Stanford Linear Accelerator Center
Operated for the U.S. Department of Energy by Stanford University

2001 ES&H Self-Assessment Report

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Year 2001 Environment, Safety & Health Self-Assessment Report

I. Purpose of this Document

This document summarizes SLAC's efforts to assess the health of the laboratory's Integrated Safety Management Systems. This document summarizes the outcome of each self-assessment (SA) tool; summarizes SLAC's Environment, Safety, and Health (ES&H) performance, provides a detailed record of the SA process, and then examines the combined information to drawn conclusions about the overall health of Safety Management Systems (in Department of Energy terminology "Safety" includes ES&H) at SLAC.

II. Executive Summary

The 2001 self-assessment process uses 6 specially designed tools:

- DOE/SLAC Quarterly Integrated Safety Management System (ISMS) Reviews
- Talk, Walk, Clean (TWC) Program
- Line Management /Building Management Assessment Program
- Worker Initiated Assessments/Behavior Based Safety Program (BBSP)
- Independent Assessments
- Performance Measures

These tools were used to determine the health of the Safety Management Systems and the health of ES&H performance at the laboratory. This process suggested that the safety management systems at the laboratory are effective and achieving desired results.

III. Overview of the 2001 Self-Assessment Process

The SLAC SA program was designed to evaluate the effectiveness of the ES&H program at SLAC. The SA process has been designed to be integrated with, and support the SLAC ISMS required under the university's contract with DOE. This report will cover all six specially designed tools used in the 2001 SA process:

- DOE/SLAC Quarterly ISMS Reviews
- Talk, Walk, Clean (TWC) Program
- Line Management /Building Management Assessment Program
- Worker Initiated Assessments/Behavior Based Safety Program (BBSP)
- Independent Assessments
- Performance Measures

Evaluating the overall integration of ES&H into SLAC management and work practices at all levels is a fundamental part of the self-assessment process. Successful management of ES&H at SLAC requires the development and implementation of management systems which integrate ES&H into the fiber of the laboratory. These safety management systems

specify who is required to develop and implement the programs. Another basic part of the overall assessment process is evaluation of the ES&H performance that is achieved as measured by the "Performance Measures" required under the SLAC/DOE Management and Operations contract. The parts of the institution involved in each the six self-assessment tools are summarized below:

	Level within Institution	**Self- Assessment Tool**
	Major Department or Project Within Institution	DOE/SLAC Quarterly ISMS Reviews
	Division, Department, Groups or Employees	Talk, Walk, Clean Program
	Division, Departments, Groups or Employees	Line Management/Building Management Assessment Program
	Employees	Worker Initiated Assessments/ Behavior Based Safety Program (BBSP)
	Divisions, Departments, Groups or Projects	Independent Assessment of Compliance by Third Party
	Institution-wide	DOE Performance Measures

The joint DOE/SLAC ISMS Reviews are a new element of the overall self-assessment process. On a quarterly basis, DOE and SLAC partner to examine the effectiveness of ES&H safety management systems within a selected area or activity within the laboratory. This self-assessment tool is specifically designed to determine how well the ISMS process is being implemented at the facility.

The laboratory has conducted a Safety and Environmental standdown for the past six years. This annual event was significantly revised (beginning in 2000) into the Talk, Walk, Clean program. This program was designed to identify and correct behavioral, procedural, managerial and facility safety and environmental concerns. The TWC program allows groups to choose one of three options: the traditional Safety and Environmental Discussion, or a Walk-through inspection of a predetermined area, or a Clean-up activity for a pre-designated area.

Associate Directors, Managers, and Building Managers continued to perform inspections and walkthroughs of SLAC areas and buildings through the Line Manager and Building Manager Assessment process. Recognizing the Building Manager's role as essential to maintaining a safe and healthy workplace at SLAC, the Building Manager Program was revised this year. The Building Manager Steering Committee and the Division Building Manager Coordinator roles were created to support Building Managers, the *Building Manager Program Manual* was rewritten, and a role-specific Building Manager training program was implemented. Associate Directors' and Managers' walkthrough inspections continued to bring management and workers together to review and discuss safety concerns and issues.

The worker initiated assessment process, a Behavior Based Safety Program (BBSP) continued with the implementation of Phase II in the Mechanical Fabrication Department of the *Prevent Accidents Work Safe (PAWS)* activity. PAWS is in the data collection stage. The original *Safety Towards Avoiding Risk Today* (*START*) Program is continuing. BBSP is a process that uses peer-to-peer observation of safety-related behavior followed

by positive verbal feedback, data collection, and problem solving to identify and correct at-risk behaviors and the management systems that produce them. The BBSP does not involve supervisors or safety department personnel trying to change behaviors.

Over the past three years, URS (formally known as Dames and Moore) has conducted two independent assessments per year of ES&H compliance at the SLAC facility. These assessments were used to verify that existing management systems yield compliance assurance and to provide a mechanism to promote continuous improvement. In the past year, URS conducted two independent ES&H assessments at SLAC. Each assessment was conducted over a four-day period and included site visits, compliance document reviews, and interviews with facility personnel. Findings were categorized into many different categories and four levels. Level one was the most serious and level four the least serious.

The Performance Measures section of this report summarizes "outcome measures" which provided results such as rates of injuries and "process measures" which show progress toward completion of management milestones. DOE and SLAC work together to define the performance measures that will be used to evaluate the effectiveness of the ES&H programs at SLAC. Generally, the performance measures fall into one of four categories:

- Anticipate, identify, evaluate and control personnel hazards
- Perform work in a way that does not present a threat of harm to the pubic or the environment and identify, control and respond to environmental hazards
- Minimize or manage hazardous and radioactive waste generated and restore the site where appropriate
- Integrate ISMS into the management and work practices at the institutional, site and activities levels to protect employees, the public and the environment

The DOE Performance Measures process is described in the Overview of Results section below.

IV. Overview of the 2001 Self-Assessment Results

The self-assessments of ES&H management systems and ES&H results suggested that the laboratory management systems are effective in meeting the seven guiding principles and five core functions of ISMS requirements. The ISMS requirements are sufficiently detailed to identify gaps that provide opportunity for improvement. This general conclusion was drawn from the information obtained from all six elements of this year's SA Process. The results are summarized below:

A. DOE/SLAC Quarterly ISMS Reviews

During Fiscal Year 2000 (10/1/00-9/30/01), the Construction Subcontracting Process, Final Focus Test Beam Experimental Operations, the Stanford Synchrotron Radiation Laboratory Beam Line Operations, and Site Engineering and Maintenance (SEM) activities were evaluated by joint DOE/SLAC review

teams. In all cases, the review teams found that management and staff demonstrated commitment to safety as a part of their line management roles and responsibilities and a series of noteworthy practices, strengths and weaknesses. With all four assessments, the number of noteworthy practices and strengths significantly outnumbered the opportunities for improvements. The following table summarizes the Quarterly ISMS reviews:

Topic	Noteworthy Practices	Strengths	Opportunities for Improvement
Construction Subcontracting	0	11	7
Final Focus Test Beam	2	11	3
Stanford Synchrotron Radiation Lab.	8	22	10
Site Engineering & Maintenance	1	3	7
Total	11	45	27

One of the four reviews provided a summary conclusion which read: "The ISM[S] Review Team concluded that the SSRL Beam Line Operations demonstrated effective integration of ISM[S] in 6 of the 7 SLAC ISM[S] elements."

Evaluating all four reviews as a whole suggested that ES&H was integrated into the activities evaluated in FY01. In total, the strengths and noteworthy practices of the systems outnumbered the opportunities by more than two to one.

B. Talk, Walk, Clean (TWC) Program

The results of the TWC program can be gauged by the degree of staff involvement, and scale of information and materials associated with the program. As in previous years, the Director, Associate Directors, and the vast majority of staff participated directly in the program. In the Talk effort, 37 ES&H issues were identified and reviewed for the appropriate corrective action plans. In the Walk program, 20 walk-through inspections were performed, identifying and removing hundreds of ES&H facility-related deficiencies. The Clean program contributed to making the work areas more safe and orderly by removing 32 cubic yards of scrap metal, 3.5 tons of cardboard and paper, and salvaging 16 pallets of materials. These efforts contributed significantly to the health of management systems, and the facility's operations as a whole.

C. Line Management /Building Management Assessment Program

Line Management assessments were conducted on a regular basis. Line management assessments included, but were not limited to those reported to the ES&H Coordinating Council (ES&HCC). The ES&HCC minutes provide a record of assessed activities. In addition, the Building Manager program involved an annual safety walk-through coordinated by Building Managers.

D. Worker Initiated Assessments/Behavior Based Safety Program (BBSP)

A traditional measure of the progress of BBSP activities is the number of worker observations that are occurring in the workplace. With the advent of a second BBSP team (called PAWS), the number of observation visits associated with this program stood at 628, with 6,730 individual behaviors observed. A second typical measure of success is the "percent safe," which is defined as the percentage of behaviors observed where the safe behavior (correct behavior) is demonstrated. Overall the percent safe was 91% since the start of the program, which was considered a good number for this stage of the process. A linear trend line analysis of percent safe for the original BBSP team (called START) indicated that between the period of November 1999 to September 2001 the percent safe climbed from about 85% to 95%. The PAWS percent safe has ranged in the first six months of the program from 88% to 98% safe based on a small sample size.

E. Independent Assessments

The first independent assessment focused on Health and Safety was held September 18-22, 2000. This assessment addressed:
1) General Health and Safety, 2) Industrial Hygiene; 3) Electrical Safety; 4) TSCA/PCBs; and 5) asbestos. During this assessment nine findings were reported: three at level two, three at level two/three, and fifty-three at level three. As of October 24, 2001 all of these findings had been corrected. About one quarter were completed within 30 days, and half within 60 days of the findings.

The second assessment, focused on Environmental Protection, was held April 9-13, 2001 and addressed: 1) Hazardous Materials Management, Waste Management, and Waste Treatment; 2) Medical Waste Assessment; 3) Air Quality Assessment; and 3) Radioactive Material Management. In general, URS characterized four of these six areas as being in good condition. No characterization and few findings were reported for the other two. Specifically, during the assessment 72 level three findings were identified. As of September 21, 2001 all but five of these findings had been corrected. About one quarter were completed within 30 days, and half within 60 days of the findings. The outstanding five were to be completed by the end of calendar year 2001.

F. Performance Measures

DOE assesses performance and assigns the points awarded. However, the performance criteria, performance measures and performance assumptions permit a preliminary assessment of overall performance. Of the 17 criteria that were to be evaluated, preliminary assessment could be made on eight. Of these eight, four were expected to be outstanding and four excellent. If the evaluations available were predictive of the remainder, we would expect about half of the evaluations to be outstanding and the remainder excellent.

G. Conclusion

Self-assessment of the overall Safety Management Systems, as well as the components of those management systems, suggest that SLAC's ISMS process was effective. Moreover, SLAC ES&H performance supported this conclusion.

V. Relationship of Self-Assessment to the ISMS Process

New this year was a joint DOE/SLAC quarterly review of the level of implementation of the ISMS program. This process has been incorporated into the overall SA effort, and is provided as Appendices A1-A4. Four quarterly reviews were conducted since the last Year 2000 SA report covering: 1) the Construction Subcontracting process, 2) the Final Focus Test Beam facility, 3) SSRL Beam Line Operations, and 4) Site and Engineering Maintenance activities. Each report provided a review of noteworthy practices, strengths and opportunities for improvement.

In addition to the ISMS review process, the other five elements of the SA served an important role in assuring that the Seven Guiding Principles (GP) and five Core Functions (CF) as defined in the SLAC Integrated Safety Management System document were carried out at the working level.

VI. Detailed Discussion of 2001 Self-Assessment Activities/Results

A. DOE/SLAC Quarterly ISMS Reviews

A detailed treatment of all ISMS reviews is provided in the reports contained in Appendices A1-A4.

B. TALK/WALK/CLEAN (TWC) Program

A detailed treatment of the TWC Program is provided in Appendix B with the TWC Program Report.

C. Line Management/Building Manager Assessments

A program of structured line management and building manager assessments continue to be a part of the overall self-assessment effort. These activities were summarized routinely through a quarterly report from each Division to the ES&H Coordinating Council (ES&HCC). These reports included but were not limited to activities such as walk-throughs of buildings and projects, updates of the status of administrative concerns such as training, identification of emerging ES&H issues, and lessons learned as identified by the Divisions. Divisional Safety Coordinators routinely query key individuals within their divisions to prepare information for these reports. Detailed records of these line inspections were maintained by the

line supervisors, Building Managers, and Division Safety Coordinators. Records of the Divisional Quarterly Reports to the ES&HCC are maintained by the staff person for the ES&HCC.

D. Worker Initiated Assessment Program

As previously described the worker initiated assessment program is a behavior based safety process. This peer-review process is designed to allow workers to initiate an assessment of both safe and at-risk behaviors and to generate recommendations to improve workplace safety. The objective of BBSP is to reduce the probability of an employee sustaining an injury or illness. Figure 1 shows the lines of communication in BBSP, and where some of the guiding principles and core functions of ISMS fit in the process.

1. BBSP Process

The key teams for identifying and analyzing safe and at-risk behaviors were called START (Safety Toward Avoiding Risk Today) and PAWS (Prevent Accidents Work Safe). START consisted of employees from the Site Engineering and Maintenance (SEM) and the Operational Health Physics (OHP) Departments. The START Team was the group that participated in the BBSP Pilot study, considered Phase I of BBSP. PAWS consisted of employees from the Mechanical Fabrication Department (MFD) and represented the second implementation or Phase II of BBSP at SLAC.

The teams were divided into two functional sections: the Steering Committee and Observers. Observers worked with peers to identify and provide feedback on at-risk and safe behaviors. The Steering Committee analyzed at-risk behaviors within their respective work groups. The Steering Committee provided team suggestions to the appropriate Citizen Committees and SLAC departments to effect changes in work environments or safety policies or procedures. A management sponsor, a member of the ES&H Coordinating Council, is a direct management contact for the teams to provide guidance and resources needed to effect changes in work environments or safety policies and procedures. The management sponsor also helps keep team suggestions and the BBSP visible to upper management.

Prior to initiating the BBSP process, the SLAC Union Steward and members of the SLAC Bargaining Unit participated in a meeting to discuss the BBSP process. Bargaining Unit members participated as Steering Committee members and Observers.

The BBSP process consisted of five major steps shown in Figure 1 (See page 10):

1. Team peers and workers identified safe and at-risk behaviors.
2. Team provided analysis of worker-initiated feedback.
3. Team analyzed behaviors and barriers to safety.
4. Team identifies barriers and communicated suggestions toward improving safety.
5. Changes were made in work environments, policies, procedures or guidelines to improve safety.

The teams could bring recommendations for addressing at-risk behaviors to the Safety, Health and Assurance (SHA) Department, Operating Safety Committee, SLAC Citizen Committees or to department heads, project managers, safety managers, University Technical Representatives (UTR), or others that could provide changes to the work environment. These changes were used to eliminate safety barriers that were originally identified in the worker initiated observations and could also be presented to effect changes throughout the entire SLAC site (a feedback mechanism as shown in Step 5 above, ISMS CF5).

2. Management Participation

SLAC management has been indirectly involved in the BBSP process in tasks ranging from ES&HCC approval of funding for BBSP, to an employee who needs time for observations. On-going meetings were scheduled for the ES&HCC to be informed of the BBSP successes. The managers and supervisors within OHP, SEM, and MFD actively worked with the Steering Committee and Observers to participate in observations, to attend ownership meetings, and to avert scheduling and budgetary constraints.

3. Milestones

3.1 On-going Action Items for START:

- Identification of Critical Behaviors, Observations (Data Collection & Feedback), Reduction/Elimination of Barriers, and Action Planning

3.2 Action Items for PAWS:

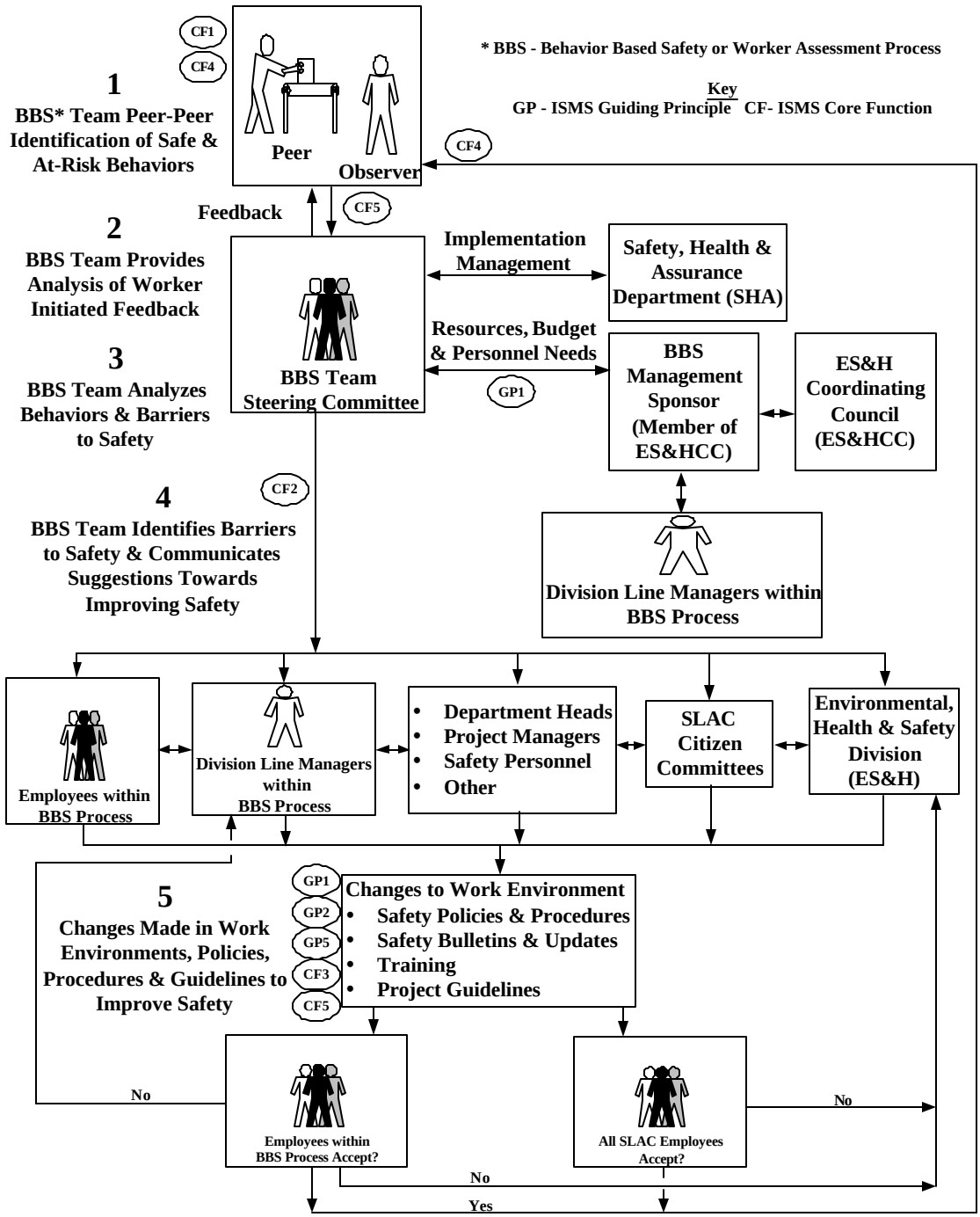
- Observation (Data Collection)
- Behavior Action Planning
- Behavior Based Safety Program Review

4. Observations, Data Generation, and Action Planning

Appendix H provides a summary of observation results from the BBSP. Since initiation of the BBSP process, over 750 observations have been conducted. During the observation and feedback process, data and information were collected. The data were then entered into a software database where reports could be generated to ascertain specific information with respect to at-risk behavior trends. These data were used by the Steering Committees (PAWS or START) to generate action plans. To produce quantifiable data, reports were generated and reviewed by the Steering Committees. The review process, a method of quality control, ensured that correct barriers to safety were identified by consensus and entered into the database. Along with barriers to safety, detail of observations, appropriateness of the categories, and feedback levels are reviewed to ensure that entry personnel correctly interpreted these items. The database was modified to reflect any changes from the review process. The barrier reports were generated from the database to aid in the Action Planning phase.

The Action Planning phase required quantifiable data to develop the steps necessary to address an at-risk behavior trend. After a trend was identified, an action plan was generated to inform at-risk work group(s). The Steering Committees sought assistance from employees who may or may not have worked within the targeted population for BBSP. With respect to the last action plan, the Steering Committee needed assistance from individuals within the following departments: SHA, Training, OHP, and SEM.

Figure 1
Worker-Initiated Assessment Process - Lines of Communication and Relationships to the Integrated Safety Management System



E. Independent Assessments

The program of independent assessments was coordinated by the Quality Assurance and Compliance (QAC) Group in the Safety, Health and Assurance (SHA) Department. Independent assessments included three major elements: 1) multi-disciplinary assessment of projects from ES&H and building code requirements by ES&H Division professionals, 2) safety and environmental field surveillance by QAC personnel, and 3) subcontracted multi-disciplinary semi-annual audits, provided by URS. All three activities provided assurance that applicable regulations, ISMS, and other requirements were implemented.

Multi-disciplinary assessments for SLAC projects continued to be numerous this year, and are on record in QAC. Safety and environmental field surveillance activity is also an ongoing activities, with unresolved issues tracked by the ES&H Division's Program Planning Office.

Results from the first URS assessment indicate that the programs were in good condition. The most noteworthy improvement areas provided are summarized below.

General Health and Safety

Various general health and safety concerns were reported. The most significant in the view of the assessors was a hardhat violation and a trenching situation.

Industrial Hygiene

A recommendation was offered that the logic to establish the IH sampling program should be provided.

Electrical Safety

A few deficiencies were reported, including grounding and GFCI testing.

TSCA/PCBs/Asbestos

No significant issues reported.

During the second URS assessment, three of the four areas were generally in good condition, and the following improvements were suggested.

Hazardous Materials Management, Waste Management, and Waste Treatment

Activities associated with Hazardous Materials and Waste Management were generally in good condition with opportunities for improvements identified in the areas of container management and documentation. For example, while the required hazardous materials documentation was prepared and available, improvements were suggested in container management (including type, labeling, securing, segregating, and use of secondary containment). Similarly, while activities managed by the Waste Management Department were found to be in good condition, improvements were suggested in container management and training in the waste accumulation and generation areas. Lastly, while the activities associated with Hazardous Waste Treatment are in good condition, improvements were suggested in secondary containment management and documentation (certain training records and inspections).

Medical Waste Assessment

Areas for potential improvement include making a determination of the volume generated and applicability for regulations relating to registrations and Medical Waste Management Plans.

Air Quality Assessment

Overall, SLAC appears in compliance with the air quality requirements while improvements are suggested in the documentation of information regarding use of boilers and back-up boilers.

Radioactive Material and Waste Management Program Radiation Protection Program

Overall, SLAC has an effective program to address occupational radiation protection, personnel dosimetry, and radioactive waste management. Sufficient management and operational controls are in place to recognize and address existing and potential radiation hazards from the use of radioactive materials and radiation devices. Opportunities for improvement exist in the area of instrument calibration and accreditation documentation.

F. Performance Measures

The laboratory uses performance measures to track ES&H progress each quarter. The performance measures consist of: 1) outcome measures, which provide results such as injury rate (known as lagging indicators), and 2) process measures, which show progress toward completion of management programs such as the behavior based safety (known as leading indicators)

Performance measure information is provided in Appendix I. Overall, good progress was made in ES&H performance as demonstrated by the specific information provided in Appendix I.

APPENDICES

APPENDIX A.1
SLAC Integrated Safety Management (ISM) Implementation
Quarterly Review Report

A1- FY01 ISM Review Area #1:
Construction Subcontracting

FY01 ISM Review Area #1: Construction Subcontracting

ISM Review Dates: November 29-30, 2000-December 1, 2000
ISM Review Team: D. Osugi (SSO), R. Haddock (OAK), J. Fry (SLAC), R. Todaro (SLAC)

SLAC Participants:

R. Todaro (PUR)
B. Goodman (PUR)
J. Hubbard (PUR)
G. Byam (PUR)
L. Klaisner (TD)
B. Skaggs (SEM)
N. McMahon (SEM/UTR)
H. Shin (SEM/UTR)
D. Saenz (SEM/UTR)
Ali Farvid (MFD)
J. Hahn (SHA)

SLAC Contractors

B. Hayter (Psychrometric Systems, Inc.)
D. Duval (Continental Roofing)

ISM Review Documents:

- SLAC Integrated Safety Management (ISM) Quarterly Review Objective, Criteria and Approach
- SLAC University Technical Representative Guide, Rev. 1, October 2000
- SLAC Instructions to Bidders for Fixed Price Construction Subcontracts and Purchase Orders, Rev. 2, October 2000
- Pre-Work Hazards Analysis Checklist
- SLAC Terms and Conditions for Construction Work (Under $10,000)
- SLAC ISMS Pre-Work Safety Checklist
- Investigative Report for Preliminary Notification Report Number ESH-234, December 1, 2000
- Psychrometric Systems Inc.(PSI) Safety Manual 2000
- Honda Landscape and Maintenance, Inc. Safety Program
- Honda Landscape and Maintenance, Inc. Safety Program Meeting Notes
- SLAC Integrated Safety Management System
- Business Services Procedure, 41-11, "Emergency Procurements", January 1, 2000
- Integrated Safety Management System Guide, Figure 6., "Matrix for Use in Review of Existing System", May 27, 1999

Performance Objective: SLAC effectively integrates ISM into all management and work practices at institutional, site and activity levels so that missions are accomplished while protecting the worker, the public and the environment.

Scope

The ISM review team identified four subcontracting activities at SLAC as representative of SLAC subcontracting activities. The four selected for the review included: 1) Sector 20 cooling tower installation, 2) Linear Coherent Light Source (LCLS) stairs installation project, 3) emergency and routine roof maintenance and repair and 4) landscaping.

The scope of this ISM review included an assessment of the effectiveness of ISM implementation in the SLAC construction subcontracting process including the SLAC contract bid and award process and line management oversight of construction subcontractor activities. The review team evaluated the involvement of subcontractors in safety reviews and work planning activities and the role of SLAC line management and support elements in defining appropriate safety practices, conveying safety and site work requirements, communicating site hazards, overseeing safety activities and imposing methods to ensure safety compliance.

The review consisted of interviews of SLAC line managers, workers and subcontractors, review of safety documentation (e.g., manuals, policies and procedures), field observations at the Sector 20 cooling tower and LCLS stairs installation projects and related documentation of work processes. A SLAC Purchasing Department safety meeting to discuss SLAC contractor landscaping activities was attended.

The evaluation was based on the criteria identified in the SLAC Integrated Safety Management System Description document that outlines how SLAC integrates the ISMS seven Guiding Principles and five Core Functions into all management systems and work practices at the institutional, site and activity levels. The review is the first of four quarterly SLAC ISM implementation reviews planned in FY01. The collective results of the four reviews will be used as the basis for determining how well SLAC has met the performance objective on ISM implementation.

Guiding Principles 1 and 2, Line Management Responsibility for Safety: Roles and Responsibilities

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

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

Strengths:

- *Discussions with SLAC line management found they were committed to safety in their contractor oversight roles. University Technical Representatives (UTRs) and contracting personnel demonstrated awareness of their safety roles and responsibilities pertaining to SLAC oversight of contractors.*

Opportunities for Improvement:

- *SLAC UTRs should ensure that their oversight role includes review of contractor roles and responsibilities prior to initiating work (e.g., review of contractor health and safety plans). Review of contractor health and safety plans should be integrated into pre-work planning activities to ensure that SLAC's expectations of contractor performance in ES&H is documented and communicated to subcontractors.*

Guiding Principle 3, Competence Commensurate with Responsibilities

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

Strengths:

- SLAC line management and support divisions have clear understanding of their training needs (e.g., OSHA construction safety training, UTR training). 26 of 39 UTRs in Site Engineering and Maintenance (SEM) Department (SEM) have completed UTR training.

- Recent revisions of contract terms and conditions for construction subcontract and purchase orders include a requirement for bidders to submit documentation of State of California license for type of work involved.

Opportunities for Improvement

- SLAC should continue to ensure that all UTRs have completed the required training.

Guiding Principle 4, Balanced Priorities; Core Function 1, Define the Scope of Work

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

Strengths:

- SLAC demonstrates that safety considerations are incorporated into construction subcontracting process through bid package specifications signed off by line managers, pre-bid conferences, pre-award walkthroughs, pre-work hazard analyses, pre-work safety checklists and job-site safety checklists (SEM) and post-award kickoff meetings with contractors.

- Construction subcontracts and purchase orders contain provisions for safety enforcement including assessment of fines against the contractor for safety violations. Contract provision also explicitly authorizes SLAC employees to stop an unsafe activity.

Opportunities for Improvement:

- SLAC should clarify laboratory process for pre-qualification of contractors based on ES&H performance criteria.

Guiding Principle 5, Identification of Safety Standards

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

Strengths:

- SLAC has implemented various mechanisms to ensure that an appropriate level of hazard analyses has been conducted and safety standards and requirements have been identified. SLAC utilizes pre-work hazard analyses, pre-work and job-site safety checklists (SEM) and post-award kickoff meetings to ensure that the hazards have been identified and the contractor is aware of the appropriate safety requirements.

- SLAC effectively utilizes the expertise of the ES&H Division Construction Inspector to provide direction and guidance in this area (e.g., pre-work hazard analyses, post-award kickoff meetings, observations of contractor work activities).

Guiding Principle 6, Hazard Controls Tailored to Work Being Performed; Core Function 2, Analyze the Hazards; and Core Function 3, Develop and Implement Hazard Controls

Criteria: Administrative and engineering controls to prevent and mitigate hazards shall be tailored to the work being performed and associated hazards.

Strengths:

- SLAC has implemented various mechanisms to ensure that an appropriate level of hazard analyses has been conducted and safety standards and requirements have been identified. SLAC utilizes pre-work hazard analyses, safety checklists (SEM) and post-award kickoff meetings to ensure that the hazards have been identified and the contractor is aware of the appropriate hazards and safety requirements.

- UTR and Construction Inspector review of hazard analyses appears to be an effective process for ensuring that subcontractors are using appropriate hazard controls.

Opportunities for Improvement

- SLAC's efforts to identify job hazards appears to exceed those of the subcontractor. Subcontractor hazard assessments reviewed were generic, not always specific to the job expected on site. Suggest the subcontractor be tasked to note specific accident prevention activities they will be using on site for SLAC to review and comment on. This will ensure contractor shows up for the job properly prepared for hazards to be faced.

Guiding Principle 7, Operations Authorization; Core Function 4, Perform Work Within Controls

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

Strengths:

- UTR and Construction Inspector oversight of day-to-day construction activities and appears to be an effective process for ensuring that subcontractors are using appropriate hazard controls.

- SLAC contractor on cooling tower project demonstrated knowledge of safety issues and commitment to ensuring workers are adequately trained and using appropriate controls.

Opportunities for Improvement:

- Policies and procedures for addressing resolution of potential emergency maintenance or repairs is not fully understood or communicated at all levels.

Core Function 5, Provide Feedback and Continuous Improvement

Opportunities for Improvement:

- SLAC line management should ensure feedback on implementation of corrective actions to all levels of organization.

- SLAC should establish a method of safety information sharing among UTRs on different projects and tasks.

Conclusions

SLAC line manages and staff seemed to demonstrate a strong commitment to safety in their work practices and a good understanding of their roles and responsibilities. SLAC emphasizes the use of construction contracting pre-award and post-award mechanisms to ensure that safety standards are identified and appropriate hazard controls are in place prior to initiating work. Oversight of contractor construction activities by SLAC University Technical Representatives and the SLAC Construction Inspector seems to be an effective process for ensuring that appropriate hazard controls are in place.

A review of pre-hazard analysis documents received from SLAC contractors and discussions with SLAC representatives indicates that SLAC relies substantially on its own resources and expertise to identify safety requirements and hazards for the contractors. Contractor health and safety plans, although required in contract terms and conditions as post-award submittals, are not routinely reviewed by the University Technical Representatives (UTRs) for proper definition and implementation. SLAC should seek to establish clear safety performance expectations for contractors in safety documentation submittals and develop contractor pre-qualification criteria based on ES&H performance.

Feedback from UTRs and the SLAC Construction Inspector should be communicated and considered in decisions involving final award of contracts. The review team also identified the need for more feedback on status of corrective actions in both directions of line management and recommended information sharing among UTRs.

APPENDIX A.2
SLAC Integrated Safety Management (ISM) System Implementation Quarterly Review Report

A2- FY01 ISM Review Area #2:
Final Focus Test Beam (FFTB) Experiments, E-150, E-157 and Test Beam Experiments

SLAC Integrated Safety Management (ISM) System Implementation Quarterly Review Report

FY01 ISM Review Area #2: **Final Focus Test Beam (FFTB) Experiments, E-150, E-157 and Test Beam Experiments**

FY01 ISM Review Team: **D. Osugi (SSO), M. Molloy (SSO), J. Weisend (SLAC), S. Rokni (SLAC)**

Performance Objective: **SLAC effectively integrates ISM into all management and work practices at institutional, site and activity levels so that missions are accomplished while protecting the worker, the public and the environment.**

SLAC Interviewees:

S. Zalog (EFD)
M.Racine (EFD/ Deputy Head of Cryogenic Operations)
T. Figueth (EFD/Laser Safety Officer, Test Beam Coordinator)
P. Anthony (EFD/ Electrical Safety Committee, Experimenter)
S. Pierson (RD/ES&H Coordinator))
R. Reek (ES&H/Fire Marshal)
M. Saleski (ADSO/ Accelerator Department Safety Office)
J. Weisend (EFD)
W. Craddock (EFD/Hazardous Experimental Equipment Committee))
S. Williams (RD/Acting Associate Director))

ISM Review Documents:

General Documents

- SLAC Guidelines for Operations, Document #01-01-05-02, 3/97
- ES&H Manual, SLAC-I-720-0A29Z-001-R021

ISM Documents

- SLAC FY01 Process Performance Measure (Quarterly ISM Reviews), in Environment, Safety , and Health Coordinating Council Minutes, 10/16/00 and 11/13/00.
- "SLAC Integrated Safety Management System", Stanford Linear Accelerator Center, ES&H Division, SLAC-I-720-0A00B-R001, 10/00.
- "FY01 ISM Review Area #1: Construction Subcontracting", SLAC Integrated Safety Management (ISM) Implementation Quarterly Review Report, DOE Stanford Site Office (SLAC), 1/11/01.
- Cryogenics and Electronics Support Group Training Records
- "Radiation Protection System for the Final Focus Test Beam at SLAC", S.H. Rokni, E.C. Benson, D.L. Burke, T.M. Jenkins, J.C. Liu, G. Nelson, W.R. Nelson, H.E. Smith, P. Tenenbaum, V. Vylet and D.R. Walz, 6/27/96.

Test Beam Documents

- Final Safety Analysis Document (FSAD) for the Final Focus Test Beam, 8/23/93
- "SLAC Test Beams, FY00", T-436 to T-448, SLAC-EFD/T. Fieguth, 4/13/01.
- "Test Beam Coordination", Stanford Linear Accelerator Center, roles and responsibilities diagram, 4/13/01.
- T-443 Test Request: SPARC Pixel Telescope", G.P. Grim, UC Davis, Dept. of Physics, 5/2/00.
- "Distribution: Test Beam Requests – T-443, SPARC Pixel Telescope", SLAC/T. Fieguth, Test Beam Coordinator, 5/11/00.
- "Radiation Safety Review Test Beam Requests T-443, T-445", SLAC Memorandum from S. Rokni to Nisy Ipe, 7/29/00.
- "Radiation Safety Analysis for the Test Beam Requests T-446/447 in FFTB", SLAC Memorandum from S.H. Rokni, J.C. Liu, S. Roesler to Nisy Ipe, 9/8/00, p. 1.
- T-436 "GLAST Test Beam Experiment Be Target Hazards and Mitigation", presented to SLAC Hazardous Experimental Equipment Safety Committee (HEEC), J.G. Weisend, 9/13/99, P. 1.
- Radiation Safety Committee Meeting – Sept. 22, 1999; T-436: "Radiation Safety Analysis for Hadron Test Beam for GLAST", SLAC Memorandum RSC-99-004 from G. Nelson to Distribution, 10/19/99, p. 1.
- FFTB Beam Containment Checklist, SLAC-I-040-30400-007-R092, 3/12/01
- FFTB Parasitic Beam Containment Checklist, SLAC-I-040-30400-007-R087, 1/11/01
- Radiation Safety Work Control Form, SLAC-I-040-30500-011, 3/7/01
- Beam Authorization Sheets, Accelerator Department Safety Office (ADSO)

Laser Safety Documents

- "E-150 SOC (Safety Overview Committee) Review", SLAC Memorandum from SOC Chairman David Fryberger to Dieter Walz, 9/30/98.
- "Laser Safety for Experiment E150", SLAC Memorandum from Pisin Chen, E-150 Spokesperson, and Dieter Walz, E-150 Project Manager, to Ted Fieguth, SLAC Laser Safety Officer, 2/2/99.
- "Laser Safety for the E-150 Laser Located in Building #407B", by T. Kotseroglou and D. Meyerhofer, Apr. 14, 1999, Rev. 6, Safety Document Sign-off sheet.
- "Laser Safety Document for Operation of the E-150 Laser System in the FFTB Tunnel", by T. Fieguth, P. Bolton and D. Waltz, Rev. 6; 4/7/00, Safety Document Sign-Off sheet.
- "Experiment E-150 & E-157", SLAC Memorandum from D. Walz and UCLA/K. Marsh to HEEC (Hazardous Experimental Equipment Safety Committee), W. Craddock and W. Innes; Final Rev. 6/18/99, p. 1, 4 &8.
- "Appendix A: Authorization for E150 Laser Operation", 6/30/00.
- "Temporary Authorization for Operation of E150 Nd:YAG Laser in FFTB Tunnel", SLAC Memorandum from SLAC Laser Safety Officer T. Fieguth and FFTB Safety Officer C. Field to P. Bolton, 7/26/00.
- "E-157 Laser Safety Expert", Stanford University letter from E-157 Co-Spokesman R. Siemann to SLAC Laser Safety Officer T. Fieguth, 6/23/99.
- "Laser Safety for the E157 Laser System – Version 2", by D. Whittum and T. Kotseroglou (Ver. 1), P. Muggli and R. Siemann (Ver. 2); Safety Document Sign-off sheet, 7/16/99.
- "Laser Safety Document for the E-157 Laser System Located in the FFTB Tunnel", by T. Fieguth, P. Muggli and D. Walz, Safety Document Sign-Off sheet, 11/12/99.
- "Request for Approval of Maintenance Work on the E-157 Excimer Laser", SLAC Memorandum from P. Muggli & D. Walz to W. Innes and T. Fieguth, 1/25/00.

- "Temporary Authorization for Operation of E157 Excimer Laser in Tunnel", SLAC Memorandum from SLAC Laser Safety Officer T. Fieguth and FFTB Safety Officer C. Field to P. Muggli, 1/26/00.

Background

The Final Focus Test Beam (FFTB), constructed in 1993 by an international collaboration, is a beam line that is used to develop and test new concepts and techniques for measurement and control of high-energy electron beams. The original purpose of the FFTB was to investigate the factors that limit the size and stability of the beam at the collision point for a linear collider, setting world records in small stable beam spot sizes. In recent years, FFTB has served as a test bed for developing advanced accelerator technologies.

The FFTB is a beam line designed to test new beam optics concepts, hardware and techniques necessary to achieve and measure small spot sizes required for future generations of high-energy electron-positron linear colliders. The FFTB is an extension of the SLAC linear accelerator that uses a series of magnetic elements to reduce the size of the beam produced by the linac. The FFTB takes a 47 GeV electron beam at the end of the linear accelerator and transports it to the FFTB beam dump. The FFTB utilizes a low intensity beam of electrons created in the SLAC injector, condensed in the north SLC damping ring, accelerated in the SLAC linac, and transported through the central channel in the Beam Switch Yard (BSY) of the accelerator complex. A radiation protection system was designed and installed for the FFTB that consists of shielding, a beam containment system and a personnel protection system.

The FFTB is operated as part of the accelerator complex under the authorization of the Experimental Facilities Department of the Research Division and the Radiation Physics Department of the Environment, Safety and Health (ES&H) Division of the Laboratory.

Scope

The scope of the review included completed or ongoing beam experiments E-150 (Plasma Lens Experiment), E-157 (Plasma Wakefield Acceleration) and Test Beam Experiments at the FFTB. The review included interviews of SLAC line managers, safety officers, Citizen Committee members, experimenters and workers; review of safety documentation, for example, written policies and procedures, safety committee meeting notes, checklists, logs and work authorizations (e.g., beam authorization sheets, radiation safety work control forms); and field observations of work activities. The evaluation was based on the criteria identified in the *SLAC Integrated Safety Management System* description document approved by the SSO on December 6, 2000 that describes how SLAC implements and fully integrates the seven ISMS Guiding Principles and five Core Functions into all management systems and work practices at the institutional, site and activity levels.

This review was the second of four quarterly ISM implementation reviews scheduled for FY01. The collective results of the four reviews will be used as the basis for determining how well SLAC has met the ES&H performance objective on ISM implementation. In accordance with Article 42 of the contract between the U.S. Department of Energy and Stanford University, SLAC is required to ensure that management of environment, safety and health (ES&H) is an integral part of the Laboratory's work planning and execution processes.

The criteria, lines of inquiry and approach used to determine whether or not the Laboratory has successfully achieved the safety performance objective are provided below:

Guiding Principles 1 and 2, Line Management Responsibility for Safety: Clear Roles and Responsibilities

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

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

Noteworthy Practice

- The direct reporting relationship between the Citizen Safety Committees and the Lab Director is well understood at the working levels of the organization.

Strengths

- *Interviews with EFD personnel having line management responsibilities demonstrated commitment to safety as part of their roles and responsibilities. The ES&H goals and objectives are communicated to workers including the annual performance evaluation process.*

Opportunities for Improvement

- *The Review Team believes that the Test Beam safety reviews are sufficient and effective. However, the safety review process for Test Beam experiments should be documented. Safety review guidelines, criteria and approval process should be made available by the Test Beam Coordinator to prospective users.*

- *The line management responsibilities of the FFTB Facility Operations Manager for ensuring safety should be communicated to SLAC and non-SLAC spokespersons/experimenters, including Test Beam experiments.*

- *The roles and responsibilities of the non-SLAC spokespersons for the safety of the experiments should be clarified, documented and communicated by line management.*

Guiding Principle 3, Competence Commensurate with Responsibilities

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

Strengths

- *EFD line management personnel involved in the FFTB experiments had a clear understanding of the training needs of their staff. SLAC has provided and sufficiently documented job-specific training to address specialized hazards (e.g., cryogenic hazards, lasers).*

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Guiding Principle 4, Balanced Priorities; Core Function 1, Define the Scope of Work

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

Noteworthy Practice

- *The presence of safety officers in the areas where activities are occurring is effective.*

Strengths

- *SLAC demonstrated that safety considerations were incorporated into the design and operation of experiments E-150 and E-157 through review of these experiments by various Citizen Safety Committees. The Test Beam Requests are reviewed by some of these committees as deemed necessary by the Safety Overview Committee chairperson and the Test Beam Coordinator.*

- *SLAC Research Division Safety Coordinator is actively involved in the implementation of safety requirements.*

Guiding Principle 5, Identification of Safety Standards and Requirements

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

Strengths

- *Mechanisms have been implemented to ensure that an appropriate level of hazard analyses have been conducted and safety standards and requirements have been identified.*

Guiding Principle 6, Hazard Controls Tailored to Work Being Performed; Core Function 2, Analyze the Hazards; and Core Function 3, Develop and Implement Hazard Controls

Criteria: Administrative and engineering controls to prevent and mitigate hazards shall be tailored to the work being performed and associated hazards.

Strengths

- *Mechanisms have been implemented to ensure that an appropriate level of hazard analyses have been conducted and safety standards and requirements have been identified. These include requirements for safety reviews by SLAC Citizen Safety Committees. Required engineering and administrative controls related to radiation and electrical safety are documented in the Beam Authorization Sheet (BAS). The secretary or chairpersons of the relevant Citizen Safety Committees conduct walkthroughs with the experiment safety officer to identify possible hazards that need to be mtigated.*

- *Safety requirements are communicated to the workers through formal training, pre-work meetings with supervisors and the Safety Coordinator.*

- *The SLAC Citizen Safety Committees are an important mechanism for reviewing and evaluating potential hazards and controls, policies, procedures and programs and for providing input on the design of experiments, projects and facility modifications.*

Guiding Principle 7, Operations Authorization; Core Function 4, Perform Work Within Controls

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

Strengths

- *Radiation Physics and Accelerator Department Safety Office oversight and control of activities generating radiation in the FFTB through the use of Radiation Safety Work Control Forms and Beam Authorization Sheets is effective. Changes in the engineered radiation safety systems are reviewed through the Radiation Work Safety Control form and readiness to start operation is controlled through the BAS sign off procedure.*

Core Function 5, Provide Feedback and Continuous Improvement

Criteria: SLAC management provides several avenues for communicating concerns about hazards in the workplace to the appropriate authorities for action.

Strengths:

- ES&H information is communicated to workers through their training and updates through ES&H Bulletins and Updates.

- *The annual SLAC Talk, Walk and Clean stand down is perceived by many SLAC employees to be an effective feedback mechanism for communicating safety and environmental concerns and issues.*

Conclusions

The Review Team found that management and staff in EFD demonstrated commitment to safety as part of their line management roles and responsibilities. The Review Team also found that EFD has implemented mechanisms to ensure an appropriate level of hazard analyses, identification of applicable standards and requirements and documentation of engineering and administrative controls. Based on interviews with SLAC personnel, EFD has established constructive working relationships with both experimenters and safety personnel.

The SLAC Citizen Safety Committees continue to be an important mechanism for reviewing and evaluating potential hazards, controls, policies, procedures and programs and for providing input on the design of experiments, projects and facility modifications.

The Review Team found that the review process for Test Beam experiments should be documented and the safety review guidelines, criteria and approval process should be made available by the Test Beam Coordinator to prospective users. The Review Team recommends that such information could be made available electronically to prospective users through the SLAC web site.

The line management responsibilities of the FFTB Facility Operations Manager for ensuring safety should be communicated to SLAC and non-SLAC spokespersons/experimenters, including the Test Beam experiments. The roles and responsibilities of the non-SLAC spokespersons for the safety of the experiments should be clarified, documented and communicated by line management.

ISM Review Team Concurrences:

_____ _____

Dave Osugi Date
Stanford Site Office (SSO)

_____ _____

Martin Molloy Date
Stanford Site Office (SSO)

_____ _____

John Weisend Date
Stanford Linear Accelerator Center (SLAC)

_____ _____

Sayed Rokni Date
Stanford Linear Accelerator Center (SLAC)

APPENDIX A.3
SLAC Integrated Safety Management (ISM) System Implementation Quarterly Review Objective, Criteria and Approach

A3- FY01 ISM Review Area #3:
SSRL (Stanford Synchrotron Radiation Laboratory) Beam Line Operations

SLAC Integrated Safety Management (ISM) System Implementation Quarterly Review Objective, Criteria and Approach

FY01 ISM Quarterly Review #3:

SSRL (Stanford Synchrotron Radiation Laboratory) Beam Line Operations

Performance Objective: **SLAC effectively integrates ISM into all management and work practices at institutional, site and activity levels so that missions are accomplished while protecting the worker, the public and the environment.**

EXECUTIVE SUMMARY

A joint DOE-SLAC Integrated Safety Management (ISM) Team reviewed SSRL's Beam Line Operations (Figure 1), and critical safety interface personnel on the SPEAR Experimental Floor (Figure 2). The purpose was to determine whether SLAC-SSRL effectively integrates ISM in all management and work practices of Beam Lines Operations. Interviewees included line managers (2), supervisors (2, incl. Beam Line Operations), Beam Line Duty Operators (2, incl. 1 backup), SSRL Safety Officer, Experimental Support Group member, and an SSRL User. The Review Team observed Duty Operators during a Shift Change, and putting a User On line. Duty Operators Directives, Procedures, and safety documents were reviewed.

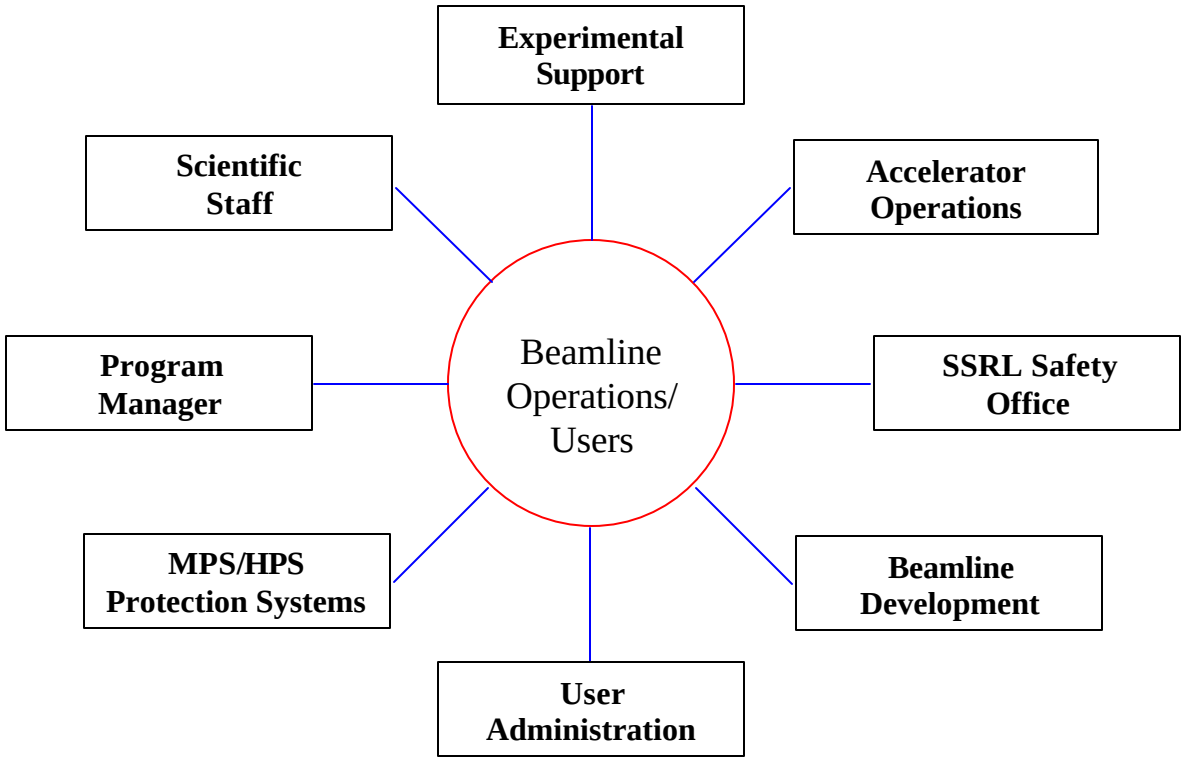


Figure 1. SSRL Beam Line Operations - Critical safety interfaces.

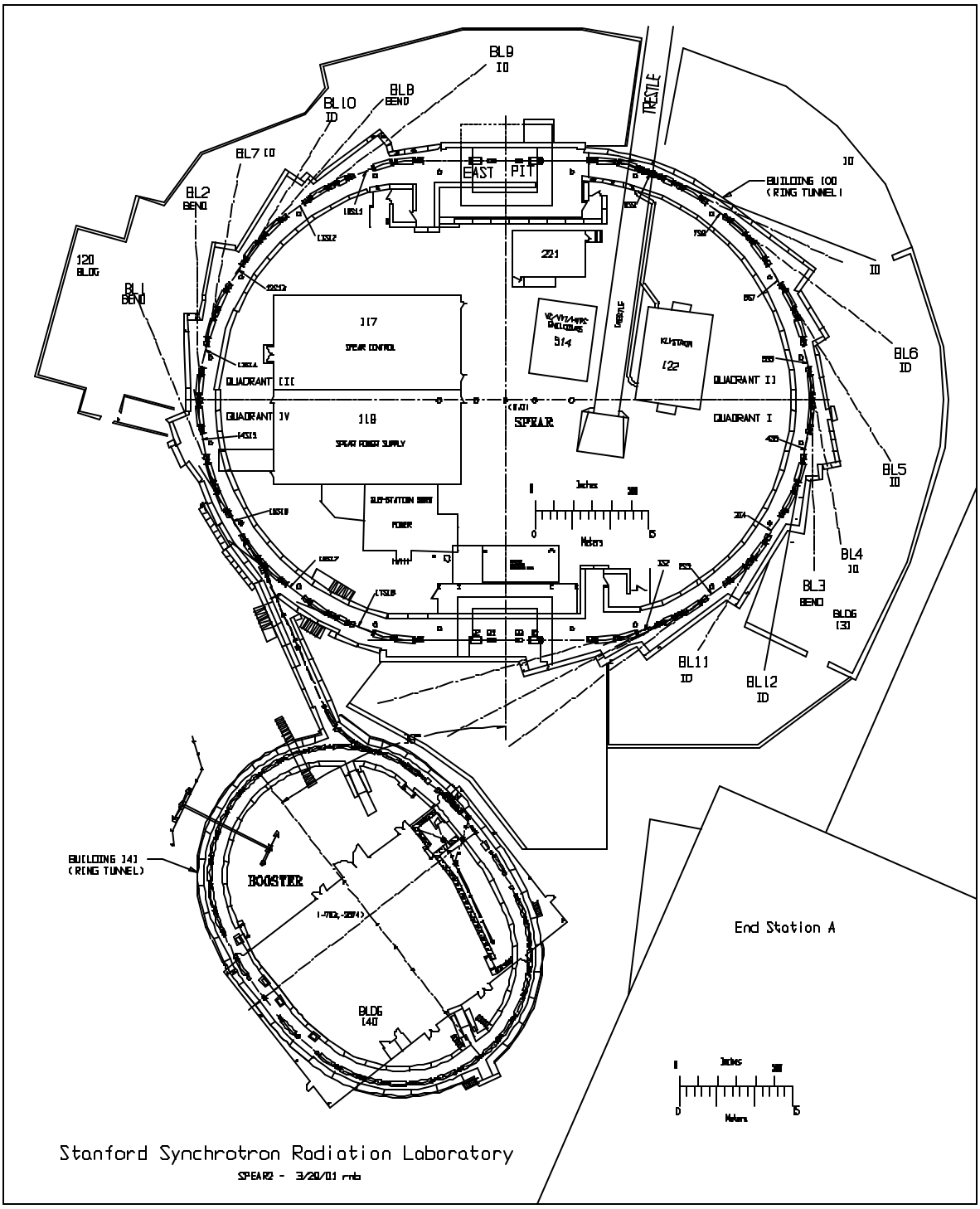


Figure 2. Stanford Synchrotron Radiation Laboratory.

Significant Strengths found include: managers and workers know and practice safety as a line management function; Duty Operator's roles and responsibilities are clear, and their training and knowledge is commensurate with their operations responsibilities; SSRL has program and operations responsibilities in

balance; Experiment Proposal reviews and Safety Checklists are effective in identifying hazards, and the methods needed to control hazards; outside safety resources (e.g. SLAC Laser Safety Officer, ES&H Division, Citizen Safety Committees) are effectively utilized; Beam Line Operators use process, procedures, and checklists to bring Users On-line and Off-line in a controlled, safe manner; Duty Operators are clear and emphatic on their activity to stop an unsafe activity; and, feedback for continuous improvement is provided by formal workgroup communications.

Significant Opportunities for Improvement include: updating "SLAC Guidelines for Operations" for current SSRL-SPEAR Beam Line Operations; familiarizing Duty Operators with SLAC's Work Smart Standards (WSS) set, which SLAC-SSRL experts use to mitigate safety problems; establishing a Change Control system for regular review and update of Duty Operator Procedures and safety documents; and, assuring that Duty Operators receive all safety critical information in a timely manner.

Significant Noteworthy Practices include: everyone was cognizant of their safety responsibility, and confident that management would support their safety actions; managers conduct walk-throughs of facilities to note changes and assess needs; Beam Line Operators are enthusiastic and dedicated in serving SSRL Users; SSRL's system trains ~1,000 visiting scientists a year to safely conduct X-ray and VUV research on the Experimental Floor; SSRL management provides adequate resources for safety, including changing the experimental schedule, when necessary; and, engineering controls for actinide experiments are a good example of effectively tailoring hazard controls to the work being performed.

The ISM Review Team concluded that SSRL Beam Line Operations demonstrated effective integration of ISM in 6 of the 7 SLAC ISM elements. Improvement is needed in Guiding Principle 5: Identification of Safety Standards, Duty Operator awareness of SLAC Work Smart Standards (WSS) set. SSRL should consider the value of a Lessons Learned Program, which could be introduced by electronic capture of safety issues and solutions noted by Beam Line Duty Operators in shift changes, logbooks, e-mail, etc.

BACKGROUND:

SSRL is a National User Facility at SLAC, which provides synchrotron radiation (powerful x-ray and ultraviolet infrared beams) to Users for experiments in: basic energy sciences (incl. biology, chemistry, material science, medical sciences, physics and other disciplines); health and environmental sciences; natural sciences, engineering, and related disciplines (Figure 1). Beamtime is competitively awarded by the SSRL Director on the basis of recommendations from the SSRL Proposal Review Panel. Specific beam lines (11 beam lines, 23 experimental stations) and beam time schedules are assigned to experimenters by SSRL User Administration.

The SSRL Proposal Form requires an experimenter to state that "No hazardous substances, equipment or procedure will be brought to SSRL as part of this proposed experiment"; or, to list "all potential safety hazards including toxic, radioactive, reactive, and flammable materials; biohazards; infectious agents; or hazardous procedures or equipment. Additionally, provide detailed safety procedures in the proposal text." SSRL's Safety Officer reviews the safety aspects of the User's proposal, and develops checklists for Beam Line Operators to use when experimenters conduct their experiments at the SPEAR Storage Ring on the SSRL Experimental Floor. General and experiment-specific safety training for each User is conducted through the SSRL Safety Office, in addition to SLAC-required ES&H and radiation training, as appropriate.

SSRL Beam Line Operators work closely with experimenters to successfully carry out their experiments on the Experimental Floor (24-hour/day, 7-day/week during 9-10 month Run). The Beam Line Operators ensure that the SSRL beam lines are operational. Beam Line Operators set up, monitor, and control the complex systems required for operation of the beam lines, and provide assistance to the experimenters. Operators help experimenters find their assigned X-ray and vacuum ultra-violet (VUV) beam line(s); interact directly with SSRL scientific staff and SPEAR Control to ensure desired beam line performance; and, answer Users questions and calls for expert technical support (Figure 2). During Accelerator

ShutDown periods, Beam Line Operators participate in design, construction, and repair of beam lines. Certification is required in Radiological Worker Training (RWT-I), crane and forklift operator, fire extinguisher, and First Aid/CPR.

SLAC-SSRL INTERVIEWEES:

Piero Pianetta	Operations & Systems Manager
Ed Guerra	Operations Manager
Ian Evans	Safety Officer
Mike Horton	MPS/PPS/HPS (Safety Systems) Group Supervisor
Glenn Kerr	Beam Line Operations Group Supervisor
Ken Culler	Beam Line Duty Operator
Tom Hostetler	Experimental Support Group , Back-up Beam Line Duty Operator
Charles Troxel, Jr.	Experimental Support Group
SSRL User:	
Dr. Stephen Conradson	Los Alamos National Laboratory

FIELD OBSERVATIONS:

SSRL Duty Operator Shift Change	May 31, 2001.
SSRL Duty Operator put User On-line	June 7, 2001.

ISM Review Team Concurrences:

_____ _____
James Chwang, FPE Date
Oakland Operations Office/ESHD

_____ _____
Quang Le, CHP Date
Stanford Linear Accelerator Center/ESHD

_____ _____
Wayne Linebarger Date
Stanford Linear Accelerator Center/AD

_____ _____
Martin W. Molloy, Ph.D, Leader Date
Stanford Site Office

_____ _____
W. Hal Tompkins Date
Stanford Linear Accelerator Center/SSRL

SCOPE:
The scope of this ISM Quarterly Review included selected activities of the SSRL Beam Line Operations Group during the FY2001 SPEAR Run.

ISM Quarterly Reviews may include: interviews of SLAC/SSRL line managers, Safety Officers, Citizen Committees, Experimenters, and workers; review of safety documentation, e.g., written policies and procedures, safety committee meeting notes, checklists, logs and work authorizations (e.g., Beam Authorization Sheets, radiation safety work control forms); and field observations of work activities. The evaluation is based on the criteria identified in the "SLAC Integrated Safety Management System" description document approved by the DOE Stanford Site Office (SSO) on December 6, 2000, that describes how SLAC implements and fully integrates the seven ISMS Guiding Principles and five Core Functions into all management systems and work practices at the institutional, site, and activity levels.

This ISM Review is the third of four quarterly ISM implementation reviews scheduled for FY 2001. The collective results of the four Reviews will be used as the basis for determining how effectively SLAC integrates the Guiding Principles and Core Functions of Integrated Safety Management "into all management and work practices at institutional, site, and activity levels, so that missions are accomplished while protecting the worker, the public, and the environment." (ES&H Process Performance Measure) In accordance with Article 42 of the Management and Operations Contract between the U.S. Department of Energy and Stanford University, SLAC is required to ensure that management of environment, safety and health (ES&H) is an integral part of the Laboratory's work planning and execution processes.

ISM Guiding Principles, Core Functions, and Criteria used to determine whether the Laboratory successfully achieved the safety performance objective are provided with relevant Background below, together with ISM Review Team assessments of SLAC Strengths, Opportunities for Improvement, and Noteworthy Practices.

Guiding Principles 1: Line Management Responsibility for Safety; and 2: Clear Roles and Responsibilities

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

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

BACKGROUND:

In addition to functions listed above, the SSRL Duty Operator (DO) is responsible for: maintaining safe working conditions on the Experimental Floor; ensuring conformance to Safety Checklists, and Procedures; perform radiation surveys following guidelines for dose control; monitor beam lines and equipment to ensure that all activities are in compliance with established rules and directives; and, participate in emergency response and coordination per the SLAC Emergency Preparedness Plan, the SSRL Emergency Plan, and SSRL Safety Office Directives. (Job Description)

SSRL's four Duty Operators average 15 years experience, and were grandfathered into their positions. The Beam Line Operations Group Supervisor reports to SSRL's Operations Manager, who also supervises SSRL's Accelerator Operations Group. The Operations Manager reports to the Operations and Systems Manager, Experimental Systems and Research Department, which reports to the Associate Director, SSRL.

The Beam Line Duty Operator is the principal person with whom the User (Principal Investigator, experimenter, researcher, visiting scientist, graduate student, etc.) interacts. The Duty Operator completes

the SSRL Beam Line Safety Checklist (issued by the Safety Officer), which is unique for each Experiment, beam line, and On/Off beamtime schedule dates. After each Beam Line Safety Item is initialed and dated to verify compliance, the Duty Operator puts the User on line, issues the Hutch Search Reset Key to certified experimenters, and assists the User as needed. When the User's beamtime is complete, the Duty Operator takes the User off-line, and recovers the Search Reset Key. Duty Operators work in two shifts: 12 hours on, 12 hours off, 4 days a week.

STRENGTHS:

Both managers and workers understand that safety is a line management function. Beam Line Operations Group line managers stated that safety is their first priority; they know their ES&H responsibilities.

SSRL Line Managers responsible for Beam Line Operations demonstrate their leadership and commitment to safety by: emphasizing "Safety First" in meetings, bringing attention to safety issues, supervising on a daily basis, on-the-job training, periodic safety walkthroughs, acting on safety reports, reviewing/approving procedures, and supporting people to do what they think is right. Senior Managers' safety responsibilities for Beam Line Operations ultimately come from the "SLAC Guidelines for Operations", and the "SLAC ES&H Manual". Senior Managers summarized their responsibilities as: "Carry out a safe and effective program for the Lab and Users"; and, "Coordinate the (Operations and Systems) functions so they work together, with the same kinds of safety standards, and quality of work." SSRL Line Managers take their safety responsibilities seriously, and provide ES&H leadership for the Beam Lines Operations Group.

The SSRL Duty Operator is formally assigned responsibility to oversee safe working conditions on the Experimental Floor. Individual Duty Operators, the SSRL Safety Officer, and the Safety Systems Manager (Machine, Personnel, Hutch) were clear on their responsibility and authority to immediately take an unsafe beam line off-line, or stop an unsafe User activity. When a Duty Operator exercised this authority, he was supported by SSRL Management.

Principal Investigators and Graduate Students sign SSRL safety documentation before they come to the Laboratory, committing to their safety responsibilities on the Experimental Floor. The safety protocol prepared by the SSRL Safety Office (with SLAC OHP, RP, etc.) has to be followed.

OPPORTUNITIES FOR IMPROVEMENT:

Managers of the Beam Line Operations Group need to develop an ongoing process that demonstrates their ES&H commitment to the Beam Line Operators. Formal shift changes (per "SLAC Guidelines for Operations" Shift Routines, Ch. 6) could utilize a Duty Operator's agenda, which starts with Safety issues; Supervisors need to formally review Duty Operator safety functions, responsibilities, and training needs during their annual Performance Evaluation. (see Core Function 5: Provide Feedback and Continuous Improvement, below).

"SLAC Guidelines for Operations" could be revised for SSRL Beam Line Operations activities, which have settled into mature patterns since the Guidelines were last updated.

NOTEWORTHY PRACTICE:

Everyone interviewed appeared cognizant of his responsibility for safety, and comfortable with his work environment. There was a commendable common confidence that any safety action taken will be supported by management.

Managers at all levels conduct walk-throughs of facilities to keep abreast of changes and to assess needs.

The enthusiasm and dedication of SSRL Beam Line Operators to serve the Users was repeatedly noted. An experienced User confirmed that the Duty Operator is the principal person with whom an experimenter interacts, and noted that SSRL individuals provide excellent support and committed to safety.

ISM REVIEW TEAM CONCLUSION:

SSRL Line Management responsibility for safety, and clear Beam Line Operations roles and responsibilities, were evident, and effectively integrated within SLAC's Integrated Safety Management System.

Guiding Principle 3: Competence Commensurate with Responsibilities

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

BACKGROUND:

Knowledge, skills and experience required for a Duty Operator's position are specified in the Job Description, and determined during the hiring process. SSRL Beam Line Duty Operator training needs are established from their Job Description, for which the Safety Officer provides SSRL's ES&H requirements. SLAC provides an on-line Employee Training Assessment to assist supervisor and employee in identifying and tracking required ES&H training.

SLAC provides general ES&H courses (Employee Orientation to ES&H, General Employee Radiological Training), and safety training required by Duty Operators including: basic material handling and crane operation (incl. hoisting & rigging), CPR/first aid, electrical safety, fire extinguisher, fork lift operator, hazardous materials/waste management, lock and tag, radiological worker (RWT I & II), and respirator training. Duty Operators receive extensive on-the-job training from their supervisor and certified Duty Operators, on which they are questioned. User and experiment aspects of a Duty Operator's job are unique to SSRL. Operators are required to know SSRL Safety Directives and Beam Line Procedures. SSRL-specific safety training is provided in the accelerator, personnel, hutch, and machine protection systems (PPS, HPS and MPS). SSRL's Safety Officer and SLAC Safety Engineers provide specific training, supplies and safety equipment (e.g. lead handling class, clean-up bags, and air monitoring) for unique beam line hazards.

ES&H training records for visiting scientists (Users, experimenters) are maintained by SSRL User Administration, which issues lists of individuals on each proposal, who are approved for access to the Experimental Floor. In addition to SLAC ES&H requirements for site access, all X-ray and Vacuum Ultraviolet (VUV) researchers must receive and understand the SSRL Safety Talk, before they can be put on-line by the Duty Operator. The Safety Talk includes Emergency Egress and Seismic Protection ("run and hide"). X-ray experimenters receive the Hutch Search Reset Key (SLAC "Hutch Interlock Orientation") Talk before they can use the Search Reset Key. Note: VUV sample chambers do not require a personnel protection radiation enclosure "hutch".

STRENGTHS:

SSRL Beam Line Duty Operators are a very experienced (av. 15 yrs.) group of individuals with knowledge and skills acquired from many years of work experience. This seasoned workforce is a major asset in an operation where many skills and knowledge can only be learned on-the-job.

SSRL Safety Officer, and Safety Systems Manager (PPS, HPS, MPS), assure that Duty Operators are trained as new hazards are introduced, and protection systems upgraded. Beam Line Operators receive regular notification of required ES&H training.

The SSRL Safety Officer reports directly to the SSRL Associate Director. SLAC's ES&H Safety Engineers continually support SSRL with training tailored to needs identified by the SSRL Safety Officer.

and n and nSSRL's system for training visiting scientists to safety conduct research with X-ray and VUV beam lines on the Experimental Floor is a mature process and effectively conducted.

OPPORTUNITIES FOR IMPROVEMENT:

The Beam Line Operations Group needs a comprehensive training program for new Beam Line Operators. "SLAC Guidelines for Operations" Operator Training, Ch. 11, would be a good resource.

Duty Operators know what training they have had, but do not seem to understand their job training requirements. An approved list of Duty Operator training requirements is needed.

Emergency evacuation drills for the Experimental Floor are infrequent. Brief drills should be regularly scheduled with User participation.

Actinide experiments have settled into a disciplined routine at SSRL, but not every Duty Operator is comfortable with them. Continuing education on sample properties and hazards, potential problems, and the experimenters' response to control and contain spills, should assure these professionals, and strengthen Duty Operator-Actinide Experimenter mutual support systems.

NOTEWORTHY PRACTICE:

SSRL's system for training ~1,000 visiting scientists a year to safety conduct research at X-ray and VUV beam lines on the Experimental Floor.

ISM REVIEW TEAM CONCLUSION:

Safety training for SSRL's Beam Line Duty Operators and visiting scientists is comprehensive for their responsibilities, and effectively integrated within SLAC's Integrated Safety Management System.

Guiding Principle 4: Balanced Priorities; Core Function 1: Define the Scope of Work

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

BACKGROUND:

When the SPEAR Storage Ring is running (9-10 mos./yr.), the Duty Operator's work consists of putting Users on-line according to the Master Schedule, and assigned projects (electronics, upgrades, etc.). During the Annual Downtime for major accelerator upgrades and modifications (2-3 mos./yr.), the Duty Operator works on Downtime Projects, takes training, and vacations.

SSRL's Safety Officer reports directly to SLAC's Associate Director for SSRL. The Safety Officer is responsible for: safety oversight of the SSRL Accelerator (Linac, Booster and Storage Ring) and Users; compliance with SLAC ES&H policies; and, supporting Lab Management in accomplishing the SSRL mission. The Safety Officer interacts closely with SLAC's ES&H Division (electrical safety, environmental protection, ES&H training, fire protection, industrial hygiene, occupational health physics, OSHA construction safety, radiation physics, waste management, etc.). The Safety Officer evaluates hazards, engineering controls, educates workers and Users, and constantly assesses whether SSRL safety controls are working. The Safety Officer translates DOE ES&H Orders into SSRL terms, and makes them effective in SSRL's activities. The Safety Officer is responsible for knowing what operations are proposed for, and actually happening on the Experimental Floor.

STRENGTHS:

Each SSRL manager emphasized safety over the pressure to get work done. SSRL's Operations and Systems Manager states the schedule is adjusted, if necessary for the work to be done safely. The SSRL Operations Manager emphasizes safety first, with the goal of carrying out a safe and effective program for the Lab and Users. The Beam Line Operations Supervisor's guidance is to slow down – make less mistakes.

Duty Operators were clear that safety would not be compromised for program priorities.

SSRL seems to have program and safety priorities in balance. All interviewees expressed confidence that when they have a valid safety concern, managers will support them and provide funding. Employees consistently reported that work does not have priority over safety. The Operations Manager has a separate safety account. Management is "very supportive" of training necessary for new hazards, incl. ES&H extension courses at UC Santa Clara, and biohazard classes at UC San Francisco.

Resources are effectively used. Tracking systems address when repairs are required to the SSRL Beam Line's Radiation Safety System. There is demonstrated use of Radiation Safety Work Control Forms, and Beam Line Safety Checklists.

NOTEWORTHY PRACTICE:

While sometimes pushed by "customers" to take "short cuts", Duty Operators always follow procedures to ensure that activities are done safely.

SSRL Management provides adequate resources, incl. schedule changes, when necessary for safety. Together with walk-throughs of the Experimental Floor, this demonstrates their commitment to and leadership of safety in the workplace.

ISM REVIEW TEAM CONCLUSION:

SSRL has demonstrated that Balanced Priorities are effectively implemented in the activities of Beam Line Operations, within SLAC's Integrated Safety Management System.

Guiding Principle 5: Identification of Safety Standards

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

BACKGROUND:

SSRL's Safety Officer is the Point-of-Contact for SLAC's Work Smart Standards (WSS) set. In 1996, ESHD/Gary Warren evaluated SSRL's hazards, incl. animal care and use, and incorporated them in SLAC's WSS set. The Safety Officer uses SLAC's WSS set as the primary source for hazard descriptions, controls and SLAC expertise. If a new hazard appears in Beam Line Operations or User experiments, the Safety Officer brings it to the attention of ESHD Management, and requests development of a new Standard. ESHD Subject Matter Experts track external changes to SLAC's WSS set, and inform the Safety Officer of changes relevant to SSRL activities.

STRENGTHS:

SSRL has a process to review new experiments, by the Safety Office, to identify hazards, request changes and publish safety checklists. In addition to the resources at the SSRL Safety Office, other outside resources are utilized. (e.g., SLAC Laser Safety Officer, ES&H Division and SLAC Citizen Committees)

SSRL uses a solid programmatic approach to hazards before any project is performed. The use of experiment proposal reviews, beam line authorization sheets and various checklists are effective for identifying hazards as well as methods and resources needed to handle such hazards. The use of these planning tools is well implemented.

OPPORTUNITIES FOR IMPROVEMENT:

SLAC's WSS process is largely invisible to SSRL Management and employees. Except for the SSRL Safety Officer, most workers interviewed were not aware of the Lab-wide WSS system, which was established for their protection, and hazard control of User experiments.

ISM REVIEW TEAM CONCLUSION:

SLAC's Work Smart Standards Set is not effectively integrated into SSRL's Beam Line Operator activities. SSRL Facilities/Engineering and Technical Groups (e.g. Vacuum, Mechanical Services & Maintenance), which use construction codes, etc., provide WSS support to Beam Line Operations and experimenters.

Guiding Principle 6: Hazard Controls Tailored to Work Being Performed; Core Functions 2: Analyze the Hazards; and 3: Develop and Implement Hazard Controls

Criteria: Administrative and engineering controls to prevent and mitigate hazards shall be tailored to the work being performed and associated hazards.

BACKGROUND:

Identification of hazards in each User experiment begins with SSRL Safety Office review of the Experiment Proposal (in parallel with SSRL Proposal Review Panel's peer review of scientific merit). The experimenter's goal is to obtain X-ray or VUV beamtime; SSRL's goal is to provide beamtime in a safe environment. The Safety Officer looks for hazards, tries to understand the magnitude of hazard risk, and develops a safety protocol. There is always a potential beam radiation hazard to personnel on the Experimental Floor. Samples are usually inert, but may contain actinides (U, Pu) or biohazards. The experimenter's equipment may contain electrical, toxic gas or other hazards.

Unusual hazards (e.g., actinides, toxic gases, laser, magnetic fields) are reviewed by SLAC's Citizen Safety Committees, and may require formal DOE Safety Analysis Documents. Specific procedures and training for Duty Operators are established for dealing with these hazards.. SSRL's Safety Officer works closely with SLAC ESHD Subject Matter Experts (EE, FPE, IH, OHP, RP, etc.), and biohazard/human subject experts on Stanford Campus. The Safety Officer is in contact with safety organizations at DOE Synchrotron Radiation Labs at Argonne/Advanced Photon Source, Berkeley/Advanced Light Source, and Brookhaven/National Synchrotron Light Source. Major projects (e.g., new beam lines) are presented to SLAC's Citizen Safety Committees by the Project Manager, who is responsible for implementing all hazard mitigations. Intermediate-scale projects are analyzed by bringing groups together with the Safety Officer, identify the safety hazards, and address the safety issues.

The Safety Officer prepares a unique SSRL Beam Line Safety Checklist for each experiment, listing all hazard controls that must be in place, authorized experimenters, Beam Line Safety Instructions, and Beam Line Safety Items. Posting of specific hazard warning signs may be required on the beam line, and in Control Rooms. The Principal Investigator agrees through signature of the Safety Review Summary to follow the SSRL safety protocol, or negotiate a modification. The approved experiment safety protocol must be followed by the Duty Operator and each experimenter at the SSRL beam line.

If an emergency situation occurs during actinide experiments, Beam Line Duty Operators are in charge of the Experimental Floor. The Operator's responsibilities include: emergency evacuation, first aid, identifying injured personnel, refusing entry to the Beamline Buildings to all non-emergency personnel, and guiding the on-site Palo Alto Fire Department (which is informed of actinide experiments and is

aware of building layout). The actinide-trained LBNL/LLNL/LANL Experimenter on Duty is responsible for sample containment and the hutch, unless incapacitated, in which case the Beam Line Operator takes control.

STRENGTHS:

Since ES&H concerns are addressed very early in the planning stages of all experiments, SSRL is able to provide researchers and staff with the necessary training and tools to handle potential hazards.

SSRL has a process to review new experiments, by the Safety Office, to identify hazards, request changes and publish safety checklists. In addition to the resources at the SSRL Safety Office, other outside resources are utilized. (e.g., SLAC Laser Safety Officer, ES&H Division and SLAC Citizen Committees)

The use of procedures (online/offline, safety checklist, beam line authorizations) as part of administrative controls indicates careful evaluation of potential hazards. Example instruction sets (actinides) are tailored to the hazards. Because the range of experiments done at SSRL is so extensive, outside resources are utilized (SLAC Laser Safety Officer, Stanford University Human Subject Committee, etc.).

OPPORTUNITIES FOR IMPROVEMENT:

SSRL Duty Operators effectively use Radiation Safety Work Control Forms and Radiation Safety Procedures. Implementation of other Work Control Forms (safety permits) should be reviewed in terms of Duty Operator awareness to safety conditions on the Experimental Floor, e.g. smoke alarm shut-off. "SLAC Guidelines for Operations" Safety in Accelerator Housings, Ch. 12, and Configuration Control of Atmospheric Safety Systems, Ch. 20, would be a good resource.

Most workers did not know when any safety documents were last reviewed or updated. According to at least one interviewee, written procedures are not reviewed or updated often enough to incorporate lessons learned and other changes. SSRL should have a Change Control process for safety documents and policies, and have the workers review them after a revision.

NOTEWORTHY PRACTICES:

SSRL has developed a mature Experiment Proposal review process. The Safety Officer: identifies hazards in experiments; works with SLAC Subject Matter Experts and Citizen Safety Committees, to establish controls for new hazards; and, educates staff and Users to conduct accelerator operations and experiments safely on the SPEAR Experimental Floor.

SSRL has developed safety procedures and safety checklists for specific Beam Lines and hazardous experiments. (e.g., Beam Line Duty Operator – Procedures for Actinide Experiments). Engineering controls used for the actinide experiments are a good example of how SSRL has effectively tailored the hazard controls to the work being performed.

Safety experts from outside SSRL (SLAC/ES&H, SU Campus, etc.) are brought in when the need arises.

SSRL assists Users in accomplishing their experiments safely. SSRL (Safety Office, etc.) works with Users to design/build/test safety items required to interface User experimental equipment with the SSRL beam line (e.g., interlocked laser window).

ISM REVIEW TEAM CONCLUSION:

Hazard analysis, development and implementation of hazard controls, are effectively integrated into SSRL's Beam Line Duty Operator activities, within SLAC's Integrated Safety Management System.

Guiding Principle 7: Operations Authorization; Core Function 4: Perform Work Within Controls

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

BACKGROUND:

Every year, SSRL follows a disciplined, standard procedure authorizing Start-up of the SSRL Accelerator (Linac, Booster Synchrotron, and SPEAR Storage Ring). The new Start-up checklist is signed by SSRL's Operations and Systems Manager. SSRL's Beam Authorization Sheet (BAS) controls the SSRL Accelerator Start-up sequence: Safety System (PPS, HPS, MPS) checkout, certification and signoff; SLAC RP and OHP final checkoffs; Linac Gun turn-on; and, bringing electron beam through the Booster to the SPEAR Storage Ring. SSRL's Beamline Authorization (BLA) controls opening each beam port to bring X-ray or VUV light into the 11 Main beam lines and their 23 Branchlines and associated Experimental Stations. After an extended shutdown or any modifications to a beam line or branchline, the SSRL Safety Office or designee, must validate the first BLA. The Beam Line Operator may conduct subsequent validations, which come about through reconfiguration of beam line hutches or experiments.

SSRL Accelerator and Beam Line Operations are conducted in strict compliance with the "SLAC Guide-lines for Operations". Formal procedures are followed for: configuration control, Control Room activities, emergency response, radiological work controls, safety deficiency reports, shift routines, etc. Each week, SSRL's Master Schedule sets out the main focus for SPEAR Accelerator and Beam Line Operations.

STRENGTHS:

SSRL through the Beam Line Operator uses process, procedures and checklists to bring Users On/Off line in a controlled, safe method. SSRL safety procedures, incl. Beamline Authorizations (BLA), Beam Line Safety Checklists, Non-Experimental Online Authorizations (NOA), and Logbooks are effectively used to ensure that necessary controls are in place, and training has been conducted before experiments are allowed. The SSRL Beam Line Safety Checklist clearly specifies conditions to be satisfied before putting a User on line and allowing an experiment to begin; this experiment checklist is updated as often as needed. Beam Line Operators and Program Managers monitor floor activities using regular walking tours of the facility. These processes were demonstrated and documented as being effective.

SSRL's Operations Manager and Beam Line Duty Operators are clear and emphatic on their authority to stop an unsafe activity. They devise ways to make the activity safe, bring the incident to the attention of the person responsible, and make sure that procedural issues are covered by Operations Procedures. Duty Operators clearly felt that management would support them in any Stop Activity or Stop Work action.

ISM REVIEW TEAM CONCLUSION:

SSRL has effectively integrated Operations Authorization, and performance of work within controls, into Beam Line Duty Operator activities, within SLAC's Integrated Safety Management System.

Core Function 5: Provide Feedback and Continuous Improvement

Criteria: SLAC management provides several avenues for communicating concerns

BACKGROUND:

Feedback for continuous improvement at SSRL is provided in three general ways: workgroup communication, annual employee Performance Evaluations, and formal Lessons Learned Programs.

Workgroup Communications: Formal procedures for Accelerator and Beam Line Operation provide numerous channels for communication of problems and solutions. Duty Operators, Safety Officer and SSRL staff respond to Users, and provide immediate feedback on safety issues. The Duty Operator will shut down unsafe equipment, and call the SSRL Experimental Program Manager, to figure out which beam line systems can continue to operate. Safety problems are entered in the Duty Operator Logbook; they are summarized in the Duty Operator Shift Report; and the new Duty Operator is briefed on problems during Shift Change. The Duty Operator e-mails the problem report to the responsible subsystem group and Safety Officer for action.

Duty Operators also meet as a group during Annual Downtime, and share Lessons Learned. The Safety Officer meets one-on-one with a person and their supervisor to understand their issues. SSRL's Protection System (PPS, HPS, MPS) Manager talks with his counterpart at Berkeley/Advanced Light Source. About 50% of Users submit SSRL's End of Run Summary Form, with comments on experimental station readiness/problems, beam line components, staff support, training, etc.

Performance Evaluations: Beam Line Operator's safety performance is constantly evaluated through operations problem report/response/solution procedures, following "SLAC Guidelines for Operations".

SLAC's ES&H Performance item (Non-Bargaining Unit) reads: "Understanding of and attention to ES&H requirements in carrying out assignments."

Lessons Learned Programs: A formal safety communications system, which retains and feeds back safety problem solutions to those concerned (workers and managers) at the site, exchanging relevant Lessons Learned with similar sites. The purposes are to avoid "reinventing the wheel" in responding to significant safety problems, and to constantly improve safety performance of facility personnel.

STRENGTHS:

An open-door policy, and round-the-clock availability of key personnel, help foster and reinforce the safety culture at SSRL. Electronic mail appears to be effectively used, in addition to traditional tools (meetings, reports, checklists, forms…), to communicate safety issues and lessons learned.

The User End-of-Run Summary Form provides feedback for all parts of SSRL.

SSRL's Operations and Systems Manager works to improve safety throughout the year, with the people he evaluates. Workers with specific safety duties (e.g. PPS) are reviewed on their safety performance. If a particular safety problem occurs, the Manager raises the issue with them. The SSRL Operations Manager is very much involved as soon as a problem arises. Duty Operator (Bargaining Unit) Performance Evaluations include specific safety points. The Safety Officer will talk to supervisors if an employee is falling behind. If it is a cost situation (e.g. training course), the Safety Officer has never had a problem getting resources.

OPPORTUNITIES FOR IMPROVEMENT:

Workgroup Communications: The Beam Line Duty Operator is responsible for safety on the SSRL Experimental Floor. The process by which the Duty Operator receives information (briefings, logbooks, Shift Report, Control Room, e-mails, etc.) does not assure timely reception of all safety critical information. Parts of the Duty Operator's safety system and safety communications are unstructured and informal, e.g. using e-mail with various distribution lists. These critical systems could become more effective, if formalized feedforward (new process is going to happen) and feedback systems were placed in operation. SSRL's process of reliable, efficient Duty Operator safety communications should be reviewed and improved. Management must assure that Duty Operators get all critical safety information in a regular and reliable way.

Performance Evaluations: Perhaps as a result of continual operational safety reviews, the generic ES&H item on SLAC's annual Performance Evaluation Form was characterized as, "pretty vanilla - motherhood

statements", and "could be improved". Beam Line Operators did not seem to understand the safety goals and objectives of their supervisors. Specific, documented safety goals and objectives could assist each worker in improving safety performance. ES&H responsibilities could be reiterated and evaluated during annual Performance Evaluations. The Beam Line Operations Group could meet with the SSRL Safety Officer, to establish a list of safety functions for emphasis during the coming year. This could stimulate constructive employee/supervisor review of the year's safety successes and challenges, recognize safety accomplishments, and identify safety training needs.

On-line employee training records have been available to SLAC supervisors for the past two years. A list of employee training needs was added last year. Providing the employee with an updated training record before their Performance Evaluation, could assist them in preparing for a constructive discussion with their supervisor.

Lessons Learned Program: SSRL does not have a formal Lessons Learned (LL) Program. SSRL gets LL from SLAC ESHD and Operational Safety Committee, but seldom provides ESHD with LL from SSRL (unless reported in the DOE ORPS system). SSRL does not seem to report "Near Misses", or send Near Miss LL to SLAC and other DOE Light Sources; SSRL only informs and shares LL with their workers. SSRL should consider ways of inputting Duty Operator safety data in electronic format, so repetitive problems can be tracked and trended, and solutions recalled efficiently.

ISM REVIEW TEAM CONCLUSION:

SSRL's disciplined interweaving of safety with operations in the Beam Line Duty Operator's activities (per "SLAC Guidelines for Operations"), demonstrate that Feedback and Continuous Improvement are effectively integrated into SLAC's Integrated Safety Management System.

SUMMARY CONCLUSION

The ISM Review Team concluded that SSRL Beam Line Operations demonstrated effective integration of ISM in 6 of the 7 SLAC ISM elements.

Improvement is needed in Guiding Principle 5: Identification of Safety Standards. SSRL Duty Operators were not aware of the SLAC Work Smart Standards (WSS) set.

ISM REVIEW DOCUMENTS:

"Characteristics of SSRL Experimental Stations"; SSRL Beam Line Characteristics, www-ssrl.slac.stanford.edu/beamlines/bl_characteristics.html

"ES&H Forms and Templates", SLAC Environment, Safety & Health: www.slac.stanford.edu/esh/forms.html

"ES&H Roles and Responsibilities", Stanford Linear Accelerator Integrated Safety Management System (ISMS), www.slac.stanford.edu/esh/isms/rrarr.html

"ESRD Operations Document List"; SSRL, Hal Tompkins, 5/10/01.

"FY2001 ES&H Process Performance Measure", Integrated Safety Management (ISM) 9/20/00; DOE-Stanford University (SLAC) Management and Operations (M&O) Contract DE-AC03-76SF00515, DOE Stanford Site Office (SLAC).

"Guiding Principles Fig. 6. Matrix for Use in Review of Existing System"; Integrated Safety Management System Guide, DOE G 450.4-1A, vol. 1, ch. III, p. 56, 5/27/99.

"Overview of SSRL User Training", SSRL, Ian Evans, 5/29/01.

Radiation Safety Work Control Form, Install/Reinstall Beamline 7 out of alcove shielding and "B" locks; SSRL Beamline 7, Form # 78S, 5/23/01.

"Roles and Responsibilities"; SSRL, Ian Evans, 5/01.

"Roles, Responsibilities, and Authorities for Positions at SLAC with Special ES&H Importance"; SLAC-HR March 2001.

"SLAC Guidelines for Operations"; SLAC Document # 01-01-01-04, Rev. May 1998, www.slac.stanford.edu/pubs/gfo/gofindex.html
"SLAC Integrated Safety Management System"; SLAC, ES&H Division, SLAC-I-720-0A00B-R001, Oct. 2001, www.slac.stanford.edu/esh/isms/sms.pdf
SSRL Beam Line Duty Operator – Procedures for Actinide Experiments; Lawrence Berkeley National Lab, Lawrence Livermore National Lab & Los Alamos National Lab, Rev 05/18/01.
SSRL Beam Line Safety Checklist, Branchline 4-2, Proposal 2711A*, Nancy Hess, On 6/7/01, Off 6/9/01; OPS-068 Rev:0:0, MLH, 11/9/94.
SSRL Beam Line Safety Checklist, Branchline 4-3, Proposal 2512C, John Bargar, On 6/7/01, Off 6/11/01; OPS-068 Rev:0:0, MLH, 11/9/94.
SSRL Beam Line Safety Checklist, Branchline 7-2, Proposal 2591C*, Bruce Begg, On 6/7/01, Off 6/11/01; OPS-068 Rev:0:0, MLH, 11/9/94.
SSRL Beam Port Schedule, Week of June 4, 2001; www-ssrl.slac.stanford.edu/xray_schedule.html
"Stanford Synchrotron Radiation Laboratory, Beamlines, Beamline Facilities"; SSRL, www-ssrl.slac.stanford.edu/beamlines/
"SSRL Beamline Operations Directives" OPS-069: Personnel; Staffing Requirements; Operations; and, Safety; SSRL, 5/12/01, 4 ch., 9 p.
SSRL Beamline Operations Safety Procedures:
"Access to Radiation Lock Areas" OPS-045; SSRL, 5/10/01;
"BLA Implementation" OPS-079; SSRL, 5/10/01;
"Non-Experimental Online Authorization" OPS-082; SSRL, 5/8/01;
"Online/Offline Procedure" OPS-043; SSRL, 5/8/01;
"Safety Checklist Implementation Procedure" OPS-003; SSRL, 5/8/01;
"Safety Deficiencies" OPS-114; SSRL, 5/10/01.
SSRL End of Run Summary Form; SSRL, Rev. 1/12/01, www-ssrl.slac.stanford.edu/users/user_admin/form_ers.html
"SSRL Experimental Proposal Safety Review Procedure"; Rev. 2.0. 12/10/97.
SSRL Functional Organization; SSRL, v25; 5/23/01
SSRL Hutch Protection System Checkout Beam Line 11-0; OPS-112 Rev. 0, MLH, 5/28/99.
"SSRL Organizational Structure, Stanford Synchrotron Radiation Laboratory – A National User Facility"; www-ssrl.slac.stanford.edu/ssrl_organization.html
"Stanford Linear Accelerator Center, Research and SSRL Divisions"; www.slac.stanford.edu/grp/do/orgcharts/research-ssrl.html
Stanford Linear Accelerator Center Performance Evaluation Form, Bargaining Unit, Evaluation Period April 1, 2000 through March 31, 2001; SLAC-I-00C-006TP-001 R001
Stanford Linear Accelerator Center Performance Evaluation Form, Non-Bargaining Unit, Evaluation Period April 1, 2000 through March 31, 2001; SLAC-I-00C-006TP-001 R001.
"Stanford Synchrotron Radiation Laboratory-SLAC, Safety Office"; www-ssrl.slac.stanford.edu/safety
TMS Bargaining Unit Job Description; SSRL, ESRD, Beam Line Operator, (May 2001).
US Department of Energy Integrated Safety Management System Policy; DOE P 450.4, DOE-HQ-EH, 11-15-96.

APPENDIX A.4
SLAC Integrated Safety Management (ISM) System Implementation Quarterly Review Objective, Criteria and Approach

A4 - FY01 ISM Review Area #4:
SE&M Maintenance Activities

SLAC Integrated Safety Management (ISM) System Implementation
Quarterly Review Objective, Criteria and Approach

FY01 ISM Review #4: SE&M Maintenance Activities

FY01 ISM Review Team:	**S. Kesterson (OAK), R. Haddock (OAK), R. Schwartz (HQ), D. Osugi (SSO), R. Cellamare (SLAC), J. Dabney (SLAC)**
Performance Objective:	**SLAC effectively integrates ISM into all management and work practices at institutional, site and activity levels so that missions are accomplished while protecting the worker, the public and the environment.**
Performance Criteria:	**SLAC systematically integrates the Integrated Safety Management System's (ISMS) seven Guiding Principles and five Core Functions into all management systems and work practices at the institutional, site, and activity levels.**

SLAC Interviewees:

Technical Division Associate Director
Site Engineering & Maintenance Department Head
Site Engineering & Maintenance ES&H Coordinator
SEM Facilities Support Group Leader
SEM Utility Maintenance/Construction Group Leader
SEM Rigging Supervisor
SEM HVAC Supervisor
High Voltage Electrician Supervisor
(2) Operations Mechanics
(2) Equipment Mechanics
(2) Heating, Ventilation & Air Conditioning Mechanics
(2) Facilities Electricians
(2) Riggers
(1) Lighting Electrician
(4) High Voltage Electricians

ISM Review Support References:

- DOE Integrated Safety Management System Policy P450.4
- SEM ISMS Resource List (provided by SEM)
- ES&H Manual
- Work Smart Standards (WSS)
- SLAC Integrated Safety Management System
- SLAC Lock and Tag Program for the Control of Hazardous Energy
- University Technical Representative Guide (UTR Manual)
- Building Manager Program Manual, 03/01 Revision

- SEM ISMS Pre-Work Safety Checklist
- SEM Job Site Safety Checklist
- Site Engineering & Maintenance Organization Chart
- Critical Behaviors Inventory (Behavior Based Safety Program)

SEM Documents:

- B. Skaggs Presentation, SE&M ISM Review, August 2001
  - Memorandum: ISMS Pre-Work Safety Checklist, B. Skaggs to PED, 11/30/99
  - Memorandum: Lock & Tag, B. Skaggs to SE&M, 6/21/01
  - SEM ISMS Pre-Work Safety Checklist Form
  - SEM Job Site Safety Checklist Form
- HVAC Preventive Maintenance Work at B41
  - ISMS Pre-Work Safety Checklist for B41, 8/14/01
  - SLAC Electrical Hot Work Approval Form, Troubleshooting of HVAC Controls, 8/10/01
  - SLAC Electrical Hot Work Approval Form, Troubleshooting of HVAC Controls, 460V, 8/10/01
  - Preventive Maintenance Procedure: Multi-Zone Heating/Cooling System B41, 2/2/00
- Lighting Maintenance
  - ISMS Pre-Work Safety Checklist for B84, R170
  - AR System Entry 014133
- High Voltage Electricians
  - Summary of Work Assignments 8/15/01
  - Summary of Trouble Calls, 8/15/01
  - SE&M Electrical Shop Work Assignment, 8/15/01, 3 Assignments
  - Preventive Maintenance Work Order 46,599.1, Manhole 008 Procedure CBL008-9608, 8/12/01
  - Manhole Maintenance Procedure
  - SafeMate Operating Procedure
  - Gastechtor Operating Procedure
  - Conductivity/pH Calibration Procedure
- Utility Operations
  - Plant Engineering Operations Training Manual Volumes 1, 2, 3
- Hoisting and Rigging
  - Preventive Maintenance Work Order 46,273.1, B113, Crane CRN025-09-02, 7/29/01 and earlier PM Work Orders
  - Bridge Crane and Large Hoist Inspection Report, Site Crane No. 25, B113, 8/14/01
- SLAC Performance Evaluation Forms
  - Bargaining Unit
  - Non-Bargaining Unit

Background:

In January 2000, the Facilities Office and Plant Engineering Department were merged into one department now called Site Engineering and Maintenance (SEM). SEM combines most of the previous responsibilities of these two groups. SEM is responsible for maintaining the entire SLAC site except the experimental apparatus, beam components, cafeteria service and mail delivery.

Scope:

The scope of the review included SEM's completed, ongoing or planned programmatic and non-programmatic maintenance activities. Specific areas included facilities, infrastructure utilities and support services (crane and rigging maintenance). The review consisted of interviews of line managers and workers, data generated from SLAC's internal tracking systems, other documented work process products and the review of site policies and procedures and their implementation.

The evaluation was based on the criteria identified in the SLAC Integrated Safety Management System description document approved by the DOE Stanford Site Office (SSO) on December 6, 2000. That document describes how SLAC implements and fully integrates the seven ISMS Guiding Principles and five Core Functions into all management systems and work practices at the institutional, site and activity levels and considers the following as appropriate:

- Vertical and horizontal integration of Integrated Safety Management Systems
- Flow-down of ISM requirements into SLAC contracts and other site documentation
- Implementation of line organization self-assessments
- Processes are in place that ensure feedback and continuous improvement
- Establishment and tracking/trending of key safety indicators and metrics

This review is the final of four quarterly ISM implementation reviews scheduled for FY01. The collective results of the four reviews will be used as the basis for determining how well SLAC has met the ES&H performance objective on ISM implementation. In accordance with Article 42 of the contract between the U.S. Department of Energy and Stanford University, SLAC is required to ensure that management of environment, safety and health (ES&H) is an integral part of the Laboratory's work planning and execution processes.

Guiding Principles 1 and 2, Line Management Responsibility for Safety: Clear Roles and Responsibilities

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

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

Discussion of Results:

Interviews and observations indicated that roles and responsibilities are clearly defined and understood within SEM. Chapter 1 of the ES&H Manual delineates that the responsibility and authority for complying with ES&H laws, standards and regulations flows from the Director through the ADs and the line management organization to the first line managers. Department Head has a vigorous approach toward educating his department, with the goal of personal safety, e.g., June 21, 2001 memo regarding streamlined Lock and Tag guidelines in response to incident with SEM electrician. Worker accountability for safety is clearly conveyed by SLAC. Workers are familiar with their ability to stop an unsafe activity.

Guiding Principle 3, Competence Commensurate with Responsibilities

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

Discussion of Results:

Interviews and observations of workers indicated that they possess a good knowledge of a job's safety hazards and what Personal Protective Equipment (PPE) is needed. Electricians have a good inspection/maintenance program for protective gloves, both for regular SLAC employees and for job-shoppers. SEM has augmented worker training by bringing in vendors and equipment manufacturers for demonstration sessions when appropriate.

Interviews with both management and workers and observations of work activities indicate that in general, SEM is reliant on Skill of Craft as evidence of experience, knowledge, skills, and abilities for maintenance work. Recent incidents attributed to inexperienced journeyman workers have led to informal certifications for specialized carpentry shop equipment; these certifications have yet to be documented.

During a field observation of cable maintenance in a manhole, it was noted that although High Voltage (HV) electricians have an emergency tripod available in the truck, they do not appear to be adequately prepared for an emergency, such as someone disabled in the hole. Though they are first aid trained, they do not carry a first aid kit. It is not clear that either worker is adequately trained on the emergency tripod, and they have not performed drills with the Palo Alto Fire Department personnel, who are designated as the primary rescuers for SLAC confined spaces.

The ES&H Division provides the Employee Training Assessment (ETA) for ES&H training courses. The assessment points all employees and their supervisors to the ES&H courses that are necessary to maintain the competence needed to deal with specific workplace hazards and job responsibilities. Interviews revealed that supervisors are not consistent in assessing worker training needs.

Interviews indicate the possible need for coaching within the department for persons asked to perform new tasks. This refers to anything from a new supervisor learning how to effectively communicate with workers, to a person who has never performed an investigation being asked to write an investigative report.

Everyone in the department attends the Department ES&H Coordinator's monthly safety meetings, which are offered seven (7) times in one day in order to incorporate all groups.

Strengths:

- The Department ES&H Coordinator's monthly meetings are an effective educational tool and a way for all employees to feel involved in some regular dialogue concerning safety, and to be updated about current procedures and policies.

Opportunities for Improvement:

- Higher priority needs to be given to all SEM supervisors completing Employee Training Assessments for their workers at the time of hire, job changes, or annual performance evaluation. Supervisors should be trained in using this tool so that the ETAs are consistently and accurately completed throughout the department.

- Safety, Health and Assurance Department staff should observe the manhole maintenance procedures performed by the SEM HV electricians and make recommendations regarding appropriate emergency preparedness.

Guiding Principle 4, Balanced Priorities; Core Function 1, Define the Scope of Work

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

Discussion of Results:

The Review revealed balanced priorities are evident across SEM. Required PPE is available. SEM provides resources needed to perform a job safely; for example, Heating, Ventilation and Air Conditioning (HVAC) technicians were able to revise the work scope and get additional manpower to handle a job associated with moving a heavy compressor.

The SEM Service Desk provides support to the SLAC community, communication between SEM maintenance groups, and enables safety issues to become visible and receive correction action assignment in a timely fashion.

Interviews indicate that department management may be able to use the person in the role of Department ES&H Coordinator more fully, e.g., as a knowledgeable supplement to the UTR on construction sites; as a point-of-contact for training documentation (including On-the-Job Training); as a liaison with ES&H Division subject-matter experts.

The Hoisting and Rigging Training Program is on hold because of inadequate funding, which has impacted a few interviewed employees.

Noteworthy Practice:

- Creation of SEM Service Desk to communicate more effectively with the customer and highlight/give higher priority to items determined to be safety issues.

Strengths:

- The team noted that all interviewees observed that management was willing to provide the appropriate personnel protective equipment (PPE) for them to do their job. Management listens and responds if someone says they can't do their job safely.

Guiding Principle 5, Identification of Safety Standards and Requirements

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

Discussion of Results:

SLAC uses the Work Smart Standards (WSS) Set as a tool to identify safety standards, which provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences. The Review Team found the flow down from the WSS Set to the SEM policies and procedures that were reviewed was satisfactory.

Guiding Principle 6, Hazard Controls Tailored to Work Being Performed; Core Function 2, Analyze the Hazards; and Core Function 3, Develop and Implement Hazard Controls

Criteria: Administrative and engineering controls to prevent and mitigate hazards shall be tailored to the work being performed and associated hazards.

Discussion of Results:

In general, SEM uses the ISMS Pre-Work Safety Checklist to prevent and mitigate hazards specific to work being performed. Repetitive activities may be addressed with a written procedure covering safety requirements (SLAC PED memo dated November 30, 1999). The ISMS Pre-Work Safety Checklist does not directly address or analyze hazards, including some environmental concerns. It does list potential controls which trigger obvious hazards associated with work but does not strictly follow the ISMS process as delineated in core functions 2 and 3. Field observations indicated that this approach may not be adequate and may allow the opportunity for unsafe practices.

Utility Maintenance/Construction Group depends on operating and maintenance procedures for hazard analyses and controls. The Pre-Work Safety Checklist is not used by Utility Operations. Review of the Utility Operations procedures indicates that hazard analyses and controls are not fully addressed. Some procedures have been developed using a comprehensive approach to cover both hazards and controls, but others do not address needed controls.

Observations of maintenance work activities indicated non-compliance with Lock and Tag Program procedures. Specifically, two workers failed to perform 100% verification in two ways (attempt to operate the equipment, and use a circuit tester appropriate to the expected voltage that the power is off prior to working on anything locked out), a requirement of SEM per a memo from the Department Head dated June 21, 2001.

Opportunities for Improvement:

- Recommend that SEM revise the Pre-Work Safety Checklist to identify hazards and ensure that controls are developed and implemented which are tailored to work being performed. Formal instructions on the application and use should also be established to develop a consistent approach throughout SEM.

- Utility Operations procedures should be reviewed and revised to fully address hazard analyses and controls. In the interim, Utility Operations should use the Pre-Work Safety Checklist where current procedures do not adequately address both hazards and controls.

- Lock and Tag procedures should be reviewed with all SEM workers.

Guiding Principle 7, Operations Authorization; Core Function 4, Perform Work within Controls

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

Discussion of Results:

In general, maintenance work is informally authorized by the supervisor. Formal and uniform instructions for filling out the Pre-Work Safety Checklist have not been developed. Some groups require the work crew to sign the checklist to acknowledge their understanding of the job's hazards and controls. The requirement and application of the Pre-Work Safety Checklist was disseminated only to the former Plant Engineering Department (before the merge with Facilities Office and subsequent creation of SEM). As a result, the use and effectiveness of the Pre-Work Safety Checklist is not consistent throughout SEM.

Opportunities for Improvement:

- The work authorization process should be formalized.

Core Function 5, Provide Feedback and Continuous Improvement

Criteria: SLAC management provides several avenues for communicating concerns about hazards in the workplace to the appropriate authorities for action.

Discussion of Results:

Though interviews, the Review Team found that ES&H expectations are satisfactorily communicated through SEM monthly safety meetings and in most cases by weekly meetings. The Associate Director takes advantage of opportunities to "walk the floors" to review safety concerns at SLAC.

The Facilities Support Group Leader has developed an excellent way of communicating with his workers and supervisors: he starts off each day with a 7:00 meeting for the whole group, in which he shares All Hands memos and discusses new issues as necessary. At 7:30, his supervisors and leads develop a Plan for the Day; and at 8:15, he and the other group leader meet with the Department Head; ES&H Coordinator joins them at least once a week.

SEM is implementing the Behavior Based Safety Process, which is called "Safety Toward Avoiding Risk Today" (START) in their department. The existence of a Behavior Based Safety Process in this department has empowered the employees to feel more confident in calling attention to safety hazards with their fellow employees (or perhaps even employees in other departments). Although a few interviewees expressed some skepticism about the process, in general the worker observations have had the positive effect of improving safety and raising hazard awareness.

The Hoisting and Rigging Committee takes a limited role in discussing and resolving the issues related to the high-hazard activities under their jurisdiction. The committee meets infrequently and the results of their meetings are not made available to SLAC stakeholders via minutes.

Strengths:

- SEM managers have exhibited good support for their department's Behavior Based Safety Process, called "Safety Toward Avoiding Risk Today" (START); the Review Team encourages continued support of present and future START team members and observers.

Opportunities for Improvement:

- The Hoisting and Rigging Committee (chaired by SEM manager) should become a more active resource to the SLAC community by communicating more effectively via elicitation of concerns, regular meetings, and posted minutes.

Conclusion:

The Review Team found that the Site Engineering and Maintenance (SEM) Department is satisfactorily meeting all criteria presented in the SLAC Integrated Safety Management System.

For supporting details on each criterion, see the sections related to a specific Guiding Principle or Core Function in this report. The Review Team's "Opportunities for Improvement" cover hazard identification, controls, and training and have been called out under their respective Guiding Principle/Core Function sections.

The Review Team agrees that, upon completion of the recommended "Opportunities for Improvement", SEM will have made significant contributions toward sitewide implementation of ISM.

ISM Review Team Concurrences:

_____ _____
Rich Haddock Date
DOE Oakland Operations Office

_____ _____
Ray Schwartz Date
DOE, Office of Science, SC 83

_____ _____
Dave Osugi Date
DOE Stanford Site Office (SSO)

_____ _____
Rich Cellamare Date
Stanford Linear Accelerator Center (SLAC)

_____ _____
Janice Dabney Date
Stanford Linear Accelerator Center (SLAC)

_____ _____
Shaun Kesterson, Team Lead Date
DOE Oakland Operations Office

APPENDIX B - Year 2001 TWC Program Report

Year 2001 TWC Program Report

1. TWC Process

The second year of the Talk, Walk, Clean Program (see Appendix B, C, D, E) establish the process as a significant addition to SLAC's overall commitment to ES&H. As in previous years, those groups wishing to discuss, report and effectively deal with ES&H issues via the Talk activity had the opportunity to do so. For the rest of the groups (more than 75%) the newer format continued to provide a hands on and timely solution to resolving ES&H related matters. Processes used to identify teams, collect data and report hazardous conditions or safety and environmental issues remained similar to that in previous years. A clear set of focus topics and objectives allowed groups to be prepared for their activity. In addition, SEDAC provided checklists for groups performing the Walk, extra recycling containers and garbage bins for groups performing the Clean, as well as a way for material to be taken to SLAC Salvage. Forklift drivers were "on call" from various divisions to help transport items discarded in the Clean efforts, though their assistance was not needed. The combination of these tools alleviated conference room space problems, allowing discussion groups to be less cramped and time conscious than in past years. This year's changes also made life easier for key personnel at the "salvage yard" who had to deal with the large quantities of unwanted material.

On February 13, 2001, the director issued an "All Hands Memo" (Appendix F) announcing the TWC event to be held April 20, 2001. TWC team leaders were given reference material at the kick-off meeting and referred to the Web for additional support. The TWC website

(http://www.slac.stanford.edu/esh/standdown/standdown.html)

provided full details of this year's process. SEDAC members were available to provide information for anyone not having easy computer access.

In keeping with SLAC's ISMS philosophy, all three programs (especially when viewed globally) produce an effective means of addressing ES&H issues by:

- Pre-planning which ensured that the scope of work through the TWC Program was well defined and that the proper resources were applied.
- Identification and analysis of hazards performed by all groups, either through discussion or inspection process, via checklists, or at the working level as personnel cleaned their work areas.
- Controls that were developed to mitigate hazards to acceptable levels or fix the problem in the short term. Talk groups proposed corrective actions, while Walk

groups reported safety issues through the division, which allowed departments and groups to identify and allocate resources as necessary. Clean groups took care of issues in pre-defined areas throughout the allotted time, e.g., removing or relocating equipment, salvaging items, and performing housekeeping duties.

- Providing feedback at the divisional level, about the success of the TWC program to management and the line organizations via staff meetings and by SEDAC representative contacts. Collating the entire positive as well as the negative comments allows the program to be further refined for next year.

2. TWC Benefits

In the view of SEDAC, the idea of a choice of a Talk, Walk or Clean activity continues to be a successful and popular format for the annual standdown.

The Talk program resulted in 37 issues total, with 12 site-wide concerns being identified. The Talk process provides a beneficial ongoing re-assessment of safety and health priorities as situations change and the laboratory grows. For example with the laboratory's focus on resource conservation, this process was able to develop new ideas to deal with this concern. Another team considering the effects of a growing campus population and increasing use of parking on the sides of roadways, offered a proposal that pedestrian safety be revisited based on these new circumstances.

The Walk Program resulted in numerous observations such as: computers/components cluttering floors and work space; loose cables hanging from ceilings, unsecured objects or cabinets that may become hazardous in earthquakes; lack of exits signs in corridors; improperly tagged fire extinguishers; hazardous material containers not labeled or without lids, fluorescent lamps without safety barriers; lights and computer monitors left on; and the need for additional electrical outlets. Identification of these issues by line personnel helps to address specific concerns, and maintain ES&H awareness at the working level throughout the year.

The Clean Program activities include cleaning up cluttered offices, laboratory space, storage cabinets, and bookshelves; removing tripping hazards; and recycling materials or returning property to Salvage. These efforts continue to assist in environment, safety and health issues, as well as efficient property utilization and cost recovery.

3. TWC Results

Nineteen teams chose the Talk, 20 groups chose Walk and 50 chose Clean. A few of the groups did both Walk and Clean. The results of the Talk Program, the Walk-through inspections, and the Clean activities are discussed below.

3a. Talk Program

The TWC 2001 Talk Program resulted in identification of 37 issues (see Appendix G). The distribution of issues is represented in the four tables below.

Table I -- Distribution of Issues by Division

Director's Office	0
Business Services Division	0
ES&H Division	0
Research Division	9
SSRL	10
Technical Division	18
TOTAL	37

Table II -- Distribution of Issues by Problem Type

Transportation Safety	10
Slips, Trips and Falls	7
Electrical Safety	4
Emergency Preparedness	4
Resource Conservation	4
Repetitive Strain	2
Burn/Eye Irritation	1
Fire Protection	1
Hazardous Materials/Hazardous Waste Mgmt.	1
Industrial Safety	1
Radiation Protection	1
Sprains, Strains, Tendonitis	1
TOTAL	37

Table III -- Distribution of Causes

Procedure/Policy Implementation	10
Improper Tools or Equipment	9
Maintenance	9
Management Attitude/Pressure	4
Obsolete Components/Equipment	3
Qualifications/Training not Adequate	1
Lack of Procedures	1
TOTAL	37

The top two problem types were: 1) Transportation Safety, and 2) Slips, Trips, and Falls. The top three causes were: 1) Policy/Procedure Implementation, 2) Improper Tools or Equipment, and 3) Maintenance.

Examples of some of the Talk issues from this year's TWC Program are:

- Parking on sidewalks on the campus loop road requires pedestrians to walk in the street. There are two factors here; the first is lack of parking spaces and the other is the lack of sidewalks. Parking will only get worse as new

buildings are put up and few spaces allocated for them. Lack of sidewalks is a pressing issue because people have no place to park and must walk long distances (to BaBar etc.) on the roads.

- No continuous sidewalk around loop road. Pedestrians must walk in roadway. Especially a problem where sidewalk ends and pedestrians step out into traffic.
- Stair coverings are wobbly and unsafe. This is a long-standing problem which has become worse with time.
- Lighting Controls - wasteful energy, improper lighting can cause safety hazards.
- The South entrances to the Klystron Gallery are not posted with warning signs to watch for electric carts. The north side entrances are posted. Cart travel in the south aisle is less frequent, but does occur, and is necessary for Power Conversion crews.
- Earthquake preparedness: We think it important to re-stock the earthquake safety kits (fresh food/water, new flashlight batteries), issue them to those without kits, and remind everyone of the proper procedures for safety during earthquakes.
- The grounding (bonding) of racks, modulators and cable trays in the LINAC klystron gallery needs to be brought up to standard in Sectors 13 through 30. Contributing cause of existing condition is funding to complete the job.

3b. Walk Program

Twenty teams chose to do walk-through inspections of rooms, buildings, labs, or outside areas. Each team filled out a "Walk Report" which was submitted to the ES&H Division. Any corrective actions required were submitted to Division/Department safety coordinators for tracking. A sampling of the results from the Walk reports follows:

- The dominant needed action is general housekeeping. Many of these areas are in transition so this was expected. Some wet floors were noted, as were holes in the siding of 125. These will be taken care of locally.
- The areas were walked looking for Electrical Safety Hazards & concerns. The most notable hazards found is the use of hanging enclosed 208V Busbars in the shop area room no.155. The concern was that a piece of metallic rod or bare cable can be accidentally inserted in the Busbar and cause electrical shock.
- No exit signs in main corridor. Bulbs in fluorescent fixtures unrestrained in labs, offices, and corridors. Shelves too high in rooms B287, B235, B273, B288.
- Found many aerosol cans without caps, chemicals stored in containers without labels or improper labeling and non-flammable chemicals stored in flammable lockers. Replaced labels where possible. A memo will be distributed and these items will be discussed at the next safety meeting. A location for non-flammable chemicals will need to be located.

3c. Clean Program

Fifty teams chose to clean up offices, labs, or outside areas around the site. Each team filled out a "Clean Report" which was submitted to the ES&H Division. The Clean effort resulted in a very significant improvement in the state of housekeeping and safety within the laboratory. The magnitude of this effort can be quantified by considering the amounts of materials collected:

- Approx. 3.5 tons of corrugated cardboard, mixed paper and white paper
- One 30-cu yd dumpster with scrap metal (from SEM)
- 16 Pallets of Property Control materials site wide
- 3 drums of scrap metal
- Some office furniture

Examples of Clean reports and comments about the process:

- Extensive cleaning and disposal/recycling of office supplies, obsolete software, and excess paper/files. All files were checked to make sure they had no archival value.
- Materials sent to salvage, clutter removed from work areas, identified cabinets (in G223) in need of bracing, corrected serial extension cord, removed heavy items from high shelves, segregated chemicals for disposal, recycled excess paper, reorganized materials and equipment.
- Several generations of obsolete computer network cabling in the rooms and adjacent hallway were removed. All rooms were tidied up with trip hazards eliminated and several garbage cans of paper sent for recycling.
- All of the obsolete equipment and the left-overs from the SSC (Super-Conducting Supercollider) have now been removed from the area. This has given us much better access to the building #25 shut off valves. We have much more storage space now. All the excess computer equipment has been salvaged. Efforts will be made to keep these areas free of debris in the future. Looks much better!
- The group found this process very valuable and as a result we have a cleaner more organized workspace.

4. TWC Corrective Actions

For the Talk program, the Associate Directors assigned responsibility for issues (Appendix G) within the control of their respective divisions and referred the site-wide issues to SEDAC which coordinated corrective action determination through the ES&HCC. Examples of corrective actions that have been implemented or are in progress:

- Consider posting caution signs on the South entrances to the Klystron Gallery similar to the North Side (assigned to the Operating Safety Committee)
- Develop proposal to upgrade ground on Sector 13 to 30 (assigned to the Electrical Safety Committee)

- Consider cost/benefit of following ideas: lighting occupancy sensors at all offices/shops and timers or photocells at exterior lights. Relamp (or clean) light fixtures to improve lighting levels. To improve visibility, paint certain areas where lighting levels are low.
- Consider calling for a plan for bike and pedestrian traffic in light of new buildings on site, and new user activity.
- Replace/repair non-skid surfaces on stairs.

5. TWC Evaluation of the Process, Lessons for the Future

For the first time this year, the Director's All Hands memo announcing the Talk, Walk, and Clean process for 2001 was distributed solely by electronic method, thereby continuing the site's attempt to conserve resources and go "paperless" when possible. TWC Leaders were given a concise pamphlet at the kick-off meeting and referred to the Web for additional information. Accessibility to TWC results through the Web with easy links from the ES&H Division Web Page continued to allow participants to check the status of any "Talk" issue and its related corrective action(s).

Supportive responses to the second year of this program format were noted on the various Talk, Walk, or Clean forms turned in to the Program Planning Office. The primary goals stated in the "00 summary were met: pre-event planning with Property Control, providing extra forklift drivers from the divisions; pre-Clean distribution of Property Control tags; further education of departments on the necessity and methods of sorting; heightened efforts beforehand to determine how many pallets and recycle containers were needed at various sites.

Additional ideas for next year are: hands-on communication by SEDAC members with TWC leaders to make sure container needs (bins, pallets) are more accurately determined (especially office areas); highlight deadlines for requesting extra containers even more clearly in the trifolds; clarify whether office items need to have survey form and inform participants; continue to work closely with Property Control to alleviate this year's situation of some materials still awaiting pick-up a few months after the standdown; address the merit of various kinds of staging areas again; highlight early deadline to TWC leaders for requesting OHP survey assistance for any applicable TWC effort planned by their group (for either day of standdown or before).

APPENDIX C - Talk Pamphlet

3/2/01

TALK, WALK, CLEAN (TWC 2001) Program

"TALK"

Team Leader Instruction Pamphlet

Kick-Off:	Monday,	4/02/01 – 1:30 to 2:35 pm
Event:	Friday,	4/20/01 – 8:00 to 10:00 am
Reports Due:	Monday,	4/23/01 – End of Day

ttp://www.slac.stanford.edu/esh/standdown/standdown.html

Purpose of this Pamphlet

This instructional pamphlet is for Team Leaders who have chosen the "TALK" choice in the TWC Program. The "TALK" process is similar to the SLAC Safety and Environmental Discussions from previous years. Those interested in a "WALK" or "CLEAN" choice should see the instructions for these items.

All instructions are accessible from the Web at: http://www.slac.stanford.edu/esh/standdown/standdown.html

For Team Leaders who do not have Web access, hard copy materials are available from your Divisional SEDAC representative: ES&H/DO - Ellen Moore TD - Janice Dabney, SSRL - Ian Evans, BSD - Gail Gudahl, RD - Frank O' Neill, or Waste Minimization Specialist, Rich Cellamare.

Objectives of the Team "TALK":

With reference to the Focus Topics listed below,

- *Discover* two significant deficiencies in our work habits, or our work or general site areas that, left uncorrected, may adversely effect the environment, safety or health conditions at SLAC.

- *Develop* a statement of cause.

- *Suggest* a brief corrective action plan.

Ideally, the team will uncover at least one issue that can be **corrected by the team.** New issues that have not been reported in previous years are also encouraged.

Focus Topics and "TALK" Program Tools:

Focus Topics are based on the most common injuries, illnesses, and environmental issues as reported in FY00, as well as potentially high impact events (serious injury, death, chemical explosion, fire, etc.). The Focus Topics are:

- **Potentially High Impact Events**
  Serious injury, death, chemical explosion, fire, etc.

- **Most Common Injuries, Illnesses and Environmental Issues**
  Strains & sprains from lifting, abrasions/contusions/lacerations, slips/trips/falls, hazardous materials and waste handling, general office and ergonomic habits.

- **Resource Conservation/Environmental Performance**
  Tips from the Director's All Hands, "Energy Issues for the Lab," dated 1/25/01; reduce nonproductive use of energy; water, chemicals, etc.

- **Items defined by the Team**

Related to the Focus Topics are the "TALK" Tools, which are a detailed listing of what individuals can do to prevent the accidents and environmental issues suggested by the Focus Topics. The "TALK" Tools and the Director's All Hands email can be found on theTWC Program Web site.

Pre-"TALK" Checklist for the Discussion Leader:

? All operations will cease between 8:00 a.m. and 10:00 a.m. Friday, April 20th. The accelerator will go into a standby condition. With Division management, determine the affect of your team's participation on standby operations. If support problems exist, or problems with off-shift operations occur, generate an alternative time on _____ or _____.)

? Arrange meeting place and notify your team of the place and time.

? If a whiteboard is not available in your meeting room, gather flip chart style paper and marking pens so ideas can be recorded by an appointed secretary and displayed during the "TALK"

? Encourage your team to review the Director's All Hands, of 2/13/01. (See TWC Program Web site for a copy.)

? Encourage your team to review the "TALK" Tools on the Web site.

? Encourage your team to read the " TWC and S&E Discussion Information From Previous Years," posted to the Web site, for a summary of corrective actions from the previous programs.

? The Team Leader should review the TWC "TALK" Phase One form on the Web to determine the information that he/she will collect during the "TALK" meeting.

Ground Rules for Conducting the "TALK" Brainstorming Activity

1. Conduct "TALK" activity on Friday, April 20th from 8:00 – 10:00 am.

2. In a brainstorming fashion, have the team think about reported/unreported accidents, near misses, incidents or unsafe behaviors experienced by your work group, that relate to the Focus Topics.

3. Think about the nature of work performed by your group and the areas where this work is done.

4. Allow each team member an opportunity to offer their issues of concern for a team vote.

5. Record all suggestions on a whiteboard or paper.

6. One issue should be able to be corrected by the team.

7. Openness and candor are key to the discovery of dangerous or unsafe conditions. Respect for each person's suggestion is critical. Discussions on the merit of a suggestion should be avoided. Discussions clarifying a suggested issue should be brief.

Steps for Conducting the "TALK": Discovery of Issues/Concerns:

? Explain the "TALK" objectives and rules for brainstorming. *(Note - If you would like a script to follow, see the TWC Program Web site.)*

? Brainstorm by polling each member in turn for a suggested issue. Continue until each member has had the opportunity to suggest three issues. Record each suggestion on the whiteboard or paper viewable by all.

? Allow for brief discussion of the suggested issues.

? Vote. Allow each member, in turn, to vote for their issue of most concern. Each member has three votes only. The two issues with the most votes become your first and second choices.

? The issue receiving the most votes is issue #1; the issue receiving the next most votes is issue #2. Hopefully one of these two issues can be addressed and corrected by the team itself.

Develop a Statement of Cause and a Suggested Corrective Action:

? Members volunteer ideas describing the condition or activity they feel resulted in the dangerous, unsafe or environmental issue.

? By polling the team members, determine which of the causes suggested is the single circumstance most likely to result in the issue being discussed. Each member has up to three votes toward the discovery of a single cause for each of the two issues under discussion.

? With the cause for each issue in mind, the team develops a suggested corrective action for each. The majority rules in the case of disagreements.

? The team assesses if "there is danger of immediate death or serious physical harm, or there is a clear and present danger of contamination of the environment" requiring immediate action.

Steps After the "TALK" Activity:

? If the team decided that immediate action is required as defined above, the Team Leader alerts their Division Associate Director and Jack Hahn, ES&H, ext. 3295, immediately by phone.

? By close of business Monday, April 23rd, the Team Leader is to report information via the "TALK" Phase One form on the TWC Program Web site.

If the Team Leader does not have Web access, mail the "TALK" Phase One form to Jack Hahn, ES&H, MS 84, and send a copy to your division Associate Director (both by April 23rd).

APPENDIX D - Walk Pamphlet

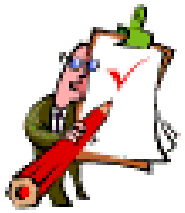
3/2/01

TALK, WALK, CLEAN (TWC) 2001 Program

"WALK"

Team Leader Instruction Pamphlet

Kick-Off:	Monday,	4/02/01 -- 1:30 to 2:35 pm
Event:	Friday,	4/20/01 -- 8:00 to 10:00 am
Reports Due:	Monday,	4/23/01 – End of Day



ıttp://www.slac.stanford.edu/esh/standdown/standdown.html

Purpose of this Pamphlet:

This instructional pamphlet is for Team Leaders who have chosen the "WALK" choice in the TWC Program. The "WALK" process is similar to the annual Building Manager walk-through assessments. Those interested in a "TALK" or "CLEAN" choice should see the instructions for these items.

All instructions are accessible from the Web at:
http://www.slac.stanford.edu/esh/standdown/standdown.html

For Team Leaders who do not have Web access, hard copy materials are available from your Divisional SEDAC representative:
ES&H/DO - Ellen Moore, TD - Janice Dabney, SSRL - Ian Evans, BSD - Gail Gudahl, RD - Frank O' Neill, or Waste Minimization Specialist – Rich Cellamare.

Objectives of the Team "WALK":

To conduct a walk-through inspection of pre-defined indoor and/or outdoor areas for environment, safety and health concerns. This walk-through, if applied to the entire building, may also fulfill the annual Building Manager walk-throughs. The output from this activity will be a list of facility-related issues requiring attention, with corrective actions to be coordinated by the organizations involved in the "Walk".

Focus Topics and "WALK" Program Tools:

Focus Topics are intended to suggest general items that may be worth considering in walking through the facility or outside areas. These Focus Topics have been developed in part based on known problems that have been discovered on previous walk-throughs. There are four major categories of Focus Topics:

1. **Building/Outdoor Area (generally applicable topics)**

   Earthquake readiness, electrical safety, fire safety, general workplace environment, (ventilation, noise, eating areas /food storage, warning and hazard signs)

2. **Building/Outdoor Area (special topics - may not be applicable to all areas)**

   Abandoned materials and facilities, chemical storage, hazardous waste, compressed gases, compressors and compressed air, cranes and hoists, material handling, oxygen deficiency and confined space, personal protective equipment, radiation and radioactive materials, and welding, cutting, and brazing.

3. **Resource Conservation/Environmental Performance**

   Tips from the Director's All Hands, "Energy Issues for the Lab," dated 1/25/01; reduce non-productive use of water, energy, chemicals, etc.

4. **Storm Water, Creek & Bay Protection**

   Leaking chemicals, protection of storm drains, spill readiness.

5. **Low Use Areas/Remote Locations**

6. **Hazards Unique to Your Building/Outdoor Area** (team defined)**:**

A detailed listing of suggestions of what to look for related to the Focus Topics can be found under "WALK" Tools on the TWC Program Web site.

Pre-"WALK" Checklist for the Team Leader:

? All operations will cease between 8:00 a.m. and 10:00 a.m. Friday, April 20th. The accelerator will go into a standby condition. With Division management, determine the affect of your team's participation on standby operations. If support problems exist, or problems with off-shift operations occur, generate an alternative time on _____ or _____.)

? Define an area that the "WALK" activity will cover. Consider including an outside area closest to your building if ES&H problems are anticipated. Notify your Building Manager of your plans.

? Consider coordinating with other teams that may be planning a "WALK" activity, especially if they are in the same building. For a list of leaders choosing the "WALK," see the TWC Program Web site.

? It is not likely that this option will satisfy the normal Building Manager inspection. However, if you plan on inspecting the entire building, this may serve as the required annual Building Manager inspections if the following requirements are met:

- The effort is coordinated and approved by the Building Manager,
- A two-hour "WALK" period allows for no compromise in the quality of the building inspection,
- The "WALK" Tools/Checklist is utilized.

? Encourage your team to review:

- The Director's All Hands of February 13, 2001, and the Focus Topics attachment pertaining to the "WALK". (A copy is available on the TWC Program Web site.)
- The detailed "WALK" Tools /Checklist found on the TWC Program Web site. This is an important document and offers guidance on what to consider when reviewing buildings. Determine in advance what items from this Tools/Checklist might apply to your circumstances and plan accordingly. Define any unique hazards that you may want to look for during your activity.

? Print several hard copies of the "WALK" Tools/Checklist to be used as a reference for your team as you perform your "WALK" activity.

? Consider the safety of the "WALK" activity you intend to perform. Hazardous activities including but not limited to entering confined spaces, inspecting items at height, entering electrical substations, and the like should be avoided. Consider inspection risks against rewards and err on the side of safety. If work includes inspecting grassy outdoor areas take precautions against ticks.

? Appoint a secretary to take notes on what you find during the course of your area walk-through.

Steps for Conducting the "WALK":

? Walk the areas defined in the scope of your inspection using the Focus Topics and the detailed "WALK" Tools/Checklist as a guide. (Note: Do not feel required to systematically go through all checklist items in all areas; use the checklists as a reference only).

? Introduce yourself, if necessary, to anyone you may encounter in the area inspected, and state your purpose.

? Have the secretary note any ES&H deficiencies, and the area where they occur.

? The team assesses if "there is danger of immediate death or serious physical harm, or there is a clear and present danger of contamination of the environment" requiring immediate action.

Steps After the "WALK" Activity:

? If the team decided that immediate action is required as defined above, the Team Leader alerts their Division Associate Director and Jack Hahn, ES&H, ext. 3295, immediately by phone.

? By close of business Monday, April 23rd, the Team Leader is to summarize the scope of the "WALK" activity using the TWC "WALK or CLEAN" Report Submittal form found on the TWC Program Web site

If the Team Leader does not have Web access, mail the Report Submittal form to Jack Hahn, ES&H, MS 84, and send a copy to your divisional Associate Director (both by April 23rd).

APPENDIX E - Clean Pamphlet

3/2/01

TALK, WALK, CLEAN (TWC) 2001 Program

"CLEAN"

Team Leader Instruction Pamphlet

Kick-Off:	Monday,	4/02/01 -- 1:30 to 2:35 pm
Event:	Friday,	4/20/01 -- 8:00 to 10:00 am
Reports Due:	Monday,	4/23/01 – End of Day

Purpose of this Pamphlet:
This instructional pamphlet is for Team Leaders who have chosen the "CLEAN" choice in the TWC Program. The "CLEAN" choice is a site wide team clean up activity. Those interested in a "TALK" or "WALK" choice should see the instructions for these items.

All instructions are accessible from the Web at:
http://www.slac.stanford.edu/esh/standdown/standdown.html

For Team Leaders who do not have Web access, hard copy materials are available from your Divisional SEDAC representative:
ES&H/DO - Ellen Moore, TD - Janice Dabney, SSRL - Ian Evans, BSD - Gail Gudahl, RD - Frank O' Neill, or Waste Minimization Specialist – Rich Cellamare.

Objectives of the Team "CLEAN":

With reference to the Focus Topics listed below,

- *Perform* hands-on team clean ups of pre-designated indoor and/or outdoor areas at SLAC.
- *Summarize* briefly, and *document* the scope of the "CLEAN" activity.
- *Generate* before and after photos of areas (optional), for sharing with SLAC staff.

"CLEAN" Focus Topics:

Focus Topics have been developed to offer suggestions for the "CLEAN" program activity. These Focus Topics are:

- **Improve Safety**

  Clear walkways, trip hazards and remove potentially falling objects.

- **Improve Workspace Utilization and Productivity in Work or Office Area**
- **Improve the Environment**

  Organize for recycling; allow clear aisles to inspect for potentially leaking or overdue hazardous material/waste containers, etc., and eliminate potential storm water contaminants.

- **Improve Appearance of Facility**

  Maintain pride in the lab and good image to visitors.

- **Areas of Interest to the Team**

Pre-"CLEAN" Checklist for the Team Leader:

? All operations will cease between 8:00 a.m. and 10:00 a.m., Friday, April 20th. The accelerator will go into a standby condition. With Division management, determine the affect of your team's participation on standby operations. If support problems exist, or problems with off-shift operations occur, generate an alternative time on _____ or _____.)

? Encourage your team to review the Director's All Hands of February 13, 2001, and the Focus Topics attachment pertaining to the "CLEAN". A copy is available under "Director's Memo" on the TWC Program Web site.

? Considering the Focus Topics, and confirming with your team, define an area inside or outside buildings at SLAC that will be the focus of your team's "CLEAN" effort. Cleanup time should be limited to the two-hour session or at the discretion of the team and management.

? Select a staging area for collection of:

- Solid wastes (not hazardous or radioactive wastes).
- Recyclable materials
- Salvage and property controlled materials (PC# or Gov't Property stickers)

? Determine your need for extra containers to collect:

- Solid wastes (not hazardous or radioactive wastes).
- Recyclable materials (cardboard/paper/cans and bottles)

and pallets for:

- Salvage and property controlled materials (PC# or Gov't Property stickers)

? By April 5, 2001:

- Call Site Engineering & Maintenance Department (SEM, ext.8901) for extra
  - Containers to collect recyclable paper/beverage cans and bottles,
  - Dumpsters to collect trash

  and arrange for their pick up after the "CLEAN" activity.

- Call Property Control, Ext. 2329, for collection containers or pallets to collect
  - scrap metal
  - property controlled equipment

  and arrange for their pick up after the "CLEAN" activity.

- Specify a team assembly point/time and notify each participant

- Arrange for any brooms, gloves, eyewear and other protective equipment as appropriate. Contact Industrial Hygiene (IH) at ext. 4105 if you have questions regarding protective equipment.

  Work must be safe and must not require respiratory protection, involve confined spaces, working at heights, or hand carrying heavy loads.

- Arrange for a camera to take before and after photographs if acceptable to the team. These photos may be shared with SLAC. Contact your SEDAC representative mentioned above if you don't have access to a camera.

- Locate your staging area for collected materials so that normal operations are not disrupted during their pick up and removal.

? As a result of a DOE moratorium, all salvageable materials must be documented with a *Material Request Transfer Form (*aka *Salvage Form)*. The form is available on the TWC Program Web site.

? For recycling information, consult the Web page http://www-group.slac.stanford.edu/sem/recycling/recycle.html to develop plans to properly segregate and dispose of recyclables (cardboard, papers, cans/bottles, etc.)

? If planning to clean an area, to prevent storm water pollution and storm drain plugging, check Storm Water Best Management Practices on the Web at http://www.slac.stanford.edu/esh/reference/Stormwater/stormwaterBMP.html.

? Due to regulatory constraints, do not plan to clean up any hazardous or radioactive wastes or materials during the "CLEAN" period. Do not plan on removing materials from Radioactive Material Management Areas during the "CLEAN" period.
Before or after, but not during the "CLEAN" activity, contact:

- Waste Management Department, ext. 2399 for hazardous waste disposal

- Operational Health Physics (OHP), ext. 4299 for radioactive waste disposal

Steps for Conducting the "CLEAN" Activity:

? Have members put on any appropriate personal protective equipment.

? Take "before" photograph(s) of the area(s) to be cleaned. (optional)

? Have the team clean the area, using the preplanned staging area to segregate:

- Solid wastes (not hazardous or radioactive wastes).
- Recyclable materials (cardboard/paper/cans and bottles)

- Salvage and property controlled materials (PC# or Gov't Property stickers). Complete the *Material Request Transfer Form (*aka *Salvage Form)* as needed for salvageable materials. One form is sufficient for palletized equipment or clusters of staged materials.

? Take an "after' photo (optional).

After The "CLEAN" Activity:

? By close of business Monday, April 23rd, the Team Leader is to summarize the scope of the "CLEAN" activity using the TWC "WALK or CLEAN" Report Submittal Form found on the TWC Program Web site.

If the Team Leader does not have Web access, mail the Report Submittal form to Jack Hahn, ES&H, MS 84, and send a copy to your divisional Associate Director (both by April 23rd).

Also mail any photos to the Program Planning Office at MS 84. Digital photo's can be sent to emoore@slac.stanford.edu.

APPENDIX F - Director's All Hands C Memo

SLAC Director's Office

All Hands Memo

TO: All Hands

FROM: Jonathan Dorfan, Director

DATE: February 12, 2001

SUBJECT: **Site-Wide Safety and Environmental Talks, Walks & Cleanups, 20 April 2001**

In an ongoing effort to make SLAC a safer and healthier place, we will hold our annual "Talk, Walk, Clean" (TWC) safety and environmental standdown on Friday, April 20th, from 8:00AM to 10:00AM. (In the interest of resource conservation, this notice is being sent electronically this year; hardcopies are being sent to those persons without a computer account.)

Operations will cease for that period, and the accelerator and critical processes in other areas will go into an appropriate stand-by condition. This is the second year for the TWC, and division groups will again have a choice of three methods of action:

- ✓ **Talk**: in which the suggested focus topics are used to generate discussion that leads to two documented concerns;
- ✓ **Walk**: in which small groups will use the applicable sections of a checklist to determine possible hazards in areas pre-defined by the group; or,
- ✓ **Cleanup**: a two-hour housekeeping effort in areas pre-defined by the group.

You can obtain some direction in these areas by reviewing the attached list of Focus Topics, which includes a new concern this year of resource conservation. This is a timely reminder that reinforces my previous memo on "Energy Issues for the Laboratory." Further materials to assist TWC Leaders have been developed by the Safety and Environmental Discussion Assistance Committee (SEDAC) and are viewable on the ES&H Division TWC 2001 Web site at

http://www.slac.stanford.edu/esh/standdown/standdown.html

An orientation for TWC Leaders is scheduled for Monday, April 2nd, from 1:30 PM to 2:35 PM in the Auditorium to assist both new and previous leaders. The associate directors will be asked to confirm their TWC group leaders and their activity preference for this year shortly.

There was a very positive response to last year's revised version of the standdown, which made many feel as if they were participating more fully than in the past. If you participate in a Talk group this year, try coming up with new observations instead of ones you know are in process. Walk groups play a very valuable role in complementing the efforts throughout the year of building managers, who should be notified of any planned walkthroughs. And we suggest that Cleanup groups review guidelines on the Web to ensure safety and a coordinated effort with Property Control. Photos of your work area before and after the effort are encouraged.

The safety professionals in SLAC's ES&H Division and your own division, in addition to the Operating Safety Committee members, all serve as your resources on a daily basis. I encourage you to take this opportunity to don a safety hat for one day and work with your team to alleviate, reduce, or heighten awareness of hazards in your workplace. I am confident that every effort you make on April 20th will be a worthwhile one.

Attachment

APPENDIX G - Talk Issues List

Talk, Walk, Clean 2001 Issues List (Talk Program)

Issue ID	Issue Description
TWC01-001	Many roof leaks in B84 and B40.
TWC01-002	Equipment sent to salvage with parts that could be reused.
TWC01-003	Removal of pull boxes from SLAC buildings has created a problem of how to sound an alarm to evacuate a building in case of emergency. Calling 911 does not sound an alarm.
TWC01-004	Tight schedules and lack of planning on the part of managers make long hours necessary to get work completed. Sometimes over 12 hours a day 7 days a week for long periods.
TWC01-008	Parking on sidewalks on the campus loop road requires pedestrians to walk in the street. There are two factors here the first is lack of parking spaces and the other is the lack of sidewalks. Parking will only get worse as new buildings are put up and few spaces allocated for them. Lack of sidewalks is a pressing issue because people have no place to park and must walk long distances (to BaBar etc.) on the roads.
TWC01-009	Vehicular traffic, failure to obey stop sign between Central Lab and Computer Buildings.
TWC01-010	There is no safe pedestrian path between Central Lab (Bldg 040) and the plating shop/ light Fab building area. When it rains the present bare area becomes slippery (fall hazard) and muddy, which forces personnel into the street where they are endangered by vehicular traffic, and spattered by same.
TWC01-011	Lighting Controls - wasteful energy; improper lighting can cause safety hazards.
TWC01-012	Lack of recycling containers in SSRL building 137 for bottles and cans. Therefore most people throw away recyclable items because there is no where to discard them.
TWC01-013	Lack of information on proper evacuation procedures in the event of fire or earthquake.
TWC01-014	Proper trimming of shrubs: Currently the height of some shrubs are such that it has caused several close accidents.
TWC01-015	Traffic hazard exists at south east corner of B/26. Vehicles traveling around this corner at excessive speed and on wrong side of road divider marking present hazard to MFD personnel operating forklift to remove metal from exterior metal racks. Hazardous also to pedestrians and MFD personnel handling compressed gas.
TWC01-016	Metal halide light fixtures recently installed in B/26 produce intense light. Welders working in area suffer eye strain when welding due to this light reflecting off the inside surface of their welding helmet lens and back into their eyes.
TWC01-017	The grounding (bonding) of racks, modulators and cable trays in the LINAC klystron gallery needs to be brought up to standard in sectors 13 through 30. Contributing cause of existing condition is funding to complete the job.

TWC01-018	Energy resources are used by automobile travel on the SLAC site when alternatives could be used. Bicycles could be made available for general use to reduce pollution caused by automobiles and to minimize fuel usage. Alternative travel methods should be available.
TWC01-019	Frequent improper parking, blocking thoroughfares and access to equipment.
TWC01-020	Flashing yellow/magenta (PPS) incandescent light bulbs frequently burn out.
TWC01-021	Stair tread and stair handrail condition deteriorating.
TWC01-022	No continuous sidewalk around loop road. Pedestrians must walk in roadway. Especially a problem where sidewalk ends and pedestrians step out into traffic.
TWC01-023	Two traffic problems were identified, one with mail/package delivery on site and one with SLAC security. The delivery staff have a tendency to drive at unsafe speeds, especially when backing away from buildings where they have delivered packages. The problem the group identified with SLAC security is a failure to follow the traffic rules they are supposed to enforce. Examples were cited of parking as well as moving violations. It is understood that security might need to break rules occasiona
TWC01-024	The 2nd floor walkway between the two halves of building 137 is hazardous when wet or windy. In even moderately windy conditions doors can slam open or shut and windy rainy days result in slick floors on the eastern side of 137 where the hallway floor is linoleum.
TWC01-025	Earthquake preparedness: re-stock the earthquake safety kits (fresh food/water, new flashlight batteries), issue them to those without kits, and remind everyone of the proper procedures for safety during earthquakes.
TWC01-027	Road safety/construction area traffic - We note increased traffic and congestion on the loop road near the construction site. There are large trucks, machines and a flow of materials which adds to the existing pedestrian, bike and car traffic. This mix of traffic, people, distractions and hazards needs attention.
TWC01-028	The South entrances to the Klystron Gallery are not posted with warning signs to watch for electric carts. The north side entrances are posted. Cart travel in the south aisle is less frequent, but does occur, and is necessary for Power Conversion crews.
TWC01-029	MCC Conference room door knobsets do not meet fire code. Rooms with >50 occupants should not have latching knobsets.
TWC01-030	In magnetic measurements, we should place flashing lights on the magnet under test in addition to the lights we presently have in the test area.
TWC01-031	We need a lock on a power supply that was recently installed in our lab.
TWC01-032	Stair coverings are wobbly and unsafe. This is a long standing problem which has become worse with time.

TWC01-033	New traffic pattern at main gate has introduced a new hazard. At the stop line east bound loop road, one is blind to oncoming traffic (up the hill) if there is a car parked at the guard house. There have been near misses.
TWC01-034	Ergonomics: need ergonomically-correct keyboards, mice/track balls, wrist pads and telephones with headsets.
TWC01-035	Ergonomics: need ergonomic furniture which has more depth so that the monitor and keyboard fit properly on the work surface.
TWC01-036	The Building 137 outside stairs are slippery when wet.
TWC01-037	The talk group felt the need for fire drills and activities on emergency preparedness.
TWC01-038	Many of the SSRL protein crystallography visiting researchers produce sharp waste from items such as glass slides, cover slips, razor blades and mounting pins. They create this waste at the beamlines, however, they must go to the lab upstairs to dispose of these items.
TWC01-039	There are considerable leaks and floods in bld. 120. This is dangerous becuase of slip and fall injuries. Other problems with the floods and leaks are electrical hazards as electrical cables and their connectors and plugs can commonly fall or be placed on the floors and may be submerged during floods. Leaks from the roof make it even more difficult to prevent electronic items from getting wet.
TWC01-040	General concern about transportation of equipment in trucks and on chariots.
TWC01-041	Site-wide use of Lock and Tag and general carefree attitude towards it.

APPENDIX H - BBSP Observation Results

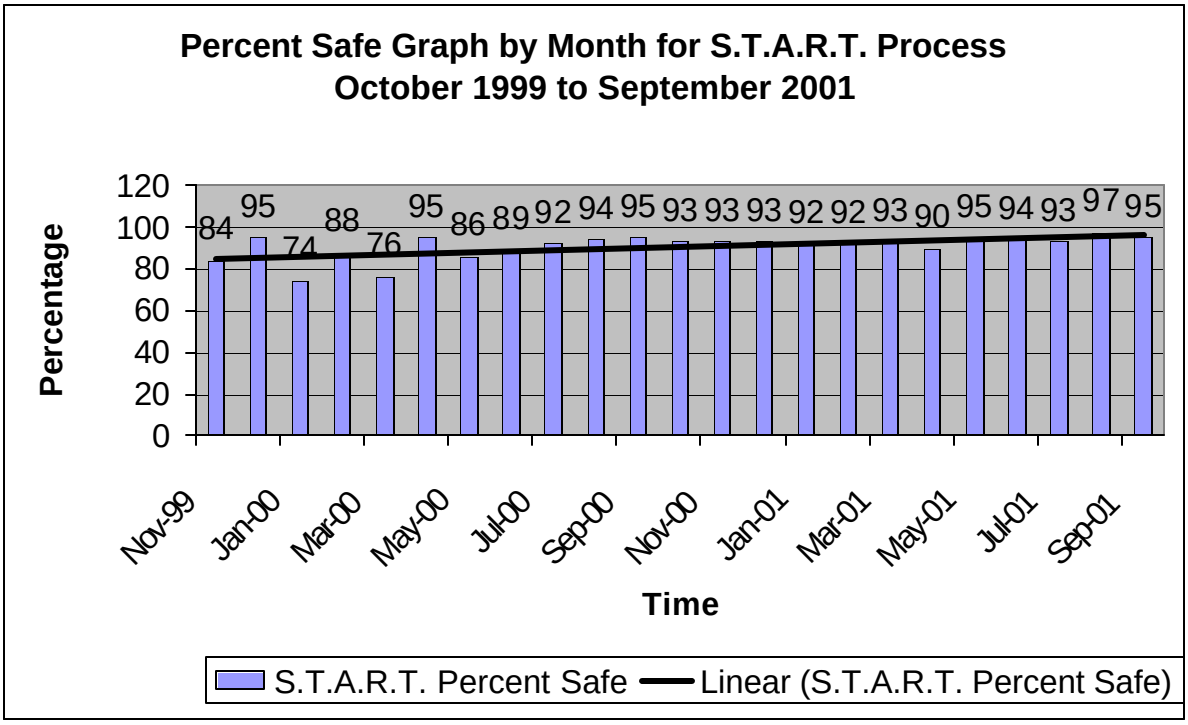
START Data Reports

¤ CBI® TABULAR REPORT [all records]

From 10/01/1999 to 07/31/2001

Total number of sheets used in this report 590
Average number of items marked per sheet 10.6

		BEHAVIORS			SHEETS	
P.P.E.						
		Safe	**At Risks**	**% Safe**	**Sheets**	**% Sheets**
1. 1	Head	194	51	79	239	40
1. 2	Eyes/Face	325	74	81	379	64
1. 3	Ears	98	20	83	118	20
1. 4	Hands	272	51	84	319	54
1. 5	Fall Protection	55	10	84	65	11
1. 6	Body	106	26	80	130	22
1. 7	Respiratory	46	25	64	67	11
1. 8	Foot	455	50	90	503	85
		1,551	307	83		
Body Position						
		Safe	**At Risks**	**% Safe**	**Sheets**	**% Sheets**
2. 1	Ascending/Descending	131	9	93	140	23
2. 2	Extension/Cramping	166	17	90	183	31
2. 3	Line of Fire	118	16	88	134	22
2. 4	Pinch Point	101	3	97	104	17
2. 5	Posture	457	40	91	493	83
		973	85	91		
Body Use						
		Safe	**At Risks**	**% Safe**	**Sheets**	**% Sheets**
3. 1	Eyes on Hands/Task	475	11	97	486	82
3. 2	Lifting/Lowering	177	10	94	187	31
3. 3	Pushing/Pulling	158	20	88	178	30
3. 4	Eyes on Path	237	9	96	246	41
3. 5	Work Pace	485	17	96	502	85
		1,532	67	95		
Work Environment						
		Safe	**At Risks**	**% Safe**	**Sheets**	**% Sheets**
4. 1	Communication	270	8	97	278	47
4. 2	Housekeeping	456	52	89	500	84
4. 3	Other	4	2	66	6	1
		730	62	92		
Tools/Equipment						
		Safe	**At Risks**	**% Safe**	**Sheets**	**% Sheets**


Percent Safe Graph by Month for S.T.A.R.T. Process
October 1999 to September 2001
Percentage
120
100
80
60
40
20
0
84 95 74 88 76 95 86 89 92 94 95 93 93 93 92 92 93 90 95 94 93 97 95
Nov-99
Jan-00
Mar-00
May-00
Jul-00
Sep-00
Nov-00
Jan-01
Mar-01
May-01
Jul-01
Sep-01
Time
S.T.A.R.T. Percent Safe
Linear (S.T.A.R.T. Percent Safe)

APPENDIX I - ES&H Performance Measures

Total Available Points: 110

Note: 40 points have been reserved for the FY01 ISMS Process Performance Measure.

1.0 Performance Objective:

SLAC will perform its work so that personnel hazards are anticipated, identified, evaluated and controlled.

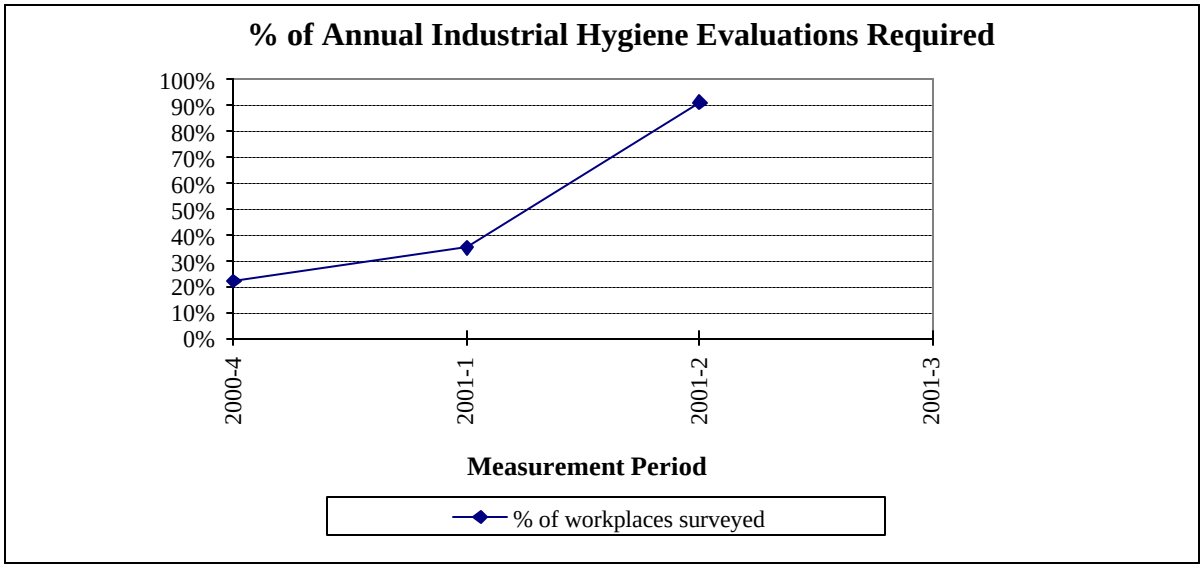
1.1 Performance Criteria:

Exposures of personnel to chemical, physical, and biological hazards will be adequately controlled.

1.1a Performance Measure: Available Points: 8

An Industrial Hygiene exposure prevention program is in place such that:

- Potential exposures greater than 1/4 of an Occupational Exposure Limit (or heat stress exposure greater than the ACGIH "heavy continuous work" TLV) are anticipated and monitored yearly.
- OSHA-required substance-specific sampling is planned and conducted yearly as required.
- Vulnerable systems are evaluated yearly.



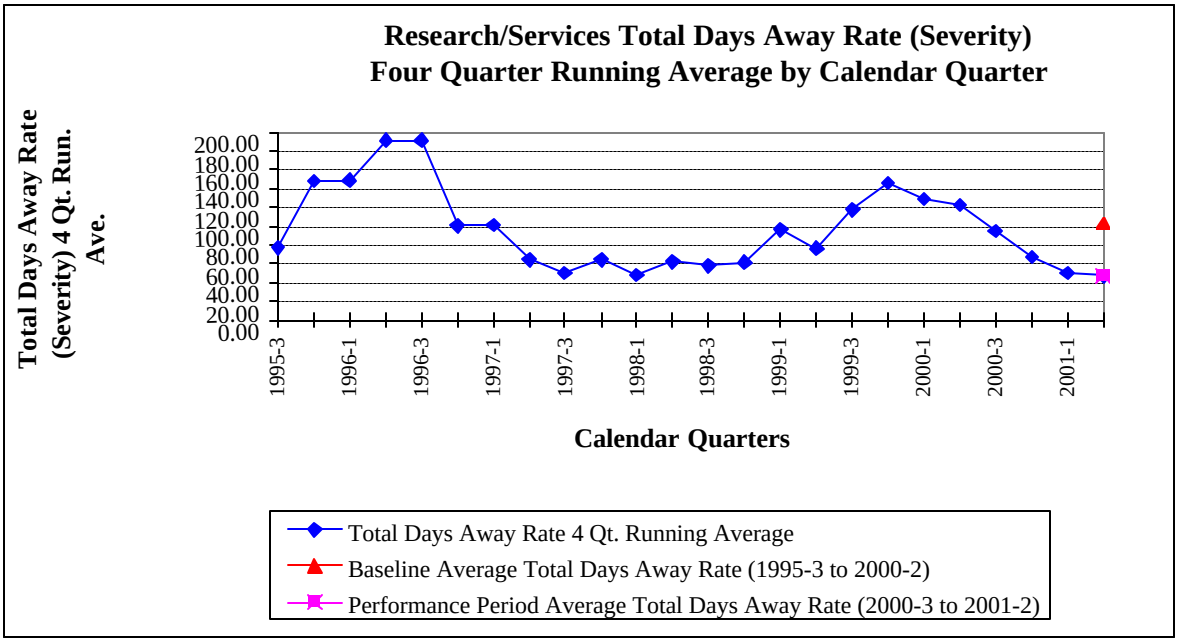
Performance Summary: To be determined at the end of the fourth quarter.

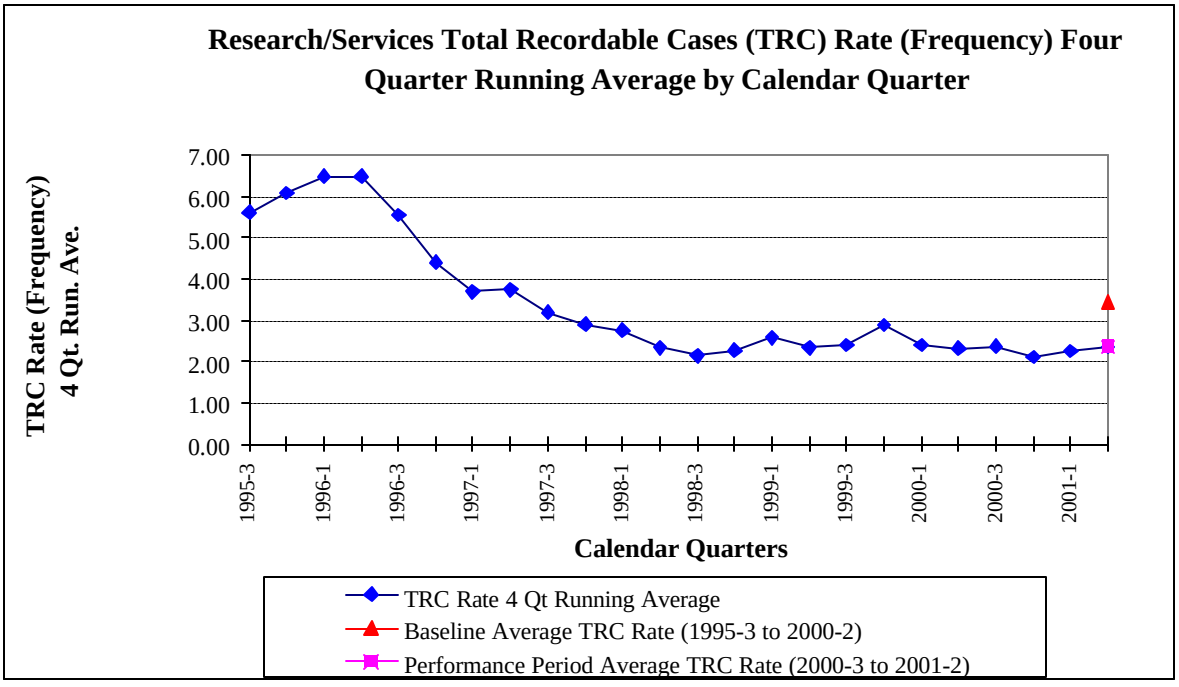
1.2 Performance Criteria:

Accident and injury rates lost workday rates, and the DOE injury cost index are adequately controlled.

1.2a Performance Measure: Available Points: 8

The period for comparison with the current performance period will be the average of the five previous years (baseline). The lab's frequency (Total Recordable Cases) and severity (Lost Work Days) rates for the Research/Services composite and Construction functions will be compared to the SLAC baseline average. A downward trend is expected.





Performance Summaries for Research/Services: Total Days Away (Severity) Rate for Research/Services: Outstanding

The Total Days Away (Severity) rate for the Research /Services performance period shows a 54% decrease when compared to the SLAC baseline average.

Total Recordable Case (Frequency) Rate for Research/Services: Outstanding

The Total Recordable Case (Frequency) Rate for the Research/Services performance period shows a 31.6% decrease when compared to the SLAC baseline average.

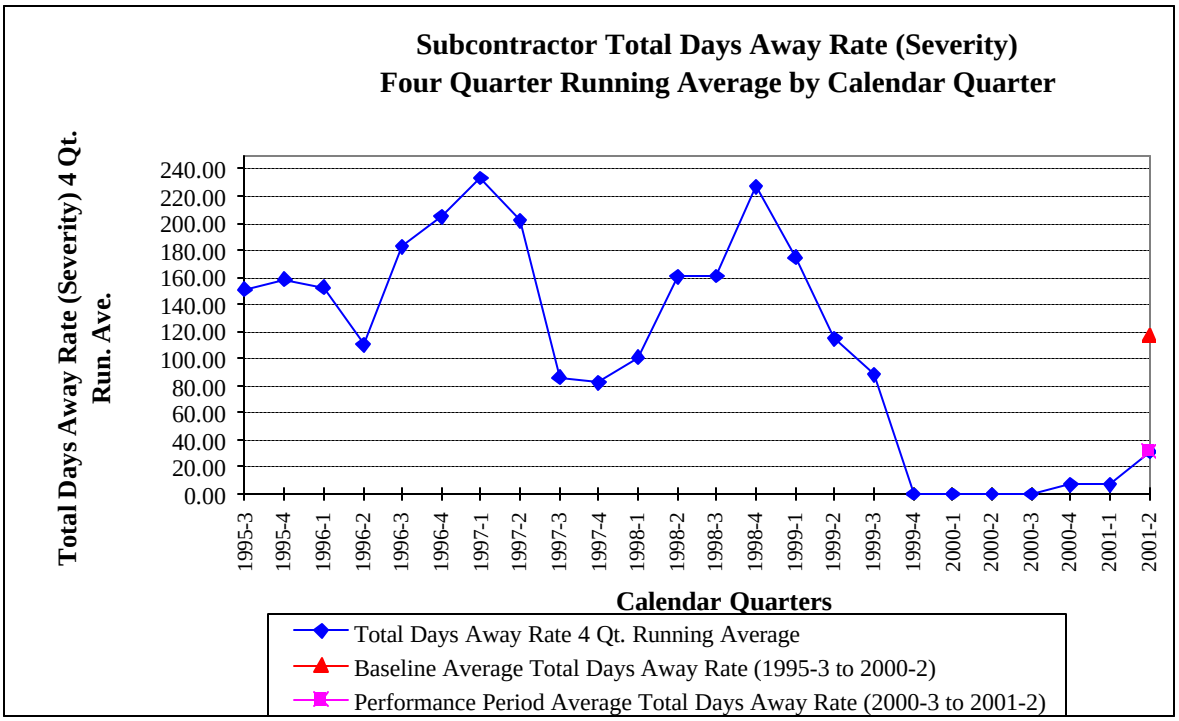
Performance Gradient:

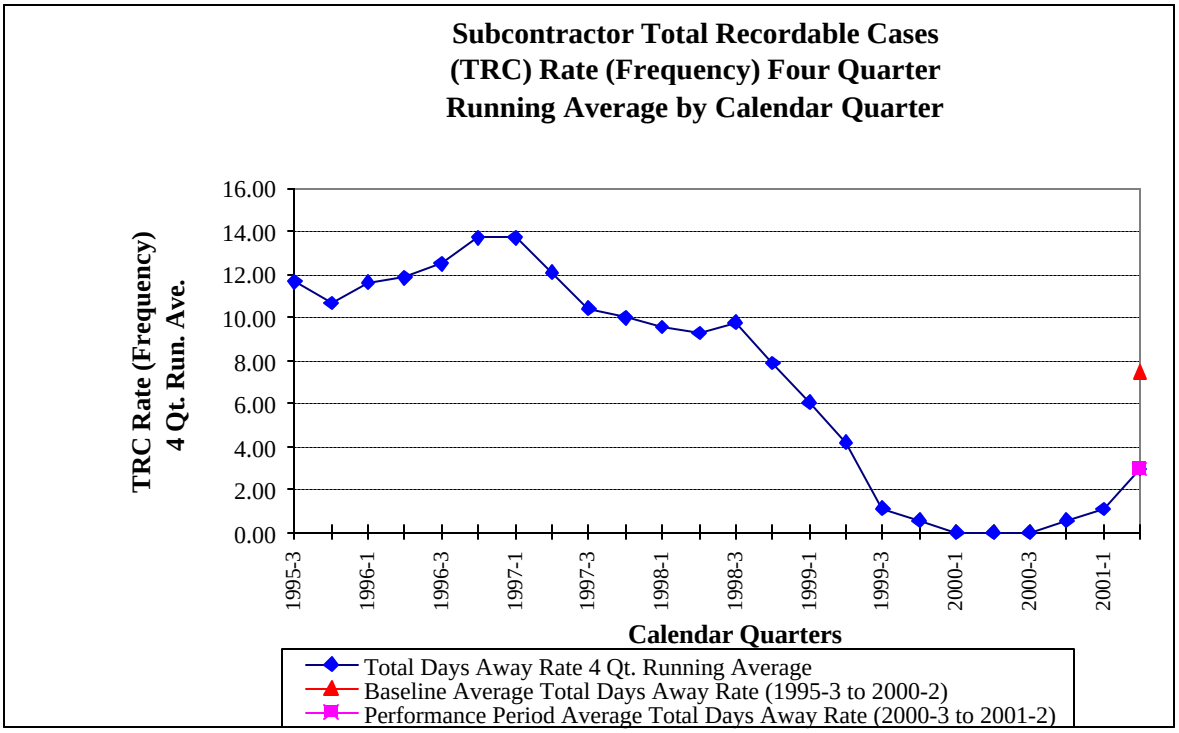
Outstanding

When the Performance Period Frequency Rate for the Research/Services composite and Subcontractor function is compared to their Baseline rate, a 38.5% decrease is shown.

Outstanding

When the Performance Period Severity Rate for the Research/Services composite and Subcontractor function is compared to their Baseline rate, a 56.1% decrease is shown.





Performance Summaries for Subcontractors:

Total Days Away (Severity) Rate for Subcontractors: Outstanding

The Total Days Away (Severity) Rate for the Subcontractors performance period shows 73.1% decrease when compared to the SLAC baseline average.

Total Recordable Case (Frequency) Rate for Subcontractors: Outstanding

The Total Recordable Case (Frequency) rate for the Subcontractors performance period shows a 60.5% decrease when compared to the SLAC baseline average.

1.3 Performance Criteria:

Exposures of personnel to ionizing radiation will be adequately controlled.

1.3a Performance Measure: Available Points: 5

Unplanned radiation exposures (both internal and external) and ORPS reportable occurrences of skin or personal clothing contamination are managed and minimized.

Performance Assumption:

1. For FY01, the performance period is January 1, 2000 to December 31, 2000; that is, calendar year 2000 (CY00).
2. Radiation doses to non-radiological workers in excess of 100 mrem/yr are considered as unplanned exposures.
3. The number of occurrences is considered to be the number of individuals who experience ORPS-reportable radiation doses or

contamination, plus unplanned doses as defined in the above performance assumption.

4. The current projection of the number of radiation doses to non-radiological workers in excess of 100 mrem in CY00, based on best available information, is four (4).

5. In any event, the most recent three (3) calendar year running average will be calculated for application to the latest Performance Gradients at such time that appropriate information is available.

Performance Summary: Excellent

There were no ORPS-reportable exposures in CY00. Of the only other type of occurrence defined for this performance measure, there was one non-radiological worker with an occupational dose exceeding 100 mrem in CY00, which is less than 50% of the most recent three (3) –calendar-year running average of four (4).

1.3b Performance Measure: Available Points: 5

Occupational radiation doses to individuals (excluding accidental exposures) from DOE activities will be managed to assure that applicable 10 CFR 835 limits are not exceeded.

Performance Assumptions:

1. For FY01, the performance period is January 1, 2000 to December 31, 2000; that is, calendar year 2000 (CY00).

2. Any actual or anticipated significant changes in workloads; that is, collective dose will be brought to the attention of SLAC management and DOE so that appropriate adjustments will be made. Significant change in collective radiation dose is defined to be an increase or decrease of 20% or more.

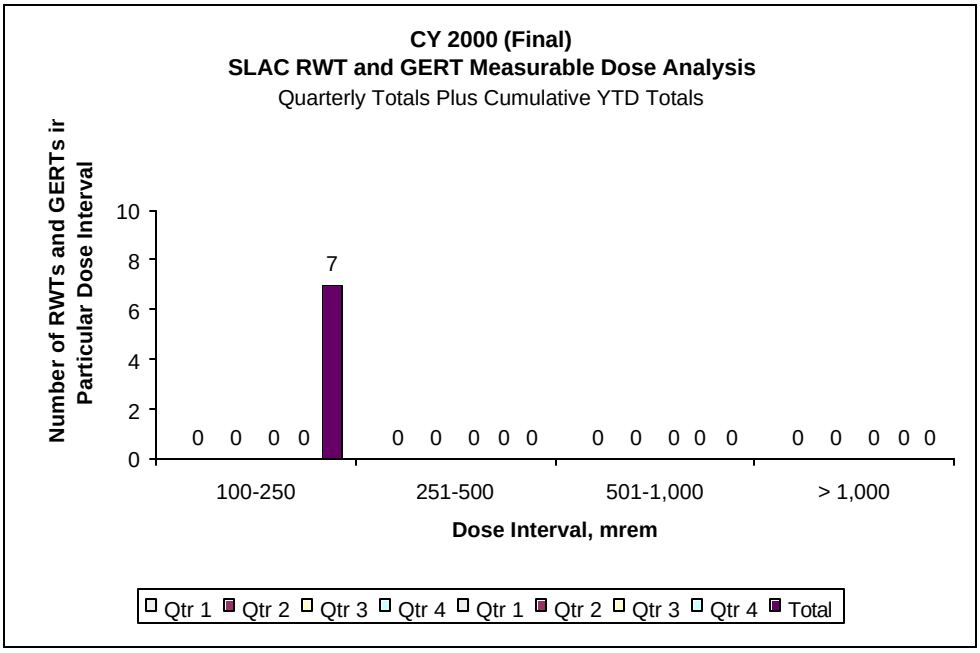
Performance Summary: Excellent

No radiological worker at SLAC received a dose in excess of 1 rem (highest individual radiological worker dose was 139 mrem and the highest individual non-radiological worker dose was 121 mrem), the number of individuals who exceeded the following dose range interval did not exceed the previous 3-year running average in two or more of the intervals (in fact, none of these intervals were exceeded),

	CY97-99	CY00
Dose Interval	Combined RWT & GERT Average	Combined RWT & GERT Average
100-250 mrem	18	7
251-500 mrem	13.3	0

501-1,000 mrem	1.3	0
Greater than 1,000 mrem	0	0

and the total collective dose was less than 90% of the previous three (3) calendar-year running average; that is, 5.766 person-rem in CY00 versus the previous 3-year running average of {(CY97 [16.8 person rem] + CY98 [13.1 person rem]+CY99 [10.2 person rem] = 40.1 person-rem over the three previous years)/3=} 13.4 person rem. The exact CY00 total collective dose percentage of the previous 3 year running average percentage is (5.766 person rem/13.4 person rem x 100%), or 43%.



CY01 Radiation Worker-Only Dose Summary

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	CY01 Totals
Number Monitored	575	575			575
Number having > 0 mrem	1	7			8
Collective Dose (Person-rem)	0.026	0.313			0.339
Maximum Individual dose (mrem)	26	105			105
Number 100-250 mrem	0				0
Number 251-500 mrem	0				0
Number 501-1,000 mrem	0				0
Number > 1,000 mrem	0				0

1.3c Performance Measure:Available Points: 2

Lost or unreturned dosimeter investigations and dose assignments are

carried out in a timely manner (within 90 days of the monitoring period).

Performance Summary: Outstanding.

No investigation and dose assignment from a given monitoring period is more than ninety days old.

Note: All first quarter CY01 Radiation Worker Training (RWT) individual dose investigations were completed by 06/30/01. CY00 General Employee Radiological Training (GERT) individual dose investigations were also completed by 03/31/01; however, acceptance of them was held in abeyance until 04/30/01 to permit redirection of resources onto investigation of a collection of minor positive doses in that dataset. The investigation concluded no significant engineering nor administrative control problems were indicated by those results.

1.4 Performance Criteria:

Radioactive material will be adequately controlled.

1.4a Performance Measure: Available Points: 3

Radioactive materials, including contaminated and/or activated materials, are controlled at all times so that the number of reportable occurrences as defined in SLAC *Workbook for Occurrence Reporting* does not exceed the current three (3) year-running average by more than three (3). The current three-year-running average is one (1).

Performance Summary: Outstanding.

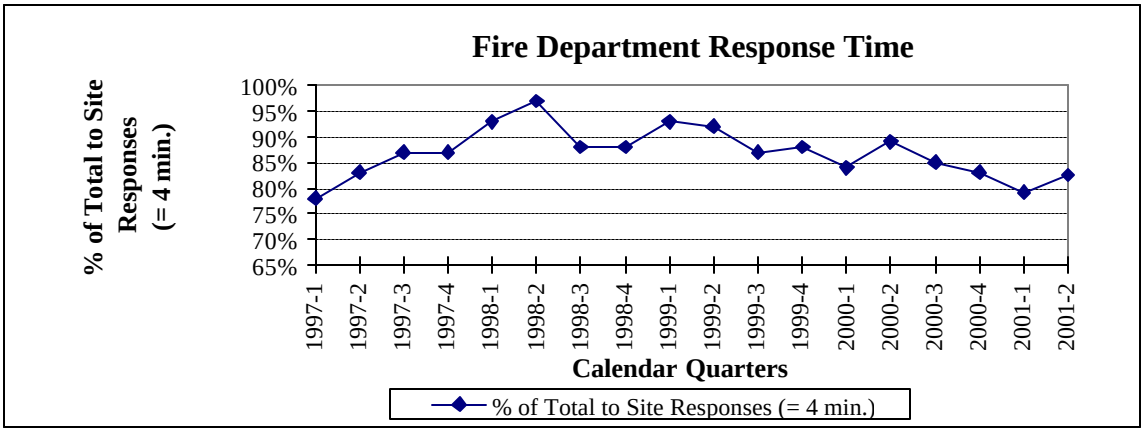
No occurrences resulted. The corresponding weighted number of occurrences is equal to zero.

1.5 Performance Criteria:

Fire Department response time and the rate of completion of required fire protection will be adequately controlled and accomplished.

1.5a Performance Measure: Available Points: 1

Fire Department will record all fire apparatus response time. All response time will be measured against the pre-fire plan response time.



Note: Various conditions exist which will cause a delay in response time. Some examples are weather conditions, distance of travel, responding from inside tunnel areas, & equipment deployed during a drill.

1.5b Performance Measure: Available Points: 3

SLAC conducts fire protection surveys per the SLAC Fire Protection Program list to ensure their facilities meet DOE fire protection goals and requirements.

Period: 04/01/01 – 06/30/01

Surveys conducted: 102

Surveys scheduled in quarter: 88

Performance Period (01/01/01-12/31/01) Year to Date Progress

Surveys conducted (01/01/01-06/30/01): 179

Surveys scheduled portion of year: 176

(2/4's of 352)

Performance Summary: 50.8% completion rate, through 50% of performance period. Rating will be determined at end of year.

1.5c Performance Measure: Available Points: 3

A documented design review program shall be in place to ensure all designs for new construction and modification projects are reviewed and approved by SLAC's Fire Protection Engineer in a timely manner with adequate records and documentation.

Performance Summary: 100% of the design reviews were completed for quarter, and calendar year-to-date.

1.5d Performance Measure: Available Points: 1

SLAC shall inspect, test and maintain its fire protection systems in accordance with the SLAC Fire Protection Maintenance Testing and

Inspection schedules and procedures. Tracking and trending is done on the SLAC maintenance computer system.

Performance Summary: 91% (3439/3749) of annual total of Sprinkler systems & Fire Alarms have been completed during the period October 1, 2000 through June 30, 2001. Annual performance period is defined as October 1, 2000 through September 30, 2001.

2.0 Performance Objective:

SLAC will perform its work in a manner that does not present a threat of harm to the public or the environment and will identify, control, and respond to environmental hazards.

2.1 Performance Criteria:

Exposures to members of the public to ionizing radiation and radiological emissions to the environment will be adequately controlled.

2.1a Performance Measure: Available Points: 10

Public ionizing radiation exposure monitoring and calculations are accomplished to assure that the dose to the maximally exposed individual in the public from DOE operations will be controlled and will not exceed Federal limits. Radiological emissions to the environment are monitored or calculated and controlled such that applicable limits are not exceeded.

Performance Summary: Excellent. The computed total effective dose equivalent to the maximally-exposed individual (MEI) of the public was 5.662 mrem, of which direct radiation dose contributed was 5.63 mrem and airborne radiation dose contributed was 0.032 mrem.

2.2 Performance Criteria:

Environmental violations and releases will be adequately controlled.

2.2a Performance Measure: Available Points: 8

Environmental incidents will be tracked and measured. These will include:

- Formal violations noted by regulatory inspections, regulatory reports or non-compliance with agreements made with regulatory agencies.
- Spills, which exceed established local, state, or federal reporting requirements.
- Releases, which exceed regulatory, permit limits.

Performance Summary: There was one release, which required notification to the Regional Water Quality Control Board during the second quarter of FY01.

3.0 Performance Objective:

SLAC demonstrates sound stewardship of its site through safe and effective hazardous and radioactive waste minimization and management and through restoration of the site where degradation has occurred.

3.1 Performance Criteria:

SLAC has a program in place to reduce both the amounts of waste generated and pollutant emissions. The program will reduce as much as is practical the volume of municipal solid waste and hazardous waste generated in accordance with SLAC's Waste Minimization Plan. In addition, as long as benefits exceed costs, SLAC will plan and perform its work in a manner that prevents pollution into the environment.

3.1a Performance Measure: Available Points: 5

SLAC completes tasks identified in the Annual Performance Objective Plan. Progress continues towards meeting the DOE pollution prevention goals for the FY01.

Performance Summary: The Performance Measurement period for FY01 is October 1, 2000 through September 30, 2001. The overall rating for FY00 was Far Exceeds Expectations.

3.2 Performance Criteria:

SLAC will manage hazardous and radioactive wastes in a manner that meets regulatory requirements and is cost effective.

3.2a Performance Measure: Available Points: 4

Hazardous waste generated will be managed in compliance with regulations of CCR, Title 22, Division 4.5, applicable parts, and the budget expended cost effectively.

Performance Summary: The Performance Measurement period for FY01 is October 1, 2000 through September 30, 2001. The overall rating for FY00 was Far Exceeds Expectations.

3.2b Performance Measure: Available Points: 5

Low-level waste generated will be managed in compliance with applicable DOE Orders and regulatory requirements and the budget expended cost effectively.

Performance Summary: The Performance Measurement period for FY01 is October 1, 2000 through September 30, 2001. The overall rating for FY00 was Outstanding.

3.3 Performance Criteria:

SLAC will maintain the scheduled rate of progress toward completion of the Remedial Investigation/Feasibility Study and source mitigation activities designed to achieve a level of restoration acceptable to cognizant regulatory agencies by September 30, 2002.

3.3a Performance Measure: Available Points: 5

Performance will be determined based on points earned in three categories. The successful completion of selected major tasks/milestones in the Environmental Restoration Program Current Year Work Plan, the efficient management of the budget, and project management effectiveness will be

evaluated and awarded points. There will be a maximum of 60 points possible.

Performance Summary: The Performance Measurement period for FY01 is October 1, 2000 through September 30, 2001. The overall rating for FY00 was Outstanding.

FY01 ES&H Process Performance Measure

The following Performance Objective, Criteria and Measure is linked to the seven Guiding Principles and five Core Functions of Integrated Safety Management Systems (ISMS). The Annual Review process for evaluating the overall effectiveness of ISMS implementation at SLAC is described below.

4.0 Performance Objective

SLAC effectively integrates ISMS into all management and work practices at institutional, site, and activity levels so that missions are accomplished while protecting the worker, the public and the environment.

4.1 Performance Criteria:

SLAC systematically integrates the Integrated Safety Management System's (ISMS) seven Guiding Principles and five Core Functions into all management systems and work practices at the institutional, site, and activity levels.

4.1a Performance Measure: Total Available Points: 40

SLAC effectively implements Integrated Safety Management in its management systems and work practices at the institutional, site, and activity levels.

The DOE Annual Review process for demonstrating accomplishment of the performance objective will be based on a jointly conducted review by DOE and SLAC of contractor management systems or work elements falling into the following categories: 1) research projects and associated support operations, 2) infrastructure projects and associated support operations and activities, and 3) other routine support operations and maintenance activities. DOE and SLAC will identify for review each quarter one activity from the three categories identified above.

The activity identified by DOE and SLAC will be subject to review by a team composed of no less than two representatives each from DOE and SLAC. At a minimum, the review team will include a representative from the Stanford Site Office (SSO), an OAK subject-matter expert, as needed, a representative from the SLAC ES&H Division, and a cognizant SLAC line manager. Other DOE or SLAC subject-matter experts or line organization representatives may also be included on the review team to provide technical support if appropriate based on the scope and complexity of the reviews. Review team members are expected to have demonstrated knowledge about ISMS.

Although the Annual Review Process will be conducted jointly, the results of the quarterly review will be used by DOE to independently document completion of the DOE Annual Review requirement for determining the overall effectiveness of ISMS

Implementation at SLAC. SLAC may also choose to independently use the data generated from the quarterly reviews for the SLAC annual self-assessment report on SLAC's performance against the measure.

The scope of the Annual Review may include, but is not limited to, review of site policies and procedures and their implementation, interviews of line

managers, workers and subcontractors, data generated from SLAC's internal tracking systems and other documented work process products.

A number of other factors may be considered to determine the extent of success against the measure gradient independent of the specific quarterly review process. This includes results of program/project reviews, SLAC self-assessments (including results of internal independent assessments), ongoing DOE Operational Awareness activities conducted throughout the year, 'For Cause Reviews' by DOE, and any external reviews.

The intent of this performance measure is to evaluate how effectively the ISMS guiding principles and core functions are integrated into management systems and work practices at the institutional, site and activity levels; and to determine to what extent SLAC is fostering continuous improvement in ISMS implementation through integration of the guiding principles and core functions in line organization activities, implementation of line organization self-assessments, integration of ISMS in program/project reviews, implementation of an effective lessons learned program, development of safety performance objectives and key ISMS performance indicators and implementation of appropriate corrective actions. The degree of success in meeting the process measure gradients will be based on the collective results of the DOE and SLAC reviews conducted during the DOE fiscal year.

The review will consider the following when documenting the site's performance against the measure:

- Vertical and horizontal integration of safety management systems.
- Flow-down of ISMS requirements into SLAC contracts and other site documentation.
- Implementation of line organization self-assessments.
- Processes are in place that ensure feedback and continuous improvement.
- Establishment and tracking/trending of key safety indicators and metrics.

Performance Assumptions:

1. Rating period is October 1, 2000 to September 30, 2001.
2. DOE and SLAC will meet during the annual ES&H performance-assessment process to discuss the evaluations from each of the ISMS

quarterly reviews and assign an overall performance rating for this performance measure.

3. SLAC will independently incorporate the results from the ISMS quarterly reviews into the laboratory's annual self-assessment report on all performance measures.

4. The final overall rating for this measure will be based on the aggregate results from the quarterly ISMS reviews.

Performance Gradients:

The gradients will be based on an assessment of the effectiveness of performance against the seven elements described in Section 5 of the *SLAC Safety Management System* (SLAC-I-720-0A00B-001). These elements are implementation of ISMS:

1. Guiding Principles 1 and 2
2. Guiding Principle 3
3. Guiding Principle 4 and Core Function 1
4. Guiding Principle 5
5. Guiding Principle 6 and Core Functions 2 and 3
6. Guiding Principle 7 and Core Function 4
7. Core Function 5

Each activity reviewed will be scored on its effectiveness in implementing each element (that is, effective or not effective). Each activity will then be given a gradient evaluation according to the following:

Outstanding:	**6 of 7 ISMS elements demonstrated to be effectively implemented.**
Excellent:	**5 of 7 ISMS elements demonstrated to be effectively implemented.**
Good:	**4 of 7 ISMS elements demonstrated to be effectively implemented.**
Marginal:	**3 of 7 ISMS elements demonstrated to be effectively implemented.**
Unsatisfactory:	**Less than 3 of 7 ISMS elements demonstrated to be effectively implemented.**

The final overall rating for this performance measure will be determined as the average of the ratings of each individual activity are assessed.

Performance Summary:

The second ISMS Review was completed during this quarter. The Q2FY01 ISMS Review Area was the Final Focus Test Beam (FFTB) program in the Research Division. The scope of the review included completed or ongoing beam experiments E-150 (Plasma Lens Experiment), E-157 (Plasma Wakefield Acceleration) and Test Beam Experiments at the FFTB.

The Review Team found that management and staff in the Experimental Facilities Department (EFD) demonstrated commitment to safety as part of their line management roles and responsibilities. The Review Team also found that EFD has implemented mechanisms to ensure an appropriate level of hazard analyses, identification of applicable standards and requirements and documentation of engineering and administrative controls. Based on interviews with SLAC personnel, EFD has established

constructive working relationships with both experimenters and safety personnel.

The SLAC Citizen Safety Committees continue to be an important

mechanism for reviewing and evaluating potential hazards, controls, policies, procedures and programs and for providing input on the design of experiments, projects and facility modifications.

The Review Team found that the review process for Test Beam experiments should be documented and the safety review guidelines, criteria and approval process should be made available by the Test Beam Coordinator to prospective users. The Review Team recommends that such information could be made available electronically to prospective users through the SLAC web site.

The line management responsibilities of the FFTB Facility Operations Manager for ensuring safety should be communicated to SLAC and non-SLAC spokespersons/experimenters, including the Test Beam experiments. The roles and responsibilities of the non-SLAC spokespersons for the safety of the experiments should be clarified, documented and communicated by line management.