



LAWRENCE
LIVERMORE
NATIONAL
LABORATORY

LLNL Laser Operations Safety Audit Form

M. E. Ludwig

June 22, 2006

Laser Safety Officer Workshop
Brookhaven, NY, United States
July 11, 2006 through July 13, 2006

Disclaimer

This document was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor the University of California nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or the University of California, and shall not be used for advertising or product endorsement purposes.

Laser Operations Safety Audit Form

Form rev. 02/06

Auditor (LSO/DLSO/Other) _____ IWS/SP # _____ Audit Date: _____

Type of Audit: Annual New Amend Self-Assessment Other

Facility Name: _____ Building: _____ Rooms: _____

Responsible Individual: _____

Room Contact During Audit: _____

Classes of Lasers in this experiment/rooms: Class 4 Class 3b Class 3a Class 2 Class 1 embedded

**Recommended
Compliance Code**

Posted Documentation and Security Measures

- | | | | | | | | |
|---|--------------------------|---|--------------------------|---|--------------------------|----|------------|
| 1. Access door interlocks & status panel functional: <input type="checkbox"/> Key <input type="checkbox"/> Code Comments: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.02 |
| 2. Access door signs current format, emergency contact current: Comments: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.08 |
| 3. Posting on ancillary doors: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.08 |
| 4. Current IWS/SP available: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | M-ES-PP.03 |
| 5. Eyewear requirements posted: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.02 |
| 6. Interlock check sheet available & current : _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.09 |
| 7. Alignment procedure (class 3b & 4): _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.10 |
| 8. Interlock check procedures available for complicated systems: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.09 |
| 9. Are two or more Class 3B lasers operation at different wavelengths: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | N/A |
| 10. If so, is it addressed in an IWS/SP: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | M-ES-PP.02 |

Laser unit safety controls:

- | | | | | | | | |
|---|--------------------------|---|--------------------------|---|--------------------------|----|------------|
| 11. Laser classification labels present on commercial units: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.12 |
| 12. Protective housings in place: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.01 |
| 13. Beam shutters interlocked & functioning as per interlock check sheet: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.02 |
| 14. Interlock bypass functioning (≤ 15 seconds): _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.02 |

Engineering and Administrative Laser Safety Controls:

- | | | | | | | | |
|--|--------------------------|---|--------------------------|---|--------------------------|----|------------|
| 15. Lasers & optics secured to table: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.17 |
| 16. Beam properly contained (Not a hazard to persons sitting or standing): _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.01 |
| 17. Beams enclosed where available: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.01 |
| 18. Noncombustible, non-specular beam barriers in place: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.01 |
| 19. Evidence of laser burn marks, if so how extensive: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.01 |
| 20. Adequate controls where beams leave tables or leave enclosures: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.01 |
| 21. All beams attenuated or low power when practical: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.01 |
| 22. Windows/door openings covered: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.13 |
| 23. Beams blocked from open by-passed doors: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.14 |
| 24. Non-essential reflective materials out of beam paths & surroundings: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.01 |
| 25. Administrative controls employed, barriers, demarcated: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.01 |
| 26. Upward directed beams are labeled: _____ | <input type="checkbox"/> | Y | <input type="checkbox"/> | N | <input type="checkbox"/> | NA | S-IS-LA.15 |

Other Safety Measures

- 27. Laser eye exams by all personnel (3b and 4 lasers): _____
- 28. Proper eyewear available for all personnel, ODs OK?: _____
- 29. Does one pair of eyewear cover all wavelengths?: _____
- 30. Are separate pairs of eyewear used for different wavelengths?: _____
- 31. Proper storage of eyewear, where?: _____
- 32. Proper skin protection available & employed: _____
- 33. Have workers completed required training?: _____
- 34. Have workers completed and documented OJT for laser alignment work? _____
- 35. Have workers acknowledged the read and sign section of the IWS?: _____
- 36. Collecting optics used (microscopes, binoculars, telescopes): _____

<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA

- S-IS-LA.16
- S-IS-LA.03
- N/A
- N/A
- S-IS-LA.18
- M-ES-GE.05
- M-ES-TR.01
- M-ES-TR.01
- M-ES-PP.00
- S-IS-LA.19

Non-beam Hazards:

- 37. High voltage hazards minimized: _____
- 38. Optical tables bonded to building ground: _____
- 39. Optical Tables seismically secured: (if no, how many?): _____
- 40. Housekeeping fire hazards minimized: _____
- 41. Good housekeeping on optical tables: _____
- 42. Fiber optic use: _____
- 43. Container for fiber sharps: _____
- 44. Fiber ends/connectors labeled: _____
- 45. Fiber conduit labeled: _____
- 46. Other non-beam hazards minimized: _____

<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA
<input type="checkbox"/>	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	NA

- N/A
- S-IS-LA.05
- S-IS-LA.20
- S-IS-LA.01
- M-ES-GE.01
- M-ES-GE.01
- S-IS-LA.21
- S-IS-LA.22
- S-IS-LA.22
- N/A

Comments: _____

Auditor/LSO/DLSO signature _____

Date _____