

# **UNIVERSITY OF KANSAS - LAWRENCE CAMPUS LABORATORY SAFETY MANUAL PART V LASER SAFETY PLAN**

## **Section 2) Standard Operating Procedures (SOPs) and Practices for Laboratories Using Non-exempt Lasers**

### **2.1) General Principles for Working Safely with Laboratory Non-exempt Lasers**

All authorized users and authorized laboratory supervisors using non-exempt lasers shall:

2.1.1) Avoid laser exposures in excess of limits established in ANSI Z136.1

2.1.2) Avoid underestimation of laser-related risks.

2.1.3) Comply with the requirements of this KU Laser Safety Plan.

### **2.2) Review of Universal Standard Operating Procedures for Non-Exempt Lasers**

Note: This section provides references to the Universal Standard Operating Procedures in Laboratories with Hazardous Materials/Radiation Generating Equipment provided in Part I, as applicable, for achieving Laser Safety. References to Part I are given.

All individuals, authorized users, and authorized laboratory supervisors using non-exempt lasers shall:

2.2.1) Responsibilities under Standard Operating Procedures

2.2.1.1) Fulfill their responsibilities as identified under Standard Operating Procedures in Part I: Section 2.1, specifically Sections 2.1.1 through 2.1.4.

2.2.2) Procurement of non-exempt lasers

2.2.2.1) Procure non-exempt lasers in accordance with the procedures given in Part I: Section 2.2 marked with an asterisk.

2.2.3) General Lab Safety Practices and Conduct with non-exempt lasers

2.2.3.1) Comply with and enforce the access restrictions applicable to visitors, non-laboratory personnel, and/or non-laboratory authorized occupants in rooms with non-exempt lasers as identified in Part I: Section 2.5.1.

2.2.3.2) Comply with and enforce the access restrictions applicable to individuals who are authorized occupants in rooms with non-exempt lasers as identified in Part I: Section 2.5.2.

2.2.3.3) Follow the general lab safety practices identified in Part I: Section 2.5.3. (marked with an asterisk or super-script L) when working with non-exempt lasers.

#### 2.2.4) Specialized Safe Laboratory Practices

2.2.4.1) Adhere to each of the specialized safe laboratory practices when working with non-exempt lasers, as applicable. These are identified in Part I: Section 2.6 (marked with an asterisk or superscript L).

#### 2.2.5) Hazard-Specific Safety Procedures

2.2.5.1) Follow hazard-specific safety procedures as identified in Part I: Section 2.7.11.

2.2.5.2) Follow laser-specific safety procedures as identified in this Part V, Section 2.5 below.

#### 2.2.6) Laboratory Specific Standard Operating Procedures

2.2.6.1) Develop and implement laboratory-specific Standard Operating Procedures in accordance with Part I: Section 2.8.

#### 2.2.7) Emergency Procedures

2.2.7.1) Adhere to the general emergency procedures identified in Part I: Section 2.9, specifically Sections 2.9.1 through 2.9.6.

### **2.3) Hazardous Material (HM) Receipt and Distribution**

All individuals, authorized laboratory supervisors, and authorized users shall:

2.3.1) Follow the requirements of Part I, II, III or IV, as applicable, if a laser installation requires the introduction of hazardous materials into the laser laboratory.

### **2.4) Hazardous Materials Storage**

All individuals, authorized laboratory supervisors, and authorized users shall:

2.4.1) Follow the requirements of Part I, II, III or IV, as applicable, if a laser installation requires the introduction of hazardous materials into the laser laboratory.

## **2.5) Laser Safety - Standard Procedures**

### 2.5.1) General Standard Operating Procedures

Authorized Users and Authorized Occupants shall:

2.5.1.1) Avoid staring into a laser beam (class 2 or higher) or pointing such a beam toward an individual. Avoid looking at the pump source.

2.5.1.2) Wear approved laser eyewear specified for the type and class of laser beam as required whenever the laser is in operation (or follow safety procedures providing equivalent protection as specified in written laboratory-specific standard operating procedures. See section 3.6.1.3.)

Note: Personnel should be especially cautious around lasers with invisible light frequencies.

Authorized Users shall:

2.5.1.3) Not operate lasers at eye level unless specific permission has been granted by the Laser Safety Officer.

2.5.1.4) Warn all individuals present, verify that all required safety measures are satisfied, and certify that all personnel are cleared from the path of the beam before energizing the beam.

2.5.1.5) Not leave an active laser unattended unless it is part of an approved and controlled environment designed for unattended operation.

2.5.1.6) Exercise extreme care in all procedures that might result in inadvertent reflections of the laser beam. (All procedures with such a potential must have been evaluated for safety by the Authorized Laboratory Supervisor and provided in writing together with appropriate training.)

Note: This includes good housekeeping with special emphasis on verifying that no device, tool, or other reflective materials are left in the path of the beam.

2.5.1.7) Not wear bright, reflective jewelry or other reflective objects.

2.5.1.8) Use enclosed beams and/or with appropriate beam stops whenever it is feasible to do so.

2.5.1.9) Keep occupancy as low as possible consistent with the required work when open laser beams are in operation and verify that all occupants present are either Authorized Occupants or Authorized Users.

2.5.1.10) Not remove the protective housings of the laser system.

2.5.1.11) Secure the laser against unauthorized use based upon approved written laboratory-specific standard operating procedures when the laser is not in operation or under the control of an Authorized User.

2.5.1.12) Not over-ride or by-pass laser safety system interlocks unless specific permission is granted by the Laser Safety Officer.

2.5.1.13) Report all accidents or suspected eye injuries to the Laser Safety Officer.

2.5.2) Restricted or controlled access to Laboratory during operations with accessible laser beams

The Authorized Laboratory Supervisor shall:

2.5.2.1) Evaluate the need for restrictions on access to the laboratory during critical laser operations within the laboratory. This evaluation should include the need for interlocked entrances and/or annunciators and flashing "beam on" lights (See Section 3.4.2, Section 8.5, and ANSI standards)

2.5.2.2) Instruct the Authorized Users and Authorized Occupants concerning the nature of those restrictions, including the instructions in the laboratory specific Standard Operating Procedures.

Note: This includes an evaluation of the need to inform visitors, authorized occupants, and even authorized users of special risk factors.

2.5.2.3) Implement all access restrictions specifically required by any applicable Laboratory-Specific Safety Plan.

Authorized Users and Authorized Occupants shall:

2.5.2.4) Follow the instructions given by the Authorized Laboratory Supervisor concerning access restrictions.

2.5.3) Location of Non-exempt Lasers and Associated Warning Devices.

The Authorized Users shall:

2.5.3.1) Not move lasers to a new location unless the appropriate hazard evaluation has been performed by the Authorized Laboratory Supervisor and/or Laser Safety Officer, as applicable.

2.5.3.2) Maintain warning signs, interlocks, and alarms in accordance with the requirements specified in Section 3.4.2 of this Part.

2.5.3.3) Not by-pass required interlocks unless written procedures for by-passing an interlock have been approved by the Authorized Laboratory Supervisor/Laser Safety Officer and the user has been specifically trained in the procedure.

All occupants of a laser laboratory shall:

2.5.3.4) Follow the safety precautions and/or restrictions specified by any sign, annunciator, or warning light.

2.5.4) Disposal of laser associated hazardous materials and/or transfer of laser ownership. Authorized Users and Authorized Laboratory Supervisors shall:

2.5.4.1) Comply with the requirements identified in Part V: Chapter 6.