**APPENDIX C: Sample Standard Operating Procedure (SOP) without Optical Table**

|  |  |
| --- | --- |
| Principal Investigator: | Date: |
| Department: | Location: |

1. LASER SAFETY CONTACTS

Principal Investigator: Phone:

Laser Safety Officer: Valerie Perez Phone: 215-746-6652

Service Contractor: Phone:

Emergencies: University Police Phone: 511 or 215-573-3353

1. LASER DESCRIPTION

Type: Wavelength: Classification:

Manufacturer: Model: Serial #:

Continuous Wave Laser

 Maximum Power:

Pulsed Laser

 Maximum Energy: Pulse Duration:

 Pulse Repetition Frequency:

Description of Application:

1. PERSONNEL
2. Authorized Personnel: The laser is located in ­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and may be operated only by authorized personnel who are fully cognizant of all safety issues involved in the operation of such a device. These personnel are to ensure that the laser is only operated in the manner laid out in this document. To become an authorized user, one must:
3. Complete Environmental Health & Radiation Safety (EHRS) training for laser safety.
4. Read and fully understand the standard operating procedures published by the University of Pennsylvania at <http://www.ehrs.upenn.edu/programs/laser/lasermanual/>.
5. Read and fully understand the standard operating procedures as described in this document
6. Receive training on the laser by an authorized user.
7. Sign the authorized user sheet to affirm that the above steps have been completed.

Unauthorized Personnel: No unauthorized personnel may enter the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ during laser operation unless accompanied by an authorized user. All visitors must be briefed on proper safety protocol and must wear appropriate protective eyewear located in the laboratory unless the laser sources are turned off during the entire visit.

1. OPERATING PROCEDURES:

**NOTE: Refer to Section 7 below for appropriate Laser Safety Eyewear.**

1. Laboratory preparation and start-up procedures.

1. Ensure that laser hazard warning lights are switched on.

2. Ensure doors or curtains are closed and all personnel are wearing appropriate protective eyewear

3. Inspect all electrical connections for damage and connectivity.

1. Target area preparation.
2. Normal operating procedures

1. The laboratory doors will remain closed, and the hazard warning lights switched on, when the laser is operating.

2. Laser protective eyewear for sufficient protection against \_\_\_\_\_\_\_\_\_\_ are available in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. **Laser protective eyewear must always be worn when the laser is in operation.**

3. Specular and diffuse reflections will be controlled using apertures, and enclosures. These control methods must remain in place during normal operation.

1. Shut down procedures
2. Special operating procedures, including alignment, interlock bypass, maintenance and service.
3. Optical Amplifier procedures.
4. Emergency procedures.

In the event of a laser accident, follow the procedure below:

1. Ensure the laser is shut off.
2. Provide for the safety of the personnel as needed (first aid, evacuation, etc.). Note – if an eye injury is suspected, have the injured person keep his/her head upright and still to reduce bleeding. A physician should evaluate laser injuries as soon as possible.
3. Obtain medical assistance for any injured persons:

**Ambulance:**

Call campus police: 511 (campus phone) or 215-573-3333 (any phone)

**Students (during business hours):**

Student Health

3535 Market Street, Suite 100

215-746-3535

 **University Staff (during business hours):**

 Occupational Medicine

 Ravdin 2nd floor

215-662-2354

 **After hours/visitors:**

Emergency Service at HUP

 Ground floor Silverstein Pavilion/HUP

 34th and Spruce Streets

1. Notify Prof. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as soon as possible.
2. Notify EHRS when an exposure incident occurs.
3. CONTROL MEASURES

|  |  |  |
| --- | --- | --- |
| Y/N/NA | CONTROL | COMMENTS |
|  | Entryway interlocks or controls are present. |  |
|  | Protective housing interlocks are present. |  |
|  | Enclosure interlocks are present. |  |
|  | Emergency stop/panic button is present. |  |
|  | Master switch is present. |  |
|  | Laser and associated equipment is secured to base. |  |
|  | Beam stops or attenuators are present. |  |
|  | Protective barriers are present. |  |
|  | Warning signs are posted. |  |
|  | Personal protective equipment is available and used. |  |
|  | Nominal Hazard Zone is defined. |  |
|  | Manufacturer’s operating manual is available.  |  |

ADDITIONAL COMMENTS:

1. HAZARDS AND CONTROLS

|  |  |  |
| --- | --- | --- |
| Y/N/NA | HAZARD | CONTROL MEASURES |
|  | Unenclosed beam. |  |
|  | Potential exposure to direct beam or reflections. |  |
|  | Laser positioned at eye level. |  |
|  | Reflective materials in beam path. |  |
|  | Exposure to ultraviolet or blue light. |  |
|  | Hazardous materials are used. (Dyes, solvents, etc.) |  |
|  | Hazardous waste is generated. |  |
|  | Laser generated air contaminants are generated. |  |
|  | Exposure to high voltage. |  |
|  | Compressed gases are used. |  |
|  | Fire hazards are present. |  |
|  | Plasma radiation is generated.  |  |

ADDITIONAL COMMENTS:

1. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Laser Eyewear

|  |  |
| --- | --- |
| FOR THIS LASER | WEAR THIS EYEWEAR |
| Laser | Wavelength(s)(nm) | Wavelength(s)Attenuated(nm) | Optical Density | Manufacturer |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Other PPE Required

1. LASER OPERATOR REVIEW

I have read this procedure and understand its contents.

Name Signature Date