Laser Setup, Alignment or Service

1. Process
   a. Initial setup, cleaning, repair, or reconfiguration of Class 3b or 4 Laser devices.

2. Overview of Equipment and Regulatory Standards
   a. Class 3b and 4 lasers are lasers or laser equipped devices which:
      i. Are capable of causing permanent eye, skin, or deep tissue injuries, electrocution, and fire if beam and electrical hazards are not properly controlled and/or if proper safety equipment is not used.
      ii. Have mandatory legal requirements for registration, signage, PPE, and safety procedures.

3. Potential Hazards
   a. Direct viewing or contact with beams may cause skin, tissue, or eye
   b. High voltage power sources are a potential electrocution hazard.
   c. Beams may provide an ignition source for flammable materials and create a potential fire hazard.
   d. Lasing media and materials may contain toxic, corrosive, or poisonous substances.

4. Personal Protective Equipment
   a. Safety glasses which are certified for laser use and are marked with the appropriate optical density and wavelength protection.
   b. Fire extinguisher.
   c. For lasing materials containing hazardous substances, adequate PPE to prevent exposure to the particular material (IE gloves, face shields or goggles, lab coats, etc.) may be necessary, consult with EH&S for particular recommendations prior to laser operation.

5. Engineering Controls
   a. Where applicable (cleaning, setup activities, electrical work etc) disconnect and lock out laser from power source. For alignment procedures, use low power if available.
   b. Use appropriate warning signage at lab/room entrance to indicate that laser service is being performed.
   c. Make sure all safety interlock devices are in place and operational.
   d. Make sure that any flammable materials are removed from the area when service is occurring.
   e. If electrical service is performed, make sure conductive items or tools are properly controlled and or insulated. Remove items not used for the service from the immediate vicinity.
6. Work Practices and procedures

* For all class 4 lasers, and any class 3b lasers which the process below is not appropriate, PI’s must write a laser specific SOP for aligning, maintaining, and operating that laser using SOP form F:NAU:LAZ:1. Copies of the SOP must be posted in the lab, and submitted to NAU EH&S for filing with the master safety file for that specific laser. For all other Class 3b lasers, please use the following procedure.

a. Prior to starting work erect appropriate signage to designate the extent of the temporary control area. If other parts of the lab are in use, verbally notify other lab occupants and inform them of the extent of the temporary control area.
b. If possible, disconnect and lock out the laser from the power source. Ensure all shutters, beam stops, and safety devices are in place and properly engaged.
c. Don all necessary PPE. If shielding materials such as curtains are required, erect these materials prior to proceeding with any service.
d. Perform necessary service.
e. Following completion of service, double check to make sure all built in safety devices are intact and operational, police area for tools or loose items left behind, and remove any trash or old parts.
f. Remove PPE and de-regulate work area.
g. If service results in a change of power output or wavelength, if new lasers are put into service, or if a new open beam configuration is created, contact the Laser Safety Officer (3-6435) to perform a risk assessment and validate PPE and safety equipment prior to putting the laser into service.

7. Emergency Procedures

a. Minor Injuries: Call or proceed to the NAU Campus Health Services Center for assistance and medical care. Call the NAU Laser Safety Officer (928)-606-3788 or 3-6435 to report the injury. Fill out and submit an SRI.
b. Major injuries: Dial 911. Call the NAU Laser Safety Officer to report the injury. Fill out and submit an SRI.
c. Minor chemical spill: Call the NAU Chemical Hygiene Manager (928)-607-9995 or 3-1146 for guidance and/or assistance.
d. Fire, major chemical spill, or other emergency: Dial 911 or 523-3000 to report the emergency. Clear the area of personnel, activate fire alarm if necessary.
e. All Laser related injuries have mandatory reporting requirements which are performed by NAU EH&S. Please refer to the Emergency Procedures section of the NAU Laser Safety Manual for details on these reporting requirements.