

****EXAMPLE****

LASER SAFETY STANDARD OPERATING PROCEDURES

Ref: (a) OPNAVINST 4790.2H
(b) OPNAVINST 5100.27A
(c) SECNAVINST 5100.14C
(d) BUMEDINST 6470.23
(e) E0410-BA-GYD-101/LASER
(f) MCO 5104.1B
(g) ANSI Z136.1-2007
(h) MIL-HDBK-828A

Encl: (1) Battalion ALSM Appointment
(2) LASER Eye Exam Request
(3) Annual LASER Inventory
(4) LASER Incident Report
(5) Class 3B And 4 LASER Inventory
(6) Military Exempt LASER Inventory
(7) LASER Safety Eye Examination Report
(8) LASER Overexposure Pre-Incident Plan

1. PURPOSE: To define the policy and provide procedures for implementing an effective LASER Hazard Control Program and assign responsibilities for the safe operational use of LASER systems per the references (a)-(h).

2. SCOPE: This Order applies to all (unit name) Companies operating LASERS, regardless of classification or military exemption status.

3. DEFINITIONS:

a. LASER: An acronym for Light Amplification by the Stimulated Emission of Radiation. Any device can be made to produce or amplify electromagnetic radiation in the X-ray, ultraviolet, visible, infrared, or other portion of the wavelength spectrum primarily by the process of controlled, stimulated emission of photons.

b. LASER Classifications: All LASER systems are categorized to identify the biological threat and the subsequent level of LASER safety control measures required for their safe and effective use. This classification ranges from a Class-1 LASER, which is inherently safe for direct beam viewing, to a Class-4, which poses the greatest biological threat and requires the strictest safety control measures. LASER system classifications are typically labeled on the exterior of the system and identified for normal system operation only. When a LASER system is disassembled for maintenance or when protective features are removed, the LASER classification may default to a more hazardous classification.

(1) Class 1 lasers emit a laser beam that is not hazardous, and consequently require no controls or warning labels.

(2) Class 2 lasers emit a visible laser beam that is not considered hazardous for momentary exposure in unintentional viewing. Protection is afforded by the human aversion response, eye blinking, to avoid deliberately viewing bright light. A yellow caution label on the laser warns against intentionally staring directly into the laser beam.

(3) Class 3a lasers emit a visible beam that is not considered hazardous for momentary exposure in an unintentional viewing situation, but which is potentially hazardous if viewed through magnifying optics such as binoculars. These lasers must be operationally controlled to avoid viewing of the beam with magnifying optics. These lasers may have either a yellow caution or red danger label depending on the power output of the laser.

(4) Class 3b lasers emit a laser beam that is potentially hazardous to the eye if viewed directly or if the specular (vice diffuse) reflected beam is viewed. Care is required by the operators to avoid intra-beam viewing and to control specular reflections from mirror-like surfaces. Special eye protection is recommended with these lasers and they require red danger warning labels.

(5) Class 4 lasers emit a high-powered laser beam that is hazardous to the eye from direct viewing and from specular reflection. These lasers may also produce diffuse reflection hazards, and / or constitute a skin and / or fire hazard. These lasers require strict control, which usually includes special eye protection, door interlocks, and baffles to guard against transient personnel exposure. They also have a red danger label.

c. Military Exempt Lasers: The Federal Performance Standard for Light Emitting Products published in the CFR 21, Part 1040, issues safety and design requirements for the manufacture of lasers for commercial and military applications. Some of these design requirements are incompatible with operational military use, therefore, an exemption has been granted exclusively to DoD for "military exempt lasers," which are defined as LASER systems that are designed for combat, combat training, or classified in the interest of national security and exempted from the regulatory obligations of the Federal Performance Standard for Light Emitting Products 21 CFR Part 1040 in accordance with reference (e).

d. 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 eyes or skin. The Bureau of Medicine and Surgery (BUMED) adopts through references (b) the MPE thresholds and determination methods outlined in reference (g).

e. Nominal Ocular Hazard Distance (OHD): The distance along the axis of the unobstructed beam from the LASER to the human eye beyond which the irradiance or radiant exposure during normal operation is not expected to exceed the MPE.

f. All other essential terms relating to lasers are further defined in references (b) through (h).

4. BACKGROUND: As LASER systems proliferate within the military, the potential of concentrated energy being directed and absorbed by biological tissues increases, resulting in LASER overexposure. Specifically, the eyes and skin are highly susceptible to LASER energy. Due to the refractive capability of the eye, LASER energy received by the eye can become exponentially intensified and subsequently damage internal tissues. LASER effects to the skin are similar to that of sun exposure. When LASER energy is absorbed by the eyes or skin, the energy is transformed into heat. This leads to rapid heat build-up within the tissue, which is the primary mechanism for LASER overexposure. Current fleet operational LASER systems typically do not operate in the high output ranges required to damage the skin; however, the eyes remain extremely vulnerable to the LASER systems. The widespread use of LASERS in the military creates the potential for the associated risk of causing permanent and serious injury to unprotected personnel and under trained personnel. To minimize this risk, the control of LASER hazards is a necessity during training and operational exercises where LASER devices are used. The biological effects of LASER radiation are similar to those of light generated by high intensity conventional ultraviolet, infrared, and visible light sources such as the sun, nuclear explosions, or arc lamps. However, the chance of eye or skin damage is greater from LASER radiation. The LASER output is highly coherent and the high intensity is localized into a concentrated directional beam, which enables the LASER output to be up to 1000 times greater in magnitude than light from the sun. The widespread use of LASER systems increases the probability of personnel exposure to injurious LASER light. Safeguards are needed since injury may occur from the LASER source. To ensure safe and effective use of LASER systems, reference (b) designates the Bureau of Medicine and Surgery (BUMED) as the lead agency for LASER Safety in the Navy and the Marines Corps and grants military exempt status for LASER systems used for combat, combat training, or classified in the interest of national security. Reference (b) prescribes BUMED policy and guidance in the identification and control of LASER radiation hazards. It applies to the design, use, and disposal of all equipment and systems capable of producing LASER radiation, including LASER fiber optics and issue guidance in the identification and control of LASER Hazard Control Programs for commands utilizing Class-3b and Class-4 LASER systems. This includes the requirements for a LASER Systems Safety Officer (LSSO), LASER standard operating procedures and safety regulations, personnel safety training, operator medical surveillance, LASER eye protection, LASER warning signs, and administrative protective control measures. Reference (d) establishes medical surveillance requirements and notification procedures for suspected LASER overexposure injuries. Reference (e) provides LASER system safety parameters. Reference (f) delineates Marine Corps guidance for establishing a command LASER Hazard Control Program. Reference (g) defines maximum permissible exposure (MPE) limits and establishes LASER standards, defining the control measures necessary for each LASER classification. Technical

information on measurements, calculations, and biological effects are also provided in reference (g).

5. POLICY: In accordance with the references, the policy of this command is organizing and managing a local LASER Hazard Control Program as follows:

a. A Laser Safety Organization shall be established to ensure that adequate laser safety design, training, documentation, and audits are provided.

b. An Administrative Laser Safety Officer (ALSO) or Administrative Laser Safety Manager (ALSM) shall be school trained /certified, appointed by name, and shall establish a Local Laser Safety Program per reference (b) and (c).

6. RESPONSIBILITIES:

a. Administrative Laser Safety Officer (ALSO):

(1) A Battalion Administrative Laser Safety Officer shall be appointed in writing by the Commanding Officer and shall have direct access to the Commanding Officer on all issues pertaining to laser operations and safety. The LSSO shall be a certified graduate of an Administrative Lead Agency (ALA) / lead Navy technical laboratory (LNTL) approved ALSO course or higher. Current Cat II LSSOs will be grandfathered as an ALSO, but must recertify as an ALSO every 4 years.

(2) The ALSO is responsible for the administration of the Local Laser Hazard Control Program.

(3) The ALSO will assign in writing an Administrative Laser Safety Manager (ALSM). The ALSM will assist the ALSO in discharging his responsibilities.

(4) The ALSO will conduct annual safety inspections and surveys to ensure compliance with all regulations.

(5) The ALSO shall have the authority to suspend, restrict or stop the operation of a laser or laser system.

(6) The ALSO shall identify and maintain records of all personnel who require medical surveillance and schedule them for proper screening using Enclosure (2). In addition, the ALSO will also maintain records for personnel who do not require medical surveillance. In addition, the ALSO will investigate and report all suspected laser overexposure incidents, per references (b), (d), and (f). Enclosure (8) provides definitive guidance for the initial response to a suspected laser over exposure incident.

(7) The ALSO will maintain a current inventory of all lasers held by the unit including physical location and the individuals responsible for the equipment. In addition, the ALSO will maintain a Laser Data Worksheet, Enclosure (3), for each type of laser that is held by the Unit.

(8) The ALSO will conduct annual Laser Safety refresher training, document and maintain records of the training.

(9) The ALSO will ensure that all required personnel have proper Laser Safety Indoctrination documented using Enclosure (2).

(10) The ALSO will implement a laser safety committee. This committee shall assist the ALSO in supervising adherence to the Unit laser safety policies.

(11) The ALSO will establish local laser Standard Operating Procedures (SOP) to ensure safe and effective use of laser systems held by the command.

(12) The ALSO will obtain BUMED approval prior to disposal of military exempt lasers. Ensure excess military exempt lasers are not sold or donated outside of DoD unless they have been brought into compliance with 21 CFR and received FDA registration.

b. Administrative Laser Safety Manager (ALSM):

(1) The ALSM will be appointed in writing from the ALSO.

(2) The ALSM will act as the ALSO in the absence of the ALSO.

(3) The ALSM will assist the ALSO in discharging his responsibilities as outlined in paragraph 5a.

(4) The ALSM shall establish laser safety procedures in conjunction with the ALSO for all procedures involving lasers.

(5) The ALSM shall assist the ALSO with the training of personnel designated using laser systems.

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(EXAMPLE ALSM APPOINTMENT)

From: Administrative Laser Safety Officer
To: Administrative Laser Safety Manager (Select)

Subj: APPOINTMENT OF COMPANY ADMINISTRATIVE LASER SAFETY MANAGER
(ALSM)

Ref: (a) OPNAVINST 4790.2
(b) E0410-BA-GYD-101/LASER
(c) OPNAVINST 5100.27
(d) BUMEDINST 6470.23
(e) SECNAVINST 5100.14C
(f) MCO 5104.1A
(G) BnO 5100.3

1. In accordance with the references, you are hereby assigned as the Administrative Laser Safety Manager for (unit name) .

2. You are directed to become familiar and to comply with provisions of the references and all other related directives and instructions. You will assist the Administrative Laser Safety Officer in any of the duties that may be performed. You are directed to act as the Administrative Laser Safety Officer for (unit name) in the absence of the Administrative Laser Safety Officer.

//SIGNATURE//

Copy to: (unit name) ALSO

(EXAMPLE LASER EYE EXAM REQUEST LETTER)

Date: _____

From: (Unit name) Administrative Laser Safety Officer (ALSO)
To: Head, Occupational Medicine Department, U.S. Naval Hospital
Okinawa

Subj: LASER EYE EXAMINATION REQUEST

Ref: (a) OPNAV 5100.27
(b) BUMEDINST 6470.23

1. Per the references, it is requested that the following individual be given a Laser Eye Examination: (Circle one)

PRE-PLACEMENT

PERIODIC

POST OVEREXPOSURE

NAME: _____ RANK _____

SSN/MOS: _____ / _____

2. LSSO assigned _____ (SNM) Risk Category: (Circle one)

INCIDENTAL PERSONNEL

LASER PERSONNEL

//SIGNATURE//

Date: _____

FIRST ENDORSMENT

From: Head, Occupational Medicine Department, U.S. Naval Hospital
Okinawa

To: ALSO, (UNIT NAME)

Subj: LASER EYE EXAMINATION REQUEST

1. The above named individual has completed the documented laser eye exam requirements for the indicated risk category as outlined in the reference.

Signature

(EXAMPLE REPORT FORMAT)

From: SSgt I.M. Marine, (UNIT NAME/UNIT ORGANIZATION)
To: LCDR I.M. Sailor, (UNIT ORGANIZATION) LSSO
Via: Lt. I.M. Smith, (UNIT ORGANIZATION) LSSO

Subj: (UNIT NAME) CLASS 3B AND CLASS 4 ANNUAL LASER INVENTORY

Ref: (a) SPAWARS INST 5100.14B

1. Per the reference, the following is submitted for Class 4 LASERS:

- a. Laser Name:
- b. Type:
- c. Wavelength:
- d. Max Output:
- e. Pulse or CW:
- f. Class:
- g. Manufacturer/Part Number:
- h. Serial Numbers:
- i. Contract Number:
- j. National Stock Number:
- k. Plant Account Numbers:
- l. Program/User/Custodian:
- m. Location:
- n. Uses:
- o. Custodian's Telephone number:

2. Per the reference, the following is submitted for Class 3b LASERS:
 - a. Laser Name:
 - b. Type:
 - c. Wavelength:
 - d. Max. Output:
 - e. Pulse or CW:
 - f. Class:
 - g. Manufacturer/Part Number:
 - h. Serial Numbers:
 - i. Contract Number:
 - j. National Stock Number:
 - k. Plant Account Numbers:
 - l. Program/User/Custodian:
 - m. Location:
 - n. Uses:
 - o. Custodian's Telephone number:

3. Per the reference, the following is submitted for Class 3b LASERS:
 - a. Laser Name:
 - b. Type:
 - c. Wavelength:
 - d. Max. Output:
 - e. Pulse or CW:
 - f. Class:
 - g. Manufacturer/Part Number:
 - h. Serial Number:
 - i. Contract Number:
 - j. National Stock Number:
 - k. Plant Account Numbers:

- l. Program/User/Custodian:
 - m. Location:
 - n. Uses:
 - o. Custodian's Telephone number:
4. Per the reference, the following is submitted for Class 3b LASERS:
- a. Laser Name:
 - b. Type:
 - c. Wavelength:
 - d. Max. Output:
 - e. Pulse or CW:
 - f. Class: Class
 - g. Manufacturer/Part Number:
 - h. Serial Numbers:
 - i. Contract Number:
 - j. National Stock Number:
 - k. Plant Account Numbers:
 - l. Program/User/Custodian:
 - m. Location:
 - n. Uses:
 - o. Custodian's Telephone number:
5. Point of Contact is _____.

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(EXAMPLE REPORT FORMAT)
LASER INCIDENT REPORT

ORIGINATOR
5100
(date)

From: Commanding Officer
TO: Commanding Officer, (UNIT NAME) (Attn: TLSO)

Subj: LASER INCIDENT REPORT NUMBER _____

Ref: (a) BnO 5100.4

Encl: (1) Medical Report

1. Per the reference, the following information is forwarded concerning a personal injury as the result of possible exposure to laser radiation:

a. Narrative. (Provide a plain language narrative of the incident. Include the time, date, and location, name/rank/SSN of the individual(s), and the type and wavelength of the laser.)

Description of laser source

- (1) Equipment nomenclature _____
- (2) Operating Mode _____
- (3) Power output during exposure _____
- (4) Maximum duration of exposure _____
- (5) Distance of individual from laser source _____

c. Medical surveillance and post incident assessment.

d. Point of Contact is _____.

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(EXAMPLE REPORT FORMAT)
CLASS 3B AND 4 LASER INVENTORY

From: Commanding Officer, (Company or Activity)
To: Commanding Officer, Bureau of Medicine and Surgery
Via: Commanding Officer, (Unit Name)

Subj: CLASS 3B AND 4 LASER INVENTORY FOR FY _____

Ref: (a) OPNAVINST 5100.27

1. Per the reference, the following is submitted:

Laser type: (include laser medium, emitted wavelengths, maximum power output of the laser radiation, pulse duration and laser class)

Manufacturer: _____

Serial Numbers: _____

Contact Numbers: _____

Number of Lasers: _____

National Stock Number: _____

Plant Account Account Number(s): _____

Disposition

Program/User/Custodian(s) _____

Location(s) _____

Use(s) _____

//SIGNATURE//

(EXAMPLE REPORT FORMAT)
MILITARY EXEMPT LASER INVENTORY

From: Commanding Officer, (Company or Unit Name)
To: Commanding Officer, Bureau of Medicine and Surgery
Via: Commanding Officer, (Unit Name)

Ref: (a) OPNAVINST 5100.27

1. Per the reference, the following is submitted:

Laser type: (include laser medium, emitted wavelengths, maximum power output of laser radiation, pulse duration and laser class)

Manufacturer: _____
Serial Numbers: _____
Contract Number: _____
Number of Lasers: _____
National _____
Stock Number: _____

Exemption Qualification: (check the appropriate line)

Combat _____ Training _____ Classified _____

Status

Number of lasers: _____

In Use _____ In Storage _____ Awaiting Disposition _____

Transferred within DOD to: _____
Serial Number(s) _____
ASD Approval date _____ Transfer date _____

Disposed outside of DOD to: _____
Serial Number(s) _____
ASD Approval date _____ Transfer Date _____

//SIGNATURE//

(EXAMPLE REPORT FORMAT)

LASER SAFETY EYE EXAMINATION REPORT

From: Administrative Laser Safety Officer
To: Head, Occupational Medicine Department, U.S. Naval Hospital
Okinawa, Japan

Subj: LASER SAFETY EYE EXAMINATION; REQUEST FOR _____ (SNM)

Ref: (a) NAVMEDCOMINST 6470.2A

1. Per reference (a), a pre-assignment laser eye examination is requested for:

NAME _____ RANK _____ SSN/MOS _____

2. (To be completed by the medical examining authority).

a. Post examination results. (Pre-assignment laser eye examination results documented in this section.)

b. Examination completed by:

NAME/TITLE _____ DATE _____

3. This report is forwarded to the individual's training folder.

//SIGNATURE//

Copy to:
(SNM's) Training Jacket

LASER OVEREXPOSURE PRE-INCIDENT PLAN

Ref: (a) NAVMEDCOMINST 6470.2a

1. Purpose: To provide guidance for either a suspected or an observed LASER overexposure incident.
2. Action: If a LASER eye injury is suspected or observed, a complete medical examination must be conducted by an ophthalmologist or optometrist, as soon as practical following the overexposure. The ALSO shall ensure the following steps are completed during the initiation of reporting procedures.

- ___ 1. SUBMIT FLASHREPORT
- ___ 2. CONTACT ___ (unit name) ___ ALSO/AMSO
- ___ 3. CONTACT REGIMENTAL MEDICAL OFFICER TO ARRANGE EYE EXAM
- ___ 4. LASER SYSTEM & SERIAL#: _____
- ___ 5. LASER WAVELENGTH & MODE OF OPERATION: _____
- ___ 6. ESTIMATE OF EXPOSURE (TIME & DISTANCE) _____
- ___ 7. EVOLUTION AT THE TIME OF THE INCIDENT _____
- ___ 8. LASER EYE PROTECTION USED (IF ANY) _____
- ___ 9. EXTENT OF INJURIES: _____
- ___ 10. SEND **NOTIFICATION MESSAGE** WITHIN 24 HOURS
- ___ 11. COMPLETE **FORMAL FOLLOW-ON REPORT** [DUE WITHIN 30 DAYS]