LLEINST 6550R
20 May 2014

LLE INSTRUCTION 6550R

SUBJECT: **LABORATORY SAFETY PROGRAM**

REFERENCE: a. LLEINST 7700

ENCLOSURES: (1) Job Hazard Assessment Form
(2) Safety Inspection Guidelines
(3) Laboratory/Area Assignments and Inspection Schedule

1. **Purpose:** The safety of personnel conducting operations and research is of paramount importance. This Instruction describes the safety training and laboratory safety inspection program. This program is intended to reinforce the philosophy that every individual has a responsibility to maintain a safe work environment.

2. **Organization:** The Chief Safety Officer reports directly to the LLE Director. Individual Safety Officers provide safety training, procedural expertise, and oversight, and are assigned as follows:

Chief Safety Officer	Douglas Jacobs-Perkins
Chemical Safety Officer	Kenneth Marshall
Electrical Safety Officer	John Reid
Fire Safety Officer	John Sawyer
Laser Safety Officer	Eugene Kowaluk
Mechanical Safety Officer	Milton Shoup
Radiation Safety Officer	Walter Shmayda

Chief Safety Officer: The Chief Safety Officer is responsible for administering the overall safety program of the Laboratory in coordination with the University Environmental Health and Safety and reports directly to the LLE Director. His specific responsibilities include:

- Risk and hazard management, advocating safe work practices, providing educational and training programs, and ensuring compliance with University and all local, state, and federal regulatory standards and codes.
- Ensuring that all systems are designed, assembled, and installed in accordance with Reference (a), including safety risks and mitigation strategies in the design, and that all as-built systems are inspected to be in compliance with design requirements.
- Administering the initial and recurrent training of all employees, including keeping the LLE Safety Zone website current.
- Ensuring the accuracy and completeness of all safety documentation.

- Ensuring that all LLE laboratories are inspected at least twice annually and that deficiencies noted on these inspections are corrected.
- Supervising and coordinating the activities of the Chemical Hygiene Officer, the Electrical Safety Officer, the Fire Safety Officer, the Laser Safety Officer, the Mechanical Safety Officer, and the Radiation Safety Officer.
- Terminating operations when required for safety reasons.
- Ensuring that all employees adhere to safety procedures and practices. Employees who fail to adhere to safety procedures should be referred to their Group Leader and Division Director for possible disciplinary action.
- Reviewing all LLE incident reports regarding safety and assuring that corrective actions identified in these reports are completed.

Safety Officers: Individual Safety Officers have the responsibility to support the Chief Safety Officer in fulfillment of the responsibilities enumerated above. In particular, they have the full authority vested in the Chief Safety Officer for ensuring compliance with safety procedures, including terminating operations when required for safety reasons.

All Individuals: While the Safety Officers are responsible for providing safety program direction and control, a true safety program begins at the individual level. Each individual is responsible for reporting any safety concern to their supervisor and the responsible Safety Officer. Additionally, each individual has the responsibility to stop and not proceed if they do not have the requisite knowledge, training, and experience to perform a task, or if they have any questions about the safety of a task they have been asked to perform.

3. Procedures:

a. Training: Training is a prerequisite to ensure safety. No individual is allowed unescorted access to laboratory spaces or allowed to perform tasks that pose safety risks without having completed the requisite initial and/or refresher training. The Job Hazard Assessment (JHA) form defines the worker's safety training requirements based on the supervisor's assessment of the worker's job responsibilities. The supervisor must review the form with the worker to ensure that expectations are understood.

(1) Prior to a worker reporting for initial orientation, the supervisor shall complete the JHA [Enclosure (1)]. This form will be forwarded to the Administrative Division Administrative Assistant who will enter data from the JHA into the safety training database.

(2) New workers are expected to complete all required core training topics (course names *_001 on the JHA) within two weeks of starting work at LLE. Training materials for core topics are on the LLE Safety Zone website, and require completion of a written test to ensure understanding of the material presented. After completion of the test(s), new workers shall meet with the requisite Safety Officer(s) and/or the Chief Safety Officer, who will verify that the worker understands the subject matter and reinforce the expectation that everyone has a role in the LLE Safety Program.

(3) Advanced training topics must be completed prior to undertaking related job responsibilities. Under no circumstances is a worker permitted to perform a job for which requisite safety training has not been completed.

(4) Periodic refresher training is required, including the associated test(s). Workers are not required to meet with Safety Officers following retraining unless they fail a test or are required to demonstrate proficiency. Individuals who do not complete the refresher training within two months of the anniversary date are prohibited from performing tasks for which training has expired. The worker's supervisor is responsible for determining if this lapse is grounds for disciplinary action.

(5) The Engineering Division Administrative Assistant (AA) will send targeted, periodic email reminders to persons whose training is due to expire. When subject material is not available online, the AA will schedule training with the requisite Safety Officers.

(6) The JHA will be updated annually by each employee and reviewed/approved by the supervisor. The Administrative Division Administrative Assistant will initiate and track the completion of this annually, typically between December/January. The updated information will be entered in the safety training database.

b. Safety Database Administration: The safety database is used to manage safety training data, and to keep records of who is responsible for specific LLE work areas. The training data contains records for each topic listed in a worker's JHA and is used to generate email reminders, management training reports, and personal training status reports. The work area assignment data is used to create emergency contact lists, generate room signs, schedule safety inspections, and assign responsibility for correcting safety deficiencies.

(1) The Administrative Division Database Administrator is responsible for maintaining the safety database including database design, user access-permission, queries, reports, and the user interfaces.

(2) The Chief Safety Officer is responsible for adding and updating course descriptions listed in the JHA database table as they become available. Paper copies of the JHA [Enclosure (1)] are generated directly from data in this table.

(3) Worker training requirements will be entered by the Administrative Division Administrative Assistant based on input provided by on the worker's initial JHA and following the annual update. The Administrative Division retains the signed JHA's, and/or scanned electronic copies of them, as required.

(4) As training is completed, the individual's training records will be updated by an authorized user. Authorized users include the Database Administrator, Administrative Division Administrative Assistant, Engineering Division Administrative Assistant, Chief Safety Officer, and the Safety Assistant.

(5) Each worker who has an LLE computer account has access to a report on the LLE Safety Zone that lists their personal training status and that of LLE personnel whom they supervise.

(6) Emergency contact information for each laboratory will be entered by the Administrative Division Administrative Assistant when room assignments change. During safety inspections, Safety Officers will verify the accuracy of room signs and notify the Administrative Assistant if there are discrepancies.

(7) The Chief Safety Officer establishes which rooms are included in each monthly safety inspection and updates the database accordingly. The monthly schedule is generally invariant and ensures that each room is inspected twice annually. The room inspection order is updated as needed by the Chief Safety Officer to meet schedule constraints.

c. Safety Inspections: Periodic safety inspections are conducted by Safety Officers to ensure that all work areas meet established safety requirements.

(1) All work areas (excluding offices) within LLE will be inspected every six months per Enclosure (2). Inspections generally occur on the third Tuesday of a month, except Omega Facility inspections, which must be coordinated with the respective Laser Facility Manager. The Engineering Division Administrative Assistant will email an inspection schedule with specific dates and times to responsible parties approximately two weeks prior to the inspection date.

a. Inspections will be conducted by the Safety Officers or their designated representatives. General inspection guidelines are contained in Enclosure (2).

b. Enclosure (3) designates the people responsible for safety within individual areas. These people are responsible for ensuring that installed equipment meets specified safety requirements, that safety equipment is not altered or defeated, that individuals who work in the area have received requisite safety training, and that they comply with safety rules and procedures. The individual assigned responsibility in Enclosure (2) or his/her representative will be present during safety inspections.

c. The appropriate Safety Officer should be contacted whenever training, guidance, or assistance in correcting safety deficiencies is required.

d. Inspection results will be reported to the Chief Safety Officer and the people responsible for individual areas. Deficiencies shall be expeditiously corrected by those assigned responsibility in the inspection report. A report of corrective action taken shall be submitted to the Safety Officer and Safety Assistant. Significant safety deficiencies will be brought to the attention of the LLE Director.

e. The Safety Assistant will maintain the list of deficiencies, including the date reported, recommended corrective action, responsible person(s), and status. During a safety inspection, the Safety Assistant will bring the list of outstanding deficiencies for the rooms being inspected and review them for completeness. Following the inspection, the list will be updated to reflect new and resolved deficiencies and send reports of outstanding deficiencies to the responsible person(s).

f. Compliance with safety training and procedural requirements is mandatory. Failure to comply can result in disciplinary action as well as securing

individual laboratory operations. The Safety Officers have authority to shut down offending laboratories/areas until they are assured activities can resume safely.

4. Responsibilities

a. LLE Director:

(1) Provide overall direction of safety program.

b. Chief Safety Officer:

(1) Administer the safety inspection program, and fulfill the responsibilities outlined on p. 1.

c. Safety Officers:

(1) Provide safety training and procedural guidance.

(2) Perform safety inspections.

(3) Train and designate other qualified personnel to perform safety inspections.

(4) Shut down operations deemed to be unsafe until satisfied they may resume safely.

(5) Interface with University Environmental Health and Safety personnel.

d. Administrative Assistants:

(1) Maintain the safety database.

(2) Formulate and distribute the reports.

(3) Schedule safety training and safety inspections.

e. Individuals Assigned Space Responsibility:

(1) Ensure their space meets requisite safety requirements.

(2) Ensure people working in their space are trained and comply with safety requirements.

(3) Be present or, if unavailable, provide a designated representative during semiannual inspections.

(4) Ensure that inspection deficiencies are expeditiously corrected and reported.

f. All LLE and Associated Personnel:

(1) Comply with all safety requirements.

5. Approval:

Robert L. McCrory
Director

Job Hazard Assessment

Name: _____
Title: _____

LLE Division: Admin; Engineering; Experimental; Operations; Theory
Other Affiliation: _____

Position: ☐ *LLE Staff;* ☐ *Faculty;* ☐ *Contractor; Co-Op/TAR*
☐ *UR Undergraduate Student;* ☐ *UR Graduate Student*
☐ *Other* _____
Status: ☐ *New Hire;* ☐ *Current;* ☐ *Re-Hire*

Room: _____ *Phone:* _____ *E-mail:* _____

All persons must obtain required safety training before undertaking related job duties and must keep training current as long as those duties continue.

Supervisors are responsible for ensuring that subordinates receive required safety training before undertaking related job duties and for ensuring that training is kept current at all times. Review the course descriptions below and check all that are applicable for the above named employee to conduct his/her duties.

New Personnel:
The supervisor must sign this form and submit it to the Administrative Division Administrative Assistant(ADAA) prior to the new employee checking in. The ADAA will obtain the employee's signature during check in.

Current Personnel:
Review safety training course descriptions below and check all that are applicable to current or planned job duties. Initial bottom of each page where indicated. Review with supervisor and obtain his/her signature, then return to the Administrative Division Administrative Assistant.

Employee's Signature _____ *Date:* _____/_____/_____

Supervisor's Signature _____ *Date:* _____/_____/_____

ID	*Title (Periodicity)*	*Required Attendees*	*Description*	*Comments*
☐ C_001	Chemical Safety (12 months)	Persons who work in a laboratory with chemicals, hazardous materials and solvents, or persons who handle, work with, store, or dispense chemicals, hazardous materials and/or solvents.	Review of UR's Chemical Hygiene Program; Safe work practices; Hazard communications, MSDS; personal protective equipment, Hazardous Waste Management.	New personnel: Requires signature of Chemical Safety Officer after completing quiz.
☐ C_002	Beryllium Safety (12 months)	Persons who store, handle, process or use beryllium; those who handle potentially contaminated equipment, or enter the target chamber; supervisors of persons conducting the above activities.	Beryllium (Be) health hazards; LLE Instruction 6706; Policy for Be use and handling.	New personnel: Requires signature of Chemical Safety Officer after completing quiz
☐ C_003	Formaldehyde Safety (12 months)	Persons who work with formaldehyde.	Specific procedures and protocols for working with formaldehyde at LLE.	~ 30 min Web-based

ID	Title (Periodicity)	Required Attendees	Description	Comments
☐ C_004	High Pressure Liquid Nitrogen Fill Station (One-Time Only)	Persons who need authorization to operate high pressure liquid nitrogen fill station.	Operation of high pressure liquid nitrogen filling station and related policies.	~ 30 min
☐ C_005	Introduction to Globally Harmonized System for Hazard Communication (One-Time Only)	All laboratory supervisors and persons working with chemicals at LLE	OSHA mandated training introduces international labeling standards for chemical products, how they are interpreted, and standardization of format for safety data sheets	Mandatory introductiuon by 12/31/2013. Will be integrated in all Chemical Safety Training classes during 2014
☐ E_001	Electrical Safety (12 months)	Persons who design, build, or trouble shoot electrical or electronic equipment with voltages greater than or equal to 50 volts.	Electrical shock, fire and explosion hazard awareness; Electrical safety policies; Worker authorization & supervisor responsibilities; Safe work practices; Electrical system design; Biological effects; Lockout/Tagout.	~ 1 hr. Effective Nov. 2011: LLE adopted OSHA & UR policy 50V threshold
☐ E_002	NFPA 70E Arc-flash (One-Time Only)	LLE Electricians, Power Conditioning Operators.	Electrical safety standards; Electrical Hazards, Limiting shock & flash hazards; Electrical incident & hazard prevention; Attending to electrical incident victims; Arc-flash calculations.	~4 hrs; Prerequisite: E_001
☐ E_003	Energized Work Permit (One-Time Only)	Trade professionals (e.g. Electricians, Mechanics, Plumbers), Group leaders, managers.	Review of LLE & UR's Energized work policy. Plan activities to avoid energized work, process to obtain permit when required.	Presented by UR ES&H or Read/review Policy document
☐ G_001	General Laboratory Safety and Access Procedures (12 months)	All persons having key-card access to LLE	Overview of LLE's safety polices; Job hazard assessment (JHA); Hazard management techniques; Stop work, buddy system, building access policies; Emergency response procedures.	~30 min. Oral (web based option) New hires meet with Chief Safety Officer
☐ G_002	Respiratory protection (12 months)	Persons who enter the OMEGA or EP target chamber or remove the lower pylon cover on OMEGA; Persons working in areas where beryllium dust contamination is likely. Note: C_002 prereq. Medical clearance and annual respirator fit-testing at UHS required.	When respirators are required at LLE; Types of respirator used at LLE; Use, care and storage of respirator; Medical surveillance program.	11/10 - Medical surveillance & fit check available; training in development.
☐ G_003	Fire extinguisher use (Voluntary participation) (24 months)	Optional	Types of extinguishers, proper use, "PASS" (Point, Aim, Squeeze, Sweep). Demonstration with fire simulator.	< 30 min oral with demo
☐ G_004	First-Aid/CPR/AED (Voluntary participation) (24 months)	Optional	American Heart Assn. Basic first-aid techniques, preparation, response. Cardiopulmonary resuscitation (CPR). Indications for and use of Automated External Defibrillator (AED).	~8hrs
☐ G_005	Guest Worker Safety Training (12 months)	Guest workers who will be working in any LLE laboratories.	Introduces guest workers to LLE safety policies. Covers General safety & PPE, plus overview of Chemical, Electrical, Laser, Mechanical and Compressed Gas. Does NOT cover Beryllium or Radiation safety. This training satisfies most external worker needs.	~1hr

ID	Title (Periodicity)	Required Attendees	Description	Comments
☐ G_006	Hot Work Training (One-Time Only)	Personnel performing or supervising hot work at LLE.	UR Policies and practices for workers performing hot work (e.g. open flame use, welding). Administered by UR Fire Safety Office.	Given @ EH&S office, 685 Mt Hope Ave (corner McLean St.). Tue & Thu 0900, 1500. Appointment req'd.
☐ L_001	Laser Safety (12 months)	All persons who operate lasers or work in an environment where class 3B or 4 lasers are used, including all OMEGA and OMEGA EP qualified watchstanders. Note: A one-time eye examination, arranged by LLE, is required prior to using a laser at LLE.	Fundamentals of lasers, laser radiation, hazards, and safe operating practices.	~1 hr
☐ M_001	General Mechanical Safety (12 months)	Persons who use, manufacture, assemble, rig, install, or maintain mechanical equipment, or those who work with compressed-gas systems.	Overview of LLE Mechanical design policies, mechanical hazards, energy sources.	~1 hr
☐ M_002	Compressed gas safety (12 months)	Persons who use, assemble, transport or maintain compressed-gas systems and/or cryogenic liquids and gasses.	Compressed gas systems & related hazards. Care, use, storage and transport of compressed gas cylinders; Regulators, pressure relief devices; Flammable gasses; Cryogenic gas & liquid handling.	~1 hr; Prerequisite: M_001
☐ M_003	Overhead Hoists (12 months)	All personnel who use hoists and/or cranes.	Types of hoists; Load ratings; Inspection; Hoist hazards and mitigation; Preparing and executing a lift; Safe work practices.	~1 hr; Prerequisite: M_001
☐ M_004	Basic Rigging (120-500 lbs) (12 months)	Personnel attaching 120-500 lb load to any hoist or crane. No formal training is required for loads <120 lbs.	Rigger's responsibilities; Understand the payload; Rigging hardware & inspection; Rig, attach, move and secure the payload; Rigging calculations.	~2 hr; Prerequisite: M_001
☐ M_005	Advanced Rigging (24 months)	Personnel attaching >500 lb load to any hoist or crane.	Operation of hoists and cranes with > 500 payload.	Training provided by consultant.; Prerequisite: M_001
☐ M_006	Fall protection (12 months)	Persons working on elevated platforms or structures >6' above the ground where integral fall protection (e.g. railings) is not available.	When fall protection is required, types of fall protection available. Use, inspection and care of equipment. Specific uses at LLE.	~1 hr; Prerequisite: M_001
☐ M_007	Powered industrial trucks (36 months)	Persons who operate or maintain any mobile power-propelled truck used to carry, push, pull, lift, stack or tier materials.	OSHA rules regarding use. Equipment capabilities, features & pre-operation inspection; Site-specific hazards; Safe operating practices. Requires performance evaluation with equipment.	Prerequisite: M_001
☐ M_008	Aerial Lifts (36 months)	Persons who operate or maintain any aerial lift.	Definition: Any device, telescoping, articulating or both, which is used to position personnel. Equipment capabilities, features & pre-operation inspection; Site-specific hazards; Safe operating practices.	http://www.osha.gov/Publications/aerial_lifts_safety.html
☐ M_009	Overhead Crane Operator (24 months)	Personnel operating 10-ton overhead cranes in OMEGA or OMEGA EP.	Overhead crane operations; Types of overhead cranes; Load ratings; Inspection; Overhead crane hazards and mitigation; Preparing and executing a lift; Safe work practices.	~ 3 hrs; Prerequisite: M_001, M_003

ID	Title (Periodicity)	Required Attendees	Description	Comments
☐ R_001	Radiation Safety Training for New Radiation Workers (One-Time Only)	All new hires working with tritium contaminated materials and/or activated materials.	A series of 1 to 5 sessions based on job requirements. See Jean Steve.	~ 1 - 7 hrs in total
☐ R_002	Refresher Course for RW1 and RW2 level: General Radiation Workers, refresher/ Qual Card Rad Worker (12 months)	Re-certification for General Radiation Workers and LLE Radiation Workers (includes Shot Directors, XOPS, and Tritium Operators).	Radiation hazards at LLE; Fixed vs. diffuse sources; Naturally occurring radiation; Exposure limits; Biological effects; ALARA principles & protection measures; Methods for working with activated and/or contaminated items.	~ 30 min
☐ R_003	Refresher Course for RW2 level: Dosimetric Calculations for Qual Card Rad Worker (12 months)	Re-certification for LLE Radiation Workers (includes Shot Directors, XOPS, and Tritium Operators).	Estimating exposure associated with point and diffuse sources.	~1 hr

SAFETY INSPECTION GUIDELINES

General Safety:

- Fire doors are unobstructed and not propped open (except with approved electromagnetic latches).
- Laboratories are labeled with the names and phone numbers of at least two people to contact in the event of an emergency.
- Refrigerators are labeled for contents and food is not stored in chemical refrigerators.
- Safety showers are available where needed, are accessible, and tested quarterly.
- Eyewash stations are available where needed, are accessible, and weekly test logs are maintained.
- Safety harnesses are available and used when working aloft, e.g., on top of the frequency-conversion crystal (FCC) structures and grating compression chamber (GCC).
- Appropriate protective eyewear is available. Eyewear (all types):
  - meet ANSI Z87.1 impact resistance standards.
  - are in good condition—no pitting, crazing, discoloration, etc.
- Spaces requiring hearing protection are posted and hearing protection is provided.
- Safety equipment for handling liquid N_2 or other cryogens is provided including eye protection and insulated gloves.
  - Portable oxygen monitors are present where needed and operating properly.
  - Installed, permanent oxygen monitors are working properly.

Fire Safety:

- Sprinkler heads are unobstructed (nothing within 18 in.).
- Nothing is attached to fire suppression system plumbing.
- Fire extinguishers are located per installation plan and inspected monthly by LLE.
- Flammable material is not allowed to accumulate, e.g., cardboard, paper, etc.
- Highly flammable materials and solvents are properly stored.
- No space heaters or non-laboratory, non-regulated hot plates allowed (no personal appliances are allowed).
- Coffee pots, microwaves, refrigerators and other appliances are only in approved locations—none are allowed in offices or in laboratories.

Laser Safety:

- Installed safety interlocks are operable and not defeated.
- Appropriate Laser Radiation Area warning signs are in place; Caution for Class 2 and 3R; Danger for Class 3B and 4. Appropriate optical density values and wavelengths are listed, along with the appropriate signal words, colors, and laser-burst graphics in compliance with ANSI Standard Z136.1.
- Laser safety eyewear is labeled with optical density values and wavelengths for which protection is afforded, and is worn when Class 3B and 4 lasers are available, utilized, and functional.
- Appropriate door warning signs are available and utilized.
- Personnel working with lasers have completed the requisite eye examination.

- All personnel working with lasers have completed laser safety training and laser qualification.
- Appropriate shields/beam blocks are provided to prevent stray reflections/propagation (e.g., table covers/shields).

Electrical Safety:

- A minimum of 30-in. unobstructed access is maintained in front of all circuit breaker panels and emergency switches ("dump buttons").
- Cable insulation is undamaged; note especially portable equipment leads and plugs.
- Electrical wiring, including that for portable or semi-portable equipment, conforms with code.
- No free access is permitted to uninsulated electrical terminals, wiring, etc. Note especially that electronic equipment chassis have exterior protective panels that inhibit inadvertent personal contact with interior circuits.
- Electrical interlocks are in place and operational.
- Equipment is de-energized prior to maintenance, or appropriate precautions are taken for working on energized equipment.
- Appropriate labels are installed on high-voltage equipment.
- Electrical panel breakers are labeled.
- Optical tables grounded.
- Electrical outlets adjacent to sinks and those used for open-reservoir pumping systems that circulate conductive fluids (e.g., machine-tool coolant) are ground-fault interrupt (GFI) protected.
- Non-underwriters laboratory (UL) approved power strips are not in use.
- Power strips are not daisy chained.
- Temporary wiring is not used in lieu of permanent wiring.

Chemical Safety:

- All personnel working with chemicals have completed chemical safety training.
- All chemical containers are in good physical condition and properly marked with appropriate hazard labels.
- Chemicals are stored by *hazard class* in well-marked cabinets or storage areas. Examples of inappropriate storage are
  - oxidizers with flammable solvents or other organic reagents;
  - acids with bases, cyanides, or heavy metal inorganic salts;
  - carcinogens or teratogens with other chemical compounds.
- Flammable liquids are kept in self-contained, fire-resistant cabinets with an integral liquid sump to contain spills when not in use.
- Only explosion-proof refrigerators are to be used for low-temperature storage of flammable materials.
- Appropriate personnel protection equipment is available, used, and in good condition.
- Hazardous chemical waste is to be stored in containers that are chemically compatible with the waste (either glass, heavy-walled plastic, or metal) that are clearly marked with the contents and collection start date. Containers must be filled to no more than 3/4 of their total volume and kept in a clearly marked area. Secondary containment must be provided for "in use" waste containers. Waste chemicals are stored only in a designated "Hazardous Satellite Waste Accumulation Area."

- Fume hoods are labeled with indicator of face velocity dated within one year and clear of excessive storage.
- Safety data sheets (SDS's) are available.
- Beryllium must be handled and stored in accordance with LLEINST 6706.

Mechanical Safety:

- Anyone using the machine shop has been qualified by the machinist on safety procedures.
- Systems subject to being pressurized have properly rated piping, reducing valves, regulators, and relief protection.
- Equipment is securely mounted with proper number and size of fasteners, and nuts have full thread engagement.
- Fluid-piping systems are run to prevent collateral damage should they fail.
- Compressed gas cylinders are properly secured, contents labeled, standing upright; empty cylinders stored separately from full ones; unused cylinders are capped, and not stored adjacent to a laboratory exit. An approved cylinder cart must be used when transferring cylinders and the cylinder must have the regulator removed and the cylinder cap installed.
- Safety glasses are available and used when operating machine tools.
- Optical tables are not loaded in a manner to allow them to tip over.

Radiological Safety:

- Only personnel who have received radiological training are working with sources of radiation.
- Radioactive sources are only handled and stored in predefined locations approved by the Radiation Safety Officer.
- Verify all radioactive sources have approval from the Radiation Safety Officer.
- Facilities that contain sources of radiation must be locked when unattended.
- OMEGA, OMEGA EP, and Multi-Terawatt (MTW) Target and Laser Bays are posted with "Caution Radiation Area" or "Caution High Radiation Area" signs as appropriate.
- Areas in which x rays are generated are posted with a "Notice to Employees" poster supplied by Radiation Safety. Access to these sources is controlled.
- Material designated as "radioactive" is in compliance with instructions provided in the LLE Radiological Controls Manual.
- Locations that have radioactive material (e.g., sources of tritium), are labeled with "Caution Radioactive Material" signs.
- Verify that locations that handle tritium or tritium-contaminated equipment are surveyed weekly. Surface activities will be maintained below 1000 DPM/100 cm^2.
- Equipment used to handle tritium is labeled with radiation emblem stickers indicating the surface activity or tritium inventory as appropriate.
- Radioactive material is only stored in pre-approved locations.

LABORATORY/AREA ASSIGNMENTS AND INSPECTION SCHEDULE

ROOM	DESCRIPTION	CONTACT 1	CONTACT 2	MONTH
1	ANNEX PUMP ALLEY	Rigatti, A		May, Nov
3	ANNEX UTILITY ROOM	Sawyer, J		May, Nov
100B	DARKROOM	Kowaluk, E		Jan, Jul
100D	ELEVATOR UTILITIES	Sawyer, J		Jun, Dec
100G	PLENUM	Stagnitto, S	Pien, G	Jun, Dec
112A	MOLECULAR SPECTROSCOPY AND THERMAL	Marshall, K	Starowitz, J	Jan, Jul
112B	NUCLEAR MAGNETIC	Marshall, K	Starowitz, J	Jan, Jul
112C	LIQUID CRYSTAL CLEAN ROOM	Marshall, K	Starowitz, J	Jan, Jul
112D	CHEMICAL SYNTHESIS	Marshall, K	Starowitz, J	Jan, Jul
115	MATERIALS LAB	Marshall, K	Shojaie, J	Jan, Jul
116	ELECTRONICS SHOP	Peck, R	Lonobile, D	Jan, Jul
116A	ELECTRONICS SHOP	Peck, R	Lonobile, D	Jan, Jul
116B	ELECTRONICS LAB (BITTLE OFFICE)	Bittle, W	Lonobile, D	Jan, Jul
131	LASER DEVELOPMENT LAB	Zuegel, J	Begishev, I	Jan, Jul
131A	LDL ANTE ROOM	Zuegel, J	Begishev, I	Jan, Jul
132	LDL ANEX	Zuegel, J	Bromage, J	Jan, Jul
132A	MECHANCIAL/ELECTRICAL ROOM	Zuegel, J	Sawyer, J	Jan, Jul
136	DEBRIS SHIELD DECONTAMINATION LAB	Rigatti, A	Guiliano, V	Jun, Dec
141	OMEGA CONTROL INTERFACE ROOM	Peck, R	Brancato, A	Jun, Dec
144	LACAVE	Stagnitto, S	Pien, G	Jun, Dec
144A	OMEGA OPERATION DARKROOM	Stagnitto, S	Pien, G	Jun, Dec
146	LACAVE (NORTH)	Stagnitto, S	Pien, G	Jun, Dec
148	LACAVE LOWER PYLON & MCTC STAGING	Janezic, R	Koch, M	Jun, Dec
148A	LACAVE (SOUTH) ULTRASONIC CLEANING	Stagnitto, S	Pien, G	Jun, Dec
150	FAN ROOM (SOUTH)	Sanford, E		Jan, Jul
150A	MCTC MAINTENANCE	Janezic, R	Fella, C	Jun, Dec
150B	OMEGA VACUUM PUMP/TRS RM	Janezic, R	Regan, P	Jun, Dec
151	OMEGA CAPACITOR BAY #4 (SOUTH)	Stagnitto, S	Folnsbee, L	Jun, Dec
152	OMEGA CAPACITOR BAY #3	Stagnitto, S	Folnsbee, L	Jun, Dec
152B	PULSE GENERATION ROOM	Stagnitto, S	Hill, E	Jun, Dec
153	OMEGA CAPACITOR BAY #2	Stagnitto, S	Folnsbee, L	Jun, Dec
153A	DRIVER LINE ELECTRONICS ROOM	Stagnitto, S	Hill, E	Jun, Dec
153B	POWER COND. ELECTRONIC SHOP	Stagnitto, S	Folnsbee, L	Jun, Dec
154	OMEGA CAPACITOR BAY #1 (NORTH)	Stagnitto, S	Folnsbee, L	Jun, Dec
156A	VENTILATION PLENUM/D.I. WATER (EAST)	Santiago, L	Morse, S	Jun, Dec

LABORATORY/AREA ASSIGNMENTS AND INSPECTION SCHEDULE

ROOM	DESCRIPTION	CONTACT 1	CONTACT 2	MONTH
156B	VENTILATION PLENUM/GLYCOL (WEST)	Santiago, L		Jun, Dec
157	CRYO & TRITIUM FACILITY (C&TF)	Janezic, R	Koch, M	Jun, Dec
163	DRIVER TESTBED ANTEROOM	Puth, J	Cuffney, R	Jun, Dec
164	PULSE SHAPE TESTBED LABORATORY (PSTL)	Puth, J	Cuffney, R	Jun, Dec
166	FLASH LAMP TEST FACILITY	Santiago, L	Smith, T	Jun, Dec
170	MECHANICAL ROOM	Sanford, E		Jan, Jul
174	C&TF MAINTENANCE ROOM	Regan, P	Scarantino, S	May, Nov
175	DIAGNOSTIC CHECK-OUT	Bahr, R	Sorce, C	May, Nov
176	METROLOGY	Rigatti, A	LeBarron, N	May, Nov
177	DIAG SUPPORT & DEVELOPMENT LAB	Bahr, R	Keck, R	May, Nov
178	OPTOMECHANICAL LAB	Kwiatkowski, J	Huff, R	May, Nov
179	REFLECTOMETER ROOM	Smith, C	Rigatti, A	May, Nov
180	OMAN OPTIC STORAGE	Rigatti, A	Oliver, J	May, Nov
181	OPTICAL MANUFACTURING CLEAN ROOM	Rigatti, A	Mitchell, G	May, Nov
181A	OPTICAL MANUFACTURING	Rigatti, A	Mitchell, G	May, Nov
182	EXPERIMENTAL OPEATIONS SUPPORT	Pien, G	Ruth, B	May, Nov
183	OPTICAL MANUFACTURING	Oliver, J	Rigatti, A	May, Nov
184	DAMAGE TESTING LABORATORY	Papernov, S	Kozlov, A	May, Nov
185	OPTICAL MANUFACTURING	Oliver, J	Rigatti, A	May, Nov
186	SYSTEM SCIENCE DEVELOPMENT LABORATOR	Kelly, J	Kruschwitz, B	May, Nov
187	OPTICAL MANUFACTURING	Oliver, J	Rigatti, A	May, Nov
189	ANNEX MECHANICAL ROOM	Sanford, E	Sawyer, J	May, Nov
236	OMEGA CONTROL RM CONF RM	Stagnitto, S	Puth, J	Jun, Dec
240	OMEGA CONTROL ROOM	Stagnitto, S	Puth, J	Jun, Dec
240A	OMEGA LASER&TGT BAY ANTERM	Stagnitto, S	Puth, J	Jun, Dec
247	OMEGA TARGET BAY	Stagnitto, S	Pien, G	Jun, Dec
251	OMEGA LASER BAY	Stagnitto, S	Kwiatkowski, J	Jun, Dec
253	BOILER ROOM	Sanford, E		Jan, Jul
260	LASER COMPUTING FACILITY	Ryskin, A	Brancato, A	Jan, Jul
260A	LASER COMPUTING FACILITY	Ryskin, A	Brancato, A	Jan, Jul
261	ROD AMPLIFIER ASSEMBLY	Stagnitto, S	Santiago, L	Jun, Dec
263	AMPLIFIER CLEANING	Stagnitto, S	Santiago, L	Jun, Dec
263A	VESTIBULE	Stagnitto, S	Santiago, L	Jun, Dec
264	AMPLIFIER ASSEMBLY	Stagnitto, S	Santiago, L	Jun, Dec
264B	INTERFEROMETER ROOM	Stagnitto, S	Santiago, L	Jun, Dec

LABORATORY/AREA ASSIGNMENTS AND INSPECTION SCHEDULE

ROOM	DESCRIPTION	CONTACT 1	CONTACT 2	MONTH
292	ANNEX MECHANICAL ROOM	Sanford, E	Sawyer, J	Apr, Oct
1206	HOLOGRAPHIC OPTICAL TECHNOLOGY	Kessler, T	Kellogg, C	May, Nov
1210	MATERIALS CHEMISTRY LAB	Marshall, K	Shojaie, J	May, Nov
1224	PUMP ROOM	Kessler, T	Marshall, F	May, Nov
1228	X-RAY DIAGNOSTICS LABORATORY	Marshall, F	Yaakobi, B	May, Nov
1232	PARTICLE DIAGNOSTIC LAB	McCluskey, M	Sangster, T	May, Nov
1236	DIAGNOSTICS EVALUATION LABORATORY	Boni, R	Sorce, A	May, Nov
1240	SPINNING DEV LAB	Kessler, T	Barone, J	May, Nov
1314	BOILER ROOM	Sanford, E	Sawyer, J	Apr, Oct
1314B	TRANSFORMER ROOM	Sanford, E	Sawyer, J	Apr, Oct
1406	OPTICS AND IMAGING	Kessler, T	McGowan, K	May, Nov
1406A	OPTICS AND IMAGING DEV	Kessler, T	McGowan, K	May, Nov
1406B	OPTICS AND IMAGING	Kessler, T	McGowan, K	May, Nov
1406D	OPTICS AND IMAGING	Kessler, T	Barone, J	May, Nov
1406E	OPTICS AND IMAGING	Kessler, T	Barone, J	May, Nov
1406F	OPTICS AND IMAGING	Kessler, T	Barone, J	May, Nov
1410	OPTICAL MANUFACTURING	D'Alessandro, H	Rigatti, A	Apr, Oct
1410A	OPTICAL MANUFACTURING METROLOGY	D'Alessandro, H	Rigatti, A	Apr, Oct
1410B	INTERFEROMETER ROOM	D'Alessandro, H	Rigatti, A	Apr, Oct
1410C	OPTICAL MANUFACTURING METROLOGY	D'Alessandro, H	Rigatti, A	Apr, Oct
1420	DIGITAL IMAGING & CALORIMETER LAB	Kidder, R	Kalb, A	Apr, Oct
1430	OPTICAL PROCESSING II	Taylor, B	Jacobs, S	Apr, Oct
1434	MRF LABORATORY	Jacobs, S	Taylor, B	Apr, Oct
1504	OPTICAL MANUFACTURING DEVELOPMENT	Oliver, J	Rigatti, A	May, Nov
1508	OPTICAL MANUFACTURING CLEAN ROOM	Rigatti, A	Mitchell, G	May, Nov
1508A	OPTICAL MANUFACTURING CLEAN ROOM	Rigatti, A		May, Nov
1508B	OPTICAL MANUFACTURING CLEAN ROOM	Rigatti, A	Mitchell, G	May, Nov
1602	OPTICAL FABRICATION SHOP	Maltsev, A	Kaplun, M	Apr, Oct
1602A	OPTICAL FABRICATION SHOP	Maltsev, A	Kaplun, M	Apr, Oct
1602B	OPTICAL METROLOGY	Rigatti, A	Taylor, B	Apr, Oct
1604	MACHINE SHOP & QUALITY CTRL LAB	Clark, T	Shoup, M	Apr, Oct
1620	NANOMETROLOGY LABORATORY	Papernov, S	Jacobs, S	Apr, Oct
1640	MACHINE SHOP	Fellows, R	Romanofsky, M	Apr, Oct
1702	LLE EAST MAINT/MECHANICAL ROOM	Sanford, E	Sawyer, J	Jan, Jul
1706	COOLING TOWER SUMP/PUMPS	Sanford, E	Sawyer, J	Jan, Jul

LABORATORY/AREA ASSIGNMENTS AND INSPECTION SCHEDULE

ROOM	DESCRIPTION	CONTACT 1	CONTACT 2	MONTH
1720	OMAN STORAGE	Rigatti, A	LeBarron, N	Jan, Jul
1721	OMAN STORAGE	Rigatti, A	LeBarron, N	Jan, Jul
2000A	PUMP ROOM	Sanford, E		Mar, Sep
2222	OPTICAL DIAGNOSTIC DEVELOPMENT LAB	Seka, W		Mar, Sep
2224	OPTICAL DIAGNOSTIC DEVELOPMENT LAB	Seka, W		Mar, Sep
2226	MIFEDS LAB	Fiksel, G	Knauer, J	Mar, Sep
2232	FIBER DEVELOPMENT LAB (FDL)	Okishev, A	Cuffney, R	Mar, Sep
2234	LC MATERIALS RESEARCH LABORATORY	Marshall, K	Starowitz, J	Mar, Sep
2236	LC MATERIALS RESEARCH LABORATORY	Marshall, K	Starowitz, J	Mar, Sep
2314	MECHANICAL ROOM	Sanford, E	Sawyer, J	Apr, Oct
2402	NIF CONDITIONING & PHOTOMETRY LAB	LeBarron, N	Rigatti, A	Mar, Sep
2402B	NIF METROLOGY	LeBarron, N	Rigatti, A	Mar, Sep
2416	NETWORK/COMPUTER GRP	Goheen, M	Ryskin, A	Mar, Sep
2420	MECHANICAL ASSEMBLY	Earley, R	Shoup, M	Mar, Sep
2426	ULTRAFAST OPTOELECTRONICS LAB	Sobolewski, R	Serafini, J	Mar, Sep
2430	ELECTRO OPTIC SAMPLING LAB	Sobolewski, R	Serafini, J	Mar, Sep
2602	QUANTUM COMMUNICATIONS LAB	Sobolewski, R		Mar, Sep
2606	TERAHERTZ LAB	Dai, J	Zuegel, J	Mar, Sep
2610	HYDROGEN LAB	Shmayda, W	Redden, N	Mar, Sep
2630	SOLID STATE EXPERIMENTAL	Donaldson, W	Sobolewski, R	Mar, Sep
2636	CRYO TEST	Lund, L	Shoup, M	Mar, Sep
2640	MECHANICAL ASSEMBLY AREA	Romanofsky, M	Shoup, M	Mar, Sep
2828	MICROASSEMBLY LABORATORY	Bonino, M	Harding, D	Mar, Sep
2832	MICROFABRICATION SHOP	Lintz, K	Harding, D	Mar, Sep
2834	TARGET FAB ASSEMBLY ROOM	Bonino, M	Harding, D	Mar, Sep
2835	POWELL SCOPE (SECURE)	Harding, D	Wittman, M	Mar, Sep
2838	TRITIUM LABORATORY	Wittman, M	Harding, D	Mar, Sep
2838C	UTILITY CHASE	Wittman, M	Harding, D	Mar, Sep
2839	MICROFABRICATION	Bonino, M	Harding, D	Mar, Sep
5000	EP DIAGNOSTIC BAYS	Canning, D	Pien, G	Feb, Aug
5001	EP NORTH CAPACITOR BAYS	Canning, D	Folnsbee, L	Feb, Aug
5001A	EP Power Conditioning Annex	Canning, D	Folnsbee, L	Feb, Aug
5003	EP LASER SOURCES (C1000)	Canning, D	Hill, E	Feb, Aug
5004	EP LASER SOURCES (C1000)	Canning, D	Hill, E	Feb, Aug
5005	EP LASER SOURCES (C1000)	Canning, D	Hill, E	Feb, Aug

LABORATORY/AREA ASSIGNMENTS AND INSPECTION SCHEDULE

ROOM	DESCRIPTION	CONTACT 1	CONTACT 2	MONTH
5007	WEST PLENUM	Sanford, E	Sawyer, J	Feb, Aug
5008	EP SOUTH CAPACITOR BAYS	Canning, D	Folnsbee, L	Feb, Aug
5008A	Power Conditioning Workshop	Brent, G	Folnsbee, L	Feb, Aug
5009	EAST PLENUM (CHASE)	Sanford, E	Sawyer, J	Feb, Aug
5010	WEST MECHANICAL ROOM	Sanford, E	Sawyer, J	Jan, Jul
5100	STORAGE (BEHIND LDL)	Zuegel, J	Begishev, I	Jan, Jul
5101	STORAGE VAULT	Byrne, W		Feb, Aug
5101A	MTW POWER CONDITIONING & NEUTRONICS	Zuegel, J	Stoeckl, C	Jan, Jul
5102	STORAGE (BEHIND LDL)	Zuegel, J	Begishev, I	Jan, Jul
5106	EAST MECHANICAL ROOM	Sanford, E	Sawyer, J	Feb, Aug
5107	OMEGA EP CONTROLS	Peck, R	Puth, J	Apr, Oct
5111	TELE/DATA ROOM	Brancato, A	Sawyer, J	Feb, Aug
5112	EP ANTE ROOM (LASER SOURCES)	Canning, D	Hill, E	Feb, Aug
5118	SHIPPING AND RECEIVING	Byrne, W	Mittermeyer, P	Apr, Oct
6000	EP LASER BAY (1000)	Canning, D	Pien, G	Feb, Aug
6104	EP DARKROOM	Canning, D	Pien, G	Feb, Aug
6105	FILM PROCESSING	Canning, D	Pien, G	Feb, Aug
6106	DIAGNOSTIC WORKSHOP	Canning, D	Pien, G	Feb, Aug
6107	EP ANTE ROOM	Canning, D	Puth, J	Feb, Aug
6109	EP CONTROL ROOM	Canning, D	Puth, J	Feb, Aug
6112	EP CONFERENCE ROOM	Canning, D	Puth, J	Feb, Aug
6113	AMPLIFIER ASSEMBLY AREA	Canning, D	Smith, T	Feb, Aug
6114	METAL ULTRASONICS CLEANING	Canning, D	Smith, T	Feb, Aug
6115	METAL CLEANING	Canning, D	Smith, T	Feb, Aug
6116	OPTICAL COATING	Rigatti, A	Mitchell, G	Feb, Aug
6117	OPTICAL CLEANING AND ASSEMBLY	Rigatti, A	Canning, D	Feb, Aug
6120	SOUTH MECHANICAL ROOM	Sanford, E	Smith, T	Apr, Oct