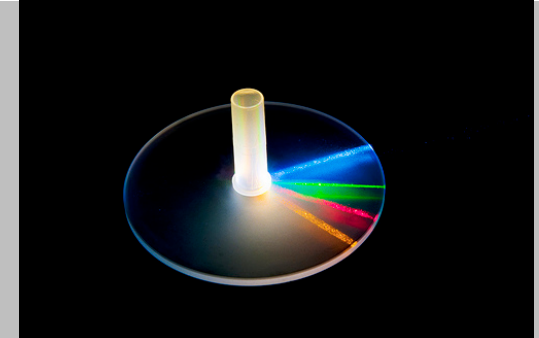
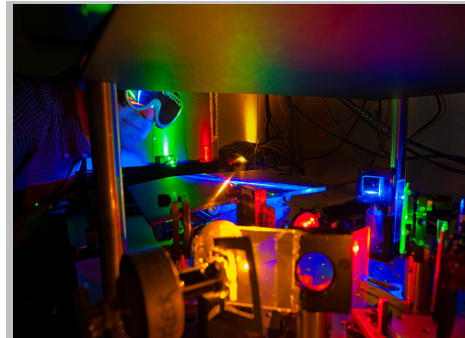
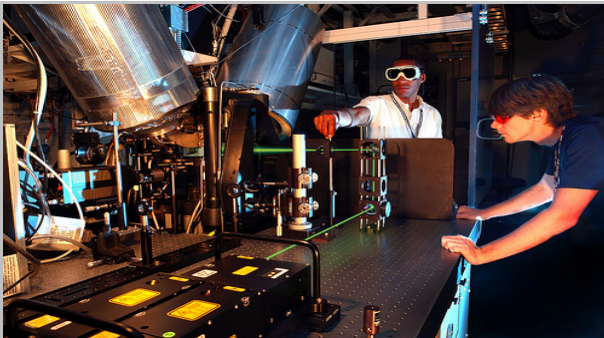


Exceptional service in the national interest



Unique Challenges & Opportunities for Improvement Sandia's Laser Safety Program

Mendy Brown, CIH, CSP



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Laser Program – What makes us unique?

- Research & Development Environment
- Over 1000 Class 3B & Class 4 lasers used in multiple configurations, both in New Mexico and California
- Corporate Laser Safety Program
 - Industrial Hygiene Program
 - Less than 0.5 FTE is dedicated to LSO responsibilities
- Laser Safety Officer/Deputy Laser Safety Officer Structure
 - Combination of corporate Laser Safety Officer (LSO), corporate Deputy Laser Safety Officers (DLSOs), and Line DLSOs
 - Corporate LSO and DLSOs are Industrial Hygienists
 - IH Program corporate DLSOs work directly with Line and support LSO
 - Line LSOs are researchers and technologists

Laser Program – What makes us unique?

- Share ANSI responsibilities
 - LSO primary responsibility for Laser Safety Program
 - Corporate DLSOs support LSO and Line directly; primarily back-up
 - Line DLSOs responsible for hazard evaluation, identifying/implementing control measures and Technical Work Document (TWD) development
- 2-3 FTEs to perform these responsibilities without Line DLSOs
- Funding
 - Corporate LSO and DLSOs Indirect funded
 - Line DLSOs Direct funded

Laser Program – What makes us unique?

- *The DLSO shall perform the functions of the LSO when the latter is not available.*
 - Definition of DLSO from ANSI Z136.1, Appendix A
- Per ANSI, DLSOs shall be appointed by management or the LSO.
 - Line DLSOs appointed by their managers

Problem?

- Referred to personnel in Line organizations as “DLSOs” without being fully cognizant of the LSO responsibilities outlined in Appendix A of ANSI Z136.1
- Lack of clarity over who is responsible for what!

Laser Program – Regulatory Drivers

- Sandia is a Department of Energy (DOE) Laboratory operated by the National Nuclear Security Administration
- 10 CFR 851, *Worker Safety and Health Program*
 - ANSI Z136.1-2000, *Safe Use of Lasers* – Contractually bound to this version
 - ANSI Z136.1-2007, *Safe Use of Lasers* – Primarily follow this version of the standard, with the exception of the Medical requirements
- *DOE Special Operations Report: Laser Safety*
- DOE Laser Safety Training

Laser Program - Overview

- Corporate Laser Safety Program resides in the Industrial Hygiene (IH) Program.
- Corporate Procedure ESH100.2.IH.7, *Evaluate and Control Laser Hazards*
- Internal IH Program Documents (Operating Procedure IHOP-15 *Laser Safety*, Work Instructions)
- Tools
 - Laser Program Guidance Webpage
 - Laser Safety Assurance Survey
 - LAZAN[®] Laser Hazard Analysis Software

Laser Program – Site Snapshot

New Mexico

- Laser Control Areas: 220
- Lasers: 860*
- Deputy Laser Safety Officers in Line organizations: 31

- Majority of the IHs (16/24) in the IH Program have been trained as LSOs & can serve as a DLSO if needed

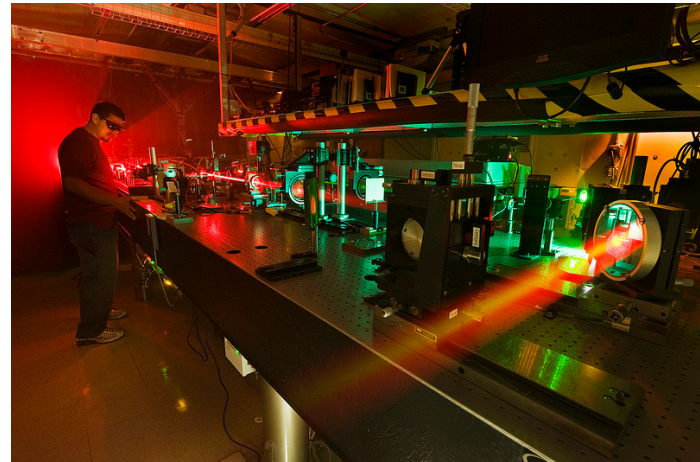
California

- Laser Control Areas: 40
- Lasers: 163
- Deputy Laser Safety Officers in Line organizations: 1

*Based on 2012 Inventory submissions

Laser Operations

- Variety of laser operations, which may take place both indoors and outdoors.
 - Laser systems range from enclosed lasers used in analysis & characterization tools, which normally operate as a Class 1 laser system to large open beam systems.
 - Lasers wavelengths include UV, visible and IR.



Photos by Randy Montoya

Program Self-Assessment

- IH Program performed a Program Self-Assessment of the Laser Program during the Summer of 2010.
 - Laser control areas visited
 - Laser operations discussed with Line Deputy Laser Safety Officers
 - Technical Work Documents were reviewed
 - Used Laser Safety Assurance Survey to perform Self-Assessment
 - Technical requirements

Program Self-Assessment

- Performed a requirements crosswalk of ANSI Z136.1-2007 and Corporate Procedure ESH100.2.IH.7, Evaluate and Control Lasers to identify any gaps between the Corporate Laser Program and the ANSI Standard
 - Minor gaps identified (e.g., procurement requirements, eyewear labeling)
 - Revisited Laser Safety Officer (LSO) and Deputy Laser Safety Officer (DLSO) responsibilities and associated training
 - Waited until Internal Audit of Laser Safety Effectiveness Validation was completed to determine corrective actions

Internal Audit – Laser Safety Effectiveness Validation

- Audit of the Laser Safety Program was conducted from 2010-2011 by Sandia's Internal Audit group.
 - Performed a program and line implementation assessment to verify compliance with ANSI Z136.1, *Safe Use of Lasers*, DOE laser safety performance expectations and the Corporate Procedure ESH100.2.IH.7, *Evaluate and Control Laser Hazards*



Corrective Action Development – Not for the faint of heart.

- Finding 1: *The depth of initial training requirements for DLSOs is not tied to the responsibilities of the position, as required by DOE laser safety performance expectations.*
 - Points back to the LSO responsibilities outlined in Appendix A of ANSI Z136.1.
 - Also relates to the concern discussed in the DOE Special Operations Report regarding training requirements for LSOs and the lack of Supervisor training.

Corrective Action Development

- A corrective action plan (CAP) was entered into Corrective Action Tracking System (CATS) in February 2011:
 - Finding 1: The IH Department Laser Safety Program Subject Matter Expert will review the roles, responsibilities and training requirements for DLSOs that are contained in ANSI Z136.1. After this review, Corporate Procedure ESH100.2.IH.7, *Evaluate and Control Lasers* will be revised to comply with ANSI Z136.1 requirements and submitted to the ES&H Clearing House for approval and publication.

Finding 1 – Initial Corrective Action

- Shift some responsibilities from 48 DLSOs in Line organizations to the LSO and DLSOs in the Industrial Hygiene Program
 - 16 Industrial Hygienists attended LSO Course in May 2008
 - Perform hazard evaluations
 - Determine classification of non-commercial systems or modifications to previously classified laser systems, if necessary
 - Prescribe controls for laser hazards – engineering, administrative, PPE, etc.
 - Review facility/equipment for new & modified laser operations
- DLSOs in Line organizations will become LCA Owners with limited responsibilities
- Training requirement for Line personnel to be trained as DLSOs eliminated
- LCA Owner training will be commensurate with new responsibilities

Lockheed Martin Corporation Safety Oversight Subcommittee (SOSC)

- SOSC had some concerns with the initial Corrective Action for the finding and provided the following feedback:
 - Deputy Laser Safety Officers (DLSOs) to reside in the Line organizations and not in the IH Program as previously proposed
 - Do not shift any current Line DLSO responsibilities to the IH Program staff
 - Emphasize Line responsibility to perform regulatory requirements associated with identification, evaluation, and control of hazards

Making the revised Corrective Action happen – Apply Murphy's Law



PHOTO: EVERETT COLLECTION

Revised Corrective Action

- Revised Corrective Action Elements
 - Require Line DLSOs to be trained at the ANSI Z136.1 LSO level (Appendix A)
 - Line DLSOs will be qualified to perform LSO responsibilities
 - Assign and/or clarify assignment of ANSI LSO responsibilities to the corporate LSO/IH Program and/or the Line DLSOs
 - Revise *Corporate Procedure: ESH100.2.IH.7 Evaluate and Control Lasers* to reflect changes in LSO/DLSO responsibilities, training requirements, and to address any other identified gaps from internal self-assessment
 - Modify existing corporate training course LAS202, *Fundamentals of Laser Safety* and establish a corporate course for off-site LSO training
 - Submit revised Corporate Procedure for Clearing House approval
 - Publish revised approved Corporate Procedure

Steps Taken to Improve Laser Program

- Reviewed the training requirements for DLSOs in ANSI Z136.1, the most recent version of the Laser Corporate Procedure and Program Document
 - Also performed a thorough Gap Analysis of Laser Program with ANSI Z136.1
- Defined the DLSO responsibilities and restructured the current model
- Benchmarked against other DOE facilities for DLSO training requirements
- Substantively revised ESH100.2.IH.7, *Evaluate and Control Lasers* to reflect DLSO responsibilities, closed any identified gaps from Gap Analysis and included new training requirements for DLSOs and Managers of Laser Personnel

Training Development

- Worked with Corporate Training group to develop DLSO training course and modify existing training.
 - Development initially placed on hold until Corporate Clearing House approved the substantively revised Laser Corporate Procedure and the new training requirements.
 - Once approvals were granted by the Corporate Clearing House, there were still many hurdles to clear
 - Logistics of bringing an DLSO training course on-site
 - Staffing changes in Corporate Training group
 - Determining an accurate head-count of DLSOs needing the training
 - Developing the Manager and DLSO refresher training modules to be added to the existing Laser Safety Training

Implementation – A Work in Progress

- Revised Corporate Procedure ESH100.2.IH.7, *Evaluate and Control Laser Hazards* published in November 2012
- New tools added to Laser Guidance Webpage
- On-site LSO course offered in February 2013
 - 20 Attended the course
 - 20 DLSOs attended the course or were granted equivalency; still have 11 DLSOs that need to take the course
- Revised version of LAS202, *Fundamentals of Laser Safety*, was published in April 2013
 - 210 Managers completed LAS202, including Manager-specific module in May 2013
- Developing internal program documents – Program OP, Work Instructions

Questions?

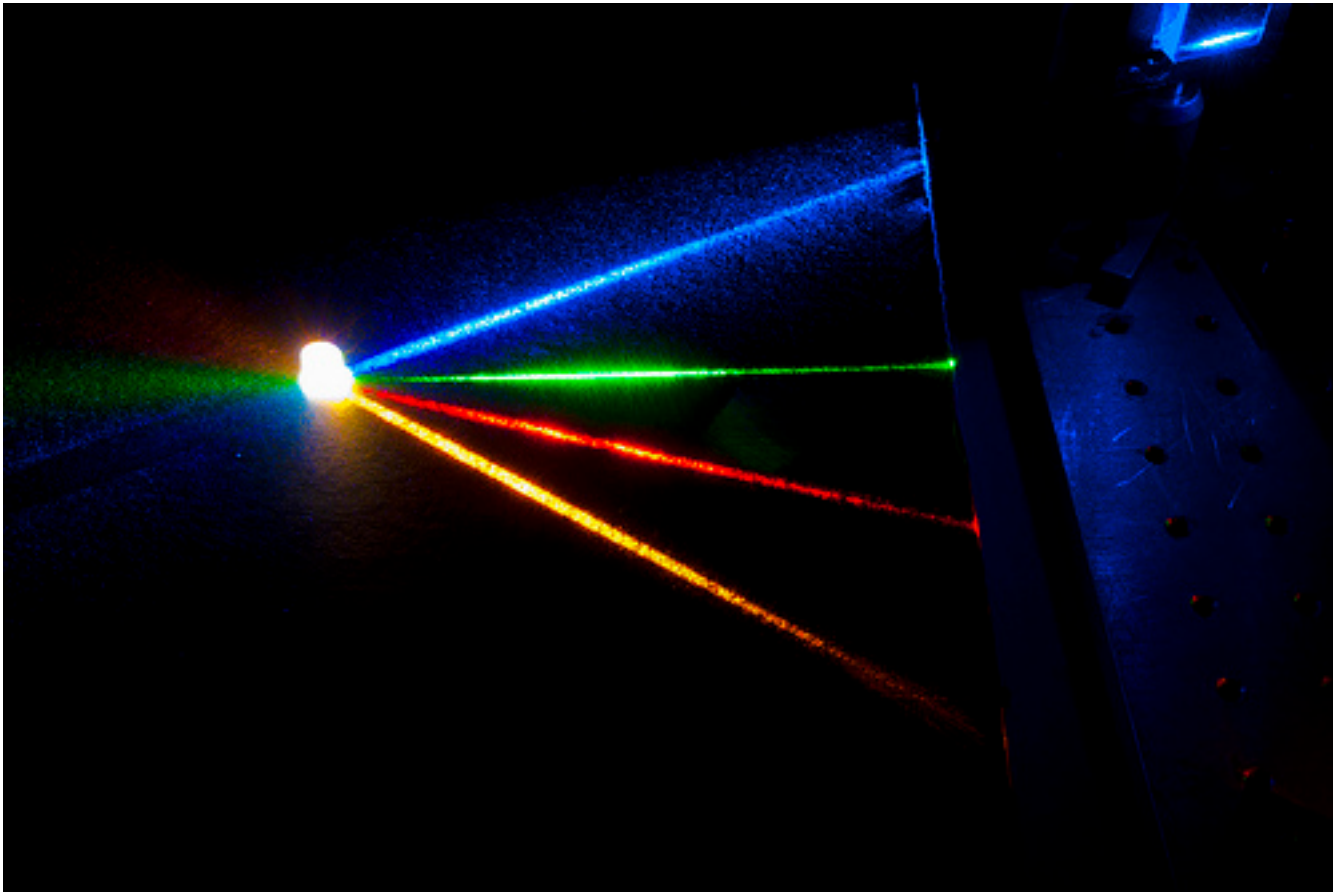


Photo by Randy Montoya