Department of Energy
Washington, DC 20585

JUN 25 2009

MEMORANDUM FOR WILLIAM A. ECKROADE
DIRECTOR
OFFICE OF INDEPENDENT OVERSIGHT
OFFICE OF HEALTH, SAFETY AND SECURITY

FROM: GEORGE J. MALOSH
DEPUTY DIRECTOR FOR FIELD OPERATIONS
OFFICE OF SCIENCE

SUBJECT: Response to the "Independent Oversight Inspections of Environment, Safety and Health Programs at the Lawrence Berkeley National Laboratory, June 2009"

I have approved the attached Corrective Action Plan (CAP) in response to the subject report from your office. This CAP includes corrective actions for the Lawrence Berkeley National Laboratory (LBNL). It should be noted that LBNL self identified two findings that are documented in this CAP but will be tracked separately from the Corrective Action Tracking System.

If you have any questions or require further assistance in this matter, please contact Marcus E. Jones at (301) 903-4097 or Scott L. Davis at (301) 903-9869.

Attachment

cc: w/attachment
G. Podonsky, HS-1
M. Jones, SC-31
B. Freeman, HS-64
T. Staker, HS-64
A. Richards, BSO
M. Gross, BSO

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Department of Energy
Office of Science
Berkeley Site Office
Lawrence Berkeley National Laboratory
1 Cyclotron Road, MS 90-1023
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JUN 11 2009

MEMORANDUM FOR: GEORGE MALOSH
DEPUTY DIRECTOR FOR FIELD OPERATIONS
OFFICE OF SCIENCE

FROM: AUNDRA RICHARDS
SITE OFFICE MANAGER
BERKELEY SITE OFFICE

SUBJECT: Lawrence Berkeley National Laboratory (LBNL) Corrective Action Plan (CAP) for Independent Oversight Inspection of Environment, Safety, and Health Programs Assessment

Enclosed please find, for your review and approval, the Corrective Action Plan (CAP) prepared by the Lawrence Berkeley National Laboratory (LBNL) in response to the DOE report *Independent Oversight Inspection of Environment, Safety, and Health Programs at the Lawrence Berkeley National Laboratory*, April 2009. This report resulted from the DOE Office of Health, Safety, and Security (HSS) Independent Oversight Inspection conducted at LBNL during January through February 2009. The CAP describes the specific actions that LBNL is taking to correct the findings from the review, while ultimately improving its environment, safety, and health programs. The Berkeley Site Office (BSO) concurs with this plan.

The HSS review impacted positively upon the LBNL; not only did it strengthen the lab's current safety culture, but it also increased safety awareness across the entire facility. The inspection was viewed by LBNL staff as an opportunity to utilize external expertise to identify improvements by which LBNL could improve and sustain a robust Integrated Safety Management program.

The HSS inspection also included a review of the Berkeley Site Office. HSS rated BSO oversight as "effective performance." BSO oversight processes are in good working order; no findings were identified. However, continued review and improvement of BSO oversight measures are particularly important as they provide the greatest potential for return by improving LBNL's ability to self-identify and correct deficient conditions.

BSO and LBNL mutually embrace a system of self-assessment and continuous improvement in which the parties constructively raise issues, identify shortcomings and develop efficient and effective solutions to problems that affect performance and contract compliance. We will partner together in the monitoring of the progress of the HSS CAP by regularly reviewing the status of clearly established deliverables, verifying action completion, conducting effectiveness reviews, and handling any issues that hinder successful and timely completion of the CAP. This approach, supported by the University of California, ultimately will lead to the successful development and implementation of a comprehensive system approach to the oversight of safety at the LBNL.

Enclosure:
LBNL CAP for Independent Oversight Inspection of Environment, Safety, and Health Programs Assessment

cc w/attachment:
Mark Jones, SC
Scott Davis, SC
Tom Staker, HSS
Larry Kelly, ORO
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cc w/o attachment:
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BERKELEY LAB
LAWRENCE BERKELEY NATIONAL LABORATORY

Corrective Action Plan to the Independent Oversight Inspection of Environment, Safety and Health Programs at the Lawrence Berkeley National Laboratory

JULY 2009
Revision 1

U.S. DEPARTMENT OF
ENERGY

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Lawrence Berkeley National Laboratory

Corrective Action Plan to the Independent Oversight Inspection of Environment, Safety and Health Programs at the Lawrence Berkeley National Laboratory

June 9, 2009

Revision 0

Submitted by: _____

Jim Krupnick
Chief Operating Officer/Associate Laboratory Director for Operations,
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Submitted by: _____

Jay Keasling
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Submitted by: _____

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George Malosh
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Change Log

Revision No.	Date	Reason
0	June 9, 2009	Original document.
1	July 9, 2009	1. Page 29, C1-8, date action will be completed needs to be changed from December 31, 2009 to February 28, 2010 2. Page 47, D1-6, date action will be completed needs to be changed from November 1, 2009 to February 1, 2010 3. Page 47, D1-6, change the first line from "Develop plan to communicate action D1-3" to "Develop plan to communicate action D1-2" 4. Page 13, Table 1-3, completion date for D1-6 needs to be changed from 11/1/09 to 2/1/2010 5. Cover, indicate that as a result of these changes the Revision number changes from 0 to 1 6. Cover, change document date from "June 2009" to "July 2009" 7. Adjust the completion date for C1-7 to February 28, 2010

Table of Contents

GLOSSARY

AHD	Activity Hazard Document
BSO	DOE Berkeley Site Office
CAC	University of California Contract Assurance Council
CAP	Corrective Action Plan
CATS	Corrective Action Tracking System (DOE and LBNL systems)
CHSP	Chemical Hygiene and Safety Plan
CMS	Chemical Management System
COO	LBNL Chief Operating Officer
DCOO	LBNL Deputy Chief Operating Officer
DDM	Division Directors Meeting
DOE	Department of Energy
DSC	Division Safety Coordinators
EA	Exposure Assessment
EEWP	Energized Electrical Work Permit
EHSD	Environment, Health & Safety Division (of LBNL)
ES&H	Environment, Safety and Health
FA	Facilities Division (of LBNL)
HP	Health Physicist
HSS	DOE Office of Health, Safety, and Security
IMP	Issues Management Program
ISM	Integrated Safety Management
IT	Information Technology
JHA	Job Hazards Analysis
LBNL	Lawrence Berkeley National Laboratory
LMO	UCOP Laboratory Management Office
LOTO	lockout/tagout
LSAC	Laboratory Support Advisory Council
OCA	Office of Contract Assurance
OFI	Opportunities for Improvement
OIIRR	Occupational Injury and Illness Recordkeeping and Reporting
PUB-3000	LBNL Health and Safety Manual
RCT	Radiological Control Technician
RMA	Radioactive Material Area
RPG	Radiation Protection Group
RWA	Radiological Work Authorization
RWP	Radiological Work Permit
SAC	Safety Advisory Committee
SME	subject matter expert
SRC	Safety Review Committee
TAAP	Technical Assurance Assessment Plan
TAP	Technical Assurance Program
THA	Task Hazard Analysis
UC	University of California
UCOP	University of California Office of the President

Section 1.0

HSS CAP Summary and Introduction

1.1 Introduction

This Corrective Action Plan (CAP) has been prepared by Lawrence Berkeley National Laboratory (LBNL or Laboratory) and is submitted to the U.S. Department of Energy (DOE) for approval in response to the DOE report *Independent Oversight Inspection of Environment, Safety, and Health Programs at the Lawrence Berkeley National Laboratory*, April 2009 (Inspection Report), resulting from the DOE Office of Health, Safety and Security (HSS) Independent Oversight Inspection conducted at LBNL during January through February 2009. As detailed in the Inspection Report, HSS identified four strengths in the Laboratory's Environment, Safety and Health (ES&H) programs, along with three weakness, 10 findings, and multiple opportunities for improvement. In addition to the 10 HSS findings, LBNL self-identified two findings that are documented in this CAP. The Laboratory is integrating these actions with other ES&H-related Corrective Action Plans developed over the past year as an integrated set of activities to continue to improve its Integrated Safety Management (ISM) system to enhance its safety culture and reduce the risk of accidents and injuries.

The CAP describes the specific actions that LBNL is taking to correct the findings, improve its ES&H programs, and meet its management commitments to DOE. Immediate/compensatory actions have already been initiated, as reported herein, to remedy weaknesses. Monthly reporting of progress will be provided to the DOE Berkeley Site Office (BSO) and University of California Office of the President (UCOP).

1.2 Background

In 2006, the University of California (UC) and LBNL Senior Management made a strategic decision to further improve ISM implementation at the Laboratory. The first step in implementing this initiative was a critical examination of the then-existing ISM program, along with associated development of specific actions and recommendations for improvement. Specifically, in 2006, UC and LBNL (1) commissioned an ISM Peer Review, (2) hosted a DOE Independent Validation of the Corrective Action Plan arising out of the ISM Peer Review, and (3) subsequently engaged McCallum-Turner, Inc. to lead an ISM self-assessment of LBNL that incorporated team members from a cross-section of science laboratories across the DOE complex.

Based on findings and recommendations from these reviews, LBNL developed an integrated ISM CAP which formed a blueprint for ISM improvement. Augmented by enhancements that were implemented in response to events in 2007, this CAP has provided the overall plan by which LBNL has managed and driven ISM improvements since the CAP's inception in 2007.

Key ISM initiatives implemented as part of the ISM CAP have included:

- establishing the "Work Lead" concept to enhance safety accountability at the first level of line management supervision
- developing and revising ISM component programs including Issues Management, ES&H Self-Assessments, and Job Hazards Analysis
- revising and clarifying critical ISM roles and responsibilities, such as for Safety Liaisons, Division Safety Coordinators, and the Safety Advisory Committee.

By the time of the DOE HSS Independent Oversight Inspection in February 2009, significant progress had been made in ISM performance at LBNL. Specific achievements resulting from the ISM CAP include:

- strengthening of the Laboratory's safety culture (e.g., improved reporting, improved feedback and improvement, reinforced management commitment, and increased qualification levels for Division Safety Coordinators)
- improved safety in the performance of work (e.g., increased awareness related to work authorization, enhanced subcontractor construction and vendor safety).

This sustained ISM initiative has also expanded LBNL's capacity to use performance data to drive further ISM improvements; for example, the Laboratory now:

- has a broader understanding of effectively applying ISM principles to day-to-day work at the activity level
- has developed a framework for implementing safety improvements
- is better equipped to perform causal analysis, develop and implement effective corrective actions, and apply lessons learned.

Within the overall context of this strategic focus on ISM improvement, the HSS inspection was viewed as an opportunity to utilize external expertise to gauge progress and to identity further improvements that could be incorporated into the ISM CAP. To help maximize the value of the inspection, UC and LBNL undertook a proactive approach for preparation. A number of activities were initiated and/or refocused for the inspection, including:

- annual Laboratory Director's Strategic Retreat with a focus on safety
- Laboratory Director's "All-Hands" presentation dedicated to performing work safely
- laboratory-wide division stand-downs
- "Red Team" reviews of divisions' implementation of ISM
- weekly Town Hall ISM Improvement meetings
- "Our Safety" campaign to improve safety culture
- *ISM Improvement Project Plan* to capture all significant corrective actions and Opportunities for Improvement (OFIs).

In terms of UC, LBNL, and BSO support to and coordination for the HSS inspection, an overall policy of transparency and collaboration was adopted; specifically, the Laboratory:

- maintained a spirit of openness and cooperation
- used HSS work observations as opportunities to learn and make adjustments in real time
- established continuous communications from the Interim Laboratory Director to all Laboratory personnel during the Review
- made local corrections as issues were identified.

The HSS inspection also included a review of BSO. HSS rated BSO oversight as "effective performance;" thus, there are no BSO corrective actions.

1.3 Executive Summary of Corrective Action Plan

As detailed in the report *Independent Oversight Inspection of Environment, Safety, and Health Programs at the Lawrence Berkeley National Laboratory*, April 2009 (Inspection Report), the HSS identified no corrective actions for BSO and the following for LBNL:

- four strengths (Proactive Management, Advanced Light Source [ALS] Work Controls, Construction Safety, and Innovation in Elements of Assurance System)
- three weaknesses (Requirements Management, Work Control, and Assurance Processes)
- 10 findings within the three weaknesses
- multiple OFIs.

Within the three identified weaknesses, HSS identified the following 10 findings and mapped these weaknesses to the findings as shown in Table 1-1.

- C1 – Job Hazards Analysis
- C2 – Non-radiological Exposure Assessments

- C3 – Radiation Protection
- C4 – Document Infrastructure
- C5 – Electrical Safety
- D1 – Self-Assessment Program
- D2 – Issues Management
- D3 – Injury and Illness Reporting
- D4 – Lessons Learned
- E1 – Chemical Management

Table 1-1. Mapping of HSS Weaknesses to Findings

Area of Weakness	Individual Findings
Work Control and Authorization	C1, C5
Requirements Management	C1, C2, C3, C4, D2, E1
Assurance processes	D1, D2, D3, D4

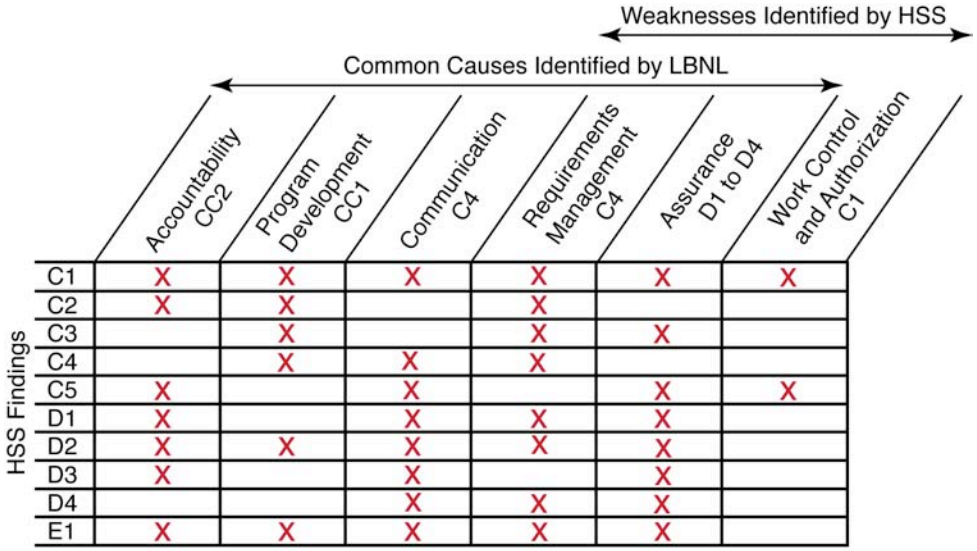
To develop the Corrective Action Plan for the HSS findings, LBNL used the Five Whys causal analysis method (described in detail in Section 2.0). This process led to identification of a series of key causal factors for each of the 10 findings; these key causal factors formed the basis of the corrective actions.

In addition, LBNL examined the extent to which there were common causes across some or all of the 10 findings. Five common causes were identified:

- ineffective management of the development of ES&H programs (Program Development)
- inconsistent understanding of and implementation of accountability mechanisms (Accountability)
- ineffective requirements management (Requirements Management)
- ineffective communication (Communication)
- inconsistent assurance (Assurance).

These problems appear to be pervasive; the occurrence of these causes in each of the 10 HSS findings is shown in Figure 1, which maps the common causes and HSS-identified weaknesses to the 10 HSS findings. (The finding number of the CAP in which the common cause or weakness is corrected is shown with the relevant issue.) Consequently, addressing these common causes is essential for the improvement of ES&H and ISM implementation at LBNL.

Figure 1. Matrix of Common Causes and Weaknesses by HSS Finding



Three of the common causes are corrected by two of the HSS findings CAPs: the CAP for finding C4 will correct the Requirements Management and Communication issues, and the CAPs for findings D1 through D4 will correct Assurance issues. The remaining two self-identified common causes, Program Development and Accountability, were assigned individual CAPS, which are in addition to the CAPS for the 10 HSS findings.

For each corrective action, LBNL established:

- action owner(s)
- implementation schedules
- final deliverables
- estimates of resources.

Additionally, the DOE Berkeley Site Office has identified a BSO lead contact for each finding. These corrective actions are detailed in Section 4.0, while the management of the overall Corrective Action Plan, as well as individual corrective actions, are outlined in Section 3.0.

UCOP and LBNL senior management are committed to managing the HSS CAP as a formal project with a dedicated project manager, clearly defined interim milestones, a resource-loaded schedule, and formal change control. UCOP and LBNL senior management will monitor the HSS CAP progress at monthly meetings to review status of clearly established deliverables, verification of action completion, results of validation and effectiveness reviews, and issues hindering successful completion of the CAP. In addition, LBNL senior management will provide ongoing progress reporting to the UCOP Laboratory Management Office, the UC Contract Assurance Council, and the DOE Berkeley Site Office. All corrective actions will be tracked in the LBNL Corrective Action Tracking System (CATS).

1.4 Summary of Results

Table 1-2 provides an overview—by finding and common cause area—of the number of key causal factors and planned corrective actions.

Table 1-2. Summary of Key Causal Factors and Proposed Corrective Actions

Finding	Causal Factors	Immediate/ Compensatory Actions	Actions to Prevent Recurrence
C1: Job Hazards Analysis	4	2	10
C2: Non-radiological Exposure Assessment	4	2	6
C3: Radiation Protection	4	2	5
C4: Document Infrastructure	8	2	7
C5: Electrical Safety	3	6	5
D1: Self-Assessment Program	6	3	5
D2: Issues Management	8	1	11
D3: Injury and Illness Reporting	4	0	6
D4: Lessons Learned	4	2	5
E1: Chemical Management	7	0	6
CC1: Program Development	1	1	3
CC2: Accountability	2	0	4

A brief description of the corrective actions for each of the 10 findings and the two common causes are summarized below.

Finding CC1: Program Development

The purpose of these corrective actions is to develop the framework for formal requirements management to ensure that new and significantly revised ES&H programs and associated information technology (IT) tools, developed and managed across several LBNL divisions, will be effectively developed and implemented. Based on the causal analysis, LBNL has never developed a formal process for ES&H program development. ES&H programs are not only managed by EHSD (Environment, Health, and Safety Division of LBNL) but also by other divisions such as Facilities and Engineering Divisions. This is a long standing gap which predates existing division and senior management staff. The immediate action to be taken is to identify the key factors that are most important for the effective development and implementation of both new and significantly revised ES&H programs. Requirements for the application of these factors will be developed and applied to those ES&H programs under development or revision. Going forward, two actions will be taken to prevent recurrence. The first action will build on the immediate measure and develop a suite of guidance, requirements, and tools to assure that the design and implementation of significantly new or revised ES&H programs are effective. The second action will develop a similar suite of guidance, requirements, and tools to enable effective development of IT and other tools, especially those that are an essential component of new programs. The effectiveness of these actions will be assessed by reviewing new and significantly revised programs and IT tools, factors such as compliance with all regulatory requirements, whether tools are usable, and whether the programs are understood and implemented properly by the LBNL community.

Finding CC2: Accountability

The goal of the corrective actions is to improve the clear understanding of accountability of two groups: (1) LBNL workers for following LBNL regulations, and (2) senior management for their divisions' performance with respect to ES&H. The first step in this process is to clarify the roles, responsibilities, and expectations with respect to accountability, which have been somewhat blurred by the adoption of new classifications such as "work lead" and "area safety lead." The second step is to clarify when and how to use existing methods of enforcing accountability, such as performance reviews and withdrawal of work authorization, to hold LBNL employees and all other individuals performing work at LBNL accountable for following LBNL requirements and to hold senior management accountable for their divisions' ES&H performance. This clarified guidance will be communicated to the LBNL community. The effectiveness of these actions will be assessed by evaluating the understanding of the LBNL community with respect to accountability and by reviewing incidents to determine whether accountability mechanisms were used appropriately.

Finding C1: Job Hazards Analysis (JHA)

The objective of these corrective actions is to improve the design and implementation of the JHA program to achieve compliance with 10 CFR 851, *Worker Safety and Health Program*, and DOE Policy 450.4, *Safety Management System Policy* using project management tools to manage the process. Based on the causal analysis, the corrective actions will address requirements management, program design, communication, and assurance. As part of the corrective actions, operational, regulatory requirements and user requirements (e.g., documentation of on-the-job training) will be defined; in addition work control and authorization processes will be benchmarked at other DOE laboratories. As a result of these efforts, a program that meets applicable requirements and incorporates best management practices and user requirements will be developed.

In the interim, several compensatory measures have been implemented for the existing process to better meet regulatory requirements. The effectiveness of these compensatory actions will be assessed by evaluating employees' JHAs to determine if they have provided more detail regarding description of work activities and identified the appropriate controls. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Finding C2: Non-radiological Exposure Assessment

The objective of these corrective actions is to improve the design and implementation of the non-radiological Exposure Assessment (EA) program to achieve compliance with the *LBNL Worker Safety and Health Plan* and 10 CFR 851, *Worker Safety and Health Program*. Using project management tools to manage the process, the operational and regulatory requirements will be defined, and a benchmarking survey of DOE and other relevant EA programs will be performed. LBNL will develop a program that meets these requirements and incorporates best practices from other labs and industry. The program will undergo a formal review and acceptance by LBNL senior management, and an implementation plan will be developed. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Finding C3: Radiation Protection

The corrective actions developed for this finding are focused on addressing the finding as well as correcting the fundamental reasons that allowed this finding to exist. The most important cause of the finding was missed requirements in the institutional program, especially an incorrect definition of "contamination area," which directly led to other missed requirements in work authorizations, contamination control, postings and boundary control, and training. Other unfulfilled requirements included missing technical basis documents and inadequate training in some cases.

To prevent recurrence of missing requirements in future Radiation Protection Group (RPG) programs, the first step will be to develop a procedure to ensure that new programs encompass all relevant requirements. The second step will be to perform a gap analysis of the current RPG programs against 10 CFR 835 and its implementation guide, recognizing that a number of gaps, including those given in the finding statement, have already been identified during the HSS audit. Once the remaining gaps have been identified, the RPG procedures will be rewritten using the process described above to ensure that the resulting RPG programs encompass all requirements. In addition, the RPG will revise its internal assessment procedures to periodically compare RPG procedures with requirements and ensure that the program remains compliant with 10 CFR 835 on an ongoing basis. Furthermore, the RPG will also revise its Technical Assurance Assessment Plans (TAAP) to include more effective review of the implementation of RPG procedures and to include work observation(s) to ensure that the radiation protection program is being properly implemented.

The effectiveness of these actions will be reviewed by revising the RPG TAAP to incorporate assessment requirements of 10 CFR 835 and its Implementation Guide to ensure that implementation of the RPG programs meet the requirements and to observe work observations to ensure that the radiation program is being properly implemented.

Finding C4: Document Infrastructure

The objective of these corrective actions is to ensure that LBNL has effective systems for: (1) managing ES&H requirements, (2) assuring consistent content across guidance documents and maintaining its configuration control, and (3) communicating expectations and requirements to Laboratory staff. The focus of the compensatory measures is: (1) determining if any ES&H programs have gaps between the requirements set that is the basis for the program and the requirements set that reflects all pertinent governing regulations for specific ES&H programs, and (2) effecting any necessary updates.

LBNL will conduct a comprehensive benchmarking activity to examine how other DOE laboratories organize and execute their requirements management function, manage and maintain configuration control over content, and communicate expectations and changes in content to Laboratory staff. Once the benchmarking activity is completed, a gap analysis of DOE programmatic requirements for managing requirements is conducted, and LBNL user requirements are identified, a series of recommendations will be developed addressing the three system elements (requirements management, content management, and communication of expectations). Subsequently, implementation plans will be developed and executed for

these three systems of interest. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Finding C5: Electrical Safety

The HSS inspection found that the electrical safety and lockout/tagout (LOTO) programs were generally compliant as written; however field observations of maintenance and construction subcontractors' activities by HSS indicated that work practices were not compliant with the LBNL safety program or the underlying safety requirements. Based on the causal analysis there are two underlying factors: inadequate work control and non-compliant work practices resulting from inadequate training. The immediate and compensatory actions addressed communications to appropriate work groups regarding proper use of meters for performing LOTO; providing greater detail for enhanced work planning and control; increased level of rigor of work authorization requirements and review of work planning and control documents for LOTO and electrical work performed by LBNL staff; implementation of Energized Electrical Work Permits and LOTO permits for all subcontractors performing this work (as applicable); review and revision of Facilities Division equipment-specific lockout/tagout procedures; and extent-of-condition reviews for LOTO work performed by LBNL staff and subcontractors. Other corrective actions are focused on revising LBNL's LOTO and electrical safety training programs; evaluating Facilities' work control system for LOTO and electrical safety work; and developing a construction subcontractor orientation process to communicate LBNL expectations for safety work performance. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Finding D1: Self-Assessment Program

The HSS review indicated that the structure of the LBNL self-assessment program was sufficient, but design and implementation of the individual elements of the program were not completely effective in consistently and accurately evaluating deficiencies. The initial actions addressed specific issues: (1) ensuring the EH&S Division (EHSD) Director directs EHSD employees who are responsible for performing TAP assessments to enter deficiencies into LBNL's Corrective Action Tracking System (CATS), (2) emphasizing the importance and requirements of self-assessment to senior Laboratory management, and (3) developing division-specific measures for self-assessment.

The actions to prevent recurrence begin with a gap analysis of the self-assessment program against applicable requirements. The results of this gap analysis will be used to revise the program guidance and manuals. The division self-assessment program will be revised to increase the focus on hands-on work and to include division-specific measures; the ES&H TAP will be revised to also increase the focus on hands-on work; finally, LBNL ES&H peer reviews will receive clearer, formal procedures with the requirements and expectations. Program guidance and manuals will be revised to incorporate these improvements and the results of the gap analysis. Participants in all programs will receive revised training that emphasizes factors relevant to that particular element, including effective observation of hands-on work. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Finding D2: Issues Management

The corrective actions for this finding are focused on improving LBNL's Issues Management Program (IMP). As an immediate action, LBNL released an enhanced version of its corrective action IT tool (CATS) to address user issues. To improve this program over the longer term, LBNL will perform a gap analysis of the IMP against applicable requirements of DOE Orders 414.1C and 226.1A, benchmark with other DOE facilities, and discuss potential IMP models with LBNL divisions' management. These activities will contribute to a proposed model for an improved IMP that, upon implementation, will address procedure and process updates, training, and communications. To support these efforts, LBNL will post and recruit for a dedicated Issues Management subject matter expert. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Finding D3: Injury and Illness Reporting

The HSS inspection concluded that LBNL has an adequate institutional program to classify, record, and document our occupational injuries and illnesses. However, the HSS inspection and recent LBNL assessments found weaknesses in some of the line-management investigations of injuries and illnesses. The causal analysis found issues related to Requirements Management, Communications, Training, and Assurance. The corrective actions in this CAP will include performance of a gap analysis of the Occupational Injury and Illness Recordkeeping and Reporting (OIIRR) against DOE and LBNL requirements and making appropriate corrections; and restructure the OIIRR program to streamline and simplify the investigation process to ensure that ISM deficiencies are identified and corrective actions from accident investigations are monitored. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Finding D4: Lessons Learned

The corrective actions for this finding are focused on improving LBNL's Lessons Learned and Best Practices Program. As an immediate action, the LBNL Lessons Learned Administrator signed up for the pertinent external lessons learned sources outlined in DOE Order 210.2 and attended a DOE Operating Experience Conference to gain further understanding of DOE resources and speak with other sites regarding their Lessons Learned programs. To improve this Program over the longer term, LBNL will perform a gap analysis between our current Lessons Learned Program and the requirements within DOE Orders 210.2 and 226.1A; develop and clarify roles, responsibilities, and expectations for subject matter experts (SMEs) for Lessons Learned actions; and revise the existing program manual to meet these requirements. Additional actions include incorporating lessons learned feedback into the Division Self-Assessment Program. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Finding E1: Chemical Management

The objective of these corrective actions is to improve the implementation of the Chemical Management System (CMS) program to achieve compliance with 29 CFR 1910.1200, *Hazard Communication,* and 29 CFR 1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories*. As opposed to most of the previous findings, the major causes of this finding were centered on the inconsistent implementation of the program, with only minor contributions from programmatic design.

Based on the causal analysis, the corrective actions will address the full and appropriate implementation of the Chemical Management System program in the shops and laboratories. The initial corrective actions will verify that the existing policies satisfy current requirements, and if not, identify needed modifications. Once this has been accomplished, the *Chemical Hygiene and Safety Plan* (CHSP) and the CMS program will be revised to address needed modifications and to clearly articulate LBNL requirements for the tracking, labeling, and storage of hazardous chemicals. The CHSP and CMS TAAP will be revised to more effectively assess the performance of these programs. Casual factors associated with document control and communications of these Laboratory policies are addressed in finding C4. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

1.5 Key Corrective Actions

Due to the large number of corrective actions for the 10 findings, LBNL in concert with BSO has identified key corrective actions that will be entered into the DOE Headquarters Corrective Action Tracking System (CATS). These key corrective actions will mark the formal end of a critical step or project phase for each of the findings. (See Table 1-3.)

To develop and implement robust and sustainable corrective actions for the 10 findings, LBNL will perform a thorough analysis to identify the appropriate methodologies for best-in-class systems. As a result,

the dates identified for the key milestones have been determined based on limited information. As the analysis is completed through requirements identification, benchmarking, and user requirements identification, implementation methodologies and plans will be developed. Based on the analysis and implementation plans, the completion dates for these corrective actions may be revised. LBNL will work with BSO and DOE Office of Science for appropriate review and approval regarding revisions to this CAP.

Table 1-3. Key Corrective Actions

Finding	LBNL Finding Owner/BSO Contact	Key Corrective Action	Start Date	Completion Date	Description	Deliverable
C1: Job Hazards Analysis (JHA)	Paul Alivisatos/ Mary Gross	C1-9	3/1/2010	3/15/2010	LBNL will select a methodology for an improved job hazards analysis process based on review of regulatory requirements, benchmarking, and user requirements.	Documentation of the selection of a JHA methodology.
		C1-10	3/16/2010	7/15/2010	LBNL will develop an implementation plan based on the selected methodology.	Implementation plan for JHA process.
		C1-11	7/16/2010	7/16/2011	LBNL will implement the selected methodology based on the implementation plan.	Revised LBNL/PUB-3000; evidence of communication to LBNL staff; and evidence of training for LBNL staff.
		C1-12	3/1/2012	6/1/2012	LBNL will perform an effectiveness review of the improved JHA process to ensure that the HSS finding has been corrected.	Documented effectiveness review.
C2: Non-radiological Exposure Assessment	Paul Blodgett/ Mary Gross	C2-6	4/15/2010	7/15/2010	LBNL will select a methodology and develop an implementation plan for an exposure assessment program based on review of regulatory requirements, benchmarking, and user requirements. The CAP will be amended to incorporate additional corrective actions related to implementation of the selected methodology.	Revised EA Program Description and Implementation Plan which will include: • detailed cost and schedule • IT development plan.

Finding	LBNL Finding Owner/BSO Contact	Key Corrective Action	Start Date	Completion Date	Description	Deliverable
		C2-7	7/16/2010	8/16/2011	LBNL will implement the EA program.	Functional EA program.
		C2-8	6/1/2012	9/1/2012	LBNL will perform an effectiveness review to validate the new Exposure Assessment Program	Documented effectiveness review.
C3: Radiation Protection	David Kestell/ Mary Gross	C3-4	7/1/2009	1/1/2012	LBNL will revise the current procedures to meet the requirements of 10 CFR 835 and implement revised procedures and programs.	• a documented gap analysis • an 18-month plan for complete implementation of 10 CFR 835 and a review of necessary resources to meet the needs of the plan • revised radiation protection program procedures that meet 10 CFR 835 and the 10 CFR 835 Implementation Guide and documented technical bases for employed alternate measures to meet 10 CFR 835 where appropriate.
		C3-7	9/1/2012	12/1/2012	LBNL will perform an effectiveness review to validate that LBNL has established and implemented sufficient radiation protection requirements to meet 10 CFR 835.	Documented effectiveness review.
C4: Document Infrastructure	Jim Krupnick/ Mary Gross	C4-6	5/1/2010	11/1/2010	LBNL will develop a requirements management system and operating model for	Recommendation to LBNL Senior management for a requirements management

Finding	LBNL Finding Owner/BSO Contact	Key Corrective Action	Start Date	Completion Date	Description	Deliverable
					review and approval by senior management.	system operating model proposal that documents requirements and reviews alternatives (the same deliverable as described in C4-5); and documented approval of recommended requirements management system and operating model by Laboratory senior management.
		C4-8	12/2/2010	2/1/2012	LBNL will implement the requirements management system and operating model as approved by LBNL senior management	Functional Process Description in *Regulations and Procedures Manual* that documents the LBNL system for managing requirements.
		C4-9	8/1/2012	11/1/2012	LBNL will perform effectiveness review of new systems/processes for (1) requirements management process, (2) content and configuration control process, and (3) process for communicating expectations and requirements.	Documented effectiveness review.
C5: Electrical Safety	Richard DeBusk/ Mary Gross	C5-8	7/1/2009	10/1/2010	LBNL will revise, implement, and retrain identified staff for LOTO and electrical safety training to provide comprehensive and practice-based instruction.	Revision of selected training course(s) and documentation of training of 90% of selected staff.
		C5-9	7/1/2009	8/1/2010	LBNL will revise its work control procedures in the Facilities Division to enhance supervision and observe work of electrical workers.	Revised Facilities Division work control procedures; report validating that the expectations were included in the supervisors' annual review process and the supervisors had these

Finding	LBNL Finding Owner/BSO Contact	Key Corrective Action	Start Date	Completion Date	Description	Deliverable
						expectations reviewed with them during their semi-annual performance review for 2010; and written analysis of resources and evidence of sufficient resource allocation.
		C5-11	4/1/2011	7/1/2011	LBNL will perform an effectiveness review to ensure the requirements for the safe performance of electrical work and lockout/tagout.	Documented effectiveness review.
D1: Self-Assessment Program	John Chernowski/ Donna Spencer	D1-6	7/1/2009	2/1/2010	LBNL will develop and implement a communication plan for LBNL management regarding importance of self-assessments and provide feedback on division assessment plans.	Communication plan and copies of the presentation made to the relevant LBNL committees.
		D1-7	10/1/2009	7/1/2010	LBNL will develop improved training for personnel performing ES&H self-assessments.	Revised training classes.
		D1-8	4/1/2011	7/1/2011	LBNL will perform an effectiveness review to validate the ES&H Self-Assessment corrective actions.	Documented effectiveness review.
D2: Issues Management	Jim Krupnick/ Donna Spencer	D2-8	3/1/2010	4/1/2010	LBNL will select and approve a staffing model for performing issues management.	Approved staffing model.
		D2-11	8/1/2010	12/1/2010	LBNL will implement the approved staffing model.	Staffing model in place as evidenced by identification of division employees to be trained

Finding	LBNL Finding Owner/BSO Contact	Key Corrective Action	Start Date	Completion Date	Description	Deliverable
						and/or hired, identification of core training requirements for identified employees, and communication to LBNL staff regarding new Issues Management staffing model.
		D2-12	7/1/2011	10/1/2011	LBNL will perform an effectiveness review to validate the Issues Management corrective actions.	Documented effectiveness review.
D3: Injury and Illness Reporting	Richard DeBusk/ Mary Gross	D3-3	3/1/2010	10/1/2010	LBNL will revise the Occupational Injury and Illness Recordkeeping and Reporting (OIIRR) program and procedures to clarify roles and responsibilities; streamline investigation, reporting, and recordkeeping processes; address any gaps; and integrate with other LBNL reporting systems and Issues Management Program.	Published PUB-3000 program documents with descriptions of improved OIIRR processes.
		D3-6	7/1/2011	10/1/2011	LBNL will perform an effectiveness review of the OIIRR program to ensure it has established sufficient processes and implemented a fully effective investigation and reporting program.	Documented effectiveness review.
D4: Lessons Learned	John Chernowski/ Donna Spencer	D4-5	7/1/2009	10/1/2009	LBNL will develop roles and responsibilities for the Institutional Lessons Learned	Revised PUB-5519 (4), *Lessons Learned and Best Practices Program Manual*.

Finding	LBNL Finding Owner/BSO Contact	Key Corrective Action	Start Date	Completion Date	Description	Deliverable
					administrator and subject matter experts with respect to the Lessons Learned program.	
		D4-6	10/1/2009	3/1/2010	LBNL will incorporate Lessons Learned feedback into the Division Self-Assessment Program.	Revised PUB-3105, *Division ES&H Self-Assessment Manual*.
		D4-7	10/1/2010	2/1/2011	LBNL will perform an effectiveness review of the Lessons Learned and Best Practices corrective actions.	Documented effectiveness review.
E1: Chemical Management	Paul Blodgett/ Mary Gross	E1-4	6/1/2010	6/1/2011	LBNL will implement the new Chemical Management System and Chemical Hygiene Safety Plan.	Updated CHSP chemical tracking software, training programs, PUB-5341 *Chemical Hygiene and Safety Plan*, and other guidance documents.
		E1-6	12/1/2011	3/1/2012	LBNL will perform an effectiveness review of the new Chemical Management System Program.	Documented effectiveness review.

Section 2.0

HSS CAP Approach

2.1 Organizational and Analytical Approach

LBNL began to develop its strategy for creation of the CAP during the HSS inspection. The Laboratory committed early to a CAP development approach that was structured, transparent, and thorough, consistent with the LBNL Issues Management Program policy (LBNL/ PUB-5519(1)) and DOE Orders 226.1A and 414.1C. To achieve this, the Laboratory has focused on assuring that the HSS response is a well-defined organizational construct that includes a rigorous analytical approach.

LBNL established two functions that collectively executed the CAP development process: a Steering Committee and Finding Teams. The Steering Committee was chaired by the Deputy Chief Operating Officer and the Division Director for Environment, Health & Safety (EHSD) and included roughly equal representation from operations-related organizations and research organizations. The Steering Committee was primarily responsible for the quality and rigor of the CAP products and for overseeing the efforts of the Finding Teams. The specific roles and responsibilities of the Steering Committee were to:

- provide guidance and direction on the overall CAP development process
- provide feedback and comment to the Finding Teams on the product of their analyses
- review the corrective actions with LBNL staff and stakeholders
- assure consistency, rigor, and quality of the output.

Ten Finding Teams were established, one for each of the HSS findings. Each Finding Team consisted of an issue owner and a trained causal analyst. The Finding Teams were primarily responsible for conducting the initial analysis and formulating draft corrective actions. The specific roles and responsibilities of the Finding Teams were to:

- execute the causal analysis on the respective findings
- gather necessary information to support the analyses
- identify those causal factors that were both key and actionable
- develop candidate corrective actions to address the key causal factors.

The roles and responsibilities of both the Steering Committee and the Findings Teams were codified in a formal Charter document.

LBNL examined several analytical tools and determined that the causal analysis process to be used in the CAP development process should be the Five Whys methodology. This decision was based on the premise that Five Whys is a causal analysis method very applicable when needing to (1) determine the underlying causes of programmatic or assessment findings and (2) identify any organizational aspects or conditions that might contribute to the finding. In addition, the Five Whys is a relatively straightforward technique to apply with properly trained personnel.

To that end, and to assure that personnel involved in the causal analysis process would be fully effective, each member of the Steering Committee and Finding Teams attended qualified instructor-led causal analysis training. This training included a series of presentations and break-out exercises structured around one of the HSS findings.

2.2 CAP Development Activities

Once the organizational construct was established and the analytical framework was designed, CAP development activities were conducted over a several month period. The major development activities included:

- development of Problem Statements for the causal analysis
- execution of Five Whys causal analysis
- identification of key causal factors and/or those causal factors that are actionable
- conduct of extent-of-condition reviews
- identification of common causes across the 10 HSS findings
- development of corrective actions.

Problem Statements are the initiating construct for the Five Whys causal analysis and were developed, reviewed, modified, and finalized over a two-week period. For several of the 10 findings, there were multiple Problem Statements, which is reflective of the fact that many of the HSS findings indicated weaknesses in both the design and implementation of safety programs or ISM constructs.

Once Problem Statements were established, the Finding Teams reviewed the details of the HSS Inspection Report, conducted a series of interviews, and gathered additional facts to support the conduct of the Five Whys causal analysis. Through execution of the entire causal analysis process, the Steering Committee conducted frequent and detailed reviews of the Findings Team's progress and made appropriate adjustments. Once the individual Five Whys causal analysis was completed, each Finding Team identified a series of key causal factors for each of the 10 findings; these key causal factors were the basis upon which corrective actions were subsequently identified.

For nine of the 10 findings, there were weaknesses in institutional program design as well as deficiencies in implementation identified by HSS. Rather than determine the extent of these conditions across LBNL activities, programs, organizations, or processes, the Laboratory has concluded—for purposes of developing corrective actions—that such conditions exist generically across LBNL. For the other finding (C5, Electrical Safety), LBNL is (1) observing construction subcontractor lockout/tagout (LOTO) evolutions to ensure that LOTO is performed correctly and to document the extent of condition of any field implementation deficiencies and (2) subsequently planning to observe LOTOs across all LBNL divisions.

In the execution of the Five Whys causal analysis, it became apparent that there were specific causes that emerged in multiple findings. Accordingly, LBNL examined the extent to which there were common causes across the 10 findings. Five common causes were identified:

- ineffective management of the development of ES&H programs (Program Development)
- inconsistent understanding of and implementation of accountability mechanisms (Accountability)
- ineffective requirements management (Requirements Management)
- ineffective communication (Communication)
- inconsistent assurance (Assurance)

Three of the common causes are corrected by two of the CAPs developed to address HSS findings: the CAP for finding C4 will correct the Requirements Management and Communication issues, and the CAP for findings D1 through D4 will correct Assurance issues. The remaining two self-identified common causes, Program Development and Accountability, were assigned individual corrective actions, which are in addition to the 10 HSS-identified findings. It is believed that the identification of these causes and addressing these self-identified issues will enable LBNL to more effectively and sustainably address the causes associated with several of the 10 findings.

Once the suite of analyses noted above was completed—and the results were reviewed, modified as necessary, and accepted by the Steering Committee—corrective actions were developed. For the corrective actions, LBNL established:

- action owner(s)
- implementation schedules
- final deliverables
- estimates of resources.

This characterization is essential in order that: (1) any specific action can be readily executed, and (2) a judgment can be made regarding performance in executing the CAP.

Corrective actions are of two types: Immediate/Compensatory Actions and Actions to Prevent Recurrence. Immediate/Compensatory Actions are those actions that are being completed with some urgency to mitigate an ongoing risk. Nine of the 12 findings contain Immediate Compensatory Actions. Actions to Prevent Recurrence have a longer period of time for implementation and are designed to assure that the desired change or impact is apparent, verifiable, and sustainable.

As part of establishing corrective actions, LBNL also examined two other elements of the HSS Inspection Report: (1) specific observations that were the basis for each finding, and (2) OFIs. Each Finding Team was responsible for identifying and cataloging all references or observations germane to their finding. The corrective actions for that finding were then mapped against the specific observations for that finding to assure that all pertinent observations were captured in the corrective action statements. HSS also provided a series of OFIs—some directed at LBNL organizations and others directed toward specific safety programs or ISM construct/core function. The array of OFIs was examined by the appropriate Finding Team, and those that were believed to be of high value were incorporated into the appropriate corrective actions.

Finally, when all corrective actions were identified and defined in terms of implementation schedules, milestones, deliverables, and resource requirements, the Steering Committee examined the entire suite of corrective actions holistically from two perspectives: (1) the time-phased allocation of resources to which the Laboratory was committing and (2) the integration of implementation schedules across all findings actions. This review enabled the Laboratory to both make risk prioritization decisions in light of resources previously assigned to other EHSD and/or ISM initiatives and assure execution of corrective actions consistent with governing precedence relationships.

Section 3.0

HSS CAP Management

3.1 Formal Project Management

Upon CAP approval, LBNL will exercise an array of project management-based controls to assure:

- efficient and effective implementation
- achievement of desired results
- rapid response to unanticipated circumstances
- ongoing communication with the UCOP Laboratory Management Office (LMO), UC Contract Assurance Council (CAC), BSO, Office of Science, and HSS personnel.

HSS CAP corrective actions will be integrated into the LBNL *ISM Improvement Project Plan*. The Deputy Chief Operating Office (COO) has overall authority and responsibility for the *ISM Improvement Project Plan*. The Deputy COO will direct and manage the development, implementation, and execution of the *ISM Improvement Project Plan* and establish a CAP Advisory Committee to provide periodic oversight and review. To support the Deputy COO, LBNL is assigning a dedicated Project Manager to provide day-to-day CAP management direction.

The CAP Advisory Committee will review the *ISM Improvement Project Plan* bi-weekly to monitor CAP status data and to discuss any issues that may affect the successful closure of Corrective Actions by the approved baseline dates. This meeting will be chaired by the Deputy COO.

The following activities will be accomplished at the bi-weekly meetings:

- review actual start and completion dates
- review completion criteria and documentation
- discuss issues and problems and associated corrective actions
- document outstanding action items, due dates, and the responsible person.

The *ISM Improvement Project Plan* will also include a formal change control process for changes to corrective action descriptions/deliverables, responsible persons, and baseline completion dates. All changes will require the approval of the Deputy COO.

In addition to the bi-weekly meeting, the progress of the HSS CAP will be reviewed by LBNL senior management and UCOP monthly.

All corrective actions will be tracked in the LBNL Corrective Action Tracking System (CATS). As corrective actions are completed or modified, their status will be updated in CATS. For each completed corrective action, a verification review will be performed to assure that the corrective action deliverable is met and that objective evidence is sufficient and traceable to support closure of the action.

3.2 Effectiveness Reviews

After closure of the last corrective action for a finding, effectiveness reviews will be performed in accordance with LBNL PUB-5519 and consistent with the requirements of DOE Orders 226.1A and 414.1C. The completed corrective actions will be reviewed to allow an objective determination that the actions performed have been effective in resolving the identified findings and have prevented recurrence. The effectiveness reviews will be conducted using established, written procedures, and the results will be documented in a report. The reviews will be initiated approximately six to 12 months after completion of

the last finding corrective action. The effectiveness reviews will be conducted utilizing one or more of the following approaches:

- assessments
- document reviews
- interviews
- field observations
- performance analysis, metrics, testing, and/or trending.

3.3 Communication to UC and DOE

During the entire course of CAP implementation, the Deputy COO and Project Manager will provide periodic status updates to the UCOP LMO, CAC and staff, BSO, HSS, and the Office of Science. Updates will be provided at established frequencies, as determined by the preferences of the respective agencies. Consistent with the approach taken on the existing ISM CAP, it is expected that BSO will periodically validate and verify completion of selected LBNL corrective actions on a risk-prioritized basis.

3.4 Resources

Integrating the HSS CAP into the *ISM Improvement Project Plan* and applying a formal project management approach will allow LBNL to comprehensively assess resource requirements, allocate accordingly, and incorporate these resources into the CAP.

Section 4.0

Findings and Actions

4.1 Introduction

Corrective actions are of two types: (1) Immediate/Compensatory Actions, or actions that need to be completed with some urgency to mitigate an ongoing risk, and (2) Actions to Prevent Recurrence, or actions that have a longer period of time for implementation and are designed to assure that the desired change is sustainable.

Outlined below are the corrective actions in response to the HSS Inspection Report. Actions associated with two of the common causes that LBNL identified (Program Development and Accountability for ISM) are presented first, followed by actions associated with the 10 HSS findings in the sequence reported by HSS (C1 through C5, D1 through D4, and E1).

In each section, the following information is presented:

- Finding Statement or Summary
- CATS Number
- Responsible LBNL Manager
- DOE-BSO Lead Contact
- Causal Factors
- Immediate/Compensatory Actions (as appropriate)
- Actions to Prevent Recurrence, including:
    - Responsible Individual
    - Date Action to be Initiated
    - Date Action to be Completed
    - Deliverable to Close Corrective Action.

As part of establishing corrective actions, LBNL also examined two other elements of the HSS Inspection Report: (1) specific observations that were the basis for each finding, and (2) OFIs. The corrective actions for each of the 10 findings were mapped against the specific observations for that finding to assure that all pertinent observations were captured in the corrective action statements. The array of OFIs was examined by the appropriate Finding Team, and those believed to be of high value were incorporated into the array of corrective actions.

Key corrective actions (summarized in Section 1.5) are shaded for easy identification.

4.2 Corrective Actions By Finding

Finding CC1: Program Development

Finding Statement/Summary: In the course of performing the causal analyses for the 10 HSS findings, ineffective management of the development and implementation of new or significantly revised programs was identified as a common cause in a number (C1, C2, C3, C4, D2, and E1) of the findings. While each of the resultant corrective action plans addresses this cause for that particular finding, LBNL also recognizes the need to address this globally. The following corrective actions are intended to do this.

Action Plan Summary: The purpose of these corrective actions is to develop the framework for formal requirements management to ensure that new and significantly revised ES&H programs and associated information technology (IT) tools, developed and managed across several LBNL divisions, will be effectively developed and implemented. Based on the causal analysis, LBNL has never developed a formal process for ES&H program development. ES&H programs are not only managed by EHSD but also by other divisions such as Facilities and Engineering Divisions. This is a long standing gap which predates existing division and senior management staff. The immediate action to be taken is to identify the key factors that are most important for the effective development and implementation of both new and significantly revised ES&H programs. Requirements for the application of these factors will be developed and applied to those ES&H programs under development or revision. Going forward, two actions will be taken to prevent recurrence. The first action will build on the immediate measure and develop a suite of guidance, requirements, and tools to assure that the design and implementation of significantly new or revised ES&H programs are effective. The second action will develop a similar suite of guidance, requirements, and tools to enable effective development of IT and other tools, especially those that are an essential component of new programs. The effectiveness of these actions will be assessed by reviewing new and significantly revised programs and IT tools, factors such as compliance with all regulatory requirements, whether tools are usable, and whether the programs are understood and implemented properly by the LBNL community.

Extent of Condition: Site-wide

Action Tracking: LBNL CATS Issue Number TBD

LBNL Manager Responsible for Correcting Finding:

Howard Hatayama
LBNL EH&S Division Director
(510) 486-5063
HKHatayama@lbl.gov

Causal Factors:

1. Ineffective management of the development of ES&H programs.

Immediate/Compensatory Actions:

CC1-1. Establish interim direction on the key aspects of an ES&H management system so as to ensure that ES&H programs designed or significantly revised before a fully developed management system is put in place meet minimum requirements for effectiveness. The interim direction should encompass the basic parameters for the ES&H management system described below in CC1-2.

Responsible Individual: Richard DeBusk, Occupational Safety Manager, EHSD
Date Action will be initiated: July 1, 2009
Date Action will be completed: December 1, 2009
Deliverable to Close Corrective Action: Publishing of an interim approved management system for ES&H Programs and the training of identified staff on the use of the interim management system.

Actions to Prevent Recurrence:

CC1-2. Establish a management system for the development and implementation of new and significantly revised ES&H programs. The management systems should address:

- the establishment of project management plans, including the use of project management tools such as: cost/benefit analysis, benchmarking, pilot testing, user feedback, and implementation analyses when ES&H programs are created or significantly revised
- effective user input to establish the operational requirements during the development of the ES&H program
- user testing and feedback to ensure proposed solutions will meet the operational requirements of the "client" divisions
- an interim requirements management process to ensure ES&H programs meet all applicable requirements (this task also addressed in finding C4)
- effective benchmarking to identify alternative and effective solutions
- periodic review of the effectiveness of implementation of ES&H programs through the Technical Assurance Program
- a mechanism for the review and acceptance of new or significantly revised ES&H programs by senior Laboratory management that is explicit (such as an acceptance signature) and not delegated to committees, staff scientists/staff, or Safety Coordinators.

The new ES&H program management system will be developed in concert with the Requirements Manager and corrective actions referenced in finding C4.

Responsible Individual: Richard DeBusk, Occupational Safety Manager, EHSD
Date Action will be initiated: November 1, 2009
Date Action will be completed: July 1, 2010
Deliverable to Close Corrective Action: Publishing of an approved management system for new and significantly revised ES&H Programs and the training of identified staff on the use of the management system.

CC1-3. Develop requirements for designing and implementing ES&H IT tools. The requirements will address the following issues:

- inclusion of IT requirements in the development of ES&H programs
- definition of "usability" requirements for all IT tools
- review of the effectiveness of new IT tools
- inclusion of IT personnel in the design of ES&H programs in which the IT tool plays a significant role (e.g., JHA, chemical management).

Responsible Individual: Rosio Alvarez, Director, Information Technology Division
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: March 31, 2010
Deliverable to Close Corrective Action: Published requirements document for ES&H IT tools.

CC1-4. Perform an effectiveness review of these corrective actions to determine the usefulness and implementation of the new process used to develop new and significantly revised ES&H programs and IT tools. Specifically, new and significantly revised ES&H programs and IT tools will be reviewed and factors such as compliance with all regulatory requirements, whether tools are usable, and whether the programs are understood and accepted by the LBNL community will be assessed.

Responsible Individual: Terry Hamilton, Internal Audit Services
Date Action will be Initiated: January 1, 2011
Date Action will be Completed: April 1, 2011
Deliverable to Close Corrective Action: Documented effectiveness review.

Finding CC2: Accountability

Finding Statement/Summary: In the course of performing the causal analyses for the 10 HSS findings, inconsistent (or absent) accountability was identified as a common cause in a number of the findings. In this context, accountability was insufficient for following LBNL regulations, the quality (or lack thereof) of assessments and reports, and developing effective ES&H programs. LBNL recognizes the need to address this specific issue globally. The following corrective actions are intended to do this.

Action Plan Summary: The goal of the corrective actions is to improve the clear understanding of accountability of two groups: (1) LBNL workers for following LBNL regulations, and (2) senior management for their divisions' performance with respect to ES&H. The first step in this process is to clarify the roles, responsibilities, and expectations with respect to accountability, which have been somewhat blurred by the adoption of new classifications such as "work lead" and "area safety lead." The second step is to clarify when and how to use existing methods of enforcing accountability, such as performance reviews and withdrawal of work authorization, to hold LBNL employees and all other individuals performing work at LBNL accountable for following LBNL requirements and to hold senior management accountable for their divisions' ES&H performance. This clarified guidance will be communicated to the LBNL community. The effectiveness of these actions will be assessed by evaluating the understanding of the LBNL community with respect to accountability and by reviewing incidents to determine whether accountability mechanisms were used appropriately.

Extent of Condition: Site-wide

Action Tracking: LBNL CATS Issue Number TBD

Manager Responsible for Correcting Finding:

Paul Alivisatos
LBNL Interim Laboratory Director
(510) 486-5111
APAlivisatos@lbl.gov

Causal Factors:

1. LBNL has not effectively communicated roles, responsibilities, and expectations with respect to accountability:
- for senior Laboratory management (to hold divisions accountable for following LBNL requirements)
- within divisions (accountability of individuals for following LBNL requirements). (CC2-1, 3)

2. LBNL lacks sufficiently clear guidance on when and how to use existing mechanisms to hold workers accountable for following LBNL regulations.
- for senior Laboratory management
- within divisions. (CC2-2, 3)

Actions to Prevent Recurrence:

CC2-1. Clarify the roles, responsibilities, and expectations with respect to accountability in PUB-3000 and the LBNL *ISM Improvement Project Plan* for the following positions:
- division directors
- department heads
- principal investigators/supervisors
- work leads/area safety leads
- line workers.

Responsible Individual: Don Lucas, Deputy Division Director, EHSD
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: October 31, 2009
Deliverable to Close Corrective Action: Revised PUB-3000 and LBNL *ISM Improvement Project Plan.*

CC2-2. Clarify how and when to apply mechanisms for accountability for following LBNL regulations:
- for senior Laboratory management
- within divisions.

Responsible Individual: Vera Potapenko, Director, Human Resources
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: October 31, 2009
Deliverable to Close Corrective Action: Revised appropriate sections of the *Regulations and Procedures Manual.*

CC2-3. Prepare and implement a plan to clearly communicate expectations with respect to accountability to the Laboratory community.

Responsible Individual: Don Lucas, Deputy Division Director, EHSD
Date Action will be Initiated: November 1, 2009
Date Action will be Completed: March 1, 2010
Deliverable to Close Corrective Action: Communication plan and evidence of communications.

CC2-4. Perform an effectiveness review of the CAP examining factors such as effectiveness of communication and whether accountability mechanisms are used consistently and effectively.

Responsible Individual: Terry Hamilton, Internal Audit Services
Date Action will be Initiated: September 1, 2010
Date Action will be Completed: December 1, 2010
Deliverable to Close Corrective Action: Documented effectiveness review.

Finding C1: Job Hazards Analysis

Finding Statement: The LBNL job hazards analysis (JHA) process design and implementation does not sufficiently ensure that all hazards at the activity level are systematically identified, analyzed, and controlled, as needed to ensure compliance with 10 CFR 851, *Worker Safety and Health Program*, DOE Policy 450.4, *Safety Management System Policy*, and the *LBNL Health and Safety Manual*.

Action Plan Summary: The objective of these corrective actions is to improve the design and implementation of the JHA program to achieve compliance with 10 CFR 851, *Worker Safety and Health Program*, and DOE Policy 450.4, *Safety Management System Policy* using project management tools to manage the process. Based on the causal analysis, the corrective actions will address requirements management, program design, communication, and assurance. As part of the corrective actions, operational, regulatory requirements and user requirements (e.g., documentation of on-the-job training) will be defined; in addition work control and authorization processes will be benchmarked at other DOE laboratories. As a result of these efforts, a program that meets applicable requirements and incorporates best management practices and user requirements will be developed.

In the interim, several compensatory measures have been implemented for the existing process to better meet regulatory requirements. The effectiveness of these compensatory actions will be assessed by evaluating employees' JHAs to determine if they have provided more detail regarding description of work activities and identified the appropriate controls. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Extent of Condition: Since the JHA process is an institutional process and used pervasively throughout LBNL, the extent of condition is site-wide.

HSS CATS Finding Tracking Identifier: LBNL-04/16/2009-0001-I

Manager Responsible for Correcting Finding:

Paul Alivisatos LBNL Interim Laboratory Director (510) 486-5111 APAlivisatos@lbl.gov

DOE-BSO Lead Contact:

Mary Gross BSO ES&H Division Director (510) 486-4373 MCGross@lbl.gov

Causal Factors:

1. Requirements Management: A formal requirements management process was not used during development of the JHA process, which should have included formal documentation of both regulatory and user requirements. (C1-6, 7, 8)

2. Program Development: A project management approach was not used to design and implement the JHA process; such an approach should have included the following elements:
    - review of alternative JHA models
    - benchmark of JHA programs at other DOE laboratories
    - criteria to review the content of JHAs
    - a JHA IT tool with sufficient flexibility to allow JHAs to be readily updated
    - user testing of program before distribution
    - effective management of schedule and resources. (C1-2, 4, 6, 7, 8)

3. Communication: Communication of the intrinsic value and concepts of the JHA was not adequate, including:
- The message communicated to divisions and the JHA Team by LBNL senior management was that "percent completion to meet contract requirements" was the goal of the JHA process.
- Neither an implementation guide nor a formal training program was produced.
- The Work Lead concept was not publicized to the general Laboratory community.
- The expectations for the content of JHAs were not communicated. (C1-1, 2, 5, 8, 9)

4. Assurance: There was no institutional review and feedback for the level of specificity or detail in JHA contents. (C1-3, 7)

Immediate/Compensatory Actions:

C1-1. Enhance the level of awareness amongst LBNL senior management regarding the value and purpose of the JHA.

Responsible Individual: Howard Hatayama, Director, EHSD
Date Action was Completed: February 6, 2009
Deliverable to Close Corrective Action: Dr. Chu's October presentation. Division presentations from stand-downs held in 2008.

C1-2. Modify the JHA IT tool to include a section for Description of Work Activities and communicate expectations to LBNL staff to complete Description of Work Activities section by September 30, 2009.

Responsible Individual: John Seabury, Industrial Hygienist, EHSD
Date Action was Completed: May 15, 2009
Deliverable to Close Corrective Action: Added Description of Work Activities section in the JHA IT tool on November 30, 2008. Communications to LBNL staff were made through the following actions:
- emails from John Seabury to Division Safety Coordinators and Division Liaisons dated 10/20/2008, 10/21/2008, 1/12/2009, and 3/17/2009
- *Today at Berkeley Lab* articles published 5/14/2009 and 5/18/2009
- memo and step-by-step instructions published on JHA Web site from John Seabury to DSCs, Division Liaisons, all JHA Users dated 5/5/2009.

Actions to Prevent Recurrence:

C1-3. Initiate assessments of individual JHAs to ensure Descriptions of Work are in alignment with work being performed.

Responsible Individual: John Seabury, Industrial Hygienist, EHSD
Date Action will be Initiated: October 1, 2009
Date Action will be Completed: May 1, 2010
Deliverable to Close Corrective Action: Completed assessments of a sampling from each division/department with results and recommendations (if any) for process improvement.

C1-4. LBNL management will assign a Project Manager to the JHA Improvement Project.

Responsible Individual: Jim Krupnick, Chief Operating Officer
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: July 31, 2009
Deliverable to Close Corrective Action: Assignment of a Project Manager to the JHA Improvement Project.

C1-5. EHSD management will assign an ES&H professional to the JHA Program.

Responsible Individual: Howard Hatayama, Director, EHSD
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: July 31, 2009
Deliverable to Close Corrective Action: Assignment of an ES&H professional to the JHA Program.

C1-6. LBNL will identify the regulatory requirements that the institutional JHA program must meet and define the endpoints that indicate conformance.

Responsible Individual: JHA Project Manager identified in C1-4
Date Action will be Initiated: August 3, 2009
Date Action will be Completed: September 18, 2009
Deliverable to Close Corrective Action: Report to ESHD Director and LBNL COO on JHA regulatory requirements.

C1-7. LBNL will benchmark with other DOE Laboratories to review their JHA programs for regulatory compliance, best practices, and user interfaces.

Responsible Individual: JHA Project Manager identified in C1-4
Date Action will be Initiated: August 3, 2009
Date Action will be Completed: February 28, 2010
Deliverable to Close Corrective Action: Recommendation to LBNL senior management on JHA that documents JHA requirements, best practices observed during benchmarking exercise, review alternatives, and proposed improvements (same deliverable as C1-8).

C1-8. LBNL will define the operational requirements that the institutional JHA process must meet using a Laboratory Cross-sectional team.

Responsible Individual: JHA Project Manager identified in C1-4
Date Action will be Initiated: August 3, 2009
Date Action will be Completed: February 28, 2010
Deliverable to Close Corrective Action: Recommendation to LBNL senior management on JHA that documents JHA requirements, best practices observed during benchmarking exercise, review alternatives, and proposed improvements (same deliverable as Corrective Action C1-7).

C1-9. Based on the recommendations and deliverables identified through requirements analysis, benchmarking, and LBNL user requirements (deliverable for C1-6 and C1-7), LBNL senior management will select a methodology to improve its JHA process.

Responsible Individual: Paul Alivisatos, LBNL Interim Director
Date Action will be Initiated: March 1, 2010
Date Action will be Completed: March 15, 2010
Deliverable to Close Corrective Action: Documentation of the selection of a JHA methodology.

C1-10. Based on the selected methodology, an implementation plan will be developed to identify scope, milestones, resources, and schedule. The JHA improvement process will be managed through a formalized project plan by the JHA project manager. The following will be included in the improvement project:

- JHA process that meets regulatory requirements and is flexible enough to meet user requirements
- communication and training program
- clear guidance on JHA content
- ongoing feedback and improvement.

Responsible Individual: JHA Project Manager identified in C1-4
Date Action will be Initiated: March 16, 2010
Date Action will be Completed: July 15, 2010
Deliverable to Close Corrective Action: Implementation plan for JHA process.

C1-11. Implement the selected methodology based on the implementation plan. The JHA improvement process will be managed through a formalized project plan by the JHA project manager. The following must be included in the improvement project:

- JHA process that meets regulatory requirements and is flexible enough to meet user requirements
- communication and training program
- clear guidance on JHA content
- ongoing feedback and improvement.

Responsible Individual: JHA Project Manager identified in C1-4
Date Action will be Initiated: July 16, 2010
Date Action will be Completed: July 16, 2011
Deliverable to Close Corrective Action: Revised LBNL/PUB-3000; evidence of communication to LBNL staff; and evidence of training for LBNL staff.

The completion date for this corrective action may be revised based on the results of the requirements analysis, benchmarking, and identification of user requirements. LBNL will work with BSO and DOE Office of Science for appropriate review and approval prior to making any changes to this CAP.

C1-12. LBNL will perform an effectiveness review of the improved JHA process to ensure that the HSS finding has been corrected. This effectiveness review will include an assessment of the following elements:

- appropriateness of the corrective actions
- effectiveness with regards to implementation of the corrective actions
- improved performance
- sustainability of improvements.

Responsible Individual: John Chernowski, Manager, Office of Contract Assurance
Date Action will be Initiated: March 1, 2012
Date Action will be Completed: June 1, 2012
Deliverable to Close Corrective Action: Documented effectiveness review.

Finding C2: Non-radiological Exposure Assessment

Finding Statement: The LBNL non-radiological exposure assessment (EA) program does not include adequate exposure assessment procedures and protocols and does not perform sufficient qualitative and quantitative exposure assessments to fully meet the requirements of the LBNL Worker Safety and Health Plan and 10 CFR 851, *Worker Safety and Health Program*.

Action Plan Summary: The objective of these corrective actions is to improve the design and implementation of the non-radiological Exposure Assessment (EA) program to achieve compliance with the *LBNL Worker Safety and Health Plan* and 10 CFR 851, *Worker Safety and Health Program*. Using project management tools to manage the process, the operational and regulatory requirements will be defined, and a benchmarking survey of DOE and other relevant EA programs will be performed. LBNL will develop a program that meets these requirements and incorporates best practices from other labs and industry. The program will undergo a formal review and acceptance by LBNL senior management, and an implementation plan will be developed. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Extent of Condition: Deficiencies were found in the Exposure Assessment (EA) program design that includes monitoring for chemical, cryogenic, non-ionizing radiation and other physical agents. Because the EA program affects staff in all divisions, the extent of condition is determined to be site-wide.

HSS CATS Finding Tracking Identifier: LBNL-04/16/2009-0002-I

Manager Responsible for Correcting Finding:

Paul Blodgett
LBNL Industrial Hygiene Manager
(510) 486-6218
PMCBlodgett@lbl.gov

DOE-BSO Lead Contact:

Mary Gross
BSO ES&H Division Director
(510) 486-4373
MCGross@lbl.gov

Causal Factors:

1. Requirements Management: LBNL did not fully understand DOE requirements for a comprehensive Exposure Assessment Program. (C2-3)

2. Program Development: LBNL did not develop an appropriate tool to track exposure assessments that meets the requirements (track and schedule) of 10 CFR 851. (C2-3, 4, 5, 6, 7)

3. Program Development: LBNL did not develop a comprehensive exposure assessment program in accordance with existing guidelines (e.g., American Industrial Hygiene Association). (C2-3, 4, 5, 6, 7)

4. Accountability: LBNL division leadership does not fully understand safety accountability requirements and are not being held accountable for requiring line management to understand exposure assessment requirements of PUB-3000. (See CC1.)

Immediate/Compensatory Actions:

C2-1. A review of lead exposure assessment records was conducted, and new swipe and bulk paint samples were taken to determine the level of contamination in Building 6.

Responsible Individual: Tim Roberts, Industrial Hygienist, EHSD
Date Action will be Initiated: February 19, 2009
Date Action was Completed: February 19, 2009
Deliverable to Close Corrective Action: Records of the swipe and paint samples.

C2-2. Develop and implement a Lead Management Plan to address residual lead contamination that results from deteriorated paint in Building 6.

Responsible Individual: Jim Floyd, ES&H Program Manager, Advanced Light Source
Date Action will be Initiated: February 19, 2009
Date Action will be Completed: June 12, 2009
Deliverable to Close Corrective Action: Lead Management Plan for Building 6

Actions to Prevent Recurrence:

C2-3. LBNL will identify and document the regulatory requirements that the institutional Exposure Assessment Plan must meet.

Responsible Individual: Paul Blodgett, Industrial Hygiene Manager, EHSD
Date Action will be Initiated: June 15, 2009
Date Action will be Completed: September 1, 2009
Deliverable to Close Corrective Action: A report to management of analysis of regulatory requirements for EA program.

C2-4. LBNL will review alternative models for an EA Program, including a benchmarking study of other DOE laboratories, and develop a proposed program for management.

Responsible Individual: Paul Blodgett, Industrial Hygiene Manager, EHSD
Date Action will be Initiated: September 2, 2009
Date Action will be Completed: April 1, 2010
Deliverable to Close Corrective Action: Recommendation to LBNL senior management on EA, which documents EA requirements, reviews alternatives, and proposes improvements. This report will include:

- process and roles/responsibilities
- IT infrastructure
- costs.

C2-5. LBNL will define the operational requirements that the institutional EA Program must meet through a team composed of a cross-section of affected LBNL groups and individuals.

Responsible Individual: Paul Blodgett, Industrial Hygiene Manager, EHSD
Date Action will be Initiated: September 15, 2009
Date Action will be Completed: April 1, 2010
Deliverable to Close Corrective Action: Recommendation to LBNL Senior management on EA, which documents EA requirements, reviews alternatives, and proposes improvements (same report as C2-4).

C2-6. LBNL adopt an Exposure Assessment program and develop an implementation plan. The implementation plan will include detailed costs and schedules

Responsible Individual: Howard Hatayama, EHSD Director
Date Action will be Initiated: April 15, 2010
Date Action will be Completed: July 15, 2010

- EHSD: 1.0 FTE (consultant supporting current staff)
- Divisions: minor

Deliverable to Close Corrective Action: Revised EA Program Description and Implementation Plan which will include:

- detailed cost and schedule
- IT development plan.

The completion date for this corrective action may be reevaluated based on the results of the requirements analysis, benchmarking, and identification of user requirements. LBNL will work with BSO and DOE Office of Science for appropriate review and approval prior to making any changes to this CAP.

C2-7. LBNL will implement the EA program.

Responsible Individual: Paul Blodgett, Industrial Hygiene Manager, EHSD
Date Action will be Initiated: July 16, 2010
Date Action will be Completed: August 16, 2011
Deliverable to Close Corrective Action: Functional EA Program.

C2-8. Perform an effectiveness review to validate the new Exposure Assessment Program. This will include an assessment of:

- appropriateness of the corrective actions
- effectiveness with regards to implementation of the corrective actions
- improved performance with respect to addressing the finding
- sustainability of improvements.

Responsible Individual: John Chernowski, Manager, Office of Contract Assurance
Date Action will be Initiated: June 1, 2012
Date Action will be Completed: September 1, 2012
Deliverable to Close Corrective Action: Documented effectiveness review.

Finding C3: Radiation Protection

Finding Statement: LBNL has not established and implemented sufficient radiation protection requirements in the areas of radiological work authorizations, contamination control, radiological postings and boundary control, technical basis documentation, and training, as needed to ensure adequate radiological safety consistent with all applicable requirements of 10 CFR 835, *Occupational Radiation Protection*.

Action Plan Summary: The corrective actions developed for this finding are focused on addressing the finding as well as correcting the fundamental reasons that allowed this finding to exist. The most important cause of the finding was missed requirements in the institutional program, especially an incorrect definition of "contamination area," which directly led to other missed requirements in work authorizations, contamination control, postings and boundary control, and training. Other unfulfilled requirements included missing technical basis documents and inadequate training in some cases.

To prevent recurrence of missing requirements in future Radiation Protection Group (RPG) programs, the first step will be to develop a procedure to ensure that new programs encompass all relevant requirements. The second step will be to perform a gap analysis of the current RPG programs against 10 CFR 835 and its implementation guide, recognizing that a number of gaps, including those given in the finding statement, have already been identified during the HSS audit. Once the remaining gaps have been identified, the RPG procedures will be rewritten using the process described above to ensure that the resulting RPG programs encompass all requirements. In addition, the RPG will revise its internal assessment procedures to periodically compare RPG procedures with requirements and ensure that the program remains compliant with 10 CFR 835 on an ongoing basis. Furthermore, the RPG will also revise its Technical Assurance Assessment Plans (TAAP) to include more effective review of the implementation of RPG procedures and to include work observation(s) to ensure that the radiation protection program is being properly implemented.

The effectiveness of these actions will be reviewed by revising the RPG TAAP to incorporate assessment requirements of 10 CFR 835 and its Implementation Guide to ensure that implementation of the RPG programs meet the requirements and to observe work observations to ensure that the radiation program is being properly implemented.

Extent of Condition: site-wide

HSS CATS Finding Tracking Identifier: LBNL-04/16/2009-0003-I

Manager Responsible for Correcting Finding:

David Kestell LBNL Radiation Protection Manager (510) 486-7157 DJKestell@lbl.gov

DOE-BSO Lead Contact:

Mary Gross BSO ES&H Division Director (510) 486-4373 MCGross@lbl.gov

Causal Factors:

1. Program Development: the institutional radiation protection program was developed without a rigorous procedure that ensured that all requirements were met. (C3-3)

2. Requirements Management: RPG did not perform a sufficiently rigorous gap analysis of 10 CFR 835 and the 10 CFR 835 Implementation Guide against RPG programs and available resources. (C3-4)

3. Assurance: RPG did not possess a rigorous internal program assessment procedure. (C3-5)

4. Assurance: The RPG assessment program was insufficiently rigorous to ensure adequate assessments and effective corrective actions. (C3-6)

Immediate/Compensatory Actions:

C3-1. The RPG Leader immediately reviewed the RPG procedures implicated in the HSS findings to determine a risk-based approach to developing revisions and incorporate HSS comments.

Responsible Individual: David Kestell, Radiation Protection Manager, EHSD
Date Action was Completed: February 3, 2009
Deliverable to Close Corrective Action: Notes from RPG leader.

C3-2. The RPG Leader held a meeting with the RPG Radiological Control Technicians (RCTs) and Health Physicists (HPs) informing them of the results of the HSS review. At that meeting, he also directed all RCTs to walk their assigned spaces to ensure that signage (Radioactive Material Areas [RMAs], Controlled Areas, etc.) was properly posted in accordance with the current Radiation Protection Program and RPG-issued work authorizations.

Responsible Individual: David Kestell, Radiation Protection Manager, EHSD
Date Action was Completed: March 25, 2009
Deliverable to Close Corrective Action: Minutes from the meeting.

Actions to Prevent Recurrence:

C3-3. RPG will develop procedures for designing RPG programs that assure that new or revised programs meet all requirements.

Responsible Individual: David Kestell, Radiation Protection Manager, EHSD
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: November 1, 2009
Deliverable to Close Corrective Action: Approved program development procedures.

C3-4. RPG will revise the current procedures to meet the requirements of 10 CFR 835 and the 10 CFR 835 Implementation Guide. Specifically. RPG will:

- perform a gap analysis of 10 CFR 835 and the 10 CFR 835 Implementation Guide against RPG programs and available resources
- write a plan to correct identified gaps in the gap analysis
- correct identified gaps in affected RPG procedures and programs
- implement revised procedures and programs.

Responsible Individual: David Kestell, Radiation Protection Manager, EHSD
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: January 1, 2012
Deliverables to Close Corrective Action:

- a documented gap analysis
- an 18-month plan for complete implementation of 10 CFR 835 and a review of necessary resources to meet the needs of the plan
- revised radiation protection program procedures that meet 10 CFR 835 and the 10 CFR 835 Implementation Guide and documented technical bases for employed alternate measures to meet 10 CFR 835 where appropriate.

The completion date for this corrective action may be revised based on the results of the requirements analysis, benchmarking, and identification of user requirements. LBNL will work with BSO for appropriate review and approval prior to making any changes to this CAP.

C3-5. RPG will revise its internal programs assessment procedure to meet the requirements of LBNL PUB-3111, *Operating and Quality Management Plan*.

Responsible Individual: Amy Ecclesine, RPG QA and Compliance Program Leader, EHSD
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: October 1, 2009
Deliverable to Close Corrective Action: An internal programs assessment procedure.

C3-6. RPG will revise its Technical Assurance Assessment Plans to incorporate assessment requirements of 10 CFR 835 and the 10 CFR 835 Implementation Guide to ensure that implementation of the RPG programs meets the requirements of 10 CFR 835.

Responsible Individual: Amy Ecclesine, RPG QA and Compliance Program Leader, EHSD
Date Action will be Initiated: October 31, 2009
Date Action will be Completed: January 31, 2010
Deliverable to Close Corrective Action: Revised TAP documents that meet the assessment requirements of 10 CFR 835 in a rigorous manner and are consistent with internal oversight requirements.

C3-7. Perform an effectiveness review to validate that LBNL has established and implemented sufficient radiation protection requirements to meet 10 CFR 835, *Occupational Radiation Protection*.

Responsible Individual: John Chernowski, Manager, Office of Contract Assurance
Date Action will be Initiated: September 1, 2012
Date Action will be Completed: December 1, 2012
Deliverable to Close Corrective Action: Documented effectiveness review.

Finding C4: Document Infrastructure

Finding Statement: LBNL has not established effective processes and rigorous documents that consistently and effectively communicate safety expectations and requirements to LBNL employees and contractors, as required by Criteria 1, 4 and 5 of DOE Order 414.1C, *Quality Assurance*.

Action Plan Summary: The objective of these corrective actions is to ensure that LBNL has effective systems for: (1) managing ES&H requirements, (2) assuring consistent content across guidance documents and maintaining its configuration control, and (3) communicating expectations and requirements to Laboratory staff. The focus of the compensatory measures is: (1) determining if any ES&H programs have gaps between the requirements set that is the basis for the program and the requirements set reflects all pertinent governing regulations for specific ES&H programs, and (2) effecting any necessary updates.

LBNL will conduct a comprehensive benchmarking activity to examine how other DOE laboratories organize and execute their requirements management function, manage and maintain configuration control over content, and communicate expectations and changes in content to Laboratory staff. Once the benchmarking activity is completed, a gap analysis of DOE programmatic requirements for managing requirements is conducted, and LBNL user requirements are identified, a series of recommendations will be developed addressing the three system elements (requirements management, content management, and communication of expectations). Subsequently, implementation plans will be developed and executed for these three systems of interest. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Extent of Condition: Site-wide

HSS CATS Finding Tracking Identifier: LBNL-04/16/2009-0004-I

Manager Responsible for Correcting Finding:

Jim Krupnick LBNL Chief Operating Officer (510) 486-6480 JTKrupnick@lbl.gov

DOE-BSO Lead Contact:

Mary Gross BSO ES&H Division Director (510) 486-4373 MCGross@lbl.gov

Causal Factors:

1. Program Development: Responsibilities for requirements management are only briefly mentioned in the *Regulations and Procedures Manual* and are divided among different groups in different divisions with no apparent lead for requirements management oversight. (C4-3)

2. Program Development: LBNL lacks a comprehensive and functional institutional document and process infrastructure that maps, aligns, and integrates requirements, documents, and processes across all Laboratory-wide functions (e.g., EHSD, Human Resources, Procurement, IT, Shipping). (C4-1, 2, 3)

3. Program Development: LBNL has not established an effective institutional mechanism for engaging the Laboratory community in the development of Laboratory-wide documents. (C4-2, 3)

4. Program Development: LBNL does not have an organization or position charged with the responsibility for coordinating, facilitating, and establishing a central source and repository of current and consistent information, documentation, policy, processes, procedures, and requirements for all Laboratory-wide functions and documents. (C4-1, 2, 3)

5. Program Development: There is no LBNL organization or position charged with the exclusive responsibility for coordinating and facilitating Laboratory-wide and effective dissemination of information. (C4-2, 3)

6. Program Development: There is no standard set of expectations or accompanying systems for communicating information about Laboratory-wide functions. (C4-2, 3)

7. Program Development: There is no single institutional standard set or comprehensive set of expectations for communication processes (e.g., policies, manuals, procedures, and guidelines). (C4-2, 3)

8. Program Development: LBNL has not taken a comprehensive approach to evaluate the effectiveness of various communication media and paths at the institutional or divisional level. (C4-2, 3)

Immediate/Compensatory Actions:

C4-1. Review comprehensiveness of requirements set for ES&H Programs:

- Risk rank all ES&H programs to evaluate the alignment between the requirements set for each program and the program as documented in LBNL policies and procedures.
- Based on the risk ranking, identify the programs at high risk of misalignment and conduct a gap analysis of the high risk programs. (Note: A number of ES&H Programs have recently been the subject of such reviews, and other ES&H Programs have undergone or are undergoing such reviews based on the results of the HSS inspection [e.g., JHA process, Lessons Learned, Radiation Protection, Chemical Management].)

Responsible Individual: Richard DeBusk, Occupational Safety Manager, EHSD
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: March 1, 2010
Deliverable to Close Corrective Action: Requirements gap analysis for selected ES&H Programs.

C4-2. Update requirements set for ES&H Programs where gaps are identified:

- incorporate missing requirements into appropriate requirements set
- modify guidance documentation (e.g., PUB-3000) as necessary.

Responsible Individual: Richard DeBusk, Occupational Safety Manager, EHSD
Date Action will be Initiated: January 4, 2010
Date Action will be Completed: August 31, 2010
Deliverable to Close Corrective Action: Updated requirements documentation for selected ES&H Programs.

Actions to Prevent Recurrence:

C4-3. LBNL will post for and hire a Requirements Manager to provide direction and oversight of requirements management.

Responsible Individual: Jim Krupnick, Chief Operating Officer
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: October 31, 2009
Deliverable to Close Corrective Action: Hiring records of the Requirements Manager.

C4-4. Evaluate current LBNL processes for requirements management and configuration control of content against programmatic requirements in DOE 414.1C:

- examine Criteria 1, 4, and 5 of DOE 414.1C and identify programmatic gaps, if any
- develop recommended programmatic modifications.

Responsible Individual: LBNL Requirements Management per Action C4-3
Date Action will be Initiated: November 1, 2009
Date Action will be Completed: January 1, 2010
Deliverable to Close Corrective Action: Recommended programmatic modifications to assure alignment with DOE 414.1C.

C4-5. Conduct benchmarking activity to examine how other DOE laboratories (1) organize and execute their requirements management function, (2) manage and maintain configuration control over content, and (3) communicate expectations and changes in content to Laboratory staff, including:

- establish a multi-discipline team
- identify DOE laboratories to be benchmarked
- develop recommendations for application to LBNL.

Responsible Individual: LBNL Requirements Management per Action C4-3
Date Action will be Initiated: December 1, 2009
Date Action will be Completed: April 30, 2010
Deliverable to Close Corrective Action: Recommended approaches to (1) organizing and executing requirements management system, (2) managing and maintaining configuration control over content, and (3) communicating expectations and changes in content to Laboratory staff.

C4-6. Develop a requirements management system and operating model proposal to include (1) function for effectively managing requirements, (2) function for managing and maintaining control over content of information in manuals, procedures, and guidelines, and (3) function to assure Laboratory-wide communication of requirements and safety expectations for LBNL senior management based on**:**

- defined user requirements using a Laboratory cross-sectional team
- incorporating the results of the benchmarking study, as appropriate
- incorporating the results of programmatic analysis against DOE 414.1C.

Responsible Individual: LBNL Requirements Management per Action C4-3
Date Action will be Initiated: May 1, 2010
Date Action will be Completed: November 1, 2010
Deliverable to Close Corrective Action: Recommendation to LBNL Senior management for a requirements management system operating model proposal that documents requirements and reviews alternatives (the same deliverable as described in C4-5); and documented approval of recommended requirements management system and operating model by Laboratory senior management.

C4-7. Based on the recommendations and deliverables identified through requirements analysis, benchmarking, and LBNL user requirements (deliverables for C4-4, 5, 6), LBNL senior management will select a methodology for a requirements management system and operating model.

Responsible Individual: Jim Krupnick, Chief Operating Officer
Date Action will be Initiated: November 3, 2010
Date Action will be Completed: December 1, 2010
Deliverable to Close Corrective Action: Documented approval of recommended requirements management system and operating model by Laboratory senior management.

C4-8. Implement the requirements management system and operating model as approved by LBNL senior management per C4-7:

- develop implementation plan for approved operating model for managing requirements
- monitor performance.

Responsible Individual: LBNL Requirements Management per Action C4-3
Date Action will be Initiated: December 2, 2010
Date Action will be Completed: February 1, 2012
Deliverable to Close Corrective Action: Functional Process Description in *Regulations and Procedures Manual* that documents the LBNL system for managing requirements.

The completion date for this corrective action may be reevaluated based on the results of the requirements analysis, benchmarking, and identification of user requirements. LBNL will work with BSO and DOE Office of Science for appropriate review and approval prior to making any changes to this CAP.

C4-9. Perform effectiveness review of new systems/processes. The effectiveness review(s) will evaluate the extent to which changes in the (1) requirements management process, (2) content and configuration control process, and (3) processes for communicating expectations and requirements have adequately and sustainably addressed the underlying issues associated with the Finding Statement above.

Responsible Individual: Terry Hamilton, Internal Audit Services
Date Action will be Initiated: August 1, 2012
Date Action will be Completed: November 1, 2012
Deliverable to Close Corrective Action: Documented effectiveness review.

Finding C5: Electrical Safety

Finding Statement: LBNL has not ensured that all of the requirements of LBNL PUB-3000, Chapter 8, Electrical Safety, Chapter 18, *Lockout/Tagout and Verification*, and NFPA 70E, *Standard for Electrical Safety in the Workplace*, for arc flash protection, personal protective equipment, and zero voltage verification have been effectively implemented.

Action Plan Summary: The HSS inspection found that the electrical safety and lockout/tagout (LOTO) programs were generally compliant as written; however field observations of maintenance and construction subcontractors' activities by HSS indicated that work practices were not compliant with the LBNL safety program or the underlying safety requirements. Based on the causal analysis there are two underlying factors: inadequate work control and non-compliant work practices resulting from inadequate training. The immediate and compensatory actions addressed communications to appropriate work groups regarding proper use of meters for performing LOTO; providing greater detail for enhanced work planning and control; increased level of rigor of work authorization requirements and review of work planning and control documents for LOTO and electrical work performed by LBNL staff; implementation of Energized Electrical Work Permits and LOTO permits for all subcontractors performing this work (as applicable); review and revision of Facilities Division equipment-specific lockout/tagout procedures; and extent-of-condition reviews for LOTO work performed by LBNL staff and subcontractors. Other corrective actions are focused on revising LBNL's LOTO and electrical safety training programs; evaluating Facilities' work control system for LOTO and electrical safety work; and developing a construction subcontractor orientation process to communicate LBNL expectations for safety work performance. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Extent of Condition: The HSS inspection in this topic focused on the Facilities Division. LBNL is confident that the deficiencies observed are present site-wide, so the corrective actions will focus on site-wide application, except for those corrective actions that are addressing specific weakness in the Facilities Division derived from their unique scope of work. LBNL is conducting a site-wide extent-of-condition review for lockout/tagout deficiencies by observing a sample of work practices, described more completely in corrective action C5-4 below.

HSS CATS Finding Tracking Identifier: LBNL-04/16/2009-0005-I

Managers Responsible for Correcting Finding:

Richard DeBusk LBNL Occupational Safety Manager (510) 495-2976 REDeBusk@lbl.gov

DOE-BSO Lead Contact:

Mary Gross BSO ES&H Division Director (510) 486-4373 MCGross@lbl.gov

Causal Factors:

1. Work Control: The threshold for generating detailed hazard information on individual job work orders in the Facilities Division through the Task Hazard Analysis is set too high for the hazards to be included on some of the individual work orders; there was also a lack of necessary detail. Facilities Division (FA) management systems that control electrical work or work that requires a LOTO are not adequately configured to fully ensure the safe execution of work, specifically with regard to the supervisor span of

management, communication of safety expectations to supervisors, and requirements for safety walkarounds to verify that field performance meets expectations. (C5-2, 3, 5, 6, 7, 9)

2. Training: Electrical safety and LOTO training are not adequate because they do not adequately address required topics in sufficient detail and do not include adequate task- or job-specific components. (C5-1, 8, 9, 10)

3. Assurance: LBNL does not fully ensure employees and subcontractors follow Lab and DOE regulations/requirements with regard to electrical safety and LOTO. (C5-3, 4, 5, 9, 11)

Immediate/Compensatory Actions:

C5-1. The Facilities Division Refrigeration Mechanic brought the HSS-identified LOTO issue (Live-Dead-Live meter verification) to his supervisor the day following discovery. The supervisor held a safety meeting to determine the extent of the problem among the Facilities Division craft personnel. All Refrigeration Mechanics and Plant Maintenance Technicians employees were briefed, the issue was reviewed, and the field practice was altered to include Live-Dead-Live verification of meter performance.

Responsible Individual: Larry Begley, Maintenance Supervisor, FA Division
Date Action was Initiated: February 5, 2009
Date Action was Completed: February 5, 2009
Deliverable to Close Corrective Action: Minutes of safety meeting

C5-2. The Task Hazard Analysis (THA) element of the Maximo work order system in the Facilities Division has been modified to generate a Task Hazard Analysis, which includes greater detail, at a lower threshold level, including any construction activity.

Responsible Individual: Ken Fletcher, Operations Manager, FA Division
Date Action was Initiated: February, 2009
Date Action was Completed: February 28, 2009
Deliverable to Close Corrective Action: Copy of MAXIMO threshold levels.

C5-3. Anyone doing hands-on work on a construction project must submit JHAs, THAs, and/or permits, as appropriate, to the Construction Manager for review and approval prior to beginning work.

Responsible Individual: Steve Black, Deputy Division Director, FA Division
Date Action was Initiated: March 1, 2009
Date Action will be Completed: June 30, 2009
Deliverable to Close Corrective Action: Copies of emails to FA, IT, and engineering division personnel initiating the new process and documented observations confirming new process being implemented.

C5-4. Construction Safety is currently observing construction subcontractor LOTOs. The purpose is to ensure that LOTO is performed correctly and to document the extent of condition of any field implementation deficiencies. The Program will be extended to observe LOTOs across all LBNL divisions. These observations will constitute an extent-of-condition review when completed.

Responsible Individual: Richard DeBusk, Occupational Safety Manager, EHSD
Date Action was Initiated: April 16, 2009
Date Action will be completed:

Construction	Complete
In-House Maintenance	June 22, 2009
Other LOTOs	August 30, 2009

Deliverable to Close Corrective Action: Extent-of-Condition Report

C5-5. Facilities Division will review and revise its equipment-specific lockout/tagout procedures, as necessary, to ensure a compliant procedures set.

Responsible Individual: Steve Black, Deputy Division Director, FA Division
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: October 1, 2010
Deliverable to Close Corrective Action: Revised Facilities Division LOTO procedures.

C5-6. LBNL implemented improved Energized Electrical Work Permit (EEWP) and LOTO permits for all subcontractors performing testing, troubleshooting, and inspection including LOTO verification when applicable.

Responsible Individual: Keith Gershon, Electrical Safety Officer, EHSD
Date Action was Initiated: January 14, 2009
Date Action was Completed: January 14, 2009
Deliverable to Close Corrective Action: Revised PUB-3000 chapter defining these changes for construction and non-construction contractors.

Actions to Prevent Recurrence:

C5-7. LBNL will revise the work authorization process to allow an Activity Hazards Document (AHD) (or equivalent) for work involving potential exposure to hazardous electrical energy for testing, troubleshooting, and inspection, including LOTO verification when applicable.

Responsible Individual: Mike Wisherop, Senior Safety Specialist, EHSD
Date Action was Initiated: January 14, 2009
Date Action will be Completed: October 31, 2009
Deliverable to Close Corrective Action: Revision(s) to PUB-3000; revision to AHD database; communication plan for this new requirement to implementing divisions; and initial implementation of AHDs.

C5-8. EHSD will revise current LOTO and electrical safety training and retrain identified staff to provide comprehensive and practice-based instruction.

Responsible Individual: Don Lucas, Deputy Division Director, EHSD
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: January 1, 2010 to develop training; October 1, 2010 for employees to complete retraining
Deliverable to Close Corrective Action: Revision of selected training course(s) and documentation of training of 90% of selected staff.

C5-9. The Facilities Division will revise its work control procedures and processes to do the following:

- clearly define the role of FA supervisors with respect to supervising electrical work and LOTO and performing walkarounds to validate the safe performance of work
- effectively communicate these expectations to FA supervisors
- adjust FA staffing levels such that FA has enough supervisors to supervise electrical work and LOTO and meet the expectations for walkarounds and work observations.

Responsible Individual: Steve Black, Deputy Division Director, FA Division
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: August 1, 2010
Deliverable to Close Corrective Action: Revised Facilities Division work control procedures; report validating that the expectations were included in the supervisors' annual review process and the supervisors had these expectations reviewed with them during their semi-annual performance review for 2010; and written analysis of resources and evidence of sufficient resource allocation.

C5-10. The Facilities and EHS Divisions will develop a construction subcontractor orientation process to communicate LBNL expectations for safe work performance.

Responsible Individual: Jerry Ohearn, Capital Projects Department Head, FA Division
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: October 1, 2009
Deliverable to Close Corrective Action: Completed orientation process ready for implementation.

C5-11. Perform an effectiveness review to ensure the requirements for the safe performance of electrical work and lockout/tagout are being implemented, including: conformance with requirements, clarity in work authorizations, and increased rigor in work control processes.

Responsible Individual: John Chernowski, Manager, Office of Contract Assurance
Date Action will be Initiated: April 1, 2011
Date Action will be Completed: July 1, 2011
Deliverable to Close Corrective Action: Documented effectiveness review.

Finding D1: Self-Assessment Program

Finding Statement: LBNL has not established and implemented a fully effective self-assessment program with sufficient rigor to ensure that safety programs and performance are consistently and accurately evaluated with deficiencies identified to ensure continuous improvement, as required by DOE Order 226.1A, *Implementation of Department of Energy Oversight Policy*, and by DOE Order 414.1C, *Quality Assurance*.

Action Plan Summary: The HSS review indicated that the structure of the LBNL self-assessment program was sufficient, but design and implementation of the individual elements of the program were not completely effective in consistently and accurately evaluating deficiencies. The initial actions addressed specific issues: (1) ensuring the EH&S Division Director directs EHSD employees, responsible for performing TAP assessments to enter deficiencies, into LBNL's Corrective Action Tracking System (CATS), (2) emphasizing the importance and requirements of self-assessment to senior Laboratory management, and (3) developing division-specific measures for self-assessment.

The actions to prevent recurrence begin with a gap analysis of the self-assessment program against applicable requirements. The results of this gap analysis will be used to revise the program guidance and manuals. The division self-assessment program will be revised to increase the focus on hands-on work and to include division-specific measures; the ES&H TAP will be revised to also increase the focus on hands-on work; finally, LBNL ES&H peer reviews will receive clearer, formal procedures with the requirements and expectations. Program guidance and manuals will be revised to incorporate these improvements and the results of the gap analysis. Participants in all programs will receive revised training that emphasizes factors relevant to that particular element, including effective observation of hands-on work. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Extent of Condition: The extent of condition for this finding is considered to be institutionally widespread and not limited to single or select divisions within the institution. As these conditions exist in each of the assessed scientific and operations divisions, it is reasonable to believe that this finding has the potential to exist in the balance of the divisions.

HSS CATS Finding Tracking Identifier: LBNL-04/16/2009-0006-I

Manager Responsible for Correcting Finding:

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DOE-BSO Lead Contact:

Donna Spencer BSO Quality Assurance Engineer (510) 486-4363 DMASpencer@lbl.gov

Causal Factors:

1. Require0ments Management: self-assessments did not sufficiently "focus on hands-on work" to fulfill the requirements of DOE Order 226.1A. (D1-4)

2. Communication: formal procedures for conducting MESH reviews are insufficient. (D1-5)

3. Communication: Some division management did not see the value of self-assessment as an improvement tool. (D1-2, 6)

4. Training: Division Self-Assessment teams, MESH review teams, and EHSD subject matter experts (SMEs) lacked sufficient training to effectively perform their assigned reviews. (D1-7)

5. Assurance: Office of Contract Assurance (OCA)/EHSD and Safety Review Committee (SRC) did not establish adequate feedback and improvement systems for ES&H self-assessments. (D1-8)

6. Accountability: Division management and EHSD SMEs are not held accountable for the quality of self-assessments. (See CC2.)

Immediate/Compensatory Actions:

D1-1. EHSD Director instructed EHSD personnel responsible for performing TAP assessments of LBNL's policy, as defined in the ES&H Technical Assurance Program Manual, Report 913E, to enter TAP findings into CATS.

Responsible Individual: Howard Hatayama, Director, EHSD
Date Action was Completed: February 3, 2009
Deliverable to Close Corrective Action: email "Clarification on Entering TAP Findings into CATS."

D1-2. Laboratory Director, Deputy Director, and COO set expectation and need for division-specific ES&H self-assessments at leadership retreat.

Responsible Individual: Jim Krupnick, Chief Operating Officer
Date Action was Completed: September 29, 2008
Deliverable to Close Corrective Action: Retreat presentation

D1-3. Divisions are required to develop division-specific ES&H self-assessment measures for FY 2009.

Responsible Individual: Division Directors
Date Action was Completed: May 30, 2009
Deliverable to Close Corrective Action: Documented division-specific measures.

Actions to Prevent Recurrence:

D1-4. OCA will perform a gap analysis of the LBNL self-assessment program against the applicable requirements of DOE Order 226.1A and DOE Order 414.1C.

Responsible Individual: ES&H Assurance Program Manager
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: July 31, 2009
Deliverable to Close Corrective Action: Documented gap analysis.

D1-5. OCA will update affected self-assessment program guidance and manuals:

- include missing requirements identified by the gap analysis, as appropriate
- emphasize the requirement to observe hands-on work
- improve formal procedures for self-assessments, especially peer reviews
- include division-specific measures/topical assessments in division ISM plans
- develop division-specific self-assessment plans
- update Technical Assurance Assessment Plans to include greater emphasis on observation of work.

Responsible Individual: ES&H Assurance Program Manager
Date Action will be Initiated: August 1, 2009
Date Action will be Completed: April 1, 2010
Deliverable to Close Corrective Action: Revised PUB-3105, *Division Self-Assessment Manual*; Report # LBNL-913E, ES&H Technical Assurance Assessment Program Manual; PUB-5344, *ES&H Self-Assessment Program*; and develop a new manual for peer reviews.

D1-6. Develop plan to communicate action D1-2 by reinforcing and clarifying expectations, needs, and benefits for ES&H self-assessment to line management and provide feedback on division assessment plans, schedules, and reports.

Responsible Individual: ES&H Assurance Program Manager
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: February 1, 2010
Deliverable to Close Corrective Action: Communication plan and copies of the presentation made to the relevant LBNL committees (e.g., DDM, LSAC, SAC, DSC).

D1-7. Develop and/or improve training for personnel performing ES&H self-assessments:

- update division self-assessment training to be consistent with updates to PUB-3105, Division Self-Assessment Manual
- develop TAP training consistent with updates to Report #LBNL-913E, ES&H Technical Assurance Assessment Program Manual
- develop a training plan for peer reviews.

Responsible Individual: ES&H Assurance Program Manager
Date Action will be Initiated: October 1, 2009
Date Action will be Completed: July 1, 2010
Deliverable to Close Corrective Action: Revised training classes.

D1-8. Perform an effectiveness review to validate ES&H Self-Assessment corrective actions.

Responsible Individual: Terry Hamilton, Internal Audit Services
Date Action will be Initiated: April 1, 2011
Date Action will be Completed: July 1, 2011
Deliverable to Close Corrective Action: Documented effectiveness review.

Finding D2: Issues Management

Finding Statement: The LBNL Issues Management Program is not fully effective in ensuring that ES&H-related events, injuries, conditions and program and performance deficiencies are rigorously categorized, analyzed, and corrected, and recurrence controls are established as required by DOE Order 414.1C, *Quality Assurance*, and DOE Order 226.1A, *Implementation of DOE Oversight Policy*.

Action Plan Summary: The corrective actions for this finding are focused on improving LBNL's Issues Management Program (IMP). As an immediate action, LBNL released an enhanced version of its corrective action IT tool (CATS) to address user issues. To improve this program over the longer term, LBNL will perform a gap analysis of the IMP against applicable requirements of DOE Orders 414.1C and 226.1A, benchmark with other DOE facilities, and discuss potential IMP models with LBNL divisions' management. These activities will contribute to a proposed model for an improved IMP that, upon implementation, will address procedure and process updates, training, and communications. To support these efforts, LBNL will post and recruit for a dedicated Issues Management subject matter expert. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Extent of Condition: The extent of condition for this finding is considered to be institutionally wide-spread and not limited to single or select divisions within the institution. As these conditions exist in each of the assessed scientific and operations divisions, it is reasonable to believe that this finding has the potential to exist in the balance of the divisions.

HSS CATS Finding Tracking Identifier: LBNL-04/16/2009-0007-I

Manager Responsible for Correcting Finding:

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DOE-BSO Lead Contact:

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Causal Factors:

1. Requirements management: When the Issues Management Program (IMP) was initiated, the Program's requirements were not always incorporated into other LBNL program documents. (D2-4)

2. Program development: LBNL's approach to ES&H issues management has been reactive rather than proactive (assigning resources to the issues management program only as a result of occurrences). (D2-5, 6, 7)

3. Program development: implementation of IMP is not consistent among divisions. (D2-3, 6, 7)

4. Program development: LBNL has not developed a staffing model for allocating personnel to manage issues and to perform root cause analyses and extent-of-condition reviews. (D2-7, 8, 9)

5. Communication: The IMP Manuals lack specificity regarding rigorously categorizing, analyzing, correcting, and developing recurrence controls and do not clearly communicate the requirements and expectations for issues management. (D2-10, 11)

6. Communication: The expectations for issues management have not been effectively communicated to LBNL staff and senior management. (D2-6, 7, 8, 9)

7. Program development: LBNL does not have a sufficient feedback mechanism to assess and correct the usability of IT tools. (See CC1.)

8. Accountability: Implementing organizations are not held accountable for following the requirements of the IMP. (See CC2.)

Immediate/Compensatory Actions:

D2-1. OCA released the CATS Phase 2 database from development to production.

Responsible Individual: Melanie Gravois, Assurance and Quality Program Manager
Date Action was Completed: February 15, 2009
Deliverable to Close Corrective Action: Upgraded CATS database.

Actions to Prevent Recurrence:

D2-2. LBNL will develop a program for requirements management that addresses internal requirements as well as external requirements. (Corrected by the C4 CAP and not repeated here).

D2-3. OCA will hire a dedicated subject matter expert to manage IMP and support divisions via training and technical guidance.

Responsible Individual: Jim Krupnick, Chief Operating Officer
Date Action will be Initiated: August 1, 2009
Date Action will be Completed: January 1, 2010
Deliverable to Close Corrective Action: Hiring records of dedicated subject matter expert.

D2-4. OCA will perform a gap analysis of the LBNL IMP against the applicable requirements of DOE Order 226.1A and DOE Order 414.1C.

Responsible Individual: Melanie Gravois, Assurance and Quality Program Manager
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: August 31, 2009
Deliverable to Close Corrective Action: Documented gap analysis.

D2-5. LBNL will benchmark with other DOE sites to review their IMPs for regulatory compliance, best practices, and user interface.

Responsible Individual: Melanie Gravois, Assurance and Quality Program Manager
Date Action will be Initiated: September 1, 2009
Date Action will be Completed: January 1, 2010
Deliverable to Close Corrective Action: Documented IMP models for benchmarked DOE sites.

D2-6. OCA will engage management from a sampling of LBNL science and operations divisions on Issues Management Program elements and potential models.

Responsible Individual: Melanie Gravois, Assurance and Quality Program Manager
Date Action will be Initiated: September 1, 2009
Date Action will be Completed: January 1, 2010
Deliverable to Close Corrective Action: Interview schedule and notes.

D2-7. OCA will develop a staffing model for the following:

- issues management administration and implementation
- performing causal analysis and extent-of-condition reviews, which will include the following:
  - structure of the program (few employees performing all analyses and reviews, many employees performing few analysis and reviews, or very few team leaders performing all analyses and reviews with teams composed of employees from divisions, etc.)
  - determining the number of division employees to be trained and/or hired.

Responsible Individual: John Chernowski, Manager, Office of Contract Assurance
Date Action will be Initiated: January 1, 2010
Date Action will be Completed: February 28, 2010
Deliverable to Close Corrective Action: Draft staffing model.

D2-8. LBNL will approve a staffing model per D2-7.

Responsible Individual: Jim Krupnick, Chief Operating Officer
Date Action will be Initiated: March 1, 2010
Date Action will be Completed: April 1, 2010
Deliverable to Close Corrective Action: Approved staffing model.

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D2-9. OCA will revise the *Issues Management Program Manual* (LBNL/ PUB-5519(1)) and *Root Cause Analysis Program Manual* (LBNL/ PUB-5519(2) to incorporate staffing model, additional requirements (as appropriate), and other identified improvements.

Responsible Individual: Melanie Gravois, Assurance and Quality Program Manager
Date Action will be Initiated: January 1, 2010
Date Action will be Completed: May 1, 2010
Deliverable to Close Corrective Action: Revised LBNL/PUB-5519 (1) and LBNL/ PUB-5519(2).

D2-10. OCA will revise the BLI2000 *Issues Management Program* course, to provide adequate guidance on how to develop corrective actions, including those that will prevent recurrence.

Responsible Individual: Melanie Gravois, Assurance and Quality Program Manager
Date Action will be Initiated: May 1, 2010
Date Action will be Completed: August 1, 2010
Deliverable to Close Corrective Action: Revised BLI2000 *Issues Management Program* course.

D2-11. LBNL will implement the staffing model approved in D2-8.

Responsible Individual: Melanie Gravois, Assurance and Quality Program Manager
Date Action will be Initiated: August 1, 2010
Date Action will be Completed: December 1, 2010
Deliverable to Close Corrective Action: Staffing model in place as evidenced by identification of division employees to be trained and/or hired, identification of core training requirements for identified employees, and communication to LBNL staff regarding new Issues Management staffing model.

D2-12. Perform an effectiveness review to validate Issues Management CAP.

Responsible Individual: Terry Hamilton, Internal Audit Services
Date Action will be Initiated: July 1, 2011
Date Action will be Completed: October 1, 2011
Deliverable to Close Corrective Action: Documented effectiveness review.

Finding D3: Injury and Illness Reporting

Finding Statement: LBNL has not established sufficient processes nor implemented a fully effective investigation and reporting program for occupational injuries and illness to identify ISM deficiencies and implement effective recurrence controls as required by DOE Manual 231.1-1A, *Environment Safety and Health Reporting Manual*, DOE Order 414.1C, *Quality Assurance* and DOE Order 226.1A, *Implementation of Department of Energy Oversight Policy*.

Action Plan Summary: The HSS inspection concluded that LBNL has an adequate institutional program to classify, record, and document our occupational injuries and illnesses. However, the HSS inspection and recent LBNL assessments found weaknesses in some of the line-management investigations of injuries and illnesses. The causal analysis found issues related to Requirements Management, Communications, Training, and Assurance. The corrective actions in this CAP will include performance of a gap analysis of the Occupational Injury and Illness Recordkeeping and Reporting (OIIRR) against DOE and LBNL requirements and making appropriate corrections; and restructure the OIIRR program to streamline and simplify the investigation process to ensure that ISM deficiencies are identified and corrective actions from accident investigations are monitored. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Extent of Condition: Site-wide

HSS CATS Finding Tracking Identifier: LBNL-04/16/2009-0008-I

Manager Responsible for Correcting Finding:

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DOE-BSO Lead Contact:

Mary Gross BSO ES&H Division Director (510) 486-4373 MCGross@lbl.gov

Causal Factors:

1. Requirements management: DOE and LBNL requirements for investigation and reporting have not been fully incorporated in the Occupational Injury and Illness Recordkeeping and Reporting (OIIRR) program documents (PUB-3000, Chapter 5.1, Accident Investigation and Reporting). (D3-1, 2, 3, 5)
2. Communications: Existing OIIRR program documents lack sufficient detail to adequately communicate the expectations to participants. These expectations are neither sufficiently documented nor effectively communicated. (D3-2, 3)
3. Training: Current program training requirements for investigating injuries are not effective. (D3-4)
4. Assurance: The LBNL ES&H Technical Assurance Assessment Plan (TAAP) has not been effectively implemented for the OIIRR program. (D3-1, 2, 3)

Immediate/Compensatory Actions:

No immediate or compensatory actions for finding D3.

Actions to Prevent Recurrence:

D3-1. Perform a gap analysis of the OIIRR program against internal and external requirements. Map the resulting requirements against the current OIIRR program requirements and note the crosswalk disconnects.

Responsible Individual: Ross Fisher, Occupational Safety Group, EHSD
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: October 31, 2009
Deliverable to Close Corrective Action: Gap analysis and associated crosswalk.

D3-2. Develop conceptual model of the restructured OIIRR program:

- Based on the gap analysis and associated crosswalk, prepare a model of the restructured OIIRR processes that will effectively investigate and report occupational injuries and illnesses and initiate controls to prevent incident and issues recurrence.
- Solicit stakeholder vision and gain stakeholder acceptance of the proposed program restructure model.

Responsible Individual: Ross Fisher, Occupational Safety Group, EHSD
Date Action will be Initiated: November 1, 2009
Date Action will be Completed: February 28, 2010
Deliverable to Close Corrective Action: Conceptual model and template for restructuring of the OIIRR program.

D3-3. Revise the OIIRR program and procedures:

- revise and clarify program requirements, guidance, roles, and responsibilities
- streamline investigation, reporting, and recordkeeping processes
- add program details that address gaps and issues not otherwise identified
- integrate OIIRR with the other LBNL reporting systems and the Issues Management Program.

Responsible Individual: Ross Fisher, Occupational Safety Group, EHSD
Date Action will be Initiated: March 1, 2010
Date Action will be Completed: October 1, 2010
Deliverable to Close Corrective Action: Published PUB-3000 program documents with descriptions of improved OIIRR processes.

D3-4. Revise training curriculum and train affected LBNL staff to the revised OIIRR program requirements:

- roles and responsibilities
- program structure and details
- interface with LBNL Issues Management Program.

Responsible Individual: Ross Fisher, Occupational Safety Group, EHSD
Date Action will be Initiated: August 1, 2010
Date Action will be Completed: November 30, 2010
Deliverable to Close Corrective Action: Revise applicable EHS courses and train 90% of identified staff.

D3-5. LBNL will centralize the OIIRR process.

Responsible Individual: Howard Hatayama, Director, EHSD
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: October 1, 2009
Deliverable to Close Corrective Action: Assignment letter to a dedicated subject matter expert.

D3-6. Perform an effectiveness review of the OIIRR program to ensure LBNL has established sufficient processes and implemented a fully effective investigation and reporting program to identify ISM deficiencies and implement effective recurrence controls as required by DOE Manual 231.1-1A, *Environment Safety and Health Reporting Manual*; DOE Order 414.1C, *Quality Assurance*; and DOE Order 226.1A, *Implementation of Department of Energy Oversight Policy*.

Responsible Individual: John Chernowski, Manager, Office of Contract Assurance
Date Action will be Initiated: July 1, 2011
Date Action will be Completed: October 1, 2011
Deliverable to Close Corrective Action: Documented effectiveness review.

Finding D4: Lessons Learned

Finding Statement: LBNL has not established and implemented a fully effective lessons learned program that demonstrates application of some pertinent externally generated lessons learned as required by DOE Order 210.2, *DOE Corporate Operating Experience Program*, and DOE Order 226.1A, *Implementation of DOE Oversight Policy*.

Action Plan Summary: The corrective actions for this finding are focused on improving LBNL's Lessons Learned and Best Practices Program. As an immediate action, the LBNL Lessons Learned Administrator signed up for the pertinent external lessons learned sources outlined in DOE Order 210.2 and attended a DOE Operating Experience Conference to gain further understanding of DOE resources and speak with other sites regarding their Lessons Learned programs. To improve this Program over the longer term, LBNL will perform a gap analysis between our current Lessons Learned Program and the requirements within DOE Orders 210.2 and 226.1A; develop and clarify roles, responsibilities, and expectations for SMEs for Lessons Learned actions; and revise the existing program manual to meet these requirements. Additional actions include incorporating lessons learned feedback into the Division Self-Assessment Program.

Extent of Condition: Site-wide

HSS CATS Finding Tracking Identifier: LBNL-04/16/2009-0009-I

Manager Responsible for Correcting Finding:

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Causal Factors:

1. Requirements management: decentralized approach to implementing the Lessons Learned Program did not satisfy all of the DOE Order 210.2 requirements. (D4-1, 2, 3, 4)

2. Specificity on the DOE HQ HSS Web site regarding the location of all required DOE Order 210.2 Lessons Learned sources is lacking. (D4-4)

3. Communication: OCA did not adequately identify Roles and Responsibilities, specifically for the institutional Lessons Learned Administrator. (D4-5)

4. Assurance: OCA has not established criteria/metrics for performing effectiveness reviews for lessons learned. (D4-6, 7)

Immediate/Compensatory Actions:

D4-1. The institutional Lessons Learned Administrator signed up for the pertinent external lessons learned sources outlined in DOE Order 210.2.

Responsible Individual: Melanie Gravois, Assurance and Quality Program Manager
Date Action was Completed: February 6, 2009
Deliverable to Close Corrective Action: Communication from DOE HQ or other evidence that the institutional Lessons Learned Administrator is signed up for all pertinent external Lessons Learned sources outlined in DOE Order 210.2.

D4-2. The institutional Lessons Learned Administrator will attend the DOE Operating Experience conference held in Carlsbad, New Mexico.

Responsible Individual: Melanie Gravois, Assurance and Quality Program Manager
Date Action was Initiated: March 27, 2009
Date Action was Completed: April 29, 2009
Deliverable to Close Corrective Action: The attendance sheet, name tag, or other evidence of attendance at the Operating Experience Conference with the institutional Lessons Learned Administrator's name on it.

Actions to Prevent Recurrence:

D4-3. OCA will perform a gap analysis of the current Lessons Learned and Best Practices Program against the DOE Order 210.2 and Order 226.1A requirements; identify potential improvements; and revise the Lessons Learned and Best Practices Programs, as appropriate.

Responsible Individual: Melanie Gravois, Assurance and Quality Program Manager
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: July 31, 2009
Deliverable to Close Corrective Action: Documented gap analysis.

D4-4. OCA will verify with DOE HQ that the institutional Lessons Learned Administrator is signed up for all pertinent external Lessons Learned sources outlined in DOE Order 210.2 and located on the DOE HQ Web site.

Responsible Individual: Melanie Gravois, Assurance and Quality Program Manager
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: July 31, 2009
Deliverable to Close Corrective Action: Documented verification statement.

D4-5. LBNL will develop roles, responsibilities, and expectations for the following:

- institutional Lessons Learned Administrator
- subject matter experts (SMEs) with regard to review and incorporation of external Lessons Learned into the institutional Lessons Learned Program.

Responsible Individual: Melanie Gravois, Assurance and Quality Program Manager
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: October 1, 2009
Deliverable to Close Corrective Action: Revised PUB-5519 (4), *Lessons Learned and Best Practices Program Manual*.

D4-6. OCA will incorporate Lessons Learned feedback into the Division Self-Assessment Program.

Responsible Individual: John Chernowski, Manager, Office of Contract Assurance
Date Action will be Initiated: October 1, 2009
Date Action will be Completed: March 1, 2010
Deliverable to Close Corrective Action: Revised PUB-3105, *Division ES&H Self-Assessment Manual*.

D4-7. Perform an effectiveness review of the Lessons Learned and Best Practices corrective actions.

Responsible Individual: Terry Hamilton, Internal Audit Service
Date Action will be Initiated: October 1, 2010
Date Action will be Completed: February 1, 2011
Deliverable to Close Corrective Action: Documented effectiveness review.

Finding E1: Chemical Management

Finding Statement: LBNL has not implemented an effective process to ensure that: all hazardous chemicals are captured in the CMS; all secondary containers, except for immediate use, are appropriately labeled with the identity of the hazardous chemical and appropriate warnings; and chemicals are properly stored, as required by 29 CFR 1910.1200, *Hazard Communication*; 29 CFR 1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories*; or the LBNL CHSP.

Action Plan Summary: The objective of these corrective actions is to improve the implementation of the Chemical Management System (CMS) program to achieve compliance with 29 CFR 1910.1200, *Hazard Communication,* and 29 CFR 1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories*. As opposed to most of the previous findings, the major causes of this finding were centered on the inconsistent implementation of the program, with only minor contributions from programmatic design.

Based on the causal analysis, the corrective actions will address the full and appropriate implementation of the Chemical Management System program in the shops and laboratories. The initial corrective actions will verify that the existing policies satisfy current requirements, and if not, identify needed modifications. Once this has been accomplished, the *Chemical Hygiene and Safety Plan* (CHSP) and the CMS program will be revised to address needed modifications and to clearly articulate LBNL requirements for the tracking, labeling, and storage of hazardous chemicals. The CHSP and CMS TAAP will be revised to more effectively assess the performance of these programs. Casual factors associated with document control and communications of these Laboratory policies are addressed in finding C4. An effectiveness review will be done to assure that concerns raised in this finding have been adequately addressed.

Extent of Condition: Since the CMS is an institutional program used throughout most divisions of LBNL, the extent of condition is site-wide.

HSS CATS Finding Tracking Identifier: LBNL-04/16/2009-0010-I

Manager Responsible for Correcting Finding:

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DOE-BSO Lead Contact:

Mary Gross BSO ES&H Division Director (510) 486-4373 MCGross@lbl.gov

Causal Factors:

1. Program Development: LBNL does not have an effective process for developing and reviewing guidelines. (E1-4, CC1)

2. Requirements Management: Tracking materials that are non-hazardous in storage but can produce hazardous aerosols when used (welding rods and grinding wheels) was not addressed by the CHSP and the CMS program managers and therefore was not addressed in the CMS procedures. In addition, the CMS and CHSP program managers believed that tracking primary containers obviated the need to track secondary containers. (E1-1, 2, 3, 5)

3. Communication: The CMS tracking process guidelines are neither clearly defined nor effectively communicated. (E1-4)

4. Program Development: The CHSP combines the Occupational Safety and Health Administration (OSHA) Hazard Communication and the OSHA Laboratory Standards into one program. The OSHA Laboratory Standard doesn't have secondary container labeling requirements. Therefore the HazCom Standard's labeling rules were used. It is not clear to users how to apply these rules in lab settings. (E1-1, 3, 4)

5. Communication: The CHSP combines requirements and recommendations in the Storage Section but does not always distinguish one from the other, and hazard determination guidelines are difficult to locate. (E1-4)

6. Accountability: Employees are not held accountable for fulfilling either CMS tracking or hazardous materials labeling and storage requirements. (E1-5, 6, CC2)

7. Assurance: The CHSP and CMS program managers did not know that components were being removed from kits and therefore were not aware that CMS tracking guidance was needed. (E1-6)

Immediate/Compensatory Actions:

No immediate or compensatory actions for finding E1.

Actions to Prevent Recurrence:

E1-1. LBNL will define the proper regulatory framework for laboratory and non-laboratory occupational setting. Specific items to be considered include:

- the application of the OSHA HazCom Standards versus the OSHA Laboratory Standards to research laboratories
- the limits on the use and storage of solvents per the California Building Code.

Responsible Individual: Don Lucas, Deputy Division Director, EHSD
Date Action will be Initiated: July 1, 2009
Date Action will be Completed: November 1, 2009
Deliverable to Close Corrective Action: A documented determination of how regulations such as OSHA HazCom and OSHA Laboratory Standards apply to different occupational settings. A determination if the potential exists for exceeding solvent limits.

E1-2. Based on the recommendations and deliverables identified through requirements analysis, the CMS Program Manager will update the CMS program to clarify which materials and/or containers must be entered into CMS. The requirements analysis will include the following actions:

- perform a gap analysis of the CMS requirements versus the OSHA HazCom and OSHA Laboratory Standards emphasizing the following issues:
  - individual components of prepackaged chemical kits
  - consumables such as welding rods, solder, and grinding wheels
  - contents of secondary containers
- benchmarking other DOE sites to compare how they address the regulations
- discuss the changes in the CMS guidelines with user groups and incorporate their input
- clearly define CMS tracking guidelines.

Responsible Individual: Lee Aleksich, CMS Program Manager, EHSD
Date Action will be Initiated: November 1, 2009
Date Action will be Completed: April 1, 2010
Deliverable to Close Corrective Action: Recommendation for upgraded CMS program.

E1-3. Based on the recommendations and deliverables identified through requirements analysis the CHSP Program Manager will update the CHSP to clarify: (1) labeling requirements for secondary containers and (2) storage requirements. The following items will also be addressed:

- review of the OSHA HazCom and OSHA Laboratory Standards to identify the requirements for:
    - labeling secondary containers with hazard warnings
    - use of abbreviations to identify contents of secondary containers
- review of the CHSP storage guidelines and clearly differentiate between what is required and what is recommended
- clarify when drip trays are required
- revise the CHSP to incorporate these changes in accordance with LBNL policy (see E1-1).
- discuss the changes in the CHSP with user groups and incorporate their input.

Responsible Individual: Larry McLouth, CHSP Program Manager, EHSD
Date Action will be Initiated: November 1, 2009
Date Action will be Completed: March 1, 2010
Deliverable to Close Corrective Action: Recommendation for upgraded CHSP program to EHSD Director.

E1-4. LBNL will implement the new CMS and CHSP programs. Specifically:

- If necessary, IT will modify existing software to accommodate changes in procedures
- EHSD will update CHSP training
- EHSD Industrial Hygiene will update guidance manuals

Responsible Individual: Howard Hatayama, Director, EHSD
Date Action will be Initiated: June 1, 2010
Date Action will be Completed: June 1, 2011
Deliverable to Close Corrective Action: Updated CHSP chemical tracking software, training programs, PUB-5341 *Chemical Hygiene and Safety Plan*, and other guidance documents.

The completion date for this corrective action may be revised based on the results of the requirements analysis, benchmarking, and identification of user requirements. LBNL will work with BSO and DOE Office of Science for appropriate review and approval prior to making any changes to this CAP.

E1-5. To review the effectiveness of these actions, the CHSP and CMS TAAPs will be updated, to include the following:

- field observations of tracking of containers in CMS
- field observations of chemical labeling
- field observations of chemicals storage.

Responsible Individual: Paul Blodgett, Industrial Hygiene Manager, EHSD
Date Action will be Initiated: July 1, 2011
Date Action will be Completed: September 1, 2011
Deliverable to Close Corrective Action: Revised CHSP and CMS TAAPs.

E1-6. Perform an effectiveness review to validate that the new Chemical Management System Program is compliant with 29 CFR 1910.1200, *Hazard Communication,* and 29 CFR 1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories*. This review will include an assessment of:

- appropriateness of the corrective actions
- effectiveness with regards to implementation of the corrective actions
- improved performance with respect to addressing the finding
- sustainability of improvements.

Responsible Individual: John Chernowski, Manager, Office of Contract Assurance
Date Action will be Initiated: December 1, 2011
Date Action will be Completed: March 1, 2012
Deliverable to Close Corrective Action: Documented effectiveness review