

Laser Safety Committee meeting April 5, 2012

Present: Marc Hertlein, Chair (ALS), Joel Ager (MSD), Ken Barat (LBNL Laser Safety Officer), Jerry Bucher (CSD), Mike Carr (Berkeley Site Office), Eddie Ciprazo (UCB Laser Safety Officer), Quang Le (EH&S, Radiation Protection Group), Shawn Roe, Justine Wu (intern with Ken Barat)

Minutes:

(1) Recent Laser (non-)incidents

a) Glare incident

Occurred at an ALS beamline. Person experienced eye fatigue from prolonged reflective viewing of a 0.95mW He(Ne) Class II laser spot. Conditions included: 2.5 meter path length from focused laser spot on object and observer. 10-15 prolonged observations were done. Researcher complained of visual eye fatigue. Examination was done at LBNL and UCB (School of Optometry?). No lasting damage, but reflected light level greatly exceeded recommended power levels. Eye strain can start at the 50 μ W level. Issue: Group was doing a staging operation on the beamline instead of using facilities in Bldgs. 7 or 15. Probably not utilizing valuable beam line time in the best manner.

Issue: Beamline walkway involved crossing laser beams from two lasers by personnel not necessarily involved with the experiment

Recommendation: put up safety signs/tape, and designate a safety watch person during alignment operations.

b) UC Berkeley, Physics Department

User was using a microscope system that involved laser illumination. One (1) mW. power level was needed. The system laser supplies a power of up to 70mW at 532nm. For safe operation ND 2 filters are needed to attenuate power sufficiently to perform safe microscope eyepiece visual observations. No attenuation of laser beam occurred. Excessive laser light power hit the users' eye (10 μ W was measured at the eyepiece). Lab-mate reported the accident. User was taken to Alta-Bates emergency room by his professor (PI).

Issues: Standard Operating Procedure (SOP) was not up to date. Lack of adequate on-the-job training (OJT) for the researchers.

Remedies: Explore using notch filters to reduce laser light intensity to less than 1 mW before hitting the turning prism. Consider using a CCD camera in place of using the user's eye for obtaining image from the microscope eyepiece.

An investigation of this incident was performed the next day by the UCB LSO, Eddie Ciprazo.

c) Incident at University of Maryland – 8/2011 – involving unintended partial decomposition of SF₆ gaseous compound into SF₄. When the remarkably inert SF₆ compound was pumped out of the experimental chamber, the pump exhaust was directly vented to the experimental room and also towards an experimenter. Laser light induced decomposition of sulfur hexafluoride had occurred. Decomposition products may include: sulfur pentafluoride (SF₅) (aka di sulfur decafluoride (S₂F₁₀)) and sulfur tetrafluoride (SF₄). These materials have high health risk ratings in both the NFPA and

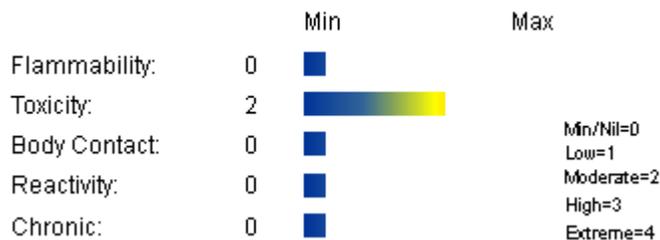
ChemWatch msds rating systems. See below for visual risk values for the respective compounds. SF₅ and SF₄. The ultimate consequence of inhaling these types of reactive compounds is forming HF in the lungs.

SF₆

NFPA



CHEMWATCH HAZARD RATINGS

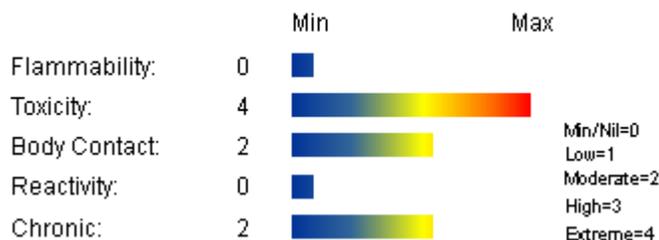


SF₅

NFPA



CHEMWATCH HAZARD RATINGS

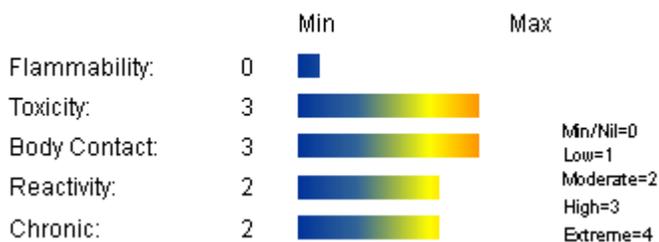


SF₄

NFPA



CHEMWATCH HAZARD RATINGS



Discrepancy in the NFPA and ChemWatch health ratings for SF₆ arise from realizing NFPA is first a fire fighting acute rating while ChemWatch does not consider this type of activity. For SF₆ NFPA the strong possibility of creating an asphyxiant situation dominates the rating consideration. It should be noted that SF₆ in the presence of oxygen and heat or an electrical arc can form the additional hazardous compounds: sulfuryl fluoride and thionyl fluoride. These compounds like the previous SF₅ and SF₄ will ultimately result in forming HF if inhaled.

Remedy: Vent the experimental chamber exhaust to an approved engineered exhaust system such as an operating laboratory hood or a dedicated exhaust pipe.

(2) Changes in the Laser Safety Program

- 1) Shawn Roe will leave LBNL by May 30. Bob Fairchild will serve as Ken Barat's backup. Bob will be taking a week long LSO training session in June.
- 2) Efforts are ongoing to find a new LSO. Ken Barat will leave LBNL at the earliest – August, 2012 or at the latest October, 2012. Interviews of many hill located laser users have informed the Radiation Protection group (RPG) management of what qualities would be expected from a new LSO.
- 3) The Laser Safety refresher course (EH&S 281?) is being revamped to include interactive discussions and individual topics, such as remote viewing, in the redesigned web based course.
- 4) 300 people listed as participants on laser AHDs have not signed off as required by PUB3000.

(3) Laser Guides: - “How to” information (Ken: where are these items available for download?)

- 1) Laser Disposal Guide (send to Property Management)
- 2) Laser Laboratory Design and Layout Guide (end of May release date)
- 3) Guide for formalizing laser interlock systems and testing
- 4) Magnetic field awareness guide
- 5) Ultraviolet (UV) light awareness guide

(4) Miscellaneous

Kentek representative visit on 4/13 resulted in creating attractive reduced pricing for materials to set up laser table shields.

UCB has a Laser Fair at Tan Hall room 775, April 12, 10:30AM to 2:00PM.