

Laser Safety EFCOG Working Group Meeting Minutes

Date: August 4, 2011

EFCOG annual meeting attendees:

Name	Laboratory
Avirett, Don	Pantex Plant
Barat, Ken	Lawrence Berkeley National Laboratory
Bett, Tom	AWE, England
Brown, Mendy	Sandia-Albuquerque National Laboratory
Casson, Joanna	Los Alamos National Laboratory
Hintz, Patrick	FDA-CDRH
King, Jamie	Lawrence Livermore National Laboratory
Manzlak, Bert	Thomas Jefferson National Accelerator Laboratory
Odom, Connon	Los Alamos National Laboratory
O'Kane, Barb	National Renewable Energy Laboratory
Owen, Richard J.	Thomas Jefferson National Accelerator Laboratory
Potter, Elvet A.	Michigan State University
Santucci, James	Fermilab National Accelerator Laboratory
Schaaf, David N.	Air Force Research Laboratory
Weilandics, Chris	Brookhaven National Laboratory
White, Graham	AWE, England
Woods, Mike	SLAC National Accelerator Laboratory

1. Minutes for May 2011 phone conference

- These have been posted on the website. The minutes were approved.

2. Action items from May meeting - status and discussion

Item	Person Assigned	Action Item
1.	Barb O'Kane	<i>Post minutes from May 2011 meeting on website. done</i>
2.	Barb O'Kane	<p><i>Post results from questionnaires conducted on website. Not done yet. (action item 1, re-assign to M. Woods)</i></p> <p>Questionnaire results to be posted are on requirements and practices at the different labs for the following topics:</p> <ul style="list-style-type: none"> • Alignment eyewear requirements • Service subcontractor requirements and practices • Training and supervision • Laser use in construction work • SOPs • Laser pointers
3.	Mike Woods	<p><i>Present proposal at August meeting for survey questionnaire on quantifying risk for laser injury incident or near miss. Also present some results from survey done at SLAC.</i></p> <p>Mike presented results from a questionnaire distributed to 150 laser operators at SLAC. Notes on this:</p> <ul style="list-style-type: none"> • Survey was developed as part of a laser safety assessment being done. There were 4 members on the assessment team in addition to the LSO, including 2 members of the Laser Safety Committee and a representative from the DOE site office.

		<ul style="list-style-type: none"> • SurveyMonkey was used for this and 104 responses were received. SLAC has a contract with SurveyMonkey for conducting questionnaires and an ESH computer expert implemented the questionnaire. SurveyMonkey has good tools for developing questions with different formats and providing tools for analyzing data and presenting results. • Questions were focused on assessing risk for a laser eye injury and risk to meeting science program goals and schedule, and then identifying ways to mitigate risk. A total of 37 questions were asked including 2 open-ended text questions. Survey questions took about 15 minutes for laser personnel to complete. • Mike presented some of the results and questions, including the effectiveness of OJT and supervision and different training courses. One question asked laser operators their perception of the perceived risk for a laser eye injury accident to any of SLAC's 150 laser operators. Responses indicated a perceived risk of 10-15% each year to get a laser injury accident. A related question indicated the probability to report an injury accident is very high, which is good. Similar questions for perceived risk in a university setting indicate a higher risk for an injury accident and a lower probability for it to get reported. • The questionnaire will be conducted annually at SLAC to monitor trends and to provide important performance metrics for the laser safety program. • Mike will send to EFCOG members the set of questions used for the questionnaire and some of the results summarized in the management assessment report just completed. Can have follow-up discussion at next EFCOG meeting on possibility to conduct similar survey questionnaire at other labs with common questions used. (action item 2)
4.	Barb O'Kane	<p><i>Post link to website for 2011 LSO Workshop on LSSG website. Done, but no longer there as of 8/25/2011. Need to post links to 2011 and previous LSO workshop websites or to presentation material from these. Need to get EFCOG website to host the presentation material for all LSO Workshops. (action item 3, re-assign to Ken Barat and Mike Woods)</i></p>
5.	LSSG Board members	<p><i>Performance metrics needed for LSSG, which should be updated at annual meeting. Not done. Barb O'Kane agreed to draft a set of performance metrics for discussion at next quarterly meeting. (action item 4)</i></p>
6.	All	<p><i>Need volunteers for LSSG board positions.</i></p> <ul style="list-style-type: none"> • Jamie King will be the new secretary starting with the fall meeting. • Mike Woods becomes vice-chair. • Barb O'Kane becomes chair. • Joanna Casson becomes past-chair. • Workshop Lead will be shared between Ken Barat and Mike Woods. More on this in Workshop discussion below. • Need to update website to reflect above changes. (action item 5)
7.	LSSG Board members	<p><i>Annual LSO Workshop. Develop planning document and establish a workshop committee to assist Workshop Lead. Budget discussion needed.</i></p> <ul style="list-style-type: none"> • Ken Barat will draft a planning document for discussion at Fall meeting, which will include budget information. Ken and Mike will be meeting to discuss this prior to the Fall meeting. (action item 6) • Workshop committee includes Ken, Mike, Jamie and George Andrews from Yale University. George has expressed interest in hosting a future workshop at Yale.
8.	Barb O'Kane	<p>Post LBNL Laser Reference Guide on LSSG website. Done</p>

3. Laser ORPS events from past year

- Mike presented 2 slides about a Near Miss event at SLAC where a laser operator noticed an unexpected laser beam on his shirt sleeve when the lab operation mode had been set to Class 1, which means all beams must be fully enclosed. No injury resulted. Incident occurred as a result of configuration change that moved a safety shutter and failure to verify laser "zero energy condition" prior to setting Class 1 operation. Lessons learned included need for better safety configuration control, importance of zero energy verification when setting Class 1, and importance for laser operators being committed to integrity of safety configuration and engineering controls. ORPS report on this has been submitted to DOE and to EFCOG members.

- Ken reported on 2 incidents at LBNL involving non-laser personnel accessing operational laser labs unaware of the laser hazard. One incident involved a technician who didn't think he needed PPE when dropping off tools to a work site and who had observed the entry code "1234" to gain access to the lab. In the other incident, the laser door interlocks were not operational and temporary alternate controls were being used that included no unattended operation; an unknown condition was that the laser entry sign was defective and did not indicate to entering personnel that the laser was energized. ORPS reports are still in progress for these incidents. No injuries.
- There was an ORPS at Pantex for an accidental firing of a laser due to a design flaw in a commercial component. The ORPS report did not identify the commercial component. No injury.
- We want to post all laser-related ORPS incidents since ~2000 on the EFCOG website. Barb will work on collecting these reports, then forward to Mike for posting on the website (*action item 7*).

4. Lessons learned events

- Link to LBNL Lessons learned and best practices is now on EFCOG website. There are 7 lessons learned and 3 best practices posted; Ken reviewed some of these. Best practices include the Newport BB-25 beam block and use of cameras for remote viewing. Lessons learned include the 2009 SLAC injury incident involving a polarizing beamsplitter, a laser pointer warning, and a retinal injury that occurred during viewing of a plasma flash when protective eyewear was not worn, though not clear whether injury was due to plasma flash or the laser beam - no protective eyewear was worn by the person injured.
- SLAC lessons learned. As part of a recent internal management assessment of the laser safety program at SLAC, Mike prepared a document with a list of lessons learned events that occurred at SLAC in the last 3 years of laser operations. Mike presented some results summarized in this document. There were 21 events, including one injury and one near miss. Some aspects noted for these events:
 - Safety configuration control (3 events)
 - Interactions between engineered safety systems for laser safety + radiological access control (3 events)
 - Administrative procedure mis-steps (7 events)
 - Engineering configuration design (6 events)
 - Laser safety system malfunctions (8 events: safety shutter - 2, unlocked door - 2, electronic signs - 2, hutch door cableplant connector - 2)
 - Electrical safety issues with potential for exposed HV (2 events)
 - PPE issues (2 Events)

Lessons learned summaries for these events have generally not been generated for distribution beyond the immediate personnel involved, other than for the injury and near miss incidents. Mike will be distributing this lessons learned summary document to SLAC's laser personnel after discussing it with the laser safety committee and will continue to update it. Mike also plans to make it available to the EFCOG laser group. (*action item 8*)

5. LSO Workshop

- 2011 Workshop. There were ~180 attendees. Website is <http://advanced-laser-safety.com/>. 77 evaluation forms submitted, generally very positive. Notes from evaluations:
 - Liked the panel session
 - Want the workshop to be annual
 - Top ten rated presentations were: Laser Safety in Ophthalmology, Future of Laser Eyewear, Performing an Effective Audit (panel), The Human Eye, Laser Safety NIST Perspective, Developing a Laser Safety Culture, Medical Laser Technology, ANSI update, On-the-Job Training, and Holography.
 - The keynote speaker and museum evening reception were rated highly.
 Other notes:
 - Kentek provided a large amount of support; viewed meeting as being in their own backyard. They did the online registration and website and bought the baseball tickets.
 - Need to carefully evaluate presentations from companies that they present a topic broadly and not do a sales pitch for their products; a couple presentations were borderline in this regard
 - Vendor fair went well and vendors were satisfied. 1 day where they have their material displayed works well; good to be close but removed from refreshment area.
 - Software workshop went well. Have had it 2 years in a row, so should probably not do it 3rd year in row.
 - Speaker presentations will be uploaded to website after Sept. 15. Would be nice for future workshops to have them available during the workshop if available.
- 2012 Workshop.
 - SLAC will host the 2012 Workshop (8th annual).
 - Workshop committee will include Ken Barat, Mike Woods, Jamie King and George Andrews from Yale University. George has expressed interest in hosting a future workshop at Yale.
 - Ken is preparing Workshop planning document and will provide budget information from 2010 and 2011 workshops.

- Committee will need to develop program, determine dates and logistics. Will give status/plans at next quarterly meeting. Will take into account notes from minutes of May meeting.
- Future Workshops
 - Possibilities include NIST, NREL, NIF, NASA and Yale.
 - May want to have 10th annual one be at Livermore in 2014? Or 10th anniversary (11th annual) there in 2015?

6. LBNL Laser Reference Guide

- It's linked from the EFCOG website
- Ken noted that authors got \$250 spot award for their contributions to this.
- Genesis was SLAC accident in 2009. Wanted it to provide guidelines for good laser operations and laser safety; to be used as a reference document, not an audit document with requirements.
- Ken recommended it could be used by EFCOG to update and then to have EFCOG adopt it to become an EFCOG publication. Discussion point for next quarterly meeting. (*action item 9*)

7. Speaker from DOD laser safety group. Nick Schaaf

- Nick is with the US Air Force Research Lab and spoke about the DOD laser safety working group, for which he is chair. Group meets formally twice per year.
- Most laser work is outdoors and mostly non-CDRH. Has to address training appropriate for high school dropouts and needs to be very prescriptive.
- Have issues with use of laser pointers in field for signaling causing injuries. Have issues with personnel acquiring unapproved high power laser pointers.
- Intentional illumination of personnel is done with dazzlers either as warning to unknowns or as signal to friends.

8. FDA discussion with Patrick Hintz.

- Had follow-up discussion from Patrick's presentation at 2010 EFCOG annual meeting where he indicated desire to receive annual reports from the DOE labs related to the 1978 exemption letter regarding DOE use of non-CDRH lasers. The requirements in that letter were supposed to be reflected in Laser Notice 25, which is linked now from the EFCOG website. Our working group interpretation of Laser Notice 25 is that only need to report on lasers acquired from commercial manufacturers that don't meet all the CDRH requirements, but not for lasers developed in-house where Laser Notice 14 (also linked from EFCOG website) applies. Patrick wants us to read the 1978 letter carefully which he provided and determine if it has any requirements not covered by Laser Notice 25. We should send FDA, c/o Patrick, a letter indicating how the DOE labs interpret Laser Notices 14 and 25 and the 1978 letter and what reporting should be done annually by the labs pursuant to these. Need to draft a letter for review/discussion at the next EFCOG quarterly meeting. Include discussion on whether this is a collective letter to FDA or a letter each Lab should submit. (*action item 10*)

9. Safety of using reflective laser eyewear

- Mike Woods sent a note to the EFCOG working group in July on a concern regarding lack of OD information for reflective eyewear at incidence angles greater than 30 degrees in the retinal hazard region 400-1400nm. ANSI Z136.7 and EN207 have different requirements regarding this with EN207 only requiring OD be reported for angles between 0-30deg and Z136.7 requiring OD info for any angles that get thru filter to the pupil, which include angles larger than 30 degrees. Currently no eyewear manufacturers seem to give OD information stating compliance with Z136.7, only compliance with Z136.1 or EN207. Mike's note posed 6 questions and was sent to the EFCOG and BALSO mailing lists. Very little response from the mailing lists to the questions. I also discussed the issue with David Sliney at the LSO Workshop who was interested in the issue and felt it needs to be addressed; David felt that Europeans were overly focused on frame meeting OD requirements and energy damage issues and it was important to have OD requirement at angles that can enter the pupil as noted in Z136.7. Some notes related to questions posed:
 - Q1. Any reported injuries from angle dependence of reflective eyewear? A1: none that anyone seems aware of. None reported in RLI accident database. Mike also discussed FDA database with Patrick Hintz at LSO Workshop and that would like to be able to get summary of injury reports there. RLI only has 49 accidents reported with Class 3B/4 lasers and Patrick indicated might have ~100 FDA reports. We should follow up with FDA to encourage them to make their accident database information available. (*action item 11*)
 - Q2. Does EN207 requirement provide adequate protection? No responses received.
 - Q3. Better to select absorptive eyewear with 22% VLT vs. reflective eyewear with 45% VLT? Only one response received from Cathi Scogin, Sperian CLSO: depends on the needs of users, and whether higher VLT is critical to their task.

- Q4. Should laser operators be informed they may not be fully protected if exposure at large angle of incidence. Discussion at EFCOG meeting was that operators should be informed of the issue, that possibility for hazardous exposure exists at large angles but that no injuries have been reported due to this.
- Q5. Should reflective eyewear be restricted to laser operators with advanced laser skills? Discussion at EFCOG meeting was in direction of discouraging this, but that should make both absorptive and reflective eyewear available where possible and to inform laser operators of issue.
- Q6. Any laser eyewear manufacturers market reflective eyewear that meets Z136.7 requirements? None on market are known to do this. At LSO Workshop, Mike discussed issue with Bonnie Simmons from Kentek and the speaker from Spica who spoke on OD measurements at large angles for reflective eyewear. Bonnie indicated Kentek eyewear is good beyond 30deg though their commercial info does not provide that information. The eyewear the Spica speaker tested was from Kentek and was measured out to large angles of ~60deg with adequate OD. Kentek's reflective eyewear seems very good and may have more complexity in # dielectric layers used and is also quite expensive, especially if it has EN207 ratings. Bonnie noted that Kentek does not give "M" ratings (i.e. sub-nanosecond rating) for their eyewear.
- EFCOG group should develop guidance for the labs regarding this issue. Mike Woods to make proposal at next phone meeting. *(action item 12)*

10. Other topics for discussion

- E-meeting software. Bert Manzlak suggested use of EVO to improve the quarterly phone conferences. EVO website is <http://evo.caltech.edu/evoGate/> and is an electronic meeting tool developed for high energy physics. It needs evaluation to see if it would be useful for our phone meetings. It does require Java to be installed. Also can evaluate other alternatives and need to see if some participants would have computer security issues with desktop sharing for the e-meetings. *(action item 13)*
- Need to have labs review and update their member list information for the EFCOG webpage. Need to add James Santucci as a member from FNAL in addition to Matt Quinn. *(action item 14)*

Action items

Item	Person Assigned	Action Item
1.	Mike Woods	Post results from questionnaires conducted on website. Questionnaire results to be posted are on requirements and practices at the different labs for the following topics: <ul style="list-style-type: none"> ● Alignment eyewear requirements ● Service subcontractor requirements and practices ● Training and supervision ● Laser use in construction work ● SOPs ● Laser pointers
2.	Mike Woods	Send EFCOG members the set of questions used for recent laser operator survey at SLAC and some of the results summarized in the management assessment report just completed. Should have follow-up discussion at next EFCOG meeting on possibility to conduct similar survey questionnaire at other labs with common questions used.
3.	Ken Barat, Mike Woods	<ul style="list-style-type: none"> ● Post links to all LSO Workshops that are available (2005-2011) ● Obtain presentation material at all workshops and arrange to host material on EFCOG website ● Would be good to have separate webpage related to LSO Workshop
4.	Barb O'Kane	Draft a set of performance metrics for discussion at next quarterly meeting.
5.	Mike Woods	Update website to reflect new board positions.
6.	Ken Barat	LSO Workshop. Draft a planning document for discussion at Fall meeting, which will include budget information. Ken and Mike will be meeting to discuss this prior to the meeting.
7.	Barb O'Kane and Mike Woods	Collect and then post all laser-related ORPS incidents since ~2000 on the EFCOG website.
8.	Mike Woods	Make available to EFCOG laser group the SLAC document on recent lessons learned events.
9.	All	Discuss further work on LBNL Laser Reference Guide.
10.	Mike Woods and Jamie King	Review Laser Notices 14 and 25 and the 1978 exemption letter, related to FDA requirements for annual laser reports by DOE labs to FDA. Draft EFCOG letter to FDA, c/o Patrick Hintz, for review/discussion at next phone meeting.

11.	Mike Woods	Follow up with Patrick Hintz to encourage FDA to make their accident database available.
12.	Mike Woods	Recommend guidance for labs on issue of angular dependence of reflective eyewear OD in retinal hazard region.
13.	Jamie King?	Evaluate EVO and other possible tools for quarterly phone conference meetings. Would be useful to have desktop sharing for this or meeting webpage with agenda and any attachments for discussion.
14.	All	Members to review member information on website and send to Mike Woods for update.

Topics for Next Quarterly Phone Conference

1. See action item #2. Discuss possibility of conducting conduct survey questionnaire at other labs with common questions used. (Mike Woods)
2. EFCOG Metrics (Barb O'Kane)
3. 2012 Workshop committee give status on program, dates and logistics. (Ken Barat and Mike Woods)
4. LBNL Laser Reference Guide - do we want to adapt and adopt as an EFCOG guide? (Ken Barat)
5. Discuss FDA laser notices - (team reviewing)
6. Safety of using reflective laser eyewear and developing guidance through EFCOG (M. Woods)