serviced within required schedules.

Berkeley Lab has published standards for machine guards that self-assessment teams use during their inspection activities. However, the Laboratory does not have standards for high-voltage electrical and laser interlocks.

Division administrative controls are reviewed annually and when work is modified for formal authorizations and self-authorizations. Division line managers play an important role in creating and maintaining administrative controls. Institutional and divisional programs ensure that AHDs and RWAs are renewed on schedule. However, the institutional inventory of AHDs is not accurate for all divisions. Divisions must more diligently inform the institutional AHD program when authorizations are renewed and updated. In addition, the institutional AHD program must engage divisions more regularly.

ESD documents hazard review and control for off-site work on Off-site Safety and Environmental Protection Plans (OSSEPs). Earth Sciences principal investigators complete OSSEPs for field work away from Berkeley Lab. The plan documents site-specific hazards, activity-specific hazards, self-authorized hazard controls, and work clearances and permits. The principal investigator, Division Safety Coordinator, and all staff are required to read and sign the document. Other divisions that engage in off-site fieldwork should emulate this process.

Divisions use a combination of staff training and workstation evaluations to control ergonomic hazards. Divisions are proactive in addressing ergonomic hazards. Some divisions have surveyed staff to focus the efforts of their ergonomic programs. Facilities and some Computing Sciences staff participate in Workers Observing Workers (WOW) programs, which reinforce safe work habits. EETD has trained several staff members to perform routine workstation evaluations, while using EH&S experts for staff experiencing discomfort. Life Sciences and Physical Biosciences promote ergonomically friendly laboratory equipment by inviting outside vendors to present their materials to staff. Facilities and EH&S require MoveSmart training for appropriate staff.

Core Function 4: Perform the Work

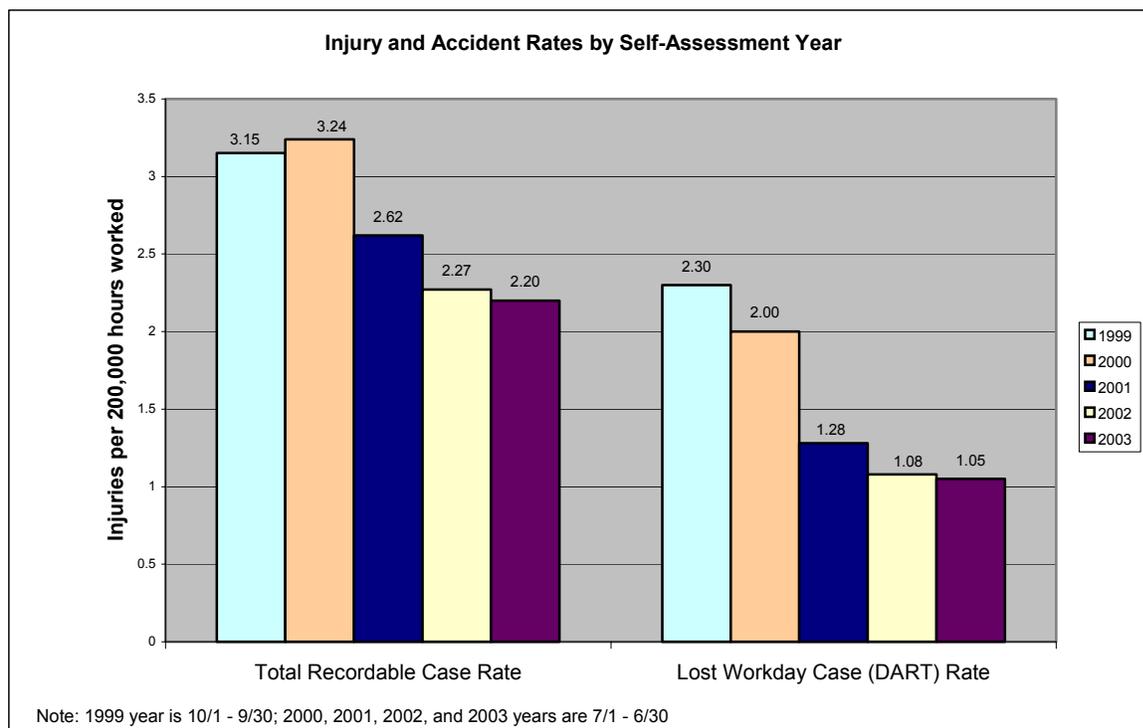
Performance Rating: 95.7 %

The Labwide performance rating under Perform Work in the 2003 self-assessment year is the highest on record. The improvement continues a six-year upswing in the Perform Work performance rating that was interrupted by a slight decline from the 2001 results (95.4%) to the 2002 results (93.3%).

While all divisions' Perform Work performance has improved, four divisions (ALS, AFRD, CSD, and ESD) have near perfect performance. In all four of these divisions, staff incurred no recordable or lost-worktime injuries, regularly completed required training, operated within authorization requirements, and properly managed waste.

With few exceptions, divisions are fulfilling the requirements of formal authorizations. Nuclear Sciences had three instances of authorization noncompliance that resulted in four major RWA violations. LSD incurred one major RWA violation. EH&S received three major RWA violations, all related to the same incident.

The total recordable case rate (TRC) has leveled off, with recordable injuries occurring at approximately the same rate for the last two self-assessment years, about a thirty percent reduction from the 1999 and 2000 TRC rates. Likewise, the days away from work and restricted time (DART) rate remained roughly equivalent for the last two years, and down approximately fifty percent from the 1999 DART rate. Labwide TRC and DART rates for the last five self-assessment years are displayed below.



The divisions effectively manage their hazardous, radioactive, and mixed waste. Divisions accumulate waste consistently within regulatory requirements and characterize waste with high accuracy. All divisions are pursuing waste-minimization opportunities. Several divisions focused on reducing mixed waste, with significant success in CSD, ESD, EH&S, LSD, NSD, and PBD. Divisions are also recycling materials (e.g., wastewater, radionuclides, batteries, absorbents), to reduce waste generation.

Core Function 5: Feedback and Improvement

Performance Rating: 97.9 %

Feedback and improvement is very robust in all divisions, thanks in large part to the active involvement of senior and line management. Managers in all divisions inspect their staff workspaces and facilitate ES&H communications. Division management communicates the importance of a safe workplace at division-wide and group meetings and participates in their respective accident review boards and division safety committees. Actively involved

management has increased staff awareness of ES&H issues, which has resulted in effective ISM programs across all divisions.

Divisions are reviewing Supervisor Accident Analysis Review forms (SAARs) to ensure that proper root causes are identified and appropriate corrective actions are proposed. Divisions are successfully implementing corrective actions designed to prevent repeat incidents. All divisions have a mechanism for reviewing accident and injury reports. At a minimum, a division safety coordinator, EH&S Division liaison, the injured employee, and the injured employee's supervisor will meet to discuss the event. Several divisions have formed accident review boards that convene as appropriate. In a few divisions, SAARs are reviewed at safety committee meetings.

Divisions diligently track workspace safety deficiencies to resolution. Almost all divisions are using LCATS to record safety deficiencies and pursue implementation of corrective actions. Through their self-assessment activities and review of injuries and accidents, divisions recorded over 1,200 findings in the 2003 performance year, with over 90% of these findings closed on schedule. These efforts result in a safer workplace for everyone at Berkeley Lab.

Integrated Functional Appraisals (IFAs)

IFAs evaluate higher-hazard and complex operations that demand subject matter expertise from the EH&S Division. A focus of the IFA is authorization compliance. The following divisions received an Integrated Functional Appraisal during the 2003 performance year:

<u>Division</u>	<u>IFA date</u>
Physics	June 2003
Production Genomics Facility	June 2003
Environment, Health & Safety	July 2003
Chemical Sciences	October 2003
Materials Sciences	October 2003

Integrated Functional Appraisal Results

The five IFAs performed in FY03 conclude that the divisions have satisfactory ES&H programs. Hazards are effectively identified, managed, and controlled; and work performed under formal and line-management authorizations are conducted properly. Divisions focus on reducing injuries and accident through administrative and engineering controls. As the divisions' ISM programs mature, they place greater emphasis on continuous-improvement initiatives. Each division is actively enhancing its feedback and improvement cycle through means tailored to the division.

Common noteworthy practices from the five IFAs are the following:

1. Management is committed to strong divisional ES&H programs. Division management regularly communicates ES&H issues through various means. Also, management participates in self-assessment activities, such as workspace inspections and accident-review meetings.
2. Divisions are proactively managing hazards. CSD and EH&S jointly managed a project to locate, identify, and dispose of legacy radioactive materials from actinide-chemistry programs. PGF has reduced ergonomic hazards by replacing manually intensive sequencing tasks with highly automated machines.

Each IFA identified opportunities for improvement in the assessed divisions. However, the opportunities are very diverse, with most findings addressing improvements in workplace safety. Noteworthy practices and opportunities for improvement for each of the five assessed divisions are listed in Appendix D.

Safety Review Committee Management of ES&H (MESH) Reviews

The Safety Review Committee (SRC) conducts reviews of each division's management of ES&H in operations and/or research, focusing on the implementation and effectiveness of each division's Integrated Safety Management (ISM) Plan. Noteworthy practices and opportunities for improvement identified in each assessment are provided in Appendix E. For FY03, the SRC conducted MESH reviews in the following divisions:

<u>Division</u>	<u>MESH review date</u>
Advanced Light Source	June 2003
Physical Biosciences	June 2003
Directorate/Operations/ASD	July 2003
Environmental Energy Technologies	July 2003

A scheduled MESH review of the Physics Division was not completed in time for inclusion in this report. The FY03 MESH reviews concluded that the assessed divisions provide a safe workplace for employees and guests. All divisions are following their ISM Plans and are generally proactive in managing safety. Hazards are identified during space walkthroughs and projects reviews. These hazards are effectively controlled through engineering and administrative means. Competent hazard control results in safe work performance by staff and visitors. Division managements understand their safety responsibilities and emphasize program improvements. Noteworthy practices and opportunities for improvements for each of the divisions are described in Appendix E.

Common noteworthy practices found include:

1. Divisions have developed sophisticated methods of ES&H communication to best engage their staff. Examples include group safety circles, newsletters and reports, and new-employee safety checklists.
2. Divisions are carefully tracking their safety performance, which fosters programmatic improvement. The Administrative Services Department (ASD) developed a department-specific At-A-Glance table of each unit, and EETD has extensive spreadsheets that track hazards, authorizations, compliance, and status of open issues.
3. Divisions use great ingenuity to proactively address ergonomic hazards. The Financial Services Department identified a new computer program as a source of ergonomic-related staff injuries. In response, the department implemented improvements that effectively reduced musculoskeletal discomfort of staff. In an effort to evaluate more workstations, EETD trained ten workstation evaluators. PBD performed a comprehensive survey of all computer workstations.

Common deficiencies from the reviewed divisions follow.

1. The laser safety program must evaluate programmatic and technical issues noted during self-assessment. The required laser safety retraining is a Web-based training course from Livermore Lab. Some aspects of the course are confusing to Berkeley Lab users, and the course lacks automatic notification to the Berkeley Lab training department. Also, two laser labs that were reviewed have safety deficiencies, one regarding the interlock system and one related to laser configuration. Finally, a few laser AHDs may not have received proper EH&S Division review and maintenance.
2. The institutional formal authorization program requires improvement. Many of the AHD records maintained by the EH&S Division are outdated and contain inaccurate information. Four laser AHDs in EETD are not in the EH&S inventory of laser users and may not have undergone appropriate review in the past year. Also, the notification and approval process for formal authorizations requires improvement, as division managements are not aware of all formal authorizations.

ES&H Improvements

Status of FY02 Self-Assessment Corrective Actions

Each year, as a result of the annual ES&H self-assessment reports, the Laboratory identifies institutional issues that require management action. The status of the corrective actions for the institutional issues identified in the FY02 ES&H Self-Assessment Report is described below.

1. Legacy waste management

- Berkeley Lab management has clarified that line management is responsible for processing hazardous materials and waste when research projects and principal investigators terminate operations. The EH&S Division provides tools (e.g., RWA termination surveys, contract staff allocation) to support this responsibility. For projects that require funding, EH&S assigns appropriate project management and staff.
- The revised Chemical Inventory database notifies division safety coordinators when chemical custodians leave Berkeley Lab.
- All legacy material in the Heavy Elements Research Laboratory (HERL) was characterized and disposition paths identified. Legacy waste in Buildings 85 and 75A is still in process of identification and disposition.

2. Institutional ES&H agreements

- Berkeley Lab continues to negotiate a revised Memorandum of Understanding with UC Berkeley campus representatives. The Laboratory has proposed a draft schedule to UC Berkeley with a completion date of Fall 2003. The new MOU will clarify responsibilities for Berkeley Lab and UCB.
- An institutional policy for matrixed employees has been reviewed and approved by the Safety Review Committee. The policy has been formally approved for adoption into the Berkeley Lab Regulations and Procedures Manual and LBNL/PUB-3000.

Divisional Improvements

During the FY03 Self-Assessment year, divisions addressed opportunities for improvement identified from the FY02 Division Self-Assessments, IFAs, and MESH reviews. Divisions successfully resolved 33 of the 39 opportunities for improvement recognized in the FY02 ES&H Self-Assessment Report. Four of the unresolved deficiencies concern high divisional injury and accident rates recorded during the FY02 Self-Assessment year. Although all four divisions (Engineering, EH&S, Facilities, PGF) proactively implemented program improvements to address staff injuries, the injury rates for each division either increased or remained approximately the same. Appendix F lists the corrective actions and status for each of the FY02 Divisional Opportunities for Improvement.

FY03 Recommendations for Institutional Improvements

Based on the results of the FY03 Division Self-Assessments, Integrated Functional Appraisals, and the SRC MESH reviews, the following opportunities for institutional improvement are recommended:

1. Laser safety

The laser safety program must evaluate programmatic and technical issues noted during the reviews.

- Berkeley Lab does not publish standards for laser interlocks.
- The required laser safety retraining is a Web-based training course from Livermore Lab. Some aspects of the course are confusing to Berkeley Lab users, and the course lacks automatic notification to the Berkeley Lab training department.
- Two laser labs that were reviewed have safety deficiencies, one regarding the interlock system and one related to laser configuration.
- A few laser AHDs may not have received proper EH&S Division review and maintenance.

2. Formal authorizations

- The institutional Activity Hazard Document program requires improvement. Presently, divisions must inform the institutional AHD program (managed by the EH&S Division) when authorizations are renewed and updated. Therefore, the EH&S Division does not have an accurate and current inventory of all AHDs and has not appropriately reviewed all AHDs. Four laser AHDs are not in the EH&S inventory of laser users and may not have undergone adequate review in the past year. Another AHD lacks EH&S Division approval a year after its effective date of May 2002.
- The notification and approval process for formal authorizations requires improvement, as division management is not aware of all formal authorizations (e.g., authorizations for the following committees: Institutional Biosafety, Human Subject Research Quality Assurance, Radioactive Drug Research).

3. Division injury and accident reduction programs

- Four of the unresolved FY02 Divisional Opportunities for Improvement concern high divisional injury and accident rates recorded during the FY02 Self-Assessment year. Although all four divisions (Engineering, EH&S, Facilities, PGF) proactively implemented program improvements to address staff injuries, the injury rates for each division either increased or remained approximately the same. The EH&S Division should focus efforts on the conditions that result in chronically elevated staff injury rates in these four divisions.

Appendix A

Performance Year 2003 Self-Assessment Performance Criteria

EXPECTATION	VALIDATION	RATING
DEFINE WORK		
E1. Resources are effectively allocated to address ES&H, programmatic, and operational considerations.	V1. Are resources allocated to address ES&H considerations?	satisfactory - green partial - yellow marginal - red
E2. Line management regularly communicates ES&H policy, procedures, and lessons learned to all staff. Division staff has clear lines of communication to convey ES&H issues to Lab and Division management, including evidence of clear policy for all staff to communicate safety concerns. Examples of appropriate communication/policy include: <ul style="list-style-type: none"> • Annual all-hands division meeting • Research procedures and protocols include safety notes, PPE requirements • Division-wide emails • Active Division Safety Committee • Group safety meetings • Division ES&H web site • Roles and responsibilities detailed in ISM plan 	V2. Is there evidence of on-going and two-way communication of ES&H between line management and staff?	satisfactory - green partial - yellow marginal - red
IDENTIFY HAZARDS		
E3. Workspaces are inspected and evaluated on a regular basis.	V3. % Division workspace inspected	>85% - green >60% - <85% - yellow <60% - red
E4. Divisions have a process to identify, analyze, and categorize hazards associated with work. Examples of hazard inventory include:	V4. For all Division projects, programs, and operations, have hazards been identified and inventoried? Does inventory include both new work and modification of	satisfactory - green partial - yellow marginal - red

EXPECTATION	VALIDATION	RATING
<ul style="list-style-type: none"> • HEAR database • project safety review • workspace safety review 	existing work?	
CONTROL HAZARDS		
<p>E5. Divisions ensure engineering and other safety controls are in place and maintained. Examples include, but are not limited to:</p> <ul style="list-style-type: none"> • guards • fume hoods • interlocks • personal protective equipment • gas monitors <p>E6. Divisions ensure administrative controls are in place and maintained. Examples of administrative controls for self-authorized work include:</p> <ul style="list-style-type: none"> • work procedures • project safety reviews • assurance letters <p>E7. Divisions ensure that ergonomic issues are effectively addressed for work processes and staff workstations.</p>	<p>V5. Are engineering controls monitored as part of division self-assessment program? Are controls certified/checked, calibrated, and/or serviced within the required schedule?</p> <p>V6. Are hazards controlled for all Division projects? Are administrative controls reviewed annually and when work is modified? This includes work under formal authorizations (i.e. AHDs, RWAs, SSA, XRSs) and self-authorized work (i.e. Division approval only).</p> <p>V7. Does the Division have an active ergonomic program for its employees, including ergonomic training (i.e. EHS060, EHS052, EHS062), evaluations, and controls for work processes and workstations? Are evaluation recommendations implemented?</p>	<p>satisfactory - green partial - yellow marginal - red</p> <p>satisfactory - green partial - yellow marginal - red</p> <p>satisfactory - green partial - yellow marginal - red</p>
PERFORM WORK		
<p>E8. Work is performed within the ES&H conditions and requirements specified by Lab policies and procedures.</p>	<p>V8a. Work within authorization: % SAA compliance (including MWSAAs, RWCAAs)</p> <p>% Authorization compliance (i.e. RWAs, RWPs, XRSs, AHDs)</p>	<p><i>regulatory driven</i> >90% - green >75% - <90% - yellow <75% - red</p> <p><i>regulatory driven</i> >90% - green >75% - <90% - yellow</p>

EXPECTATION	VALIDATION	RATING
	<p>% compliance QA waste samples</p> <p># Waste Management issued NCARs</p> <p>V8b. Injuries and Accidents: Is TRC rate under 2.62 or evidence of divisional improvement?</p> <p>Is LWC rate under the DOE contract control level of 1.50 or evidence of divisional improvement?</p>	<p><75% - red</p> <p><i>regulatory driven</i> >95% or only 1 failure - green >92% - <95% - yellow <92% - red</p> <p><i>regulatory driven</i> 0 - green type 1* - yellow type 2 @ - red</p> <p><i>contract driven</i> TRC >25% below 2.62 or 20% improvement or 1 case/yr - green TRC <25% below/above 2.62 or 10% improvement or 2 cases/yr - yellow TRC >25% above 2.62 - red</p> <p><i>contract driven</i> LWC >25% below 1.50 or 20% improvement or 1 case/yr - green LWC <25% below/above 1.50 or 10% improvement or 2 cases/yr - yellow LWC >25% above 1.50 - red</p>
<p>E9. Staff is proficient in performing work safely.</p>	<p>V9a. % completion of JHQs or equivalent system.</p> <p>V9b. Based on JHQs or training profiles, % completion rate for required courses.</p>	<p>>85% - green >60% - <85% - yellow <60% - red</p> <p>>90% - green >80% - <90% - yellow <80% - red</p>
<p>E10. Divisions review at least one research or operations process. Reviews are documented and , if possible,</p>	<p>V10. 1) Divisions demonstrate progress in minimization opportunities identified in FY02 self-assessment.</p>	<p>satisfactory - green partial - yellow</p>

EXPECTATION	VALIDATION	RATING
waste reduction strategies implemented.	<p>2) Divisions review at least one research or operations process. Reviews are documented and , if possible, waste reduction strategies implemented. Divisions include waste minimization in division project review protocols.</p> <p>3) Divisions that generate no regulated waste pursue minimization opportunities for other wastes (paper, batteries, toner, etc.).</p>	marginal - red
FEEDBACK AND IMPROVEMENT		
<p>E11. Managers and staff are regularly involved in ES&H feedback and improvement activities.</p> <p>E12. ES&H deficiencies identified from workspace inspections, self-assessment activities, and external appraisals are corrected in a timely manner. A downward trend of Level 1 and 2 LCATS repeat deficiencies is established.</p> <p>E13. Division performs thorough review of all staff injuries and accidents, including analysis of conditions that led to injury and implementation of corrective actions.</p>	<p>V11. Do line management (including division directors, principal investigators, and senior/mid managers) and staff participate in feedback and improvement activities (i.e. walkthroughs, programmatic safety review, and other ES&H activities)?</p> <p>V12. % completion rate of corrective actions implemented in a timely manner (including Levels 1, 2, and 3 LCAT-recorded deficiencies and other opportunities for improvement identified).</p> <p>V13. Has Division ensured that accident causes and corrective actions are effectively identified on SAARs? Are corrective actions implemented?</p>	<p>satisfactory - green partial - yellow marginal - red</p> <p>>90% - green >80% - <90% - yellow <80% - red</p> <p>satisfactory - green partial - yellow marginal - red</p>

Appendix B

FY03 Division Self- Assessment Performance

Criteria	Divisions Expectations	AFRD	ALS	Chemical Sciences	Computing Sciences	Directorate	EH&S	Engr	Environ. Energy Tech	ESD	Facilities	LSD	MSD	Nuclear Sciences	Phys Biosci.	Physics	PGF	Expectation Score	
1	Resources allocated to address ES&H considerations.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100%
	Evidence of strong ES&H communication.	Yes	Yes	Yes	Yes	Partial	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	97.9%
2	% Work space inspected.	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	90%	100%	100%	100%	100%	100%
	Hazards identified and inventoried.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100%
3	% Engineering controls certified and calibrated.	100%	96%	100%	100%	N/A	100%	100%	100%	100%	100%	98%	99%	96%	100%	97%	100%	100%	100%
	Administrative controls appropriate and maintained.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100%
	Evidence of an effective ergonomics program.	Partial	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Partial	Yes	Partial	Yes	Yes	93.8%
4	% SAAs in compliance.	100%	90%	100%	N/A	N/A	95%	93%	99%	95%	100%	98%	90%	100%	100%	100%	100%	100%	100%
	% Authorized work w/o major deficiencies.	100%	100%	100%	N/A	N/A	87%	100%	100%	100%	100%	97%	100%	86%	100%	100%	100%	100%	95.2%
	% QA compliance rate.	100%	100%	100%	N/A	N/A	100%	100%	100%	100%	100%	97.0%	97.0%	100%	97.9%	100%	N/A	N/A	100%
	# NCARs.	0	0	0	N/A	N/A	0	0	0	0	1	0	0	0	0	0	0	N/A	94.9%
	Injury & accident case rate (TRC).	0.00	0.00	0.00	1.61	3.00	3.37	3.27	1.38	0.00	6.82	0.36	0.92	2.46	2.12	0.99	5.22	5.22	79.2%
	Lost workday case rate (LWC).	0.00	0.00	0.00	0.81	1.50	1.12	1.48	0.46	0.00	4.82	0.00	0.00	1.23	0.00	0.00	1.31	1.31	91.7%
	% Job hazard questionnaire (JHQ) completed.	93%	99%	98%	85%	96%	91%	100%	93%	94%	86%	91%	95%	91%	98%	88%	99%	99%	100%
	% Completion rate of required courses.	91%	96%	95%	91%	91%	95%	93%	92%	92%	91%	92%	91%	90%	94%	82%	97%	97%	97.9%
Waste minimization (haz., rad., mixed, & sanitary).	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100%
5	Managers and staff involved in ES&H feedback and improvement.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100%
	LCATS completion rate.	87%	91%	100%	>99%	100%	100%	91%	95%	100%	94%	100%	100%	Partial	100%	Partial	100%	100%	93.8%
	SAARs properly completed.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100%
Division Score		96.5%	100%	100%	100%	92.9%	94.7%	96.5%	100%	100%	89.5%	100%	100%	93.0%	98.2%	94.7%	96.1%	97.0%	

Appendix C

FY03 Division Self-Assessment

Noteworthy Practices and Opportunities for Improvement

Division	Noteworthy Practices	Opportunities for Improvement
Accelerator and Fusion Research	<ul style="list-style-type: none"> • AFRD has a well-established system of communicating ES&H issues. The Division Director sends an annual safety memorandum and discusses safety at program-head meetings. Each program head conducts a staff safety meeting annually. The Division Safety Committee meets monthly and includes representatives of all groups. • The division's safety inspection program ensures a safe workplace and promotes continuous improvement. QUEST teams inspect 100% of all workspace. Hazards are recorded in the HEAR database, and safety deficiencies are aggressively recorded and tracked to resolution in the LCATS database. • Division work is performed safely and meets applicable regulatory requirements. Staff incurred no recordable or lost worktime injuries this year. In addition, waste is managed appropriately. 	<ul style="list-style-type: none"> • The Division does not have a proactive ergonomic program. The Division should actively identify potentially deficient workstations and conduct evaluations.
Advanced Light Source	<ul style="list-style-type: none"> • QUEST teams inspect 100% of staff workspace. Hazards are identified and recorded in the HEAR database. Safety deficiencies are tracked to resolution in the LCATS database. • The ALS has an excellent hazard review system. Each research team must document the hazards present in their work. In addition, a technical committee reviews the conceptual design and operational safety of each 	

Division	Noteworthy Practices	Opportunities for Improvement
Advanced Light Source (continued)	<p>beamline.</p> <ul style="list-style-type: none"> • Work is performed safely. ALS staff had no recordable or lost worktime injuries this year, staff is well trained, and waste is managed properly. • Senior and line management is actively involved in the safety program. The Division Safety Committee and technical committees include senior managers, and all managers participate in QUEST inspections. • The QUEST inspections identified 219 findings during the performance year. Ninety-one percent of these deficiencies were resolved on schedule. 	
Chemical Sciences	<ul style="list-style-type: none"> • The self-assessment team conducts effective workspace inspections. Line managers accompany the team on their inspections. The team identified 42 safety deficiencies, all of which were closed in a timely manner. • Chemical Sciences has an effective hazard control program. All controls are certified in the HEAR database. In addition, all PIs sign safety-assurance statements certifying that hazards are controlled. • The Division has a flawless record of zero staff recordable and lost worktime injuries and zero waste-management deficiencies. • Waste-minimization efforts resulted in reducing mixed-waste generation by over 60 liters. 	<ul style="list-style-type: none"> • Chemical Sciences' safety communication system could be improved by implementing a more active avenue of two-way communication. • The Division should expand their control of ergonomic hazards to include workstation evaluations and consider ergonomics of laboratory work.

Division	Noteworthy Practices	Opportunities for Improvement
Computing Sciences	<ul style="list-style-type: none"> • Computing Sciences was the first LBNL organization to mandate ergonomic training for all staff and widespread workstation evaluations. Aggressive implementation of this policy has resulted in maintaining a low injury rate. Division policy requires workstation evaluations for heavy computer users and when new work areas are established. Ninety-one percent of staff has completed ergonomic training, and 80% of staff has had workstation evaluations. • Feedback and improvement is robust in Computing Sciences. Two units established pilot Workers Observing Workers (WOW) programs. All line managers inspect their staff workspaces, an activity that has resulted in discovery and resolution of 158 safety deficiencies. Finally, an accident review board investigates significant injuries and accidents. 	
Directorate/ Operations/ ASD	<ul style="list-style-type: none"> • Senior management involvement is strong. The Deputy Director for Operations chairs the Safety Committee and led an Operations-wide Safety Forum on May 19. Also, all department heads inspect their staff workspace as part of the self-assessment activities. 	<ul style="list-style-type: none"> • Outside of ASD, the safety communication system is inconsistent and may not reach all employees. The Directorate/Operations Safety Committee meets twice annually, but minutes are not documented. • The total recordable case rate is 3.0. • The organization has recently begun systematically recording and tracking safety deficiencies. Continuing this process will improve staff workplace safety. • The ASD Executive Safety Committee was formed to review staff injuries and accidents. However, this body was not active during the 2003 Self-Assessment year.

Division	Noteworthy Practices	Opportunities for Improvement
Earth Sciences	<ul style="list-style-type: none"> • Earth Sciences is participating in a pilot program in which Berkeley Lab shares ergonomic-upgrade costs with the division. The Division allocated \$7,000 for ergonomic upgrades and received an additional \$7,000 from Berkeley Lab. • The Division has a robust two-way ES&H communication system. ES&H was first on the agenda at all three Division-wide town hall meetings this year. ES&H is a standing agenda item at all Division council meetings. The Division Safety Committee meets regularly and distributes minutes. • The Division Director meets with each injured employee and the employee's supervisor to discuss the accident and preventative measures. • Earth Sciences inspected 100% of staff workspaces, recorded hazards in the HEAR database, and tracked safety deficiencies. These inspections included line management. • Waste-minimization efforts were very successful. Manual separation of hazardous and nonhazardous samples eliminated up to 125 gallons of waste. In addition, three liters of waste were benchtop neutralized each month. • The Division Director attends all safety committee meetings. 	<ul style="list-style-type: none"> • The OSSEPP is a good initiative to identify and control hazards, but it is not applied to all field locations.
Engineering	<ul style="list-style-type: none"> • Engineering has a dedicated account to support the Division ES&H program. • Self-assessment teams inspected 100% of staff workspaces. Hazards identified are recorded in the HEAR database, and safety deficiencies are tracked in the LCATS database. 	<ul style="list-style-type: none"> • Engineering continues to struggle with recordable and days away from work and restricted time (DART) injuries.

Division	Noteworthy Practices	Opportunities for Improvement
Engineering (continued)	<ul style="list-style-type: none"> Both senior and line management participate in self-assessment activities. The Division Director, department heads, and PIs inspect staff workspaces. The Division accident review board includes department heads of affected organizations. 	
Environmental Energy Technologies	<ul style="list-style-type: none"> The Division has a very active ergonomic program. Key to this process is that ten staff members have been trained as workstation evaluators. These individuals perform routine workstation inspections, which frees EH&S experts to evaluate workstations of staff experiencing discomfort. In this way, the Division increases the quantity of workstation evaluations without compromising the quality of evaluations. EETD has done extremely well in all areas of Perform Work, with high regulatory and authorization compliance rates and low staff injury rates. Feedback and improvement is well implemented in the division's ES&H program. The system of inspections, hazard review, and corrective action tracking is integrated and highly effective. 	
Environment, Health and Safety	<ul style="list-style-type: none"> The Division Safety Committee is integral to the self-assessment program. Committee members communicate ES&H issues to all groups, participate in inspections, and track safety deficiencies. Staff members who perform physical work as part of their job are required to complete MoveSmart training. 	<ul style="list-style-type: none"> Although the total recordable case rate improved slightly from the 2002 performance year, EH&S still needs to reduce injuries. However, the DART rate improved significantly from 2002. An RWA noncompliance resulted in three major violations.

Division	Noteworthy Practices	Opportunities for Improvement
Environment, Health and Safety (continued)	<ul style="list-style-type: none"> Senior and line management inspects all staff workspaces. Line managers are responsible for reviewing hazards and updating the HEAR database. 	
Facilities	<ul style="list-style-type: none"> The new Division Director instituted quarterly all-hands meetings with safety on the agenda. The Division continues to support MoveSmart training and WOW. These programs promote safe work practices with the goal of reducing injuries and accidents. All managers have performance expectations to reduce the number of staff accidents and participate in the WOW program. 	<ul style="list-style-type: none"> Hazard review of complex work orders that do not fall under the small-projects review requires more consistent and formal administrative controls. The injury rates for total recordable cases and DART are higher than last year.
Life Sciences	<ul style="list-style-type: none"> Life Sciences' line managers inspected 100% of staff workspaces. The division's space-hazards database is updated as part of this process. Life Sciences has a very proactive ergonomic program. Workstation evaluations have been performed for all administrative workstations. Selected vendors have presented ergonomic laboratory equipment to Division staff. Finally, the Division is part of the pilot program to receive matching Berkeley Lab funds for ergonomic upgrades. This program has resulted in numerous workstation upgrades. Life Sciences continues a multiyear effort to reduce mixed-waste generation, which is generated at five percent of previous year's rates. The Division identified 59 safety deficiencies and tracked all to resolution in the LCATS database. 	

Division	Noteworthy Practices	Opportunities for Improvement
Materials Sciences	<ul style="list-style-type: none"> • Materials Sciences' ES&H communication system has improved in recent years. Notable is that the Division Director addressed all Division PIs on the importance of working safely. • Work is performed safely. Injury and accident rates are traditionally low, and staff is well trained. • The Division self-assessment team inspected all staff workspace, recording 158 findings. All deficiencies were resolved on schedule. 	<ul style="list-style-type: none"> • Workspace inspections are very thorough. Materials Sciences has pledged to require PIs to accompany the self-assessment team during inspections of staff workspace, a model successfully employed by Chemical Sciences and Life Sciences Divisions. This will strengthen the division's feedback and improvement mechanisms.
Nuclear Science	<ul style="list-style-type: none"> • ES&H considerations are funded by projects, but the Division has an account number to support ES&H division-wide and when projects lack required funds. • Nuclear Sciences dedicates one of the regular all-hands meetings to ES&H. This meeting is mandatory for all staff. • The Division eliminated all mixed-waste generation, a reduction of 56 liters. • Senior and line managers are involved in self-assessment activities. The Division Director inspected staff workspaces. Both Division safety committees include line managers. 	<ul style="list-style-type: none"> • Workspace inspection and hazard inventory should be more systematic. Some workspaces were not inspected, perhaps due to lack of organization. The hazard inventory will improve as the Division uses the HEAR database. • Nuclear Sciences should be more proactive in performing workstation evaluations. • The Division had three authorization noncompliances that resulted in four major violations. • Staff incurred two recordable injuries this year, an increase from zero a year ago. However, the Division sees progress in their accident-prevention efforts because last year matrixed staff and guests had recordable injuries. • Nuclear Sciences does not successfully track corrective actions to resolution. Fifteen deficiencies were recorded in the LCATS database, but none were resolved.

Division	Noteworthy Practices	Opportunities for Improvement
Physical Biosciences	<ul style="list-style-type: none"> • Physical Biosciences has a proactive ES&H communication system. The Division Safety Committee meets ten times a year, and includes representation from all division groups. The Division safety planning team prepares ES&H reports three times a year that are discussed with the Division Director and the Division Deputy. • The Division has established a UCB campus EH&S liaison who participates in applicable communication and safety committee activities. • The Division reduced mixed-waste generation of one research group. A second research group transferred unnecessary ¹⁴C scintillation standards to another Division for continued use. 	<ul style="list-style-type: none"> • Division staff had two recordable injuries for the third straight year. However, the Division had no lost work-time injuries.
Physics	<ul style="list-style-type: none"> • The Physics Division implemented corrective actions from their FY02 Management Review of ES&H. Corrective actions include an improved Division ES&H Web site and revised performance evaluations for all staff to include safety. • Management commitment to ES&H is strong. Division management is part of the Division Safety Committee. In this role, they actively participate in safety communication, workspace inspections, and hazard review. Safety is also addressed at group leader and Physics management meetings. Also, the Division Director has inspected staff workspace. 	<ul style="list-style-type: none"> • The Division has committed to using the HEAR database to inventory hazards during the 2004 performance year. This will create a more comprehensive hazard inventory than is presently available. • Physics staff is not diligent in completing ergonomics training. Also, workstations evaluations are not regularly performed. • Division staff completed only 82% of all required training. For the second straight year, this is a significantly lower completion percentage than all other divisions. • Physics documents safety deficiencies but does not have an effective system to track implementation of corrective actions.

Division	Noteworthy Practices	Opportunities for Improvement
Production Genomics Facility	<ul style="list-style-type: none"> • Line management inspects staff workspaces twice yearly with the Division Safety Coordinator. These inspections engage management on ES&H concerns, identify workspace hazards, and ensure accuracy of the hazard inventory. • Genomics has a proactive ergonomics program. All staff has completed required ergonomic training, and workstation evaluations are emphasized. The Division is focusing on laboratory ergonomics in the future. • Management is committed to the safety program. The Division Director and Operations Manager performed a safety walkthrough of staff workspaces. Line managers inspect workspaces semiannually. Finally, the Division Safety Committee includes division management. 	<ul style="list-style-type: none"> • PGF had an increase in recordable injuries to staff this performance year. However, the DART rate declined significantly, with only one lost work-time injury to staff. • PGF should expand the application of LCATS to include deficiencies discovered during line management inspections.

Appendix D

FY03 Integrated Functional Appraisal

Noteworthy Practices and Opportunities for Improvement

Division	Noteworthy Practices	Opportunities for Improvement
Chemical Sciences	<ul style="list-style-type: none"> • Management support of the safety program within CSD is excellent, as evidenced by the regular safety meetings among the Division Deputy, Division Liaison, and Division Safety Coordinator. In addition, the Division Deputy attends all IFA and self-assessment inspections, and actively participates in reviewing compliance records and implementing needed modifications. • Over the past several years, CSD and EH&S have managed a project to locate, identify, and dispose of legacy radioactive materials connected with the Actinide Chemistry programs. As a result of this project, the Division and LBNL have assurance that issues are addressed proactively, and no "surprises" should occur in this area. 	<ul style="list-style-type: none"> • A significant number of findings were discovered in newly renovated spaces occupied by a new research group. This probably reflects the group's unfamiliarity with how safety is managed at LBNL, but does not reflect any lack of safety-consciousness on the part of that group. The group should consult closely with CSD safety staff and with EH&S directly as necessary. • Division staff (including students) located on UCB campus is not specifically included in the Division's Integrated Safety Management Plan. Over the next performance year there will be a Labwide effort to recognize LBNL and DOE responsibility for safety in DOE-funded projects wherever they may be executed (including UCB). CSD should anticipate this requirement so that the Division is in a position to respond appropriately.
Environment, Health & Safety	<ul style="list-style-type: none"> • EH&S maintenance of hazards and self-authorizations is exemplary. All workspaces are entered into the HEAR database, and virtually all spaces have been verified and re-approved within the last twelve months. • The process of documenting, reviewing, and authorizing Environmental Restoration projects involving physical labor assures full communication among the Site Restoration staff, the individuals 	<ul style="list-style-type: none"> • One possible deficiency is work under Waste Management Procedure 852, <i>Onsite Transportation and Desensitization of Reactive Hazardous and Mixed Wastes</i>. This is work meeting the criteria for an AHD under the requirements of LBNL/ PUB-3000. While the work and attendant hazards and precautions appear to be appropriately described in the procedure, the review and approval process lacks the formality of an AHD review.

Division	Noteworthy Practices	Opportunities for Improvement
Environment, Health & Safety (continued)	<p>performing the work, and the industrial hygienist overseeing the job safety requirements.</p> <ul style="list-style-type: none"> • Workers at remote sites carry cell phones for emergency communications. A two-person rule is in effect for staff working at locations out of cell-phone range. • Division Safety Committee members take turns developing and presenting safety discussions at committee meetings. Other committee members then present these discussions in their respective group meetings. The presentations are also posted on the safety committee Web site. 	<ul style="list-style-type: none"> • LBNL contracts require service contractor safety plans to be approved by the EH&S Division Field Support Department (now Occupational Safety Group). Safety plans for Barton Security and for the Alameda County Fire Department should be submitted to the Occupational Safety Group for approval. • Electronics repair work in Building 75 is performed by an electronics technician working without supervision and without other people in the room, in apparent conflict with LBNL electrical safety requirements. A thorough review of the work and procedures by the electrical safety engineer should be requested. • Fire sprinkler/foam systems, alarm and fire-detection systems, and the emergency power generator in the HWHF require maintenance, testing, and inspection in accordance with National Fire Protection Association (NFPA) 25, NFPA 72, and NFPA 110 respectively. The HWHF manager is uncertain if current Facilities Department procedures meet these criteria. The LBNL Fire Protection Engineer should review the current inspection and maintenance practices to verify compliance.
Materials Sciences	<ul style="list-style-type: none"> • Access, egress, general housekeeping, and seismic considerations have improved significantly since the last IFA. • The division's authorization maintenance and compliance has improved recently. X-Ray, RWA, Biological Use, and SAA authorizations are current and compliant. 	<ul style="list-style-type: none"> • Liquid containers in many storage cabinets are stored on flat shelves without adequate secondary containment. The recessed area in liquid storage cabinets serves as the secondary containment for the lower shelf only; trays should be supplied for bottles on upper shelves. • Most glass windows on vacuum chambers were open and unprotected. Covers (e.g., lexan) should be fitted

Division	Noteworthy Practices	Opportunities for Improvement
Materials Sciences (continued)	<ul style="list-style-type: none"> • MSD responded immediately and aggressively to resolve deficiencies in the AHD management process. The Division continues to pay proper attention to this issue. • The applicability of LBNL's ISM System to Laboratory employees who work in UCB spaces was clarified in April. Materials Sciences was the first Division to announce to its UCB researchers that they have responsibility to LBNL and to DOE for safety on DOE-funded projects. 	<p>over the windows to protect against dropping something onto the window (tool, bolt, etc.) and to protect against backsplash of glass fragments in the event of window failure.</p> <ul style="list-style-type: none"> • MSD chemical custodians are not actively using the LBNL Chemical Management System. • Materials Sciences has maintained its own file system for reauthorization of AHDs for several years. While the basic requirement of having the AHD reviewed and reauthorized annually has been met, several opportunities for improvement exist. (Note: these areas were identified to MSD early in the IFA process, and the Division implemented corrective actions immediately.) • A large amount of obsolete equipment, apparently not in use, has accumulated in laboratories (especially in Building 66). This equipment takes up space that could otherwise be productively used; MSD should consider the value of this obsolete equipment vs. the value of research space. • A number of single-edge razor blades were left unattended on the countertops. This issue may be research-group dependant. Where one blade was observed, generally several were observed. Other labs have well-marked and well-used "sharps" containers. Also, the use of razor blades for cutting should be examined; bare razor blades are very difficult to hold onto safely, and disposable scalpels or razor blade holders may be safer and more appropriate cutting tools.

Division	Noteworthy Practices	Opportunities for Improvement
Materials Sciences (continued)		<ul style="list-style-type: none"> • In general, the improper use and "daisy-chaining" of extension cords is much less prevalent than in the past. However, opportunities still exist for providing permanent wiring so that extension cords are not necessary. • Many cryogen dewars are not adequately secured for resistance to earthquake (especially in Building 2). Locking wheels or wheel chocks are not sufficient, as this can cause these top-heavy items to tip over and discharge. Rather, anchoring should be to mid-height or above, and secure to a structural member. • PIs must make additional efforts to support their SAA custodians, who are often junior graduate students without sufficient experience or authority to counsel more senior staff into adhering to requirements.
Physics	<ul style="list-style-type: none"> • In 2002, the Physics Division Safety Committee undertook a "vertical slice" survey of employees to verify that students, technicians, researchers, supervisors, and group leaders implemented safety requirements. This significant and worthwhile effort helped to pinpoint the strengths and weaknesses of the Division safety approach. 	<ul style="list-style-type: none"> • The Liquid Argon Test AHD lacks EH&S Division approval a year after its effective date of May 2002. The AHD was submitted to the EH&S Division for approval in May 2002, and the Laser Safety Officer met with the PI at the time. However, the procedure was not amended, and the signoff was not completed. Necessary changes to the Engineering Safety Note were also not completed nor submitted at the time. The experiment is now under review again, and the AHD and Safety Note will be revised and signed appropriately. The EH&S Division has also modified the hazard-assessment procedures to prevent such oversights in the future. • Few provisions have been made to facilitate ergonomically correct body positioning for personnel using

Division	Noteworthy Practices	Opportunities for Improvement
Physics (continued)		<p>microscopes. This was noted during the previous IFA, and little improvement is noted since then.</p> <ul style="list-style-type: none"> • Staff does not regularly complete required training in a timely manner. • Tracking hazards and authorizing work in all spaces should be improved.
Production Genomics Facility	<ul style="list-style-type: none"> • Top management commitment is evident. The new Division Director took the initiative to issue a formal written safety communication (via e-mail) to the all staff. Safety responsibility/accountability and hazard mitigation have been the emerging messages delivered by management. • All PGF managers and supervisors completed a tailored EH&S 20 training course (EH&S for Supervisors). • Management revised the division's ISM Plan to reflect a more tailored approach in managing ES&H issues. • PGF has sound biosafety practices for its biosafety level-one biological work. • Engineering solutions to sequencing work are noteworthy. Megabace 1000 and 4000 units, with their manually intensive sequencing tasks, have been replaced by highly automated ABI 3730 machines. • The Division is proactively designing warning notices and labels for newly fabricated equipment. • The Division is driving down the severity of injuries and illnesses. 	<ul style="list-style-type: none"> • A more robust system for supervisor participation in safety is needed. Some forms of job safety analysis (JSA), SAAR investigation refresher training, and safety performance accountability are necessary to reinforce the importance of proactive oversight and management of workplace safety.

Appendix E

FY03 SRC MESH Review

Noteworthy Practices and Opportunities for Improvement

Division	Noteworthy Practices	Opportunities for Improvement
Advanced Light Source	<ul style="list-style-type: none"> • The Division ES&H/ QA Committee and QUEST Safety Circles provide an established method of communication that engages all staff. • ALS staff has established an open and inviting safety culture that is very accommodating to visitors. The ALS provides visitors with professional expertise and a wide range of parts and accessories to upgrade the safety of their equipment. The culture of the ALS results in increasing the safety awareness of visitors, which often leads to visitors taking the initiative to improve their equipment. • ALS has an outstanding review process for identifying new and existing hazards. Beamline scientists and principal investigators must certify that hazards are controlled whenever modifications that have safety implications are made and annually during the experiment review process. • ALS has a very effective hazard control process. The Technical Safety Committee authorizes all modifications to personnel safety systems. The Beamline Review Committee reviews and authorizes all new and modified beamlines. 	<ul style="list-style-type: none"> • ALS has nearly 500 procedures, creating logistical difficulties in ensuring that all procedures remain current. In fact, some procedures are beyond their review period. Division management recognizes this vulnerability and has begun the process of prioritizing procedures to ensure the most important documents remain current. • The physical space of the ALS floor creates significant emergency-preparedness difficulties. The MESH team noted several egress, trip, and seismic hazards in staff workspaces. Emergency egress paths are not properly marked.
Directorate/ Operations/ ASD	<ul style="list-style-type: none"> • The ASD requirement that all units conduct semiannual safety meetings is an effective way of ensuring that all staff is engaged and communicating safety related information. 	<ul style="list-style-type: none"> • Outside of ASD, communication in the organization is inconsistent and may not reach all staff. The safety committee, which meets twice yearly, can address this issue. The committee charter, as provided in the ISM Plan, does not

Division	Noteworthy Practices	Opportunities for Improvement
Directorate/ Operations/ ASD (continued)	<ul style="list-style-type: none"> • The Financial Services Department noticed a recent increase in ergonomic-related first aid and recordable injuries. The Department determined that a new computer program regularly used by staff contributed to these injuries. As a result, the Department implemented improvements that have proven effective in reducing musculoskeletal discomfort of staff. • ASD has developed an ES&H Performance At-A-Glance matrix that displays the safety performance of each unit. This is a useful tool, as it encourages managers to focus on those areas of staff safety that require attention and also provides important feedback to the Department Head. 	<p>define roles and responsibilities for committee members. Meeting minutes are not recorded and distributed.</p> <ul style="list-style-type: none"> • Senior management and the Division Safety Coordinator were unaware of the results of the previous MESH review, conducted in June 2000. As a result, most corrective actions proposed in response to the findings remain unimplemented. • Directorate/Operations/ASD has identified ergonomics as the primary hazard in staff workspace. However, the system of tracking ergonomic evaluations is not operating effectively. As of June 2003, approximately one-third of all staff has not received an ergonomic evaluation at any time during employment (according to the EH&S training database). The organization should monitor evaluations more closely, as ergonomics is the only significant hazard that staff encounters. • ASD has established an Executive Safety Committee to focus on accident reduction and management of ES&H issues. However, the Department Head indicated that this body has not met in over a year. Considering the number of accidents and injuries to ASD staff, more frequent meetings are warranted. • Directorate/ Operations/ ASD does not have a systematic process for recording and tracking safety deficiencies. The organization claimed they have had no recorded safety deficiencies in recent years, and therefore did not need to track findings. However, line managers indicated that they had discovered safety deficiencies and were acting independently to track and resolve these findings. Also, a review of inspection checklists revealed safety deficiencies that were not tracked systematically.

Division	Noteworthy Practices	Opportunities for Improvement
Environmental Energy Technologies	<ul style="list-style-type: none"> • EETD has instituted a range of mechanisms to ensure that safety information is reaching all levels of the organization. The Division prepares a Quarterly Division Safety Report, addresses safety in many of its weekly electronic newsletters, has an extensive intranet ES&H Web site, produces its own lessons learned Web site, sends out a quarterly hazardous waste newsletter to all EETD waste generators, and meets quarterly or more frequently with the Safety Team. The Division Safety Coordinator is also very active in visiting laboratories on a regular basis and communicating and resolving ES&H issues with the principal investigator. • The Division has developed several internal databases/spreadsheets to track its safety performance. The EETD Facilities Overview spreadsheet, in particular, provides EETD management with clear, concise, and current information on hazards, authorizations, compliance, and status of open issues for all EETD facilities at LBNL. At a more detailed level, spreadsheets are used to track compliance and reviews of AHDs, radioactive materials, SAAs, and office safety in Building 90. • EETD has identified ergonomic hazards as a leading cause of recordable injuries. To mitigate such injuries, EETD initiated a program to train ergonomic evaluators, evaluate all Division workstations, and implement workstation upgrades. Ten EETD evaluators have been trained. They have evaluated over 52 workstations, with the goal of evaluating 300 workstations before the end of the fiscal year. • EETD is participating in a Laboratory pilot program to share the cost of 	<ul style="list-style-type: none"> • The MESH team noted that many EETD AHDs in the EH&S Division files are several years old and have inaccurate information. Records of AHDs in both the Division and EH&S files should be consistent with any updated information. • Several programmatic and technical issues require evaluation and action by the LBNL Laser Safety Officer (LSO). They are: <ul style="list-style-type: none"> a. Four of the active laser AHDs were not in the EH&S inventory of laser users and may not have been reviewed in the past year by the LSO. b. The utility door for the laser in room 238, Building 62, is not part of the interlock system. An individual can enter the room through the utility corridor and potentially be exposed to an operating laser. c. The required laser safety re-training is web-based training course from Livermore Lab. The course includes LLNL site-specific attributes that are not applicable to Berkeley Lab, and without clarification provided by the Berkeley program, are confusing to Berkeley Lab laser users. • One suite of EETD laboratories in Building 62 is not as well maintained as other Division facilities. Many of the safety deficiencies have been self-identified by during past walkthroughs, but the findings persist. Lack of space in these laboratories contributes to some of the safety problems.

Division	Noteworthy Practices	Opportunities for Improvement
Environmental Energy Technologies (continued)	<p>workstation upgrades. So far, over \$17,000 has been spent on upgrades.</p> <ul style="list-style-type: none"> The Division initiated a major cleanout of two laboratories in Building 70. The cleanout involved characterizing thousands of unlabeled and inadequately labeled chemical containers. The coordinated effort to characterize the chemicals with former employees and EH&S subject matter experts has resulted in significant hazardous waste disposal cost savings. 	
Physical Biosciences	<ul style="list-style-type: none"> Physical Biosciences has developed a safety checklist that each staff member is required to complete at commencement of employment. The exercise of completing the checklist is an effective method of communicating staff safety responsibilities and increasing awareness of workspace hazards. PBD has identified a UC Berkeley campus EH&S Liaison. This is an important relationship, as a significant portion of Division staff occupies campus space. The campus liaison regularly communicates with the Division Safety Coordinator, receives Safety Committee minutes, and has attended a Safety Committee meeting. At each lab that contains chemicals, PBD has established stations to provide guidance and all necessary forms and labels to properly manage chemicals and hazardous waste. Each group has a designated group chemical coordinator who is responsible for managing the chemical inventory and SAA Physical Biosciences has a very proactive ergonomics program. The Division performed a comprehensive survey of all computer workstations to 	<ul style="list-style-type: none"> The authorization process for several institutional committees (e.g., Institutional Biosafety Committee, Human Subject Research Quality Assurance Committee, Radioactive Drug Research Committee) lacks a mechanism requiring division-level senior and safety management notification and approval. At a minimum, notification requirements should be revised to ensure that Division management is aware of all formal authorizations. Several issues related to laser safety were noted. Some confusion exists about proper notification that staff has completed EHS0281, Laser Safety Retraining. Staff must view an online training program via Livermore Lab and inform the Berkeley Lab training department when completed. The laser configuration in a researcher's lab in Building 3 is a concern. While operation of the laser appears safe, improved controls, including clearer demarcation of the beam route, are warranted.

Division	Noteworthy Practices	Opportunities for Improvement
Physical Biosciences (continued)	<p>identify highest-risk employees. PBD has a standing policy that all remodeled and newly occupied spaces receive ergonomic workstations.</p> <ul style="list-style-type: none">• As part of their Division self-assessment process, all staff members inspect their personal workspaces and complete safety checklists. Well over 90% of all staff fulfills this requirement annually.• Senior management has demonstrated great commitment to ES&H. The Division Director holds senior staff accountable for safety in their employee reviews.	

Appendix F

Status of FY02 Divisional Opportunities for Improvement

Division	Opportunities for Improvement	Corrective Action	Status
AFRD	Eighty-three percent of programmatic corrective actions were completed or on schedule as of June 30, 2002. The Division has a very active inspection program, but due to funding constraints, is unable to address all deficiencies.	Communication with Work Request Center has improved, resulting in improved closure of institutional findings and findings requiring Facilities labor.	Closed
	While the accident/injury rate for AFRD employees is low, a number of Engineering Division employees (matrixed to AFRD) were injured in the last few years. AFRD is currently working with the Engineering Division to address this issue.	AFRD and Engineering have formalized an agreement for matrixed employees as part of their ISM Plans. Also, an institutional policy on matrixed employees has been adopted. The Engineering Division Safety Coordinator participates in AFRD walkthroughs and safety meetings, as appropriate, which has led to improvements in shop safety.	Closed
	Emergency Team training is currently up to date, but the Division needs to better define the responsibilities and backups for members.	AFRD is improving the organization of the emergency teams for Building 71. This building was the main area of concern.	Closed

Division	Opportunities for Improvement	Corrective Action	Status
Advanced Light Source	The ALS received an NCAR for noncompliant waste storage.	The ALS has expanded the frequency of SAA inspections. WM-led inspections occur quarterly (up from three times last PY), and QUEST teams monitor SAAs. In addition, the scope of the inspections has increased to identify waste not stored in the SAA. SAA compliance rate is 90%, and the ALS has no QA exceptions or NCARs through May.	Closed
Chemical Sciences	Chemical Sciences still has only one formal safety meeting a year. The infrequency of safety meetings may not effectively provide timely communication of safety issues to staff.	Chemical Sciences has bimonthly safety meetings among the Division Safety Coordinator, EH&S Liaison, and Division Deputy. Relevant information from these meetings is communicated to staff via electronic and face-to-face interactions. Division Safety Committee meeting minutes are sent to all PIs. The Division had a safety meeting for all campus staff on February 13.	Closed
	The Safety Assurance Statement is simply a signed statement and does not provide a mechanism to track EH&S concerns, such as hazard review and equivalent training for campus staff. However, this is primarily an institutional issue that must be addressed in the revised Memorandum of Understanding.	The February 13 staff meeting addressed this concern. The Division is also creating a tailored JHQ for campus staff. The LBNL/ UC Berkeley MOU is presently being modified. When finalized, Chemical Sciences will revise the ISM Plan to incorporate the new agreement. Tracked as an institutional finding.	Closed
	Chemical Sciences shares responsibility with EH&S Division for characterization of legacy items in HERL. These materials create a potential safety hazard to people working in the facility.	The Legacy Waste Task Force, a cooperative effort between the EH&S and Chemical Sciences Divisions, continues to make progress on processing legacy waste. In addition, all staff working in HERL sign the facility safety binder. Tracked as an institutional finding.	Closed

Division	Opportunities for Improvement	Corrective Action	Status
Computing Sciences	Evaluation of individual ES&H performance of staff is insufficient. Each P2R reviewed has a standard ES&H statement of responsibility and expectations. There is no actual data or information to confirm that expectations, such as completing ergonomic training or workstation evaluation, are met. The new PRD forms introduced for this year's evaluations should elicit specific supervisor comments on ES&H performance relative to expectations.	Performance reviews now include evaluation of ES&H tailored to individual job descriptions.	Closed
	Although workstation evaluations for each employee became a Division requirement as early as July 2001, a significant number of employees still have not had their evaluations. Although the Division aggressively promotes evaluations, the individual employee is responsible for initiating the request for an evaluation. If workstation evaluation is a Division job requirement, then line managers should ensure better compliance with the stated requirements.	Everyone lacking EHS068 prior to PY03 is scheduled for an ergonomic evaluation. As of 6/30/03, 80% of staff has completed EHS068.	Closed
	The Directorate does not systematically track the follow-up actions recommended during a workstation evaluation. Division management believes that staff should be responsible for implementing recommendations. A combination of staff responsibility and management assurance is a better approach for enacting ES&H improvements in the work environment.	The Division tracks significant recommendations to closure in Berkeley Lab's ergonomic database.	Closed
Directorate/ Operations/ ASD	Walkthroughs of workspaces should be planned earlier in the year to avoid scheduling conflicts. Although deficiencies discovered during the FY02 walkthroughs were minor in nature, more attention is warranted in documenting corrective actions for tracking and trending purposes.	Self-assessment walkthroughs were performed in May and June. Findings recorded and tracked to resolution in the LCATS database.	Closed

Division	Opportunities for Improvement	Corrective Action	Status
Earth Sciences	Participation in periodic safety walkarounds by department heads, group leaders, and supervisors would create visibility and open up dialog between employees and management. Such proactive efforts would help reinforce consistent safe work practices.	Most department heads and group leaders have inspected staff workspace.	Closed
Engineering	Engineering is still working to reduce recordable and lost workday injuries.	The Division is working with staff that have had repetitive injuries. Also, department heads now participate in the SAAR review process. The Division Safety Coordinator trends all injuries by department and reports results to the Division Director.	Open
Environmental Energy Technologies	EETD should continue the process of migrating their present corrective action tracking methodology to the LCATS database.	EETD is tracking corrective actions in LCATS this performance year.	Closed
Environment, Health & Safety	EH&S experienced an increase in recordable and lost-workday injuries from the previous self-assessment year.	EH&S is presently tracking recommendations from SAARs and ergonomic evaluations, ensuring proper implementation. The Division Accident Review Board remains active and has reviewed most first-aid cases and all recordable injuries. Division staff has incurred three recordable and one lost-worktime injury through June.	Open

Division	Opportunities for Improvement	Corrective Action	Status
Environment, Health & Safety (continued)	A significant incident of RWA noncompliance resulted in three major and one serious authorization violations.	Corrective actions identified in the ORPS (EHS-02-02) have been implemented. High-hazard operations of the RWA remain suspended. The Waste Management Group Leader is acting Operations Team Leader. Hiring of permanent Operations Team Leader is pending (6/03).	Closed
	The EH&S Division has not designated a primary lead for work planning to deal with legacy-waste issues. Perhaps work planning could be improved by designating a single point of contact (POC) as lead for all legacy-waste issues. In addition, a system including more highly trained, full-time personnel with proper training focusing on the legacy waste problem might produce a faster and safer outcome.	The Legacy Waste Task Force is processing legacy waste and aims to complete operations by the end of FY03. This corrective action is managed as an institutional corrective action.	Closed
Facilities	Facilities received an NCAR for a significant weight discrepancy on an item of waste.	Facilities has received a second NCAR for a similar issue. In response, Facilities: 1) revised the procedure for sending waste to the Nevada Test Site, 2) combined it into one set of procedures, and 3) retrained all personnel involved in the project, with an emphasis on increased communications.	Closed
	Facilities continues to struggle with injuries and accidents to staff. After showing significant improvement in the last self-assessment year, there was only marginal improvement this year.	Seventeen recordable injuries through June. The Division program to reduce injuries includes: expanding the WOW program, with more staff performing observations; a new Division Safety Coordinator; and a new Division Director with strong commitment to safety and injury reduction.	Open
	The Facilities Department HEAR Database accurately reflects the hazards assessed in the physical space walkthroughs. However, it was noted that responsible individuals and locations require update. The Division Safety Coordinator will input and maintain the appropriate changes required to create an updated and effective database.	The HEAR database is not current. The new Division Safety Coordinator will update the Facilities spaces in the HEAR database when the PDA feature is operable.	Open

Division	Opportunities for Improvement	Corrective Action	Status
Facilities (continued)	Proper chemical storage and handling should be emphasized as an important training and inspection concern. The cross-shop inspection program should identify chemical storage as a primary deficiency noted during the IFA field review.	The Division has a proactive chemical inventory system. All containers are checked three times a year. Changes are reflected in the database.	Closed
	The guard for the metal scissors cutter in Building 76 was disconnected. The use and maintenance of machine guards should be emphasized in training and safety meetings as well as during equipment inspection and servicing.	Importance of machine guards was discussed in group safety meetings. Discussion included pictures of the missing guards.	Closed
Life Sciences	Life Sciences Division had one NCAR during the self-assessment year for liquid hazardous waste found in low-level dry radioactive waste.	LSD received zero NCARS in PY03. Following the NCAR received in PY02, the Division Safety Coordinator met with the group that generated the offending waste. Also, this incident was discussed at the Division Safety Committee. LSD has decreased their generation of liquid low-level waste, due to the proliferation of chemi-luminescence in Division research.	Closed
	In order to address ergonomic concerns, the Division should purchase low force or electronic/automatic pipettes to reduce or eliminate pipetting-related injuries.	Ergonomic pipettes are used throughout the Division, with widespread use at Building 84. Much of the production pipetting is now performed robotically, eliminated the ergonomic hazard to workers. Also, LSD has had ergo-pipette training and trade-in opportunities of old pipettes for new ergo-pipettes.	Closed

Division	Opportunities for Improvement	Corrective Action	Status
Life Sciences (continued)	The Division experienced an increase in recordable injuries to staff, although the lost-workday-case rate remains low.	The TRC rate has dropped from seven recordable injuries in PY02 to one in PY03. The ergonomic initiatives have likely contributed to the downward trend. The Division Safety Committee is engaged in accident prevention. Finally, the Division Safety Coordinator has stressed deliberate work planning on the part of PIs to anticipate potential hazards.	Closed
Materials Sciences	The Materials Sciences Division ISM Plan was updated in June 2002. However, there is no evidence that senior management has reviewed and approved the updated plan.	Plan signed 8/26/02 by Daniel S. Chemla.	Closed
	For the majority of the self-assessment year, the Division did not have an active ergonomics program. In June 2002 the Division began taking measures to address the ergonomic hazards present in staff work. A Division strategy to address ergonomics will likely be implemented during the 2003 performance year.	The Division ergonomics plan was implemented. An ergonomics survey was developed at MSD's request by EH&S subject matter experts. The survey has become a model for other divisions (e.g., EETD). The Division is working with EH&S subject matter experts to prioritize workstation upgrades. Workstation upgrades have begun. Also, ergonomic hazards are discussed at every safety committee meeting.	Closed
	Despite showing improvement, the Division continues to have difficulties managing waste compliantly. There were three QA failures for waste characterization and one NCAR for waste stored for greater than one year.	MSD has a ninety percent SAA compliance rate and zero NCARs in the 2003 performance year. Waste Management is an agenda item at each MSD Safety Committee meeting.	Closed
	Attendance of Group Safety Representatives at Division Safety Committee meetings is inconsistent. Moreover, there are research groups that conduct work at the LBNL Hill Site that appear not to be represented on the Safety Committee.	All research groups are represented on the Division Safety Committee. A new representative was appointed for the CXRO group, replacing a representative with a poor attendance record. The Safety Committee Chair provides feedback to PIs when group representation is deficient.	Closed

Division	Opportunities for Improvement	Corrective Action	Status
Materials Sciences (continued)	<p>There are limited follow-up activities by the Division to verify that line managers are in conformance with their signed Assurance Statements. There is no feedback to the Division safety organization that line managers are performing annual workspace inspections and safety presentations. In addition, much of the day-to-day operations and responsibilities of a laboratory fall on MSD graduate students and post-docs who may not be familiar with the conditions and requirements of the Assurance Statement.</p>	<p>Annual Self-Assessment inspections are an important follow-up activity. All PIs submit Safety Assurance Statements as part of their research proposals. Per the amended MSD Safety Assurance Statement, PIs affirm that they perform inspections and communicate relevant safety issues, including safety committee activities, to staff. In addition, MSD Safety Committee minutes are distributed to all PIs. In FY04, PIs will accompany the Division self-assessment team for inspections of their staff workspace.</p>	Closed
	<p>Minor workplace safety deficiencies discovered by the MESH team are not identified and entered into LCATS. Regular inspections and follow-up by the researchers may alleviate such conditions.</p>	<p>Workspace safety deficiencies are found and corrected during the MSD Self Assessment process. Deficiencies found in other inspections (Fire, IFA, etc.) are tracked in LCATS and fixed on time.</p>	Closed
Nuclear Science	<p>The Division has a good framework for hazard review of self-authorized work. However, a more rigid and systematic approach is required that provides assurance that all hazards are identified and all workspaces are inspected.</p>	<p>Nuclear Sciences has implemented a systematic review of self-authorized work. All projects complete division-tailored HEAR forms. The Division Safety Committee reviews each form to ensure that hazards are recorded and controls are implemented. The safety committee also participates in self-assessment inspections, which allows for visual verification.</p>	Closed
	<p>The Division has encountered some difficulty in complying with storage requirements for hazardous waste.</p>	<p>SAA compliance is 100%. SAA managers have been designated for each accumulation area. The Division has only one problem SAA and has focused compliance efforts there. In addition, the Division is conducting frequent internal SAA inspections this year.</p>	Closed

Division	Opportunities for Improvement	Corrective Action	Status
Physical Biosciences	The Division experienced an increase in recordable injuries to staff, although the lost-workday-case rate remains low.	PBD has been more vigilant in follow-up of ergonomic evaluations and implementation of recommendations. Also, the Division Accident Review Board has been formalized. This body includes the Division Director, Safety Coordinator, and EH&S Liaison meeting with the injured employee.	Closed
Physics	Hazard control in Division workspaces requires some improvement. Timely calibration of gas monitors requires greater attention.	All monitors in Division workspaces are currently calibrated. Division self-assessment teams routinely check certification and calibration dates on all engineering controls.	Closed
	Division staff only completed 80% of all required training, a significantly lower completion percentage than any other division.	Training completion is 82% in FY03.	Open
Production Genomics Facility	Hazard analysis and review of self-authorized activities and operations are not fully documented. The PGF Safety Plan, which included an initial description of hazards and controls for the facility, has not been updated.	Genomics updated the HEAR database for all workspaces in November. The Division Safety Coordinator inspected all workspaces with the appropriate line managers and assisted line management in revising the information in HEAR.	Closed
	PGF had an increase in recordable injuries and lost-worktime injuries to staff this performance year.	The injury and accident rate increased in FY03, though the DART rate decreased. The Division has emphasized ergonomic evaluations and follow-up of recommendations from the evaluations. All injuries are discussed in Division Safety Committee meetings. Also, the Safety Coordinator has stressed the importance of safe staff workspaces to line management. The Division Director has sent a JGI-wide e-mail regarding commitment to PGF Workplace Safety.	Open

Division	Opportunities for Improvement	Corrective Action	Status
Production Genomics Facility (continued)	The Division continues to implement a system to properly record, track, and resolve safety deficiencies discovered in staff workspace. PGF is not appropriately using an effective corrective-action tracking system to provide assurance that these activities occur.	The Division is using LCATS and will record all appropriate inspection findings and recommendations from SAARs and ergonomic evaluations in the database.	Closed

Appendix G

List of Acronyms and Abbreviations

AFRD	Accelerator and Fusion Research Division
AHD	Activity Hazard Document
ALS	Advanced Light Source
ASD	Administrative Services Department
BBAP	Behavior-Based Accident Prevention
CSD	Chemical Sciences Division
DART	Days Away from work and Restricted Time
DOE	Department of Energy (U.S.)
EETD	Environmental Energy Technologies Division
EH&S	Environment, Health and Safety Division (LBNL)
ESD	Earth Sciences Division
ES&H	Environment, Safety, and Health (DOE term)
HEAR	Hazards, Equipment, Authorizations, and Review System
IFA	Integrated Functional Appraisal
ISM	Integrated Safety Management
JHQ	Job Hazards Questionnaire
LCATS	Laboratory Corrective Action Tracking System
LSD	Life Sciences Division
LWC	Lost Workday Cases
MESH	Management of ES&H
MOU	Memorandum of Understanding
MSD	Materials Sciences Division
NCAR	Nonconformance and Corrective Action Report
NFPA	National Fire Protection Association
NSD	Nuclear Science Division
OAA	Office of Assessment and Assurance
ORPS	Occurrence Reporting and Processing System
OSSEP	Off-Site Safety and Environmental Protection Plan
PBD	Physical Biosciences Division
PI	Principal Investigator
PGF	Production Genomics Facility
RWA	Radiological Work Authorization
RWP	Radiological Work Permit
SAA	Satellite Accumulation Area
SAAR	Supervisor Accident Analysis Report
SRC	Safety Review Committee
SSA	Sealed Source Authorization
TRC	Total Reportable Cases
UCB	University of California at Berkeley
UCOP	University of California Office of the President
WOW	Workers Observing Workers
XSD	X-Ray Machine Safety Document