



STEVEN CHU  
DIRECTOR

June 1, 2006

To: Aundra Richards, Manager  
U.S. Department of Energy  
Berkeley Site Office

From: Steven Chu, Director   
Lawrence Berkeley National Laboratory

Subject: Corrective Action Plan, LBNL ISM Peer Review

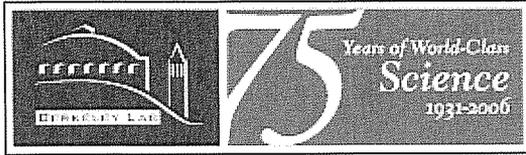
I am pleased to submit the attached Corrective Action Plan for the Lawrence Berkeley National Laboratory Integrated Safety Management (ISM) Peer Review that was conducted in January, 2006. It reflects a concerted effort by my staff to analyze the findings of the Peer Review and findings of previous reviews to identify root causes and develop corrective actions that address these root causes. The actions are designed to improve overall ES&H performance by addressing the organizational and cultural issues as well as the implementation issues raised by the Peer Review.

We look forward to the DOE Validation Team's visit at the end of this month and appreciate your ongoing support in the development and implementation of this plan.

cc:  
Vice President Foley, UC  
Associate Vice President Van Ness, UC  
Deputy Director Fleming  
Chief Operating Officer McGraw  
Division Directors

Note: The Corrective Action Plan and supporting documents for outside users are available at:

<http://www.lbl.gov/ehs/ism/cap/>



# Berkeley Lab

Corrective Action Plan  
For the  
Lawrence Berkeley National Laboratory  
Integrated Safety Management Peer Review

June 1, 2006

A handwritten signature in black ink, appearing to read 'S. Chu', written over a horizontal line.

Dr. Steven Chu  
Director, LBNL

A handwritten signature in black ink, appearing to read 'D. McGraw', written over a horizontal line.

David McGraw  
Chief Operating Officer, LBNL

A handwritten signature in black ink, appearing to read 'H. Hatayama', written over a horizontal line.

Howard Hatayama  
Acting, EH&S Division Director

**Corrective Action Plan  
For the  
Lawrence Berkeley National Laboratory  
Integrated Safety Management Peer Review**

**June 1, 2006**

**Executive Summary**

In response to a series of leading indicators of deteriorating Environment, Safety and Health (ES&H) performance, the University of California commissioned a peer review of implementation of Integrated Safety Management (ISM) at the Lawrence Berkeley National Laboratory (LBNL) in January, 2006. This Corrective Action Plan (CAP) responds to root causes that were developed from findings of the Peer Review and a number of previous assessments and incidents. The root causes fell into five general categories and the corrective actions were developed along these lines: 1) Line management execution of ES&H, 2) ES&H assurance mechanisms, 3) Educating managers, supervisors and coordinators, 4) Proactive posture on ES&H, and 5) Lab-wide work control. The corrective actions are designed to improve overall ES&H performance by addressing the organizational and cultural issues as well as the implementation issues raised by the Peer Review.

**Introduction**

On January 5, 2006, the University of California commissioned a peer review of the implementation of Integrated Safety Management (ISM) at the Lawrence Berkeley National Laboratory (LBNL) in response to a series of leading indicators of deteriorating safety performance. The Lawrence Berkeley National Laboratory Integrated Safety Management Peer Review Report, 02/10/06 (Appendix 1) transmits the Peer Review Committee's findings and suggestions. This ISM Peer Review Corrective Action Plan (CAP) responds to these findings and suggestions.

A CAP Development Team (Appendix 2) was established that included staff from a cross-section of the Laboratory. Many of the members of the Team were also involved in the investigations and assessments that occurred prior to the Peer Review and that were reviewed as part of developing this CAP. The members of the Team were selected to leverage the knowledge gained from their participation in the previous investigations and assessments to better understand the extent of condition of the findings in the Peer Review. A CAP Working Group was drawn from the CAP Development Team to manage the process of developing the CAP. Two Root Cause Analysis sub-teams were drawn from the CAP Development Team to conduct root cause analysis of the Peer Review findings and the results of the analysis of previous investigations and assessments.

The goals of the CAP development process were to: 1) Evaluate the Peer Review findings in light of previous findings, 2) Integrate and condense the information in a rigorous and formal manner, 3) Identify the common themes with institutional impact, 4) Identify latent management issues as potential underlying causes of less than adequate performance in specific programmatic, technical, and management areas, and 5) Identify a set of corrective actions to address these issues.

## **Process Used in Developing the CAP**

### Backlook Review

To achieve the above stated goals, the CAP Working Group reviewed the following reports that were generated from analyses conducted in 2003, 2005 and 2006:

- Lawrence Berkeley National Laboratory Building 58 Electrical Safety Event of June 2, 2005, June 23, 2005
- LBNL Electrical Safety Self-Assessment, April 8, 2005
- Causal Analysis of 15 Electrical Incidents that Occurred at Berkeley Lab from July 2002 to June 2005, August 31, 2006
- Laser Safety Program Review Panel Report, July 28, 2003
- Berkeley Lab FY05 50 OSHA Recordable Cases Root Causes and Lessons, January 9, 2006
- Crane, Hoist, Rigging & Forklift Safety Program at the Lawrence Berkeley National Laboratory, October 13, 2005
- Report of the RSC Sub-committee to Investigate and Review ALS Shielding Control Procedures, January 18, 2006

The issues identified, referred to as the Backlook List, and those from the Peer Review were sorted using the Occurrence Reporting Causal Analysis Tree (CAT). Common themes emerged, some of which indicated broad extent of condition and a few with latent management implications. The CAT categories with the highest number of common themes are “management methods” and “work organization and planning.”

The information developed from the initial analysis was presented to the CAP Development Team for discussion, elaboration, and vetting in an open forum. Potential extent of condition issues and latent management issues were identified. All issues were recorded by a facilitator and discussed and clarified as they were recorded. Two separate meetings were devoted to this process with sufficient time in between to allow the group members to discuss the information with co-workers, managers, and staff. Care was taken to ensure that the issues raised by BSO Response to Commitments 23 & 25 were included. Using the Peer Review as a framework (i.e., the 7 principles of ISM), the CAP Working Group sorted and incorporated all the issues from these meetings into the Issues section of the Peer Review Report. No information was deleted or modified and overlapping issues were not combined. This resulting document is entitled Issues (PR/Backlook), 3/24/06 (Appendix 3).

## Root Cause Analysis

Two teams of individuals with TapRoot training subjected the Issues (PR/Backlook) to root cause analysis using proactive analysis approach designed to address programmatic and systemic weaknesses in implementation of ISM. The goal at this stage was to identify a list of root causes that address in a proactive manner all the issues gathered in the Backlook Review and the Peer Review. This task was completed on 4/25/06 and the results presented as Peer Review/Backlook Issues: Root Cause Analysis (Appendix 4). The Principles of ISM are used as the framework for listing the identified set of root causes and conditions.

In order to facilitate development of corrective actions, the root causes from the Peer Review/Backlook Issues: Root Cause Analysis (Appendix 4) were grouped into five categories (Appendix 5):

1. Line management execution of ES&H
2. ES&H assurance mechanisms
3. Educating managers, supervisors, and coordinators
4. Proactive posture on ES&H
5. Lab-wide work control program

Sub-teams were assigned to each category and corrective actions were developed for the root causes in these categories (Appendix 6). Where a corrective action is applicable to more than one root cause, there is a cross-reference to the first root cause where it applies. Each corrective action has a unique number that can be traced back to the Peer Review/Backlook Issues: Root Cause Analysis (Appendix 4) and to the Peer Review Report (Appendix 1). For instance, Corrective Action 1.1.1.01 relates to Root Cause 1.1.1, which in turn relates to Peer Review Report Issue 1.1.

## **Interim Actions Taken to Address Peer Review Issues**

The Laboratory has taken a number of interim actions to address the issues raised by the Peer Review. Some were initiated before the Peer Review occurred because it was recognized that improvements in these areas could improve the Laboratory's safety performance overall. Descriptions of these actions are included in the weekly CAP status reports that have been provided to the DOE since the beginning of March, 2006.

Some of these actions are still in the process of being implemented and are directly pertinent to the root causes cited in the root cause analysis. These are included as on-going corrective actions in this CAP:

- Corrective Action 3.3.1.01 through 3.3.1.04 : Improving our incident investigation process and root cause analysis capability
- Corrective Action 6.3.1.02: Development and delivery of safety walkaround training (Appendix 9)

Interim actions completed include:

- Corrective Action 2.1.2.07: Revision of IFA and MESH protocols for FY06 (Appendix 10)
- Corrective Action 3.3.1.02: Training of individuals in TapRoot methodology for performing root cause analysis
- Corrective Action 7.1.3.02: Development of the Corrective Action Tracking System (Appendix 11)
- Initiation of a benchmarking relationship with Intel Corporation in March, 2006
- Hiring of key EHS personnel including an electrical safety officer, a laser safety officer and a health physicist

A number of Divisions have also taken additional actions to enhance safety performance:

- Physics – Revision of safety roles and responsibilities for supervisors and permanent scientific staff, trained managers and supervisors
- Computing Sciences – Verifying that managers and PI's are accepting responsibility for effective ISM implementation through conduct of safety specific all-hands meetings, integrating safety into regular staff meetings, including safety articles and tips in weekly electronic newsletter
- Engineering – Enhanced training of managers and supervisors regarding line management responsibility for safety, cascading of roles and responsibilities
- Material Sciences – Customizing EH&S training for all managers and supervisors based on the institutionally developed course.

## **Corrective Actions**

As noted above, the corrective actions are organized according to five Corrective Action Categories (Appendix 6). To facilitate review and understanding, Appendix 7 arrays the corrective actions according to ISM Principles and Appendix 8 lists only those root causes with corrective actions by Corrective Action Category.

### Category 1 - Line Management Execution of ES&H

A critical step in addressing many of the root causes is more clearly defining line management with regards to ES&H and establishing this in the Laboratory's governing documents. Part and parcel of defining line management is more clearly defining ES&H roles and responsibilities for line managers. These steps are necessary precursors to refining performance review criteria, re-defining training requirements and revising training.

### Category 2 - ES&H Assurance Mechanisms

Corrective actions in this category are directed at re-establishing ES&H technical program assurance capabilities and refining key elements of the ES&H assurance system. This includes refining division self-assessments based on revised line management roles

and responsibilities and other drivers. Criteria for the Integrated Functional Appraisals (IFA) and Management of ES&H (MESH) reviews were revised for FY06 and the effectiveness of these changes will be reviewed as part of the CAP. As part of LBNL's effort to expand collaboration with UCB, the existing partnership agreement regarding ES&H matters will be reviewed and revised.

### Category 3 - Educating Managers, Supervisors and Coordinators

Corrective actions in this category are directly related to those in category 1 in that any revisions of training requirements and training courses is dependent on the definition of line manager and the attendant roles and responsibilities. The Safety Coordinator plays a critical role in how these roles and responsibilities are carried out. Corrective actions are planned to determine and formalize minimum qualifications and training requirements for this group. There will also be a focus on enhancing mentoring and ES&H awareness of post-docs and graduate students. Part of educating line managers regarding ES&H will be a coordinated communications strategy focused on quality of work AND concern for ES&H.

### Category 4 - Proactive Posture on ES&H

A key element to taking a more proactive posture is looking at what is being communicated about safety and developing and implementing a communications strategy around safety that is credible and consistent. This section also focuses on seeking to understand risk-taking behavior at the Laboratory and developing strategies and messages that will guide Laboratory staff in making better choices regarding job hazards analysis and establishing controls. These corrective actions are intended to address the fear of reporting issue through better understanding what messages are being transmitted and changing those messages in systematic manner.

### Category 5 - Lab-wide Work Control

This category focuses on improving the work control program Lab-wide including EH&S approved authorizations, line management authorizations and project/maintenance work. This includes completing the transition of Activity Hazard Documents (AHDs) into an online electronic format, reviewing the effectiveness of the revised system and developing routine methods of ensuring implementation of AHDs. An approach to more formality in line management authorizations will be developed. Hazard identification and oversight policies and procedures for work performed by Facilities Division, construction sub-contractors and equipment vendors will be reviewed and revised.

### Laser Safety

The EH&S Division developed a corrective action plan to address deficiencies identified during inspections of laser labs in November and December 2005 (Appendix 12). Although significant progress has been made, the conduct of comprehensive reviews of all Class 3B and 4 laser labs is behind schedule. This activity was scheduled to be

completed by April 30, 2006. However, the sudden departure of the former Laser Safety Officer, the need to provide real time customer support (e.g., eyewear selection, AHD review, interlock safety, etc.), and the need to develop/improve our infrastructure (AHD database, laser inventory, inspection procedures, and documentation) caused the Laboratory to delay this effort. This activity is now anticipated to begin in June/July 2006 (supported by the new Laser Safety Officer) and conclude by September 30, 2006.

The effort will include:

- Conducting and documenting laser safety inspections
- Reviewing activity hazard documents (AHDs)
- Reviewing completeness of the laser inventory
- Checking laser protective eyewear
- Testing interlock systems

In the interim, BSO requested assurance that laser safety requirements are in place and the Laboratory is providing this assurance.

#### Advanced Light Source (ALS)

The ALS is making good progress on corrective actions relative to Radiation Safety Committee's review of shielding at the ALS and the related PAAA NTS report (Appendix 13). Review and tracking of corrective action implementation continues to be carried out by the Committee.

#### **Supplement to LBNL Response to DNFSB Recommendation 2004-1 Implementation Plan Commitments 23 and 25**

On 2/1/06, LBNL provided its initial response to Commitments 23 and 25 of the Defense Nuclear Facilities Safety Board Recommendation 2004-1 Implementation Plan (Appendix 14). This response described our current systems for work planning and control and for feedback and improvement. It also identified a few areas for improvement and referred to the Peer Review as a source for other opportunities for improvement. The corrective actions for Corrective Action Category 2, Feedback and Improvement, and Corrective Action Category 5, Work Control, are directly applicable to Commitments 23 and 25, and serves to supplement our response of 2/1/06.

#### **Process for Tracking Implementation of CAP**

Progress on implementation of the CAP will be included as a routine agenda item in the quarterly performance reviews that are conducted between DOE, LBNL and the University of California. LBNL will use its institutional Corrective Action Tracking System (CATS) as the mechanism for tracking implementation and closure of the corrective actions in this CAP.

## **CAP Change Control Process**

A change control board will be convened consisting of representatives of DOE-BSO, LBNL and the University of California. Members of this board will be appointed by the DOE-BSO Manager, LBNL Director and UC Vice President for Laboratory Management. The Board will be responsible for reviewing proposed changes that would materially alter a corrective action approach or cause a delay of more than a month to its schedule. The Board will make a recommendation to the DOE-BSO Site Manager who is responsible for approving the proposed change. Changes that do not rise to the threshold for review by this Board, will be reviewed and approved by the LBNL EHS Division Director.

## **Follow-up CAP Effectiveness Review Process**

Completion of corrective actions will be validated by LBNL Office of Contract Assurance. Effectiveness review of the corrective actions will be integrated with the UC Assurance Plan for Lawrence Berkeley National Laboratory (Appendix 15).

## **Appendices**

1. LBNL ISM Peer Review Report, 2/10/06
2. CAP Development Team Roster, 6/1/06
3. Issues (Peer Review + Backlook), 3/24/06
4. Peer Review/Backlook Issues Root Cause Analysis, 4/25/06
5. Actionable Items for Corrective Action, 5/4/06
6. 2006 ISM Peer Review Corrective Action Plan Schedule, 6/1/06 (By Corrective Action Categories)
7. 2006 ISM Peer Review Corrective Action Plan Schedule, 6/1/06 (By Principles of ISM)
8. 2006 ISM Peer Review Corrective Action Plan Schedule, 6/1/06 (By Active Root Causes)
9. Line Management Walk-around Training Course Syllabus
10. Revised IFA and MESH protocols
11. Corrective Action Tracking System description
12. Status of Laser Safety corrective actions
13. Status of ALS corrective actions
14. Memo from Howard Hatayama to Aundra Richards, Subject: Response to Commitments 23 & 25, February 1, 2006
15. UC Assurance Plan for Lawrence Berkeley National Laboratory, October, 2005

**LBNL ISM Peer Review  
Corrective Action Plan Development Team  
Roster**

Name	Organization	Title	Role on Team	Phone Ext
Don Lucas	EETD	Staff Scientist	Member/Sub Team 1	x7002
Eugene Lau	EH&S	Deputy Director	Member/Sub Team 4/Working Group	x4301
Guy Bear	Facilities	Deputy Director	Member/Sub Team 3	x4560
Jack Bartley	EH&S	Consultant	Member/RCA/Sub Team 3/Working Group	x4191
John Chernowski	Office of Contract Assurance	Manager Office of Contract Assurance	Member/RCA/Sub Team 2/Working Group	x7457
Michael Banda	Comp.Sciences	Division Deputy	Member/Sub Team 1	x2837
Mike Ruggieri	EH&S	EHS Specialist	Member/RCA/Sub Team 4	x5440
Michelle Flynn	Office of Assurance	ES&H Assurance Program Manager	Member/RCA/Sub Team 2	x7073
Pat Thomas	AFRD	Safety Coordinator	Member/RCA	x6093
Peter Lichty	EH&S-Health Services	Group Leader	Member/RCA/Sub Team 4	x6267
Richard DeBusk	EH&S-Occupational Safety	Group Leader	Member/RCA/Sub Team1	x2976
Richard Kadel	Physics	Staff Scientist	Member/Sub Team 5	x7360
Rick Kelly	Material Sciences	Facilities & EHS Manager	Member/Sub Team 5	x4088
Scott Taylor	Life Sciences	Staff Scientist	Member/Sub Team 5	x4103
Tom Caronna	EH&S	Electrical Eng.	Member	x4314
Weyland Wong	Engineering	Safety Manager	Member/RCA/Sub Team 3	x6045
Wim Leemans	AFRD	Staff Scientist	Member	x7788
Howard Hatayama	EH&S	Division Director	CAP Development Team Leader	x5063
Kurt Deshayes	Directorate PMO	Senior PM	PM Support	x7866
Dennis Derkacs	Los Alamos Lab	ISM Program Manager	Advisor	x5185
Alyce Herrera	EH&S	Administrator	Administrative Support	x4261
Nikki De Jager	EH&S	Administrative Assistant	Administrative Support	x6395

RCA = Root Cause Analysis Sub Team

Sub Team 4 = Proactive posture on ES&H

Sub Team 1 = Line Management execution of ES&H

Working Group = CAP Working Group

Sub Team 2 = ES&H assurance mechanisms

Sub Team 3 = Educating managers, supervisors and coordinators

## Issues (Peer Review+Backlook)

### 1. Principle 1 - Line Management Responsibility for Safety:

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

Definition of roles and responsibilities, a sense of accountability, training and guidance, as well as performance expectations for line managers (PIs and Supervisors) with respect to safety management, maintenance of work place safety, and commitment to safe work activities are less than adequate.

1.1. There are indications that line management including the PIs generally understand their responsibilities for the safety of their employees and operations. However, there appears to be weaknesses in execution of their responsibility.

- PIs do not appear to be well trained/prepared for their line management responsibilities.
- Middle and first line managers and supervisors need to be supported in doing work safely.
- The span of control for a PI can exceed what is easily manageable making it even more difficult to monitor their spaces and activities.
- Span of control (excessive) does not allow responsible safety management.
- Safety management is not a high priority for many PIs.
- Underlying/latent cause of LTA line management implementation of work place safety: proactive involvement – major changes required that go well beyond increased frequency of walk throughs.
- Practicing the 5 Core Functions of ISM at the activity level all the time is LTA
- Presence of senior management walking the work area is spotty. The senior management walk-arounds of the work area varies from once a year to twice a day. The institutional expectation is that senior managers inspect all of their staff workspaces annually, which is insufficient oversight for many work activities. Discussions with the workforce confirm the positive impact the presence of senior management in the laboratories has in reinforcing the premise that management is interested in them and their safety.
- Management's communication of issues related to safety to the rank and file is not effective.
- Formal communications designed to make ISM real for workers and researchers are LTA.
- Based upon a random sampling of performance review documents (PRDs), the majority of the comments regarding performance in the area of ES&H were perfunctory and contained little qualitative measure of performance.

- Relationship between PI and post doctoral and graduate student staff deters identification of safety issues and implementation of work place safety.
- Not all PIs are equal with respect to responsibility for and performance of safety management.
- Who is a line manager? PD is not consistent across the Laboratory.

*Principle 2 - Clear Roles and Responsibilities:*

*Clear and unambiguous lines of authority and responsibility for ensuring safety shall be established and maintained at all organizational levels within the department and its contractors.*

2.1 It is not clear how senior management is assured of an independent review of ES&H programs and work activities within divisions. EH&S assurance mechanisms are ineffective.

- In the crafts at LBNL, work observations and inspections are sometimes perceived as punitive and therefore actively resisted.
- Relationship between PI and post doctoral and graduate student staff deters identification of safety issues and implementation of work place safety.
- Documentation provided by division ISM plans and division self-assessment plans reflect an uneven consideration of safety from one division to another.
- LTA feedback for improvement systems – IFA, SA, MESH  
Scope  
CRADs  
Ongoing/periodic/multidirectional views
- EH&S Division is not adequately consulted when (renovated or new) facilities are planned.
- Change control LTA in highly matrixed organizations and/or tasks
- The role of the safety coordinator varies across LBNL.
- Not all PIs are equal with respect to responsibility for and performance of safety management.
- Work Authorizations: Roles and responsibilities not clearly communicated.
- Expectation to use and follow procedures LTA
- Who is a line manager? PD is not consistent across the Laboratory.
- EH&S oversight is ineffective  
Supervision of matrixed EH&S staff is LTA  
Roles and responsibilities of EH&S staff with respect to to other divisions (i.e., liaisons, coordinators) is LTA  
Distinction between user model vs. traditional model is not clear.  
Clarity of role of EH&S and line in safety management LTA.  
EH&S oversight is to decentralized  
Potential conflict of interest for EH&S staff between safety and programmatic goals.

2.2 Lack of stability in the EH&S division management has created the atmosphere that work in the division is not understood or appreciated.

- There have been three division leaders in three years.

2.3 Some workers may view statements like “Each employee is responsible for his or her own safety” and “Unsafe behavior is antisocial behavior” as a way to assign blame to the worker in the event of an accident.

- This is not an idle concern. In our own institutions and in the news we have all observed blame and punishment put on workers involved in accidents that “were waiting to happen” because of working conditions or de facto accepted work practices.
- Some LBNL workers expressed feeling trapped by this responsibility because they have no effective way to change unsafe working conditions or practices.

3. *Principle 3 - Competence Commensurate with Responsibilities:*

*Personnel shall possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities.*

3.1. There is not a uniform, laboratory-wide way to educate leaders, managers, and supervisors on how to make safety an integrated part of the activities in the workplace.

- It is not clear that all line managers are trained to conduct meaningful safety walk-arounds.
- The role of the safety coordinator varies across LBNL.
- The minimum qualifications and training of safety coordinators should be determined and formalized.
  - Safety coordinators are the primary implementers of the LBNL safety program, and some evidence indicates that the quality of the safety program is directly related to the quality of the safety coordinator.
  - There are only two required courses for safety coordinators and no other qualifications have been formalized.
  - Safety coordinators are the “gatekeepers” to the involvement of ES&H subject matter experts (SMEs).

3.2. Work pressures could be driving people to work in less safe ways, causing mistakes, or creating stressed personal interactions.

- In the absence of information, assumptions are being made regarding the relative value of the work being done resulting in risk acceptance that may not be what is intended.

- Some employees suggested that supervisors had to approve their time away from work to attend counseling sessions, thus making it known that they were attending these sessions.
- 3.3. Causal analysis is inconsistently applied and may not result in corrective actions that will prevent reoccurrence.
- Root cause determination is only required for serious incidents.
  - The root cause analyses performed for the 15 electrical incidents and the 50 OSHA recordable cases did not result in any formal corrective or preventive actions.
  - It was not apparent that corrective actions for lower level incidents are tracked to closure.
  - Technical people without causal analysis expertise lead root cause analyses.

4. *Principle 4 - Balanced Priorities:*

*Resources shall be effectively allocated to address safety, programmatic, and operational considerations. Protecting the public, the workers, and the environment shall be a priority whenever activities are planned and performed.*

- 4.1. Even though there is a very proactive approach in many elements of LBNL, the wide spread perception is that the Laboratory is in a very reactive posture with respect to ES&H.
- Significant portions of the staff believe that improvements do not occur unless there is a serious problem. Interviews with supervisory and non-supervisory employees disclosed their concern that “someone had to get hurt” before a safety problem would get fixed.
  - Middle and first line managers and supervisors need to be supported in doing work safely.
  - Lack of management support of staff when safety issues are identified
  - Staffing in many support groups has dropped below levels that allow high quality support.
  - Insufficient resources for safety
  - Employees see safety as a lower priority to “production” because of cuts in safety staff and safety issues that remain unfixed.
  - Risk taking is recognized, tolerated, and encouraged by workers, supervisors, coworkers, guests, and students. Situation aggravated during RIF and facility and/or users outgrowing static safety resources.
  - People will take safety risks to get the job done in order to retain project funding.
  - ES&H-type employees described their inability to provide adequate coverage because of the lack of staff.
  - The professional safety staff currently has no time to participate with the scientific staff in the planning of new experiments or facilities. Safety and the

minimization of hazardous waste generation is thus reduced to an after thought rather than designed in from the beginning.

- LTA change management control of work control process when scope, resources, personnel, schedule change.

4.2. The excessive focus on the DART and TRC rates has negatively impacted the safety program.

- The employees fear that any reported accident will have serious implications for LBNL, their division, their laboratory and possibly their job. The loss of this accident information has negatively impacted the Laboratory's safety leading indicator program and thus the ability to implement programs specific to correcting deficiencies in the current program.
- The need for upper management review of all injuries produces an underground mentality because of the concern employees have with the use of the information. This would not be a problem if employees trusted the management to use the information to truly improve safety.

4.3. Mentoring of leadership PIs on operational issues does not get the same attention as the technical issues and the span of control for these leaders makes their jobs excessively challenging. Span of control does not allow responsible safety management

- PRDs are thorough for technical work content and superficial on operations.
- Potential conflict between the culture of research and everything else – PIs see rewards in doing everything else.
- PIs can have as many as 30-50 people in a research group.
- Division directors can have as many as 70 PIs in as many as 16 facilities in addition to his/her own research group.
- The span of control for many leaders is beyond what can be expected to produce good results. Leaders are driven to choose between safety activities and schedule. When time is an issue, product and schedule are seen as more important than safety expectations.

*5. Principle 5 - Identification of Safety Standards and Requirements:*

*Before work is performed, the associated hazards shall be evaluated and an agreed-upon set of safety standards and requirements shall be established which, if properly implemented, will provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences.*

5.1. It is not clear that activity hazards that are below the threshold or not the primary subject for Activity Hazard Descriptions (AHDs) are adequately analyzed and controlled.

- We observed a laser experiment that had an AHD that addressed the laser hazards but did not address the high voltage, toxic gas, and chemical hazards.

5.2. Subcontractors seem to be held to a lower safety standard.

- For the sake of contract worker's safety, the reputation of LBNL, and the morale of LBNL craft employees, it is important to "level the playing field" regarding ES&H implementation rigor at LBNL. Holding subcontractors to a lower standard or simply not enforcing the standards has several negative impacts:
  - It undermines credibility of active program.
  - It makes on-site crafts uncompetitive.
  - It introduces hazards in unacceptable way.

5.3. Work Planning: The work authorization process is not well suited to project/maintenance type work.

- The building 58 electrical incident could have been prevented if a more thorough hazard identification process was used.
- The "Project Report" for this incident is not a "worker-friendly" format and is not comprehensive.
- The "Task Hazard Analysis" form used by maintenance workers was perceived by ~30% of the group as protecting the LBNL from lawsuits, not protecting them.

6. *Principle 6 - Hazard Controls Tailored to Work Being Performed: Administrative and engineering controls to prevent and mitigate hazards shall be tailored to the work being performed and associated hazards.*

6.1. Safety is not a multi-layered redundant consideration in all divisions: some hazard controls do not allow for human error.

- Some controls seem to be based on the premise that no human error will occur. This places unreasonable expectations on the workers and sets them up for failure.
- For example, critical administrative controls at the ALS depend on operator memory and/or logbook entry. A requirement to tag a safety system key with the reason(s) for a lock-out is a simple "operator aid" that provides backup for the operator. It also places the information where and when it is needed, a useful concept.

6.2. The recent series of shielding control incidents at the ALS indicates that administrative control of shielding and interlock systems is not adequate.

- At the ALS, radiation protection depends almost entirely on interlocks and configuration control of shielding.
  - The January 2006 report by the LBNL Radiation Safety Committee (RSC) documents lapses in the control of the shielding and interlocks.
  - Procedures are too complex/process is too involved; leads to work arounds.
  - The RSC report provided a comprehensive review of the problems that led to these lapses and put forth recommended solutions.
  - A majority of the report recommendations are prescriptive in nature. However, as good management practice, the actions needed to correct the deficiencies must be devised and owned by ALS and LBNL line management.
  - The varied and constantly changing research activities at light source facilities require robust administrative controls to ensure safety.
- 6.3. Facility Inspection program is variable in frequency and effectiveness and is not identifying and correcting hazards in a timely fashion.
- The Director's walk-through identified poor housekeeping, outdated safety contact lists, water leaks and other concerns that indicated a potential for creating a serious hazard. This resulted in a shutdown of the individual PI's laboratories.
  - The requirement for formal facility inspection as part off the S/A is just once per year.
  - The inspection protocols do not require involvement of PIs or appropriate SMEs.
- 6.4. Recent inspections and reviews have identified shortcomings in laser safety.
- About a year ago a DOE directive was issued identifying laser issues system wide. In late 2005, a DOE verification of the LBNL response to these issues turned up problems in laser inventory and interlock controls. An action plan to correct these discrepancies is due for completion on April 17, 2006.
  - During the last several years, responsibility for laser safety was moved to Occupational Safety, then to Radiation Protection, and in 2006, back to Industrial Hygiene. The Laser Safety Officer recently resigned and a search is underway for a replacement. In the meantime, individuals on loan from other institutions have filled this function.
  - The use of lasers at LBNL is widespread, in a variety of settings and with many different types of lasers.

*7. Principle 7 - Operations Authorization:*

*The conditions and requirements to be satisfied for operations to be initiated and conducted shall be clearly established and agreed upon.*

7.1. The Lab-wide work control program is LTA. It should cover activities, work, and facilities from the individual to the institution and from the lower hazards to the highest.

- Formal work control including planning and permitting provides a means for including ES&H controls in all routine maintenance and other work that supports the LBNL mission. This is safety integration at a basic level.
- Work control enhances proactive resolution of ES&H and work coordination issues in an environment of complex laboratory activities.
- Safe work authorization (Chapter 6 of Publication 3000) is a necessary program but is initiated only after ES&H issues have been identified and hence is not at the basic level of integrated safety management.
- A uniform work control program could be used at the division level for in-house and outside contractor work.

7.2. The requirement to keep the AHD personnel list current is not clear

- Personnel lists in the AHDs are not all current and some PIs were not clear what the requirement was.

## 8. Other

*A few of the Issues identified did not lend themselves to inclusion in the principles list but are captured here.*

8.1 There are no ES&H performance measures or performance metrics that can be considered “leading indicators” for each division.

### Discussion

- What gets measured gets done. Performance metrics tied to safety processes help define ES&H expectations and can lead to better overall ES&H performance.
- Choosing appropriate leading indicator metrics is not intuitive.

8.2 The SA process may not be serving the intended purpose.

### Discussion

- Division SA content/formality varies widely.
- Division SA roll-up may not be telling management what they need to know. Evaluation criteria need more senior management attention and strategic focus.
- The SA evaluation criteria development process is not aligned with LBNL strategic objectives.

- Integrated Functional Appraisals (IFAs) by SMEs are vertical reviews as are Management of Environment, Safety, and Health (MESH) reviews; there is no process to focus independently on a program across the Laboratory (horizontal).

8.3 Individuals at BSO believe that the Laboratory only shares information it has to and does not trust the DOE (site office, HQ, etc.).

#### Discussion

- The BSO notes very late notifications.
- LBNL does not give the BSO information it needs to support the LBNL.
- This reinforces feeling of distrust (both DOE and LBNL).

## PEER REVIEW/BACKLOOK ISSUES

### ROOT CAUSE ANALYSIS

April 25, 2006

***Principle 1 – Line Management Responsibilities for Safety:***

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

**Issue 1.1: Line Management’s execution of ES&H is less than adequate.**

**Root Cause 1.1.1 – Standards, policies and/or administrative controls (SPAC) lack detail, are confusing and incomplete, or do not exist. In addition, the SPACs in place are not strict enough and poorly enforced.**

A latent safety management issue appears to underlie effective line management implementation of workplace safety. Workplace safety requires proactive involvement by line managers. They are responsible for communicating and demonstrating by example the principles and five core functions of ISM work activities and facility operations. A basic weakness noted was the finding that confusion exists throughout the Laboratory with respect to the title of “line manager.” The term line manager is not well understood and is not defined in the Laboratory’s RPM. Consequently, line management position descriptions are not consistent across the Laboratory and the understanding of line management expectations is not clear.

Periodic walk-arounds are an essential part of line manager’s responsibilities in implementing safety. Senior management walk-arounds are spotty and vary from once a year to twice a day. The institutional expectation is that senior managers inspect all of their workspaces annually, but is not defined in any Lab policy as a requirement. In any case, annually is insufficient oversight for many work activities. Discussions with the workforce confirm that the presence of senior management in the workplace has a positive impact, reinforcing the premise that management is interested in them and their safety.

**Root Cause 1.1.2 – The need for training of line managers to effectively carry out their safety oversight responsibilities has not been effectively analyzed. The lack of presenting a convincing analysis of the need for this training led in part to a senior management decision to not make such training a laboratory-wide requirement.**

The Peer Review report notes that Principal Investigators do not appear to be well trained and prepared for their line management responsibilities. As noted in Root Cause 3.1.1, line managers are not formally trained to conduct meaningful safety walk-arounds.

**Root Cause 1.1.3 – Line management accountability for implementation of existing policies and administrative controls has been inadequate, resulting in deviations in implementation or non-use of standard-based safety requirements. The need for adherence to and communication of safety policies and procedures down the management line is less than adequate. There is evidence that the senior management support of middle and first line supervisors for doing work safely is not consistent and in some groups support is less than adequate.**

Common comments from the staff were: safety management is not a high priority for many PIs, and formal communications, designed to make ISM real for workers and researchers, could be improved. Another major contributing factor to poor communication of safety issues is the relationship between principal investigator and post docs and graduate students. Post docs and graduate students are dependent on the recommendations from their PIs for future career opportunities. This relationship deters identification of safety issues and implementation of work place safety.

Lack of accountability contributes to less than adequate adherence to safety policies and administrative controls. Inadequate safety performance expectations were noted as a major contributing factor to an overall weakness in line management implementation and oversight of work place safety. Based upon a random sampling of performance review documents (PRDs), the majority of comments regarding ES&H performance was perfunctory and contained few qualitative measures. This was contrasted to the rigorous and detailed comments on technical and scientific performance. The Backlook review amplified this observation noting that not all PIs are equal with respect to responsibility for and performance of safety management.

The practice of principal investigators having 20-60 post docs and graduate students on a project is seen as a major contributing factor to weakness in the implementation and enforcement of safety at the activity level. This issue was noted in the Peer Review as: the span of control for a principal investigator can exceed what is easily manageable making it even more difficult to monitor their spaces and activities and by the Backlook Review as: span of control (excessive) does not allow responsible safety management (see Issue 4.4).

Inadequate participation by EH&S professions in monitoring field and work place activities contributes to lenient and inconsistent implementation of the existing safety policies (see Issue 2.1.1).

***Principle 2 – Clear Roles and Responsibilities:***

***Clear and ambiguous lines of authority and responsibility for ensuring safety shall be established and maintained at all organizational levels within the department and its contractors.***

**Issue 2.1 ES&H Assurance mechanisms are ineffective.**

**Root Cause 2.1.1 – Not all EH&S Division technical programs include regular, required inspections of the workplace, work activities, or facilities.**

The EH&S Division does not have a mechanism for regular inspections to assess programmatic effectiveness. For example, due to the requirements of 10CFR 835, the Radiation Protection Program performs regular inspections of Laboratory workspaces to ensure compliance with programmatic standards. However, many EH&S Division programs do not have similar forms of programmatic assurance. These responsibilities need clarification and guidance to avoid the potential conflict of interest for EH&S staff as they provide support to the divisions and discharge their stewardship responsibilities. In short, currently EH&S oversight is too decentralized and ineffective.

**Root Cause 2.1.2 - Self-assessment inspection instructions and techniques require improvement.**

The Division Self-Assessment is not providing adequate assurance of ES&H performance to the home division. As the institutional ES&H Self-Assessment relies upon the 16 separate division self-assessments, the ES&H Division Self-Assessment results do not provide adequate institutional ES&H assurance. In addition, line managers lack a fundamental understanding and training to properly participate in division self-assessment activities. Work observations and inspections are sometimes perceived as punitive and therefore actively resisted.

The EH&S Division liaison program creates a potential conflict between satisfying safety and scientific program goals. This is exacerbated in the Integrated Functional Appraisal, which requires EH&S Division liaisons to audit divisions that they normally serve in support roles.

**Root Cause 2.1.3 – The term line management is not defined in LBNL’s RPM.**

Consequently, existing policies for line management responsibilities in performing ES&H self-assessment activities are too lenient and unenforceable. Therefore, the concept is not well understood or consistently applied across the Laboratory. This results

in safety coordinators performing many ISM duties that are line management responsibilities

Line management responsibilities in performing self-assessment activities require greater definition. In many cases, line managers rely on division safety coordinators to perform workspace inspections, hazard analysis, hazard control, and ES&H communications. These are central tenets of ISM that must be performed by line managers. Safety coordinators should support line managers and provide the tools necessary to effectively fulfill these responsibilities.

Policy for line managers engaging EH&S division staff also require improvement. Many line managers do not consult EH&S staff in planning and modifying work.

**Root Cause 2.1.4- Communication of line management ES&H responsibilities requires improvement.**

Although generally knowledgeable of ISM, line managers are unaware of their specific ES&H responsibilities. PRDs are not explicit in stating line management ES&H responsibilities, and many principal investigators do not have PRDs. PIs often rely on post-docs and graduate students to implement safety policies.

***Principle 3 – Competence Commensurate with Responsibilities:  
Personnel shall possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities.***

**Issue 3.1 – There is not a uniform process for educating managers, supervisors, and coordinators on overseeing and implementing safety in the workplace.**

**Root Cause 3.1.1 – The lack of a thorough analysis of the need for and type of safety training for supervisors led, in part, to a decision not to require this training.**

Even though there are ongoing efforts to improve safety training for line managers, development of new policies and administrative controls as part of a corrective action to address Issues 1.1 and 2.1 should result in a thorough analysis of these training needs and the development of a required course to meet these needs.

**Root Cause 3.1.2 – The role of safety coordinator varies across LBNL. The minimum qualifications and training of safety coordinators is not determined and formalized.**

There are only two required courses for safety coordinators and no other qualifications have been formalized.

**Issue 3.2 – Work pressure could be driving people to work in less safe ways, causing mistakes, or creating stressed personal interactions.**

**Root Cause 3.2.1 – In the absence of information, assumptions are being made regarding the relative values of the work being performed resulting in risk acceptance that may not be what is intended.**

Employees state that excessive workload requirements including tight schedules and feeling overwhelmed lead them to take shortcuts in risk management to increase their work volume. Employees see safety as a lower priority to “production” because of cuts in safety staff and safety issues that remain unfixed.

**Root Cause 3.2.2 – Risk taking is recognized, tolerated, and encouraged by workers, supervisors, coworkers, guests and students.**

The situation is aggravated during changes in resources: Reductions-In-Force (RIF), a facility and/or the number of users outgrowing static safety resources. Current Standards, Policies, and Administrative Controls are not strict enough to prevent these practices. Management policies do not provide adequate expectations and direction on risk management to allow safety to be of paramount importance. People will take safety risks to get the job done in order to retain project funding. Management and management systems are tolerating or encouraging this practice. Safety does not appear to be a value in how work is to be done.

**Root Cause 3.2.3 – Current Standards, Policies, or Administrative Controls are not strict enough to prevent these practices.**

Management policies do not provide adequate expectations and direction on risk management to allow safety to be paramount value. Teamwork should be enhanced to stress that schedule is always second to safety.

**Root Cause 3.2.4 – Less than adequate work control process when scope, resources, personnel, schedule change (see Root Cause 3.2.2, Issues 5.1 and 7.1).**

Instances were noted in which a new definition work and hazard analysis were not triggered when changes impacting the work and/or hazards were evident.

**Root Cause 3.2.5 – A significant portion of the staff believe that improvements do not occur unless there is a serious problem.**

Interviews with supervisory and non-supervisory employees disclosed their concern that “someone had to get hurt” before a safety problem would get fixed (see Issue 4.1).

**Issue 3.3 – Causal analysis is inconsistently applied and may not result in corrective actions that will prevent recurrence.**

**Root Cause 3.3.1 – Staff performing causal analysis are not adequately trained, possibly due to the failure of management to recognize the need or to identify the staff position most likely to be involved in causal analyses.**

LBNL only performs in-depth causal analysis by trained investigators for serious incidents. Only a handful of Lab staff has formal root cause analysis training. Although safety coordinators and EHS liaisons are most likely to perform causal analysis investigations, the majority of this staff lacks any formal root cause analysis training.

***Principle 4 – Balanced Priorities:***

***Resources shall be effectively allocated to address safety, programmatic, and operational considerations. Protecting the public, the workers, and the environment shall be a priority whenever activities are planned and performed.***

**Issue 4.1 – The Lab is in a reactive posture with respect to ES&H.**

**Root Cause 4.1.1 Management’s written and verbal safety communications program does not effectively communicate management concerns for quality workmanship, safety, and protection of the environment.**

Even though there is a very proactive approach in many elements of LBNL, the wide spread perception is that the Laboratory is in a very reactive posture with respect to ES&H. Significant portions of the staff believe that improvements do not occur unless and until there is a serious problem. Interviews with supervisory and non-supervisory employees disclosed their concern that “someone had to get hurt” before a safety problem would get fixed.

When safety issues are identified, there has been less than adequate management support of staff, first line and middle managers, both in the form of encouragement, rewards and availability of time. Employees see safety as a lower priority to “production” because of management actions that cut safety staff while leaving safety issues unfixed.

Risk taking is recognized, tolerated, and encouraged by coworkers, supervisors, guests, and students. This situation is aggravated during RIFs and growth periods because there is less than adequate change control when scope, resources, personnel or schedules change. Some staff expressed belief that raising safety concerns with management can result in missing a promotion (e.g., negative PRD), demotion, and even firing.

**Issue 4.2 – Excessive focus on DART and TRC rates has negatively impacted the safety program.**

**Root Cause 4.2.1 – Although evidence exists that LBNL conducts evaluation of accidents and near hit/miss events, the communication of this information to the general work population focused too heavily on previous injuries and injury rates and insufficiently on safe work practices to avoid these incidents.**

Accident and near hit/miss events constitute a wealth of incident avoidance information. Responses to accidents at other DOE sites was interpreted by some employees as a need to avoid a shut down, possibly by withholding safety information, rather than focusing on how to work safely.

**Issue 4.3 – Communication of line management ES&H responsibilities requires improvement.**

**Root Cause 4.3.1 – Performance expectations and review for principal investigators requires improvement.**

Although generally knowledgeable of ISM, line managers are unaware of their specific ES&H responsibilities. PRDs are not explicit in stating line management ES&H responsibilities, and many principal investigators do not have PRDs. PIs often rely on post-docs and graduate students to implement workplace safety policies.

**Root Cause 4.3.2 – In general, principle investigators do not provide proper mentoring to students and post-docs.**

This failure is due to lack of knowledge and training. Often, students and post-docs receive no mentoring from their PIs on understanding and fulfilling their ISM responsibilities. Students and post-docs frequently are focused exclusively on science, to the detriment of everything else. Lacking effective safety mentoring from PIs, this can result in unsafe behavior.

**Issue 4.4 – Span of control is too large and does not allow for responsible safety management (see Root Cause 1.1.3).**

**Root Cause 4.4.1 – Current practice allows PIs to supervise too many people to effectively fulfill ISM responsibilities.**

Some principal investigators supervise 20-60 people. In many cases, no formal line of management authority and responsibility as defined by LBNL policy exists between the PI and staff. This results in PIs delegating core ISM responsibilities to graduate students and post-docs. Students and post-docs are not qualified to perform line management ISM responsibilities.

***Principle 5 – Identification of Safety Standards and Requirements:***

***Before work is performed, the associated hazards shall be evaluated and an agreed-upon set of safety standards and requirements shall be established which, if properly implemented, will provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences.***

**Issue 5.1 – It is not clear that activity hazards that are below the threshold or not the primary subject of AHDs are adequately analyzed and controlled.**

**Root Cause 5.1.1 – The Laboratory does not have a policy in place requiring formal work planning and authorization for activities and work below LBNL regulatory threshold.**

Laboratory management needs to recognize that low-level hazards can pose a threat to safety and develop a policy, the implementation of which would mitigate the risk of adverse consequences. This policy could include recognition by line managers of their safety responsibilities in assigning and authorizing work (see Issues 1.1 and 1.2).

**Root Cause 5.1.2 – The current policy and implementation guidance for AHDs lacks specificity, resulting in inconsistent implementation across the institution and frequent interpretation that allows for lower standards to be used.**

The current policy needs to be improved to meet these concerns (see Issues 7.1 and 7.2).

**Root Cause 5.1.3 – The current assessment and performance evaluation processes for work authorizations, particularly AHDs, either lack the depth or are conducted by individuals closely aligned with the programs under scrutiny, thereby enhancing chances of less-than-rigorous inspections and/or evaluations.**

**Issue 5.2 – Subcontractors seem to be held to a lower safety standard than comparable LBNL staff.**

**Root Cause 5.2.1 – The perception of a double standard in safety oversight may be related to there being more levels of safety oversight for Lab staff.**

This issue is derived from interviews with craft employees in Facilities Division. Safety inspectors and EH&S staff must make a special effort to ensure that subcontractors and their LBNL counterparts are held to the same safety standards and subjected to the same oversight. LBNL staff and subcontractors need to be routinely reminded that “Stop Work” responsibility when unsafe practices are observed applies to both equally.

**Issue 5.3 – The work authorization process is not well suited to project/ maintenance type work.**

**Root Cause 5.3.1 The Laboratory currently lacks policies and implementation modes that include rigorous hazard identification and detailed, documented work planning for project/maintenance-type work and activities including legacy clean-up activities.**

Any improvement in this aspect of the work authorization process should be part of the overall improvement in work planning and authorization (see Issues 7.1 and 7.2).

***Principle 6 – Hazard Controls Tailored to Work Being Performed:  
Administrative and engineering controls to prevent and mitigate hazards shall be tailored to the work being performed and associated hazards.***

**Issue 6.1 – Safety is not a multilayer redundant consideration in all divisions: some hazard controls do not allow for human error.**

**Root Cause 6.1.1 – Currently, no management policy requires safety walk-arounds by line managers.**

The policy that exists is vague and open to interpretation. As a result, the division implementation of safety walk-around programs is inconsistent. Some managers walk their spaces weekly, others once a year, some not at all. The current policy also can be interpreted that managers can delegate this responsibility – safety committees or safety coordinators sometimes carry out this vital management duty. In addition, no training is provided to line managers on how to organize a safety walk-around program or how to conduct the walk-around itself (see Issue 3.1).

**Issue 6.2 – Some evidence exists that administrative controls are selected before the need and utility of engineering controls has been determined.**

**Root Cause 6.2.1 – Some divisions are creating administrative hazard controls that are poorly defined and difficult to implement.**

This practice was a factor in the recent radiation shielding events at the Advanced Light Source (ALS). DOE requirements require a hierarchal approach to hazard controls that rely on engineering controls first, and then administrative controls, and finally personal protective equipment.

**Issue 6.3 – Facility inspection program is variable in frequency and effectiveness and is not identifying hazards in a timely fashion.**

**Root Cause 6.3.1 – Lab policies do not specify frequency of facility inspections and training of those responsible is lacking (see Issues 1.1, 2.1, and 3.1).**

Evidence demonstrates that line management and EH&S technical staff is not uniformly enforcing the use of administrative controls when they are established.

***Principle 7 – Operations Authorization:  
The conditions and requirements to be satisfied for operations to be initiated and conducted shall be clearly established and agreed upon.***

**Issue 7.1 Lab-wide work control program is less than adequate.**

**Root Cause 7.1.1 Standards, policies and/or administrative controls (SPAC) designed to ensure adequate work planning either lack detail and are confusing and incomplete, or do not exist.**

The SPACs in place are not strict enough or are poorly enforced. In addition, it is not clear that activity hazards that are below the threshold or not the primary subject for Activity Hazard Documents (AHDs) are adequately analyzed and controlled. This problem may be related to the ambiguity of the current guidance for developing an AHD.

Although significant hazards are controlled through formal authorizations, the process for lower-level hazards is largely undefined. As a result, divisions employ a variety of line management authorizations to varying degrees of effectiveness.

**Root Cause 7.1.2 – Adherence to the existing work control program is less than adequate and communication by managers of the requirement and value of compliance needs reinforcement.**

Employees not adhering to the current work authorization requirements failed to understand that they were responsible for compliance.

**Root Cause 7.1.3 – Corrective actions developed in response to inconsistent adherence to work planning and authorization policies are often delayed.**

This inadequacy is related to the lack of or ineffective communication by laboratory senior and middle managers.

**Issue 7.2 – The requirement to keep the AHD personnel list current is not clear.**

**Root Cause 7.2.1 – The current SPAC for work planning is not strictly enforced and the lack of clarity in the policy and its implementation likely contributes to this leniency (see Root Cause 7.1.1 and Issue 5.1).**

## **Actionable Items for Corrective Action**

**(Directly derived from Root Cause Analysis )**

**Issue 1. Line Management's execution of ES&H is less than adequate.**

**Root Cause 1.1.1 – Standards, policies and/or administrative controls (SPAC) lack detail, are confusing and incomplete, or do not exist. In addition, the SPACs in place are not strict enough and poorly enforced.**

**Root Cause 2.1.3 – The term line management is not defined in LBNL's RPM.**

**Root Cause 1.1.3 – Line management accountability for implementation of existing policies and administrative controls has been inadequate, resulting in deviations in implementation or non-use of standard-based safety requirements. Enforcement and communication of safety policies and procedures down the management line is less than adequate. There is evidence that the senior management support of middle and first line supervisors for doing work safely is not consistent and in some groups support is less than adequate.**

**Root Cause 4.4.1 – Current practice allows PIs to supervise too many people to effectively fulfill ISM responsibilities.**

**Root Cause 6.1.1 – Currently, no management policy requires safety walk-arounds by line managers.**

**Root Cause 6.3.1 – Lab policies do not specify frequency of facility inspections and training of those responsible is lacking.**

**Root Cause 4.3.1 – Performance expectations and review for principal investigators requires improvement.**

**Issue 2. ES&H Assurance mechanisms, currently based on S/As, IFAs, and MESH reviews, are ineffective.**

**Root Cause 2.1.1 – Not all EH&S Division technical programs include regular, required inspections of the workplace, work activities, or facilities.**

**Root Cause 2.1.2 - Self-assessment inspection instructions and techniques require improvement.**

**Root Cause 5.1.3 – The current assessment and performance evaluation processes for work authorizations, particularly AHDs, either lack the depth or are conducted by individuals closely aligned with the programs under scrutiny, thereby enhancing chances of less-than-rigorous inspections and/or evaluations.**

**Root Cause 7.1.3 – Corrective actions developed in response to inconsistent adherence to work planning and authorization policies are often delayed.**

**Issue 3. There is not a uniform process for educating managers, supervisors, and coordinators on overseeing and implementing safety in the workplace.**

**Root Causes 3.1.1 & 1.1.2 – The need for training of line managers to effectively carry out their safety oversight responsibilities has not been effectively analyzed. The lack of presenting a convincing analysis of the need for this training led in part to a senior management decision to not make such training a laboratory-wide requirement.**

**Root Cause 6.3.1 – Lab policies do not specify frequency of facility inspections and training of those responsible is lacking.**

**Root Cause 2.1.4 – Communication of line management ES&H responsibilities requires improvement.**

**Root Cause 3.1.2 – The role of safety coordinator varies across LBNL. The minimum qualifications and training of safety coordinators is not determined and formalized.**

**Root Cause 4.1.1 – Management’s written and verbal safety communications program does not effectively communicate management concerns for quality workmanship, safety, and protection of the environment.**

**Root Cause 4.3.2 – In general, principle investigators do not provide proper mentoring to students and post-docs. This failure is due to lack of knowledge and training.**

**Issue 4. The Lab needs to be in a more proactive posture with respect to ES&H. Management policies do not provide adequate expectations and directions on risk management to allow safety to be of paramount value.**

**Root Cause 4.1.1 – Management’s written and verbal safety communications program does not effectively communicate management concerns for quality workmanship, safety, and protection of the environment.**

**Root Cause 6.2.1 – Some divisions are creating administrative hazard controls that are poorly defined and difficult to implement.**

**Root Cause 3.2.3 – Current Standards, Policies, or Administrative Controls seem insufficient to prevent excessive risk taking.**

**Root Cause 3.2.1 – In the absence of information, assumptions are being made regarding the relative values of the work being performed resulting in risk acceptance that may not be what is intended.**

**Root Cause 3.2.2 – Risk taking is recognized, tolerated, and encouraged by workers, supervisors, coworkers, guests and students.**

**Root Cause 5.2.1 – The perception that a double standard exists in safety oversight for contract and LBNL craft workers.**

**Root Cause 3.2.5 – A significant portion of the staff believe that improvements do not occur unless there is a serious problem.**

**Root Cause 3.3.1 – Causal analysis is inconsistently applied and may not result in corrective actions that will prevent recurrence. Staff performing causal analysis are not adequately trained, possibly due to the failure of management to recognize the need or to identify the staff position most likely to be involved in causal analyses.**

**Root Cause 4.2.1 – Although evidence exists that LBNL conducts evaluation of accidents and near hit/miss events, the communication of this information to the general work population focused too heavily on previous injuries and injury rates and insufficiently on safe work practices to avoid these incidents.**

**Issue 5. Lab-wide work control program is less than adequate.**

**Root Cause 7.1.1 Standards, policies and/or administrative controls (SPAC) designed to ensure adequate work planning either lack detail and are confusing and incomplete, or do not exist. Policy for line managers to engage EH&S division staff when planning and modifying work also requires improvement.**

**Root Cause 5.1.1 – The Laboratory does not have a policy in place requiring formal work planning and authorization for activities and work below LBNL regulatory threshold.**

**Root Cause 5.1.2 – The current policy and implementation guidance for AHDs lacks specificity, resulting in inconsistent implementation across the**

**institution and frequent interpretation that allows for lower standards to be used.**

**Root Cause 5.3.1 The Laboratory currently lacks policies and implementation modes that include rigorous hazard identification and detailed, documented work planning for project/maintenance-type work and activities including legacy clean-up activities.**

**Root Cause 3.2.4 – Less than adequate work control process when scope, resources, personnel, schedule change.**

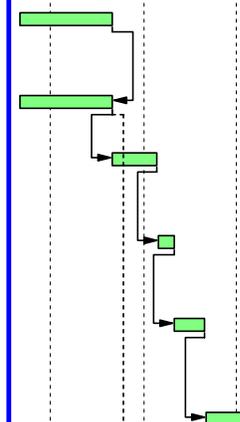
**Root Cause 7.1.2 – Adherence to the existing work control program is less than adequate and communication by managers of the requirement and value of compliance needs reinforcement.**

**Root Cause 7.2.1– The requirement to keep the AHD personnel list current is not clear.**

Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1		
<b>LBNL ES &amp; H Corrective Action Plan</b>														
<b>CA Category #1 - Line Management Execution of ES &amp; H</b>														
<b>Root Cause 1.1.1</b>														
1.1.1	Root Cause 1.1.1 - Standards, policies and/or administrative controls (SPAC) lack detail, are confusing and incomplete, or do not exist. In addition, the SPACs in place are not strict enough and poorly enforced.													
1.1.1.01	Senior management walk-arounds are spotty and vary from once a year to twice a day. Refer to the Corrective Action for Root Cause 1.1.3 under Correction Action Category #1.													
<b>Root Cause 1.1.2</b>														
1.1.2	Root Cause 1.1.2 - The need for training of line managers to effectively carry out their safety oversight responsibilities has not been effectively analyzed.													
1.1.2.01	Principal Investigators do not appear to be well trained and prepared for their line management responsibilities. Refer to to CA for Root Cause 3.1.1 under Corrective Action Category #3.													
<b>Root Cause 1.1.3</b>														
1.1.3	Root Cause 1.1.3 - Line management accountability for enforcement of safety practices and procedures is less than adequate		01-Jun-06	28-Sep-07										
1.1.3.01a	Define line management and their roles and responsibilities in the appropriate section of the RPM.	Chu	01-Jun-06*	30-Aug-06										
1.1.3.01b	Define safety roles and responsibilities for line management in Chapter 1 of PUB 3000	Hatayama	01-Jun-06	30-Aug-06										
1.1.3.02	Obtain SRC concurrence for policy changes to line management definition and roles and responsibilities.	Chu	31-Aug-06	13-Oct-06										
1.1.3.03	Revise the current mandatory PRD ES&H evaluation criteria for managers to reflect changes in PUB 3000.	Chu	16-Oct-06	30-Oct-06										
1.1.3.04a	Provide a template for Division ISM plans that will enable Divisions to upgrade ISM Plans to reflect changes in PUB 3000.	Hatayama	31-Oct-06	30-Nov-06										
1.1.3.04b	Divisions develop ISM plans that will enable them to meet new guidance of PUB 3000.	Chu	01-Dec-06	15-Jan-07										

Refer to the Corrective Action for Root Cause 1.1.3 under CA Category #1.

Refer to to Corrective Action for Root Cause 3.1.1 under CA Category #3



- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work

**2006 ISMS Peer Review Corrective Action Plan Schedule**

**Lawrence Berkeley National Laboratory**

CAP Schedule - By Corrective Action Category 31-May-06



Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
1.1.3.05	Revise the Division Self Assessment Criteria for 2007 to reflect new guidance in PUB 3000.	Krupnick	02-Oct-06*	02-Jan-07								
1.1.3.06	Evaluate the effectiveness of the changes of PUB 3000 regarding roles and responsibilities for line management in the 2007 Division Self Assessment.	Krupnick	03-Jan-07	28-Sep-07								
<b>Root Cause 2.1.3</b>												
2.1.3	Root Cause 2.1.3 - The term line management is not defined in LBNL's RPM.											
2.1.3.01	Line management responsibilities in performing self-assessment activities require greater definition. Refer to the Corrective Action for Root Cause 1.1.3 under Correction Action Category #1.											
<b>Root Cause 4.3.1</b>												
4.3.1	Root Cause 4.3.1 - Performance expectations and review for principal investigators requires improvement											
4.3.1.01	Line managers are unaware of their specific ES&H responsibilities. Refer to the Corrective Action for Root Cause 1.1.3 under CA Category #1.											
<b>Root Cause 4.4.1</b>												
4.4.1	Root Cause 4.4.1 - Current practice allows PIs to supervise too many people to effectively fulfill ISM responsibilities.											
4.4.1.01	No formal line of management authority and responsibility as defined by LBNL policy exist between the PI and staff. Refer to the Corrective Action for Root Cause 1.1.3 under CA Category #1.											
<b>Root Cause 6.1.1</b>												
6.1.1	Root Cause 6.1.1 - Currently, no management policy requires safety walk-arounds by line managers.											
6.1.1.01	The Division implementation of safety walk-around programs is inconsistent. Refer to the Corrective Action for Root Cause 6.3.1 under CA Category #1.											
<b>Root Cause 6.3.1</b>												
6.3.1	Root Cause 6.3.1 - Lab policies do not specify frequency of facility inspections and training of those responsible is lacking.		17-Apr-06 A	30-Nov-06								

Refer to the Corrective Action for Root Cause 1.1.3 under CA Category #1.

Refer to the Corrective Action for Root Cause 1.1.3 under CA Category #1.

Refer to the Corrective Action for Root Cause 1.1.3 under CA Category #1.

Refer to the Corrective Action for Root Cause 6.3.1 under CA Category #1.

- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work

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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
6.3.1.01	Revise the requirement for management walk-arounds in Chapter 1 of PUB 3000	Hatayama	01-Jun-06*	18-Aug-06								
6.3.1.02	Develop and deliver safety walk-around training (EHS-27)	Hatayama	17-Apr-06 A	29-Jun-06								
6.3.1.03	Assess effectiveness of safety walk-arounds and present results to the SRC.	Krupnick	01-Jun-06*	30-Nov-06								
6.3.1.04	The SRC will review the effectiveness of improvements in line management walk-arounds (including the effectiveness of EHS-27) and direct additional actions as needed.	Lucas	01-Jun-06	30-Nov-06								
<b>CA Category #2 - ES &amp; H Assurance Mechanisms</b>			02-Jan-06 A	28-Sep-07								
<b>Root Cause 2.1.1</b>			01-May-06 A	28-Sep-07								
2.1.1	Root Cause 2.1.1 - Not all EH&S Division technical programs include regular, required inspections of the workplace, work activities, or facilities.											
2.1.1.01	Determine and document which efforts that are underway in support of 10 CFR 851 implementation address root cause 2.1.1 (e.g. one existing task is to "develop program validation methodology").	Hatayama	01-May-06 A	14-Jul-06								
2.1.1.02	Solicit and document feedback on existing instructions and techniques from Division Safety Coordinators and EH&S Liaisons.	Krupnick	22-May-06*	16-Jun-06								
2.1.1.03	Survey EH&S Group Leaders/Technical Leads to determine baseline of EH&S assurance systems for technical programs.	Krupnick	07-Jun-06*	05-Jul-06								
2.1.1.04	Catalog EH&S programs' assurance system: survey of GL/Technical Leads	Krupnick	07-Jun-06*	05-Jul-06								
2.1.1.05	Develop Assurance Systems for EH&S Technical Programs.	Hatayama	06-Jul-06	15-Sep-06								
2.1.1.06	Document enhanced and/or newly develop EH&S Technical Program Assurance Systems, ES&H Self Assessment Program, PUB 5344.	Krupnick	18-Sep-06	29-Sep-06								
2.1.1.07	Validate effectiveness of enhanced / newly developed EH&S Technical Program assurance systems.	Krupnick	03-Aug-06*	28-Sep-07								
<b>Root Cause 2.1.2</b>			01-Mar-06 A	02-Apr-07								

- █ Actual Work
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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1		
2.1.2	Root Cause 2.1.2 - Self-assessment inspection instructions and techniques require improvement.													
2.1.2.01	Solicit and document feedback on existing instructions and techniques and on January walk-throughs from Division Safety Coordinators and EH&S Liaisons.	Krupnick	22-May-06*	16-Jun-06										
2.1.2.02	Compile lessons learned (including noteworthy practices) on January 2006 walk-throughs.	Krupnick	09-Jun-06*	23-Jun-06										
2.1.2.03	Determine requirements for additional documents, as required.	Krupnick	26-Jun-06	21-Jul-06										
2.1.2.04	Determine requirements for training, as deemed necessary.	Hatayama	26-Jun-06	21-Jul-06										
2.1.2.05	Incorporate feedback and results from actions 1-3 into the following documents and training:	Hatayama	24-Jul-06	29-Sep-06										
2.1.2.05a	Environment, Safety, and Health Self Assessment Program, PUB-5344	Hatayama	24-Jul-06*	29-Sep-06										
2.1.2.05b	Tools and procedures for conducting Division ES&H Self-Appraisals, PUB-3105	Hatayama	24-Jul-06*	29-Sep-06										
2.1.2.05c	ES&H Self-Assessment Training	Hatayama	24-Jul-06*	29-Sep-06										
2.1.2.05d	Performing an Effective Safety Walk-around, EHS 27. Refer to to Corrective Action for Root Cause 3.1.1 under Corection Category #3.													
2.1.2.06	Develop additional training as appropriate.	Hatayama	24-Jul-06*	22-Dec-06										
2.1.2.07	Revise IFA and MESH protocols for FY06.	Krupnick	01-Mar-06 A	24-May-06 A										
2.1.2.08	Assess effectiveness of revised IFA and MESH protocols.	Krupnick	01-Nov-06*	30-Nov-06										
2.1.2.09	Revise division self-assessment criteria based on Lab policy.	Krupnick	03-Jul-06*	02-Jan-07										
2.1.2.10	Revise Partnership Agreement between LBNL and UCB, ensuring consistency with Lab policy.	Chu	02-Oct-06*	02-Apr-07										
<b>Root Cause 5.1.3</b>			02-Jan-06 A	16-Aug-07										

Refer to to Corrective Action for Root Cause 3.1.1 under CA Category #3

- █ Actual Work
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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1		
5.1.3	Root Cause 5.1.3 - The current assessment and performance evaluation processes for work authorizations, particularly AHDs is less than adequate.													
5.1.3.01	Revise IFA guidance to focus on formally authorized work in the assessed division.	Krupnick	02-Jan-06 A	22-May-06 A	[Actual Work Bar]									
5.1.3.02	Assess effectiveness of revised IFA protocol. Refer to to CA for Root Cause 2.1.2 under CA Category #7				[Remaining Work Bar]									
5.1.3.03	Solicit feedback from Group Leaders and Division Safety Coordinators to determine merits of liaisons performing IFAs of other divisions.	Krupnick	07-Jun-06*	05-Jul-06	[Remaining Work Bar]									
5.1.3.04	Provide input for AHD database upgrades to enhance Division Self-Assessment validation process.	Krupnick	07-Jun-06	10-Jul-06	[Remaining Work Bar]									
5.1.3.05	Incorporate recommendations from Root Cause above in AHD database.	Hatayama	11-Jul-06*	04-Oct-06	[Remaining Work Bar]									
5.1.3.06	Incorporate AHD database upgrades into FY07 SA validation	Krupnick	14-Jul-06*	16-Aug-07	[Remaining Work Bar]									
<b>Root Cause 7.1.3</b>			02-Jan-06 A	19-May-06 A	[Actual Work Bar]									
7.1.3	Root Cause 7.1.3 - Corrective actions to address inconsistent adherence to work planning and authorization policies are often delayed due to non-identification of task master.		02-Jan-06 A		[Remaining Work Bar]									
7.1.3.02	Developed Corrective Action Tracking System (CATS)	Krupnick	02-Jan-06 A	19-May-06 A	[Actual Work Bar]									
<b>CA Category #3 - Educating Managers, Supervisors and...</b>			01-May-06 A	11-Oct-07	[Actual Work Bar]									
<b>Root Cause 2.1.4</b>					[Remaining Work Bar]									
2.1.4	Root Causes 2.1.4 - Communication of Line Management ES&H responsibilities requires improvement.				[Remaining Work Bar]									
2.1.4.01	Define Line Managers ES&H Roles and Responsibilities. Refer to to Correction Action for Root Cause 3.1.1 under CA Category #3				[Remaining Work Bar]									
<b>Root Cause 3.1.1</b>			16-Oct-06	11-Oct-07	[Remaining Work Bar]									
3.1.1	Root Causes 3.1.1 - The need for training of line managers to effectively carry out their safety oversight responsibilities has not been effectively analyzed.				[Remaining Work Bar]									

Refer to to CA for Root Cause 2.1.2 under CA Category #7

Refer to to CA for Root Cause 3.1.1 under CA Category #3

- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work

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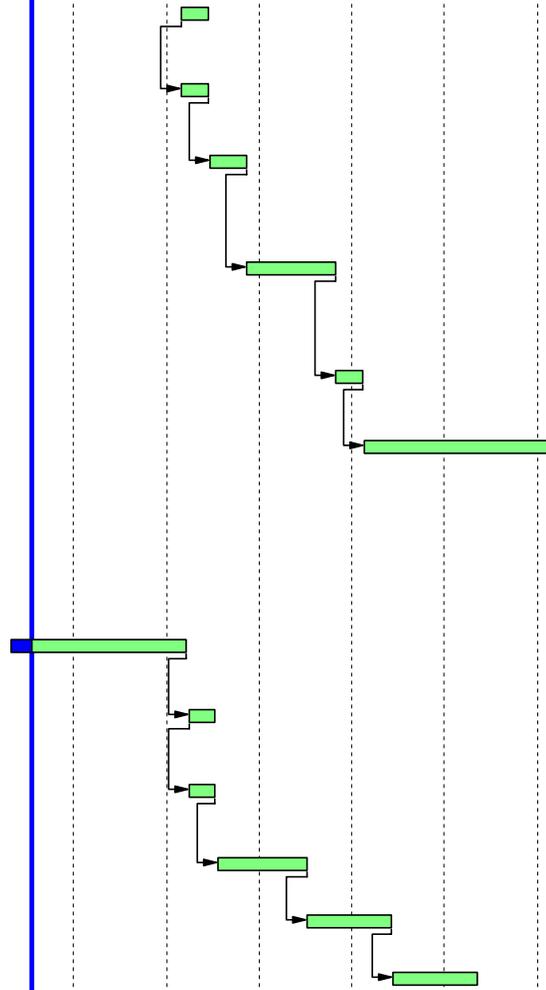
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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
3.1.1.01	Establish the LBNL ES&H (not HR) definitions plus roles and responsibilities of line manager, supervisor and safety coordinators. Refer to the Corrective Action for Root Cause 1.1.3 from CA Category #1.											
3.1.1.02a	Establish the need, scope, requirements of line manager safety oversight training.	Hatayama	16-Oct-06*	10-Nov-06								
3.1.1.02b	Perform a Gap Analysis on oversight training requirements. Document Findings.	Hatayama	16-Oct-06*	10-Nov-06								
3.1.1.02c	Review existing LBNL policy regarding line manager safety oversight training requirements and revise training as required	Chu	13-Nov-06*	18-Dec-06								
3.1.1.02d	Establish training course evaluation process that measures the effectiveness and quality of not only each class taught but periodically of the course /program	Hatayama	19-Dec-06	15-Mar-07								
3.1.1.02e	Establish retraining/refresher training interval criteria for safety training courses	Hatayama	16-Mar-07*	12-Apr-07								
3.1.1.02f	Develop training schedule. Train new and exiting staff as required.	Hatayama	13-Apr-07	11-Oct-07								
<b>Root Cause 3.1.2</b>			<b>01-May-06 A</b>	<b>02-Aug-07</b>								
3.1.2	Root Cause 3.1.2 - The role of safety coordinator varies across LBNL. The minimum qualifications and training of safety coordinators is not determined and formalized.											
3.1.2.01	Determine and formalize roles and responsibilities for safety coordinators across LBNL. Update Pub 3000	Chu	01-May-06 A	20-Oct-06								
3.1.2.02a	Review qualifications of all safety coordinators against new requirements	Chu	23-Oct-06	17-Nov-06								
3.1.2.02b	Analyze, determine and formalize minimum training for safety coordinators	Chu	23-Oct-06	17-Nov-06								
3.1.2.02c	Develop training course(s) for Safety Coordinators	Hatayama	20-Nov-06	15-Feb-07								
3.1.2.02d	Initiate training for all coordinators (as necessary)	Hatayama	16-Feb-07	10-May-07								
3.1.2.02e	Review effectiveness of training and recommend changes as necessary	Krupnick	11-May-07	02-Aug-07								
<b>Root Cause 4.1.1</b>			<b>01-Jun-06</b>	<b>01-Nov-06</b>								

Refer to the Corrective Action for Root Cause 1.1.3 from CA Category #1.



- █ Actual Work
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					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
4.1.1	Root Cause 4.1.1 - Management's written and verbal safety communications program does not effectively communicate management concerns for quality workmanship, safety, and protection of the environment.											
4.1.1.01a	Review and evaluate existing management safety communications plan and revise as necessary.	Chu	01-Jun-06*	30-Jun-06								
4.1.1.01b	Initiate and verify or establish new requirements for the management safety communications plan.	Chu	03-Jul-06	31-Aug-06								
4.1.1.01c	Develop/ revise management safety communications plan.	Chu	01-Sep-06	04-Oct-06								
4.1.1.01d	Develop management communications program based on new/ revised plan.	Chu	05-Oct-06	01-Nov-06								
<b>Root Cause 4.3.2</b>												
4.3.2	Root Cause 4.3.2 - Principal investigators do not provide proper mentoring to students and post-docs due to lack of knowledge and training.											
4.3.2.01a	Enhance mentoring and safety awareness of post-docs. Analyze the purpose and content of the current EHS0024 ES&H for Mentors & Supervisors course and how/when it is being offered to PI's. Refer to CA for Root Cause 3.1.1 under CA Category #3											
4.3.2.01b	Revise EHS0024 (if necessary) to include additional safety awareness. Refer to to CA for Root Cause 3.1.1 under CA Category #3											
4.3.2.01c	Make EHS0024 required for all staff who mentors post-docs. Refer to to CA for Root Cause 3.1.1 under CA Category #3											
4.3.2.01d	SRC review effectiveness of EHS0024 and suggest changes as necessary. Refer to to CA for Root Cause 3.1.1 under CA Category #3											
<b>Root Cause 6.3.1</b>												
6.3.1.0	Root Cause 6.3.1 - Lab policies do not specify frequency of facility inspections and training of those responsible is lacking.											

Refer to to Corrective Action for Root Cause 3.1.1 under CA Category #3

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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
6.3.1.01a	Revise (if necessary) Lab policy on work place inspections. Review existing Lab policies to identify current requirement for work place inspections and inspection frequency, revise as necessary. Refer to to CA for Root Cause 3.1.1 under CA Category #3											
6.3.1.02a	Define responsibility for work place inspections and required training. Review existing Lab policies to identify current responsibility for performing work place inspections and training requirements. Refer to the Corrective Action for Root Cause 3.1.1											
6.3.1.02b	Piloted EHS0027 "How to perform an effective safety walk-around" is with Lab SRC to determine acceptance as safety training course. Refer to the Corrective Action for Root Cause 1.1.3 & 3.1.1 under CA Category #3											
6.3.1.02c	Ensure a training analysis has been performed on EHS0027. Refer to the CA for Root Cause 3.1.1 under Correction Action Category #3											
6.3.1.02d	Ensure a training analysis has been performed on EHS0027. Refer to the CA for Root Cause 3.1.1 under CA Category #3											
6.3.1.02e	SRC review effectiveness of training and recommend changes as necessary. Refer to the CA for Root Cause 3.1.1 under CA Category #3											
<b>Root Cause 7.1.2</b>			01-Jun-06	27-Oct-06								
7.1.2	Root Cause 7.1.2 - Adherence to the existing work control program is less than adequate and communication by managers of the requirement and the value of compliance needs reinforcement.											
7.1.2.01	Review the results of the 2005 and 2006 IFAs and MESH reviews to identify aspects of the work control that are not being effectively implemented.	Hatayama	01-Jun-06*	29-Sep-06								
7.1.2.02	Develop a plan to improve training of individuals responsible for formal authorization documents and the communication of formal authorization requirements to staff and students.	Hatayama	01-Jun-06*	29-Sep-06								

Refer to to Corrective Action for Root Cause 3.1.1 under CA Category #3

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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
					7.1.2.03	Present Plan to the SRC for concurrence and initiate.	Hatayama	02-Oct-06	27-Oct-06			
<b>CA Category #4 - Proactive Posture on ES &amp; H</b>			15-Mar-06 A	28-Sep-07								
<b>Root Cause 3.2.1</b>			01-Jun-06	29-Jun-07								
3.2.1	Root Cause 3.2.1-Workers may be taking risks greater than what is expected.											
3.2.1.01	Develop presentation materials to support EH&S communications between management and direct reports on the topic of risks. Refer to the corrective action for Root Cause 4.1.1 under CA Category #3.										Refer to the Corrective Action for Root Cause 4.1.1 under CA Category #3.	
3.2.1.02	Add requirements for safety communications to Performance Review and Development forms. Refer to the corrective action for Root Cause 1.1.1 under CA Category #1.										Refer to the corrective action for Root Cause 1.1.1 under CA Category #1.	
3.2.1.03	Perform a survey on the safety culture at Berkeley Lab and report results to Lab Management and employees.	Hatayama	03-Jul-06*	29-Jun-07								
3.2.1.04	Revise institutional ISM Plan and Division ISM Plans to define and discourage excessive risk taking. Define and compare types of risks (safety risks versus research program risks)	Hatayama	01-Jun-06*	01-Aug-06								
<b>Root Cause 3.2.2</b>			01-Jun-06	01-Mar-07								
3.2.2	Root Cause 3.2.2 - Risk taking is recognized, tolerated, and encouraged by workers, supervisors, coworkers, guests and students.											
3.2.2.01	Develop presentation materials to support EH&S communications between management and direct reports on the topic of risks. Refer to the corrective action for Root Cause 3.2.1 under CA Category #4.										Refer to the Corrective Action for Root Cause 3.2.1 under CA Category #4.	
3.2.2.02	Issue a memo from the Directorate that defines types of risks and discourages excessive risk taking in safety.	Chu	01-Jun-06*	01-Aug-06								
3.2.2.03	Add requirements for safety communications to Performance Review and Development forms.	Chu	01-Jun-06*	01-Mar-07								
3.2.2.04	Perform a survey on the safety culture at Berkeley Lab and report results to Lab Management and employees.	Hatayama	01-Jun-06*	29-Sep-06								
<b>Root Cause 3.2.3</b>												

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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
					3.2.3	Root Cause 3.2.3 - Current Standards, Policies, or Administrative Controls seem insufficient to prevent excessive risk taking.						
3.2.3.01	Revise institutional ISM Plan and Division ISM Plans to define and discourage excessive risk taking. Define and compare types of risks (safety risks versus research program risks). Refer to the corrective action for Root Cause 3.2.1 under CA Category #4											
3.2.3.02	Distribute memo from upper management that defines types of risks and discourages excessive risk taking in safety. This would be first of routine periodic memos from upper management on EH&S issues. Refer to CA Root Cause 4.1.1, CA Category 3											
3.2.3.03	Add requirements for safety communications to Performance Review and Development forms. Refer to CA Root Cause 4.1.1, CA Category 3											
3.2.3.04	Revise EH&S 26 to include greater emphasis on defining, communicating and managing safety risks. Refer to the corrective action for Root Cause 3.2.1 under CA Category #4											
<b>Root Cause 3.2.5</b>												
3.2.5	Root Cause 3.2.5 - A significant portion of the staff believe that improvements do not occur unless there is a serious problem.											
3.2.5.01	Develop presentation materials to support EH&S communications between mngmnt and direct reports. Refer to the CAs for Root Cause 3.2.1 Under CA Category #4.											
3.2.5.02	Perform a survey on the safety culture at Berkeley Lab. Report results from survey to Lab management and employees. Refer to the corrective action for Root Cause 3.2.2 under CA Category #4.											
<b>Root Cause 3.3.1</b>					15-Mar-06 A	28-Sep-07						
3.3.1	Root Cause 3.3.1 - Root Cause analysis may be inadequate due to training inadequacies.											
3.3.1.01	Revise incident investigation procedures	Hatayama	01-Jun-06*	30-Jun-06								
3.3.1.02	Provide Tap Root and training to incident investigators	Hatayama	15-Mar-06 A	31-Aug-06								

Refer to the Corrective Action for Root Cause 3.2.1 under CA Category #4

Refer to the Corrective Action for Root Cause 4.1.1, CA Category 3

Refer to the Corrective Action for Root Cause 3.2.1 under CA Category #4

Refer to the Corrective Action for Root Cause 3.2.1 Under CA Category #4.

Refer to the Corrective Action for Root Cause 3.2.2 under CA Category #4.



- █ Actual Work
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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1		
3.3.1.03	Provide incident investigation training to Division Safety Coordinators and EH&S Liaisons.	Hatayama	01-Jun-06*	01-Sep-06										
3.3.1.04	Revise investigator training to minimize stress to individuals under investigation.	Hatayama	01-Jun-06*	28-Sep-07										
<b>Root Cause 4.2.1</b>			01-Jun-06	01-Aug-06										
4.2.1	Root Cause 4.2.1 - Management safety communications are not consistently focused on lessons learned from accident/ incident investigations.													
4.2.1.01	Develop presentation materials to support EH&S communications between management and direct reports. Refer to corrective action Root Cause 4.1.1, CA Category 3.				Refer to Corrective Action Root Cause 4.1.1, CA Category 3.									
4.2.1.02	Implement enhanced Lessons Learned program to accept near misses	Krupnick	01-Jun-06*	03-Jul-06										
4.2.1.03	Institute routine periodic memo from upper management to employees on EH&S issues	Chu	01-Jun-06*	01-Aug-06										
<b>Root Cause 5.2.1</b>														
5.2.1	Root Cause 5.2.1 - The perception that a double standard exists in safety oversight for contract and LBNL craft workers.													
5.2.1.02	Develop standardized approach to EH& H oversight. Refer to corrective actions for root cause 5.3.1, CA Category #5.				Refer to Corrective Actions for root cause 5.3.1, CA Category #5.									
<b>Root Cause 6.2.1</b>														
6.2.1	Root Cause 6.2.1 - Some divisions are creating administrative hazard controls that are poorly defined and difficult to implement.													
6.2.1.01	Develop hierarchical approach to hazards control. Refer to corrective actions for Root Cause 5.1.1, CA Category #5.				Refer to Corrective Actions for Root Cause 5.1.1, CA Category #5.									
<b>CA Category #5 - Lab-Wide Work Control</b>			10-Jan-06 A	31-Oct-07										
<b>Root Cause 3.2.4</b>			01-Jun-06	31-Oct-07										
3.2.4	Root Cause 3.2.4 - Work control processes are less than adequate when scope, resources, personnel, schedule change.													
3.2.4.01	Develop a system to identify people who perform work under a formal authorization	McGraw	01-Jun-06*	31-Jan-07										

- Actual Work
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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008				
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1			
					Gantt Chart										
3.2.4.02	Develop procurement policies and procedures for tagging new acquisitions.	McGraw	01-Jun-06*	31-Jan-07											
3.2.4.03	Present proposed system to SRC	McGraw	01-Feb-07	15-Feb-07											
3.2.4.04	Use feedback from the SRC and other sources to guide the development of a system that manages changes in scope, resources, personnel and schedule that is graded to the level of authorization and can be effectively implemented	McGraw	16-Feb-07	28-Sep-07											
3.2.4.05	Publish new policies and procedures in PUB 3000	Hatayama	01-Oct-07	31-Oct-07											
<b>Root Cause 5.1.1</b>			<b>01-Jun-06</b>	<b>31-Aug-07</b>											
5.1.1	Root Cause 5.1.1 - The Laboratory does not have a policy in place requiring formal work planning and authorization for activities and work below LBNL regulatory threshold.	Chu													
5.1.1.01	Form a Team of Line Managers, Division Safety Coordinators and EH&S liaisons to develop methods to formalize and document "line management authorization" of work.	Chu	01-Jun-06*	12-Jul-06											
5.1.1.02	Develop a proposal for presentation to the SRC.	Chu	01-Jun-06*	13-Sep-06											
5.1.1.03	Incorporate feedback from the SRC, DSCs and Liaisons and develop a policy on review and documentation for line management authorization of work.	Chu	01-Jun-06*	10-Nov-06											
5.1.1.04	Integrate the approved methodology into PUB 3000	Hatayama	01-Jun-06*	12-Feb-07											
5.1.1.05	Develop appropriate training/ communication as needed.	Hatayama	01-Jun-06*	10-Nov-06											
5.1.1.06	Develop appropriate validation during the 2007 Self Assessment.	Krupnick	10-Jan-07*	31-Aug-07											
<b>Root Cause 5.1.2</b>			<b>22-May-06</b>	<b>29-May-07</b>											
5.1.2	Root Cause 5.1.2 - The current policy and implementation guidance for AHDs lacks specificity.														
5.1.2.01	Transition all AHDs to the electronic AHD system	Hatayama	22-May-06*	22-Nov-06											
5.1.2.02	Evaluate the need to include SME review for non-laser AHDs and incorporate results in the Pub 3000.	Hatayama	01-Jun-06*	31-Jul-06											

- Actual Work
- Remaining Work
- Critical Remaining Work

**2006 ISMS Peer Review Corrective Action Plan Schedule**

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CAP Schedule - By Corrective Action Category 31-May-06



Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
5.1.2.03	Evaluate and develop the on-line technical support and/or training for AHD-preparers and adjust or enhance the training as necessary.	Hatayama	01-Jun-06*	31-Aug-06		█						
5.1.2.04	Complete a review of all policies relating to AHD.	Hatayama	01-Sep-06*	01-Nov-06			█					
5.1.2.05	Collect and review feedback from the 2006 IFA pertaining to the formal authorization program.	Hatayama	01-Jun-06*	31-Oct-06		█						
5.1.2.06	Propose new formal authorization policies and guidelines to the SRC. (If Needed)	Hatayama	01-Nov-06	31-Jan-07				█				
5.1.2.07	Publish the final policy revision in Pub3000.	Hatayama	01-Feb-07	30-Mar-07					█			
5.1.2.08	Evaluate implementation of policy revision. Publish final policy.	Krupnick	02-Apr-07	29-May-07						█		
<b>Root Cause 5.3.1</b>			<b>10-Jan-06 A</b>	<b>26-Oct-07</b>								
5.3.1	<b>Root Cause 5.3.1 - Work and hazard identification for projects/ maintenance-type work and activities is less than adequate.</b>											
5.3.1.01	Evaluate existing policies governing hazard identification and oversight work performed by the Facilities Division.	McGraw	01-Jun-06*	31-Jul-06		█						
5.3.1.02	Evaluate existing policies governing hazard identification and review for work performed by construction sub-contractors.	McGraw	01-Jun-06*	31-Jul-06		█						
5.3.1.03	Evaluate existing policies governing hazard identification and oversight for work performed by equipment vendors.	Hatayama	01-Jun-06*	31-Aug-06		█						
5.3.1.04	Develop a proposal for hazard assessment and planning for these work classes and present this to the SRC.	Hatayama	01-Sep-06	31-Oct-06			█					
5.3.1.05	Incorporate feedback from Line Managers/ SRC, DSCs and Liaisons and develop a policy on review and documentation for these categories of work.	McGraw	01-Nov-06	31-Jan-07				█				
5.3.1.06	Integrate the approved methodology into PUB3000	Hatayama	01-Feb-07	28-Feb-07					█			
5.3.1.07	Develop additional training/communication	Hatayama	01-Mar-07	30-Apr-07						█		
5.3.1.08	Review and evaluate effectiveness during the 2007 Self Assessment	Krupnick	01-May-07	31-Jul-07							█	

- Actual Work
- Remaining Work
- Critical Remaining Work

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CAP Schedule - By Corrective Action Category 31-May-06



Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
					5.3.1.09	Revise Division Self-Assessment to validate effectiveness.	Krupnick	10-Jan-06 A	31-Aug-07			
5.3.1.10	Implement review process (External to Subject Division) for this element.	Krupnick	03-Sep-07	26-Oct-07								
<b>Root Cause 7.1.1</b>												
7.1.1	Root Cause 7.1.1- Standards, policies and/or administrative controls (SPAC) designed to ensure adequate work planning either lack detail and are confusing and incomplete, or do not exist.											
7.1.1.01	Define process for lower-level hazards. Refer to the corrective actions for Root Cause 5.1.2, CA Category #5, 5.1.3 CA Category #2											
<b>Root Cause 7.2.1</b>												
7.2.1	Root Cause 7.2.1- The requirement to keep the AHD personnel list current is not clear.											
7.2.1.01	Review current EH&S policy documents (e.g. Pub 3000) to determine what existing language, if any, addresses this issue. Refer to the corrective actions for Root Cause 5.1.2, CA Category #5											
7.2.1.02	Develop proposed policy and present it to the SRC. Refer to the corrective actions for Root Cause 5.1.2, CA Category #5											
7.2.1.03	Implement policy and reflect this in Pub3000 where appropriate (chapter 6 at a minimum) Refer to the corrective actions for Root Cause 5.1.2, CA Category #5											

Refer to the Corrective Actions for Root Cause 5.1.2, CA Category #5, 5.1.3 CA Category #2

Refer to the Corrective Actions for Root Cause 5.1.2, CA Category #5

- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work

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CAP Schedule - By Corrective Action Category 31-May-06



Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008					
					FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1						
<b>Principle #1 - Line Management Responsibilities for Safety</b>					01-Jun-06	28-Sep-07												
<b>Root Cause 1.1.1</b>																		
1.1.1	Root Cause 1.1.1 - Standards, policies and/or administrative controls (SPAC) lack detail, are confusing and incomplete, or do not exist. In addition, the SPACs in place are not strict enough and poorly enforced.																	
1.1.1.01	Senior management walk-arounds are spotty and vary from once a year to twice a day. Refer to the Corrective Action for Root Cause 1.1.3				Refer to the Corrective Action for Root Cause 1.1.3													
<b>Root Cause 1.1.2</b>																		
1.1.2	Root Cause 1.1.2 - The need for training of line managers to effectively carry out their safety oversight responsibilities has not been effectively analyzed.																	
1.1.2.01	Principal Investigators do not appear to be well trained and prepared for their line management responsibilities. Refer to CA for Root Cause 3.1.1.				Refer to to Corrective Action for Root Cause 3.1.1													
<b>Root Cause 1.1.3</b>					01-Jun-06	28-Sep-07												
1.1.3	Root Cause 1.1.3 - Line management accountability for enforcement of safety practices and procedures is less than adequate																	
1.1.3.01a	Define line management and their roles and responsibilities in the appropriate section of the RPM.	Chu	01-Jun-06*	30-Aug-06														
1.1.3.01b	Define safety roles and responsibilities for line management in Chapter 1 of PUB 3000	Hatayama	01-Jun-06	30-Aug-06														
1.1.3.02	Obtain SRC concurrence for policy changes to line management definition and roles and responsibilities.	Chu	31-Aug-06	13-Oct-06														
1.1.3.03	Revise the current mandatory PRD ES&H evaluation criteria for managers to reflect changes in PUB 3000.	Chu	16-Oct-06	30-Oct-06														
1.1.3.04a	Provide a template for Division ISM plans that will enable Divisions to upgrade ISM Plans to reflect changes in PUB 3000.	Hatayama	31-Oct-06	30-Nov-06														
1.1.3.04b	Divisions develop ISM plans that will enable them to meet new guidance of PUB 3000.	Chu	01-Dec-06	15-Jan-07														

- Actual Work
- Remaining Work
- Critical Remaining Work

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CAP PM Schedule Layout - By Principle



Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1		
1.1.3.05	Revise the Division Self Assessment Criteria for 2007 to reflect new guidance in PUB 3000.	Krupnick	02-Oct-06*	02-Jan-07										
1.1.3.06	Evaluate the effectiveness of the changes of PUB 3000 regarding roles and responsibilities for line management in the 2007 Division Self Assessment.	Krupnick	03-Jan-07	28-Sep-07										
<b>Principle #2 - Clear Roles and Responsibilities</b>			01-Mar-06 A	28-Sep-07										
<b>Root Cause 2.1.1</b>			01-May-06 A	28-Sep-07										
2.1.1	Root Cause 2.1.1 - Not all EH&S Division technical programs include regular, required inspections of the workplace, work activities, or facilities.													
2.1.1.01	Determine and document which efforts that are underway in support of 10 CFR 851 implementation address root cause 2.1.1 (e.g. one existing task is to "develop program validation methodology").	Hatayama	01-May-06 A	14-Jul-06										
2.1.1.02	Solicit and document feedback on existing instructions and techniques from Division Safety Coordinators and EH&S Liaisons.	Krupnick	22-May-06*	16-Jun-06										
2.1.1.03	Survey EH&S Group Leaders/Technical Leads to determine baseline of EH&S assurance systems for technical programs.	Krupnick	07-Jun-06*	05-Jul-06										
2.1.1.04	Catalog EH&S programs' assurance system: survey of GL/Technical Leads	Krupnick	07-Jun-06*	05-Jul-06										
2.1.1.05	Develop Assurance Systems for EH&S Technical Programs.	Hatayama	06-Jul-06	15-Sep-06										
2.1.1.06	Document enhanced and/or newly develop EH&S Technical Program Assurance Systems, ES&H Self Assessment Program, PUB 5344.	Krupnick	18-Sep-06	29-Sep-06										
2.1.1.07	Validate effectiveness of enhanced / newly developed EH&S Technical Program assurance systems.	Krupnick	03-Aug-06*	28-Sep-07										
<b>Root Cause 2.1.2</b>			01-Mar-06 A	02-Apr-07										
2.1.2	Root Cause 2.1.2 - Self-assessment inspection instructions and techniques require improvement.													
2.1.2.01	Solicit and document feedback on existing instructions and techniques and on January walk-throughs from Division Safety Coordinators and EH&S Liaisons.	Krupnick	22-May-06*	16-Jun-06										

- Actual Work
- Remaining Work
- Critical Remaining Work

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CAP PM Schedule Layout - By Principle



Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1		
2.1.2.02	Compile lessons learned (including noteworthy practices) on January 2006 walk-throughs.	Krupnick	09-Jun-06*	23-Jun-06										
2.1.2.03	Determine requirements for additional documents, as required.	Krupnick	26-Jun-06	21-Jul-06										
2.1.2.04	Determine requirements for training, as deemed necessary.	Hatayama	26-Jun-06	21-Jul-06										
2.1.2.05	Incorporate feedback and results from actions 1-3 into the following documents and training:	Hatayama	24-Jul-06	29-Sep-06										
2.1.2.05a	Environment, Safety, and Health Self Assessment Program, PUB-5344	Hatayama	24-Jul-06*	29-Sep-06										
2.1.2.05b	Tools and procedures for conducting Division ES&H Self-Appraisals, PUB-3105	Hatayama	24-Jul-06*	29-Sep-06										
2.1.2.05c	ES&H Self-Assessment Training	Hatayama	24-Jul-06*	29-Sep-06										
2.1.2.05d	Performing an Effective Safety Walk-around, EHS 27. Refer to to Corrective Action for Root Cause 3.1.1 .													
2.1.2.06	Develop additional training as appropriate.	Hatayama	24-Jul-06*	22-Dec-06										
2.1.2.07	Revise IFA and MESH protocols for FY06.	Krupnick	01-Mar-06 A	24-May-06 A										
2.1.2.08	Assess effectiveness of revised IFA and MESH protocols.	Krupnick	01-Nov-06*	30-Nov-06										
2.1.2.09	Revise division self-assessment criteria based on Lab policy.	Krupnick	03-Jul-06*	02-Jan-07										
2.1.2.10	Revise Partnership Agreement between LBNL and UCB, ensuring consistency with Lab policy.	Chu	02-Oct-06*	02-Apr-07										
<b>Root Cause 2.1.3</b>														
2.1.3	Root Cause 2.1.3 - The term line management is not defined in LBNL's RPM.													
2.1.3.01	Line management responsibilities in performing self-assessment activities require greater definition. Refer to the Corrective Action for Root Cause 1.1.3.													
<b>Root Cause 2.1.4</b>														
2.1.4	Root Causes 2.1.4 - Communication of Line Management ES&H responsibilities requires improvement.													

- Actual Work
- Remaining Work
- Critical Remaining Work

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CAP PM Schedule Layout - By Principle





Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
3.1.2.02b	Analyze, determine and formalize minimum training for safety coordinators	Chu	23-Oct-06	17-Nov-06								
3.1.2.02c	Develop training course(s) for Safety Coordinators	Hatayama	20-Nov-06	15-Feb-07								
3.1.2.02d	Initiate training for all coordinators (as necessary)	Hatayama	16-Feb-07	10-May-07								
3.1.2.02e	Review effectiveness of training and recommend changes as necessary	Krupnick	11-May-07	02-Aug-07								
<b>Root Cause 3.2.1</b>			<b>01-Jun-06</b>	<b>29-Jun-07</b>								
3.2.1	<b>Root Cause 3.2.1-Workers may be taking risks greater than what is expected.</b>											
3.2.1.01	Develop presentation materials to support EH&S communications between management and direct reports on the topic of risks. Refer to the corrective action for Root Cause 4.1.1											
3.2.1.02	Add requirements for safety communications to Performance Review and Development forms. Refer to the corrective action for Root Cause 1.1.1											
3.2.1.03	Perform a survey on the safety culture at Berkeley Lab and report results to Lab Management and employees.	Hatayama	03-Jul-06*	29-Jun-07								
3.2.1.04	Revise institutional ISM Plan and Division ISM Plans to define and discourage excessive risk taking. Define and compare types of risks (safety risks versus research program risks)	Hatayama	01-Jun-06*	01-Aug-06								
<b>Root Cause 3.2.2</b>			<b>01-Jun-06</b>	<b>01-Mar-07</b>								
3.2.2	<b>Root Cause 3.2.2 - Risk taking is recognized, tolerated, and encouraged by workers, supervisors, coworkers, guests and students.</b>											
3.2.2.01	Develop presentation materials to support EH&S communications between management and direct reports on the topic of risks. Refer to the corrective action for Root Cause 3.2.1											
3.2.2.02	Issue a memo from the Directorate that defines types of risks and discourages excessive risk taking in safety.	Chu	01-Jun-06*	01-Aug-06								

- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work

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CAP PM Schedule Layout - By Principle



Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1		
3.2.2.03	Add requirements for safety communications to Performance Review and Development forms.	Chu	01-Jun-06*	01-Mar-07										
3.2.2.04	Perform a survey on the safety culture at Berkeley Lab and report results to Lab Management and employees.	Hatayama	01-Jun-06*	29-Sep-06										
<b>Root Cause 3.2.3</b>														
3.2.3	Root Cause 3.2.3 - Current Standards, Policies, or Administrative Controls seem insufficient to prevent excessive risk taking.													
3.2.3.01	Revise institutional ISM Plan and Division ISM Plans to define and discourage excessive risk taking. Define and compare types of risks (safety risks versus research program risks). Refer to the corrective action for Root Cause 3.2.1													
3.2.3.02	Distribute memo from upper management that defines types of risks and discourages excessive risk taking in safety. This would be first of routine periodic memos from upper management on EH&S issues. Refer to CA Root Cause 4.1.1													
3.2.3.03	Add requirements for safety communications to Performance Review and Development forms. Refer to CA Root Cause 4.1.1													
3.2.3.04	Revise EH&S 26 to include greater emphasis on defining, communicating and managing safety risks. Refer to the corrective action for Root Cause 3.2.1													
<b>Root Cause 3.2.4</b>			01-Jun-06	31-Oct-07										
3.2.4	Root Cause 3.2.4 - Work control processes are less than adequate when scope, resources, personnel, schedule change.													
3.2.4.01	Develop a system to identify people who perform work under a formal authorization	McGraw	01-Jun-06*	31-Jan-07										
3.2.4.02	Develop procurement policies and procedures for tagging new acquisitions.	McGraw	01-Jun-06*	31-Jan-07										
3.2.4.03	Present proposed system to SRC	McGraw	01-Feb-07	15-Feb-07										

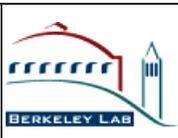
Refer to the Corrective Action for Root Cause 3.2.1

Refer to Corrective Action for Root Cause 4.1.1

Refer to Corrective Action for Root Cause 4.1.1

- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work

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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1		
4.1.1.01b	Initiate and verify or establish new requirements for the management safety communications plan.	Chu	03-Jul-06	31-Aug-06										
4.1.1.01c	Develop/ revise management safety communications plan.	Chu	01-Sep-06	04-Oct-06										
4.1.1.01d	Develop management communications program based on new/ revised plan.	Chu	05-Oct-06	01-Nov-06										
<b>Root Cause 4.2.1</b>			01-Jun-06	01-Aug-06										
4.2.1	Root Cause 4.2.1 - Management safety communications are not consistently focused on lessons learned from accident/ incident investigations.													
4.2.1.01	Develop presentation materials to support EH&S communications between management and direct reports. Refer to corrective action Root Cause 4.1.1													
4.2.1.02	Implement enhanced Lessons Learned program to accept near misses	Krupnick	01-Jun-06*	03-Jul-06										
4.2.1.03	Institute routine periodic memo from upper management to employees on EH&S issues	Chu	01-Jun-06*	01-Aug-06										
<b>Root Cause 4.3.1</b>														
4.3.1	Root Cause 4.3.1 - Performance expectations and review for principal investigators requires improvement													
4.3.1.01	Line managers are unaware of their specific ES&H responsibilities. Refer to the Corrective Action for Root Cause 1.1.3.													
<b>Root Cause 4.3.2</b>														
4.3.2	Root Cause 4.3.2 - Principal investigators do not provide proper mentoring to students and post-docs due to lack of knowledge and training.													
4.3.2.01a	Enhance mentoring and safety awareness of post-docs. Analyze the purpose and content of the current EHS0024 ES&H for Mentors & Supervisors course and how/when it is being offered to PI's. Refer to CA for Root Cause 3.1.1													

Refer to Corrective Action Root Cause 4:1.1

Refer to the Corrective Action for Root Cause 1:1.3

Refer to to Corrective Action for Root Cause 3.1.1

- Actual Work
- Remaining Work
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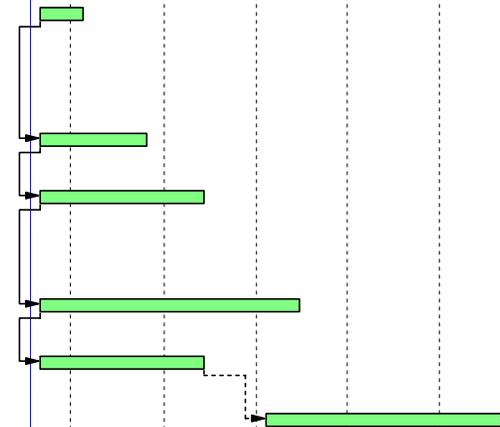
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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
4.3.2.01b	Revise EHS0024 (if necessary) to include additional safety awareness. Refer to to CA for Root Cause 3.1.1 under CA Category #3											
4.3.2.01c	Make EHS0024 required for all staff who mentors post-docs. Refer to to CA for Root Cause 3.1.1 under CA Category #3											
4.3.2.01d	SRC review effectiveness of EHS0024 and suggest changes as necessary. Refer to to CA for Root Cause 3.1.1 under CA Category #3											
<b>Root Cause 4.4.1</b>												
4.4.1	Root Cause 4.4.1 - Current practice allows PIs to supervise too many people to effectively fulfill ISM responsibilities.											
4.4.1.01	No formal line of management authority and responsibility as defined by LBNL policy exist between the PI and staff. Refer to the Corrective Action for Root Cause 1.1.3											
<b>Principle #5 - Identification of Safety Standards and Require...</b>			02-Jan-06 A	26-Oct-07								
<b>Root Cause 5.1.1</b>			01-Jun-06	31-Aug-07								
5.1.1	Root Cause 5.1.1 - The Laboratory does not have a policy in place requiring formal work planning and authorization for activities and work below LBNL regulatory threshold.	Chu										
5.1.1.01	Form a Team of Line Managers, Division Safety Coordinators and EH&S liasions to develop methods to fomalize and document "line management authorization" of work.	Chu	01-Jun-06*	12-Jul-06								
5.1.1.02	Develop a proposal for presentation to the SRC.	Chu	01-Jun-06*	13-Sep-06								
5.1.1.03	Incorporate feedback from the SRC, DSCs and Liaisons and develop a policy on review and documentation for line management authorization of work.	Chu	01-Jun-06*	10-Nov-06								
5.1.1.04	Integrate the approved methodology into PUB 3000	Hatayama	01-Jun-06*	12-Feb-07								
5.1.1.05	Develop appropriate training/ communication as needed.	Hatayama	01-Jun-06*	10-Nov-06								
5.1.1.06	Develop appropriate validation during the 2007 Self Assessment.	Krupnick	10-Jan-07*	31-Aug-07								
<b>Root Cause 5.1.2</b>			22-May-06	29-May-07								

Refer to the Corrective Action for Root Cause 1.1.3



- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work

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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
					5.1.2	<b>Root Cause 5.1.2 - The current policy and implementation guidance for AHDs lacks specificity.</b>						
5.1.2.01	Transition all AHDs to the electronic AHD system	Hatayama	22-May-06*	22-Nov-06								
5.1.2.02	Evaluate the need to include SME review for non-laser AHDs and incorporate results in the Pub 3000.	Hatayama	01-Jun-06*	31-Jul-06								
5.1.2.03	Evaluate and develop the on-line technical support and/or training for AHD-preparers and adjust or enhance the training as necessary.	Hatayama	01-Jun-06*	31-Aug-06								
5.1.2.04	Complete a review of all policies relating to AHD.	Hatayama	01-Sep-06*	01-Nov-06								
5.1.2.05	Collect and review feedback from the 2006 IFA pertaining to the formal authorization program.	Hatayama	01-Jun-06*	31-Oct-06								
5.1.2.06	Propose new formal authorization policies and guidelines to the SRC. (If Needed)	Hatayama	01-Nov-06	31-Jan-07								
5.1.2.07	Publish the final policy revision in Pub3000.	Hatayama	01-Feb-07	30-Mar-07								
5.1.2.08	Evaluate implementation of policy revision. Publish final policy.	Krupnick	02-Apr-07	29-May-07								
<b>Root Cause 5.1.3</b>			<b>02-Jan-06 A</b>	<b>16-Aug-07</b>								
5.1.3	<b>Root Cause 5.1.3 - The current assessment and performance evaluation processes for work authorizations, particularly AHDs is less than adequate.</b>											
5.1.3.01	Revise IFA guidance to focus on formally authorized work in the assessed division.	Krupnick	02-Jan-06 A	22-May-06 A								
5.1.3.02	Assess effectiveness of revised IFA protocol. Refer to to CA for Root Cause 2.1.2 under CA Category #7		01-Nov-06*									
5.1.3.03	Solicit feedback from Group Leaders and Division Safety Coordinators to determine merits of liaisons performing IFAs of other divisions.	Krupnick	07-Jun-06*	05-Jul-06								
5.1.3.04	Provide input for AHD database upgrades to enhance Division Self-Assessment validation process.	Krupnick	07-Jun-06	10-Jul-06								
5.1.3.05	Incorporate recommendations from Root Cause above in AHD database.	Hatayama	11-Jul-06*	04-Oct-06								

- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work

**2006 ISMS Peer Review Corrective Action Plan Schedule**

**Lawrence Berkeley National Laboratory**

CAP PM Schedule Layout - By Principle



Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
					5.1.3.06	Incorporate AHD database upgrades into FY07 SA validation	Krupnick	14-Jul-06*	16-Aug-07			
<b>Root Cause 5.2.1</b>												
5.2.1	Root Cause 5.2.1 - The perception that a double standard exists in safety oversight for contract and LBNL craft workers.											
5.2.1.02	Develop standardized approach to EH& H oversight. Refer to corrective actions for root cause 5.3.1											
<b>Root Cause 5.3.1</b>					10-Jan-06 A	26-Oct-07						
5.3.1	Root Cause 5.3.1 - Work and hazard identification for projects/ maintenance-type work and activities is less than adequate.											
5.3.1.01	Evaluate existing policies governing hazard identification and oversight work performed by the Facilities Division.	McGraw	01-Jun-06*	31-Jul-06								
5.3.1.02	Evaluate existing policies governing hazard identification and review for work performed by construction sub-contractors.	McGraw	01-Jun-06*	31-Jul-06								
5.3.1.03	Evaluate existing policies governing hazard identification and oversight for work performed by equipment vendors.	Hatayama	01-Jun-06*	31-Aug-06								
5.3.1.04	Develop a proposal for hazard assessment and planning for these work classes and present this to the SRC.	Hatayama	01-Sep-06	31-Oct-06								
5.3.1.05	Incorporate feedback from Line Managers/ SRC, DSCs and Liaisons and develop a policy on review and documentation for these categories of work.	McGraw	01-Nov-06	31-Jan-07								
5.3.1.06	Integrate the approved methodology into PUB3000	Hatayama	01-Feb-07	28-Feb-07								
5.3.1.07	Develop additional training/communication	Hatayama	01-Mar-07	30-Apr-07								
5.3.1.08	Review and evaluate effectiveness during the 2007 Self Assessment	Krupnick	01-May-07	31-Jul-07								
5.3.1.09	Revise Division Self-Assessment to validate effectiveness.	Krupnick	10-Jan-06 A	31-Aug-07								
5.3.1.10	Implement review process (External to Subject Division) for this element.	Krupnick	03-Sep-07	26-Oct-07								
<b>Principle #6 - Hazard Controls Tailored to Work Being Perfor...</b>			17-Apr-06 A	30-Nov-06								
<b>Root Cause 6.1.1</b>												

Refer to Corrective Actions for root cause 5.3.1

- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work

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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1		
6.1.1	Root Cause 6.1.1 - Currently, no management policy requires safety walk-arounds by line managers.													
6.1.1.01	The Division implementation of safety walk-around programs is inconsistent. Refer to the Corrective Action for Root Cause 6.3.1													
<b>Root Cause 6.2.1</b>														
6.2.1	Root Cause 6.2.1 - Some divisions are creating administrative hazard controls that are poorly defined and difficult to implement.													
6.2.1.01	Develop hierarchical approach to hazards control. Refer to corrective actions for Root Cause 5.1.1													
<b>Root Cause 6.3.1</b>			17-Apr-06 A	30-Nov-06										
6.3.1	Root Cause 6.3.1 - Lab policies do not specify frequency of facility inspections and training of those responsible is lacking.													
6.3.1.01	Revise the requirement for management walk-arounds in Chapter 1 of PUB 3000	Hatayama	01-Jun-06*	18-Aug-06										
6.3.1.01a	Revise (if necessary) Lab policy on work place inspections. Review existing Lab policies to identify current requirement for work place inspections and inspection frequency, revise as necessary. Refer to to CA for Root Cause 3.1.1 under CA Category #3													
6.3.1.02	Develop and deliver safety walk-around training (EHS-27)	Hatayama	17-Apr-06 A	29-Jun-06										
6.3.1.02a	Define responsibility for work place inspections and required training. Review existing Lab policies to identify current responsibility for performing work place inspections and training requirements. Refer to the Corrective Action for Root Cause 3.1.1													
6.3.1.02b	Piloted EHS0027 "How to perform an effective safety walk-around" is with Lab SRC to determine acceptance as safety training course. Refer to the Corrective Action for Root Cause 1.1.3 & 3.1.1													

Refer to the Corrective Action for Root Cause 6.3.1

Refer to Corrective Actions for Root Cause 5.1.1

Refer to the Corrective Action for Root Cause 3.1.1

Refer to the Corrective Action for Root Cause 1.1.3 & 3.1.1

- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work

**2006 ISMS Peer Review Corrective Action Plan Schedule**  
**Lawrence Berkeley National Laboratory**



Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008			
					FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1				
6.3.1.02c	Ensure a training analysis has been performed on EHS0027. Refer to the CA for Root Cause 3.1.1				<p><b>Refer to the Corrective Action for Root Cause 3.1.1</b></p>											
6.3.1.02d	Ensure a training analysis has been performed on EHS0027. Refer to the CA for Root Cause 3.1.1															
6.3.1.02e	SRC review effectiveness of training and recommend changes as necessary. Refer to the CA for Root Cause 3.1.1															
6.3.1.03	Assess effectiveness of safety walk-arounds and present results to the SRC.	Krupnick	01-Jun-06*	30-Nov-06												
6.3.1.04	The SRC will review the effectiveness of improvements in line management walk-arounds (including the effectiveness of EHS-27) and direct additional actions as needed.	Lucas	01-Jun-06	30-Nov-06												
<b>Principle #7 - Operations Authorization</b>			<b>02-Jan-06 A</b>	<b>27-Oct-06</b>												
<b>Root Cause 7.1.1</b>																
7.1.1	Root Cause 7.1.1- Standards, policies and/or administrative controls (SPAC) designed to ensure adequate work planning either lack detail and are confusing and incomplete, or do not exist.				<p><b>Refer to the Corrective Actions for Root Cause 5.1.2, 5.1.3</b></p>											
7.1.1.01	Define process for lower-level hazards. Refer to the corrective actions for Root Cause 5.1.2, and 5.1.3															
<b>Root Cause 7.1.2</b>			<b>01-Jun-06</b>	<b>27-Oct-06</b>												
7.1.2	Root Cause 7.1.2 - Adherence to the existing work control program is less than adequate and communication by managers of the requirement and the value of compliance needs reinforcement.															
7.1.2.01	Review the results of the 2005 and 2006 IFAs and MESH reviews to identify aspects of the work control that are not being effectively implemented.	Hatayama	01-Jun-06*	29-Sep-06												
7.1.2.02	Develop a plan to improve training of individuals responsible for formal authorization documents and the communication of formal authorization requirements to staff and students.	Hatayama	01-Jun-06*	29-Sep-06												
7.1.2.03	Present Plan to the SRC for concurrence and initiate.	Hatayama	02-Oct-06	27-Oct-06												

- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work

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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
					<b>Root Cause 7.1.3</b>							
7.1.3	Root Cause 7.1.3 - Corrective actions to address inconsistent adherence to work planning and authorization policies are often delayed due to non-identification of task master.		02-Jan-06 A	19-May-06 A								
7.1.3.02	Developed Corrective Action Tracking System (CATS)	Krupnick	02-Jan-06 A	19-May-06 A								
<b>Root Cause 7.2.1</b>												
7.2.1	Root Cause 7.2.1- The requirement to keep the AHD personnel list current is not clear.											
7.2.1.01	Review current EH&S policy documents (e.g. Pub 3000) to determine what existing language, if any, addresses this issue. Refer to the corrective actions for Root Cause 5.1.2											
7.2.1.02	Develop proposed policy and present it to the SRC. Refer to the corrective actions for Root Cause 5.1.2, CA Category #5											
7.2.1.03	Implement policy and reflect this in Pub3000 where appropriate (chapter 6 at a minimum) Refer to the corrective actions for Root Cause 5.1.2, CA Category #5											

Refer to the Corrective Actions for Root Cause 5.1.2

- Actual Work
- Remaining Work
- Critical Remaining Work

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CAP PM Schedule Layout - By Principle



Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
					<b>LBNL ES &amp; H Corrective Action Plan</b>							
<b>CA Category #1 - Line Management Execution of ES &amp; H</b>					02-Jan-06 A	31-Oct-07						
<b>Root Cause 1.1.3</b>					17-Apr-06 A	28-Sep-07						
<b>Root Cause 1.1.3</b>					01-Jun-06	28-Sep-07						
1.1.3	Root Cause 1.1.3 - Line management accountability for enforcement of safety practices and procedures is less than adequate											
1.1.3.01a	Define line management and their roles and responsibilities in the appropriate section of the RPM.	Chu	01-Jun-06*	30-Aug-06								
1.1.3.01b	Define safety roles and responsibilities for line management in Chapter 1 of PUB 3000	Hatayama	01-Jun-06	30-Aug-06								
1.1.3.02	Obtain SRC concurrence for policy changes to line management definition and roles and responsibilities.	Chu	31-Aug-06	13-Oct-06								
1.1.3.03	Revise the current mandatory PRD ES&H evaluation criteria for managers to reflect changes in PUB 3000.	Chu	16-Oct-06	30-Oct-06								
1.1.3.04a	Provide a template for Division ISM plans that will enable Divisions to upgrade ISM Plans to reflect changes in PUB 3000.	Hatayama	31-Oct-06	30-Nov-06								
1.1.3.04b	Divisions develop ISM plans that will enable them to meet new guidance of PUB 3000.	Chu	01-Dec-06	15-Jan-07								
1.1.3.05	Revise the Division Self Assessment Criteria for 2007 to reflect new guidance in PUB 3000.	Krupnick	02-Oct-06*	02-Jan-07								
1.1.3.06	Evaluate the effectiveness of the changes of PUB 3000 regarding roles and responsibilities for line management in the 2007 Division Self Assessment.	Krupnick	03-Jan-07	28-Sep-07								
<b>Root Cause 6.3.1</b>					17-Apr-06 A	30-Nov-06						
6.3.1	Root Cause 6.3.1 - Lab policies do not specify frequency of facility inspections and training of those responsible is lacking.											
6.3.1.01	Revise the requirement for management walk-arounds in Chapter 1 of PUB 3000	Hatayama	01-Jun-06*	18-Aug-06								
6.3.1.02	Develop and deliver safety walk-around training (EHS-27)	Hatayama	17-Apr-06 A	29-Jun-06								
6.3.1.03	Assess effectiveness of safety walk-arounds and present results to the SRC.	Krupnick	01-Jun-06*	30-Nov-06								

- Remaining Level of Effort
- Critical Remaining ...
- WBS Summary Bar
- Actual Work
- Remaining Work

**2006 ISMS ES & H Peer Review Corrective Action Plan Schedule**

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CAP PM Schedule Layout - By Active Root Cause 31-May-06



Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1		
6.3.1.04	The SRC will review the effectiveness of improvements in line management walk-arounds (including the effectiveness of EHS-27) and direct additional actions as needed.	Lucas	01-Jun-06	30-Nov-06										
<b>CA Category #2 - ES &amp; H Assurance Mechanisms</b>			02-Jan-06 A	28-Sep-07										
<b>Root Cause 2.1.1</b>			01-May-06 A	28-Sep-07										
2.1.1	Root Cause 2.1.1 - Not all EH&S Division technical programs include regular, required inspections of the workplace, work activities, or facilities.													
2.1.1.01	Determine and document which efforts that are underway in support of 10 CFR 851 implementation address root cause 2.1.1 (e.g. one existing task is to "develop program validation methodology").	Hatayama	01-May-06 A	14-Jul-06										
2.1.1.02	Solicit and document feedback on existing instructions and techniques from Division Safety Coordinators and EH&S Liaisons.	Krupnick	22-May-06*	16-Jun-06										
2.1.1.03	Survey EH&S Group Leaders/Technical Leads to determine baseline of EH&S assurance systems for technical programs.	Krupnick	07-Jun-06*	05-Jul-06										
2.1.1.04	Catalog EH&S programs' assurance system: survey of GL/Technical Leads	Krupnick	07-Jun-06*	05-Jul-06										
2.1.1.05	Develop Assurance Systems for EH&S Technical Programs.	Hatayama	06-Jul-06	15-Sep-06										
2.1.1.06	Document enhanced and/or newly develop EH&S Technical Program Assurance Systems, ES&H Self Assessment Program, PUB 5344.	Krupnick	18-Sep-06	29-Sep-06										
2.1.1.07	Validate effectiveness of enhanced / newly developed EH&S Technical Program assurance systems.	Krupnick	03-Aug-06*	28-Sep-07										
<b>Root Cause 2.1.2</b>			01-Mar-06 A	02-Apr-07										
2.1.2	Root Cause 2.1.2 - Self-assessment inspection instructions and techniques require improvement.													
2.1.2.01	Solicit and document feedback on existing instructions and techniques and on January walk-throughs from Division Safety Coordinators and EH&S Liaisons.	Krupnick	22-May-06*	16-Jun-06										

<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 20px; height: 10px; background-color: green; border: 1px solid black;"></span> Remaining Level of Effort</li> <li><span style="display: inline-block; width: 20px; height: 10px; background-color: red; border: 1px solid black;"></span> Critical Remaining ...</li> <li><span style="display: inline-block; width: 20px; height: 10px; background-color: black; border: 1px solid black;"></span> WBS Summary Bar</li> <li><span style="display: inline-block; width: 20px; height: 10px; background-color: blue; border: 1px solid black;"></span> Actual Work</li> <li><span style="display: inline-block; width: 20px; height: 10px; background-color: lightgreen; border: 1px solid black;"></span> Remaining Work</li> </ul>	<p><b>2006 ISMS ES &amp; H Peer Review Corrective Action Plan Schedule</b></p> <p><b>Lawrence Berkeley National Laboratory</b></p>	<p>CAP PM Schedule Layout - By Active Root Cause 31-May-06</p> <p>2 of 9</p> 
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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1		
2.1.2.02	Compile lessons learned (including noteworthy practices) on January 2006 walk-throughs.	Krupnick	09-Jun-06*	23-Jun-06										
2.1.2.03	Determine requirements for additional documents, as required.	Krupnick	26-Jun-06	21-Jul-06										
2.1.2.04	Determine requirements for training, as deemed necessary.	Hatayama	26-Jun-06	21-Jul-06										
2.1.2.05	Incorporate feedback and results from actions 1-3 into the following documents and training:	Hatayama	24-Jul-06	29-Sep-06										
2.1.2.05a	Environment, Safety, and Health Self Assessment Program, PUB-5344	Hatayama	24-Jul-06*	29-Sep-06										
2.1.2.05b	Tools and procedures for conducting Division ES&H Self-Appraisals, PUB-3105	Hatayama	24-Jul-06*	29-Sep-06										
2.1.2.05c	ES&H Self-Assessment Training	Hatayama	24-Jul-06*	29-Sep-06										
2.1.2.06	Develop additional training as appropriate.	Hatayama	24-Jul-06*	22-Dec-06										
2.1.2.07	Revise IFA and MESH protocols for FY06.	Krupnick	01-Mar-06 A	24-May-06 A										
2.1.2.08	Assess effectiveness of revised IFA and MESH protocols.	Krupnick	01-Nov-06*	30-Nov-06										
2.1.2.09	Revise division self-assessment criteria based on Lab policy.	Krupnick	03-Jul-06*	02-Jan-07										
2.1.2.10	Revise Partnership Agreement between LBNL and UCB, ensuring consistency with Lab policy.	Chu	02-Oct-06*	02-Apr-07										
<b>Root Cause 5.1.3</b>			<b>02-Jan-06 A</b>	<b>16-Aug-07</b>										
5.1.3	Root Cause 5.1.3 - The current assessment and performance evaluation processes for work authorizations, particularly AHDs is less than adequate.													
5.1.3.01	Revise IFA guidance to focus on formally authorized work in the assessed division.	Krupnick	02-Jan-06 A	22-May-06 A										
5.1.3.03	Solicit feedback from Group Leaders and Division Safety Coordinators to determine merits of liaisons performing IFAs of other divisions.	Krupnick	07-Jun-06*	05-Jul-06										
5.1.3.04	Provide input for AHD database upgrades to enhance Division Self-Assessment validation process.	Krupnick	07-Jun-06	10-Jul-06										

- Remaining Level of Effort
- Critical Remaining ...
- WBS Summary Bar
- Actual Work
- Remaining Work

**2006 ISMS ES & H Peer Review Corrective Action Plan Schedule**

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CAP PM Schedule Layout - By Active Root Cause 31-May-06



Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
5.1.3.05	Incorporate recommendations from Root Cause above in AHD database.	Hatayama	11-Jul-06*	04-Oct-06								
5.1.3.06	Incorporate AHD database upgrades into FY07 SA validation	Krupnick	14-Jul-06*	16-Aug-07								
<b>Root Cause 7.1.3</b>			02-Jan-06 A	19-May-06 A								
7.1.3	Root Cause 7.1.3 - Corrective actions to address inconsistent adherence to work planning and authorization policies are often delayed due to non-identification of task master.											
7.1.3.02	Developed Corrective Action Tracking System (CATS)	Krupnick	02-Jan-06 A	19-May-06 A								
<b>CA Category #3 - Educating Managers, Supervisors and ...</b>			01-May-06 A	11-Oct-07								
<b>Root Cause 3.1.1</b>			16-Oct-06	11-Oct-07								
3.1.1	Root Causes 3.1.1 - The need for training of line managers to effectively carry out their safety oversight responsibilities has not been effectively analyzed.											
3.1.1.02a	Establish the need, scope, requirements of line manager safety oversight training.	Hatayama	16-Oct-06*	10-Nov-06								
3.1.1.02b	Perform a Gap Analysis on oversight training requirements. Document Findings.	Hatayama	16-Oct-06*	10-Nov-06								
3.1.1.02c	Review existing LBNL policy regarding line manager safety oversight training requirements and revise training as required	Chu	13-Nov-06*	18-Dec-06								
3.1.1.02d	Establish training course evaluation process that measures the effectiveness and quality of not only each class taught but periodically of the course /program	Hatayama	19-Dec-06	15-Mar-07								
3.1.1.02e	Establish retraining/refreshers training interval criteria for safety training courses	Hatayama	16-Mar-07*	12-Apr-07								
3.1.1.02f	Develop training schedule. Train new and exiting staff as required.	Hatayama	13-Apr-07	11-Oct-07								
<b>Root Cause 3.1.2</b>			01-May-06 A	02-Aug-07								
3.1.2	Root Cause 3.1.2 - The role of safety coordinator varies across LBNL. The minimum qualifications and training of safety coordinators is not determined and formalized.											
3.1.2.01	Determine and formalize roles and responsibilities for safety coordinators across LBNL. Update Pub 3000	Chu	01-May-06 A	20-Oct-06								

- Remaining Level of Effort
- Critical Remaining ...
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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008		
					Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1			
3.1.2.02a	Review qualifications of all safety coordinators against new requirements	Chu	23-Oct-06	17-Nov-06											
3.1.2.02b	Analyze, determine and formalize minimum training for safety coordinators	Chu	23-Oct-06	17-Nov-06											
3.1.2.02c	Develop training course(s) for Safety Coordinators	Hatayama	20-Nov-06	15-Feb-07											
3.1.2.02d	Initiate training for all coordinators (as necessary)	Hatayama	16-Feb-07	10-May-07											
3.1.2.02e	Review effectiveness of training and recommend changes as necessary	Krupnick	11-May-07	02-Aug-07											
<b>Root Cause 4.1.1</b>			01-Jun-06	01-Nov-06											
4.1.1	Root Cause 4.1.1 - Management's written and verbal safety communications program does not effectively communicate management concerns for quality workmanship, safety, and protection of the environment.														
4.1.1.01a	Review and evaluate existing management safety communications plan and revise as necessary.	Chu	01-Jun-06*	30-Jun-06											
4.1.1.01b	Initiate and verify or establish new requirements for the management safety communications plan.	Chu	03-Jul-06	31-Aug-06											
4.1.1.01c	Develop/ revise management safety communications plan.	Chu	01-Sep-06	04-Oct-06											
4.1.1.01d	Develop management communications program based on new/ revised plan.	Chu	05-Oct-06	01-Nov-06											
<b>Root Cause 7.1.2</b>			01-Jun-06	27-Oct-06											
7.1.2	Root Cause 7.1.2 - Adherence to the existing work control program is less than adequate and communication by managers of the requirement and the value of compliance needs reinforcement.														
7.1.2.01	Review the results of the 2005 and 2006 IFAs and MESH reviews to identify aspects of the work control that are not being effectively implemented.	Hatayama	01-Jun-06*	29-Sep-06											

- Remaining Level of Effort
- Critical Remaining ...
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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1		
7.1.2.02	Develop a plan to improve training of individuals responsible for formal authorization documents and the communication of formal authorization requirements to staff and students.	Hatayama	01-Jun-06*	29-Sep-06										
7.1.2.03	Present Plan to the SRC for concurrence and initiate.	Hatayama	02-Oct-06	27-Oct-06										
<b>CA Category #4 - Proactive Posture on ES &amp; H</b>			15-Mar-06 A	28-Sep-07										
<b>Root Cause 3.2.1</b>			01-Jun-06	29-Jun-07										
3.2.1	Root Cause 3.2.1-Workers may be taking risks greater than what is expected.													
3.2.1.03	Perform a survey on the safety culture at Berkeley Lab and report results to Lab Management and employees.	Hatayama	03-Jul-06*	29-Jun-07										
3.2.1.04	Revise institutional ISM Plan and Division ISM Plans to define and discourage excessive risk taking. Define and compare types of risks (safety risks versus research program risks)	Hatayama	01-Jun-06*	01-Aug-06										
<b>Root Cause 3.2.2</b>			01-Jun-06	01-Mar-07										
3.2.2	Root Cause 3.2.2 - Risk taking is recognized, tolerated, and encouraged by workers, supervisors, coworkers, guests and students.													
3.2.2.02	Issue a memo from the Directorate that defines types of risks and discourages excessive risk taking in safety.	Chu	01-Jun-06*	01-Aug-06										
3.2.2.03	Add requirements for safety communications to Performance Review and Development forms.	Chu	01-Jun-06*	01-Mar-07										
3.2.2.04	Perform a survey on the safety culture at Berkeley Lab and report results to Lab Management and employees.	Hatayama	01-Jun-06*	29-Sep-06										
<b>Root Cause 3.3.1</b>			15-Mar-06 A	28-Sep-07										
3.3.1	Root Cause 3.3.1 - Root Cause analysis may be inadequate due to training inadequacies.													
3.3.1.01	Revise incident investigation procedures	Hatayama	01-Jun-06*	30-Jun-06										
3.3.1.02	Provide Tap Root and training to incident investigators	Hatayama	15-Mar-06 A	31-Aug-06										
3.3.1.03	Provide incident investigation training to Division Safety Coordinators and EH&S Liaisons.	Hatayama	01-Jun-06*	01-Sep-06										

- Remaining Level of Effort
- Critical Remaining ...
- WBS Summary Bar
- Actual Work
- Remaining Work

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CAP PM Schedule Layout - By Active Root Cause 31-May-06



Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1		
3.3.1.04	Revise investigator training to minimize stress to individuals under investigation.	Hatayama	01-Jun-06*	28-Sep-07										
<b>Root Cause 4.2.1</b>			01-Jun-06	01-Aug-06										
4.2.1	Root Cause 4.2.1 - Management safety communications are not consistently focused on lessons learned from accident/ incident investigations.													
4.2.1.02	Implement enhanced Lessons Learned program to accept near misses	Krupnick	01-Jun-06*	03-Jul-06										
4.2.1.03	Institute routine periodic memo from upper management to employees on EH&S issues	Chu	01-Jun-06*	01-Aug-06										
<b>CA Category #5 - Lab-Wide Work Control</b>			10-Jan-06 A	31-Oct-07										
<b>Root Cause 3.2.4</b>			01-Jun-06	31-Oct-07										
3.2.4	Root Cause 3.2.4 - Work control processes are less than adequate when scope, resources, personnel, schedule change.													
3.2.4.01	Develop a system to identify people who perform work under a formal authorization	McGraw	01-Jun-06*	31-Jan-07										
3.2.4.02	Develop procurement policies and procedures for tagging new acquisitions.	McGraw	01-Jun-06*	31-Jan-07										
3.2.4.03	Present proposed system to SRC	McGraw	01-Feb-07	15-Feb-07										
3.2.4.04	Use feedback from the SRC and other sources to guide the development of a system that manages changes in scope, resources, personnel and schedule that is graded to the level of authorization and can be effectively implemented	McGraw	16-Feb-07	28-Sep-07										
3.2.4.05	Publish new policies and procedures in PUB 3000	Hatayama	01-Oct-07	31-Oct-07										
<b>Root Cause 5.1.1</b>			01-Jun-06	31-Aug-07										
5.1.1	Root Cause 5.1.1 - The Laboratory does not have a policy in place requiring formal work planning and authorization for activities and work below LBNL regulatory threshold.	Chu												
5.1.1.01	Form a Team of Line Managers, Division Safety Coordinators and EH&S liasons to develop methods to formalize and document "line management authorization" of work.	Chu	01-Jun-06*	12-Jul-06										

<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 20px; height: 10px; background-color: green; border: 1px solid black;"></span> Remaining Level of Effort</li> <li><span style="display: inline-block; width: 20px; height: 10px; background-color: red; border: 1px solid black;"></span> Critical Remaining ...</li> <li><span style="display: inline-block; width: 20px; height: 10px; background-color: black; border: 1px solid black;"></span> WBS Summary Bar</li> <li><span style="display: inline-block; width: 20px; height: 10px; background-color: blue; border: 1px solid black;"></span> Actual Work</li> <li><span style="display: inline-block; width: 20px; height: 10px; background-color: lightgreen; border: 1px solid black;"></span> Remaining Work</li> </ul>	<p><b>2006 ISMS ES &amp; H Peer Review Corrective Action Plan Schedule</b></p> <p><b>Lawrence Berkeley National Laboratory</b></p>	<p>CAP PM Schedule Layout - By Active Root Cause 31-May-06</p> <p>7 of 9</p> 
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Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006				FY2007				FY2008	
					Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1		
5.1.1.02	Develop a proposal for presentation to the SRC.	Chu	01-Jun-06*	13-Sep-06		█								
5.1.1.03	Incorporate feedback from the SRC, DSCs and Liaisons and develop a policy on review and documentation for line management authorization of work.	Chu	01-Jun-06*	10-Nov-06		█								
5.1.1.04	Integrate the approved methodology into PUB 3000	Hatayama	01-Jun-06*	12-Feb-07		█								
5.1.1.05	Develop appropriate training/ communication as needed.	Hatayama	01-Jun-06*	10-Nov-06		█								
5.1.1.06	Develop appropriate validation during the 2007 Self Assessment.	Krupnick	10-Jan-07*	31-Aug-07						█				
<b>Root Cause 5.1.2</b>			<b>22-May-06</b>	<b>29-May-07</b>										
5.1.2	Root Cause 5.1.2 - The current policy and implementation guidance for AHDs lacks specificity.													
5.1.2.01	Transition all AHDs to the electronic AHD system	Hatayama	22-May-06*	22-Nov-06		█								
5.1.2.02	Evaluate the need to include SME review for non-laser AHDs and incorporate results in the Pub 3000.	Hatayama	01-Jun-06*	31-Jul-06		█								
5.1.2.03	Evaluate and develop the on-line technical support and/or training for AHD-preparers and adjust or enhance the training as necessary.	Hatayama	01-Jun-06*	31-Aug-06		█								
5.1.2.04	Complete a review of all policies relating to AHD.	Hatayama	01-Sep-06*	01-Nov-06			█							
5.1.2.05	Collect and review feedback from the 2006 IFA pertaining to the formal authorization program.	Hatayama	01-Jun-06*	31-Oct-06		█								
5.1.2.06	Propose new formal authorization policies and guidelines to the SRC. (If Needed)	Hatayama	01-Nov-06	31-Jan-07				█						
5.1.2.07	Publish the final policy revision in Pub3000.	Hatayama	01-Feb-07	30-Mar-07					█					
5.1.2.08	Evaluate implementation of policy revision. Publish final policy.	Krupnick	02-Apr-07	29-May-07						█				
<b>Root Cause 5.3.1</b>			<b>10-Jan-06 A</b>	<b>26-Oct-07</b>										
5.3.1	Root Cause 5.3.1 - Work and hazard identification for projects/ maintenance-type work and activities is less than adequate.													

- Remaining Level of Effort
- Critical Remaining ...
- WBS Summary Bar
- Actual Work
- Remaining Work

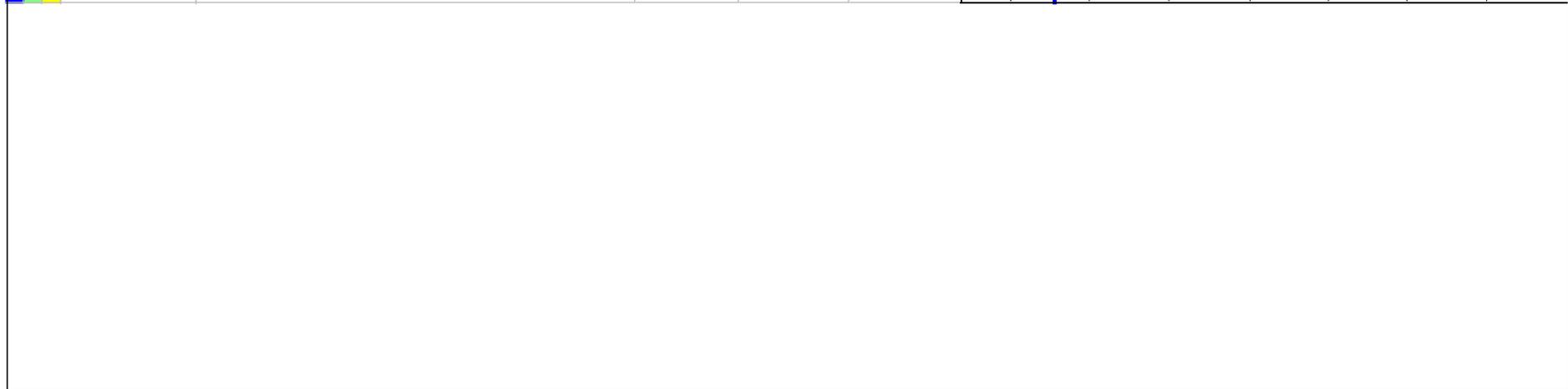
**2006 ISMS ES & H Peer Review Corrective Action Plan  
Schedule**

**Lawrence Berkeley National Laboratory**

CAP PM Schedule Layout - By  
Active Root Cause 31-May-06



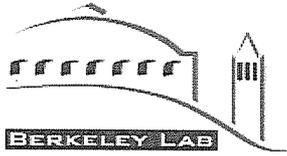
Activity ID	CAP Action Items	Responsible Person	Start	Finish	FY2006		FY2007				FY2008	
					Q2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1
					5.3.1.01	Evaluate existing policies governing hazard identification and oversight work performed by the Facilities Division.	McGraw	01-Jun-06*	31-Jul-06			
5.3.1.02	Evaluate existing policies governing hazard identification and review for work performed by construction sub-contractors.	McGraw	01-Jun-06*	31-Jul-06								
5.3.1.03	Evaluate existing policies governing hazard identification and oversight for work performed by equipment vendors.	Hatayama	01-Jun-06*	31-Aug-06								
5.3.1.04	Develop a proposal for hazard assessment and planning for these work classes and present this to the SRC.	Hatayama	01-Sep-06	31-Oct-06								
5.3.1.05	Incorporate feedback from Line Managers/ SRC, DSCs and Liaisons and develop a policy on review and documentation for these categories of work.	McGraw	01-Nov-06	31-Jan-07								
5.3.1.06	Integrate the approved methodology into PUB3000	Hatayama	01-Feb-07	28-Feb-07								
5.3.1.07	Develop additional training/communication	Hatayama	01-Mar-07	30-Apr-07								
5.3.1.08	Review and evaluate effectiveness during the 2007 Self Assessment	Krupnick	01-May-07	31-Jul-07								
5.3.1.09	Revise Division Self-Assessment to validate effectiveness.	Krupnick	10-Jan-06 A	31-Aug-07								
5.3.1.10	Implement review process (External to Subject Division) for this element.	Krupnick	03-Sep-07	26-Oct-07								



■ Remaining Level of Effort   
 ■ Critical Remaining ...  
 WBS Summary Bar  
 Actual Work  
 Remaining Work

**2006 ISMS ES & H Peer Review Corrective Action Plan Schedule**  
  
**Lawrence Berkeley National Laboratory**





ERNEST ORLANDO LAWRENCE  
BERKELEY NATIONAL LABORATORY

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**Environment, Health, & Safety  
Training Program**

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**EHS 27 ~ Performing an Effective Safety Walkaround**

**Course Syllabus**

<b>Subject Category:</b>	Occupational Safety/Leadership	<b>Course Prerequisite:</b>	EHS 26 recommended
<b>Course Length:</b>	1 hour	<b>Medical Approval:</b>	No
<b>Schedule:</b>	Monthly and by request	<b>Enrollment Cap:</b>	20
<b>Location/Time:</b>	70A-3377 or at location		

**Course Purpose:** This course provides safety leadership training for science and operational supervisors and Principal Investigators (PIs) in the area of conducting effective safety walkarounds. This course will assist those in supervisory role comply with the safety walkaround requirement that is recommended to be performed quarterly, if not monthly or more frequently. These safety walkarounds are conducted personally by Managers, Supervisors and PIs to ensure work is performed safely in all areas of their activity. Participants will learn two principal skills required to perform an effective safety walkaround are 1) observation and 2) listening. In addition, this course addresses common deficiencies found in walkarounds at the Lab and how to organize an effective safety walkaround program.

**Course Objectives:**

- Provide Information and components of effective safety walkarounds.
- Discuss strategies for planning and implementing routine workplace inspections/walkarounds.
- Review common deficiencies found in various workspaces and corrective actions.
- Identify methods and resources that assist the completion and documentation of a walkaround.
- Practice conducting an effective safety walkaround.

**Course Instructional Materials:**

- EHS 0027 Power point presentation
- Video - *LANL Safety Walkaround Training* - 3-4 minutes

**Instructors:** Richard DeBusk, and/or Janice Sexson, and/or Weyland Wong

**Training Compliance Requirements:** PUB 3000, Chapter 1, Section 1.3.1 and 1.3.2

**Course Hand-outs:** EHS 0027 Powerpoint Presentation

**Participant Evaluation:** Participants will be observed with performing the exercises and activities in class. Written evaluations regarding the effectiveness of the trainer, the training and the visual aids.

**Written Exam:** No

**Practical Exam:** No, but there is physical class participation

**Retraining/Recertification:** No

**WEB Resource:** *1 Minute For Safety* - <http://www.lbl.gov/ehs/index.shtml>

## MESH Review – Guidance and Overview

The MESH Review Team normally consists of three SRC members and one support person from the Office of Contract Assurance (OCA).

The review usually takes about two days, spread over several months. The process is described formally on the SRC website (<http://www.lbl.gov/ehs/src/mesh.shtml>). The following meetings or events are typical:

- Team planning meeting(s) (1-2 hours). The team will have access to many documents provided by the division and OCA (the Division completes the SRC MESH Questionnaire before this meeting). The team introduces themselves, reviews the documents, and plans the review. A second meeting may be necessary to finalize the review plan. The MESH team can request additional information from the Division if the SRC Questionnaire material is not sufficient.
- Division Introduction (0.5 – 1 hour). The Division presents introductory material related to their operation and EH&S activities.
- Interviews (3-5 hours). The team interviews a range of Division staff, either individually or in groups. Interviews should include the Division Director/Deputy, Department Heads, PI's, line staff, and new staff and/or students.
- Field Activity (1–3 hours). The team visits high hazard locations, locations with a large number of staff, and/or a cross-section of Division space of their choosing. Informal interviews with all staff should be a major component of this activity.
- OCA prepares a draft of the report. The team can meet to discuss the findings either before or after the draft (1-2 hours).

Sample interview areas or questions:

- How does the Division communicate EH&S issues at the group/team level?
- How does the Division respond to problems and incidents? Are they proactive in any areas?
- How has the division responded to findings from previous assessments?
- Who sets EH&S expectations? Is staff aware of the expectations? How are they enforced?
- How does the Division manage new employees, faculty, students, matrixed staff, and/or subcontractors?
- What is the Division policy on ergonomics?
- Is the work authorization process effective?
- What Best Practices should be copied by other Divisions?
- How does the Division track work changes and review their EH&S impacts?
- Does everyone hear the same message about EH&S?
- How many employees report to each PI or supervisor?
- Do staff know who to contact if they have a safety problem?

OCA roles:

- Aid in MESH document collection and preparation; provide other review documents
- Coordinate field activities

- Provide input on lines of inquiry
- Draft initial MESH report

DOE/ Berkeley Site Office Observation:

- BSO may observe the MESH team meeting in preparation for reviews. This provides DOE the opportunity to observe discussions regarding the MESH team's lines of inquiry, proposed staff interviews, and proposed inspection locations.
- Following the MESH review, BSO may observe the divisional out-briefing (if conducted) and review a draft version of the final report.
- The MESH team and subject division will address BSO questions and concerns resulting from the review of the draft final report.
- BSO will not observe formal review activities
- If subject division approves, BSO may observe division response and presentation to the Safety Review Committee meeting

## **Corrective Actions**

Findings, deficiencies, and/or concerns identified from assessments or inspections must be corrected by the responsible organization to maintain a safe and environmentally responsible work environment and to sustain continuous improvement in ES&H programs. For internal and external reviews, divisions and other organizations responsible for developing appropriate corrective actions must have a clear understanding of the following:

- The conditions that warrant the corrective actions. Typical conditions include noncompliance with ES&H regulations and requirements; the presence of hazards that are potentially harmful to employees, the public, or the environment; or a breakdown of systems and processes detrimental to the local or institutional ES&H program.
- The severity of the consequences and the likelihood of occurrence. In order to establish priorities and timeliness for corrective actions, risks and hazards must be assessed. The type of actions planned, not only to correct the immediate cause but also to correct the root cause to prevent recurrence.
- The commitment of resources, including staff and funds, necessary to correct the undesirable conditions.

Divisions are required to enter assessment findings and corrective actions into the Laboratory's Corrective Action Tracking System (see below).

## **LBNL Corrective Action Tracking System (CATS)**

To facilitate the development, tracking, and closeout of corrective actions, the Laboratory uses a computerized database called the LBNL Corrective Action Tracking System (CATS). CATS helps identify and track the following information:

- identification of the assessment type
- description of each finding to be corrected, including location
- description of the corrective task(s) for each finding, including the performance objective to be attained through its completion
- the person accountable for implementation and closeout of the corrective actions for the particular assessment. This individual must have the authority to bring about the necessary improvements and is typically a senior division manager, division safety coordinator, or EH&S functional manager.
- schedule, including applicable milestones, for the completion of each task.

CATS also used to assign a hazard level to the finding to reflect the severity of the consequences and the likelihood of occurrence.

After the corrective actions are entered into CATS, OCA monitors progress of the corrective actions and provides reports to management. Completion of the corrective actions must be noted in the electronic file and validated as appropriate by the division safety coordinator, EH&S functional manager, or OCA staff.



Environment, Health & Safety Division

May 25, 2006  
Dir-06-028

**MEMORANDUM**

To: AFRD, ALS, CSD, EETD, ESD, GN, LSD, MSD, NSD, and PBD Division Directors  
From: Howard Hatayama, Acting Director EH&S Division *H*  
Re: Laser Safety Assurances for DOE Berkeley Site Office (BSO)

---

During inspections of our laser labs conducted in November and December 2005, Berkeley Lab EH&S and the DOE Berkeley Site Office (BSO) identified some laser safety issues including intentionally disconnecting interlocks. On December 21, 2005, Phyllis Pei sent you an email alerting you to this problem and requested several actions including:

- o Verifying operation of laser interlocks for Class 4 systems
- o Ensuring proper eyewear is worn
- o Confirming proper signage is posted on doors
- o Assuring laser table housekeeping is maintained to prevent stray reflections

The EH&S Division developed a corrective action plan to address these deficiencies. One action is to conduct comprehensive reviews of all Class 3B and 4 laser labs. This activity was originally scheduled to be completed by April 30, 2006. However, the sudden departure of our former Laser Safety Officer, the need to provide real time customer support (e.g., eyewear selection, AHD review, interlock safety, etc.), and the need to develop/improve our infrastructure (AHD database, laser inventory, inspection procedures, and documentation) caused us to delay this effort. This activity is now anticipated to begin in June/July 2006 (supported by the new Laser Safety Officer) and will include:

- o Conducting and documenting laser safety inspections
- o Reviewing activity hazard documents (AHDs)
- o Reviewing completeness of the laser inventory
- o Checking laser protective eyewear
- o Testing interlock systems

We committed to BSO to have these completed by September 30, 2006, and they will accompany us during these inspections.

In the interim, BSO requested some assurance that laser safety requirements are in place. Therefore, I'm requesting that you provide me with an update by July 1, 2006 on the actions requested in Phyllis Pei's email (attached) and that you include laser safety inspections during your regular walkthroughs if you are not already doing so. I've attached copies of correspondences with BSO to give you some background on our dealings with BSO on this issue. Thank-you for your attention to this issue.

cc: Paul Blodgett, LBNL  
Carol Ingram, BSO  
Neil Landau, BSO  
Eugene Lau, LBNL  
Peter Lichty, LBNL  
Larry McLouth, LBNL  
David McGraw, LBNL

Enclosures

**Subject:** Action Required: Laser Safety Deficiencies

**From:** Phyllis Pei <PCPei@lbl.gov>

**Date:** Wed, 21 Dec 2005 16:02:44 -0800

**To:** William A Barletta <WABarletta@lbl.gov>, Christine M Celata <CMCelata@lbl.gov>, Janos Kirz <JKirz@lbl.gov>, Benedict Feinberg <B\_Feinberg@lbl.gov>, Daniel M Neumark <DMNeumark@lbl.gov>, Ali Belkacem <ABelkacem@lbl.gov>, Bo Bodvarsson <GSBodvarsson@lbl.gov>, Ernest L Majer <ELMajer@lbl.gov>, Mark D Levine <MDLevine@lbl.gov>, Donald F Grether <DFGrether@lbl.gov>, Eddy Rubin <EMRubin@lbl.gov>, James D Bristow <JBristow@lbl.gov>, Joe W Gray <JWGray@lbl.gov>, Rebecca Rishell <RRishell@lbl.gov>, A Paul Alivisatos <APAlivisatos@lbl.gov>, Mark Alper <MDAlper@lbl.gov>, James Symons <TJSymons@lbl.gov>, Volker Koch <VKoch@lbl.gov>, Jay D Keasling <JDKeasling@lbl.gov>, Heinz M Frei <HMFrei@lbl.gov>

**CC:** SChu@lbl.gov, GRFleming@lbl.gov, DCMcGraw@lbl.gov, NJPadgett@lbl.gov, Nancy J Padgett <NJPadgett@lbl.gov>, Patricia M Thomas <PMThomas@lbl.gov>, Georgeanna M Perdue <GMPerdue@lbl.gov>, Jerome J Bucher <JJBucher@lbl.gov>, Jil T Geller <JTGeller@lbl.gov>, Weyland Wong <W\_Wong@lbl.gov>, Guy O Kelley <GOKelley@lbl.gov>, Kathryn Nobrega <nobregak@eorm.com>, Tony Linard <AMLinard@lbl.gov>, Rick Kelly <RJKelly@lbl.gov>, Tom Hardy <TOHardy@lbl.gov>, Jeffrey G Pelton <JGPelton@lbl.gov>, Carole Fried <CAFried@lbl.gov>, Paul M Blodgett <PMCBlodgett@lbl.gov>, Larry McLouth <LDMcLouth@lbl.gov>, Ted Decastro <TMDecastro@lbl.gov>, Robert William Schoenlein <RWSchoenlein@lbl.gov>, Eugene W Lau <EWLau@lbl.gov>

**To:** Division Directors and Deputies who have laser systems

**cc:** Division Safety Coordinators

**cc:** Chair, Laser Safety Committee

During recent inspections of laser labs, we have uncovered some safety issues. The most serious of these is defeated or disconnected interlock control systems, which may pose exposure risks to employees, visitors and guests. **This is a violation of our laser safety policy.**

DOE's Berkeley Site Office staff is aware of these conditions and has formally requested the Lab to develop a Corrective Action Plan. The plan includes EHS staff conducting comprehensive field inspections of all laser labs. BSO personnel will be accompanying us on these walkthroughs. Exact time schedules will be worked out with your respective Division Safety coordinators.

In the meantime, laser PIs or users must take the following immediate actions:

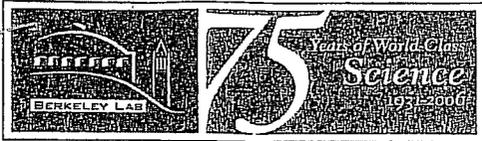
1. Test all interlocks to verify proper function. Class IV laser systems are required to have interlocks. If Class IV laser safety interlocks function cannot be verified, then laser operations must be suspended until corrected. Temporary laser use authorizations may be granted by the Laser Safety Officer on a case-by-case basis (provided administrative controls are feasible). If your laser operation is suspended, BSO **WILL** inform respective DOE Program offices.
2. Replace burned out bulbs in lighted laser warning signs and interlock panels.
3. Ensure that proper laser protective eyewear is available, stored and used.
4. Keep work areas (in particular, laser tables) clean and free of reflective objects,
5. Inspect signage on doors and entryways to make sure information is current,
6. Review accuracy of information in Laser Use Authorizations, and

7. Ensure all laser users' eye exams and laser safety training are current.

The above issues require urgent and immediate attention. Users should confirm to you that their systems have been inspected and corrective actions are being implemented. For laser interlock solutions or any other assistance, please contact your Division Safety Coordinators, or, Larry McLouth at X5286. Thanks.

--

Phyllis Pei, Division Director  
Environment, Health, Safety and Security  
Lawrence Berkeley National Lab  
One Cyclotron Road  
MS 90R1140  
Berkeley, CA 94720  
Phone: 510.486.4724  
Fax: 510 486 7488  
Email: [pcpei@lbl.gov](mailto:pcpei@lbl.gov)



Environment, Health & Safety Division

March 29, 2006  
Dir-06-014

To: Aundra Richards, Manager  
DOE – Berkeley Site Office

From: Howard Hatayama, Acting Director  
Berkeley Lab – EH&S Division

H

Re: Request for Extension of Completion Date for the Laser Safety Corrective Action Plan dated 12/16/05

Ten Laser Program corrective actions (CAs) are being tracked on a biweekly basis by Berkeley Lab and BSO staff. Six of the ten CAs are complete as described below.

1. Review and validate the comprehensiveness and accuracy of the laser inventory.
2. Develop a clear policy on how to handle laser amplifiers in the laser inventory  
2/24/06: **COMPLETE**. Definition added to laser inventory.
3. Report interlock access control deficiencies as an ORPs Management Concern and track findings and corrective actions.
4. Add laser safety program management resources.  
1/13/06: **COMPLETE**. The laser safety program is in the IH Group (Group Leader: Paul Blodgett). Larry McLouth is the program manager (administers AHD & laser inventory programs, coordinates safety inspections and interfaces with management, customers and the Berkeley Site Office).
5. Conduct comprehensive field inspections of all laser laboratories and work authorizations to determine compliance with our laser safety requirements.
6. Notify senior line management of these deficiencies for their high level attention and resolution.  
1/13/06: **COMPLETE**: EH&S Division Office sent email to senior line management on 12/21/05.
7. Engage a laser safety consultant to assist us in identifying programmatic and technical weaknesses and recommend solutions.  
3/21/2006: **COMPLETE**: Laser Safety consultant on board and providing service 3 days per week.
8. Form a task force (EHS, Facilities, Fire Protection, Electrical Safety and Scientists) to standardize laser interlocks and to facilitate cost effective installations.
9. Work with the Laser Safety Committee to resolve technical concerns, policies and implementation issues.  
1/13/06: **COMPLETE** This is ongoing and covers a broad scope of technical and programmatic issues. The amplifier issue (previously discussed) is one example.
10. Set up management progress reviews of above items between LBNL and BSO every two weeks until all issues are resolved.  
1/13/06: **COMPLETE**. Calendar appointments have been made.



**Department of Energy**  
Office of Science  
Berkeley Site Office  
Lawrence Berkeley National Laboratory  
1 Cyclotron Road, MS 90-1023  
Berkeley, California 94720

APR 19 2006

Howard Hatayama  
Acting EH&S Division Director  
Lawrence Berkeley National Laboratory  
1 Cyclotron Road (MS 90R-1140)  
Berkeley, CA 94720

Subject: Revised Completion Dates for the LBNL Laser Safety Corrective Action Plan

Reference: "Request for Extension of Completion Dates for the LBNL Laser Safety Corrective Action Plan dated 12/16/05", Howard Hatayama to Aundra Richards (March 29, 2006)

Dear Mr. Hatayama:

The Berkeley Site Office (BSO) has reviewed your request for a extension of the completion date from April 30, 2006 to September 30, 2006 for the corrective actions described in the referenced letter. In light of the conditions and events detailed in your letter, the BSO grants the extension, provided the Lab meets the following three conditions:

1. Assign each outstanding corrective action a target completion date.
2. Develop a plan to assure that laser safety requirements are implemented during the suspension of field inspections.
3. Add a corrective action to replace the retired Laser Safety Officer.

Please respond to these conditions by April 25, 2006.

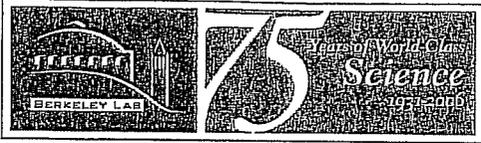
Contact Neil Landau at [neil.landau@bso.science.doe.gov](mailto:neil.landau@bso.science.doe.gov) or at extension 6479 for additional information.

Sincerely,

A handwritten signature in cursive script, reading "Aundra Richards", is positioned above the typed name.

Aundra Richards  
Site Manager  
Berkeley Site Office

cc: C. Ingram, BSO  
H. Carwell, BSO  
N. Landau BSO  
P. Blodgett, LBNL



Environment, Health & Safety Division

April 24, 2006

DIR-06-019

To: Ms. Aundra Richards  
Manager, DOE Berkeley Site Office

From: Howard K. Hatayama, Acting Director  
EH&S Division

A handwritten signature in cursive script, appearing to read 'Howard K. Hatayama for Howard'.

Subject: "Revised Completion Dates for the LBNL Laser Safety Corrective Action Plan", Aundra Richards to Howard Hatayama (April 19, 2006)

The EH&S Division received your letter granting the extension of the Corrective Action Plan (CAP) completion date from April 30, 2006 to September 30, 2006. In this letter, you requested we:

1. Assign each outstanding corrective action a target completion date.
2. Develop a plan to assure that laser safety requirements are implemented during the suspension of field inspections.
3. Add a corrective action to replace the retired Laser Safety Officer.

I will address each request below:

1. Assign each outstanding corrective action a target completion date.

The following is the list of the open corrective actions (CA) with target completion dates:

- a) Review and validate the comprehensiveness and accuracy of the laser inventory. Target Completion Date: **September 30, 2006**
- b) Report interlock access control deficiencies as an ORPs Management Concern and track findings and corrective actions. Target Completion Date: **June 30, 2006**
- c) Conduct comprehensive field inspections of all laser laboratories and work authorizations to determine compliance with our laser safety requirements. Target Completion Date: **September 30, 2006**
- d) Form a task force (EHS, Facilities, Fire Protection, Electrical Safety and Scientists) to standardize laser interlocks and to facilitate cost effective installations. Target Completion Date: **August 31, 2006**

2. Develop a plan to assure that laser safety requirements are implemented during the suspension of field inspections.

I will request that the Laboratory Division Directors include laser operations in their regular management walk-arounds and will ask them to provide me with an update on the laser safety actions requested in December, 2005. I will further inform them that the EH&S Division will complete comprehensive laser safety inspections by the end of September 2006 and request their collaboration. This will be followed up with an email to the Directors.

**Status of Laser Safety Corrective Actions**  
**Bldg 90 Rm 2063**  
**5/24/06**

**6 of 11 actions completed**

1. Review and validate the comprehensiveness and accuracy of the laser inventory:
  - 1/13/06: Laser inventory completion is evaluated during scheduled walkthroughs with divisions (see 5<sup>th</sup> bullet). MSD walkthroughs completed and laser inventory changes were documented on worksheets.
  - 1/27/06: Will meet with MSD Safety Coordinator to update laser inventory. Resumed walkthroughs with Chemical Sciences on a limited scale. Hope to ramp up after addressing customer support issues. Receiving LSO assistance from LLNL.
  - 2/10/06: (NOTE: Combined field inspection and inventory action items into a single one since they are closely related.) Meeting scheduled with MSD on Feb 17 to transfer data to inventory. Chemical Sciences inspections resuming. Most efforts are directed at customer support.
  - 2/24/06: No additional safety inspection walkthroughs have been completed since last meeting. Gave MSD Coordinator laser inventory worksheets for uploading.
  - 3/10/2006: Will use laser safety consultant to assist in uploading MSD inventory data. Met with Neil Landau on 2/27/05 to define scope of laser inventory and conduct of walkthroughs. No walkthroughs conducted this period – efforts focused on customer support.
  - 3/21/2006: No walkthroughs conducted this period – efforts focused on customer support. Neil Landau approved inventory and walkthrough scope after making an editorial change and requesting access to CATS. Note: Sent email on 3/17/06 to correct an error: The scope applies to Class 3b and 4 lasers. The original email listed Class 3 and 4 lasers.
  - 4/07/2006: No walkthroughs conducted this period – efforts focused on customer support. EH&S sent memo to BSO requesting extension of completion date for corrective actions to Sept 30, 2006.
  - 4/19/2006: No walkthroughs conducted this period. EH&S awaiting response from BSO, re- extension of completion date for corrective actions to Sept 30, 2006. Neil Landau requested to observe field activities involving laser safety consultant. Invited Neil to observe an EETD Laser Lab Observation session (EHS 287) conducted on 4/12/06.
  - 5/10/2006: BSO approved new CAP date. The due date has been extended to 9/30/06.
  - 5/24/06: Walkthroughs resuming using systematic approach. Inviting BSO to observe.
2. Develop a clear policy on how to handle laser amplifiers in the laser inventory
  - 1/13/06: Discussed this at the 12/21/05 Laser Safety Subcommittee meeting. The preliminary recommendation is to list only Class IIIb and IV lasers in the inventory and to use the AHD to describe how light hazard conditions are changed by amplifiers.
  - 1/27/06: Agreed on proposed policy at the 1/19/06 Laser Safety Subcommittee meeting. Laser inventory should include only true lasers. These are defined as devices that are designed/used as optical resonators to store or build-up energy in an electromagnetic wave and that have a purposefully designed or clearly identifiable method for output coupling. Class IIIb and IV lasers are required to be entered into the inventory. Hazards associated with beam modification (such as amplifying or frequency doubling) will be addressed in the AHD.
  - 2/10/06: Adding definition to the inventory is in progress.
  - 2/24/06: **COMPLETE**. Definition added to laser inventory.
3. Report interlock access control deficiencies as an ORPs Management Concern and track findings and corrective actions:
  - 1/13/06: ORPS submitted on 12/16/05.
  - 1/27/06: MSD Management Review scheduled to resume Monday 1/30/06. Causes, corrective actions and lessons learned stemming from this investigation will be reported through ORPS. Due date is 3/1/06.
  - 2/10/06: MSD Management Review Panel reconvened to discuss completion of investigation. Scheduling for remaining 3 interviews is underway.
  - 2/24/06: In progress – Remaining meetings have been scheduled.
  - 3/10/2006: In progress – MSD Management Review Team completed interviews with PIs, Post Docs and Grad Students. Draft in preparation.
  - 3/21/2006: Neil Landau commented the investigation scope of this management concern is too narrow. He felt that we should go beyond MSD since the condition was found in another division (CSD).
  - 4/07/2006: MSD draft report written & undergoing review. OAA extended due date to May 1. Reviewed EH&S approach to resolve ORPs with Neil Landau on 3/21/06. He approved, but suggested we note that corrective actions will be extended to other Divisions.

**Status of Laser Safety Corrective Actions**  
**Bldg 90 Rm 2063**  
**5/24/06**

4/19/2006: Review finished and awaiting completion of MSD report.

5/10/2006: Final MSD report not issued. Will develop an ORPS close out deliverable and review with BSO. ORPS extended to June 1, 2005.

5/24/06: Provided OCA list of corrective actions for review. Requested advice on how to close out.

4. Add laser safety program management resources:
  - 1/13/06: **COMPLETE**. The laser safety program is in the IH Group (Group Leader: Paul Blodgett). Larry McLouth is the program manager (administers AHD & laser inventory programs, coordinates safety inspections and interfaces with management, customers and the Berkeley Site Office).
5. Conduct comprehensive field inspections of all laser laboratories and work authorizations to determine compliance with our laser safety requirements.
  - 1/13/06: Completed MSD walkthroughs. Inspection findings were given to the DSC. Other walkthroughs have not been scheduled due to LSO's departure and time constraints resulting from Dr. Chu's request to walkthrough spaces and the upcoming Peer Review Panel.
  - 1/27/06: Resumed Chem Sciences on a limited scale. Hope to ramp up after addressing customer support. Receiving LSO assistance from LLNL.
  - 2/10/06: (NOTE: Combined field inspection and inventory action items into a single one since they are closely related.) Meeting scheduled with MSD on Feb 17 to transfer data to inventory. Chemical Sciences inspections resuming. Most efforts are directed at customer support.
  - 2/24/06: No additional safety inspection walkthroughs have been completed since last meeting. Gave MSD Coordinator laser inventory worksheets for uploading.
  - 3/10/2006: Met with Neil Landau on 2/27/05 to define scope of laser inventory and conduct of walkthroughs. No walkthroughs conducted this period – efforts focused on customer support.
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  - 5/10/2006: BSO approved new CAP date. The due date has been extended to 9/30/06.
  - 5/24/06: Walkthroughs resuming using systematic approach. Inviting BSO to observe.
6. Notify senior line management of these deficiencies for their high level attention and resolution.
  - 1/13/06: **COMPLETE**: EH&S Division Office sent email to senior line management on 12/21/05.
7. Engage a laser safety consultant to assist us in identifying programmatic and technical weaknesses and recommend solutions.
  - 1/13/06: We're in the process of selecting an LSO consultant from several candidates. Will provide customer support and programmatic review.
  - 1/27/06: Completed PD for new LSO posting. Narrowed consultants down to 3 candidates. Plan to interview them next week.
  - 2/10/06: Made selection, PO in progress. Main emphasis will be to support operations and to do walkthroughs/inspections. Posted LSO position on the web. Interview committee selection underway.
  - 2/24/06: PO to consultant issued today. Interview panel candidate members identified. Selection still in progress.
  - 3/10/2006: Laser consultant scheduled to arrive on Tuesday March 14, 2006. Interview panel selection completed for new hire. Soliciting more job candidates.
  - 3/21/2006: **COMPLETE**: Laser Safety consultant on board. Providing service 3 days per week.
8. Form a task force (EHS, Facilities, Fire Protection, Electrical Safety and Scientists) to standardize laser interlocks and to facilitate cost effective installations.
  - 1/13/06: Formation of committee and identification of candidate members have has been discussed between Facilities and EH&S.

**Status of Laser Safety Corrective Actions**  
**Bldg 90 Rm 2063**  
**5/24/06**

1/27/06: Met with Mike Dong (Facilities Mechanical & Electrical Section Head) to identify code requirements and Facilities procedures for installing interlocks. Examining code requirements is underway.

2/10/06: Meeting on *ad hoc* basis with FAC electrical engineering personnel. Identified code requirements. Meeting scheduled for next week.

2/27/06: Institutional task force pending. Per 2/15/06 meeting with Facilities, Lab built interlock boxes may be preferred as "standard" installation. Revised Laser Interlock Design and Installation Checklist. Agreed to joint Fac/EH&S commissioning inspection for newly installed interlocks.

3/10/06: Will commission interlocks in Chem Sciences next week.

3/21/06: Commissioned interlocks in 3 Chem Sciences lab.

4/07/06: Work with Facilities is ongoing. Meeting today to review an interlock system made by Kentek.

4/19/06: Work continues. Kentek to send us hardware for evaluation. Objective is to agree on laser interlock hardware (i.e. to have a standard installation package). So far we have 1) Evaluated the Rockwell Laser Sentry and the LBNL built systems 2) Identified code requirements regarding interlocks, 3) Determined that 24 volt signal wire can be strung without conduit and without wire mold, 4) Updated the Laser Lab Interlock Request Form and 5) Developed a draft Laser Interlock Commissioning Checklist (which includes a visual inspection and functional testing). I plan to have laser users use this for routine interlock inspections. Tasks that remain to be done are: 1) Test the Kentek system 2) Develop/update a standard design and installation 3) Document this in an interlock policy.

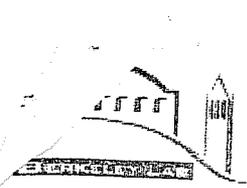
5/10/2006: BSO approved new CAP date. The due date for interlocks has been extended to 8/31/06.

5/24/06: No significant change.

9. Work with the Laser Safety Committee to resolve technical concerns, policies and implementation issues.  
 1/13/06: **COMPLETE** This is ongoing and covers a broad scope of technical and programmatic issues. The amplifier issue (previously discussed) is one example.
10. Set up management progress reviews of above items between LBNL and BSO every two weeks until all issues are resolved.  
 1/13/06: **COMPLETE**. Calendar appointments have been made.
11. Replace the retired LSO.  
 4/19/2006: Added this as an action item at BSO's request. Target completion date is 6/30/06.  
 5/10/2006: Interviews conducted. Will make offer to leading candidate.  
 5/24/06: Offer is in preparation.

**Attendance** [check box if present, add guests in blank boxes]

	1/13/06	1/27/06	2/10/06	2/24/06	3/10/06	3/21/06	4/7/06	4/19/06	5/10/06
Kim Abbott	x								
Paul Blodgett	x	x	x	x	x	x	x	x	x
Howard Hatayama	x	x		x		x	x	x	x
Carol Ingram	x		x	x					x
Neil Landau	x	x	x		x	x	x	x	x
Eugene Lau	x	x	x	x	x	x	x		x
Larry McLouth	x	x	x	x	x	x	x	x	x
Bob Schoenlein	x								
Guests:									
Hattie Carwell							x		



Howard

FYZ

February 1, 2006

To: Aundra Richards  
Carol Ingram

From: Howard Hatayama *H*<sup>2</sup>

Subject: Response to Commitments 23 & 25

On November 9, 2005, Under Secretary David Garman issued a memo on his expectations for completion of Commitment 23 Working Planning & Work Execution and Commitment 25 Feedback & Improvement. Don Erbschloe subsequently issued a memo to Office of Science site managers to perform an assessment of the effectiveness of the ISM in these two areas.

Attached please find our response to Commitments 23 and 25. We have identified a few items that we can fine tune to further strengthen the Lab's safety program. In addition, we have recently completed an external Peer Review and we anticipate that the report will identify other opportunities for improvement.

Thank you for the opportunity to comment on these important initiatives.

Cc: David McGraw  
Jim Krupnick  
John Chernowski  
Eugene Lau

Environment, Health & Safety Division  
One Cyclotron Road  
MS90R1140  
Berkeley, CA 94720

**DOE Commitment 23**  
**Descriptions of LBNL Work Planning and Work Control**  
**Programs and Processes**

**Performance Objective WPC-3: Work Control Program Documentation**

The contractor has developed an effective work planning and control process.

**Criteria**

***Criterion 1:*** *Contractor work control manual/procedure for initiating, analyzing, and developing work control documents, including job hazard analysis, is approved and implemented.*

The processes described are contained within LBNL's Institutional Integrated Environment, Health and Safety Management Plan (Pub 3140) and LBNL's Health and Safety Manual (Pub 3000).

***Criterion 2:*** *The contractor's work control process establishes the level of review and approval for different types of work control documents. The type of document chosen is based upon the degree of risks, hazards, and complexity of the work activity.*

The graded approach for work authorizations is described within Chapter 6, "Safe Work Authorizations" within LBNL's Health and Safety Manual (Pub 3000).

***Criterion 3:*** *The contractor has established work planning/control requirements for all personnel performing work at their site, including subcontractors. Affected personnel are trained on these requirements.*

The work planning/control requirements described in Chapter 6, "Safe Work Authorizations" within LBNL's Health and Safety Manual (Pub 3000) apply to all work performed at LBNL. Requirements specific to subcontractors are contained within subcontract provisions provided by LBNL's Procurement Department.

***Criterion 4:*** *The contractor's work control manual/procedure includes turnover requirements when line management and/or first line supervisor responsibilities are transferred.*

Scientific work, including formally authorized and self-authorized work, is generally single shift and no transfer of responsibilities takes place. Facilities maintenance (Plant Maintenance Technicians) has a shift overlap for pass-on information.

***Criterion 5:*** *The contractors work control manual/procedure includes a process for lessons learned/feedback during the execution of work control activities, including incorporation of lessons learned into active and in-development work control documents.*

The Lab has a formal lessons learned program as described in its UC/ LBNL Assurance Plan. The Lab also participates in the DOE-sponsored SELLS lessons learned program and disseminates the SELLS lessons learned to targeted audiences. However, the process of capturing, developing, and distributing lessons learned is not very robust.

**Corrective Action:** A process improvement team (PIT) representing several Laboratory organizations is formed and will begin meeting in February 2006. This PIT will determine the best methodology for capturing and disseminating lessons learned across the institution. A formal process, which will be a significant improvement on the existing model, should be in place by Summer 2006.

**Criterion 6:** *The contractor's work control manual/procedure includes a process for post activity review, including incorporation of lessons learned into active and in-development work control documents and/or work control manual/procedure.*

See Criterion 5 above. LBNL's Lessons Learned program is described at <http://www.lbl.gov/ehs/Lessons/index.shtml>.

**Criterion 7:** *The qualification for Work Control Managers and Planners are established.*

LBNL does not use the functions "Work Control Manager" and "Planner" within the context of this document (which is directed at nuclear facilities; LBNL is not a nuclear facility). All LBNL staff complete the Job Hazards Questionnaire (JHQ); the JHQ process analyzes the work and defines training requirements. Scientific staff who plan, control and manage their scientific work are selected through a process that includes definition of qualifications (by the hiring authority) and review of education, training and past performance. Staff who construct, maintain and operate LBNL's physical facilities are recruited using standard position descriptions outlining required skills, knowledge and abilities. These standard position descriptions are established and maintained by LBNL's Human Resources Department.

**Criterion 8:** *Records that document the successful completion and qualification of Work Control Managers and Planners are retained and auditable.*

As noted above, since LBNL does not use "Work Control Manager" and "Planner" within the context of this document, there is no formal qualification process. Human Resources records are maintained by the Human Resources Department. Records of training acquired through LBNL are maintained within LBNL's Training Program.

#### **Performance Objective WPC-4: Work Planning and Control Activity**

Proposed work activities are adequately defined and analyzed to identify hazards and their associated controls.

(The Lawrence Berkeley National Laboratory (LBNL) interprets this performance objective in terms of our own DOE authorized operations. For this objective, the term work control is interpreted to mean work authorization at LBNL. Pub 3000, Chapter 6, provides guidance as to the work authorization level required for work to be performed. Operations and infrastructure support work (plant operations and maintenance, design, construction and directorate operations and support) typically are conducted under line management authorization although some Facilities plant and institutional operations may involve formal work authorizations such as environmental permits (RCRA Part B Permit for Hazardous Waste Handling Facility, sanitary district discharge permits, etc). Research activities are typically authorized at the line management level or the formal work authorization level. Responses to each WPC criterion bear combined Operations and Infrastructure components and a research component).

## Criteria

***Criterion 1: Initial discussion/walk down of the proposed work activity is performed by appropriate personnel (e.g., line management, engineer, planner, etc.) to ensure that the work is properly scoped and that boundaries are understood.***

**Infrastructure:** The customer, estimator, engineer, shop superintendent, craft worker and EH&S representative collaborate as necessary to define the scope of proposed work to satisfy LBNL ISM requirements and in accordance with the LBNL Facilities/EH&S Interface Policy.

**Research:** Both Line Management Authorization and Formal Work Authorizations for higher hazard work require requisite and sufficient initial and periodic observation and review by the appropriate level of supervision and management, as stated in Pub 3000, Chapter 6 and the LBNL ISM Plan.

***Criterion 2: A team (team) comprised of the appropriate personnel (e.g., planner, work supervisor, workers, safety and health Subject Matter Experts, etc.) is selected by line management to participate in the development of the work control document.***

**Infrastructure:** As per the response to Criterion 1. Additionally, Standard work control/work authorization for plant operations work is the Work Request Center Work Order. Note, however, work authorization is not always a written document.

**Research:** As per Criterion 1.

***Criterion 3: The team performs effective walk downs and Job Hazard Analyses in order to develop work steps/techniques and identify possible hazards and their associated controls.***

**Infrastructure:** Effective walk downs and Job Hazard Analyses that contribute to proper work process, techniques and control of hazards are inherent components of Criteria 1 and 2 above.

Project managers, superintendents, shop supervisors, and craft all contribute to this process.

**Research:** As per Criteria 1 and 2 above.

***Criterion 4: The team considers potential upset conditions, accidents, and "what if" scenarios and their consequences during the walk downs and JHAs.***

**Infrastructure:** Design and review is performed by varying degree based on size of job and level of risk. The design review process starts at conceptual planning and continues through design stages to final design. The design review engineering and EH&S teams continue support throughout construction to assure that changes meet code and Lab requirements. This is mandated by Facilities design and construction procedure and the Facilities/EH&S Interface Policy.

**Research:** The risk and consequence analysis process in Pub 3000, Chapter 6, Appendix E is designed to address Criterion 4 issues.

***Criterion 5: The team selects controls based upon the following hierarchy: (1) hazard elimination/reduction, (2) engineered controls, (3) administrative controls, and (4) personal protective equipment.***

**Infrastructure:** The overall project design review and preliminary hazard analysis process, shop supervisor, superintendent, craft worker, and subcontractor pre-job hazard assessment/analysis, and task-specific activity hazard analyses all incorporate the fundamental hazard control hierarchy.

**Research:** The fundamental hierarchy of hazard control is the basis for Pub 3000, Chapter 6 work authorization.

***Criterion 6: The team ensures that the level of control established for a hazard is maintained throughout the activity or until the hazard has been eliminated or reduced (controls can be graded to level of hazard reduction). [This Criteria addresses potential loss of safety function during D&D and may not be applicable to all work activities]***

**Infrastructure:** Line management and EH&S inspections are programmatic requirements under Lab ISM and the Lab Self-assessment program.

**Research:** Line management and EH&S inspections are programmatic requirements under Lab ISM and the Lab Self-assessment program.

***Criterion 7: The team evaluates the possibility of creating additional hazards due to selected controls (i.e., excessive PPE causing heat exhaustion) and also evaluates the possibility of negative synergistic effects of selected controls.***

**Infrastructure:** The design review process incorporates EH&S subject matter expertise to ensure controls and hazard mitigation do not conflict with each other. EH&S oversight and support of project management is provided as necessary. Shop supervisors, superintendents, craft workers conduct pre-job hazard assessment and analysis and consider risk factors of the controls and protective measures.

**Research:** Formal work authorizations consider synergistic and aggregate effects of hazards during the hazard assessment, identification and control development.

## **Performance Objective WPC-5: Work Planning and Control Process**

The contractor work planning process generates work control documents that lead to safe and efficient completion of work activities.

## Criteria

### **Criterion 1: *The work scope and associated boundaries are clearly defined.***

The work scope and associated boundaries are defined at every level throughout the Lab consistent with the principles outlined in LBNL PUB-3140, *Integrated Environment, Health and Safety Management Plan: Integrated Safety Management (ISM) System*. As part of the work planning process, principal investigators, managers, and supervisors (work leaders) are required to consider what hazards, risks, and concerns are present, and to implement appropriate controls.

### **Criterion 2: *The work control document is written in a clear, concise, and worker friendly manner.***

Documents for work control are organized into three basic levels at the Berkeley Lab: line management, formal authorization, and facility-based authorization. Examples of the authorizations falling under these are listed in Chapter 6 of LBNL's Publication-3000 (PUB-3000), *Safe Work Authorizations*. These authorizations are not only tailored to the type of authorization, but to the specific hazard(s), and as such provide clear and concise information to all for safe operations.

### **Criterion 3: *The work steps for activities are properly sequenced.***

Chapter 6 of PUB-3000 provides templates (e.g., Appendices A, B, C, E) for all levels of authorizations to ensure that work steps for activities are considered and followed in an organized fashion.

### **Criterion 4: *Work control documents adequately incorporate technical and administrative requirements (e.g., contract, safety basis, regulatory, consensus codes, etc.).***

Chapter 6 of PUB-3000 provides templates for work control documents to ensure that all requirements, both technical and administrative are addressed. For project-based work activities, Appendix G of Chapter 6 provides an optional tool for divisions and work leaders to document that consideration has been given to possible formal authorizations that might be required for the work. In addition, line management and formal authorizations are renewed annually, and facility-based documents are renewed periodically based on regulatory and other considerations.

### **Criterion 5: *Work hazard controls identified in the JHA have been incorporated into the work control document.***

Appendices A, B, C, and E of Chapter 6 of PUB-3000 provide "trigger levels" for ES&H concerns that need to be incorporated in work control documents (safe work authorizations). In addition, Appendix G of Chapter 6, "Hazards, Equipment, Authorizations & Review (HEAR) Database Client Input Form - modified for Formal Authorizations and Project Hazard Analysis" is a tool for use in identifying hazard and controls for consideration in safe work authorizations.

HEAR  
Project

***Criterion 6: The controls for activity specific hazards are delineated immediately before the work control document step where the hazard is encountered and are highlighted to emphasize their importance.***

Templates are provided for safe work authorizations (e.g., Appendices A, B, C, and E of Chapter 6 of PUB-3000). These templates provide an organized structure for safety documentation that ensure a sequential addressing of hazards / controls consistent with the encountering of work activities.

## **Performance Objective WPC-6: Work Planning and Control Oversight**

Contractor personnel perform work in accordance with approved work control documents.

### **Criteria**

***Criterion 1: First line supervisors and workers are knowledgeable of their work control documents and meet all applicable training and medical requirements.***

The LBNL Integrated Environment, Health and Safety Management Plan, (PUB-3140-Rev.3) Section D explains how first line supervisors and workers are knowledgeable of and responsible for their work control documents. The mechanisms employed are explained in the LBNL Health and Safety Manual, (PUB-3000 May 2005) Chapter 6.

Identification of specific training requirements is embedded in this system. As a part of the work authorization procedures in Chapter 6 of PUB-3000, supervisors are responsible to assure that all of their employees complete a job hazard questionnaire (JHQ) as described in PUB-3000 Chapter 24.5.2 that identifies all training requirements.

A graded approach is used to guide the formality and detail used in these work control documents. For lower hazard operations, completion of the JHQ and associated training is considered adequate. For higher hazard or more complex operations, formal work control documents are promulgated with signatures verifying individuals and supervisors understanding of the requirements. These are referenced in PUB-3000 Chapter 6 Appendix B.

***Criterion 2: Operations work control authority reviews and authorizes all work control documents prior to commencement of work. He/she is required to evaluate all work at a facility and/or site to ensure work activities of one scope do not adversely affect the safe work of another.***

Safety of all operations at Lawrence Berkeley National Laboratory is managed according to the principles outlined in LBNL/PUB-3140, Integrated Environment, Health and Safety Management Plan: Integrated Safety Management (ISM) System. A key principle is that of work authorization.

Authorization is a review and management approval process designed to ensure that procedures, controls, and resources are in place before the work begins. All work at LBNL proceeds under authorization. Work authorization classifications include the following:

Line Management: An authorization implied from other documentation, or explicit but administered by the responsible division doing the work. Examples include routine laboratory or shop work, and work on equipment containing stored energy.

Formal: A written document, concurrently authorized by the responsible division and by the EH&S Division, that describes the scope of work, required procedures and controls, authorized materials and equipment to be used, and staff authorized to conduct the work. Examples include Radiological Work Authorizations, Activity Hazard Documents, research involving human or animal subjects, and some high pressure work.

Facility-Based: Hazard analysis and controls are based on the facility as a whole rather than on an individual operation. Examples include Safety Analysis Documents, air and water discharge permits, some other regulatory permits and NEPA/CEQA analyses.

Proposed work activities are adequately defined and analyzed to identify hazards and their associated controls. The LBNL Health and Safety Manual, PUB-3000 Chapter 6 describes work authorizations and the work authorization process.

PUB-3140 Section A, paragraph 7 states the policy that “the conditions and requirements that must be satisfied for operations to be initiated and conducted are clearly established and agreed upon.” This is also implemented on a graded approach. For higher hazard work, as defined in Appendix B of Chapter 6, PUB-3000, formal review and authorization processes are identified before work may begin. These include evaluation of all work functions that may impact others. For lower hazard work, the JHQs are required to be completed within 30 days of employment.

***Criterion 3: Effective pre-evolutionary briefings are performed.***

Pre-evolutionary briefings, as appropriate, are typically documented as part of the work authorization. Examples include pre-job briefings for radiological work permits (PUB-3000 Chapter 21.6.2) and permitted electrical work (PUB-3000 Chapter 8.6.4).

***Criterion 4: First line supervisors and workers follow work control document instructions as written, or if unexpected conditions arise, workers and supervisors take action to stop the work and follow their change control process.***

Work control document instructions are promulgated on a graded approach. These are either included or referenced in the work authorizations as appropriate. See Appendix E, section 6 in Chapter 6, PUB-3000 for Activity Hazard Documents and Chapter 21.6.1 for the description of protocols for radiological work authorizations for examples.

***Criterion 5: First line supervisors and workers understand their stop work authority.***

Stop Work authority is delineated in the General Policy and Responsibilities section of the LBNL Health and Safety Manual (Chapter 1.5). This is communicated to staff in New Employee Orientation class and reinforced through divisions' implementation of ISM and ES&H self-assessment.

**Corrective Action:** The EH&S Division continues to improve communication and understanding of the Stop Work policy. In recent months, this policy has been posted on the EH&S Division website. The policy has been directly communicated to the Safety Review Committee and Division Safety Coordinators Committee, who were tasked with disseminating this policy among division staffs. The Stop Work policy also appeared in Today At Berkeley Lab (TABL) on September 14, 2005, and will appear annually in this publication. In addition, an electrical safety specific Stop Work reminder appeared in TABL on August 15, 2005.

***Criterion 6: Work control documents contain adequate documentation (i.e., work status log) regarding work status including the nature of and response to unexpected conditions.***

The nature and detail of documentation regarding work status varies with hazard level and type. Each hazard-specific chapter in PUB-3000 describes appropriate documentation requirements for work status. Examples are LOTO for electrical work in Chapter 8 and posting/signage requirements for radiological work as described in Chapter 21.

***Criterion 7: Lessons learned/feedback is incorporated into active and in-development work control documents in a timely manner.***

Lessons learned and feedback is incorporated into ISM at LBNL at the institutional, divisional/departmental and at the project/activity level. These are described in detail in the institutional ISM Plan, PUB-3140, sections B, C and D.

## **Performance Objective WPC-7: Work Planning and Control Oversight**

The Contractor has an established process that requires line management and assessment personnel perform timely assessments/ surveillances of the work planning and control process, including periodic reviews of active and in-development work control documents.

### **Criteria**

***Criterion 1: The contractor has scheduled and performed independent and self-assessment of the work planning and control process. These activities are of sufficient scope, detail, and quantity that the contractor can ascertain the status of the work planning and control process.***

The LBNL ES&H Self-Assessment program requires independent and self-assessment of the work planning and control process. This program is described in Environment, Safety, and Health Self-Assessment Program (PUB-5344, rev.3). Division self-assessments are performed annually by line management of each division. Integrated

Functional Appraisals and Management of ES&H reviews are performed triennially for each division and serve as independent assessments of the work planning and control process.

***Criterion 2: Line managers periodically perform surveillances, which include the observations of job walk downs and JHA walk downs/ meetings, pre-evolution briefings, and work performed to work control documents.***

Division self-assessment requires all line managers to inspect their staff workspaces and communicate ES&H issues with their staff. The Division Self-Assessment is described in PUB-5344, rev.3. Division self-assessments criteria, which measure performance of these activities, are negotiated annually by division management of every division.

***Criterion 3: Line managers periodically review in-development and approved work control documents.***

PUB-3000 Chapter 6 requires formal review of all in-development formal authorizations by division line management, division management, and the EH&S Division. In addition, annual review is required for all approved formal authorizations.

***Criterion 4: The contractor tracks and trends the results of oversight activities performed on their work planning and control process and takes appropriate actions.***

The annual ES&H Self-Assessment Report (LBID-2489) identifies noteworthy practices and opportunities for improvement for every Laboratory division. Results from each of the three forms of ES&H self-assessment are analyzed in all divisions to identify institutional opportunities for improvement. Divisions and LBNL are required to address these opportunities for improvement during the following self-assessment year.

## DOE Commitment 25

### Descriptions of LBNL Integrated Safety Management System Feedback and Improvement

#### Performance Objective F&1-1: Contractor Program Documentation

Contractor Line management has established a comprehensive and integrated operational assurance system which encompass all aspects of the processes and activities designed to identify deficiencies and opportunities for improvement, report deficiencies to the responsible managers, complete corrective actions, and share lessons learned effectively across all aspects of operation.

#### Criteria

***Criterion 1:*** *A program description document that fully details the programs and processes that comprise the contractor assurance system has been developed, approved by contractor management, and forwarded to DOE for review and approval. The program description is reviewed and updated annually and forwarded to DOE for review and approval.*

The UC/ LBNL Assurance Plan describes the Lab's assurance system, process and activities. The current version of the LBNL Assurance Plan was reviewed and approved by University of California and Laboratory management in 2005. The Plan was forwarded to the DOE Site Office for review and concurrence in 2006.

***Criterion 2:*** *The contractor's assurance system includes assessment activities (self-assessments, management assessments, and internal independent assessments as defined by laws, regulations, and DOE directives such as quality assurance program requirements) and other structured operational awareness activities; incident/event reporting processes, including occupational injury and illness and operational accident investigations; worker feedback mechanisms; issues management; lessons-learned programs; and performance indicators/measures.*

The LBNL assurance system includes assessment activities, occurrence reporting and investigation, lessons learned, performance indicators, and corrective action management. Formal worker feedback mechanisms are addressed in the EH&S authorization programs (described in PUB-3000 Chapter 6), LBNL safety committee program (described in the LBNL ISM Plan), and in the Internal Audit whistleblower program.

***Criterion 3:*** *The contractor's assurance system monitors and evaluates all work performed under their contract, including the work of subcontractors.*

LBNL utilizes an authorization program to monitor and evaluate all work, including the work of subcontractors. Depending on the scope of work and level of hazards, authorization can be formal authorizations requiring independent review and approval. Work of limited scope

and hazard can be accomplished through a self-authorization process that requires line management review and approval.

***Criterion 4: The contractor's assurance system data is formally documented and available to DOE line management. Results of assurance processes are periodically analyzed, compiled and reported to DOE line management as part of formal contract performance evaluation.***

LBNL assurance results and data are provided to Lab management and the DOE Site Office in the Lab's annual ES&H Self-Assessment Report (LBID-2489). In addition, results and data related to the formal contract performance evaluation are presented quarterly in LBNL/BSO Operational Awareness meetings and tri-party (DOE, UC, LBNL) contract performance meetings.

***Criterion 5: Contractors have established and implemented sufficient processes (e.g., self assessments, corporate audits, third-party certification or external reviews, performance indicators) for measuring the effectiveness of the contractor assurance program.***

The contractor assurance program was created in 2005, and therefore, the program has not yet implemented a formal process for measuring the effectiveness of the Lab's assurance system. It should be noted that the Lab achieved a DOE certification in 2003 for its ES&H self-assessment program.

***Criterion 6: Requirements and formal processes have been established and implemented that ensure personnel responsible for managing and performing assurance activities possess appropriate experience, knowledge, skills and abilities commensurate with their responsibilities.***

As described in the position descriptions of staff in the LBNL Office of Contract Assurance, all staff possess appropriate experience, knowledge, skills, and abilities to perform their assurance activities.

## **Performance Objective F&1-2: Contractor Program Implementation**

2.1 Assessments & Performance Indicators: Contractor Line management has established a rigorous and credible assessment program that evaluates the adequacy of programs, processes, and performance on a recurring basis. Formal mechanisms and processes have been established for collecting both qualitative and quantitative information on performance and this information is effectively used as the basis for informed management decisions to improve performance.

### **Criteria**

***Criterion 1: Line management has established and implemented a rigorous assessment program for performing comprehensive evaluations of all functional areas, programs, facilities, and organizational elements, including subcontractors, with a frequency, scope and rigor based on appropriate analysis of risks. The scope and frequency of assessments are***

*defined in site plans and program documents, include assessments of processes and performance-based observation of activities and evaluation of cross-cutting issues and programs, and meet or exceed requirements of applicable DOE directives.*

LBNL has a DOE-certified ES&H self-assessment program that regularly assesses performance in all functional areas of the Lab. The self-assessment program uses performance indicators, site inspections, corrective actions, and lessons learned to meet or exceed requirements of applicable DOE directives. The self-assessment program is described in the Self-Assessment Program document (PUB-5344).

***Criterion 2: Rigorous self-assessments are identified, planned, and performed at all levels periodically to determine the effectiveness of policies, requirements and standards and the implementation status.***

Updated performance indicators for self-assessments are identified annually. Each LBNL division plans and performs its self-assessments throughout the year, with data and results compiled for the Lab's annual self-assessment report. The annual report addresses effectiveness of policies, requirements, standards, and implementation status.

***Criterion 3: Appropriate independent internal assessments are identified, planned and performed by contractor organizations or personnel having the authority and independence from line management, to support unbiased evaluations.***

The Lab's Contractor Assurance Office, EH&S Division, and Internal Audit Office perform the appropriate independent internal assessments and assure the unbiased evaluations of Lab systems, programs, and activities.

***Criterion 4: Line managers have established programs and processes to routinely identify, gather, verify, analyze, trend, disseminate, and make use of performance measures that provide contractor and DOE management with indicators of overall performance, the effectiveness of assurance system elements, and identification of specific positive or negative trends. Approved performance measures provide information that indicates how work is being performed and are clearly linked to performance objectives and expectation established by management.***

The Lab's self-assessment program provides line managers with performance measures/indicators to routinely evaluate overall performance. The performance measures and indicators are linked to specific objectives and expectations under the Lab's Integrated Safety Management (ISM). The performance measures, objectives and expectations are updated annually based feedback and improvement from the previous year

***Criterion 5: Line managers effectively utilize performance measures to demonstrate performance improvement or deterioration relative to identified goals, in allocating resources and establishing performance goals, in development of timely compensatory measures and corrective actions for adverse trends, and in sharing good practices and lessons learned.***

As part of self-assessment requirements, line managers are evaluated for meeting objectives and expectations, allocating appropriate resources, correcting deficiencies in a timely

manner, and instituting two-way communication to address issues, trends, good practices, and lessons learned

## **Performance Objective F&1-2: Contractor Program Implementation**

2.2 Operating Experience: The Contractor has developed and implemented an Operating Experience program that communicates Effective Practices and Lessons Learned during work activities, process reviews, and incident/event analyses to potential users and applied to future work activities.

### Criteria

***Criterion 1: Formal processes are in place to identify applicable lessons learned from external and internal sources and any necessary corrective and preventive actions, disseminate lessons learned to targeted audiences, and ensure that lessons learned are understood and applied.***

The Lab has a formal lessons learned program as described in its Assurance Plan. The Lab also participates in the DOE-sponsored SELLS lessons learned program and disseminates the SELLS lessons learned to targeted audiences. A process improvement team for lessons learned has formed and will soon commence activities.

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***Criterion 2: Line managers effectively identify, apply, and exchange lessons learned with the rest of the DOE complex. Lessons learned identified by other DOE organizations and external sources are reviewed and applied by line management to prevent similar incidents/events.***

See Criterion #1 above.

***Criterion 3: Formal programs and processes have been established and implemented to solicit feedback or suggestions from workers and work activities on the effectiveness of work definition, hazard analyses and controls, and implementation for all types of work activities, and to apply lessons learned.***

As part of the self-assessment requirements, each division is evaluated for its two-way communication to assure sufficient feedback from workers on their work activities. In addition, the Lab promotes its whistleblower program for workers who wish to report concerns through an independent organization and investigation.

## **Performance Objective F&1-2: Contractor Program Implementation**

2.3 Event Reporting: Contractor line management has established and implemented programs and processes to identify, investigate, report and respond to operational events and incidents and occupational injuries and illnesses.

## Criteria

***Criterion 1: Formal programs and processes have been established to identify issues and report, analyze, and address operational events, accidents, and injuries. Events, accidents, and injuries are promptly and thoroughly reported and investigated, including the identification and resolution of root causes and management and programmatic weaknesses, and distribution of lessons learned.***

Berkeley Lab has instituted a series of internal and external systems for identifying, reporting and investigating operational events, accidents and injuries: SAARs, ORPS, CAIRS and DOE-BSO notification. The Lab utilizes the DOE required ORPS reporting system to identify issues and report, analyze, and address operational events, accidents, and injuries. For all accidents and injuries, regardless of ORPS reportability, the Lab requires line managers to complete the Supervisor Accident Analysis Report (SAAR), which also addresses root causes, management and/or program weaknesses, and lessons learned.

### Occurrence Reporting (Pub 3000, Chapter 15)

- Occurrence Reporting and Processing System (ORPS) at Lawrence Berkeley National Laboratory (LBNL) notifies and keeps Laboratory management and applicable elements of the Department of Energy (DOE) informed of abnormal events that could adversely affect:
  - the health and safety of employees, guests, visitors and the general public
  - the environment.
  - the intended purpose of LBNL facilities.
  - the credibility of the DOE and/or LBNL

All LBNL divisions and departments, including subcontractors performing work at Berkeley Lab, are responsible for following ORPS procedures. Reportable occurrences require that the description, significance, causal factors, and corrective actions of the occurrence are fully documented and transmitted to the DOE ORPS Database. The LBNL ORPS procedures meet the requirements of DOE Order 231.1A, *Environment, Safety and Health Reporting*, and DOE Manual 231.1-2, *Occurrence Reporting and Processing of Operations Information*.

### Lessons Learned (Pub 3000, Chapter 14)

- The Occurrence Reporting Processing System (ORPS) implements DOE Order 232.1, *Occurrence Reporting*, which dictates that divisions analyze occurrence criteria, as developed by the Order and the LBNL document *Occurrence Reporting*, LBID-1694, to determine root causes, corrective actions, and *lessons learned*.
- The Laboratory's Operating and Assurance Program (OAP) requires that management and personnel evaluate their performance to identify, correct, and prevent problems, and to ensure achievement of performance objectives. The LBNL Self-Assessment Program implements these requirements through a formalized information-gathering process of appraisals and assessments. The self-assessment process generates *lessons learned* within each division and the Laboratory as a whole.

These lessons are reported, by division, in annual self-assessment reports to the Office of Contract Assurance.

- The Laboratory's Accident Investigation Program has been developed to identify and eliminate accident causes to prevent recurrence. Accident investigation program is a major component of LBNL's safety, health, and environment programs and its emphasis is on accident prevention by engineering safe facilities and equipment, developing sound operational procedures, and providing adequate training and protective equipment. *Lessons learned* from the accident investigation process help to define and improve these efforts. The Accident Investigation Program is written to conform with the requirements of DOE Order 225.1, Chapters 1 and 2, and LBNL's *Health and Safety Manual*, LBNL/PUB-3000.

#### Accident Investigations (PUB 3000, Chapter 5)

- Occupational Injuries and Illness Cases

Injured employees are directed to Health Services for evaluation and treatment. The An online document, Supervisor's Accident Analysis Report (SAAR), is generated and sent to the supervisor to investigate and complete within two working days. Health Services will also initiate any required reports for Workers' Compensation purposes.

- Motor Vehicle Accidents and Property Damage Incidents

Depending on the venue, Berkeley Lab Security or local police authority and LBNL motor pool handle motor vehicle accident investigation and reporting, respectively. DOE is notified on form DOE 5484.3 when motor vehicle accident damage exceeds \$1,000. Accidents that result in property damage of \$5,000 or more are reported to DOE on form DOE 5484.3.

- For major incidents, an accident investigation teams will be appointed for all incidents that are deemed of sufficient severity or potential significance to require a detailed impartial analysis. The decision for individual cases rests with the responsible division director, the EH&S Division Director, and institutional safety committees (e.g. the Radiation Safety Committee).

***Criterion 2: Contractor line management has established and implemented programs and process to identify, investigate, report, and respond to operational events and incidents and occupational injuries and illnesses.***

LBNL reporting of operational events, accidents, and injuries follows ORPS and SAAR requirements and meets all applicable DOE directives and contract terms and conditions. As required by ORPS, the Lab conducts quarterly trending analysis of its occurrences, accidents, and injuries for the previous 12 months. ?

## **Performance Objective F&1-2: Contractor Program Implementation**

2.4 Issues Management: The Contractor has developed and implemented a formal process to evaluate the quality and usefulness of feedback, and track to resolution performance and safety issues and associated corrective actions.

### Criteria

***Criterion 1: Program and performance deficiencies, regardless of their source, are captured in a system or systems that provides for effective analysis, resolution, and tracking. Issues management system elements include structured processes for determination of risk, significance, and priority of deficiencies; evaluation of scope and extent of condition; determination of reportability under applicable requirements; identification of root causes; identification and documentation of corrective actions and recurrence controls to prevent recurrence; identification of individuals/organizations responsible for corrective action implementation; establishment of milestones based on significance and risk for completion of corrective actions; tracking progress; verification of corrective action completion; and validation of corrective action implementation and effectiveness.***

The LBNL Corrective Action Tracking System (CATS) provides for effective analysis, resolution, and tracking of program and performance deficiencies. This system is described in PUB-5344 (described as LCATS, renamed CATS) and the UC/ LBNL Assurance Plan.

**Corrective Action:** Although LCATS was regularly used by all Laboratory divisions, a new version of this database (CATS) has been developed. CATS is more user friendly than LCATS, and this improvement is expected to increase recording and tracking of safety deficiencies across the Laboratory.

***Criterion 2: Issues management processes include mechanisms to promptly identify the potential impact of a deficiency and take timely actions to address conditions of immediate concern, including stopping work, system shutdown, emergency response, reporting to management, and compensatory measures pending formal documentation and resolution of the issue.***

EH&S written policies and procedures provide mechanisms for the prompt identification of impact and actions required, including stop work, system shutdown, emergency response, reporting to management, and compensatory measures.

***Criterion 3: Processes for analyzing deficiencies, individually and collectively, have been established that enable the identification of programmatic or systemic issues. Line management effectively monitors progress and optimizes the allocation of assessment resources in addressing known systemic issues.***

The Lab uses processes in ORPS, CATS, SAAR accident investigations, and self-assessments to individually and collectively analyze deficiencies to identify programmatic and systemic issues. Such issues are summarized in the LBNL annual self-assessment reports. CATS supports line management in monitoring the resolution of issues.

***Criterion 4: Processes for communicating issues up the management chain to senior management have been established and based on a graded approach that considers hazards and risks. Line management receives periodic information on the status of identified deficiencies and corrective actions and holds organizations and individuals accountable for timely and effective completion of actions. Line management has executed graded mechanisms such as independent verification and performance-based evaluation to ensure that corrective action and recurrence controls are timely, complete, and effective. Closure of corrective actions and deficiencies are based on objective, technically sound, and verified evidence. The effectiveness of corrective actions is determined on a graded basis and additional actions are completed as necessary.***

Issue communication to senior management is accomplished quarterly in reports and presentations to the UC Contract Assurance Council. This body is described in the UC/LBNL Assurance Plan. The annual ES&H self-assessment report also summarizes the past year's issues and resolutions. Line management uses CATS to monitor progress of corrective actions, including responsibility, actions required, schedules, and closeout of corrective actions that prevent recurrence.

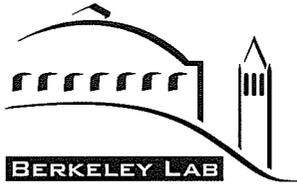
***Criterion 5: Results of various feedback systems are integrated and collectively analyzed to identify repeat occurrences, generic issues, trends, and vulnerabilities at a lower level before significant problems result.***

The LBNL Contractor Assurance Office uses feedback from its lessons learned program, ORPS quarterly analysis, and self-assessment program to integrate and collectively analyze occurrences, issues, trends and vulnerabilities to prevent more significant events from occurring.

***Criterion 6: Individuals or teams responsible for corrective action development are trained in analysis techniques to evaluate significant problems using a structured methodology to identify root and contributing causes and corrective actions to prevent recurrence.***

Personnel from the LBNL Contractor Assurance Office are trained in analysis techniques to evaluate issues, including causal analysis and corrective action development. At a lower scope level, division safety coordinators are trained to conduct self-assessments and to use CATS.

**Corrective Action:** In an effort to expand root cause analysis expertise across the Laboratory, LBNL has initiated a program for 90% of all division safety coordinators and EH&S Division liaisons to receive formal root cause analysis training by September 30, 2006.



**UC**

**Assurance Plan**

**For**

**Lawrence Berkeley National Laboratory**

**October 2005**

## REVIEW AND APPROVAL

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The University of California Contract Assurance Council and Lawrence Berkeley National Laboratory Office of Institutional Assurance approve the UC Assurance Plan.

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James Hirahara

Executive Director, Business and Finance  
University of California Laboratory Operations

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James Krupnick

Director, Institutional Assurance  
Lawrence Berkeley National Lab

## STATEMENT OF LABORATORY POLICY

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It is the policy of the Ernest Orlando Lawrence Berkeley National Laboratory (LBNL) to carry out all our activities in a reliable, safe, and quality manner while assuring that contractual commitments are met. The Assurance Plan provides the framework for a results-oriented management system that focuses on performing work safely and meeting mission and customer expectations efficiently through continuous process improvement. Line management is responsible to set and execute annual performance objectives that will achieve the goals and expectations of the Assurance Plan. In addition, every LBNL employee is individually responsible for the quality and safety of his or her work.

Our policy is to implement the Assurance Plan in a way that enables compliance with DOE contract requirements and other customer agreements, that ensures our continued scientific research and programmatic success, and that is resource-efficient. The Assurance Plan is integral to keeping the Laboratory on course in achieving its mission and eliminating non-conformances and unacceptable risks. Our program emphasizes three principles:

- The most essential resources at LBNL are the creative scientists, engineers, and support personnel.
- People who perform the work have the greatest effect on outcome and process quality.
- Problem prevention is more cost-effective than problem correction.

Accordingly, our program establishes a management system that (1) recognizes that managing a laboratory that supports research is different from managing the research itself and (2) provides a process for continuous improvement in our performance in both aspects of Laboratory management.

Director  
Ernest Orlando Lawrence  
Berkeley National Laboratory

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## OBJECTIVES AND APPLICABILITY

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The University of California (UC) Assurance Plan is a set of operating systems used to assure that LBNL organizations achieve reliable and safe performance in their work activities, in compliance with regulatory and contractual requirements. The Assurance Plan is the program document of the Office of Institutional Assurance. LBNL's assurance that the public, workers, the environment, and national assets are adequately protected and that business operations are performed effectively will be based on the effective use of assessment, performance metrics, and corrective action management described in the Assurance Plan. Through these tools, LBNL will meet requirements effectively and efficiently, identify and resolve problems and performance trends before they become significant issues, integrate and align work based on risk and performance, and eliminate duplications. The success of the Assurance Program will be directly reflected in LBNL's ability to self-identify and correct Lab problems and issues.

The Assurance Plan is designed to fulfill four main objectives:

- Describe the process for assuring acceptable performance of LBNL Operations and Financial Management divisions, departments, and programs to Lab management and the University of California Office of the President (UCOP).
- Detail the reporting relationship between LBNL and UCOP, as implemented by the Office of Institutional Assurance and the LBNL Contract Assurance Council.
- Describe the methodology to promote continuous improvement of LBNL operating and infrastructure programs and systems.
- Conform to the requirements of the DOE- UC contract for management of LBNL (No. DE-AC02-05CH11231) and DOE Order 226.1, *Implementation of Department of Energy Oversight Policy*.

The Assurance Plan applies to all LBNL Operations, Business, and Financial Management programs and systems as implemented in all Laboratory organizations, including Science divisions. For example, the Assurance Program includes monitoring and evaluation of financial, ES&H, and property management activities implemented in Science divisions as well as in Operations divisions.

The Assurance Plan implements a charter for the LBNL Contract Assurance Council. UCOP established this committee to assure that LBNL fulfills all requirement of the DOE-UC contract for management of LBNL (No. DE-AC02-05CH11231).

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## Assurance Program

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The LBNL Assurance Program provides for the effective oversight of the Lab's management systems and operating processes to ensure that compliance, operational support for science, best management practices, and continuous improvement are achieved. Such assurance gives confidence to senior Laboratory management, the Department of Energy (DOE) and the LBNL Contract Assurance Council that the expectations and strategic goals of the DOE- UC contact for management of LBNL (No. DE-AC02-05CH11231) are met. The Assurance Program is implemented by the Office of Contract Assurance (OCA). This office:

- 1) Provides a structure for oversight and assurance activities.
- 2) Implements and maintains an institutional performance assurance program. This program is composed of the following elements:
  - a. Performance metrics. Establish and maintain metrics to monitor DOE contract performance evaluation measures, as well as Laboratory and Division-specific performance of vital operations. Metrics will be linked to the DOE mission and used to monitor internal controls, trends, and progress in fulfilling Laboratory mission.
  - b. Assessments and Reviews. Develop comprehensive assessment programs for Laboratory operations; including self-assessments, peer reviews, and technical reviews. Manage self-assessments, including: developing performance metrics and review protocols with appropriate organization and program management, maintaining the assessment process, and reviewing and validating performance results.
  - c. Corrective actions. Establish a corrective action management program for all Laboratory operations that allows for tracking and managing corrective actions that result from assessment findings. These data will be entered into a single Corrective Action Tracking System (CATS) in order to ensure documentation and validation that corrective actions are both properly implemented and effective.
  - d. Continuous improvement and lessons learned. Develop and maintain a Laboratory-wide lessons-learned program to provide a systemic approach towards continuous improvement. Evaluate lessons learned and distribute them to appropriate parties, including Divisions, the Laboratory, and the DOE complex. Ensure lessons learned are integrated into work practices.
- 3) Serves as the Independent Point of Contact for evaluating Price-Anderson Amendments Act issues and deficiencies, including tracking these issues to resolution.
- 4) Investigates incidents of significant concern to Laboratory management. Performs root cause analysis of these incidents and reports results to Laboratory and Division management.
- 5) Manages the DOE Occurrence Reporting and Processing System (ORPS), including assisting in investigations, causal analysis, and report writing, as appropriate.

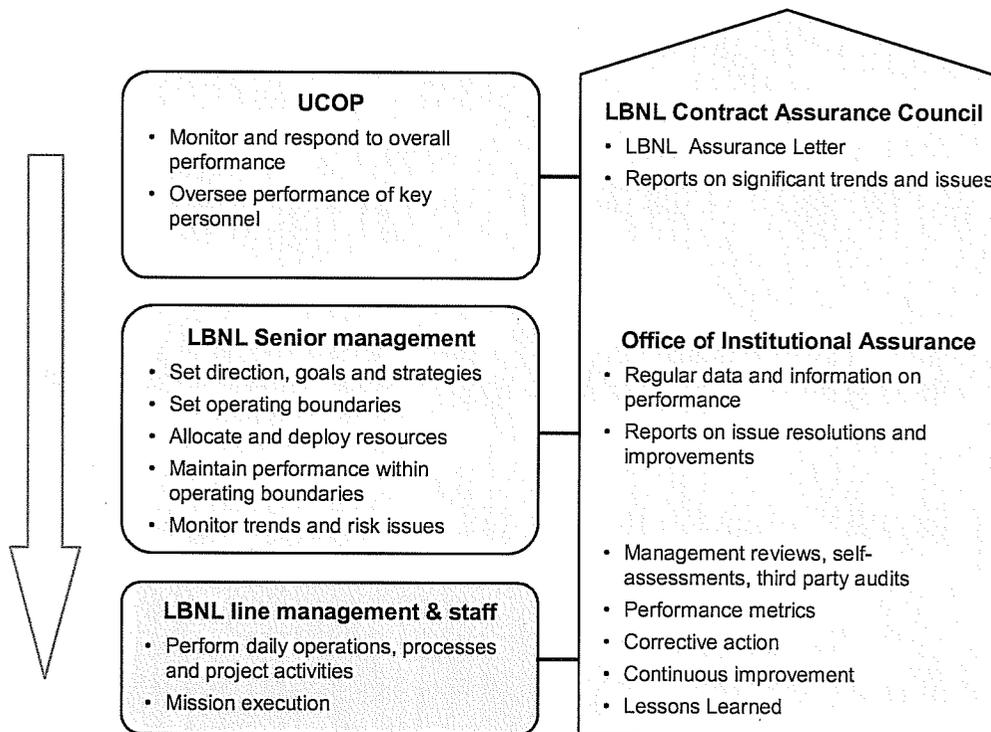
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- 6) Regularly reports to Laboratory management, LBNL Contract Assurance Council, and DOE the status, trends, and issues arising from oversight and assurance activities.
  - 7) In conjunction with DOE, UCOP, and Lab Directorate, coordinate review and implementation of emerging DOE rules, orders, directives, and similar policy documents. Interact with DOE, LBNL, and UCOP staff on applicability of DOE policy and rules to the Laboratory.

The Office of Contract Assurance is an internal assurance organization, reporting to the Office of Institutional Assurance and authorized to have unrestricted access to personnel, records, and other information sources necessary to carry out its duties. At the direction of the Laboratory Directorate, the Office of Contract Assurance coordinates independent third party reviews in areas of business, finance, operations, ES&H, and other selected areas. The Office provides information and support to the LBNL Contract Assurance Council established by the University of California Office of the President.

ORGANIZATION AND GOVERNANCE

1.1 Corporate Organization

UCOP, LBNL senior management, and LBNL line management and staff manage LBNL operations, processes, and project activities to achieve the Laboratory’s goals and mission. The University of California creates the framework for LBNL senior management to deploy resources effectively so that LBNL managers and staff can execute performance successfully. Using information provided from LBNL senior management and LBNL line managers and staff, the Office of Institutional Assurance provides assurance to UCOP, LBNL management, and DOE that the management systems and process controls are effective and efficient.



**Figure 1:** Integration of Assurance with UCOP, LBNL Management and LBNL line management and staff

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- **UCOP** oversees LBNL operations in a responsive, anticipatory, proactive, mission enabling, and cost effective manner that is valued by the DOE Office of Science. The UC oversight organization for LBNL spans all corporate levels of the University including the Regents, the UC President and Vice Presidents, and the Laboratory Director. The oversight function is performed by the LBNL Contract Assurance Council.

- **LBNL Contract Assurance Council**

The Lawrence Berkeley National Laboratory (LBNL) Contract Assurance Council advises the Vice President for Laboratory Management (VPLM) on Laboratory issues needing management attention. It reports through the VPLM to the UC President. The Council acts within the chain of line management as the means by which the VPLM ensures and coordinates the application of University resources and actions required for full compliance with all aspects of the LBNL contract. The Council leverages expertise in the functional organizations of the UC Office of the President to support the effective and efficient operation of the Laboratory.

The Council has responsibilities to determine:

- Adequacy of Laboratory policies, systems, procedures, and practices to protect DOE and UC assets
- Adequacy of performance measures and metrics
- Efficiency and effectiveness of systems
- Progress of management initiatives and improvements proposed by UC
- Areas that will require third-party assessments
- Resources required from UC to assist the Laboratory in meeting their mission and requirements.

The LBNL Contract Assurance Council will have transparent access to all relevant management information through the Laboratory's Balanced Scorecard, the Berkeley Laboratory Information System, and CATS.

The Council includes an appropriate mix of senior UC officers and external members who are appointed by the VPLM, who serves as the Council Chair, with the concurrence of the UC President. The UC Office of the President members are the Senior Vice President for Business and Finance; the Senior Vice President for University Affairs; the General Counsel/Vice President for Legal Affairs; the Vice Provost for Research; the UC Auditor; the Chair of the UC Academic Council; the Associate Vice President for Laboratory Operations; the Associate Vice President for Laboratory Programs; the Associate Vice President for Human Resources and Benefits; and the Deputy Associate Vice President for Laboratory Operations. The UC Council members have oversight and interface responsibilities for their laboratory counterparts.

The Council also includes four distinguished external members who provide additional perspective in assuring the administrative, operational, and programmatic performance of the Laboratory. The external members include scientists of national stature in areas germane to LBNL research, and operational experts in areas critical to the Laboratory.

The terms of the external members are three years, renewable, staggered so that approximately one-third of the external members rotate off each year. Except for the first term, which begins in 2005, terms begin January 1 and run through December.

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The Council will meet monthly to review and discuss management and status reports, and will receive a quarterly assurance briefing addressing areas of the Council's responsibilities. The Executive Director for Business and Finance in the Office of Laboratory Management will provide staff support for Council meetings and interface with the LBNL Office of Institutional Assurance to ensure timeliness and adequacy of reporting.

- **LBNL senior management** sets the strategic direction, deploys resources, and maintains performance within approved operating boundaries. In fulfilling its duties, LBNL Management has the responsibility of mission accomplishment, program development, Laboratory stewardship and operational excellence. Its primary functions include:
  - Establish detailed strategies and implementation plans required to achieve DOE and UCOP performance expectations and to guide the work of the Laboratory.
  - Develop and implement management systems and process controls capable of assuring operation within acceptable risks.
  - Take appropriate actions to improve Laboratory performance based on self-assessment results and feedback received from the LBNL Contract Assurance Council.
- **LBNL line management and staff** conduct the daily work, processes, and activities of the Laboratory using management systems and process controls to achieve the objectives set by LBNL Management. LBNL organizations must:
  - Describe their organizational structure, functional responsibilities, levels of authority, and interfaces.
  - Plan for their functions and activities to deliver safe, reliable, and quality products and services.
  - Hire and retain staff proficient to perform their functions and activities.

Line managers and staff regularly evaluate performance with assessment tools developed by both line organizations and the Office of Institutional Assurance. These self-assessments are conducted to assure that performance is maintained within the operating boundaries set by LBNL management. Significant findings, including performance data outside of operating boundaries and other results from assessments, are reported to LBNL Management and the Office of Institutional Assurance and tracked for corrective actions.

- **The Office of Institutional Assurance (OIA)** assesses the effectiveness of management systems and process controls using a variety of assessment processes and tools. These include self-assessments, peer reviews, internal audits, external reviews, and oversight studies. OIA evaluates performance trends, monitors improvements, and reports risk issues to LBNL management and UCOP. A single Lab-wide database system tracks non-conformances (CATS) and provides exception reports to LBNL management when corrective actions are not completed in a timely manner. The Office of Institutional Assurance works with managers, supervisors and staff to establish performance metrics, develop assessment protocols, implement corrective actions and improvements, and disseminate lessons learned. OIA has the added responsibility of providing the LBNL

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Management and UCOP with the objective evidence of significant risk issues and verification of the process improvements.

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## SECTION 2

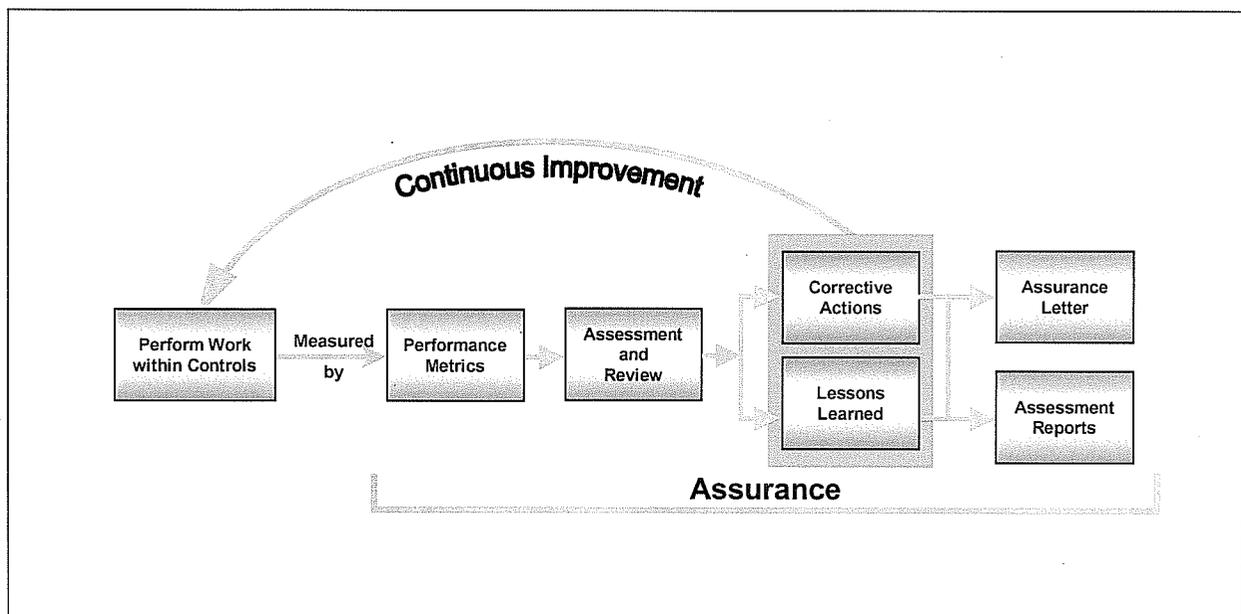
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## ASSURANCE PROCESS

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### 2.1 Assurance Process

Assurance activities confirm conformance to operating boundaries, and if short of that, to identify any unacceptable risks that are outside the boundaries and to institute the measures necessary to re-establish conformance. The strategic output is to provide UCOP and LBNL management with regular data and information on performance trends and significant or emerging risks. The assurance process flow is as follows:



**Figure 2:** Assurance Process Flow

Lab organizations must regularly evaluate and improve the performance of their units. The Assurance Program provides the processes and tools to regularly monitor performance for conformance with approved operating boundaries. OIA not only identifies unacceptable risks but also strives for lab-wide operational and financial excellence through continuous improvement. LBNL organizations implement the assurance process by:

- Conducting self-assessments
- Conducting management assessments

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- Conducting independent assessments
  - Correcting deficiencies and improving processes, products, and services.

The Office of Institutional Assurance will use assurance process results to verify that:

- Laboratory policies, procedures, and practices are adequate to protect DOE and UC assets.
- Laboratory management systems and process controls are working as intended with regard to managing the Laboratory's risk while accomplishing its mission.

Data and information on the status, progress, and resolution of performance issues are readily available through web-based reports and printed materials to all interested parties in UCOP, LBNL senior management, and LBNL line management and staff.

## **2.2 Performance Metrics**

Performance metrics are a vital tool in quantifying performance and provide a basis for many LBNL assessment processes. Performance metrics serve as organizational benchmarks and effectively and efficiently communicate Laboratory organizations' progress in meeting mission requirements and standards to DOE, UCOP, and Laboratory management. When feasible, the LBNL assurance process aligns these metrics to avoid redundant efforts in satisfying the various assessment processes. LBNL uses both leading measures with predictive qualities to drive future performance and lagging measures to assess past performance.

### **2.2.1 Office of Science Performance Appraisal**

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LBNL works with DOE and UCOP to plan, coordinate and oversee the DOE Office of Science laboratory appraisal process. Contract performance metrics are used to monitor and evaluate LBNL work performance against established annual goals and DOE requirements. The Office of Institutional Assurance assists in creating these performance measures and monitoring performance. OIA manages scheduling, data gathering, reporting, and analysis. Internal Audit validates the results of the appraisal reports prepared by each functional area.

### **2.2.2 Operations and Financial Management Balanced Scorecard**

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The Operations and Financial Management Balanced Scorecard is a set of quantifiable measures chosen to execute strategic objectives and bring focus and alignment to the organization. The measures are designed by functional area managers in collaboration with OIA. These measures are a tool to gauge progress towards strategic goals and communicate to employees, UCOP, and DOE the outcome and performance drivers for achieving Laboratory mission.

The Balanced Scorecard measures link Financial, Customer, Internal Processes, and Learning and Growth perspectives to mission success.

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### 2.2.3 ES&H Division Self-Assessment Performance

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ES&H Division Self-Assessment performance metrics are developed to demonstrate each Laboratory division's effectiveness in implementing, maintaining, and improving Integrated Safety Management (ISM) in their operations and activities. The metrics are based on the five core functions and seven guiding principles of ISM. These metrics are developed annually to promote improvement, respond to deficiencies noted in previous ES&H assessments, and respond to DOE and Laboratory management concerns.

## 2.3 Assessment

Assessments are the primary mechanism for assuring that LBNL organizations and activities function within acceptable operating boundaries, progress toward strategic goals, and satisfy Laboratory mission needs. Three forms of assessment are performed at LBNL:

- Self-assessments conducted by senior managers, line managers, and staff
- Internal reviews performed by LBNL organizations independent of the assessed programs
- External reviews performed by parties independent of LBNL.

These assessments incorporate differing areas of focus and multiple perspectives to produce complementary forms of assurance to Lab management and UCOP.

### 2.3.1 Self-Assessment

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Self-assessments are internal assessments of the LBNL functions performed by functional managers, line managers, and staff. The Office of Institutional Assurance will work with each program to:

- Develop performance criteria
- Implement assessment protocol that will assess performance in operating within operating boundaries, fulfilling LBNL management goals, and meeting contractual obligations
- Review and validate an annual self-assessment report
- Prepare an annual report summarizing the results of the self-assessment process

LBNL functional managers must regularly assess the performance of their organizations and functions to determine how well objectives and goals are met. Assessments by line managers focus on identifying and resolving both singular and systematic management issues and problems that may hinder the organization in achieving its scientific and operational objectives. Performance metrics may serve as the basis for self-assessment activities. Management should also consider any previous findings from external audits, internal reviews, and regulatory inspections when performing assessments. Managers should assess their processes for the following:

- Planning

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- Organizational interfaces (internal and external to the organization)
  - Integration of management systems (e.g., safety, security, quality, project)
  - Organizational effectiveness
  - Use of performance metrics
  - Training and qualifications
  - Corrective action management (tracking, implementation, effectiveness)
  - Supervisory oversight and support

The management assessments should include an internal evaluation of such conditions as the state of employee knowledge, motivation, and morale; communication among workers; the existence of an atmosphere of creativity and improvement; and the adequacy of human and material resources. The assessments should also involve direct observation of work so that the manager is aware of the interactions at a work location. The observations can be supplemented with worker and customer interviews, safety and performance documentation reviews, and drills or exercises.

The results of management assessments must be documented and used for continuous improvement. Assessment reports should evaluate performance against appropriate performance measures, opportunities for improvement, and noteworthy practices. Supporting documentation can include minutes of staff and operations meetings, progress reports, job expectation evaluations, inspection reports, and self-assessment reports.

### **2.3.2 Internal Review**

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Internal reviews assess operational effectiveness and programmatic adherence to missions, goals, and objectives. Internal reviews are independent assessments performed by technically and programmatically knowledgeable personnel within LBNL who are free of direct responsibility in the areas they assess.

LBNL organizations that routinely conduct internal reviews include the Office of Institutional Assurance; the Environment, Health and Safety Division; Internal Audit Services; and the Safety Review Committee. Each assessment organization has established protocols for conducting assessments and providing feedback to the assessed organizations. The type and frequency of independent assessments are based on the status, complexity, risk, and importance of the activities or processes being assessed.

Examples of independent assessments include:

- Evaluating work performance and process effectiveness
- Evaluating compliance to the management system requirements (e.g. regulatory requirements and program document standards)
- Validating performance in the Office of Science Performance Appraisal
- Identifying abnormal performance and potential problems
- Identifying noteworthy practices and opportunities for improvement
- Documenting and reporting results
- Verifying satisfactory resolutions of reported problems

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Results of independent assessments provide an objective form of feedback to Lab management that is useful in confirming acceptable performance and identifying improvement opportunities. The results must be documented in an assessment report.

### **2.3.3 External Review**

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External reviews are assessments performed by parties independent of LBNL. These reviews may be performed by regulatory agencies, DOE representatives, peers within the DOE complex, and experts from private industry. These reviews are initiated primarily by regulatory requirements, LBNL management concerns, and DOE operations and procedures.

Reviews may be initiated by external regulatory agencies intent on ensuring that LBNL operations are compliant with federal, state, and local regulations. DOE headquarters and Berkeley Site Office representatives may also perform reviews to evaluate operations and assess implementation of applicable DOE orders and directives.

Peer reviews, another form of external assessment, may assure the quality of research, operations, and project management. These reviews are performed by peers from other DOE complex sites, universities, and private industry. Peer reviews are often used to assess operational effectiveness, programmatic adherence to missions, goals, and objectives; and regulatory compliance.

The assessed organization is responsible for responding to external review findings. This includes tracking deficiencies, implementing corrective actions, and communicating opportunities for improvement and noteworthy practices as appropriate. The Office of Institutional Assurance will coordinate this process.

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## **2.4 Assurance Product**

### **2.4.1 Assurance Reports**

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- **Contract Assurance Council Reports**

The Office of Institutional Assurance (OIA) will prepare reports for the LBNL Contract Assurance Council. The Council will hold regular meetings or conference calls to discuss information provided by the Office of Institutional Assurance. At least quarterly, the Council will meet at a University-designated location for more comprehensive discussion of Laboratory assurance.

OIA reports will detail:

- Status and development of the assurance process
- Significant issues detected through the assurance process
- Events and conditions that result in reports to external agencies, including PAAA and ORPS reports
- Significant lesson learned resulting from deficiencies and noteworthy practices

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- Corrective action status of findings from external assessments and significant findings from self-assessments
  - Status of management initiatives proposed by the University
  - Annual Assessment Reports

- **Annual Assessment Reports**

The Office of Institutional Assurance will prepare annual Self-Assessment reports summarizing the results of functional self-assessments. Each report will assess the program's performance in operating within appropriate operating boundaries, fulfilling LBNL management priorities, and meeting contractual obligations. The reports will summarize results of the various assessments during the performance year, including self-assessment and any internal and external assessment. Each report will describe findings and noteworthy practices of the assessed program and propose opportunities for improvement.

The annual assessment reports will be prepared for Laboratory management, the assessed programs, and the LBNL Contract Assurance Council.

#### **2.4.2 Assurance Letter**

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The compilation of performance data and information forms the basis for the submission of the annual *LBNL Assurance Letter*. OIA will prepare this letter for the LBNL Contract Assurance Council. Following Council review, the Vice President for Laboratory Administration will sign the letter for submission to the Department of Energy.

The *Assurance Letter* provides written assurance to the Lab's governing and management bodies that:

- The Laboratory's strategic objectives and implementation plans are executed within defined operating boundaries and in a manner that produces the desired results for mission accomplishment, program development, Laboratory stewardship, and operational and financial management excellence.
- The Laboratory's management systems and process controls, including the assurance process itself, are working as intended to protect DOE and UC assets. Periodic reviews (including those performed by Internal Audit Services) of Laboratory management systems and controls are performed to provide reasonable assurance that the systems and controls are meeting objectives and operating effectively.
- Appropriate actions are taken to address risk issues and adverse trends.
- Laboratory operations adequately provide for the safety and security of staff, the public, and the environment.
- Management systems and process controls employed by LBNL are documented and satisfactory to DOE.

CONTINUOUS IMPROVEMENT

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### 3.1 Continuous Improvement

Continuous improvement is a combination of systems improvement and corrective actions that (1) uses feedback information to improve processes, products, and services; (2) prevents or minimizes operational problems (i.e. contractual, legal, financial, and ES&H deficiencies); and (3) when discovered, corrects any problems that occur.

Continuous improvement involves:

- Reviewing information and data on processes, products, or services to identify adverse conditions
- Analyzing the adverse conditions and determining the causes
- Segregating the processes, products, or services if the adverse conditions may lead to significant consequences
- Developing alternative approaches for addressing the adverse conditions and preventing recurrence
- Implementing approved solutions
- Evaluating the improvements or corrections
- Providing lessons learned to other organizations

This process should be part of the normal operation of all LBNL working groups and should be documented in the normal operational records and reports (e.g., meeting minutes, progress and activity reports, readiness reviews, and assessment and inspection reports). Significant deficiencies may require separate reports that detail root causes and measures implemented to prevent recurrence.

#### 3.1.1 Corrective Action

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Identified concerns and deficiencies should be addressed in a timely manner, as appropriate for each finding's significance. Each division is responsible for tracking corrective actions resulting from internal and external assessments. These findings are tracked in CATS. However, findings resolved at the time of discovery do not require tracking in CATS.

A corrective action plan is often necessary for findings that require multiple corrective actions implemented over a significant time period. A corrective action plan must be prepared by the responsible manager to allow for additional planning and scheduling. The corrective action plan may require senior Lab management review and approval to address risk management, funding, and resource allocation issues. Once approved by the

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appropriate Laboratory authority, the corrective actions are tracked in CATS until completion and management verification.

The Office of Institutional Assurance validates that corrective actions are implemented to effectively resolve findings. OIA also provides regular status reports on the corrective actions to advise the LBNL Contract Assurance Council and Laboratory management on progress and completion. Periodically, OIA performs trending and root cause analysis of CATS entries to prevent recurrence of concerns and deficiencies.

### 3.1.2 Lessons Learned

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The LBNL Lessons Learned Program helps the Laboratory community learn from our mistakes (and the mistakes of others) so that they are not repeated. The Office of Institutional Assurance, in consultation with various sources (e.g. the EH&S Division), identifies adverse events and conditions that may have broad applicability to the Lab community. In an effort to prevent recurrence, these events, along with the causes and corrective actions, are communicated to appropriate Laboratory staff and integrated into Laboratory procedures and operations. The ultimate goal of the Lessons Learned Program is to continually improve our performance across all Laboratory functions.

We use several different sources of information for our Lessons Learned Program. These include:

- Accidents and near misses that occur at the Laboratory. The EH&S Division has prepared several [Lessons Learned Summaries](#) based on events that have taken place at the Laboratory.
- [The DOE Lessons Learned Information Services Home Page](#). This provides a link to a [keyword searchable compilation of lessons learned summaries](#) of events that have occurred throughout the DOE complex. It also provides [links to other useful lessons learned databases and information](#)
- [The DOE Lessons Learned List Server](#). This is a subscription-based e-mail service available to all LBNL staff. Lessons learned statements are distributed via email.
- Adverse conditions and noteworthy practices identified through the Assurance Program.

Lessons learned are communicated in multiple ways, depending on the significance and applicability of each event. Possible methods of communication include:

- Submittal to the DOE Lessons Learned List Server
- One-page description of an event or condition, root causes, and corrective actions distributed electronically and in hard copy format to appropriate staff. These lessons learned are posted on the LBNL Lessons Learned web page.
- A brief paragraph in Today At Berkeley Lab that warns of an adverse condition in order to increase awareness.
- Division-specific email that provides a heads-up to staff on a potential deficiency.

Lessons learned are disseminated through various sources, including the Office of Institutional Assurance, the EH&S Division, and Division and program management.

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The Office of Institutional Assurance will monitor and record communication of lessons learned.