# ADVANCED LIGHT SOURCE DIVISION

# FY2008 SELF-ASSESSMENT REPORT

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# I. EXECUTIVE SUMMARY

The mission statement for the ALS is to 'support users in doing outstanding science in a safe environment'. Its overall goal is to conduct all operations in a manner that protects the health and safety of employees and the public and does not endanger the environment, as defined by ES&H policies and requirements in the Regulations and Procedures Manual (RPM), PUB-3000, the Integrated Safety Management System (ISMS), and the Operating and Assurance Plan (OAP).

The evaluation of the Division's ES&H Program is divided into two components. Section II consists of the evaluation of the ALS safety program against institutional criteria. Section III is an evaluation against internal criteria and goals. For this last part, a new process was instituted this year whereby the Division Safety Committee identified criteria for the internal evaluation and developed detailed questions to evaluate against these criteria. This was a very new approach and so only modest goals were made. While only a few criteria were evaluated, we feel that this forms the basis for a stronger, more effective and interesting self-assessment process and will continue this in the future.

Overall, many different ES&H programs were put in place and/or significantly modified during this past year. This involved the active participation of many ALS staff and management as well cooperation from staff from a number of other resident divisions and the EH&S Division.

ISM Core Function #4, Perform Work within Controls, remains the primary area for improvement for ALS. A number of deficiencies occurred this year in programs such as radiation safety, SAA maintenance, and the engineered nano materials safety. Two broad areas emerge from this. First, overall understanding and compliance was found to be generally very good – performance was generally dragged down by very few actions. Therefore, finding these potential 'outliers' earlier and addressing them is a goal. Second, we have centralized a number of the control points for these programs, and we need to assure that proper resources are allocated to these important functions and that a robust quality control system is in place to assure that they are indeed working.

A second theme is the necessity of working with the Laboratory and BSO to develop an effective tool to prioritize all of the various safety program goals that inevitably emerge during the year. As a broad-scope user facility, ALS is generally impacted by any changes in EHS policies, so it feels a 'multiplier effect' from these initiatives. Some concerted way needs to be developed to balance the various potential risks so that a smooth and effective implementation of safety initiatives can be made.

# II. INSTITUTIONAL EVALUATION

This section is organized around the Laboratory FY2008 Performance Criteria. All supporting information is contained in appendices at the end of the main report.

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

Because of the many significant changes during the year, the ALS waited until the end of the fiscal year before revising its ISM Plan. This year's changes were determined to be minor and so only an internal division review was conducted. Key changes in this latest version of the ISM Plan (September 30, 2008) **[Appendix 1**; also posted in the ALS Safety website: http://www-als.lbl.gov/als/safety/index.html, under ALS Resources.**]** include an update on the JHA process and training, a new section on "Accountability", and the incorporation of the Institutional ISM Plan by reference. The revisions were communicated in the Division Safety Committee meeting on October 1, 2008 **[Appendix 2]**. The Accountability section was the most significant change and a detailed discussion was held at that meeting with instructions to gather feedback at their respective safety circle meetings. Feedback received during and after the meeting were incorporated in the text. As this is an important and relatively new component, feedback will continue to be solicited throughout the year. Also, this was coordinated with Engineering Division in their September "headlights' meeting so that both divisions could have a smooth rollout.

Because of the nature of the Accountability section, the division wanted to prioritize strong, honest, open two-way communication. Therefore, Safety Circles were chosen as the mechanism to implement this.

**E2. Per the Lab-wide implementation schedule, division ensures workers have a current Individual Baseline Job Hazards Analysis (JHA), authorizing regular and routine work that he/she performs, and if necessary one or more current Task-based JHA(s) to authorize unpredictable, short-term, or unusual work that is not included in the Individual Baseline JHA.**

As mentioned earlier in E1, the 2008 ISM Plan includes updates on the JHA process **[Appendix 1; see Section 4: ISM Function & Section 5: Training]**; group JHAs, which were piloted earlier in the year, proved critical to implementation of the process. ALS ended up with relatively few group JHAs, but had to coordinate with multiple divisions that have staff members working at the ALS facility. In some cases, supplementary group JHAs were created that were owned either by ALS, matrixed staff, or the home divisions. A key component was development of the equivalency for our Users. We worked with the EH&S Division to develop and document the appropriate criteria which allowed for 1000+ users to use the pre-existing Experiment Safety Sheets (ESS) process.

A major effort was made to explicitly identify and upgrade the training requirements for our long-term guests – over 30 of these individuals were identified and they now have a much more comprehensive training set. Associated with this was an effort to verify the correct organizational code for these individuals. After review, a process was set up with PBD, MSD, and CSD to monitor these long-term guests to make sure that they were in the correct division and therefore covered by the relevant safety programs.

We reached 100% JHA completion on September 15, 2008. It is not possible to keep the 100% status for our division, due to constant influx of new users (long-term guests). However, with our efforts to ensure JHA is completed soon after a new user gets settled, we manage to remain at 98%.

A key philosophical point for us in developing these JHAs was that staff needed adequate training in each of the potential hazard areas to help them identify the boundaries of what they were routinely authorized to do and when they needed to stop and get further review. For example, beamline staff now take both Lead and Beryllium Hazard Communication. Language in the JHAs is coordinated with this to state that workers may handle up to 5 bricks of lead or beryllium windows without any further authorization, but anything beyond that requires EHS review. The thrust of the idea is that staff have a clear statement of their routine work 'envelopes'. So the end-result is that ALS staff are now signed up for many more classes than before this JHA process. This was mitigated somewhat by utilizing many of the new on-line classes which helped expedite the training. Nevertheless, ALS saw a significant (one-time) drop in its training completion status after the completion of JHA (discussed later in E9).

Task-based JHAs are relatively uncommon. Currently we have only one – for an Electronics Maintenance (EM) technician who is doing cleanup of fiberglass contamination in the power supplies. The ALS has done much developmental work on ALS Work Permits to guide the hazard identification and control of more complex jobs. Formally, these are considered task-based JHAs, though they go considerably beyond the template provided in PUB-3000. This process is discussed elsewhere in more detail.

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

**Work Hazard Review**

The ISM Plan identifies hazard analysis on a tiered level --

(1) At the Facility level, the ALS SAD has just been revised again to account for the new Top-Off operational mode **[Appendix 3;** also posted in the ALS Safety website: http://www-als.lbl.gov/als/safety/index.html, under ALS Resources**]**. ALS received formal approval and acceptance of the document from the LBNL Accelerator Radiation Safety Committee (ARSC) on July 1, 2008 **[Appendix 4]** and DOE on September 18, 2008 **[Appendix 5]**. This was the most comprehensively reviewed project in the Lab's history, with many person-years of effort devoted to assuring that this mode would be fundamentally safe. Also notable is that this was the first formal revision of an accelerator SAD that was reviewed through the new institutional ARSC process.

(2) At the Beamline level, the ALS Beamline Review Committee (BRC) met 7 times to review changes to beamlines and/or policy changes. Notable in this was the review and acceptance of 5 Beamline Shielding End-points, leaving only 9 yet to do.

(3) At the User level, the ALS maintains over 500 active Experiment Safety Sheets which are used to review and approve all beam-time experiments. The major upgrades to this system this year consisted of explicitly identifying all of the controls (as opposed to listing references where that information could be obtained) and explicitly having each user sign the form (as opposed to requiring the Lead Experimenter to inform all of his/her group). This process was formally accredited by EH&S division as being equivalent to the JHA process for Users.

(4) At the Staff level, much effort went into the JHAs (discussed in E2) and into the internal ALS Work Permit process. Explicit criteria were adopted as to when a permit was required, a standard review process was adopted, several iterations of the format of the Permit were done, on-going, independent monitoring of the work was instituted, and a robust feedback system was initiated.

**Facility Hazard Inventory**

The ALS overhauled its use of the HMS system for the Experimental Hall and now has one systematic inventory organized and maintained by the Building Manager.

In CMS, the main thrust continued to be the inventory of gases, both inert and hazardous. Occupancy of 6C storage unit took place during this year and a major effort was undertaken to insure that all bottles stored there were in the inventory and had updated information including volumes in particular for the Lab's emergency management program initiative and the correct owner. Through this, inventory continued to shrink as more and more 'orphans' were being identified and staff were able to share rather than having to procure their own bottles. ALS worked diligently with CSD and EH&S to ship off over 30 excess bottles of hazardous gases as waste. A system to identify the mobile inert gas bottles was also initiated and each beamline is now in the process of having a set of bar codes that identify their typical inventory of inerts.

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

The principal initiative this year was follow-through on the building 6 lighting project begun last year. As stated in last year's Self Assessment, consultants were brought in to develop a plan. This was completed. Facilities Division is now in the process of identifying a company to install the new lights. The contracting mechanism under consideration would ask the bidder to procure and install using their own funds and then share in the energy savings. As this is quite complex, contracting is taking a long time. There is no firm expectation for when this might be completed.

A second significant effort began just at the end of the FY and is also being undertaken with Facilities. They have hired a company to come in and evaluate the building HVAC for the

Experimental Hall. This has long been a problem in both comfort and wasted energy. Though led by Facilities, ALS is actively partnering with them.

The third area of cooperation with Facilities has been in evaluating the building air makeup system for B80. Heating is accomplished via radiator-style hot water pipes inside the air ducts. ALS experienced a number of failures last year due to the pipes failing with large quantities of water being lost (in unfortunate locations), and concomitant energy waste. ALS and Facilities worked together to identify these areas and now have a PM system in place to monitor this system.

In addition, ALS has participated in all of the standard institutional resource conservation programs – office lighting, recycled paper, double-sided printing, substituted hard-copy reports by electronic versions, phase-out of remaining CRT monitors, etc.

**E5. Division ensures appropriate engineering and other safety/environmental controls are in place and properly maintained. Examples of controls include, but are not limited to:**

- **Guards, barriers and shields**
- **Fume hoods, glove boxes, biosafety cabinets**
- **Interlocks**
- **Exhaust system filtration**
- **Secondary spill containment**
- **Personal protective equipment**
- **In-lab alarm monitors**
- **Stack emission monitors**
- **Lockout/tagout**
- **Ergonomic workstation modifications (furniture, equipment and/or accessories)**
- **Manual material handling lift assist devices**
- **Cranes and hoists**

**Radiation Interlocks**

All engineered interlock systems for accelerator radiation safety are prescribed by DOE Order 420.2B. All new projects in the ALS are reviewed for need during conceptual design meetings attended by the Interlock Engineer and other peers.

During this fiscal year we upgraded all the beamline hutch interlock systems following user feedback. All changes are in accordance with the DOE Accelerator Safety Order. During the review process we invited experts from across LBNL and from UC Davis to ensure we met the requirements.

We have also installed the new Top Off interlock system. All the interlocks were installed according to the DOE Accelerator Safety Order. We worked closely with the RPG staff and our work was reviewed by experts from LBNL and various other DOE labs including SLAC and Argonne.

## Robotic Interlocks

We addressed the installation of robotic systems inside of beamline hutches this year. ANSI R15.06-1999 was an extremely comprehensive and useful risk analysis standard to drive our robot interlock program and was adopted as our guide. This has been used on four installed robotic safety interlock systems at the ALS.

The installation details of the robotics safety systems have not been formally documented yet. Technical drawings are now being drawn up and will be issued drawing numbers and added to the ALS drawing database. This will aid in maintenance, future upgrades and will ensure that future systems are correctly documented.

## Personal Protective Equipment

A new user advisory (ALS User Advisory No. 21 **[Appendix 6]**) became effective on August 25, 2008. This advisory provided clarification of standard LBL policy and how it specifically applies to the ALS environment. Of note is a standard requirement for closed-toe shoes in the experimental areas of the floor (red painted areas). This also applies to the accelerator areas and associated lab spaces. Also, we have obtained clarification of the PPE requirements when working with pressurized cryogenic systems. Face shields and safety glasses or goggles are required whenever opening or closing valves, manipulating any of the connections and when verifying existing/absence of pressure in the systems. Lastly, we are in the process of posting many of our lab spaces with explicit eye protection requirements.

## Lockout/Tagout

We are reviewing all LOTO procedures to include proper verification steps. The procedures are for complex and multiple energy source LOTOs. All procedures are reviewed to ensure compliance with LBNL PUB3000 Chapter 18 “Lockout/Tagout & Verification”. While we believe that we have all the equipment that needs a LOTO procedure identified, any discovery of an energy system that requires but does not have a written procedure will require a work permit listing all appropriate LOTO steps before work may proceed. This will give us a quick, efficient mechanism to generate procedures (per the PUB3000 requirement) and then we can go back later, if needed, to generate an internal ALS procedure.

## Ergonomic Workstation Modifications

Towards the end of this fiscal year, two height-adjustable computer tables with adjustable monitor arms were added to the Control Room, one for the Operations staff and the other one for Software Development staff. We are also using much larger monitors for these workstations which may allow future elimination of the upper level monitors on the control consoles and thereby avoid neck muscle strain from having to look up.

### Cranes and Hoists

The Mechanical Technology group has cleaned up the inventory database of cranes and hoists as well as updated the custodians. The group has also developed work screening for crane control jobs.

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

### Work Authorizations

(1) The SAD was previously updated in August 2007 to keep information current. As an administrative update, there was no safety impact in this revision and so formal DOE review/concurrence was not required. This version was preparatory to larger, safety-affecting revisions for Top-Off. Throughout this fiscal year, great effort was expended on incorporating Top-Off revisions to the document. The new version with safe assurance of the new Top-Off operational mode was issued on September 1, 2008 **[Appendix 3]** and received formal approval and acceptance from the LBNL Accelerator Radiation Safety Committee (ARSC) on July 1, 2008 **[Appendix 4]** and DOE on September 18, 2008 **[Appendix 5]**.

(2) RWA 5123 (Operations of the ALS Accelerator Complex) was reviewed and renewed several times by RSC as part of its oversight of operations at ALS.

(3) Laser AHDs were a high priority the previous year and all were migrated as part of the upgrades to the AHD database. We received the benefit this year as the annual renewals were much more straightforward, and all were done in a timely manner. AHDs for other hazards (chemical and hazardous gas) were generally much more difficult. ALS received a much lower level of support from EH&S on these and it was very difficult to obtain timely review. Thus, the renewal of the hazardous gas AHD and inception of a (liquid/solid) hazardous chemical AHD were either very tardy or still waiting for review. On contrary, the development and implementation of an AHD for explosives received great support from EH&S and total turnaround time from first draft to approval was just a few days.

(4) The EH&S Division was very helpful in reviewing all of the ALS Biological Use Authorizations (BUA)/Notifications (BUN) and a plan was made to let the inactive operations expire. This has been generally successful. Internally, ALS is working on trying to further consolidate these by having a single BUA/BUN at the beamline owned by the Beamline Scientist. Though slow going, this should also prove a benefit for the administration as well as for developing better ISM roles and responsibilities.

(5) ALS made significant progress on an internal work authorization process through its ALS Work Permit program. Staff were hired to implement, an oversight group was created, many different iterations of the Work Permit format were evolved, formal criteria were developed for

when a permit is needed, and coordination with the Lab on its vendor/subcontractor/guest program was initiated.

(6) As discussed in E2, special emphasis was placed by ALS on its JHAs as being work authorizations and in particular the limits of these routine work authorizations were highlighted. ALS continued to implement a number of different authorization programs without incident – penetration permits, hot work permits, lead permits, etc.

(7) Change in work scope. The main area of emphasis for the division in this regard was at the worker level. On the Operations side, much effort went into detailed work planning. Both mechanical and electrical supervisors discuss planned work frequently with their staff. This constant effort and dialog, we believe, will translate into more effective change control. On a daily level, this is informal and not documented. But in case of 1 and 2-day shutdowns, work lists and work permits are used. For extended maintenance shutdowns, GANTT charts are used..

On the beamline side, there is now a more concerted effort to duplicate this. Each responsible beamline scientist is now developing a 'Beamline Work Planning Sheet' that will describe how work is planned, reviewed, scheduled, who authorizes, and how they will address unplanned situations. The goal is to replicate that level of discussion and understanding amongst workers, which we believe will facilitate better recognition of changes in scope and the need for re-evaluation.

At the level of formal authorizations, the effort is more rule-based and procedural. ALS is, to a great extent, following standard institutional programs in this regard.

(8) Assurance The ALS ISM Plan has a very complete description of the various oversight functions in its Assurance section, a part of which are designed to assure that authorization-specified controls are implemented, current, and accurate. See discussion in Section E8 for the evaluation and plans in this regard.

**E7. Division ensures that ergonomic hazards (computer, laboratory, and material handling) are adequately controlled and that employees and line management are knowledgeable and engaged in this process, including the early reporting of ergonomic pain or discomfort (before an injury). Ergonomic issues/concerns/discomfort/pain are reported promptly for immediate corrective action.**

For four months since mid July 2008 when the Lab started rolling out the online course on Ergo Self-Assessment for Computer Users (EHS0059), 104 ALS staff and users were identified in their Remedy Interactive ergo profiles as having low risk (green) for developing ergo-related discomfort, 25 with moderate risk (yellow), and 11 with high risk (red). The ALS Ergo Advocate has contacted those with moderate and high risk to offer ergo evaluation and assistance to resolve any ergo issues if needed. They were also urged to report any discomfort immediately.

During this fiscal year, there was only one recordable ergo injury which involved a staff member's ergonomic issue turning into a more serious case while working at a different workstation to back

up a co-worker who was on medical leave. The employee's condition improved later on after she moved back to her old workstation and also received physical therapy treatments. In order to improve the awareness of unusual situations such as increasing workload, working on many different tasks at the same time, or when performing a new task that is outside of normal work scope, a Safety Circle subgroup was established in the group where the injured staff worked so the group could meet frequently to evaluate their workstations, work loads, work practices, etc. The injured staff now works in another division and is no longer with the ALS.

Currently the division has one Ergo Advocate who is also the Safety Administrator for the division. The other advocate volunteer turns out to be unavailable due to her job responsibilities. Since completing the Ergo Advocate training and taking on the role in December last year, the ALS Ergo Advocate has helped more than 25 ALS staff/users achieve an ergonomically fit work environment. The Ergo Advocate will continue to monitor the ergo status of the staff within the division and to conduct ergo evaluations for new employees, new workstations from physical move, as well as for preventative purposes. Most of the "Discomfort" cases will be attended by the Lab's Ergonomists. During this fiscal year, there were six Discomfort cases, four of which were resolved by having the right ergo furniture and accessories. One of the two remaining cases will be resolved as soon as a new chair and a new keyboard are ordered. The other unresolved case involved a user who comes to the ALS only a few times a year.

With the Ergo Advocate program, the Ergo Self-Assessment Training, as well as the Remedy Interactive Risk Profile Identifier, it is hopeful that the ergonomic situation will be under control both within the division and at the Lab as a whole.

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

Working within specified controls continued to be the most difficult of all the ISM functions for the ALS. Some examples of problems this year include

- A beamline shielding incident at 6.0 involving violation of the RWA
- Discrepancies between the current Lab policy and implementation of nano-safety requirements in the User Chemistry Lab
- Deficiencies in the maintenance of SAAs
- Notice from the FAA of a potential violation of DOT/IATA requirements in the shipping of LN-cooled dewars

Two broad themes emerged from an overall evaluation of these problems. At one level, management evaluation of these has determined that the large majority of staff understand the requirements and are able to work within them – the overall programs are generally sound and well understood. Division performance has been dragged down by a small percentage of actions. The average performance is very good; the problem is the dispersion around that

average is too large. So, efforts are focused on increasing the accountability and effectiveness of internal group work planning. In concert with preparations for the upcoming HSS audit, ALS will be emphasizing the requirements for various hazard control programs and the necessity of implementation down into the work groups and individuals.

Another common thread to all of these is the user facility characteristic. In each of these, centralized systems are put in place, but have to be implemented by a large, heterogeneous, and dynamic population. The implementation strategy in many of these programs (SAAs, dewar shipping, etc.) is to create an internal, centralized check-point in the process that acts as a quality control function. Thus, all users who need to use the User Chemistry Lab get an authorization from a person in Experiment Coordination; all waste generated goes to a central SAA controlled by one individual; all dewars that are shipped go through the B7 logistics group; etc. etc.). The division needs to evaluate these check-points on a regular basis and make sure that adequate resources are available for them and that staff who perform these functions really know their responsibilities.

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

#### Staff

As of September 15, 2008, 100% of staff had completed a JHA. As discussed in E2, by management policy, much more coursework is specified now than in the past. Thus, the short-term percentage completion is temporarily lower, but is expected to rise back to the historical average of 95+%.

#### Users

ALS revised its User Training program this year, updating and incorporating the old safety video and the radiation awareness training course into a single course and putting it on-line (ALS1001). By management policy, annual refresher training is now required, and maintaining current training on this class is a pre-requisite to having card-key access to the ALS. The division had hoped to have this linkage automated by now, but are still working through organizational difficulties with Facilities, EHS, and IT in getting it implemented. Currently, this requirement is being implemented manually on an once-per-year frequency.

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

As discussed in last year's Self Assessment, ALS brought in an outside consultant to help develop a focused program based on its unique characteristics. The fundamental goal of this

program is to enhance the interactions between upper-level managers/supervisors and staff on the floor. It is more a behavior-based approach than a hazard identification approach. To that end, it is not designed to find deficiencies and become a feeder into CATS. The outcomes are designed to be stronger, closer, more effective interactions between supervisorial and working staff. Note that the focus is on upper level supervisors and managers. Due to the nature of the accelerator facility, first level supervisors typically spend more than 50% of their time on the floor working directly with their staff. Thus, they have already established these close interactions and multiple safety discussions occur daily. ALS sees no need in documenting this. The priority then is to bring the upper level managers into closer contact with the staff, so those are the individuals targeted for this program. To enhance the accountability, the Division Director typically performs his Walkarounds with one of his direct reports in his/her work area.

This program has been evaluated several times during the year and the following goals for improvement have been noted:

- Clarify in the system who is and is not required
- Clarify integration of the ALS system with the other resident division systems
- Simplify the input (into the walkaround database) to match the ISM goal rather than hazard ID goals.
- Increase the level of input – most mgrs. are doing them at the required frequency, but input into the system is substandard

On the positive side:

- Both supervisors and staff note the benefits and appreciate the focus (as noted in the Safety Culture Survey)
- It enjoys strong top-level management support

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

Both first-aids and reportables are investigated and all corrective actions are tracked in CATS through the Issues Management Database. In addition, the EH&S Office maintains an overall list and periodic evaluations are done looking for trends, etc. As standard Lab practices are followed in this regard, no explicit mention in the ISM Plan is made on how accidents are tracked.

In general, three trends were noted: one was repeated pattern of cuts (four cases) **[Appendix 7],** a second was a 'hot spot' of accidents in a particular unit, and the third consisted of two incidents involving mechanical failures of end-stations. For the cuts, no general underlying causes or ISM failure could be detected. Though they all shared the same symptom, no general root cause and therefore no general corrective actions could be ascertained. These are being shared by management with their staff and there is general awareness, but beyond this, no specific actions were undertaken.

With help from EHS ergonomics, very forceful management action was taken in response to the issues in a particular unit. Informal biweekly staff Walkarounds and closer supervision of staff work was initiated. Since then, there have been no recurrences.

The third trend, end-station accidents, was evaluated in detail (via ORPS) and a much more detailed mechanical inspection is now in place for these. A prioritized subset of endstations was inspected using this new checklist and the rest will receive the more detailed review at their regular annual cycle.

One aspect that is different from standard Lab practice is the organization of a Staff Safety Committee (SSC). This group is charged with investigating all adverse and near-miss incidents at the ALS, recommending corrective actions to prevent recurrence, and monitoring follow-up to ensure corrective actions have been properly responded to. An SSC investigation committee was commissioned once this fiscal year, to follow up on the 6.0 beamline shielding incident and used LBL standard root cause analysis techniques in its deliberations. All corrective actions are also tracked in CATS.

ALS utilized the formal LBNL Lessons Learned (LL) system in one event – 'Defective Furniture Design Becomes a Hazard: An employee struck his right knee against the cantilever bracket of his workstation while swiveling in his chair, resulting in a broken knee cap' **[Appendix 8]**. In general though, most sharing occurred through informal means. The LBNL LL system took a fair amount of time and effort to get through the EH&S review cycle – time that would likely be more profitably spent communicating directly with potentially affected groups.

At the director's instruction, internal lessons learned are shared at each Division Safety Committee meeting. This is a standing agenda item, and it is expected that these will be shared at the individual safety circles.

BSO recently has started sharing ORPS events from the entire DOE complex that are proving to be very interesting and useful to the ALS. Two in particular (a cryogen incident at LANL and a shield block rigging injury at the Jefferson Lab) were discussed in details at the ALS Division Safety Committee meeting and disseminated to the various ALS Safety Circles afterwards.

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

ALS implements the CATS system in a centralized manner. All entries, tracking, and closure are via a single inputter – the EHS Administrator. This is for two reasons. First, it counters problems when it was run in a very decentralized way; quality control, lack of clarity in responsibilities, and general chaos. Second, with the upgrades to the system, it now has a very non-intuitive interface that requires significant training to properly use. So division performance has improved in several

key respects. Quality of the entries, assignment of responsibilities, timeliness all continue to improve, and are at a very high level (for purposes of internal division needs).

Along with this, though come inherent tradeoffs. As general staff become more distant from the system, it is less immediate and they tend to lose sight of the need and benefits of 'issues management'. Thus, we have seen a general trend downward in the total number of entries. ALS has very reliably input Lab-directed items such as MESH **[Appendix 9]**, SAAR **[Appendix 7]**, ORPS, etc. entries, but relatively few internally-driven entries are now made.

Despite the increasing visibility and importance of 'issues management' to the Lab, this trend is not expected to significantly change though until a simplified interface can be developed. From a "balanced priorities' perspective, ALS does not have enough resources to expend on inefficient tracking systems, beyond what it does now.

## III. INTERNAL SELF ASSESSMENT

This section documents the internal evaluations against our own goals and plans for this past fiscal year, results of our internal QUEST evaluations, and goals for the coming year.

### A. Goals from FY07

Our plans from the FY07 Self Assessment for this year were three-fold:

- Consolidation of the program development efforts in FY07
- Implementation of JHAs
- Work Planning

### Consolidation

This is a non-quantitative measure that inherently is hard to measure progress against. One tool that was developed was a web-based Safety Culture Survey. Modeled after the Lab's overall tool, this was focused on ALS-specific issues. It provided both a general affirmation that staff believe we're on the right track, and pointers for areas to focus on. A summary of some of the results is provided in **Appendix 10**, and a more thorough discussion is recorded in the meeting minutes of the March 26, 2008 ALS Division Safety Committee meeting **[Appendix 11]**, which is also posted in the ALS Safety website: http://alsintra.lbl.gov/safety/minutes/minutes0308.html.

Another measure is to look at standard implementation measures such as in Section II, part E8. From this view, ALS still has a ways to go before it can consider itself fully successful. But the *response* to those problems also provides an important measure. In all cases, management, staff, EHS and DOE worked in increasingly constructive and beneficial ways to identify true root causes and develop meaningful corrective actions. Continuation of this trend is a crucial measure of the division's ability to attain success.

Lastly, it was not completely realistic to expect that this would be a more stable year than the previous, which then would allow resources to focus on this goal. Due to DOE, Lab, and

internal division issues, much effort was required on a broad range of initiatives that diluted efforts in this area. Overall, it is expected that the balancing of externally mandated efforts against internally-driven, 'best management' efforts will continue to be a difficult proposition.

**JHA**

This became not only a division goal, but an important laboratory-driven goal as well. Thus, it shows up as an institutional Self Assessment measure, E2. See this section for a discussion of ALS' efforts in this.

It can be confidently stated that ALS' success in this goal is due, in large part, to its linkage with a larger, institutional goal. This forced proper internal and external resources to be devoted to it.

**Work Planning**

Many noteworthy milestones were accomplished:

- New Facility Specialist was hired
- Process Improvement Team chartered by the Division Director
- Work Planning systems from other Labs analyzed
- Criteria for Work Permits procedure published
- Review process for Work Permits determined
- Developed modified Work Permit process for Extended Shutdown work
- Work Permit documents and associated documentation has undergone continuous refinement
- Developed work flow charts for general work planning processes
- Developed internal QC assurance system
- Integrated Work Permit process with Lab's vendor process
- Integrated flow charts with Lab's JHA process

The scope of this process was originally not intended to extend into routine work processes at the beamlines. However, due to a series of incidents in August, the work planning group is now assisting beamline scientists in developing internal work planning sheets. This effort is primarily being done by the responsible beamline scientists, with advice and input from the chartered group.

The interaction between ALS and the Radiation Safety Committee in these efforts is noteworthy. This initiative came out of PAAA non-compliances and the RSC has provided oversight throughout this work. Several of these accomplishments were the direct outgrowth of oversight and suggestions by the RSC.

## B. <u>Other ALS Goals</u>

This year, the QUEST teams took a different approach from previous years. Rather than a standard walkthrough of physical space, as in previous years, it was decided that the teams would identify safety functions within the division and evaluate the effectiveness of each function. Instead of being

a part of the safety implementation, the QUEST teams would actually perform independent evaluations of how those safety functions were doing. The topical areas to address were decided in a bottoms-up approach through a series of discussions in the ALS Safety Committee **[Appendix 12]**. Five areas were initially decided upon for review and team members were assigned **[Appendix 13]**. Due to time constraints, these areas had to be shaved back to four areas:

(1) Training and Procedures
(2) Shielding Control
(3) Experimental Safety Sheet
(4) ISM Roles and Responsibilities

Here is a summary of the feedback:

(1) Training and Procedures

Six (6) team members were selected from various ALS Sections to solicit feedback from individuals via interviews or internal mail. Twenty (24) beamline scientists, 5 MTs, 4 engineers, and 3 EMs were invited to participate. Each was given 12 questions covering the following areas of interest:

- Accessibility
- Usefulness
- Procedure Training Awareness
- Alternative Tools or Procedures
- Suggestions.

Since the BLSs outnumbered the rest, and they are not the primary users of the ALS procedures, the score from each of the above areas cannot accurately reflect the actual overall opinion. There are many helpful and constructive comments. Here are some examples (for details, see **Appendix 14**):

- Should have an orientation for procedures, as some do not even know that the Procedures Center exists
- Procedures should be simple and clear
- Hold experienced ALS employees responsible for updating old procedures
- Include system experts in procedures that cross many groups
- Need to post a consolidated list of required procedures and training at each beamline
- Tie the training of required procedures with individual's JHA training profile
- Reinforce that the FOs are the gatekeepers

A positive remark: One person commented that the Procedures Center Manager got it under control and together they review the procedures regularly.

(2) Shielding Control

Three (3) team members were selected from various ALS Sections to solicit feedback from individuals via interviews or internal mail. Nine (9) Operators, 5 MTs, and 5 BLSs were invited to participate. Since each of these three groups of participants have different roles in the shielding control process, separate sets of survey questions were developed for them.

*For the Operators, the following areas of interest are covered:*

- Effectiveness
- Using the right form and completing it correctly
- Verification for additional shielding work
- Frequency of shielding conflicts
- Survey follow through and completion
- Close out of Shielding Change Form (SCF) upon completion of the job
- Adequate training and support to carry out role
- Suggestions

Some Operations staff expressed fear of making errors; they said that too many incidents made them feel a lot of pressure and undermined both their confidence and the effectiveness of the process. Another suggestion was to put more restrictions in the process and asked those involved to repeatedly review the procedure. Some needed clearer instructions and a more effective SCF that flows better so they can be sure that it is filled out properly, while another suggestion was to have separate SCF procedures, requirements, and training for users and technicians. A general concern is the lack of communications between AOs and FOs.

*For the MTs, the following areas of interest are covered:*

- Verification of authorization of job order
- Verification of authorization of additional work
- Communication with requester for additional time
- Frequency of shielding conflicts
- Adequate training and support to carry out role
- Suggestions

The overall responses from the MTs are quite positive. The only challenges for them seem to be the occasional scheduling conflicts, and the need to have more visible, clearly defined shielding control endpoints, on each beamline and inside and out of the Storage Ring.

*For the BLSs, the following areas of interest are covered:*

- Do you know when shielding change is needed and how to plan for it?
- Do you know who is in charge of the work?
- How to ensure work is done properly?
- What resources are available at the ALS?
- How to handle shielding problem?
- Suggestions

Most BLSs being interviewed said they are aware of the abilities and capabilities of the workers. Some take the lead while others use the service of the FOs (for work permit and SCF) and the MTs (for vacuum work). They also know that they should contact the Control Room, or the FOs or RCT/RP if there is a shielding problem. Some felt that the FOs need more training. Some

suggested tying up inconsistencies beamline by beamline (e.g., configuration control of endstation).

For details of all three groups' feedback and comments on Shielding Control, see **Appendix 15**.

(3) Experiment Safety Sheet (ESS)

Three (3) team members were selected from various ALS Sections to solicit feedback from individuals via interviews or internal mail. One of the team members did not get any feedback since most of the EMs and MTs interviewed did not know what the ESS was since their job did not require them to fill one out. The Operations staff who participated in the survey also responded that they had no knowledge of ESS. As a result, we only have 5 BLSs' feedback to report. The following areas of interest are covered:

- Effectiveness and usefulness
- Is ESS Binder useful?
- Are you able to complete ESS document before work begins?
- Do you have adequate resources to implement ESS?
- Do you have hazard-specific issues?
- Do you contact the Experiment Setup Coordinators if changes are made to the experiment?
- Is posting of the User Experiment Form (UEF) useful?
- Suggestions

Most responded affirmatively for almost all areas listed above, except for the following:

- Some felt that the ESS Binder is not placed in a useful location. They suggested that it should be placed on the beamline, rather than at the console.
- Many felt that the User Experiment Form (UEF) is redundant to the ESS and not relevant to the beamline.

Other comments include a suggestion to create a contact list for concerns or problems and a positive remark on the Experiment Setup Coordinator doing a good job to make the process simple. For details, see **Appendix 16**.

(4) ISM Roles and Responsibilities

Five (5) BLSs were selected as team members to solicit feedback from individuals via interviews or internal mail. The following areas of interest are covered:

- Are you clear of your role in overseeing the safety of users?
- What are the biggest safety vulnerabilities at the beamline?
- What parts of the safety program are working?
- Areas of improvement?
- Suggestions?

Most responded that they were clear of their role in overseeing the safety of users. As for the biggest safety vulnerabilities at the beamline, housekeeping and space issues continue to be the top concerns. One had a specific request that was never fulfilled: at BL 10.3.2, the SEARCH button should be moved to the middle of the downstream wall of hutch to enforce a proper

search, an octant mirror in the corner is also needed to assist this search. Some warned that the sense of urgency in getting things done at the ALS might compromise safety. When asked what part of the safety program are working, the responses included: radiation safety, training, ESS, annual inspection, and the overall "make it work" attitude in the ALS community, including the EHS Program Manager's positive attitude and his approach to relate safety topics in a clear and sensible manner. On the flip side, people felt that more ALS support is needed and especially off-shift when mechanical help is limited. Some stressed that we need to strengthen work planning and to have a better understanding of our work, and the hazards and controls associated with the work. Some good suggestions included a quick reference guide or good series of links for important safety policies and information; combining the UEF with ESS; completing the process to identify shielding end-point; taller trash cans; and a resting place at the ALS so they can lie down, as fatigue can cause unsafe conditions (this could be resolved when the User Support Building is built?). For details of the feedback and comments, see **Appendix 17**.

In the following weeks, we will evaluate all the feedback received in more detail and discuss them with the leads of all of these four areas: Training and Procedures, Shielding Control, ESS and ISM Roles and Responsibilities. We will also share the information later on with the members of the Division Safety Committee and safety circles.

This year's self-assessment used a very different approach than in the past and, while it did not go into the breadth or depth originally intended, it forms a strong basis for next year's self assessment.

## C. Other Institutional Goals

As a part of the Lab's Effectiveness Review of the PAAA corrective actions, the RSC recommended that a number of the corrective actions that were closed out, continue to be monitored by the Division to assure that they remain robust. Some of these were incorporated into this annual self assessment, however, due to time constraints, most will be tracked independently and documented in next year's self assessment. Examples include some functions that will be monitored by the PI of the ALS RWA as a part of his responsibilities (turnover between shifts, integration of floor operators and accelerator operators, logging of beamline RSS status, etc.).

This is part of a larger goal for self assessment to become a year-round activity rather than a once-a-year report writing exercise. Details have yet to be worked out on how to accomplish this, and the main constraint will be how to balance priorities between useful (but not compliance-driven) initiatives and the day-to-day requirements-driven responsibilities

**Lawrence Berkeley National Laboratory**

# Integrated Safety Management (ISM) Plan at the ALS

**September 30, 2008**

**Prepared by:** _____ Date_____
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**Approved by:** _____ Date_____
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# LIST OF ABBREVIATIONS

| | |
|---|---|
| AHD | Activity Hazard Document |
| ASE | Accelerator Safety Envelope |
| BRC | Beamline Review Committee |
| CSEE | Center for Science and Engineering Education |
| ESS | Experiment Safety Sheet |
| GERT | General Employee Radiation Training |
| ISM | Integrated Safety Management |
| JHA | Job Hazard Analysis |
| JHQ | Job Hazard Questionnaire |
| MESH | Management of Environment, Safety, and Health Assessment |
| MOU | Memorandum of Understanding |
| PRD | Performance review document |
| PRT | Participating research team |
| QUEST | Quality ES&H Self-Assessment Teamwork |
| RSS | Radiation Safety System |
| RWA | Radiological Work Authorization |
| SAA | Satellite Accumulation Area |
| SAD | Safety Analysis Document |
| TSC | Technical Safety Committee |

# REVISION LOG

| Date | Major/Minor | Brief Description of Revision |
|---|---|---|
| September 2008 | Minor | • Updated organization charts.<br>• Updated JHA information.<br>• Added Section 7 Accountability.<br>• Added Section 8 Reference to Institutional ISM. |

# 1.0 INTRODUCTION

Integrated Safety Management (ISM) constitutes one of the core premises for the organization and operation of the Advanced Light Source. The ALS has integrated each of the five functions and seven principles of ISM from the institutional LBNL Integrated Safety Plan into its on-going management of the facility. The five functions are: (1) Define the scope of work; (2) Identify the hazards of the work; (3) Develop and implement controls for the hazards; (4) Perform the work as authorized; and (5) Maintain continuous improvement from regular feedback. These five ISM core functions are sustained by applying the seven guiding principles of the ISM: (1) Line management responsibility and accountability for ES&H; (2) Clear ES&H roles and responsibilities for managers and staff; (3) Competency commensurate with responsibilities; (4) An on-going balance between safety on one hand and research and operational priorities on the other; (5) Working within standards and requirements; (6) Hazard controls tailored to the work; and (7) Authorization basis established for the work.

The articulation of this responsibility begins with the ALS Mission Statement: 'Support users in doing outstanding science in a safe environment.'

As a national user facility, the basic premise is to provide scientific service, so all of its functions are organized along service lines. As the last part of the mission statement makes clear, these services are all organized within the constraint of being performed safely. This is understood to be part of management's stewardship responsibilities for a national user facility.

As a large user facility, the organization and implementation of integrated safety management is relatively larger and more complex when compared to other research divisions at Berkeley Lab (LBNL). The purpose of this plan is to describe this logic and implementation.

# 2.0 LINE MANAGEMENT RESPONSIBILITY

Clear delineation of line management responsibility for safety is critical at the ALS. Characteristics that make this especially challenging for the ALS are:

- Over 50% of the staff who routinely work at the ALS are matrixed from other divisions
- In addition to ALS, four different divisions operate beamlines at the facility
- Each year 2000+ users conduct research at the ALS

An outline of the organization chart is shown in Figure 1 below. Note that a significant part of the ALS organization is comprised of staff from AFRD and Engineering. Because of their significance, they are incorporated directly into the line management of the ALS at the Division Deputy level. In addition to ensuring integration of technical and strategic goals between the divisions, this also ensures coherence of safety responsibilities. Examples of this integration include the implementation of the ALS interlock program (Engineering and ALS), the ALS Safety Analysis Document (AFRD and ALS), and the Beamline Review Committee (Engineering, AFRD, and ALS). At a more detailed level, Memoranda of Understanding (MOUs) have been signed by the respective division directors that address specific responsibilities for staff safety at the ALS.

Formal MOUs have also been established with each of the beamlines operated by other entities. General safety responsibilities between the ALS and individual participating research teams (PRTs) are identified and agreed upon through this process. In order to ensure continuing integration, these PRTs are considered to have a 'dotted line' to the Deputy Division Director for safety oversight.

Line management safety responsibilities for the ALS users are implemented through individual Experiment Safety Sheets (ESS). The ESS describes the standard functions of ISM with signature blocks indicating respective responsibilities of both the user and the ALS staff. All users at the ALS utilize some form of the ESS process. The Beamline Scientists, as hosts, are considered to be the line management for users with respect to safety. Table 1 presents a more thorough description of the relative roles and responsibilities between users and beamline scientists. It should be noted that because users may work at many different beamlines in a year, sometimes simultaneously, the formal Human Resources designation of Supervisor is not useful in describing this responsibility.

Safety line management for ALS staff follows standard LBNL practices flowing from the Division Director to his direct reports and from them, down to first line supervisors. In cases where formal authorizations are required, work leads are clearly identified for individual scope of work. Safety accountability is implemented through standard PUB-3000 methods, and ALS has instituted language in its annual performance review documents (PRDs) to ensure accountability.

**Figure 1. ALS Organization Chart**

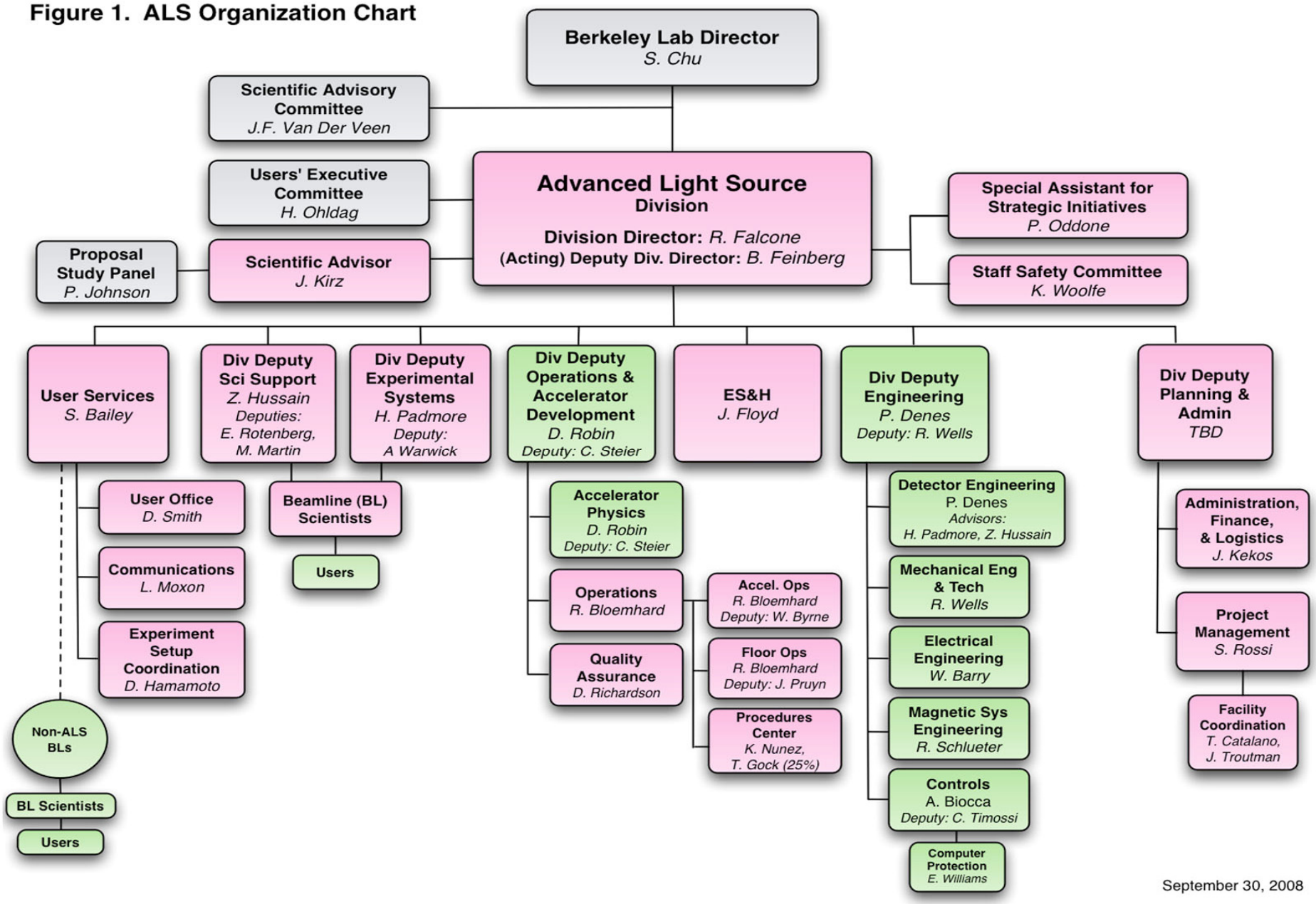


**Table 1. Roles and Responsibilities for Users and Beamline Scientists**

| BEAMLINE SCIENTISTIS |
|---|
| • **Ultimate responsibility for safety at the beamline.**<br>• **Assure that:** |
| ➢ Users submit proper information and that work has been reviewed.<br>➢ Users are qualified to perform work.<br>➢ Proper support and oversight is approved. |
| **EXPERIMENTERS-IN-CHARGE** |
| • **Responsibility for safety of the experiment.**<br>• Assure that:<br>➢ Information submitted about the work and hazards is accurate.<br>➢ All Users on the team understand and follow the requirements.<br>➢ Be present or designate an alternate to respond to safety issues. |
| **USERS** |
| • **Personal responsibility for safe conduct of work on an experiment.** |

# 3.0 SAFETY ORGANIZATION

To implement ISM, the ALS devotes a significant part of the organization to safety. Many different organizational units and their staff have explicit safety responsibilities. These consist of both committees and operational functions. Figure 2 shows the organization of these functions. Also included in that chart are the individuals from the EH&S division who provide significant, though independent, support to the ALS.

A list of the operational safety functions and resource allocation is as follows:

| **Function** | **FTE** |
|---|---|
| Interlocks | 1 |
| Facility Management | 1 |
| Work Planning | 1 |
| Procedures | 1 |
| ESH Program | 2 |
| Experiment Coordination | 2 |
| Floor Operations | 3 |
| Electronics Maintenance | 2 |
| **Total** | **13** |

In addition, a significant part of Accelerator Operations, Electronic Installation, and Mechanical Engineering units perform important safety functions as part of experiment and beamline reviews as well as accelerator operations.

Important Committees include:

- Division Safety Committee
- Beamline Review Committee (BRC)
- Staff Safety Committee

The charter for the Division Safety Committee (chaired by the Deputy Division Director) is to provide an on-going forum for communicating safety issues and status. Additionally, its members perform the annual QUEST inspections in support of the Division Self Assessment. It contains members from each organizational unit in ALS including Engineering and AFRD functions. These members also chair individual unit safety circles each month so that all staff are apprised of safety issues and status and can bring issues up for discussion on a regular basis.

The BRC provides a mechanism to evaluate proposed new beamlines or modifications to existing beamlines to ensure that all technical and safety considerations are addressed before operation. Its processes are organized along project management principles with a conceptual design review, a beamline design review, and a beamline readiness review and walkthrough. This process is discussed in more detail in later sections. It has 15 designated members from

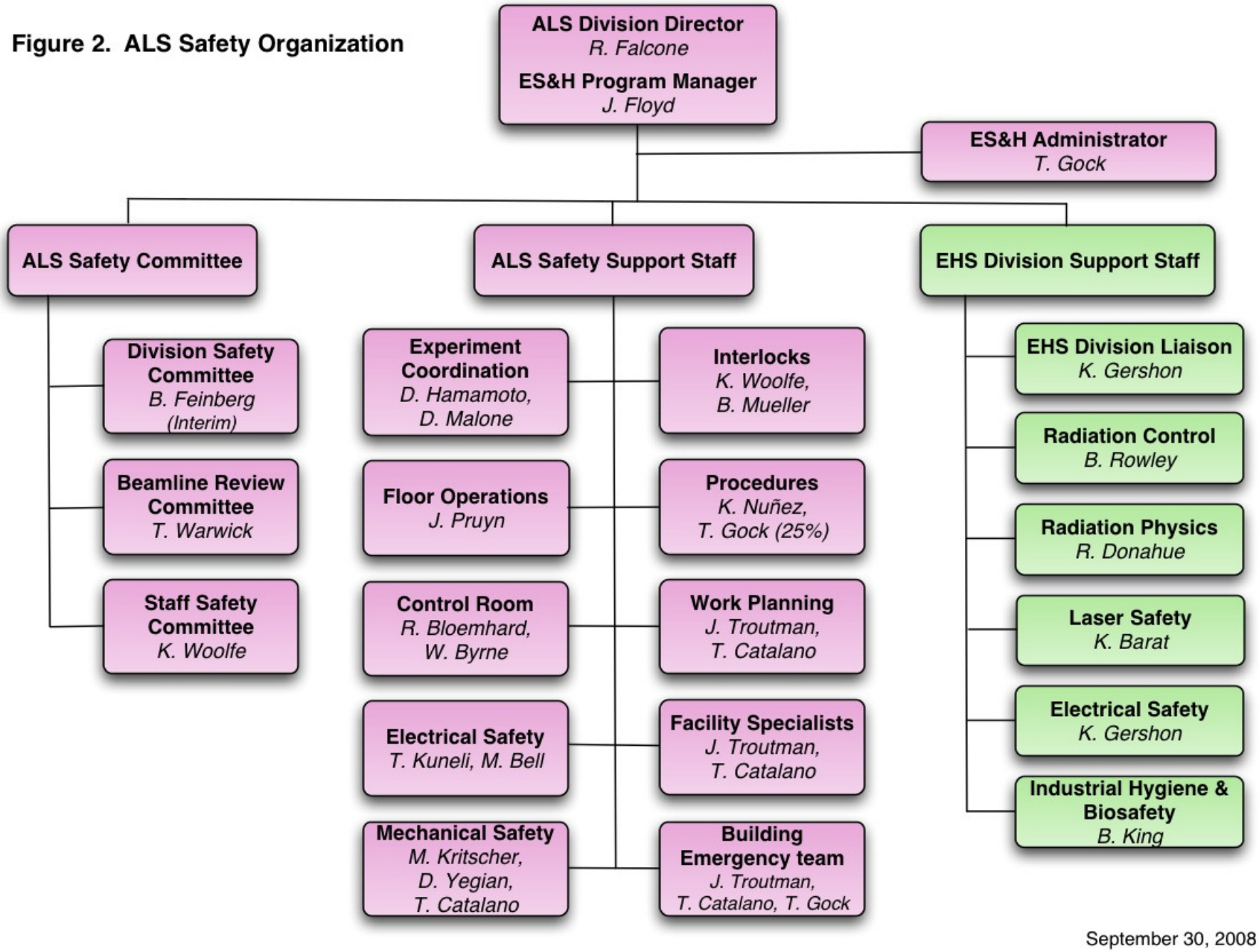
selected disciplines and several ex-officio members, comprising several different divisions. Its charter is described explicitly in ALS procedure BL 08-16.

The Staff Safety Committee members are appointed by management and are broadly representative of the ALS. Upon request, it can create ad hoc Technical Safety Committees (TSC) to investigate complex technical safety issues and make recommendations to management. It also performs investigations of incidents when appropriate. Its specific charter is described in procedure ALS 08-03.

Lastly, all staff and managers have on-going safety responsibilities and devote a fraction of their time to safety. Examples include monthly safety circle meetings, time spent on the annual self assessment inspections, supervisor walk-arounds, etc.

Commensurate with its commitment of staff time, the ALS also commits significant funding to safety projects. Each year, funding is set aside to meet these needs. A central "safety first" project ID is maintained to deal with issues on the accelerator floor that might otherwise not be addressed. Funding for this account for FY08 was $150K.

**Figure 2. ALS Safety Organization**



# 4.0 ISM FUNCTIONS

This section documents how ALS performs the five functions of Integrated Safety Management. Because of the nature of the facility, these functions are all implemented in a tiered fashion. ISM of the accelerator facility is primarily implemented via high level systems that meet Accelerator Safety Order and 10 CFR 835 requirements; safety of the ALS and matrixed staff is through standard LBNL PUB-3000 mechanisms; and safety of the users is through ALS-specific tools developed especially for users at a large user facility.

## Accelerator

Work involving the accelerator has been comprehensively evaluated through a Safety Analysis Document (SAD). The SAD and the process by which it is developed, reviewed and maintained are governed by the Accelerator Safety Order, DOE 420.2. It incorporates, at a high level, the ISM functions for the accelerator facility as a whole. Through the SAD process, a detailed catalog of ES&H risks associated with running the ALS is developed and evaluated. The mitigations to control those risks are identified and, in particular, a safety envelope is developed that defines the parameters of safe operation. Internal procedures have been developed, as appropriate, to implement these requirements.

The Safety Analysis Document (SAD), Accelerator Safety Envelope (ASE), and implementing procedures have been internally generated by the ALS. Review and update occurs when changes to the ASE or SAD have been needed. All reviews are performed by *ad hoc* committees of subject matter experts from similar institutions.

## Beamlines

A significant component of the ALS facility is its beamlines. To date, 40+ beamlines (including branches) have been installed. All beamlines undergo a thorough ES&H evaluation at significant stages in their design, installation, and operation, which exactly reflect the ISM functions. At conceptual design, the fundamental scientific rational and design is proposed ('define the work'); at beamline design review, all of the hazards have been identified – in particular radiation safety – and requirements to build specified ('identify hazards and controls'). Throughout installation, project staff work with subject matter experts to assure that build-out conforms to the beamline design requirements. This is verified before the beam is allowed to receive first light in a beamline readiness review and associated walkthrough ('perform work'). Annual beamline readiness reviews are performed to verify that the controls are adequate ('feedback and improvement'). This process is proceduralized (BL 08-16) and overseen by a standing technical committee composed primarily of ALS and Engineering staff.

Users

More than 2000 users each year come to the ALS for periods ranging from a day to months. Special ES&H systems have been instituted to assure that their work receives proper review and oversight. The process begins at the time prospective researchers apply for beamline time through a scientific peer review procedure. When they submit the proposals, hazard information is also identified. When their proposals are accepted and time is allotted, the Experiment Setup Coordination unit contacts the principal investigators to verify the hazard information, personnel who will be on the user team, and follow up on non-routine hazards that require EH&S Division or other subject matter expert review. By the time users arrive, most hazard and hazard control information would have already been reviewed. Before work begins, a physical inspection is conducted. This process has been accepted by EH&S Division as an alternate system to the Lab's new Job Hazard Analysis (JHA) program and is implemented through Experiment Safety Sheets (ESS) and procedure US 02-05. The new JHA replaces the former Job Hazard Questionnaire (JHQ).

Long-term Guests

As part of its scientific mission, the ALS hosts many intermediate to long-term guest researchers including visiting faculty, graduate students, etc. If these individuals are staying on-site continuously for 3 months or more, they will be treated as regular staff, given JHA to fill out, and incorporated into one of the LBNL scientific organizations. Their work will receive the same review and authorization as staff (see below).

Staff Work

All routine work is now reviewed and authorized through JHA. The great majority of non-office individuals were enrolled in a group 'Beamline Staff' JHA. This is written to be very broad, with individual sections identifying thresholds beyond which further review is required (where possible and appropriate). Lastly, many classes have been added to the default training profile – primarily for the purpose of increasing staff knowledge of the hazards and controls and thereby increasing understanding of the limits of their routine work authorization.

In addition, an analysis was performed to explicitly identify all long-term guests (post-docs, grad students, doctoral fellows, etc.), review and update supervisor assignments to each, and enroll them in the beamline staff group JHA. Though this greatly extends their training requirements, this is viewed as a part of their overall training at a synchrotron facility and therefore an important part of our mission.

Different mechanisms are in place in each work group to identify non-routine or complex tasks and review them appropriately. For example, on the Operations/Engineering side, weekly meetings are held to review and coordinate shut-down work. Extended shut-downs go through extensive work planning and review. Thresholds have been identified that specify when the work becomes so complex or there are enough hazards that an ALS Work Permit must be

implemented. The proposed work is reviewed by an inter-disciplinary team to identify any ES&H, scheduling, technical, or quality issues.

The division strives to include adequate discussion and communication amongst individuals involved, in addition to standardized algorithms or electronic tools. By focusing on discussion and communication, the division believes that better teamwork will be generated and more issues will be identified and resolved, thereby enabling the staff to have a greater consensus and understanding for the hazards and controls, and be more prepared for contingencies.

On the beamline side, efforts are under way to develop 'work planning sheets' that describe how work is planned and reviewed at each beamline. Because of the multiplicity of beamline characteristics (number, staffing levels, user base, technical challenges, operating times, etc.), there are several different models. These will be developed and documented more fully in the coming year.

A key component of work planning is the ALS Procedures Center. Much of the work is proceduralized and a controlled procedure system has been implemented. ALS has instituted the ALS Procedures Training Database, which is essentially an analog to the JHA to ensure that all staff members who utilize these procedures are trained to the current revisions.

Vendors

All vendors who propose to perform work on the floor go through both the Lab's SJHA process (to identify internal controls needed specifically for their tasks) and an ALS Work Permit (to identify controls needed for the interface of that work with the accelerator facility). This process is facilitated by the ALS Facilities Specialists who help individuals through the process and assures consistency of application and documentation. This process was put into place on September 1, 2008 and is scheduled for review/accreditation by EH&S in October.

Visitors

As part of its mission, the ALS makes itself available for public tours and several tours each week are given. Most are either through internal ALS staff or the Public Affairs Office (and CSEE). All LBNL staff giving the tours are trained in an ALS procedure and understand their roles and responsibilities to provide for safety of guests at the ALS. Occasionally, during periods of particularly intense work, these tours are accompanied by ALS safety support staff.

# 5.0 TRAINING

All staff and long-term guests must complete the JHA process within 30 days of their start date at the ALS. All training is tracked through the EH&S Division training database and evaluation of this training completion is a part of the PRD process.

Additionally, all staff who require unescorted access to the ALS experimental hall (Building 6, room 1000), are required to take GERT and ALS 1001: Safety at the ALS, which replaces the old safety video and incorporates the ALS 5001: Radiation Awareness Training. Presently, GERT and ALS 1001 are required to be renewed. Both are made available through the Internet. Card-key access to the floor is contingent upon maintaining currency in these two courses.

Users must also take GERT and ALS 1001. As part of the registration process, these courses will show up automatically as required training for the users who will receive instruction email from the User Services Office to take the training before they can be issued access badge to the ALS. Since users must re-register annually, training status is updated annually also through this process. Short-term users are not individually required to take a JHA. Some users may perform work that exceeds this typical bound. In those cases, additional training is identified and implemented via the Experiment Safety Sheets.

In addition to the ALS 1001, we have also introduced a new 20-minute course, ALS 5005: Beamline Radiation Safety training. Beamline staff are required to take this course given by the Floor Operators.

On-the-job training is also provided to users. General beamline orientation and technical/safety issues are covered by the Beamline Scientists. In cases where procedural requirements must be met (e.g., on handling hazard gases), this training is typically performed by other ALS operational staff.

Because a significant component of work at the ALS is performed through procedures, the ALS has established a tracking system (based on the JHA) to identify and track training on procedures.

# 6.0 ASSURANCE

To assure that the overall ES&H systems at the ALS are robust and effective, the ALS has implemented a systematic assessment approach that is matched to the needs of a large-scale user facility. For convenience, we group the assessments into categories. Process-driven assessments are those required by higher tier documents and are proceduralized to some extent. Operational assessments derive directly from the mission statement in trying to help the user staff perform their science in a safe manner. They have both an assistance and an oversight function. As with other divisions, supervisor walkthroughs are an integral component as is the annual self-assessment. These two are designed to be complementary with supervisor walkthroughs concentrated on work practices and the self-assessments concentrated on work environment.

Following is a list and short discussion of these assessment functions:

Process-driven assessment

Due to the nature of work at the ALS, assessment is an on-going function. Process-driven assessments are those performed by procedure as part of facility-based or institutional requirements. Examples are interlocks tests, projects that might extend beyond the Accelerator Safety Envelope, and Beamline reviews. Other examples are AHD or RWA-driven inspections. Examples are:

- Experiment Safety Sheets. Each experiment requires an inspection and verification before work can begin. Additionally, annual renewals are conducted for long-term projects. These are described in procedure US 02-05.

- Beamline Review. Assessments are performed at each stage in the development and installation of a beamline (and modification of a current beamline). Annual walkthroughs are conducted to assess on-going safety. These are described in procedure BL 08-16 Appendix IVc.

- Interlocks. Design, installation, and modification of personnel safety interlocks undergo a thorough evaluation by an ad hoc technical safety committee before they are implemented. This is described in procedure EE 02-01. All personnel safety interlocks (Radiation Safety System—RSS) undergo either six month or annual inspection and verification.

- Accelerator Projects. In order to assure that accelerator projects stay within the bounds of the SAD and the ASE, reviews are conducted. These assessments are described in procedure ALS 08-01.

- Other more standard LBNL examples include formal authorizations such as AHDs, RWAs, lead compliance plans, drill permits, etc. that all have assessment and evaluation components in them.

Operational Assessment

Another type of assessment can be categorized as operational. Examples of these are the function of the Floor Operators. Their positions implement radiation safety for the beamlines. They are radiological workers on the ALS RWA and are charged with maintaining configuration control of the beamlines. They spend a large part of each shift walking by each beamline as a part of this verification.

Another example is the Experiment Setup Coordination unit. As part of their function, they also walk the floor and interact with the users and beamline scientists to verify the accuracy and effectiveness of the ESS.

The ES&H Program Manager performs risk- or compliance-based walkthroughs that focus on high hazard or high compliance risk functions. These include biweekly walkthroughs of the division's SAAs, inspection of any on-going ALS Work Permits, lead compliance plans, etc.

Supervisor Assessment

At the ALS, first-line supervisors spend a significant part of each day in the field working with their staff and evaluation of safety is integrated into this process.

Second-level and higher supervisors have gone through ALS specific training in performing effective safety walkthroughs. These are focused on work activities of their staff as opposed to physical inspections of the space. The goal is to develop the same rapport and relationship between supervisor and individual in safety as exists in the technical realm. Division management expects each of these supervisors to perform two of these walkthroughs each month and to document them in an on-line system that allows for tracking/trending.

Annual Self Assessment

All staff members participate in the annual self assessment. The first component is a survey. Each year a survey is composed that identifies the priority issues for ALS and asks for confirmation from each individual that he/she understands the policy. These are done concurrently with the annual PRD process. Supervisors review the information with their staff and then pass on to the ES&H Program Manager for review.

Second, the safety circle teams form QUEST inspection teams and perform a full walkthrough of all physical space. The purpose of this inspection is to identify safety issues associated with space. Their checklists are based on the LBNL self assessment criteria.

The third component of the self assessment is evaluation of the institutional criteria. Along with this is an evaluation of the goals from the previous year's self assessment.

A report is drafted and circulated first to the ALS Division Safety Committee and then to management for review and approval.

Independent Assessment

In addition to internal assurance functions, ALS participates fully in independent institutional assurance activities. These are identified below.

- Triennial Management of Environment, Safety and Health Assessment (MESH)

As required by the SRC, the Division will participate in the MESH review that evaluates management systems and implementation of ISM requirements. This review is run by the Safety Review Committee and typically includes representatives from the Office of Contract Assurance (OCA) and EH&S Division.

- Program Reviews

The EH&S Division is developing a program review process to examine specific safety topics in details. Examples would be laser safety, electrical safety and crane safety.

# 7.0 Accountability

This section defines ALS policy for both organizational and personal accountability for safety incidents.

ALS management recognizes that the great majority of accidents are the result of organizational deficiencies. As such, management accepts accountability for these deficiencies and strives to work with the staff collaboratively to investigate, understand, and remediate areas of deficiency. The division recognizes that humans are fallible and people may at some point make errors. Rather than placing blame and applying punitive actions, ALS considers individuals involved as having made an 'honest mistake' and will work with them to understand the context of the incident and prevent similar errors.

However, a completely no-blame culture is neither reasonable nor desirable, as a small fraction of accidents do result from what are considered unacceptable behaviors. Applying a general pardon for unsafe acts would create a lack of credibility and accountability among staff members. In order to foster and maintain a strong safety culture, it is important to appropriately impose disciplinary measures. The types of behaviors that are considered unacceptable and blame-worthy are:

- Willful violations.
- Repeated accidents:
  Consistent pattern of problems over an extended period of time.
- Reckless behavior:
  Reckless behavior has a different connotation distinguishable from ‘honest errors' and involves an individual's conscious disregard for substantial or unjustifiable risk. Examples are: Ignoring direct warnings, disregarding explicit instructions, and failure to report an incident that may pose a potential risk to other staff members.

These kinds of unacceptable behaviors are usually not considered failures of the organization or safety systems; therefore, disciplinary actions may be warranted.

After a thorough investigation, any event that meets the above criteria may be potentially blame-worthy and subject to disciplinary actions. Before pursuing disciplinary action, the responsible supervisor/PI and the Division Director should first meet with the Lab Director and Chief Operating Officer to review the safety culture in the part of the organization where the incident took place, in order to identify underlying or contributing causes that need to be addressed first.

# 8.0 Institutional ISM

The LBNL Institutional ISM Plan was revised subsequent to the 2007 revision of the ALS ISM Plan. The institutional plan was a very large-scale revision with many different impacts to the ALS. Rather than identifying each applicable revision explicitly in our Plan, we acknowledge and incorporate all by reference.

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Minutes of the October 1, 2008 ALS Division Safety Committee meeting covering ISM Plan 2008 revisions and subsequent discussions about the revisions.

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## ALS Division Safety Committee

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**October 1, 2008**

**MEETING SUMMARY**

1) Jim Floyd introduced two visitors from the DOE ISM Verification and Validation team, Scott Wenholz and Tyrone Harris. They were invited to observe our safety discussions as a part of the validation process.

2) Lessons Learned

No internal ALS incidents or any applicable incidents within the Lab in the last month were reported. Floyd shared a recent accident happened in the Thomas Jefferson Laboratory in Virginia that is relevant to our recent shutdown. It was during shutdown, a crane operator and a rigger were assembling a shield wall near a beam dump. This wall was being constructed out of 2,300-pound steel shielding blocks, which were being lifted by a 4-ton boom crane. When a block that was placed on the wall at a height of about 3 feet began to shift, the crane operator instinctively reached to steady it with his left hand and caught his pinky finger between the moving block and another block. The crane operator drove himself to the emergency and subsequently had surgery which resulted in having a part of his pinky finger amputated. Floyd noted that he had already communication this information to the Mechanical Technicians Work Leads. Lessons Learned from this incident are: (i) before working on a task, think carefully and completely about the work, the hazards, and the controls we need to perform it safely, such as training, tools, time, and authorization, etc.; and (ii) fully integrate safety into our work practices, and pay attention to the job and our surroundings with great vigilance.

Floyd asked if members have Lessons Learned to share. DOE visitor Wenholz mentioned a Forklift accident in the Linac Coherent Light Source (LCLS) at Stanford Linear Accelerator Center (SLAC). A worker attempted to move a 9,200-lb scissor lift by a forklift that was not capable of such weight, which resulted in the scissor lift tipping over. Luckily no one got hurt from this accident. The Lessons Learned mentioned above for the Jefferson Lab incident can also be applied to this case.

2) ISM Plan 2008

Floyd reported that the Integrated Safety Management (ISM) Plan 2008 for ALS has just been revised. This new version includes an update on the JHA process

and training, a new section on “Accountability”, and the incorporation of the Institutional ISM Plan by reference. In general, this is a minor revision, but the section on Accountability is deserving of in-depth discussion.

Copies of the 1-page text on Accountability were handed out at the meeting. Ben Feinberg asked the Committee members to take a few minutes to read the text to enable a discussion afterwards. He noted that this has been worked on for a long time trying to come up with appropriate language and that it is now far enough along to get input from staff.

This new section on “Accountability” is intended to lay down the policy at the ALS for organizational and personal accountability for safety incidents. It is our hope that a fair and reasonable accountability policy will further encourage people to come forward when incidents occur. In order to be effective, the policy needs to be clearly stated and easily understood. In this draft Accountability text, the ALS management stated its intent to work with individuals to understand the context of the incident in order to prevent recurrence. The division also recognizes that humans are fallible and people may at some point make “honest mistakes”. Conscious disregard, on the other hand, is what we cannot condone. The Accountability text spelled out the types of unacceptable and blame-worthy behaviors: (i) willful violations; (ii) repeated accidents; and (iii) reckless behavior.

A long and engaging discussion on the topic of “Accountability” followed suit. Some asked for more clarification, some warned to be cautious with the language being used, some urged to expedite the investigation process so the person(s) involved in the incident will not feel being dragged on forever. Ken Woolfe remarked that statistically over 75% of incidents involved human errors. People in general are willing to admit and correct their mistakes, but they may likely be discouraged by the possibility of getting blame or punitive actions. Someone pointed out that people might not give too much thought to this policy until something actually happens.

Floyd asked Committee members to share the draft Accountability text with their Safety Circles and get feedback from them.

3) Required Training Identified through Job Hazard Analysis (JHA)

With the completion of the JHA, there are many newly identified courses that need to be fulfilled, along with some previously delinquent training. Tennessee Gock has been working with the ALS Director’s Office to send out reminder emails at the beginning of each week (two courses per week) to ALS staff who have delinquent training. Gock will be tracking the training status and will report back to the group leaders who will then talk with those who have unfulfilled training.

4) Upcoming HSS Audit

Floyd noted that the Lab is expecting an audit team from the DOE Office of Health, Safety, and Security (HSS) in January 2009. Individual interviews will be conducted, and the following areas will be looked into: work planning, hazards,

controls, feedback, and authorizations. While preparing for this visit, we can use this opportunity to strengthen our safety systems as well as the safety culture within our staff.

**Lawrence Berkeley National Laboratory**

# Safety Assessment Document for the Advanced Light Source *(Rev. 6)*

Updated
**September 1, 2008**

This work was supported by the Director, Office of Science, Office of Basic Energy Sciences, of the U.S. Department of Energy under Contract DE-AC02-05CH11231.

# Approval Page for the ALS SAD Rev. 6

| | **Signature** | **Date** |
|---|---|---|
| ALS Division Director | _____ | _____ |
| ALS Division Deputy for Operations | _____ | _____ |
| ALS ES&H Program Manager | _____ | _____ |

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY

1 Cyclotron Road, MS 88R0192
Berkeley CA 94720

To: David Shuh, Chair of LBNL Radiation Safety Committee (RSC)

Re: Accelerator Radiation Safety Committee (ARSC) Report on the ALS SAD (Rev. 6)

From: Accelerator Radiation Safety Committee

Date: 7/1/08

**Summary**

The Accelerator Radiation Safety Committee (ARSC) appointed by the Chair of the LBNL RSC on January 18th 2008 to review the Advanced Light Source (ALS) Safety Analysis Document (SAD) (Rev. 6) has completed it's review.

Revision 6 of the ALS SAD was specifically updated to address the changes in the operation and safety systems associated with future Top-Off operation at the ALS. The scope of the review was limited to the updated Revision 6 of the Advanced Light Source (ALS) Safety Analysis Document (SAD) and Accelerator Safety Envelope (ASE), which address the changes in operations and safety associated with Top-Off injection operation at the ALS. The committee; Claude Lyneis, Chair, James O'Neil and David Kestell, unanimously recommend the approval of this document by the Radiation Safety Committee. This completes the committee's task as set out in LBNL's Institutional Assurance of Accelerator Safety Order Compliance, EHS Procedure 703. Following approval by the RSC, the SAD will be forwarded to the DOE Berkeley Site Office (BSO) for review and approval.

**Process**

The Accelerator Radiation Safety Committee held a review on 02/20/2008 of the proposed changes to the ALS SAD, which included three external reviewers from SSRL at SLAC, APS at ANL and NSLS at BNL, respectively. Observers from DOE BSO and ORNL were also present. The ALS management and technical teams made presentations with respect to future Top-Off Operation. Following this review, the ALS completed the revision and addressed the recommendations of the review. The ARSC and the ALS have interacted several times since that review to finish the document. On June 12th, the committee met to make a comprehensive review of the document and suggested a number of minor clarifications to the ALS. A final version was received from the ALS on June 27, 2008, and this version was approved by the ARSC.

Claude Lyneis — Date: 7/1/08

James P. O'Neil — Date: 7/01/08

David Kestell — Date: 07/01/08

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

SEP 18 2008

Roger Falcone
Director
Advanced Light Source
Lawrence Berkeley National Laboratory
1 Cyclotron Road, MS: 80-0114
Berkeley, California 94720

Subject: Approval of the Advanced Light Source Safety Analysis Document, Rev. 6, and Accelerator Safety Envelope

References:

(1) Ernest Orlando Lawrence Berkeley National Laboratory Advanced Light Source Safety Analysis Document, Rev. 6, dated August 29, 2008

(2) Ernest Orlando Lawrence Berkeley National Laboratory Advanced Light Source Accelerator Safety Envelope, Rev. 6 dated August 29, 2008

Dear Dr. Falcone:

Enclosed please find the Berkeley Site Office (BSO) Review and Acceptance Report for the Advanced Light Source (ALS) Safety Analysis Document (SAD) and Accelerator Safety Envelope (ASE). These documents have been approved subject to the condition of approval documented in Section 4 of the report.

The above-mentioned documents and this letter shall be added to the safety basis effective as of the date of this letter. Implementation of the SAD and ASE shall be completed prior to Top-Off Mode operation. As stated in the condition of approval, this SAD will require a complete revision prior to March 31, 2009, in order to be compliant with the requirements of DOE O 420.2B. If you have any questions, please contact Salma El-Safwany of my staff at (510) 486-6479.

Sincerely,

Aundra Richards
Site Office Manager

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Page last updated August 22, 2008

# USER ADVISORY

| | |
|---|---|
| **Advisory Title:** | Personal Protective Equipment (PPE) at the ALS |
| **Advisory Number:** | 21/Rev. 0 |
| **Issue Date:** | August 12, 2008 |
| **Review Date:** | **Note:** The advisory procedure and all ALS user advisories are undergoing a complete review that will not be completed until late 2008. Until that time, all current advisories and procedures remain in effect. |
| **Current Info:** | This Advisory is valid for two years from Issue or Review Date(s), at which time it is reviewed for relevancy and accuracy. Copies of all current user advisories are available at the ALS User Services Office, (510) 486-7745. |

## Overview

It is Berkeley Lab policy to prescribe proper personal protective equipment (PPE) to all staff and users. PPE is to be used as a supplement to but not as a substitute for engineering controls. Which equipment should be used depends, in general, upon the hazard and the work. With the exception of the general ALS requirement (closed-toe shoes), this advisory is organized by the types of hazards likely to be found at the ALS.

Appropriate PPE should be available at the beamlines and laboratories. In addition, the stockroom in B7 has most PPE available without charge. In emergencies, the Safety Boxes located around the floor have extra PPE supplies. If you cannot find the right PPE or have any questions, contact your Beamline Scientist or the Safety Program at ext. 4499.

## ALS Policy

The guidelines and requirements provided in this advisory are designed to assist ALS users and staff in meeting Berkeley Lab's health and safety requirements for personal protective equipment. A detailed discussion of Laboratory policy on personal protective equipment can be found in Chapter 19 of the Laboratory's Health

and Safety Manual, Pub-3000, and in the personal protective equipment section of the Laboratory's Chemical Hygiene and Safety Plan.

## Requirements and Recommendations

### General ALS Requirement: Closed-Toe Shoes

Only one general PPE requirement applies throughout the ALS experimental hall. **All staff, users, and visitors must wear closed-toe shoes on the experimental floor, accelerator area, and all peripheral lab areas**. This is to provide protection from the various slip/trip, abrasion, and kicking hazards associated with the equipment on the floor. This also applies to work in the ALS mezzanine labs.

### General ALS Requirement for Work in Building 6 Mezzanine Labs: Safety Glasses

Appropriate eyewear is required for entry into all posted labs on the ALS mezzanine. This may be laser eyewear for laser operations or standard safety glasses to provide eye protection from the various chemical and physical agents that are worked with in these lab spaces.

### Cryogenics

A wide variety of cryogenics work is done at the ALS, and each use should be evaluated for the proper protective equipment. In particular, protein crystallography, which involves the extensive use of liquid nitrogen, has a separate PPE chart for its most common uses. A particular concern is working with cryogens above eye level. This should be avoided whenever possible, but if not, goggles should be used instead of safety glasses. The general requirement is to protect the face and skin from cryogenic burns due to spills. General guidelines are

| General Cryogenic Guidelines | |
|---|---|
| **Task** | **Required PPE** |
| Working with pressurized systems (i.e., opening / closing valves, manipulating connections, verifying the existence or absence of pressure in a system). | Face shield and safety glasses; gloves; long pants or apron |
| General use of dewars and other unpressurized systems. | Safety glasses or goggles; gloves; long pants or apron |
| Handling, transporting closed containers | None |

Gloves appropriate to the task should be used. If performing simple tasks involving pressurized systems, then cryogenic gloves should be used. For finer tasks, substitutions may be used.

**Power Tools**

Only staff who are qualified and have been authorized by their supervisors should work with power tools. Standard PPE requirements generally include safety glasses and appropriate gloves, but each use should be evaluated. In particular, safety shoes are required for many operations.

This guidance does not apply in the User Machine Shop (Building 80, Room 10A), where tool-specific requirements are in place. Consult with the Shop Manager (ext. 5142) if you have any questions regarding User Machine Shop PPE requirements.

**Chemicals**

Standard Berkeley Lab policy when working with chemicals in a lab or shop environment prescribes safety glasses, lab coat, and gloves, in addition to the standard closed-toe shoes; see the Chemical Hygiene and Safety Plan for more information.

Generally, work with chemicals on the floor involves little risk (small quantities of relatively nonhazardous chemicals), so PPE requirements may be minimal. Examples are:

- Loading <1 mL volumes of relatively nonhazardous samples, which requires only gloves and glasses
- Cleaning of components with <5 mL of solvents, which requires only gloves

However, some operations are done with higher quantities and/or more hazardous materials. In these cases, the work is typically done in the User Chemistry Lab, temporarily located in Building 6-2233, and PPE requirements are evaluated on a case-by-case basis.

Safety glasses and gloves are available at the Building 7 stockroom. Be sure to verify that you are using the appropriate gloves for the material you are working with. See Appendix 21-A: Glove Guidance, and Appendix 21-B: Nitrile Glove Compatibility Guide.

**Lead (<5 bricks)**

After taking Lead Awareness Training, EHS0329, staff and users may handle up to five bricks per day. Note that this does not include any cutting. The standard PPE requirement for this activity is nitrile gloves and safety shoes. PPE for work involving more than five bricks is evaluated on a case-by-case basis through a job-specific lead-compliance plan. See the EH&S Training Web site for information on training scope, requirements, and schedules.

**Beryllium**

Routine handling of beryllium (installation and removal of Be windows, etc.) does not require PPE. Consult the Environment, Safety and Health Division's Industrial Hygiene Group (ext. 6571) if

you will be performing any operations that might lead to exposure. Also, see the Industrial Hygiene Group Web site on beryllium for more information about training (course number EHS0342).

## Appendices

- 21-A. Glove Guidance
- 21-B. Nitrile Glove Compatibility Guide

## For More Information

For information about Personal Protective Equipment requirements at the ALS, contact the ALS ES&H Program Manager (ext. 4499).

| **Approved by** | **Signed** |
|---|---|
| James Floyd , ALS ES&H Program Manager | 08/12/2008 |
| Ben Feinberg, Division Deputy for Operations | 08/12/2008 |

| Log Num | CATS | Last Name | First Name | Location | Injury Date | Emp Statement | How Occured | Base Cause | How Could Prevent | Corrective Action 1 | Corrective Action 2 | Corrective Action 3 | CATS details | Trending | ISM Functions |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Building 6 Beamline 822 | 10/10/07 | The guest employee stated she was mounting crystals when the tip of her right index finger touched the liquid nitrogen wand. She stated she had double gloves on and all PPE that was required. | The user touched the metal part of the cryowand immediately after the cryowand had been removed from a liquid nitrogen bath. | The user did not keep her fingers on the teflon handle of the cryowand. In addition, she wore cotton gloves on top of nitrile gloves, instead of the reverse, which may have contributed to the speed with which the cold penetrated through the gloves. | Beamline staff should have emphasized that (1) nitrile gloves are to be worn OVER cotton (not the other way around) and (2) that liquid nitrogen is dangerous and care should be taken when using it. | Beamline staff are being retrained in how to teach users about PPE for LN. | | | Physical Biosciences | | |
| | | | | Building 2 | 10/18/07 | The employee stated he was cutting a piece of velco with a pair of scissors when the scissors slipped cutting his left thumb. | Individual was attempting to cut a length-wise strip of Velcro (~6? long by 2? wide). He was using a pair of scissors to do this. Initial cut proceeded well, but it got caught at a certain point. While applying extra force, it slipped and the upper blade sliced his left thumb. | Not the best type of scissors. The scissors had some residual glue on the blades that interfered with the cutting. Individual was just back from a European trip and may have been suffering from jet lag. | Better scissors. Not being tired from jet lag. | Get new scissors. | Discuss at unit meeting to review work tasks after return from long trips. | | CATS 5704-1. DUE DATE: 1/31/08; COMPLETION DATE: 1/8/08. Supervisor reported on 1/8/08: (i) the old scissors with the residual glue has been thrown out; (ii) a new safe scissors recommended by James Floyd has been purchased; (iii) Discuss at unit meeting to review work tasks after return from long trips.The case and the proposed actions have been discussed on the optical metrology laboratory meeting. | Cuts and Abrasions due to unidentified/ unexpected hazards. Previously the call to store and dispose sharps properly in work place worked and we did not have any more sharps incidents reported. These incidents of cuts and abrasions are of different nature. Except for the blunt scissors cutting velcro strip case in which the use of inappropriate tool could very well be the cause of injury, the other three cases were mostly caused by unexpected hazards, such as screw holes with sharp edges underneath the desk, the sharp edge underneath a hard drive, and the metal file fastener. | (1) Define work; (2) Analyze hazards; (3) Develop controls; (4) Perform work |
| | | | | Bldg. 80 Room 155 | 11/8/07 | Employee states that she had her hand on the underside of her desk and felt a sharp edge around a punched hole. Her left hand middle finger came in contact with the sharp piece of metal and she obtained a laceration to her finger. She reported to Health Services and was treated and returned to work. | Employee was going to stand up from her workstation and grabbed the front lip of the desk for support. Her fingers came into contact with the exposed edge of a screw hole on the underneath side of the desk which caused a small cut. Normally, this surface is inaccessible due to the presence of a desk drawer. In this case though, the drawer had been removed. | The exposed sharp surface on the underneath side of the desk. | 1. Had the surface been examined at the time the drawer was removed, the newly exposed sharp edge could have been detected and dealt with 2. Possibly, too much effort is required to slide out from the desk causing the need to grab onto it. A floor pad, changed casters, etc. might have removed the need to grab underneath the desk | File down and tape the exposed surface. Inspect other areas of desk for like | Notify other staff of potential problem - agenda item at Safety Committee mtg. | Evaluate need for pad, changed casters, etc. | DUE DATE: 11/30/07; COMPLETION DATE: See below. ACTIONS: (i) File down and tape the exposed surface 11/16/07; (ii) Notify other staff of potential problem - agenda item at Safety Committee mtg. and Safety Circles 12/15/07; and (iii) Evaluate need for pad, changed casters, etc. 1/1/08 EE was moving to a new office with new set of workstation for which a floor pad or new casters might not be necessary. | | |
| | | | | ALS | 1/2/08 | The student employee stated he was lifting a gate valve on a chamber, approximately 60 #'s onto a table when he felt pain in his right upper back area. Earlier in the day he also stated he was pulling a nitrogen dewar and felt alittle pain in his right upper back area. | 3 people were working on vac chamber....CG, a tech, and an engineer. A 50 lbs valve had to be removed. CG removed the valve, the valve was top heavy, and CG tried to stabilize the valve by twisting. This twist was what caused the injury. | ISM was followed in that we had a worked out plan (written). The job was discussed, but not at the level necessary, ie. the logistics of removal of the valve and what could go wrong. | 1) better communication between team members 2) better education of team with respect to issues in dealing with lifting awkward objects 3) better analysis of what can go wrong and mitigating factors; this site doesn't allow changes to days lost / restricted days. 2 days lost, 0 restricted days | communication: discussed with team giving examples | ISM: need to write down/discuss jobs at finer level | discuss need to involve lift experts if in any doubt | DUE DATE: 1/31/08, COMPLETION DATE: 1/31/08. ISM: need to write down/discuss jobs at finer level, need to improve communication (discussed with team giving examples), and need to involve lift experts if in any doubt. ACTION: Instituted more detail work planning by having biweekly discussion meetings with the group. | | |
| | | | | Bldg. 6 Room 2202H According To Employee | 1/15/08 | Employee states that she was putting papers into a file folder and she cut her right finger on the chart fastener. Came to Health Services because supervisor told her to do so. | Employee cut herself on a file while opening file. | | Perhaps more care taken while opening file | Employee has been asked to take care and never to rush | | | DUE DATE: 1/31/08; COMPLETION DATE: 1/31/08. Employee has been asked to take care and never to rush. Group Safety Circle formed and regularly meet to discuss safety topics. | See above Cuts and Abrasions. | Seee above (yellow row) |
| | | | | Bldg. 2 2212 | 1/30/08 | Employee is working at another employee's workstation ~ 2 days a month and recently daily while the employee is off (Bldg. 6 Rom 2-100). An ergonomic evaluation was completed last Friday 1/25/08 and changes have been made. Employee is still experiencing pain and discomfort when working in the temporary work station and has identified that it is also cold and drafty. | Jan 15 the employee was asked to cover the absence of another employee. This involved worked daily at a workstation only previously used for ~2 days per month. The workstation was not immediately adjusted to suit the employee. On Jan 30 the employee reported to Health services complaining of Repetitive Strain Injury UM-UPPER LIMB EXCPT DIGITS Multi/Ill Def; Both hands, elbows, right shoulder, neck and middle back. | Working at a different workstation without adjustment of the workstation. Recommendations from an ergo evaluation on Jan 25 was only partially followed by the employee. | | Supervisor to periodically remind employee to follow ergo recommendations | Employee is receiving physical therapy | | DUE DATE: 2/28/08; COMPLETION DATE: 6/25/08. Employee is receiving physical therapy. EE has been reminded to follow the ergo advice and workstation settings established for her. EE will lead safety circles for the group to help identify potential hazard. | Ergonomics injuries. Actually only one case is the real ergonomic injury, the other two injuries were caused by the design of the furniture, but all happened with a short period of time and in the same office. In order to promote safety mindfulness and the awareness of unusual situations such as increasing workload, working on many different tasks at the same time, or when performing a new task that is outside of normal work scope, a Safety Circle subgroup was established in the group where the injured staff worked so the group could meet frequently to evaluate their workstations, work loads, work practices, etc. | (1) Define work; (2) Analyze hazards; (3) Develop controls; (4) Perform work |
| | | | | Bldg 6, Rm 2212 G | 2/21/08 | On Thursday 2/21/08, I was turning in my chair and slammed my right knee into the desk edge. | The employee hit his right knee against the strut of his workstation while swiveling in his chair. | Presence of low edge to workstation relative to height of employee on chair. Turning rapidly in chair while moving from working on one part of the workstation to another. | A different workstation arrangement or more thoughtfullness when turning chair. | Adjustments have been made to workstation | | | DUE DATE: 4/30/08; COMPLETION DATE: 4/18/08. A different workstation arrangement or more thoughtfullness when turning chair. Adjustments have been made to workstation. | | |
| | | | | Bldg. 6 Room 2212A | 4/17/08 | Employee was sitting at her work station and turned to her side toward the right and hit her left knee against a metal corner or switch box on her vertical workstation. | Employee turned in her chair and hit her knee on the desk height adjust button which protrudes 1 inch below the desk. | The adjust button protrudes below the level of the desk. The employee swiveled quickly in her chair. | | A foam pad has been placed over the adjust button to prevent a hard knock | employee will lead safety circles for the group to help identify potential haz | | DUE DATE: 4/30/08; COMPLETION DATE: 4/30/08. EE will lead safety circles for the group to help identify potential haz. | | |
| | | | | ALS Building 6 Room 2225 | 5/14/08 | The employee stated he was picking up a computer hard drive when he lacerated his right 5th digit on the bottom of the hard drive. | The student was lifting a computer for transporting to SLAC. A sharp edge under the computer body cut his pinky which required first aid bandage. | Unexpected sharp edge. | The students should have paid attention to the sharp edges and wear hand gloves. | Discussion on paying attention to safety and work planning | Gloves are available in the stockroom and lab | | DUE DATE: 5/30/08; COMPLETIION DATE: 5/19/08. Discussion on paying attention to safety and work planning, particular, use of gloves which are available in the stockroom and lab. | See above Cuts and Abrasions. | Seee above (yellow row) |
| | | | | Bldg. 6 Room 457 | 6/11/08 | Employee states that an optical board fell on his right great toe creating a bruise. Came to medical for an initial evaluation and over the counter medication. | Emanuele Pedersoli is a postdoc working on my project. He was doing a completely routine job, storing some bakeout covers in the lab. Where the covers are stored, there was also a small (2x4ftx1inch 20 lbs) optical table; it was stored on end and overbalanced, hitting Emanuele on the foot. He was wearing closed toe shoes. | person concerned was somewhat careless in doing this routine job. optical table in the storage area was not secured. | if we had more space, then we could have a better designed storage area, so that each component in the area would be separately secured. considering that the components are light (typ. < 20 lbs) this was not done. | talked to Emanuele about ways to store components | | | DUE DATE: 7/11/08. COMPLETION DATE: 6/13/08. Discussion with EE took place about ways to store components, desk surface as well as interior space, and general housekeeping. | | |
| | 07/14-2, 07/14-3 | | | B 6, Beamline 80 | 6/16/08 | Employee states she was trouble shooting the motor that moves Manipulator Stage, removed belt, as Manipulator translated downward it pinched her finger between two flat surfaces. | When she was diagnosing the Z motor on the resonant X-ray scattering endstation, the drive belt lined to the pulley had to be removed. After removing the drive belt, the vacuum load pulled down the traveling stage, while her finger was rested between this traveling stage and hard stop. | the orientation of the manipulator during the time of accident was not in the nominal orientation such that she could not use the regular platform on the endstation. | 1. enforce the manipulator to be at the right orientation before performing any repair/diagnosis. 2. construct the hand hold to provide third point contact. | construct the hand hold / Steps. | add administrative control to ensure the right orientation on the manipulator | Written LOTO Procedure And Machine Guarding As Recommended By EHS SMEs | DUE DATE: (i) & (ii) 6/30/08; (iii) 9/1/08; COMPLETION DATE: (I) 6/30/08; (ii) 6/30/08; (iii) 8/29/08. (I) construct the hand hold / Steps. ; (ii) add administrative control to ensure the right orientation on the manipulator; and (iii) Written LOTO Procedure And Machine Guarding As Recommended By EHS SMEs. | Endstation mechanical problems. Both cases called for inspection of the endstations, and adding administrative (operating procedures such as LOTO and machine guarding) and engineering controls (redesign equipment). | (1) Define work; (2) Analyze hazards; (3) Develop controls; (4) Perform work |
| | 08/7-2 | | | B7 Staging Area | 7/28/08 | Employee (a guest researcher) was preparing a time-of-flight chamber end-station for an upcoming run. As the assembly was being rotated around its axis to allow for work inside the chamber, the gear came free from the worm drive and rotated quickly around, eventually coming to rest against a vacuum hose. As it swung around, a part of the component hit the researcher's finger lacerating a tendon. The employee doesn't remember what caused the injury. | Employee needed to access a large attachment that was positioned at the top of the chamber. Using a nut-driver, the employee began to rotate the chamber to position the large attachment 90 degrees (parallel to the floor). The chamber was rotated away from the employee. The chamber was off balance, with a second smaller attachment opposite the larger. When the large attachment was nearly in place, the gear rotating the chamber, and the worm-drive became disengaged. The chamber rotated quickly in the same direction until it caught a bellows. As it rotated uncontrolled, it appeared that the small attachment may have pinched the employee's finger against the nut driver. The injury was a laceration of the skin and tendon of the left index finger. | Off balance rotating chamber, flexion in thedrive shaft, hands too close to the rotating chamber and attachments. | (1) Inspect the endstation and assessing the hazards (2) A second employee may have helped by stabilizing the chamber, reducing the downward force on the worm-drive, which caused the shaft to flex, and disengage the gear from the worm-drive. | Mechanical inspection of end stations will be revised to include explicit criteria (A2B2C01) | Potentially vulnerable end stations will be identified and evaluated with new criteria ahead of the regular annual inspecction cycle (A2B3C02). | | DUE DATE: (I) 10/13/08 & iii) 11/19/08; COMPLETION DATE: (I) 10/7/08 & (ii) ??. (i) ESS expanded to include a Machnical Inspection sheet; and (ii) ?? | | |
| | | | | Sector 4 Staging Area | 7/31/08 | Employee suffered a contusion to his forehead between his eyes when the top of a liquid nitrogen (LN) popped off and hit him between the eyes. | The researcher was preparing to fill a 50 liter LN vessel for subsequent transfer of LN to a smaller vessel. The researcher assumed the 50 liter vessel was empty and checked this by opening the pressure relief valve to see if gas emerged. Oserving no gas, the researcher then began to remove the nut that secured the collar whicht held the cap in place. As the nut was being removed, the cap popped up and hit the scientist in the forehead. A small (~0.5 in diameter) brass fitting on the cap hit the researcher's forehead, broke the skin, and caused some bleeding. | 1. The researcher did not vent the vessel before removing the collar; 2. Instead of a wing nut, the collar was secured with a nut that required a wrench, causing the scientist to bring his head closer to the cap; 3. Because the vessel was considered empty, a face shield was not worn; 4. The restraining chain that held the cap to the dewar was no longer in place; and 5. The warning labels about safe use are in very small font -- difficult to read. | 1. If the cap had had a LN fill tube, there would not have been a need to remove it; 2. If a lower pressure relief valve had been used, there would have been less force driving the cap; 3. Using a safety sheild regardless of whether the vessel had LN present; 4. Venting the vessel with the main valve before opening cap. | Inspected all dewars with removable heads. Those owned by the Lab were verified to have safety chains. Those owned by vendors are now checked by the B7 Crew upon receipt. | Clarified PPE policy to indicate that safety glasses and face shields are now requiredd for pressurized work. | After noticing that the injured person was in HR system as an ALS guest which meant that his non-beamline work was "invisible" to both ALS and PBD, ALS went through all beamlines and approved programs to identify if there are others like this. The ALS User Services Office to identify all personnel belonging to other divisions and to work with HR to correct organizational codes. | DUE DATE: (i) 8/14/08; (ii) 8/25/08, & (iii) 9/30/08; COMPLETION DATE: (I) 7/31/08; (ii) 8/25/08; (iii) 10/3/08. (i) Inspected all dewars with removable heads, also sent a level-1 email to inform all users so any missing ones could be captured; (ii) PPE policy updated in the ALS User Advisory #21 and a level-1 email sent out informing people about this newly revised PPE policy; (iii) ALS User Services Office completed identifying personnel belong to other divisions and corrected organization codes accordingly with HR assistance. | | |

**Briefing Type:** Lessons Learned

**Event:** LBNL Event

**Event Date:** 2/21/08

**Category:** EH&S

**Subcategories:** Health and Wellness

**Lesson Learned No.:** LL08-0009

**Title:** Defective Furniture Design Becomes a Hazard

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## Incident

An employee struck his right knee against the cantilever bracket of his workstation while swiveling in his chair, resulting in a broken knee cap.

The employee's workstation includes a bi-level adjustable computer table in the middle, and two side tables, each with a 5.75-inch high cantilever bracket on the side "sandwiching" the computer table. It is the cantilever bracket of the right side table that the employee's right knee hit. The employee frequently uses a side table (typically the one on the right) to perform paperwork. Current ANSI standards specify a clearance of 26 inches for the knees for tall people (e.g., 95th percentile males). While the overall station complies, these cantilever brackets provide only a 24 inches clearance.

Causes

(1) Presence of a 5.75-inch cantilever bracket on the side table relative to height of employee on chair.
(2) Turning rapidly in chair while moving from working on computer table to the side table.
(3) Using a chair mat underneath a chair that is equipped with special carpet casters (designed to roll easily on carpet) might have added speed to the rolling.

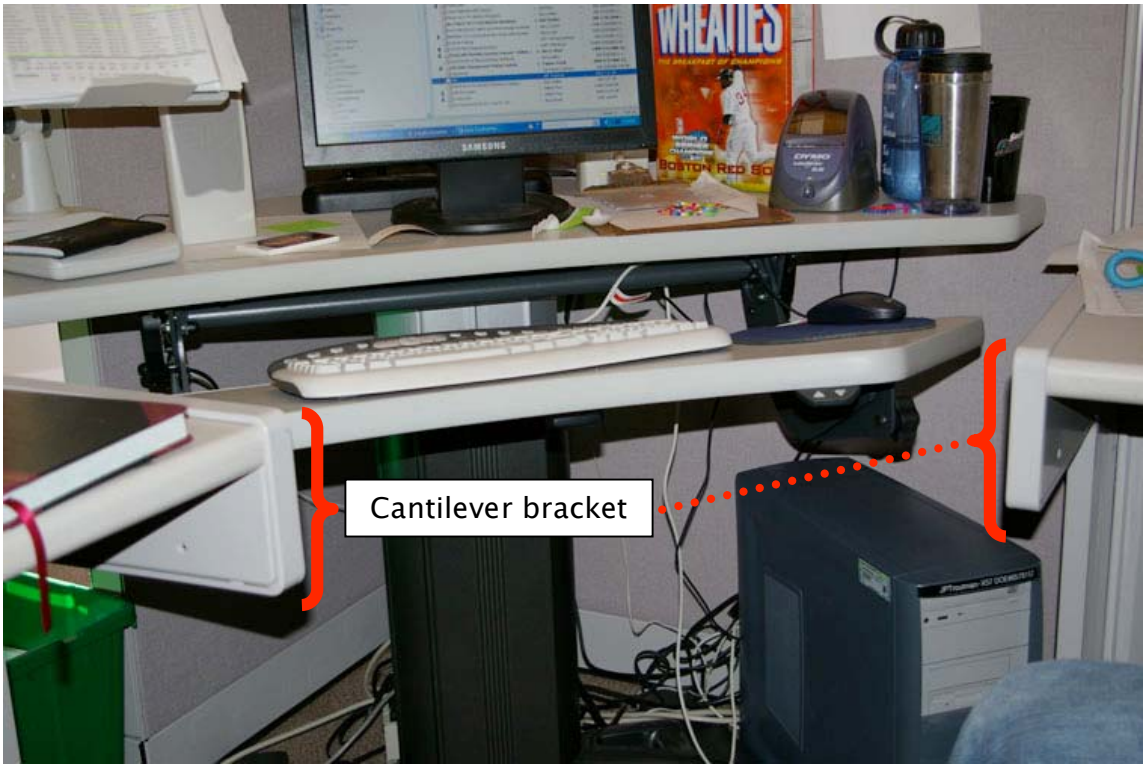
### *Lessons Learned / Recommendations*

(1) Ergonomic evaluations should include evaluation of knee space and free movement under the workstation.
(2) Advocate vigilance about leg movement underneath different work surfaces. People with longer legs will have more problems with certain furniture.
(3) Procure and install office furniture that has been designed and constructed with adequate clearances per ANSI standards.
(4) Chair casters should be matched for the surface on which they will be used. Do not use a chair mat if the chair comes with special carpet casters.

### *Further Information*

Any additional assistance or questions regarding this Lessons Learned may be directed to Mike White (510/486-5818).

***Example of the problematic furniture design (2 photos attached)***



MESH 2006 Review -- ALS findings entered in Issues Management / CATS Database

| Issue No. | Description | CATS | Discovery Date | Issue Type | Risk Level | Entered By | Date Entered | Date Due | Date Completed | Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 5442 | It was unclear to the MESH Team how ALS will adequately support Beamline Scientists in their increased safety responsibilities, particularly those responsible for non-ALS beamlines. | 5442-1: See RSC Report closeout. | 8/1/06 | Worker Safety & Health | Low | Gock, T. | 4/24/08 | 10/31/07 | 10/31/07 | Closed |
| 5443 | ALS ES&H vs. EH&S Division roles are not clearly defined. | 5443-1: See RSC Report closeout. | 8/1/06 | Worker Safety & Health | Low | Gock, T. | 4/24/08 | 10/31/07 | 10/31/07 | Closed |
| 5445 | There is a significant increase in Class-IIIb and Class-IV lasers on the ALS floor. Equipment setup and configuration is often in progress at any time somewhere on the ALS floor, and the safety risk is much higher during these time. Furthermore, the RSC subcommittee recommended a complete review of all ALS laser systems and practices. | 5445-1: Six total Laser AHDs on floor (4 ALS); all are being integrated into the AHD database (with attendant improvements in controls). 5445-2: Standardized laser trainig for users in place. ALS280 online course completed. 5445-3: Added oversight: (i) LSO tours labs regularly and (ii) Floor Operators. | 8/1/06 | Worker Safety & Health | Low | Gock, T. | 4/24/08 | All: 10/31/07 | All: 10/31/07 | Closed |
| 5446 | There is not an adequate system for indicating to users, maintenance personnel and visitors that a specific portion of the beamline is on-line. Hazards vary from beamline to beamline. Workers at adjacent beamlines have no easy way of quickly determining what hazards are present a few feet away. Some method of identifying hazards at the entrance to each beamline should be considered. | 5446-1: Updated Radiation Safety Shutter (RSS) status. See RSC report closeout. *5446-2: VOID (this item was a repeat of 5446-1 and was therefore voided).* 5446-3: Updated to Experiment Setup Sheet posting. In addition to the ESS, a new form containing a summary of hazard information and approval signatures, namely, User Experiment Form (UEF), has been made available for users to complete and post at their beamlines since mid-June of 2008. By beginning of October 2008, close to 100% posting of the UER was achieved. | 8/1/06 | Worker Safety & Health | Low | Gock, T. | 4/24/08 | 5446-1: 10/31/07. 5446-3: 10/1/08 | 5446-1: 10/31/07 5446-3: 10/9/08 | Closed |
| 5447 | Management inconsistently addresses concerns and recommendations made by staff. | 5447-1: See RSC Report closeout. | 8/1/06 | Worker Safety & Health | Low | Gock, T. | 4/24/08 | 10/31/07 | 10/31/07 | Closed |

# 2008 ALS Staff Safety Culture Survey

## Results Overview

zoomerang

Date: 3/19/2008 7:02 PM PST
Responses: Completes
Filter: No filter applied

### 1. Please select your Home Division:

| | | | |
|---|---|---|---|
| Advanced Light Source | | 58 | 50% |
| Accelerator & Fusion Research | | 6 | 5% |
| Engineering | | 35 | 30% |
| Chemical Sciences | | 2 | 2% |
| Material Sciences | | 2 | 2% |
| Physical Biosciences | | 7 | 6% |
| Other | | 5 | 4% |
| | Total | 115 | 100% |

### 2. In the ALS organization, I am primarily part of:

| | | | |
|---|---|---|---|
| Scientific Support (SSG) | | 16 | 14% |
| Experimental Support (ESG) | | 12 | 11% |
| Planning & Administration | | 9 | 8% |
| User Services | | 12 | 11% |
| Operations & Accelerator Development | | 20 | 18% |
| Engineering | | 30 | 26% |
| Other | | 15 | 13% |
| | Total | 114 | 100% |

### 3. I consider myself a:

| | | | |
|---|---|---|---|
| Line Manager/Supervisor/Work Lead | | 36 | 31% |
| Non-Manager | | 79 | 69% |
| | Total | 115 | 100% |

## 4. Safety Culture

| Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option. | Not True | Seldom True | Occasionally True | Mostly True | Definitely True | No Opportunity to Observe |
|---|---|---|---|---|---|---|
| I am comfortable that I am working in a safe environment. | 0<br>0% | 0<br>0% | 7<br>6% | 49<br>42% | 60<br>52% | 0<br>0% |
| In my daily work, I see that safety is a key value at the ALS. | 0<br>0% | 0<br>0% | 7<br>6% | 34<br>29% | 75<br>65% | 0<br>0% |
| I trust there will be no negative repercussions to me if I report an injury to my supervisor or manager. | 3<br>3% | 6<br>5% | 8<br>7% | 22<br>19% | 76<br>66% | 1<br>1% |
| I feel comfortable stopping work if I or my co-workers feel we may be at risk of being hurt. | 1<br>1% | 2<br>2% | 8<br>7% | 24<br>21% | 81<br>70% | 0<br>0% |
| The ALS communicates the lessons learned from accident investigations. | 1<br>1% | 5<br>4% | 13<br>11% | 47<br>41% | 50<br>43% | 0<br>0% |
| The ALS safety programs adequately address safety issues at the ALS. | 0<br>0% | 3<br>3% | 7<br>6% | 55<br>49% | 44<br>39% | 4<br>4% |

## 5. Line Management Commitment

| Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option. | Not True | Seldom True | Occasionally True | Mostly True | Definitely True | No Opportunity to Observe |
|---|---|---|---|---|---|---|
| ALS senior managers are personally committed to supporting safe work practices | 0<br>0% | 1<br>1% | 9<br>8% | 37<br>32% | 64<br>55% | 5<br>4% |

| | | | | | | |
|---|---|---|---|---|---|---|
| My supervisor gives me feedback on my safety performance throughout the year. | 2<br>2% | 4<br>3% | 22<br>19% | 34<br>29% | 48<br>41% | 6<br>5% |
| My supervisor checks/inspects my work area at least quarterly to make sure it is safe and adheres to environmental policies and procedures. | 6<br>5% | 8<br>7% | 19<br>17% | 32<br>28% | 40<br>35% | 10<br>9% |
| My supervisor/work leader clearly explain safety and safe work expectations to me. | 4<br>3% | 3<br>3% | 12<br>10% | 41<br>35% | 51<br>44% | 5<br>4% |
| It is clear that my supervisor puts safety concerns first. | 1<br>1% | 5<br>4% | 7<br>6% | 31<br>27% | 70<br>60% | 2<br>2% |

## 6. Work Group Safety

| Top number is the count of respondents selecting the option.<br>Bottom % is percent of the total respondents selecting the option. | Not True | Seldom True | Occasionally True | Mostly True | Definitely True | No Opportunity to Observe |
|---|---|---|---|---|---|---|
| I know how to report workplace hazards | 0<br>0% | 0<br>0% | 5<br>4% | 36<br>31% | 74<br>64% | 1<br>1% |
| Safety equipment is available in my work area. | 0<br>0% | 0<br>0% | 3<br>3% | 27<br>23% | 80<br>69% | 6<br>5% |
| I routinely wear my safety equipment as required. | 0<br>0% | 0<br>0% | 2<br>2% | 22<br>19% | 80<br>69% | 12<br>10% |
| In our workgroup, each person is fully trained to do his/her job safely. | 0<br>0% | 0<br>0% | 8<br>7% | 34<br>29% | 67<br>58% | 7<br>6% |
| People in my group are appropriately trained in the task-specific procedures. | 0<br>0% | 1<br>1% | 8<br>7% | 30<br>26% | 72<br>62% | 5<br>4% |
| I feel that my co-workers put safety concerns first. | 0<br>0% | 1<br>1% | 8<br>7% | 44<br>39% | 60<br>53% | 1<br>1% |
| I feel comfortable reporting a near miss or safety concern to my manager/supervisor/PI | 3<br>3% | 4<br>3% | 7<br>6% | 25<br>22% | 74<br>64% | 2<br>2% |

| | | | | | | |
|---|---|---|---|---|---|---|
| My group has a periodic safety meeting, which I attend. | 3<br>3% | 7<br>6% | 7<br>6% | 18<br>16% | 79<br>68% | 2<br>2% |
| I find my group's safety circle informative and useful. | 1<br>1% | 3<br>3% | 18<br>16% | 34<br>30% | 47<br>42% | 10<br>9% |
| We regularly talk about safety mistakes or near misses as opportunities to learn rather than to find fault or fix blame. | 1<br>1% | 7<br>6% | 13<br>11% | 33<br>29% | 55<br>48% | 5<br>4% |

## 8. Personal Safety

| Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option. | Not True | Seldom True | Occassionally True | Mostly True | Definitely True | No Opportunity to Observe |
|---|---|---|---|---|---|---|
| I understand what Integrated Safety Management (ISM) is and I use the 5 functions to evaluate my work before starting a job. | 3<br>3% | 1<br>1% | 9<br>8% | 35<br>30% | 66<br>57% | 2<br>2% |
| I am trained in the use of any hazardous materials I work with, which includes knowing how to handle an accident, and follow proper labeling, storage and disposal procedures. | 2<br>2% | 0<br>0% | 5<br>4% | 25<br>22% | 68<br>59% | 15<br>13% |
| I know what electrical equipment I can and cannot work on. | 0<br>0% | 0<br>0% | 2<br>2% | 20<br>17% | 87<br>75% | 7<br>6% |
| I have the resources necessary to do my job safely. | 0<br>0% | 0<br>0% | 3<br>3% | 24<br>21% | 89<br>77% | 0<br>0% |
| I have a good ergonomic setup for the workstations I use. | 3<br>3% | 5<br>4% | 9<br>8% | 43<br>37% | 56<br>48% | 0<br>0% |
| I am free of discomfort caused by computer use | 5<br>4% | 4<br>3% | 12<br>10% | 40<br>34% | 53<br>46% | 2<br>2% |

| | | | | | | |
|---|---|---|---|---|---|---|
| and repetitive use of other tools. | | | | | | |
| I know what to do and who to call for various emergencies (or know where to easily find the information) | 0<br>0% | 0<br>0% | 4<br>3% | 32<br>28% | 80<br>69% | 0<br>0% |

## 9. Policies and Procedures

| Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option. | Not True | Seldom True | Occasionally True | Mostly True | Definitely True | No Opportunity to Observe |
|---|---|---|---|---|---|---|
| I know how to find ALS current policies and procedures, as they apply to my work. | 1<br>1% | 2<br>2% | 15<br>13% | 30<br>26% | 66<br>57% | 2<br>2% |
| Safety policies and procedures are clear and understandable. | 0<br>0% | 5<br>4% | 12<br>10% | 45<br>39% | 48<br>41% | 6<br>5% |
| I am made aware of new or revised procedures that apply to my work. | 1<br>1% | 4<br>3% | 16<br>14% | 36<br>31% | 54<br>47% | 5<br>4% |
| ALS EHS policies and procedures help me control safety and environmental hazards in my work. | 0<br>0% | 3<br>3% | 15<br>13% | 37<br>32% | 55<br>47% | 6<br>5% |
| Radiation safety practices and procedures have improved in the past two years. | 0<br>0% | 1<br>1% | 7<br>6% | 27<br>23% | 58<br>50% | 22<br>19% |
| I can have input into policies & procedures that affect me (if I want to). | 0<br>0% | 3<br>3% | 14<br>12% | 31<br>27% | 56<br>49% | 10<br>9% |

## 11. Staffing

| Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option. | Not True | Seldom True | Occasionally True | Mostly True | Definitely True | No Opportunity to Observe |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| The ALS has sufficient qualified staff deployed in key safety postions to maintain safe operations. | 4<br>3% | 3<br>3% | 11<br>10% | 47<br>41% | 42<br>37% | 8<br>7% |
| The ALS is utilizing its human resources well for safety. | 3<br>3% | 2<br>2% | 8<br>7% | 48<br>42% | 39<br>34% | 14<br>12% |

## 12. Training

| Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option. | Not True | Seldom True | Occasionally True | Mostly True | Definitely True | No Opportunity to Observe |
|---|---|---|---|---|---|---|
| General safety training has improved safety awareness and knowledge in the past 2 years. | 0<br>0% | 2<br>2% | 9<br>8% | 37<br>32% | 55<br>48% | 11<br>10% |
| Radiation safety training has improved safety awareness and knowledge in the past 2 years. | 0<br>0% | 2<br>2% | 11<br>10% | 27<br>24% | 57<br>50% | 17<br>15% |
| Safety training is appropriately tailored to the needs of each group. | 2<br>2% | 1<br>1% | 12<br>11% | 48<br>42% | 40<br>35% | 11<br>10% |
| Safety training adequately addresses safety issues at the ALS. | 1<br>1% | 3<br>3% | 6<br>5% | 60<br>52% | 42<br>37% | 3<br>3% |

## EH&S Services

## 14. I know who to call (or can easily find out) if I have a question about environmental protection or worker health and safety.

| | | | |
|---|---|---|---|
| Not true | | 1 | 1% |
| Seldom true | | 0 | 0% |
| Occasionally true | | 5 | 4% |
| Mostly true | | 42 | 36% |

| | | | |
|---|---|---|---|
| Definitely true | | 68 | 59% |
| | Total | 116 | 100% |

**15.** **The ALS EHS Manager (Jim Floyd), his staff and other technical safety experts effectively help me meet EHS responsibilities.**

| | | | |
|---|---|---|---|
| Not True | | 0 | 0% |
| Seldom True | | 1 | 1% |
| Occasionally True | | 5 | 4% |
| Mostly True | | 29 | 25% |
| Definitely True | | 79 | 69% |
| | Total | 114 | 100% |

**16.** **Have you contacted the ALS EHS Manager during the past year?**

| | | | |
|---|---|---|---|
| Yes | | 84 | 72% |
| No | | 32 | 28% |
| | Total | 116 | 100% |

**17.** **If so, was the ALS EHS Manager helpful and knowledgeable in answering your questions?**

| | | | |
|---|---|---|---|
| Not True | | 0 | 0% |
| Seldom True | | 1 | 1% |
| Occasionally True | | 3 | 3% |
| Mostly True | | 16 | 17% |
| Definitely True | | 72 | 78% |
| | Total | 92 | 100% |

**18.** **Are there safety issues that the ALS is NOT adequately addressing?**
If yes, please give specifics in the following comments section.

| | | | |
|---|---|---|---|
| Yes | | 18 | 17% |

| | | | |
|---|---|---|---|
| No | | 90 | 83% |
| | Total | 108 | 100% |

**End of Survey**



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Minutes of the March 26, 2008 ALS Division Safety Committee meeting covering detailed summary of the responses collected from the ALS Safety Culture Survey.

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**ALS Division Safety Committee**

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**March 26, 2008**

**MEETING SUMMARY**

1) Tennessee Gock introduced invited speaker Nadia Tarlow from the *Remedy Interactive*, a supplier of software solutions that help prevent workplace injuries.

PRESENTATION ON ONLINE ERGONOMIC SYSTEM (OES)
(By Nadia Tarlow, *Remedy Interactive*)

OES is a flexible web-based solution that helps reduce injury rates and costs by up to 40 percent. With the OES, corporations can identify risk of workplace injury proactively, automate injury prevention activities, and track and analyze the results of these initiatives to reduce workers' compensation costs and improve operational efficiencies.

OES's customers include Chevron, HP, IBM, MIT, and 17 UC campuses. A short while ago, Berkeley Lab acquired OES and the Lab's ergo team helped customize the OES to address the Lab culture. The customized program is now a new training course entitled "Ergo Self-Assessment for Computer Users" (EHS0059), required to be taken by employees who answer "Yes" to the question "Do you use a computer for more than an average of 4 hours/day?" in the Job Hazard Questionnaire (JHQ).

The new training course, EHS0059, is essentially an ergonomics program that contains the following components:

i) Assessing individual ergo risk by gathering information on workstation setup, postures (including body posture, arm/shoulder and hand/wrist postures in relation to a keyboard and mouse), and work patterns (such as individual daily computer usage).

ii) Providing ergonomic education (with tools and techniques, see details below on one of the tools, RSIGuard) that increases employee postural awareness, improves workstation setup and teaches specific micro-break stretches.

iii) Empowering individuals to self-correct.

iv) Reassessing adjustments made and updating individual profile.

v) Providing immediate feedback to individuals via email, identifying ergo risk level (low, moderate, or high), along with a summary of identified risks and personalized recommendations. The Lab's ergo team (including division ergo advocates) uses risk level as an indicator to better assist individual needs. This risk-based assessment also includes a Discomfort module which, when positively identified, will be given immediate attention.

vi) Providing follow-up to moderate and high risks individuals over time. Supervisors of those individuals will also be informed via email at 30 days and 60 days so they could offer assistance to resolve their employees' ergo issues.

The course (self-assessment and training) takes about 40 minutes to complete and it can be done in multiple sessions. If you are interrupted during your session, it will automatically save your responses for completion at a later time. A password must be obtained from *Remedy Interactive* before logging in for the first time. Once requested (with an email address), a password will be emailed within minutes. In order to receive training credit, be sure to see the "Congratulations!" page that confirms completion of the course.

The Lab should expect the following benefits from this training:

i) Employees learn techniques that can be used to make a workspace more comfortable and ergonomically fit.
ii) On-the-job repetitive strain injuries (RSI) reduced and prevented.
iii) Employee satisfaction increased and work-related stress decreased.
iv) Costs related to Workers' Comp or work loss would be cut dramatically.

The IT Division, a participant of the OES pilot program at the Lab, has shown significant reductions in their staff's risk levels, as shown in their Division Progress Report on *Remedy Interactive* Ergo Self-Assessment conducted from July to December 2007.

Tarlow introduced RSIGuard as a highly customizable ergonomic software available from the LBNL software downloads page that helps prevent repetitive stress injuries (see handout on setup instructions). Ken Woolfe stated that he started using software and found it to be quite helpful. He noted that the RSIGuard is not the typical stretchware—It is an intelligent break software that not only teaches us to take regular breaks from using the computer and to do stretches, it also delivers customized behavioral reminders to our desktops. In addition, it offers:

i) Strain Exposure Reduction Tools --
   - Autoclick, which eliminates the need to do two of the most injury-inducing computer activities: grasping and clicking the mouse;
   - KeyControl, which allows a user to perform mouse operations, open files or applications, type common text, or perform other repetitive tasks with a single keypress.

ii) User's Work Pattern Study Tool:
   - DataLogger-- RSIGuard collects extensive information about the way a user is using the computer through both automatic observations and optional survey methods;

Getting back to the required course EHS0059, which will supersede EHS0060: Awareness for Computer Users, Mike Kritscher commented that in Engineering Division, it has become a required course for everyone, without the identifier in JHQ (i.e., 4 hours or more on the computer). Floyd expressed the desire of doing the same thing at the ALS, if feedback is positive.

Ben Feinberg commented about laptop use at home and staff having multiple workstations at work that include desktop computer, laptop, and experimental or developmental system. Someone asked if the ergo self-assessment course could be taken again for a second workstation. Tarlow replied that at this point one can only evaluate one workstation (unless a different email address is used), but the system does ask questions of everyone regarding secondary laptop use. She took note and remarked that she would take these concerns/feedback to discuss with the Lab's ergo team.

Gock noted that at the moment the Lab's ergo system continues to generate ergonomic evaluation requests for new employees and employees who have a new workstation due to physical move, etc. Once this required course is in use and data are collected to identify the ergo risk level of individual employees, ergo evaluation needs will be reduced to target only those who are identified as having moderate and high risk.

Gock questioned if after the adjustments it is determined that certain ergo accessories need to be procured, how we are going to do that with tight budget situation this year. Feinberg responded that the division should have funding allotted to address ergonomic needs. Tarlow echoed that it would be wise to invest on preventive measures than to have to spend bigger money on fixing more serious problems due to ergo issues.

2) Lessons Learned

i) A Lessons Learned handout on "Defective Furniture Design Becomes a Hazard" was distributed at the meeting. Jim Floyd noted that it was about an employee striking his right knee against the cantilever bracket of his workstation while swiveling in his chair, resulting in a broken knee cap, which became a DOE-Reportable case. Floyd remarked that there are still a number of these types of furniture on the hill.

ii) Floyd continued with the report of an electrical shock incident which took place a few weeks ago on a Saturday morning, in the Electronics Maintenance (EM) Shop at the ALS. The event occurred while a technician was diagnosing a problem with a controller in the EM shop. At some point he inadvertently touched a live component with his left middle finger. The Fire Department was called and responded immediately. Routine tests were conducted and it was decided that the employee was in good enough shape that a trip to the hospital was not necessary. The incident became a DOE-Reportable. Warren Byrne asked what made it a "reportable" incident. Floyd replied that it was reportable because the hazardous level of energy was >50 volts.

iii) Another lessons learned Floyd would like to share with the committee members is a case of radiation shutter design for BL 6.0.2 PSS202 that did not conform to our standards. The designer and beamline scientist were not mindful about radiation safety devices having to meet specific, exacting requirements and that each new design must be thoroughly reviewed by a Technical Safety Committee. Tony Young questioned why it was at all possible for this situation to happen, since everything was supposed to go through the process of Beamline Design Review (BDR) and Beamline Readiness Review (BRR). Feinberg commented that the Beamline Design Guide was out of date but did specify this requirement: "Beamline designers are required to use an ALS design for personnel safety shutters (PSS)".

Woolfe noted the need to re-communicate this requirement to all parties involved and that Bob Mueller is in the process of defining more explicit guidelines stating the need to use only approved ALS designs in radiation safety systems, specifying what those designs are, and also providing a list of standard features required on a PSS in case someone does want to vary from existing design (after technical approval). Mueller is also reviewing current designs and recommending improvements, particularly for the MDC-built hutch shutters. He is also considering a yearly physical inspection of shutters. Woolfe mentioned that the review process did work, as it did catch the error still within the process. However, it would have been better to catch and prevent the problem earlier in the process to avoid the need for removal and rework of the shutter to meet our standards.

Lesson learned here: To implement and communicate the requirements for using ALS-approved radiation safety system designs and components and, through the beamline review process, to ensure a full technical review and approval of any deviation from the standard.

Floyd noted that he would like Lessons Learned to be a regular agenda item in future safety meetings. He invited committee members to let Tennessee know if there is any lesson learned they want to share in future meetings.

3) ALS Staff Safety Culture Survey

PRESENTATION ON ALS STAFF SAFETY CULTURE SURVEY RESPONSES - 2008
(By Ken Woolfe)

A number of corrective actions were identified from the Radiation Safety Committee Report dated January 2006. Since then, ALS has been working hard on implementing the corrective actions and making improvements. The purpose of the ALS Staff Safety Culture Survey is to find out how the ALS staff view our current safety status. Staff and beamline associates were polled for a period of 6 weeks, from February 6 to March 14, 2008. We have a response rate of 40%, which is considered high for a survey. Participants were made up primarily of ALS staff (50%) and Engineering staff (30%), with small percentages from AFRD, Physical Biosciences, Chemical Sciences, and Material Sciences. Seventy percent (70%) of the participants identified themselves as non-managers and 30% managers or supervisors. The following topics were covered: safety culture, line management

commitment, work group safety, personal safety, policies and procedures, staffing, training, EHS services. Comment sections were also included.

Response Overview

Factoring out "No Opportunity to Observe", here are the response percentages of the two most positive answers combined (Mostly True and Definitely True) under each topic:

- Safety Culture (80-90% positive)
- Line Management Commitment (70% positive)
  Comments: *Issues with Manager feedback on safety and inspecting work.*
- Work Group Safety (80-90% positive)
  Comments: *Issues with usefulness of Safety Circle and talking about mistakes without getting blame.*
- Personal Safety (80-90% positive)
  Comments: *Issues with ergonomic discomfort.*
- Policies and Procedures (80% positive)
  Comments: *Issues with keeping up-to-date on policy/procedure revisions, and what policies apply to work.*
- Staffing (80% positive)
  Comments: *Concerns with staffing levels.*
- Training (80% positive)
  Comments: *Concerns with radiation safety awareness/training, lack of tailored training to the group.*
- EHS Services (95% positive)
  Note: *Over 70% of staff had contact with EHS Manager during the past year.*
- Final question: Are there safety issues that the ALS is NOT adequately addressing?
  *Seventeen percent (17%) answered "Yes" (issues need attention) and 83% answered "No" (safety issues being adequately addressed).*

Comments

*Positive*

i) Floor Operators add a safety net;

ii) EPS upgrades are welcome;

iii) Improvements made at the Procedures Center are good;

iv) Feel comfortable making suggestions to improve procedures and safety;

v) Culture changes have made people more aware of safety;

vi) Procedures are clearer, and people seem to be following them better;

vii) In spite of specific concerns, still feel grateful for the many strengths in the systems that support ALS safety.

*Major Concerns*

i) Reassignment of Brian Fairchild [former Radiation Control Technician (RCT) at ALS] and loss of ALS-specific radiation safety expertise;

ii) Whether safety awareness can be maintained in the future, particularly with significant numbers of well-trained staff retiring in the coming years and possible management changes;

iii) Staffing levels, particularly EMs. Loss of a few critical people could compromise safety;

iv) Training too rushed—not enough focus on real understanding;

v) Design, construction, or modification of Beamline or endstation is not managed well for all of the associated hazard;

vi) Specific procedural and radiation safety improvement have been made, but a fully integrated approach to assessing and mitigating radiation hazards does not seem to be happening.

*Other Concerns*

Some of the concerns (marked with *) are in the process of being addressed:

i) Noise on ALS floor;

ii) Water leaks from outside and equipment—do not know how to handle them;

iii) Ergonomic stresses*;

iv) Experimental samples brought in without informing ALS in advance*;

v) Unnecessary training of user on hutch use when they do not work at hutched beamlines*;

vi) Emergency contact list is out of date*;

vii) Need better visibility window in doors between lobby & ALS floor;

viii) Parking regulations unclear around B80;

ix) Cyclists riding bikes on the patio between B2 and B6;

x) Hostility in the workplace.

<u>Summary</u>

*Overview*

i) ALS staff generally feel we are doing a good job at safety—about 80% positive overall;

ii) Staff at all levels were perceived to be highly committed to safety;

iii) Floor Operation staff are significantly strengthened;

iv) EHS manager is working well to help staff with safety issues;

v) Safety culture, awareness, policies and procedures are moving in the right direction;

vi) ALS is mostly open to suggestions for improvement;

vii) Improvements have been made to specific safety systems such as hutch interlocks, EPS displays;

viii) The Procedures Center is helping to ensure training completion.

*Concerns*

i) Staffing levels are marginal to maintain safety;

ii) Any loss of safety expertise with transfers and retirements may compromise safety;

iii) Loss of strong safety leadership could result in backsliding;

iv) Training should be appropriate to the group and focused on real understanding;

v) ALS should focus on controlling hazards, not just checking boxes on procedure (although it can help);

vi) Ergonomic discomfort is still a problem.

Discussion

i) Woolfe noted that people's concern about Brian Fairchild's departure is understandable, since it will take time for our new RCT Bill Rowley to gain institutional knowledge. Kritscher commented that Bill did a good job at BL 9.0.1 conducting radiation survey. Floyd invited people to communicate any specific examples of problems or concerns related to Brian's departure.

ii) In response to several of the survey comments, Woolfe remarked that we should look at the functions and responsibilities of our various safety committees: Beamline Review Committee, Technical Safety Committee, Staff Safety Committee, Division Safety Committee, Safety Circles, and Mechanical Design Reviews, etc., to be sure that they integrate well in the oversight of safety issues.

iii) Floyd added that he and Woolfe are hoping to develop some action items after careful review of the survey responses. New survey would be offered again next year, may be with different or additional questions.

iv) Woolfe remarked that we are heading in the right direction; getting feedback on how we are doing and making sure that we are maintaining the safety standard are exactly what the last McCallum Turner audit had recommended.

v) Woolfe offered to give summary talks on the survey result in Safety Circle meetings; he invited people to contact him if interested.

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Minutes of several ALS Division Safety Committee meetings covering planning and discussion of the Self-Assessment 2008 at the ALS:

April 30, 2008

June 25, 2008

July 30, 2008

August 27, 2008

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# Meeting Minutes

ALS Division Safety Committee meeting dated April 30, 2008

## ALS Division Safety Committee

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**April 30, 2008**

**MEETING SUMMARY**

1) Lessons Learned

   i) Jim Floyd mentioned that during a recent work planning meeting for the upcoming shutdown, there was a discussion about taking out the entire mirror behind the shield wall at Beamline 5.0.2, M2.0.1. This led to a follow-up in-depth review as to which type of shielding change form (SCF) is needed when components are moved or modified in the beamline front-end. After a meeting with the presence of the Radiation Physicist, the Radiological Control Technician, the EHS Program Manager, and representatives from both the Accelerator Operation and Floor Operation, it was decided that a Beamline SCF will be required when the component(s) in question will affect downstream delivery of X-rays. An Accelerator SCF will also be required if any of the front-end bremsstrahlung shielding (BS) is being moved. This allows for a clean separation of activities necessary for Accelerator start-up (BS shielding) and Beamline start-up (internal optical components). Lessons Learned: There was a lack of clarity in the requirements and responsibilities for front-end shielding work. Understanding the scope of work is essential to properly identify which form should be used. In some cases, both an accelerator and a beamline shielding control form may be required. In such cases, close coordination between the two groups (Accelerator Operation and Floor Operation) will be necessary and advance planning is recommended.

   ii) Jerry Kekos noted that his staff were cleaning the back of Building 7 in preparation of housing beamline endstation staging when they saw some left-over mastic from the previous linoleum flooring on the ground. Before attempting to remove the mastic, his staff consulted Facilities and invited them to the location. Upon examination of the floor, the Facilities worker indicated that he would not have time to help scrape off the mastic; instead he gave Kekos' staff a tool and told them that they could do the job themselves. As it turned out, the mastic contained asbestos fibre. Lessons Learned: ALS material handlers will obtain awareness training in lead, asbestos, and other common facility hazards since their tasks periodically involve coming into contact with these materials. This will give them a technical foundation to better understand and evaluate answers from Facilities staff when working with them.

iii) Sue Bailey stated that her office, the User Services Office, has a few first-aid recordable/reportable cases within the last 3 months. First a staff member had a paper cut, then another staff's ergonomic issue turned into a more serious case while working at a different workstation to back up a co-worker who was on medical leave. A third case involved a fractured knee cap from hitting the cantilever of a side table, which became a DOE-reportable case. The most recent case was another knee injury caused by hitting the control panel underneath an adjustable computer table. Lessons Learned: (1) Employee has to recognize responsibility of own safety and take control of own work environment; (2) It is the supervisor's job to remind his/her staff of that responsibility; and (3) Employee should be more vigilant with situations such as increasing workload, working on many different tasks at the same time, or when performing a new task that is outside of normal work scope. To implement this, a Safety Circle subgroup (led by Olga Poblete) will be established within the User Services Office so the group can meet frequently to evaluate their workstations, work loads, and work practices, etc.

Floyd reminded Committee members to let Tennessee Gock know if they have lessons learned to share with other members and their Safety Circles.

2) FY08 Division ES&H Self-Assessment

Two handouts were distributed to Committee members: (1) Guidance for performing FY08 ES&H Division Self-Assessment and (2) Section 4.1.2 Planning Self-Appraisals from the *Division ES&H Self-Assessment Manual*; both prepared by the Lab's Office of Contract Assurance (OCA).

Floyd remarked that last year's self-assessment saw a shift from institutional to division-specific. Continuing in the same direction, he asked Committee members to have a larger perspective, i.e., think of self-assessment in functional areas (or groups) in addition to the physical inspections like the ones conducted by the Quality ES&H Self-Assessment Teamwork (QUEST) teams last year. He also suggested for them to review the steps listed under "Planning Self-Appraisals" (Section 4.1.2 of the SA Manual), such as the following:

- Review Division-specific requirements of the division ISM Plan.
- Review the goals and opportunities for improvement identified in the prior year's division self-assessment and OCA validation reports.
- Review the Division ES&H Self-Assessment Performance Measures to determine how they apply to the division's operations.
- Identify actions the division will implement towards satisfying each applicable criterion and determine the method(s) needed to appraise the effectiveness of implemented actions (e.g., inspections and review of documentation).
- Create division checklists by using the LBNL Safety Walkaround Checklist and other resources.

- Arrange for “on-the-job” training (i.e., in the workplace) from the EH&S division liaison and/or subject matter expert to learn how to look for deficiencies and how to determine the appropriate corrective action.
- Designate the self-appraisal teams and schedule appraisal team activities.

Floyd asked Committee members to share the two handouts with their Safety Circles; he invited feedback and suggestions for this year’s self-assessment.

3) Job Hazard Analysis (JHA)

With help from John Seabury of EH&S, a number of work groups were created and work lead and workers from individual groups have been holding JHA development work sessions (with Seabury as Facilitator) to discuss and validate the identified tasks, hazards, and controls. Floyd reported that a few ALS associate beamline scientists volunteered to work with him and Seabury to develop a JHA for their work group; they were half way through and have one more meeting to finish up all the questions. After this work group, Floyd will start working with other ALS functional groups, such as the Beamline scientists, the Floor Operation, and the Accelerator Operation, etc. to develop a JHA for each group. Floyd also plans to talk with Weyland Wong from Engineering Department for a JHA of the work group comprising Engineering staff working at the ALS.

The JHA, scheduled to replace the Job Hazard Questionnaire (JHQ) this summer, has a similar look as the JHQ. Questions are prefilled and members of the work group decide which questions to keep or remove. When a hazard is identified, the software allows input of precautions and controls, including reference of an Activity Hazard Document (AHD) or ALS procedure, etc.

Also, like the JHQ, required training will be generated. For example, one of the questions: “Do you perform work at the ALS?”, when answering “Yes” to it will generate training requirement of ALS1001 Safety at the ALS (which replaces the old video and incorporates the ALS5001 Radiation Awareness Training) and a new course ALS1004 “Access to the ALS” (soon to be rolled out to replace the requirement of reading the ALS procedure HP 02-01 with the same title).

Each Group Baseline JHA constitutes self-authorized work scope for each work group. In the future, a Task-Specific JHA will be used to authorize unpredictable, short-term, or unusual work that is not included in the Individual or Group Baseline JHA.

The JHA software also generates a summary listing all questions/hazards identified for that work group, as well as all the controls and precautions necessary for the jobs to be performed, including the required training and personal protection equipment (PPE). Ken Woolfe remarked that the new JHAs will address the comment about “training not tailored to the group’s need” identified in the recent ALS Safety Culture Survey.

JHA addresses requirements from 10CFR851 for formal job hazard analysis for employees/guests at all DOE facilities. LBNL has committed to having 75% of all workers complete their JHA by the end of September 2008.

4) Roundtable discussion:

   i) Woolfe noted that the summary of ALS Staff Safety Culture Survey results is posted on the ALS Safety website.

   ii) Gock mentioned that the fire alarm incident on April 9th at around 5 pm revealed the issue of lacking of Building Emergency Team (BET) members at late hours. She intended to convene with Will Thur, the ALS Building Manager / Facility Coordinator, to evaluate the list of existing BET members and their work hours. Someone added that we should also come up with some instructions on what to do in responding to emergency when there is no BET member around.

   iii) Floyd talked about the Lab's plan to allow access of a non-medicinal first-aid kits by employees at various Lab locations, but under a control mechanism monitored by the Health Services (HS) at Building 26. This is how it works (using B26 as an example): A proximity access box is installed next to the first-aid kit outside of the Medical Building (B26). Anyone who has a Lab I.D. Badge can access the first-aid kit by swiping the badge through the proximity access box next to the kit. Record of access is being sent to the HS, and a staff from the HS will do a follow-up during office hours. The kit at B26 is activated only between 3:30 am to 7 am, since HS still wants people to go inside B26 for consultation in case of injury, however minor it might be. ALS with its many users and staff working 24/7 will be one of the first locations that will house a first-aid kit. We intend to place a non-medicinal first-aid kit inside the Control Room (CR) and allow only the CR Operators to access the kit and distribute the items from the kit. There will be a log to record the name of the employee/guest who is given a band-aid or any item from the kit. We would like the ALS CR to have control over this matter since the CR Operators are trained staff and will make a good judgment on whether the injury is minor enough to not require immediate medical attention.

   iv) Gock showed the revised version of the newly issued Emergency Response Guide (2008-2010), customized for ALS use with extra contact phone numbers. She remarked that the original distribution of the guides was done in such a non-systematic way that it is not clear who the recipients are, e.g., some individuals received the guide and most mail stops got a stack of the guides sitting in the mail area. She has since sent out a level-1 email to ALS staff and associates, asking them to return their Lab version ones to exchange for the revised ALS version ones. She is also planning to deliver the revised ALS version to each beamline early next week.

# Meeting Minutes

ALS Division Safety Committee meeting dated June 25, 2008

# ALS Division Safety Committee

## June 25, 2008

### MEETING SUMMARY

1) Berkeley Site Office Changes

Neil Landau is retiring and will be replaced by Salma El-Safwany. She has nuclear and radiation safety expertise, recently with LLNL. There is some uncertainty about who will have what responsibilities related to LBNL in the BSO.

In BSO, strong focus is currently on validating that LBNL ISM plans are in place and effective. This ISM focus has taken precedence over most other issues. ISM policy must be clearly communicated and working, even if some science is curtailed until this is accomplished. This was the reason for the recent division safety meetings explaining and reinforcing ISM. Final validation of ISM compliance must be completed and documented by Fall 2008.

2) Lessons Learned

Jim described a finger pinch incident involving troubleshooting of a vertical manipulator at BL8.0. No treatment was required for this near miss, but Jim and the experimenter are looking at how to avoid this type of incident in the future.

3) 2008 Self-Assessment (SA) Process

Jim presented a different approach to doing SA than in the past. Instead of teams looking at facilities and workplaces, teams would look at ALS processes and areas of concern (see attached list). Examples are shielding control, interlocks, work planning, training and procedures, ISM roles, safety documentation, experimental safety sheets, and safety communication, etc.

The meeting attendants were generally positive about this new approach and pointed out that it was worth trying but would take some trial and error since it is new.

Suggestions were made about how to form the teams for each subject of interest. Who should be on a particular team? There was broad consensus that teams should have some subject matter experts, some people with only cursory knowledge of the area of concern and possibly some end users of the systems involved.

The next question discussed was how to do this type of assessment. Possible ways to approach it mostly involved interviewing people involved with or using the systems and analyzing any available data sets. Interview could be done individually, in focus groups or/and in safety circles.

Jim mentioned that since this would be a new process, a number of different approaches could be tried with refinements next year as we gain feedback on what works best.

# Meeting Minutes

ALS Division Safety Committee meeting dated July 30, 2008

**ALS Division Safety Committee**

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**July 30, 2008**

**MEETING SUMMARY**

1) Lessons Learned

Jim Floyd reported an accident happened early afternoon on Monday, July 28th. A guest researcher was preparing a time-of-flight chamber end-station for an upcoming run. As the assembly was being rotated around its axis to allow for work inside the chamber, the gear came free from the worm drive and rotated quickly around, eventually coming to rest against a vacuum hose. As it swung around, a part of the component hit the researcher's finger lacerating a tendon. He was transported to a local hospital where he underwent surgery the next day. The researcher was doing well and returned to work on Wednesday, July 30th.

Lessons Learned: All employees should think about the hazards of each task and the controls needed to make the work safe, even for tasks that we have done many times before. At the ALS, we perform a broad range of very complex work, and very subtle problems can have the potential for serious injuries. Ultimately the only way we can assure our safety is if each of us is dedicated to fully integrating safety into our work practices.

2) Job Hazard Analysis (JHA)

Floyd reported that several group JHAs have been developed and senior managers have been given orientation so they can train/instruct their staff to fill out a JHA. All staff members as well as long-term guests need to fill out a JHA. For the thousand users at the ALS, we have obtained approval from the EH&S Division to use the Experiment Safety Sheet (ESS) as an alternate system to the JHA. The ESS details all the equipment and materials intended for use in an experiment at the ALS; it also identifies required training and hazards and controls of the work involved.

The ALS internal deadline for all individual JHAs to be completed and in "Active" status is the end of August. The Lab is committed to having 75% completed JHAs by the end of September. This compliance is critical as it will affect the Lab's contract renewal status.

Someone asked about the impact of matrixed staff. Floyd responded that it was not a problem: The Mechanical Technician (MT), the Electronic Maintenance (EM), and the Electronic Installation group leaders have been working hard in getting their group members to complete the JHA process.

Electrician Bill Mattson reported that Facilities Division has completed all of its JHAs.

3) 2008 Self-Assessment

Floyd remarked that a meeting with all the work leads was held recently to narrow down this year's Self-Assessment QUEST* teams. A consensus was reached to focus on five areas/functions: (1) Shielding Control, (2) Training and Procedures, (3) ISM Responsibilities, (4) Experiment Safety Sheet, and (5) Walkthroughs. Tennessee Gock added that emails have just been sent out to work leads to solicit names in order to form the Self-Assessment teams. As of now, we are 1 to 2 weeks behind schedule.

*QUEST = Quality ES&H Teamwork

4) Roundtable

(i) News from BSO: Salma El-Safwany (DOE-BSO) stated that the Berkeley Site Office priority is validation of the Laboratory's ISM systems. Oak Ridge Office of DOE will be assisting and they are expecting this to occur in August/September. She added that one priority at the BSO is to complete the review of the ALS Top-Off (mode of operation) in the ALS Safety Assessment Document by the end of August.

(ii) Karen Nunez, Procedures Center Manager, noted that procedure ALS 02-01: *Authorized Persons List* is in the process of being updated. This procedure describes the roles and responsibilities of the different groups who are involved with the operation and maintenance of the accelerator and the appendices list the authorized persons who can perform the work. The procedure is now being revised to update the personnel list and to reduce the number of postings to three locations so the most current appendices will be posted in the Control Room, EM Shop and Storage Ring pit. During its update, the question of qualified person, authorized person, and how a person is authorized to perform work came to question, so the procedure now defines these terms in a more succinct manner:

- A "Qualified Person" has the capabilities, skills and training to perform work (all technicians are qualified);
- An "Authorizer" gives permission to a qualified person to perform work (group/section leads, supervisors, cognizant engineers, and lead techs are authorized persons);
- An "Authorized Person" is a qualified person who has been given permission by an authorizer to perform work; authorization may be given through pre-authorization or permission at time of project.

Peter Denes commented that in Engineering they have identified personnel who are qualified and authorized to perform electrical work. Floyd recommended adding Denes to the procedure as a reviewer.

(iii) Ken Barat noted that while the Vendor Safety chapter in PUB 3000 is being revised, the Laser Program continues with the required procedures and documentation for laser vendors coming on site, such as:

- Activity Hazard Document (AHD)
- Temporary Work Authorization
- Laser Service AHD

Barat added that a recent Lab Management walkthrough of the ALS came away with no specific findings, but an observation of the need to improve housekeeping, in particular, consumption of food in the experiment floor.

Floyd responded that he has been working with beamline staff representatives Evelyn Cruz (SSG) and Rich Celestre (ESG) in an attempt to improve the housekeeping condition at the ALS, including egress, slip and trip, seismic, and gas cylinder storage, etc. Floyd added that the housekeeping issue was also brought up in the ALS Safety Culture Survey conducted back in June 2008.

# Meeting Minutes

ALS Division Safety Committee meeting dated August 27, 2008

**ALS Division Safety Committee**

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**August 27, 2008**

**MEETING SUMMARY**

1) Lessons Learned

(i) LN Incident—Tennessee Gock reported an accident occurred on July 31st. A guest researcher from the Physical Biosciences Division (PBD) was seeking to refill a 50 liter dewar with liquid nitrogen. This dewar, which is equipped with a removable pressure head secured by a clamp, was presumed to be empty (no liquid nitrogen). The researcher was loosening the fasteners on a clamp securing the pressure head to the dewar when the removable head of the dewar burst off resulting in a minor forehead contusion. Despite all indications revealed to the scientist, the dewar was not empty and was pressurized.

PBD is taking the lead on the investigation of this incident, with support from the ALS and Mike Martin from the Staff Safety Committee is representing the ALS. The investigation team is still working on detailed causal analysis. Preliminary analysis found 4 causal factors:

1. Stripped threads on bolt were dealt with by adding 'spacer' nuts, instead of changing out the bolt. This meant that when the head was pulled off, an individual needed to use tools (instead of regular wing nuts that you can undo with your hands) and get right over the unit - and into a position of vulnerability.
2. The unit was assumed to be empty so only a cursory check of pressure was done instead of fully opening the valve to verify.
3. Safety chain was off. Usually goes between neck and brass ring. If in place, would have stopped the head after an inch or two.
4. Not wearing safety glasses or face shield at time of incident.

Since the incident, the ALS has taken the following steps:

1. Inspected all dewars with removable heads. Those owned by the Lab were verified to have safety chains. Those owned by vendors are now checked by the B7 Crew upon receipt.
2. Clarified PPE policy – safety glasses and face shields are now required for pressurized work.

3. After noticing that the injured person was in HR system as an ALS guest– which meant that his non-beamline work was 'invisible' to both ALS and PBD, we went through all beamlines and approved programs to identify if there are others like this. So far we found less than 10 such cases.

Lesson Learned: (1) Even for tasks that we have done many times before, we should think about the hazards of each task and the controls needed to make the work safe, which include wearing PPE and checking the functionality of equipment, etc. (2) No matter how routine the task is, we should take necessary precautions and make no assumptions.

(ii) Shielding Incident—Tennessee Gock invited Jeff Troutman to talk about an incident related to shielding violation. Troutman is the ALS Facility Specialist who is also leading the investigation in his capacity as a member of the ALS Staff Safety Committee (SSC). He reported that on August 13th an incident occurred involving an off-hour replacement of a beamline flange at BL 6.0 that had been done without the proper shielding review and approval. Operation of the beamline in this condition constitutes a level II violation of our RWA and so we reported it to EH&S and DOE. The ALS SSC is performing an investigation to identify root causes and preventative actions, with Troutman heading up an investigation team consisting of researchers (Mike Martin, also the SSC Vice Chair; and Seno Rekawa), floor operator (Matt Abreu), and radiological control technician (Bill Rowley). Troutman noted that the Floor Ops are a great resource so people should contact them if they have questions about the status of their beamlines, etc. He also urged beamline scientists and technicians to be in constant communication regarding work being done on their beamlines. A small discussion about the incident followed. Gock added that off-hours work and workload issues would also be examined.

Lesson Learned: (1) Before work begins, it is vital to do work planning as well as to assess potential hazards and identify necessary controls, no matter how routine the task is, or how experienced the workers are; (2) Supervisors should conduct regular group meetings and have open communications with their staff and also encourage staff to look out for one another; (3) Exhaustion brings vulnerability and increases the chances of making unwise decisions, therefore, individuals need to evaluate workload to make sure to not stress out to the maximum level. Let supervisor know if it is the case. Supervisors need to stay on top of the workload situation of their staff; and (4) Evaluate the risks of off-hour work on critical jobs.

With the recent spike of incidents happened at the ALS, Salma El-Safwany (DOE/BSO) questioned if the ALS Division was considering a standdown, i.e., temporary suspension of work at the facility. Gock replied that the ALS management has responded to the recent incidents with a series of actions:

1. The Division has since been conducting individual investigations of these incidents.
2. ISM principles were reinforced and completion of the JHA became the

priority. The JHA process enables discussions between the employee and his supervisor on working planning, identifying hazards and controls which include taking required training.

3. The Division Director sent personal messages to remind everyone in the division that it is the responsibility of each of us to ensure that work is performed in a safe manner. He also emphasized that our goals, in both the short-term and long-term, are to make our safety systems as strong as they can be and to reinforce a strong safety culture.
4. Division Director called for a mandatory meeting for all responsible beamline scientists to discuss their work planning processes to ensure that appropriate systems are in place at each beamline while formal investigations of the incidents are being performed.
5. All work involving beamline shielding components are restricted to routine hours when Floor Operators are present (8:00 am to 8:00 pm). This is to ensure that all beamline work is done with the beamlines in a safe condition and in consultation with the Floor Operators.
6. (Rick Bloemhard added) The beamline in question has been locked out.

2) Upcoming Shutdown at the ALS

ALS Project Manager Steve Rossi is not available to attend this meeting, but Facility Specialist Jeff Troutman is also involved in the planning of the upcoming shutdown at the ALS, so we invited him to give us a brief account of it.

Troutman noted the following:

(i) The Shutdown at the ALS starts on Tuesday, September 2nd. The following major tasks are planned:
- Installation of Top-Off apertures
- Top-Off Interlock testing
- More Seismic Upgrade work will be carried out
- In-Vacuum Insertion Device (IVID) repair

(ii) The area over the top of the Storage Ring and pit requires Personal Protective Equipment (PPE) due to the seismic retrofit work, crane retrofitting, and other crane work. Extra hard hats had been ordered.

(ii) The road between the ALS and the cooling tower will experience heavy truck traffic and may be shut down.

(iii) Magnet interlock testing will be happening during the first week of shutdown. It should all take place during swing shift, but people should be aware that testing is going on.

(iv) People need to inform Facility Coordinators (Troutman or Will Thur) ahead of time if any vendors are coming up to perform work.

During the last shutdown, there was an incident of fiberglass dust dropping on and inside equipment racks in Storage Ring Sectors 1-3. Peter Denes asked if precautions would be in place for this shutdown to prevent similar incident from happening again. Tim Kuneli responded that it should not be happening again,

since the reason for the previous occurrence was because the contractor, instead of cutting the fibre glass piece, ripped it and caused the fibre glass dust flying all over the place. Also, coated material will be used instead of the 'raw' fiberglass.

Tony Young asked about the noise on the Accelerator floor during the shutdown especially while rivet work is going on. He commented that the hearing protection notice sign that was used last time seemed helpful. The sign also included the following info: Ear plugs available at the Control Room and Safety Manager's name and phone extension. Gock said we could put the same sign in various locations for this shutdown.

3) Job Hazard Analysis (JHA)

Tennessee Gock showed a summary of the current status of the Division's JHA completion. She reported that the 11% completion rate was not reflecting the actual status, as the percentage was being dragged down by the inclusion of the 1000+ users which will be covered by the Experiment Safety Sheet (ESS) as an alternate system to the JHA. She added that all groups in ALS were doing great in JHA completion, Some groups have 100% completion, the Operations group has a few incomplete JHAs due to some questions that need to answered correctly, and the ESG and SSG groups each has a few outstanding JHAs needed from their long-term guests who are not covered by ESS and thus required to fill out a JHA.

The ALS internal deadline for all individual JHAs to be completed and in "Active" status is the end of August. The Lab is committed to having 75% completed JHAs by the end of September. This compliance is critical as it will affect the Lab's contract renewal status.

Ken Barat (Lab's Laser Safety Officer) pointed out that we will likely be able to achieve the JHA compliance by September 30$^{th}$, but whether we can complete all required training by the end of September remains in question.

4) 2008 Self-Assessment QUEST

Tennessee Gock reported that five QUEST teams have been formed, each focuses on one of the following five areas or functions: (1) Shielding Control, (2) Training and Procedures, (3) ISM Responsibilities, (4) Experiment Safety Sheet, and (5) Walkthroughs. There is a BLS representative for each team, nominated by Tony Young. Other members of the teams may include a Mechanical Technician rep, a EM rep, or an Operator, and in the Training and Procedures team, for example, the Procedures administrators. Gock noted that a number of survey questions have been developed for each function, team members from each team will interview about 5 people selected from different ALS sections/groups in the hope of getting feedback and suggestions so we can improve the existing systems.

*QUEST = Quality ES&H Teamwork

5) Roundtable

(i) Ken Barat announced an upcoming Laser Safety training class on Wednesday, September 3rd.

(ii) Salma El-Safwany (DOE-BSO) noted that Russ Kelly from the Oak Ridge Office has been working on reviewing and approving the ALS Top-Off (mode of operation) in the ALS Safety Assessment Document. An acceptance letter will be issued in the next few days.

(iii) Mike Bell reminded people to look out for each other and to not hesitate to point out to people if they are working under unsafe condition, such as missing PPE, or energized machine. Bell also suggested (earlier in the meeting) to post Lessons Learned articles with photographs on a bulletin board, since the visual image not only will draw people's attention but will also imprint in one's mind "what not to do".

# Self-Assessment QUEST 2008

Shielding Control
(Angelic Pearson, Don MacGill, Simon Clark)

- Policy/procedure
- Shielding control forms
- Floor operator function
- Scope clear (when are they needed?) - endpoints
- Accelerator vs. beamline shielding questions

Training and Procedures
(Karen Nunez, Tennessee Gock, Tim Kuneli, Bob Mueller, Mike DeCool, Yi-De Chuang)

- Procedure status (effective, clear, useful, scope)
- Procedure database
- Website
- On-line training
- EHS training
- Beamline training

ISM roles and responsibilities
(Sue Bailey, Jim Floyd, Alex Hexemer, Matthew Marcus, Eli Rotenberg)

- Beamline scientist host role
- Definition of ‘supervisor’ between bls, user office, and EHS
- Non-ALS division beamline scientists
- Matrix divisions

Experiment Safety Sheets
(Ken Osborne, Ed Romero, David Kilcoyne)

- Posting
- Review process
- Effectiveness/efficiency
- Hazard specific issues

Walkthroughs
(Dennis Calais, Mike Kritscher, Jinghua Guo)

- Supervisor walkthroughs
- Spot check issues/areas

# SUMMARY -- ALS Self-Assessment QUEST 2008 - Training & Procedures

Team members (interviewees): Yi-De Chuang (BLSs), Mike DeCool (MTs), Tennessee Gock (BLSs), Tim Kuneli (EMs), Bob Mueller (Engrs), and Karen Nunez (Beamline Scientists, or BLSs)
Interviewees: 24 Beamline Scientists, 5 MTs, 4 Engineers, and 3 EMs

## Accessibility (Q2-Q4)

BLSs (Chuang): 6 out of 9 YES)
BLSs (Gock): 5 out of 8 YES ) → 16 out of 24 YES
BLSs (Nunez): 5 of 7 YES )
EMs (Kuneli): 3 out of 3 YES
Engrs (Mueller): 4 out of 4 YES
MTs (DeCool): 5 out of 5 YES

TOTAL: 28 out of 36 YES = 78%

## Usefulness (Q5-Q6)

BLSs (Chuang): 5 out of 9 YES)
BLSs (Gock): 2 out of 8 YES ) → 11 out of 24 YES
BLSs (Nunez): 4 of 7 YES )
EMs (Kuneli): 3 out of 3 YES*
Engrs (Mueller): 2 out of 4 YES
MTs (DeCool): 5 out of 5 YES

TOTAL: 21 out of 36 YES = 58%
*=one comment (see below summary)

## Procedure Training Awareness (Q7-Q9)

BLSs (Chuang): 4 out of 9 YES)
BLSs (Gock): 5 out of 8 YES ) → 11 out of 24 YES
BLSs (Nunez): 2 of 7 YES )
EMs (Kuneli): 3 out of 3 YES
Engrs (Mueller): 3 out of 4 YES
MTs (DeCool): 4 out of 5 YES

TOTAL: 21 out of 36 YES = 58%

## Alternative Tools or Procedures (Q10-Q11)

BLSs (Chuang): 4 out of 9 YES)
BLSs (Gock): 5 out of 8 YES ) → 11 out of 24 YES
BLSs (Nunez): 6 of 7 YES )
EMs (Kuneli): 1 out of 3 YES
Engrs (Mueller): 0 out of 4 YES
MTs (DeCool): 3 out of 5 YES

TOTAL: 19 out of 36 YES = 53%

## Suggestions (Q12)

Chuang: Fakra, Denlinger, Stolte
DeCool: Ellis, McGill, Calais
Kuneli: Abreu
Gock: Yang, Hexemer, Kunz, Ralston, Guo, Bluhm
Mueller: Bailey
Nunez: Doran, Roy, Wilson, Rekawa, Federov

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## Feedback Summary

## Access & Communication

(1) How to access the procedures from website is not very clear.

(2) Should have a good link to the beamline specific procedures on the beamline website for easy access.

(3) Procedures should be easily located on the website. Current procedure website is not very clear about this.

(4) Best way to communicate is via email (but note that some non-ALS people such do not get email) or else via Experiment Setup Coordinators or the FOs.

(5) Reinforce that Floor Ops are the gatekeepers; ask them for questions

(6) Some BLSs know procedures exist, but not which ones they should know; suggest to add a list of needed procedures to the JHA as a one-stop shop for procedures and training.

## Usefulness

(1) Add more pictures for general procedures (to enhance interest and understanding).

(2) Not all people will go online to look at procedures. Make an abbreviated version of procedures for use by the BLSs or users; only what they need to know. Procedures should be simple and clear enough to be followed by inexperienced users.

## Awareness of Required Procedures and Training

(1) Should have an orientation/initial training for procedures because did not know that the Procedures Center exists.

(2) Recommend to add relevant procedures in the user training procedure.

(3) For each beamline, make a check sheet of what procedures are needed for the BLSs in that beamline. Post it at the beamline; it will be very visible and it will serve as a reminder.

(4) An online list, similar to the JHA, that would tell individuals which procedures they need to stay up on.

(5) Customize training on procedures by calling out all required and relevant points.

(6) Too much training now from JHA and Scientists are already stretched thin with work. Too many barricades (requirements) do not help; scientists want to get to their work and experiments.

(7) Researchers often have strange hours, so they might not take training as promptly as they should.

## Suggestions

(1) Staff at the Procedures Center should work closely with beamline scientists to periodically upgrade/improve the procedures to reflect new changes.

(2) Need to update BLSs regularly on what procedures and training they need to know.

(3) Many of the procedures are great and thoughtfully written, others are pathetically insufficient and out of date (e.g., BLS pointed out that BL 08-05 from the Procedures Center website was outdated!) Some procedures are outdated and incorrect, which means there is a disconnect between what is written and what we actually do. We should hold experienced ALS employees responsible for updating old procedures! Many can help but don't; these procedures are most useful for people who are new here, but they have got to be accurate in order to be useful.

(4) Ensure that the correct system experts are included with procedures that cross many groups, such as ID's.

(5) Procedures should not be forced on users; more paperwork does not mean better. Also, the ESS process is sufficient to list safety, but new additional paperwork similar to ESS (the User Experiment Form, UEF) has been required without communication as to why it is needed.

(6) It will be helpful to turn the new form on hazard info (UEF) developed by the Experiment Setup Coordination into an ALS procedure.

(7) *Positive comment:* The Procedures Center Manager got it under control! We review the procedures regularly.

# SUMMARY -- ALS Self-Assessment QUEST 2008 - Shielding Control

Team members: Angelic Pearson, Don MacGill, Simon Clark
Interviewees: 9 Operators, 5 Beamline Scientists, and 5 MTs

## OPERATORS:

### Effectiveness (Q1-2)

(1) Too many incidents/accidents to feel it is effective.
(2) People should repeatedly review the procedure.
(3) Could use more restrictions.
(4) The Shielding Change Form (SCF) does not flow well, difficult to know if it is done correctly.
(5) Need clear instruction for items that need to be done in specific order.
(6) People are unsure of what is the current policy.
(7) Need simple checklist.
(8) Will get more comfortable/familiar when doing more of the SCFs.
(9) The SCF has been changing and I do it so seldom, need to read it all to make sure it is right.

### Using the right form (SCF for Beamline *vs.* SCF for Accelerator) and completing it correctly (Q3-4)

(1) Refer to the procedure, ask questions if needed.
(2) Refer back to previously completed forms, or ask someone more experienced.
(3) Take time to understand what is needed to complete the form. Read the entire procedure each time.
(4) Spending time on it; it is better to do more (authorization, notification) than not enough.
(5) Double check the information on the form.

### Verification for additional shielding work (Q5-6)

All who have provided feedback confirmed that they did verification for additional shielding work.

### Frequency of scheduling conflicts (Q7)

20% Often, 10% Sometimes, 70% Rarely or none.

### Survey follow through and completion (Q8)

50% Followed through with the Survey, 50% N/A

### Close out of shielding change form upon completion of the job (Q9)

70% Yes, 30% N/A

### Adequate training and support to carry out role (Q10-11)

70% Yes, 20% Did not feel they have enough training, 20% Not enough support including the case where no one is available until the next shift reports to work.

**Suggestions (Q12)**

(1) A lot of pressure; fear of making errors.
(2) AOs have too much isolation from FOs, need more communication.
(3) Need advance notification for work involving SCFs.
(4) The challenge is the AOs (especially Owl shift staff) use the form infrequently. OIC should make sure the least experienced AO on shift can handle SCF.
(5) Operators should have more training on SCF.
(6) Should have separate SCF procedures and requirements for users, techs, etc.; current SCF procedure should be for Operations only.
(7) Should have more training on shielding control for other groups involved (BLS and Techs.)
(8) Serial number should be the first step.
(9) Reduce required signatures on form.
(10) Need to review this procedure and other safety-critical procedures more frequently.

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**MTs:**

**Verification of authorization of job order (Q1)**
All responded affirmatively.

**Verification of authorization of additional work (Q2a)**
All responded affirmatively.

**Communication with requester for additional time (Q2b)**
60% Yes, 40% No direct communication with requester

**Frequency of scheduling conflicts (Q3)**
60% Rarely, 40% Often to frequent
Note: On new construction usually 2-4 weeks, beamline work usually short notice, no notice for emergencies

**Adequate training and support to carry out role (Q4-5)**
All responded affirmatively.

**Suggestions (Q6)**
(1) Make shielding control endpoint on each beamline easily visible.
(2) Simplify and clarify instructions on what requires a SCF and what does not, both inside and outside the Storage Ring.

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**BLSs:**

**Do you know when shielding change is needed and how to plan for it? (Q2-3)**

(1) By defining Shielding Control Endpoint, e.g., valve before endstation needs shielding change.

(2) BLSs and Associates decide together as a group to discuss the scope of work.
(3) Interact with the Vacuum Group or RCT.
(4) Ask FOs if work permit is needed.
(5) One BLS said he does not require planning, may involve FO or Vacuum group.
(6) Outside hutch, ask FOs.
(7) For example, project to build endstation needs shielding change.

**Do you know who is in charge of the work? (Q4)**

(1) One of the BL staff takes the lead.
(2) BLS said he assumes responsibilities.
(4) Talk to lead of each group, e.g., for vacuum work, contact Frank Zucca.
(5) BLS is aware of the abilities and capabilities of workers.
(6) Different people do work, but the BLS coordinates.

**How to ensure work is done properly (Q5)**

(1) Talk to other groups and rely on them to do the work properly.
(2) FOs also doublecheck.
(3) Frank Zucca checks the vacuum work.
(4) Consult Safety people if there is a major change, also write in the log book.
(5) After work is completed, FOs and RCT check off and properly close out the shielding process.
(6) BLS inspects work and coordinates with workers.

**What resources are available at the ALS? (Q6)**

(1) Vacuum group, Frank Zucca and his crew.
(2) Internal resources such as general ESG resources.
(3) FOs.
(4) Beamline Review Committee.
(5) Work Planning.

**How to handle shielding problem? (Q7)**

(1) Call the Control Room.
(2) Make sure it was safe.
(3) Shut down the beamline.
(4) Call FOs, or RCT/RP.

**Suggestions (Q8)**

(1) FOs need more experience and better training.
(2) Still going through changes, needs to let this run for a while before feedback can be provided.
(3) BRC Chair gives great support.
(4) Review systems at Safety Circles.
(5) Tie up inconsistencies beamline by beamline (e.g., configuration control of endstation)
(6) Don’t rely on verbal instructions

# SUMMARY -- ALS Self-Assessment QUEST 2008 - ESS

Team members: David Kilcoyne, Ken Osborne, Ed Romero (Only two team members—highlighted in yellow—collected completed survey questions, no forms collected from Romero whose interviewees, EMs & MTs, responded that the ESS does not apply to them, i.e., they don't use ESS and don't know anything about it.)
Interviewees: 5 Beamline Scientists, 5 Operators

**BLSS ONLY** (All Operators interviewed responded that they had no knowledge of ESS)

### Effectiveness and Usefulness (Q1-Q2)

All responded affirmatively. One comments it was not applicable to his beamline.

### Is ESS Binder Useful? (Q3)

40% said Yes, 40% said No (binder is not in a useful place, at console not on beamline; the information is also needed elsewhere), 20% said people use it in the beginning of experiment.

### Are you able to complete ESS document before work begins (Q4)

All responded affirmatively.

### Do you have adequate resources to implement ESS (Q5)

All responded affirmatively.

### Do you have hazard-specific issues (Q6)

All responded affirmatively; one indicates using toxic gases but not an issue.

### Do you contact the Experiment Setup Coordinators if changes are made to the experiment (Q7)

All responded affirmatively.

### Is posting of the User Experiment Form (UEF) useful? (Q8)

60% No (no real info that are different from the ESS, the UEF is not necessary; do not know if it is used; need to be more relevant to the beamline), 40% Unsure.

### Suggestions (Q9)

(1) Who is checking the UEF in comparison to the ESS?
(2) Create stickers to warn users, or anyone if something is wrong.
(3) Create contact list for concerns or problems.
(4) Create general safety sheet relevant to the beamline, e.g., AHD for laser for experiment.

**Positive comment:**
(5) Dave Malone works hard to make the process simple, no suggestions for improvements.

# SUMMARY -- ALS Self-Assessment QUEST 2008 - ISM Roles and Responsibilities

Team members: Matthew Marcus, Sue Bailey, Jim Floyd, Alex Hexemer, and Eli Rotenberg
(Only one team member—highlighted in yellow—collected completed survey questions, the others were too busy to fulfill this assignment)
Interviewees: 5 Beamline Scientists

### Are you clear of your role in overseeing the safety of users (Q1)

All responded affirmatively; one suggests: make sure the users actually got any needed chem/bio training.

### What are the biggest safety vulnerabilities at the beamline? (Q2)

(1) 10.3.2: Needs to have the SEARCH button moved to the middle of the downstream wall of hutch to enforce a proper search (especially in the back), and needs an octant mirror in the corner to assist this search. These changes had been proposed but never done.

(2) Trying to do too much too fast. There is a sense of urgency in getting things done and we need to be deliberate about how we think about and plan work.

(3) Users bringing in wide variety of samples and working late at night w/o direct supervision (need to have a buddy system in place, i.e., having someone else to discuss with and watch over, etc.); last-minute changes.

(4) Changing definitions of things like shielding can become confusing.

(5) Housingkeeping issues. Also, trash collectors do not go down narrow corridors (e.g., 8.3.2) as often as they should.

(6) Space issues. Example: at 12.3.2, food comes too close to samples. Cramped space leads to unresolvable ergo problems as well.

### What parts of the safety program are working? (Q3)

(1) Radiation safety.

(2) Training.

(3) The procedural kinds of things, such as annual inspections. These have become routine and are working smoothly. We've got the bureaucracy down well.

(4) The attitude of "let's fix this" as opposed to "you can't do that". People try to help solve problems and they get solved.

(5) Experiment Safety Sheets (ESS). The ESS helps setup of experiment. Easy to find someone to answer questions. People will proactively help you solve the problem.

(6) *Positive comment:* EHS Program Manager's attitude made a difference—he tries to be clear and sensible about safety stuff.

**Areas of improvement (Q4)**

(1) Need more ALS support (Operators, EMs, EHS, etc.). Also, need more computer support.

(2) Need to strengthen Work Planning.

(3) Need to resolve Housekeeping issues

(4) Make sure that up and down the organization we can maximize safety and effectiveness with the existing people.

(5) Mechanical, especially off-shift, is a problem. If you can't get it done as fast as you want, you'll figure some other way, which may not be the safest way.

(6) Better training of FOs, in that they don't always recognize hazards or have the ability to judge the importance of specific issues. Need a better understanding of our work and its hazards.

**Suggestions (Q5)**

(1) Make up a quick ref guide or good series of links so that you don't have to delve into PUB 3000 for everything.

(2) A more comprehensive and easier way to access the safety program for users.

(3) Streamline some of the admin overhead, e.g., combine the User Experiment Forms (UEF) which now have to be posted on the wall with the ESS.

(4) Complete shielding end-point process.

(5) More information about what's coming down from Washington that we're being shielded from (e.g., what ALS Director discussed at the mandatory beamline meeting last month).

(6) Have some place to lie down; fatigue creates unsafe conditions.

(7) Taller trash cans.