Laser Safety Manual

Texas State University-San Marcos

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TEXAS STATE UNIVERSITY
SAN MARCOS

LASER SAFETY MANUAL

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PREFACE

RADIATION SAFETY is the responsibility of all faculty, staff, and students who are directly or indirectly involved in the use of laser devices.

The Texas State University at San Marcos is licensed by the State of Texas to use lasers in research, development, and instruction. While this means a minimum of controls by the state, it entails the responsibility that we establish and pursue an effective Laser Safety Program. It is the purpose of this manual to set out the guidelines of that program.

The use of lasers in a university, where a large number of people may be unaware of their exposure to laser hazards, makes strict adherence to procedures established by federal and state authorities of paramount importance. Special efforts to ensure the safety of faculty, staff, students and the general public are essential. The Risk Management & Safety Office has the responsibility for establishing and pursuing an effective Laser Safety Program for this University.

It is the responsibility of all faculty, staff, and students involved in laser work to familiarize themselves with the program outlined in this manual, and to comply with its requirements. Laser safety depends on a continuous awareness of potential hazards.

The purpose of this manual is to provide users and non-users of lasers the more significant facts and figures about laser safety. Overviews of state regulations, and direct policies and procedures concerning different areas of laser use at Texas State are covered. The regulations, policies and procedures set forth in this guide are written to protect Texas State faculty, staff, students, and visitors against unnecessary and potentially harmful exposures.

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SECTION I – SAFETY AND RESPONSIBILITY

A. Definitions of Key Terms and Acronyms

1. Agency means the Texas Department of State Health Services Radiation Control.
2. DSHS means Texas Department of State Health Services
3. LSO means the Laser Safety Officer
4. Registration means Texas Certificate of Registration for lasers No. Z01624
5. TAC means the Texas Administrative Code.
6. EHSRM means Environmental Health, Safety & Risk Management office
7. Maximum Permissible Exposure (MPE) - The level of laser radiation to which a person may be exposed without hazardous effect or adverse biological changes in the eye or skin. Parameters that determine the MPE are wavelength, duration, exposure conditions (point or extended source, cw or pulsed, pulse width, pulse repetition frequency). MPE are given in units of radiant exposure (J/cm^2) or irradiance (W/cm^2).
8. Nominal Hazard Zone (NHZ) - The space within which the level of direct, reflected, or scattered radiation during operation exceeds the applicable MPE. Exposure levels beyond the boundary of the NHZ are below the applicable MPE level.

B. Laser Safety Program

1. Objective: This program is designed to prevent occupational and public exposure to laser energy to protect the staff, employees, and students of Texas State; to protect members of the general public; and to comply with 25 TAC §289.301 [Texas Regulations for Control of Laser Radiation Hazards].
2. The program is based upon the laser classification as designated in American National Standard Z136.1-2000 section 3.3 “Laser and Laser System Hazard Classification Definitions.”
3. Method: Texas State has established this Laser Safety Manual (LSM) to provide guidance to faculty, staff, and students when working with Class 3b and Class 4 lasers.

C. State and Federal Standards

There are several regulations and standards that apply to lasers and their use. Priority should be given to state and federal regulations such as the Texas DSHS Rules and Regulations, and those of the Occupational Safety and Health Administration (OSHA) as they apply to use at Texas State University. The American National Standards Institute (ANSI Z136.1, Z136.5) publishes recommendations regarding laser safety, and should be used as a guideline.

D. Laser Safety Management

Should any operation involving lasers present a threat to the staff or students of the University, or to any member of the general public, EHSRM has the authority to terminate any such operation until the hazard is removed or mitigated.

E. Laser Safety Officer

1. Responsibilities – the Laser Safety Officer (LSO) will be a trained professional who is responsible for compliance with these policies and the regulations. The LSO will also provide a variety of technical services necessary to maintaining safety and compliance with regulatory requirements.
2. LSO Duties - The duties of the LSO include:
    a. Oversight of all operating, safety, emergency, and procedures and activities, and annual reviews.
    b. Ensuring that users of lasers are trained in laser safety, as applicable for the class and type of lasers the individual uses.
    c. Investigation and reporting of the circumstances for each known or suspected case of laser over-exposure to an individual and each theft or loss of lasers, to include the cause(s), and recommended corrective action to prevent recurrence;
    d. Maintenance of an inventory for all Class 3b and Class 4 lasers and laser systems on university property.
    e. Maintenance of a continuous program evaluation through routine lab inspections and hazard elimination;
    f. Maintenance of laser safety program records in the EHSRM.
    g. Maintenance of a thorough knowledge of management policies and administrative procedures of Texas State University.
    h. Prevention, by immediate suspension or termination of activity if necessary, of any unsafe or illegal use of lasers.
    j. Maintenance of files on each PI in the EHSRM office, and provision for each of a copy (and updates) of this manual.

F. Departmental Safety Officer (DSO)

Each department using lasers should designate a safety officer to serve as an advisor to and oversee the registered users. This person should be responsible for ensuring that registered users have all lasers registered and operate their lasers and/or laser systems in a safe manner that follows guidelines outlined in this manual.

G. Principal Investigator

The Principal Investigator (PI) is the faculty member, staff member, or director of a contract/private lab in control of the laser or laser system. This person must have all Class 3b and Class 4 lasers and laser systems registered with the University's LSO. They will also be responsible for the safe operation of the laser system and for the safety of those using their laser system. These tasks include, but are not limited to:

1. Assuring lab personnel and authorized users within the laser control area receive adequate laser safety training, and access to laser safety manuals, SOP, MSDS, and any other information pertinent to laser safety before operation of laser equipment
2. Implementing appropriate control measures to reduce exposure to harmful levels of laser radiation, and assuring all feasible safety precautions are taken ensure safe use of laser equipment
3. Providing lab personnel and authorized users with personal protective equipment in good condition that is appropriate for the laser being used
4. Posting of signs and labels according to ANSI Z136.1 standards
5. Writing and updating standard operating procedures for laser equipment
6. Documenting of laser safety training for lab students and laser personnel
7. Reporting of accidents and possible exposures to the DSO and LSO.

H. Authorized Users

Authorized users include those working with or around lasers (i.e. operators, technicians, maintenance, and service personnel). Laser safety training should be provided to those routinely working in laser environments. Only qualified personnel should carry out servicing and maintenance of class 3b and 4 lasers (with the exception of the vendor's qualified service personnel). Authorized users should not energize or work with or near a laser unless authorized by the Principal Investigator.

I. Lab Students

Students working under a Principal Investigator may use lasers in the lab after completing laser safety training and training in operation of the particular laser or laser system. Their responsibilities are:

1. familiarity with operating procedures
2. awareness of visitors/spectators in the area
3. compliance with the safety rules and regulations
4. termination of laser system operation if hazards exist
5. immediate reporting of any laser accident to the PI and DSO

J. Incidental Users

Personnel such as faculty, students and other professionals that may be engaged in education, laboratory research, and research support activities that do NOT work with lasers but may require unaccompanied access to the laboratory.

K. Visitors and Spectators

Visitors and spectators are not allowed in a laser area without approval of the registered user. The registered user or authorized user must supervise visitors and spectators approved by the registered user during laser system operation.

L. Environmental Health, Safety and Risk Management Office

Conduct operations and services to support the University laser safety program.

SECTION II – LASER USE AUTHORIZATION PROGRAM

A. Principal Investigator Application Procedure

1. PI Qualifications
   a. The applicant must have sufficient training and experience in the use of the laser(s) requested to ensure that proposed work is conducted and/or supervised in a safe manner.
   b. The applicant must be a Texas State employee.
   c. The applicant must specify on the application the type of lasers to be used as well as the safety precautions to be used.
   d. See Section III.F for requirements for individuals working under an applicant's auspices.
2. Application Procedure
   a. The prospective registrant will complete forms:
      RMS-LSF-001, “Laser Use Authorization Request”
      RMS-LSF-002, “Restricted Laser Registration”
      RMS-LSF-005, “Laser Class 3b & 4 Authorized Users List”
   b. The LSO will review all applications.
   c. A diagram of the proposed work area in the laboratory must accompany the application, indicating laser work areas, non-laser work areas, and equipment locations, and if applicable the Nominal Hazard Zone.
   d. Copies of the prepared Standard Operating Procedure shall be submitted along with the application.
   d. Final approval of all applications is required by the Texas State LSC.
   e. All applications must be filled out completely and signed by the applicant.
3. Actions or activities requiring an amendment
   a. If there is a change in the terms and conditions of an authorization or if procedures authorized by it change (personnel, lab relocation, etc.)
   b. If there is a change in equipment
   c. If there is a significant change in submitted Operating Procedures
   d. If significant changes occur in the normal operation of the laser operating procedures.

4. Procedure for Termination

   The following procedure shall be used should a PI desire to terminate their use of laser equipment.

   a. A letter of intent to terminate the authorization will be submitted to the LSO. This letter will include:
      - The date of termination
      - The listing of the PI's authorized laboratories
      - A statement that all lasing equipment used and/or stored will be removed
   b. Upon receipt of the letter of intent, the LSO will conduct a close-out survey of the affected areas and equipment
   c. Based on a review of the letter of intent, the results of the close-out survey, and the disposition of lasing equipment, the LSO will make his recommendations to the LSC at its next meeting, which in turn will consider and vote on the request to termination.
   d. Upon termination, all signs and labels, indicating that the areas were authorized for use lasing equipment, shall be removed.

B. Inspection/Monitoring Program

1. The LSO shall inspect all laser usage facilities for compliance with all applicable regulations - state, federal, and local.
2. The LSO shall make a record of each inspection and keep those on file.
3. The LSO will forward a formal report of inspection to each PI within two weeks of final evaluation of his/her inspection results, noting corrective action needed.
4. Each PI will revise or correct his/her individual program as noted in the report under "Corrective Actions". Questions or problems should be addressed to the LSO or the LSC.
5. The LSO will request a written response to the “Corrective Actions” from the PI within 30 days.
6. The LSO will report all major violations as well as any instance of noncompliance for a PI to the LSC.
7. The LSO shall make follow-up inspections of all PIs having deficiencies deemed serious by the LSC within 15 days of report.
8. All inspection statistics should be evaluated by the LSC.
9. PIs having repeated violations (same violation during two consecutive inspections) will be reported to the LSC for appropriate action.
10. A PI who commits the same violation during three consecutive inspections will be reported to the LSC. The LSC will issue a written notice and require the PI to meet with the committee during the next scheduled meeting to explain their violation.
11. The LSC may terminate a PI’s laser use authorization if major violations are continued.

SECTION III – LASER SAFETY PROGRAM

A. General

The LSO performs routine monitoring and inspections of all Class 3b and Class 4 laser users and the results are then presented to the LSC for their evaluation. Through this process, the Laser Safety Program at Texas State can keep abreast of past, present, and future concerns with laser safety.

The entire radiation safety program (including lasers) is periodically inspected by a Regional Inspector from the Bureau of Radiation Control for compliance with the Texas Regulations for the Control of Laser Radiation Hazards. The results of these inspections are presented to the Director of EHSRM, the Laser Safety Officer, and the Laser Safety Committee.

1. General Monitoring
   a. The LSO may visit laboratories to ensure laser operations are according to procedures set forth in this manual and PI's approved standard operating procedures.
   b. The LSO will immediately report any violation to the PI and LSC.
2. Formal Inspections
   a. Laser inspections will be performed annually by the LSO.
   b. Inspection results will be presented to the LSC.
   c. Violations found will be brought to the attention of the PI.
   d. Inspections results and reports will be sent to the PI.
3. Violation Levels

   Violations by a PI are classified as either major or minor. All violations will be presented to the LSC at the next regularly scheduled meeting. A copy of the most current monitoring and inspection criteria and the type of violation may be obtained from the LSO.

   a. Major Violations - include but are not limited to:
      (1) Unauthorized personnel in laser area when laser is in use. Authorized personnel are listed on the Laser Class 3b & 4 Authorized Users list form (RMS-LSF-005);
      (2) Operation of laser equipment in a manner, which could cause injury to personnel outside the laser area;
      (3) Operation of laser equipment in a manner other than that specified in the approved standard operating procedures;
      (4) Personnel in a laser area not utilizing proper personal protective equipment when the laser is in use;

(5) Operation of laser equipment without prior authorization from the LSC and LSO; or

(6) Any combination of (1) to (5).

Any major violation may warrant the immediate deactivation of the laser operation, and will remain so until safety concerns are addressed.

b. Minor Violations - include but are not limited to:

(1) Improper posting of a laser area;

(2) Improper labeling of laser equipment;

(3) Log books not filled out as required;

(4) Monthly surveys and interlock checks not performed;

(5) Standard operating procedures and laser equipment manuals not in vicinity of laser equipment;

Any minor violation will be reported to the PI for correction and results discussed in the LSC meeting.

B. Lasers or Laser Equipment Purchase/Transfer

1. Purchase

a. Requestor will contact the LSO.

b. Requestor will provide the following information:

(1) Principal Investigator

(2) Description of item

(3) Manufacturer/Vendor

(4) Model and Serial Number

(5) Quantity

(6) Purpose

(7) Location of intended use

c. LSO will:

(1) Verify status of laser use authorization

(2) Document information received

d. When laser received, the PI will complete the following and forward to the LSO within 5 working days:
   (1) Restricted Laser Registration form (RMS-LSF-002)
   (2) Laser Transaction Information form (RMS-LSF-006)

2. Transfer of Laser Equipment
   a. Requestor will contact the LSO and Property/Surplus Manager
   b. Requestor will complete a Laser Transaction Record Information form (RMS-LSF-006) and forward to the LSO within 5 business days
   c. LSO will document the information.

C. Facilities

1. Laser work areas(s) will have restricted access from non-authorized personnel.
2. Laboratories will have heat-chemical resistant materials in the beam paths (when applicable).
3. Laser work areas and lab entrances will be posted with the correct warning signs.
4. All signage (emergency numbers, etc.) shall be posted in prominent view.
5. Laboratories will have all windows covered with appropriate materials.
6. Laser dye, solvent, and gas laboratories will have ventilation, fume hoods, and gas cabinets capable of handling and storing the chemicals being utilized in order to comply with regulatory limits.
7. Laboratories shall be surveyed by the LSO at least once per 12 months.

D. Signage

1. Laser equipment will be labeled with manufacturer and class designation.
2. Laser equipment will have labels with warning, output, duration, medium, and wavelength.
3. 3Laser protective housing and enclosures will be labeled during normal and servicing operations.
4. Labels will be specific to the hazards of the laser.
5. Signage must be posted during maintenance and servicing operations and as stated in the Standard Operating Procedures.

E. Control Area and Access

1. Laser work areas(s) will have restricted access from non-authorized personnel.
2. Class 3B and Class 4 laser laboratories will control access to the laser radiation.

NOTE – All costs for installations and materials will be assumed by the PI or their department.

F. Training

1. Authorized Users
   a. Workers (Technicians, students, graduate assistants, post doctoral researchers, etc.) who will be working with a Class 3b or Class 4 lasing device must complete the Laser Safety Course.
   b. The course consists of the following:
      - Classroom/self-study of Texas State Laser Safety training material.
      - A written exam. Minimum score for passing is 70%.
      - Completion of Laser Operator Qualification Card form RMS-LSF-004.
   c. When form RMS-LSF-004 is complete, the form must be forwarded to the LSO for documentation and retention.
   d. PI must update form RMS-LSF-005 for all lasers that the individual will be associated with and send a copy of the form to the LSO.
2. Incidental Users
   a. Workers (Technicians, students, graduate assistants, post doctoral researchers, etc.) who as a result of their job/education requirements may be present in the laboratory during the operation of a Class 3b or Class 4 lasing device but are NOT an authorized user must complete the following:
      - Completion of the Texas State "Laser Awareness Non-User" presentation.
      - Completion of "Mastering Light: An Introduction to Laser Safety and hazards" video.
   b. Completion of the training requirements shall be documented and kept in the laboratory notebook. A copy shall be forwarded to the LSO for retention.

G. Personal Protective Equipment

1. Laser eyewear
   a. Must be in good condition and comfortable.
   b. Must be labeled with wavelength and optical density.
   c. Must be inspected annually (not to exceed 12 months) and documented. Results on inspection kept in laboratory notebook (5 years).
2. Protective clothing
   a. Clothing shall be appropriate for the protection of the operator.
3. Chemical resistant gloves for handling of dyes and solvents.
4. Various forms of shielding appropriate for the hazard.
5. Hearing protection if work environment exceeds regulatory limits.

H. Instrumentation

1. Laser equipment will have protective housing.
2. Laser safety interlocks for all Class 3B and Class 4.
3. Laser equipment will have either a key switch or a computer code.
4. Laser laboratories will have optical attenuators
5. Laser equipment will have operational lights, alarms, and devices to notify others that the laser is in "on."

I. Standard Operating Procedures

The items listed are recommended to be included in the SOP's for each laser. The information can be revised in part to reflect major modifications that affect the laser's performance and operation.

1. General Information
   a. Information of the laser owner
   b. Inventory control (Texas State University ID Number)
2. System Information
   a. Description
   b. Location
   c. Class
3. Hazards Summary
   a. Beam information
   b. Non-Beam information
4. Required Control Measures
   a. Access Controls
   b. System Controls
   c. Personnel Controls
5. Alignment Procedures
   a. By Whom
   b. Conditions
   c. Can be general for research purposes with the LSC approval.
   d. Buddy Policy is recommended for Class IIIB and IV laser laboratories.
6. Emergency Instructions

J. Modifications

1. A laser or laser system that requires modification that significantly changes the SOP and performance SHALL NOT be operated until approved by the LSO.
2. Modifications not reported to the LSO are in violation of the SOP approved by the LSC.

K. Usage Logs

Usage logs should be maintained for each Class 3b and Class 4 laser in use. The Usage Log should be dated and initialed by operator each time the laser equipment is operated. This log should include notes of adjustments, operation conditions, maintenance, servicing, and problems.

L. Record Keeping

The laser PI should keep the following for documentation and inspection purposes in one notebook. The records shall be available during routine monitoring of the lab by EHSRM personnel and/or regulatory agencies**.**

- Standard Operating Procedures (SOP)
- Signatures of SOP and PPE Training
- Laser Use Authorizaton
    - A current copy of the Laser Use Authorization.
    - Amendments
- Past Inspection Reports-All inspection reports sent from the LSO.
- LSO Memos-All memos from the LSO are available upon request.
- Laser Inventory-All current laser inventories for inspections.
- List of authorized users for the specific lasers in the laboratory (RMS-LSF-005 or equivalent).
- Results of annual eye protection examination.

M. Special Services

1. Special services include but are not limited to the following:
    a. General services
    b. Custodial services (e.g. scrubbing, stripping, and finishing floors, etc.)
    c. Building maintenance
    d. Construction services
2. Normally, all laser activity is suspended during the performance of these services.
3. The laboratories shall be surveyed (visual inspection) for any possible hazards within 24 hours of the scheduled service. The lab shall remain in order until after the services, and it is the responsibility of the PI to ensure that this is completed.
4. The results of the survey shall be documented in the laboratory notebook.
5. If it is necessary to have the laser in operation during the performance of any of these special services, then an authorized user is required to be present in the laboratory.

N. Routine Custodial Services

1. Routine custodial services include but are not limited to sweeping and/or mopping floors and emptying trash receptacles.
2. Normally, all laser activity is suspended during the performance of these services.
3. If it is necessary to have the laser in operation during the performance of any of routine custodial services, then an authorized user is required to be present in the laboratory.

O. Other Services

Normally, all laser activity is **suspended** until these services have been performed.

1. Departmental technicians may enter and perform routine duties provided they have the required laser training requirements, and are granted permission by the Principal Investigator.
2. Company technicians and servicemen servicing or checking items on any laser equipment must have the permission of the LSO. The PI will be required to have the lab surveyed within 24 hours prior to their visit. An authorized users IS required to be in the lab during the services

SECTION IV – SPECIFIC LASER REQUIREMENTS

A. Class 3b and Class 4 Lasers

All Class 3b and 4 lasers require the following items to be in full compliance of 25 TAC §289.301. Exemptions will be determined by substituting engineering and administrative controls reviewed by the LSC and the LSO.

1. Maximum Permissible Exposure (MPE)

   Each registrant or user shall NOT permit any individual to be exposed to levels of laser or collateral radiation higher than specified in ANSI Z136.1-2000 and Title 21, CFR, §1040.10.

2. Instructions to Personnel

   Personnel operating each laser shall be provided with written instructions for safe use, including clear warnings and precautions to avoid possible exposure to laser and collateral radiadiation in excess of MPE.

3. Engineering Controls
   a. Protective Housing – Prevents human access during operation to laser and collateral radiation in excess of MPE.
   b. Safety Interlocks - A switch that, when activated, will interrupt normal operation of a laser by closing a shutter or de-energizing the system.
   c. Viewing Optics and Windows – Shall incorporate suitable means to maintain the laser radiation at the viewing position at or below applicable MPE levels.
   d. Warning Systems – Visual or audible indication shall be provided during the emission of accessible laser radiation.
   e. Controlled Area - Shall be established when exposure to laser radiation in excess of MPE is possible. The area shall be posted and access restricted.

4. Key Control

   Each Class 3b or 4 laser device shall incorporate a key control or computer actuated master control. The key shall be removable and when the device is not in use, the key will be removed and stored in a location away from the machine.

B. Infrared Lasers

The beam from a laser shall be terminated in fire-resistant materials when necessary. Inspection nytervals of absorbent material and actions to take in the event or evidence of degradation hsall be specified in the operating and safety procedures.

C. Fiber Optic Lasers

The use of a tool shall be required for the disconnection of a connector of the laser fiber optic cable for servicing and maintenance purposes, if the connector is not within a secured enclosure. All connectors shall bear the appropriate label.

D. Constructed Lasers

All “constructed lasers” built from separate components must comply with the 21 Code of Federal Regulations (CFR) Part 1040, Federal Laser Product Performance Standard. Contact the LSO for more specific information.

SECTION V - EMERGENCY PROCEDURES

Introduction

This section outlines basic emergency procedures. An emergency situation or accident can arise from the use, storage, or transfer of radioactive material or from the misuse or abuse of equipment that produces non-ionizing (i.e. laser) radiation. This section is intended to enhance each PI and worker's ability to react properly to radiation accidents.

Due to the broad scope of possible accidents at Texas State, listing every step that must be followed for each type of accident would be impracticable. Instead, one must use the following basic procedures and apply them to his/her individual situation. The best advice for protection against laser accidents is to prepare for them.

A. General Information

A laser incident at Texas State should be defined as any unintentional accident or any single exposure or suspected exposure or accident involving laser radiation exposure to the eyes or skin.

NOTE
If persons involved in a laser incident are unsure as to the extent of the incident, those persons shall proceed with the assumption that an incident has occurred, unless otherwise noted. Users will report all laser incidents.

B. Organization and Authority

1. The LSO shall have responsibility for incident investigation.
2. The LSO will promptly report all investigation findings to the LSC and to the Agency [reference TAC §289.301(z)] for direction and action.
3. If preliminary findings of an incident presented to the LSC indicate there is probable cause of neglect or violation of state, federal, or local regulations or policies, the PI involved will be asked to attend the next LSC meeting to answer questions and present his/her account of the incident.
4. In the event of a major emergency situation the LSO shall have the authority to bring the situation under control. It should be noted that this may not follow the Texas State Administration Organization Chart. However, this will only be used in extreme emergencies where there is immediate danger to individual(s) or major buildings.
5. It is the responsibility of each PI to see that personnel working under their supervision have practical and easily understood plans for an emergency, and control of an emergency in their respective laboratory.

6. The LSO has the responsibility to see that each laser PI/worker knows how to:
   a. Recognize a laser emergency.
   b. Prevent or confine the accident.
   c. Exclude all personnel from possible risk of exposure.
   d. Immediately contact his/her supervisor, the LSO, and/or other emergency personnel for assistance.
7. Each user will be responsible for assisting the LSO in controlling and/or investigating the accident. Furthermore, the PI is responsible for assisting the victim(s) in obtaining medical attention, if necessary, as soon as practicable.

C. Fires, Explosions, or Major Emergencies

1. Notify all persons in the area to leave at once.
2. Call 911. Give them the address and the location of the emergency.
3. If possible, shutdown lasing equipment before evacuating the area.
4. Contact the LSO.
5. If firefighters arrive before the LSO, caution them that lasers are present in the area.
6. All users will be required to file an incident report with the LSO.
7. MINOR FIRES - If the fire is minor (individual decision) and there are no laser or chemical hazards involved, a user may attempt to put out the fire with approved firefighting equipment.

D. Accidents Involving Possible Laser Exposure

If a laser exposure has occurred, or is suspected to have occurred, proceed as follows:

1. Immediately remove affected person(s) from the area and notify the LSO.
2. Secure the area.
3. Take the affected persons(s) to the nearest emergency center immediately for clinical observation. Be sure to inform the attending medical personnel that it is a laser accident. Be prepared to answer any questions that may arise concerning the accident or type of laser involved.
4. Assist the LSO in obtaining all details of the incident.
5. The LSO will provide reports to the TDH, LSC, and regulatory agencies.

E. Loss Or Theft Of Laser Equipment

1. Any loss or theft of a laser shall be immediately reported to the LSO.
2. The LSO will provide required notification to the Bureau of Radiation Control.
3. The LSO will determine the extent of damage and analyze the recovery plan.

NOTE –Unauthorized repair of any laser device **IS PROHIBITED.** Laser sources involved in an accident, fire, flood, etc. **MAY NOT BE USED** until tested and found to be in proper and safe operating condition.

F. Malfunction of Laser Equipment

1. Any laser believed to be defective shall be locked into a safe position and made inoperative immediately. In emergency situations the individual user, authorized user, and/or the LSO can take such action as to deactivate the equipment.
2. The responsible user must restrict access to the area until the LSO arrives.
3. The LSO will evaluate the incident thoroughly, notify the LSC in writing within 10 days and if necessary report the incident to the DSHS within 30 days.