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INTRODUCTION

This Advisory contains an overview of selected health and safety good practices and regulatory requirements that Contractors may conclude to be applicable to their work at The University of Delaware. It should be considered as an introduction and not a substitute for a thorough understanding of the subjects. Furthermore, it is for informational purposes only. This Advisory does not relieve the Contractor of his/her obligation and responsibility to (1) control the manner and means by which it and its employees, subcontractors and agents perform work or services at The University of Delaware, and (2) independently ascertain what health and safety practices are appropriate and necessary for the performance of such work or services. Contractors are expected to be familiar with and follow appropriate health and safety practices, including those required by the Federal Occupational Safety and Health Administration (OSHA) regulations, as well as any applicable state or local codes. And University of Delaware policies and procedures. (Additional information about OSHA's requirements can be found at their web site, www.osha.gov).
General Standard Rules While Working On University of Delaware Campus:

1. Contractors must adhere to all University policies and federal and state regulations regarding behavior towards employees and the University community at large. For instance, sexual harassment is unlawful and is prohibited.

2. Normal working hours shall be 7:00am to 3:30pm Monday through Friday. Work creating noise near or in Residence Halls shall start after 8:30am. If needed, U of D will stipulate different work hours prior to starting a project.

3. Contractors are required to obtain parking permits if using University parking lots.

4. All accidents (injuries/illnesses) and near misses, whether injurious or not, and hazardous conditions shall be reported to the Project Manager immediately.

5. Contractors shall familiarize themselves prior to commencing any project with the location of fire extinguishers, eye-wash stations, safety cabinets, safety blankets, safety showers, emergency exits, emergency phones, etc. in case an emergency arises during construction. Emergency exits and corridors shall not be blocked or obstructed. If work requires that exits/corridors be blocked, a review by Environmental Health & Safety shall be conducted prior to work commencing.

6. Use signs, signals, and barriers to convey the areas of construction where specific safety precautions and requirements are necessary. This shall be in conformance to OSHA Standards 29 CFR- 1926 –Subpart G-Signs, Signals, and Barricades. A University setting can be unique as a construction site because students can be active at unconventional times. Additional steps to barricade and limit or restrict access may be necessary.

7. Contractors shall submit Safety Data Sheets (SDS) sheets and outlines of procedures to be employed in using these materials prior to commencing any work. A copy of all Safety Data Sheets (SDS) sheets and right to know sign-off sheets shall be maintained at the construction site.

8. STAKE-OUTS: Notify USP (Miss Utility) two days and no more than 10 days prior to proposed excavation. Accurately identify areas and provide information including data as listed in the "Facilities Stakeout Procedure". Follow the aforementioned Procedure for normal and emergency stakeouts.

9. SMOKING: Smoking is not permitted in any building or structure.

10. IMPORTANT NUMBERS:

    Emergencies (from UD Phone)  9-911
    Emergencies (from Non UD Phone)  911
    Emergencies (call direct from Blue Light Phone)  302-831-2222
    Public Safety  302-831-2222
    Building Operations and Maintenance Center Dispatch  302-831-1141
11. PERMITS/AUTHORIZATIONS: Proper authorizations and/or current permits are required before you may begin work. Permits shall be posted at the worksite when required. Permits and authorizations commonly required for work on a site listed below (others may be needed).

1. Facilities Stake out procedure (Procedure)
2. University of Delaware "Code of Conduct" (Procedure)
3. Confined space entry permit (Authorization)
4. Hot work permit (Permit/Tag)
5. Scaffold tags (Tag)
6. Hazard Communications (Form)
7. Lock out/Tag out (Tag/Process)
8. U of D first report of injury (Form)
9. Trenching (Form)
10. Work place violence prevention (program)

12. Shirts and long pants must be worn at all times while on the facility. Other attire must be neat, and appropriate for the type of work being performed.

13. Radios for providing music or other entertainment are not permitted on construction projects.

General Duty Clause
Where OSHA has not promulgated specific standards to address a given situation, it may rely upon a general duty clause in the OSH Act for the issuance of citations or fines. OSHA interprets this general duty clause (29 U.S.C. 654(a)) to give it authority to, in appropriate instances, cite a contractor for hazards to which employees of other contractors are exposed. Selected specific OSHA regulations which may be applicable to a Contractor's work on a University project are referenced below. (Please note that this is a representative, not an exhaustive list. In all instances, it is the Contractor's obligation to identify the OSHA standards or regulations that are applicable, and to be guided accordingly.)

Personal Protective Equipment
Personal protective equipment (PPE) is used to increase individual safety while performing potentially hazardous tasks, and may include safety glasses, hard hats, gloves, respirators, or any equipment or clothing used to protect against injury or illness. Contractors shall ensure that the proper types of PPE are available for and used by their employees. OSHA’s requirements are found in 29 CFR 1926 Subpart-E- Personal Protective Equipment.
Barricades and Fencing
Barricades act as warning devices, alerting others of the hazards created by construction activities, and shall be used to control traffic, both vehicular and pedestrian, safely through or around the work site.

Contractors should use barricades as required in 29 CFR 1926 Subpart G- Signs, Signals, and Barricades, or wherever necessary for the physical protection of people or property.

Temporary cyclone fencing, plastic safety fencing and portable manhole barricades are examples of acceptable barricading.

Yellow caution tape and/or cones are not considered acceptable barricades, and shall be used only until more suitable barricades can be erected.

Signage and illumination should be used where appropriate.

*At no time will barricade or fencing block fire hydrants, fire department connections or fire lane access without prior coordination with the Campus Fire Marshal.

Excavations (Including Trenches)
Before excavation work begins, the Contractor shall be familiar with and follow the regulations found in 29 CFR 1926 Subpart P - Excavations.

Scaffolding
In its simplest form, a scaffold is any temporary elevated or suspended work surface used to support workers and/or materials. There are many types of scaffolds, both supported and suspended. Contractors who erect or use scaffolding shall be familiar with and follow the requirements of 29 CFR 1926 Subpart L - Scaffolds.

Scaffolding requires a daily tag of inspection with a competent person.

Fall Protection
When work is performed on elevated surfaces that are six feet or more above the surrounding area protection against falls frequently shall be implemented. Fall arresting systems, which include lifelines, body harnesses, and other associated equipment, are often used when fall hazards cannot be controlled by railings, floors, nets, and other means. These systems are designed to stop a free fall of up to six feet while limiting the forces imposed on the wearer. Contractors shall be familiar with and follow the requirements 29 CFR 1926 Subpart M - Fall Protection.

A variety of systems are available to provide fall protection. Contractors shall analyze the work site, the potential hazards and the magnitude of possible injury to workers in assessing fall protection systems shall be used.

Fall protection plan shall be written and reviewed for leading edge work.

Hot Work (See Specific University Policies and Procedures)
Cutting and welding operations (referred to as hot work) are commonly associated with construction activities. Hot work equipment, which may produce high voltages or utilize
compressed gases, requires special awareness and training on the part of the worker to be used safely. Contractors shall control the hazards associated with hot work through the implementation of effective programs presented under 29 CFR 1926 Subpart-J Welding and Cutting.

**Hot Work Permits**
Hot work permits serve as a checklist for operators and those performing fire watch duties. The Contractor responsible for issuing permits shall be qualified to examine the work site and ensure that appropriate protective steps, such as those listed in this section, have been taken.

**Fire Watch**
A person other than the operator shall perform fire watch duties and remain at the work site for at least 1 hour per state code after hot work operations have ended. Additionally, the following steps should be taken:

A fire extinguisher rated at not less than 2-A: 10-B:C shall be attached to all portable cutting and welding carts.

If a building or area is equipped with a sprinkler system, then that system shall be operational when hot work is performed.

A hot work permit is required for all operations involving open-flame or work producing heat and/or sparks.

**Confined Spaces** *(See Specific University Policies and Procedures)*
A confined space is defined as any space that is large enough to enter and perform work, has a limited means of entry or egress (exit), and is not designed for continuous employee occupancy. Examples of confined spaces include but are not limited to pits, tanks, certain tunnels, manholes and underground vaults.

The University of Delaware’s procedures for Confined Space Entry follows OSHA’s General Industry regulations. All contractors must follow procedures equal to or greater than the UD procedures.

*For new electronic Confined Space Entry Permit System refer to Website: http://www.facilities.udel.edu/legacyforms/csep
This permit must be filled out before entries are made.

Contractors shall be familiar with relevant portions of 29 CFR 1926 Subpart C – General Safety and Health Provisions, and use appropriate entry procedures when working in confined spaces.

When a confined space entry includes hot work (welding or cutting), the additional procedures from 29 CFR 1926 Subpart J-Welding and Cutting shall be followed.

The University of Delaware’s Permitting Process should be utilized while on University property.

Cover and secure all openings to confined spaces if they will be left unattended.
Lockout/Tagout (See Facilities Energy Control Manual attached)
Lockout/Tagout procedures are designed to prevent accidental startup of machines or equipment, and to prevent the release of stored energy. Through the application of locks and/or tags as direct controls, equipment is isolated from energy sources and injuries to workers are prevented. When work affects or is done in association with University personnel, Contractors shall submit their lockout/tagout procedures to the University's Project Manager.

Contractors shall, at a minimum, adhere to the following procedures found in 29 CFR 1926 Subpart K- Electrical:

Controls
Controls that are to be deactivated during the course of work on equipment or circuits shall be locked or tagged.

Equipment and circuits
Equipment or circuits that are de-energized shall be rendered inoperative and shall have tags attached at all points where the equipment or circuits could be re-energized.

Tags
Tags shall be placed to identify plainly the equipment or circuits being worked on. Always test the system by trying to turn on equipment, etc.

Electrical Safety
All contractors and their personnel must be familiar with 29 CFR Subpart K, General Electrical. This standard covers four major divisions: installation safety requirements, safety related work practices, safety-related maintenance and environmental conditions and safety requirements for special equipment. Some specific examples include: daily inspection of extension cords and GFCI requirements.

All contractors should be aware of OSHA’s requirements for arc flash protection. This covers all skilled trades at risk. This regulation is undergoing rapid changes at present.

Power Industrial Trucks
All Contractors should follow the OSHA 29 CFR 1910.178 regulations requiring training, certification and any special licenses that may be required to operate equipment on site. A copy of such certifications and or licenses should be given the University before work begins.

- No one under the age of 18 may operate any Powered Industrial Truck in accordance with (29CFR 570.58).
- Ensure that barriers are set up when working at heights to avoid foot traffic below.
- All Powered Industrial Trucks shall be safely secured at the end of the work shift by lowering the forks/baskets to the ground and erect fencing, caution tape and or safety cones around the truck to secure it.
- Any power operating industrial truck not in safe operating condition shall be removed from service. All repairs shall be made by authorized personnel.
- At no time shall any Contractor hitch a ride on or use a forklift to work on a project at heights where a bucket lift or man lift would be suitable for the task.
Exposure Monitoring
Potential exposures include, but are not limited to, nuisance dust, chemical vapors, hazardous materials (such as lead) and noise. The Contractor shall take all necessary precautions to control or contain fugitive emissions from the job site.

Employee exposures to airborne hazardous substances must be maintained below OSHA permissible exposure limit (PEL), found in 29 CFR 1910.1000 Table Z, or American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) for any chemical.

Where engineering controls will not adequately control exposures or are not feasible, and the potential exists to create air concentrations in the work area above the PEL or TLV, work area exposure conditions shall be monitored. Monitoring should occur, at a minimum during the start of work and whenever there is a change in procedure, process, or chemical or material used.

Asbestos
Asbestos was incorporated in a number of widely used products, many of which were used in building construction from the late 1800's and the mid-1980's, when most University buildings were constructed. The most common use of asbestos in the University buildings was in floor tile, mastic, caulking, roofing, thermal systems insulation (TSI) such as pipe insulation and tank insulation, plaster, and structural steel fireproofing. Joint Compound and spackle can also contain asbestos here at the University. Per the OSHA Asbestos Standard (29 CFR 1926.1101) building materials installed prior to 1980 shall be presumed to contain asbestos unless historical information or testing indicates otherwise.

- Contractors employed by the University to perform building or facilities-related maintenance, repair or renovation shall be provided the location of suspect and known asbestos-containing materials (ACM) in the work area(s) to which they are assigned.
- Contractors shall, under no circumstances, damage or disturb known or suspect ACM (unless they are a licensed Asbestos Abatement Contractor and have been specifically employed to perform asbestos repair or removal). If in the course of the work, suspected asbestos materials are discovered, the contractor shall stop work that might disturb the material immediately and notify the Project Manager.
- It is the responsibility of the Contractor to provide its employees with an asbestos awareness program, which shall include, but not be limited to the information contained in this section and appropriate federal and Delaware regulations.

Lead
Many buildings built or renovated before 1978 have lead-based paint applied to some interior or exterior surfaces. Paint containing 0.5 percent or more lead by weight or 1 mg/cm² or more lead by x-ray fluorescence is considered to be lead paint.

- Contractors employed by the University will be provided the location of known
lead-containing building materials in the work area(s) to which they are assigned.

- Contractors that disturb lead paint during the course of work shall ensure all work is in compliance with the 29 CFR 1926.62, Lead, including controlling exposures below the permissible exposure limit and providing biological monitoring for employees, as needed.

- Contractors that disturb lead-based paint during the course of work shall take all necessary precautions to protect University employees, students and visitors from exposure to lead dust or contamination. Such measures may include but are not limited to, using plastic sheeting to isolate the work area, using wet techniques, washing with trisodium phosphate, and/or using a HEPA vacuum.

- Where the work area is an area normally occupied or frequently visited by children under 6 years old or pregnant women, University of Delaware Environmental Health and Safety shall be contacted after the work area has been cleaned to perform clearance testing. The Contractor shall continue cleaning efforts until sampling results indicate the lead dust levels are less than or equal to 100 micrograms per square foot on floor surfaces and less than or equal to 250 micrograms per square foot on interior window sills, as appropriate.

- Contractors employed to provide abatement of a lead paint hazard shall be licensed by the State of Delaware to provide such services. All work shall be performed in accordance with applicable state and federal regulations. In many cases, lead paint chips are considered hazardous waste by the U.S. Environmental Protection Agency. Contractors shall ensure that wastes containing lead paint, including paint chips, are disposed in accordance with federal and state regulations. All hazardous waste generated from University facilities must be disposed in accordance with federal and state regulations. All hazardous waste generated from University facilities must be disposed of by contacting University of Delaware Environmental Health and Safety at 831-8475.

- Contractors who perform renovations in University-owned residential units, homes, or child-occupied facilities built before 1978 need to comply with the EPA’s RRP law effective April 22, 2010.

- Contractors must be certified and follow certain work practices under the law.

- Post-renovation clearance sampling is necessary under the RRP regulations and will be performed by a University-approved 3rd party. Renovators must also educate occupants of the pending work.

*This is not a complete list of requirements. For more information consult EPA’s Renovation, Repair, and Painting Final Rule (40 CFR 745) or contact the University of Delaware Environmental Health and Safety at (302) 831-8475.

**Indoor Air Quality**

Maintaining Indoor Air Quality while construction occurs in an occupied building requires pre-planning by all parties. This includes the designers, contractors, construction managers, Environmental Health and Safety and the occupants. Methods to maintain air quality include but are not limited to: containing the work area, modifying HVAC operation, reducing emissions, increasing housekeeping, rescheduling work hours and relocating occupants. Refer to the backside of the Hazard Communication Form.

*Possible steps to maintain good air quality in occupied buildings under construction:*

1. Conduct work generating fumes, odors, dust, etc. off-hours. This may include night shifts,
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weekends, etc.
2. Isolate the work area by constructing temporary walls (i.e., 2x4’s and polyethylene sheeting). Seal non-essential openings with two layers of polyethylene sheeting.
3. In certain circumstances, the involved area may have to be put under negative pressure. This would involve all steps in example #2 plus the use of portable air moving devices to induce negative pressure in the work area. Air would only move from clean to dirty areas.
4. Another possibility is to positively pressurize occupied non-construction areas.
5. Substitute products and/or procedures that are less toxic and less odorous.
6. Selectively shutting down certain air handling systems to prevent the inflow and distribution of contaminants may be necessary.
7. Selective evacuation of part of a facility or in certain circumstances, total evacuation of the facility may be the best solution.

The above list is by no means complete. There can be many ways to minimize the impact of your project on the occupants. It is extremely important that FP&C, or Maintenance & Operations, representatives consult with the Department of Environmental Health and Safety prior to the commencement of work unless the project presents hazards for which the appropriate protective measures have already been established. In most cases, selecting one or a combination of the above steps is a judgment call based on anticipated physical and chemical contamination.

For details, consult with IAQ Guidelines for Occupied Buildings Under Construction by the Sheet Metal and Air Conditioning Contractors’ National Association, INC.

Stormwater
The Contractor shall comply with all City of Newark and DNREC sediment and stormwater regulations.

City of Newark ordinance:
1. Chapter 27 – SUBDIVISIONS APPENDIX IV. - SEDIMENT AND STORMWATER MANAGEMENT

DNREC regulations:
1. TITLE 7 NATURAL RESOURCES & ENVIRONMENTAL CONTROL\DELAWARE
2. ADMINISTRATIVE CODE 1
3. 5000 Division of Soil and Water Conservation
4. 5101 Sediment and Stormwater Regulations

Chemicals Stored or Used by The University of Delaware:
Chemicals are used extensively at The University of Delaware, including, but not limited to, laboratories, maintenance activities, and janitorial work. According to requirements of 29 CFR 1910.1200, when the Contractor works in area(s) where chemicals are stored or used, the Contractor may request from the Project Manager the following information:

- Special precautions and/or safety procedures for the work area.
- Method of obtaining Safety Data Sheets (SDS) for hazardous chemicals present in the Contractor's work area.
- Special procedures to follow in the event of an accidental release or exposure to the hazardous chemicals.

Chemicals Stored or Used by the Contractor:
- The Contractor must take all necessary precautions to protect University employees, students, and visitors from exposure to the chemicals.
University of Delaware Contractor Safety Advisor

- The Contractor shall maintain material Safety Data Sheets (SDS) on-site for all hazardous chemicals used or stored at the job site. Copies of SDS’s shall be provided to the Project Manager and copied to the University of Delaware Environmental Health and Safety to the start of work.
- The Contractor is responsible for cleaning up any spills created or caused by the Contractor. Contractors must alert the University of Delaware's Public Safety Department at 9-911.
- The Contractor must dispose of all hazardous chemicals in accordance with federal and state regulations. All hazardous waste generated from University facilities must be disposed of by contacting Environmental Health and Safety at (302) 831-8475, 222 S. Chapel St.

Policy for the Safe Use of Aerial Lifts

Purpose: To establish uniform administrative procedures and minimum requirements for the safe use of aerial lifts

Policy: The use of aerial lifts by untrained personnel can result in serious injury or death, therefore all personnel must be fully trained by a competent person before operation and the training must be documented. A competent person is defined as one who is responsible for implementing and monitoring safety and health plans, is capable of identifying existing and predictable hazards and has the authority to take prompt corrective measures. A copy of the training documentation must be sent to EHS on completion. The training must include:

a. Familiarization of the contents of the operation manual specific to the machine(s) used.

b. Trainees must exhibit knowledge of the operations manual and exhibit competency in actual operation of the machine(s).

c. Read and obey all warnings, cautions and operating instructions on the machine and in the manual.

d. Know how to use both sets of controls in the lift and ground controls

e. Instruction in identifying all known hazards in the work area such as overhead electric lines, holes, etc.

f. Instruction on prohibition of use in winds in excess of 28 mph and higher wind gusts.

g. Instruction on use of a hand-held anemometer.

h. Instruction on how to use emergency controls.

i. Instruction on conducting a daily inspection using a checklist (see attached).

j. Instruction on proper use of safety rails, chains and personal fall arrest systems.

k. Survey the areas immediately around the lift for personnel and equipment before operation.

Scope: This policy and accompanied procedures apply to all University personnel as well as all outside contractors when working on University property and applies to all types of aerial lifts.

Procedures:

a. Only trained and authorized operators shall operate the lifts.

b. Complete a daily inspection checklist.
c. A malfunctioning lift shall be shut down. Tag it out and report it to your supervisor for repairs.

d. Controls shall be plainly marked as to their function.

e. Controls shall be tested each day prior to use to determine they are in safe operating condition.

f. All safety rails and chains must be in position. In addition, a personal fall arrest system including full body harness lanyard and anchor point on lift must be used when dictated by the type of lift or if safety chains and rails have to be removed to accommodate the work.

g. Load limits shall not be exceeded.

h. Instruction and warning placards must be legible.

i. Do not use lift near electric power lines. Consult the operations manual for safe distances.

j. Recognize and avoid unsafe conditions and hazards.

k. Do not modify the lift.

l. Ground controls shall not be operated unless permission is granted from personnel in the lift except in an emergency.

m. Personnel shall always stand on the floor of the platform or in the bucket. Always operate the lift on a firm, level surface.

n. Deploy outriggers if the lift is so equipped.

o. Do not operate lift in high winds (>28 mph) or if wind gusts are forecast.

p. Do not operate if thunderstorms are in the area. Check weather forecast daily. Use the hand-held anemometer to verify wind speed and for unexpected conditions.

q. Do not move the lift with personnel on the platform or in the bucket. If this becomes necessary, consult the EHS department.

r. Do not add large surface area pieces such as signs, banners, canopies, etc. that would cause a sail effect on stability.

s. Keep all body parts inside platform railings or in the bucket when moving the lift.

t. Verify that the operator's manual is on the lift—these procedures do not take the place of the manufacturer's operators manual.

u. Do not exit the lift to gain access to elevated locations unless a personal fall arrest system is utilized and there is an anchor point on the elevated surface to tie off to maintain fall protection before releasing from the lift.

The key to safe and proper usage is common sense and its careful application along with adequate training.

If at any time a lift operator determines that an unsafe condition exists, immediately stop, lower and leave the lift.

The DEHS maintains a list of certified instructors for aerial lifts in various departments. Contact DEHS to arrange training.
Aerial Lift Operation Checklist

OK          NO
____        ____    Check weather forecast and wind speed.
____        ____    Check for damaged, loose or missing parts.
____        ____    Check tire inflation (visual).
____        ____    Check fuel level or battery charge.
____        ____    Look for air, hydraulic or fuel system leaks.
____        ____    Check for loose hoses or wires.
____        ____    Ensure operating controls are working properly.
____        ____    Ensure that auxiliary (ground) controls are working properly.
____        ____    Ensure that lift is on level surface
____        ____    Check guardrail system and chains
____        ____    Check placards, warnings and control markings
____        ____    Deploy outriggers if equipped
____        ____    Verify operations manual is on lift
____        ____    Verify that fall arrest equipment is present and in good condition.

_____ OK FOR OPERATION 
_____ DO NOT USE

Lift model and serial #:__________
Date: ________________________
Operator: ____________________

*Report Problems to issuing department for repair.
Facilities Procedure

Facilities Energy Control – Lockout/Tagout

FOM-0010-01

1.0 POLICY

1.1 It is the policy of University of Delaware that any individual engaging in the maintenance, repairing, cleaning, servicing, or adjusting of power-driven machinery or equipment on University of Delaware property will abide by the procedures outlined in this document. These procedures are designed to meet or exceed applicable OSHA standards for safe work practices.

1.2 Lockout is a first means of protection, warning tags only supplement the use of locks. Tags alone may be used only when the application of a lock is not practically feasible and with approval of the appropriate supervisor.

2.0 PURPOSE

To ensure that all individuals on the University of Delaware campus are protected from accidental or unexpected contact with energy sources, that might be injurious to the body. These energy sources include electrical, mechanical, hydraulic, pneumatic, chemical, thermal, and gravity. Individuals may come in contact with these forces during the course of their daily work activities such as repairing, cleaning, servicing, or adjusting energy containing equipment.

3.0 DEFINITIONS

Affected employee: An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized employee: A person who locks out or tags out machines or equipment in order to
perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

**Capable of being locked out:** An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

**Contractors:** Any individual or company brought onto campus under the direct or indirect management of the Facilities organization or their agent for the purposes of performing work which could result in contact with, or have reason to manipulate, any energy source on campus.

**Energized:** Connected to an energy source or containing residual or stored energy.

**Energy isolating device:** A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

**Energy source:** Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, gravity or other energy.

**Group lockout:** Where the service or repair of equipment requires multiple energy isolation points, the use of multiple keyed-alike locks (Group Locks) may be used to facilitate the process. **Every lock in a set of group locks is keyed-alike and there is only one key for a particular set of group locks.**

When this group lock key for the series of keyed-alike locks is placed in a group lockout box and secured by an employee’s personal safety lock, they are in effect affixing their personal lock to all of the multiple energy isolation points because **their personal lock controls the only key to that particular series of group locks.** Shops which experience the need to lockout multiple energy
isolation points as part of locking out a system(s) or for shutdown work, may wish to have multiple sets of group locks, e.g., for steam, water, air, electrical, etc.

Hot tap: A procedure used in the repair, maintenance and services activities which involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, and steam distribution systems.

Lockbox: A container which is used in group lockout systems to secure the single key to a series of keyed-alike locks that are being used to secure multiple energy isolation points. The lockbox design facilitates the ability of multiple individuals or crews to work under the protection of a group lockout by affixing their personal lock to the group lockbox.

Lockout: The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout device: A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Multiple lock hasps: A lockout device that enables multiple people to affix their personal safety locks to a single energy isolation point.

Normal production operations: The utilization of a machine or equipment to perform its intended production function.

Personal safety lock: Every employee assigned to work on a piece of equipment requiring lockout will be issued one or more uniquely-keyed personal safety locks. These locks are registered to an individual and are to be used only for safety lockout applications. The concept of 1-key/1-lock for employee personal safety locks is the foundation of the security a successful lockout procedure. These locks are marked with the employee’s name for easy field identification.
Servicing and/or maintenance: Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

Shop safety lock: When an employee determines that the repairs are going to be delayed (e.g., awaiting parts) or they are leaving the end of their assigned shift and the work is incomplete then they should remove their personal safety lock and replace it with a shop safety lock. Shop safety locks are registered to the shop and are individually-keyed. When a shop safety lock is placed on a piece of energy isolation point for a piece of equipment, the reason for its use needs to be logged in the shop lockout book for reference for other employees who may be assigned to finish the job at a future date (e.g., when parts are available).

Tagout: The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout device: A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

4.0 RESPONSIBILITIES

4.1 FACILITIES DEPARTMENT

a. Ensure that the lockout/tagout procedures are in compliance with OSHA requirements.
b. Provide biennial training of the lockout/tagout procedure and an annual review for affected and authorized employees.
c. Inspect energy control procedures and practices at least annually to ensure that general and specific lockout/tagout procedures are being followed.
   i. Inspections must be carried out by persons other than those employees directly utilizing energy control procedures.
   ii. Inspections will include a review between the inspector and each authorized employee,
of that employee's responsibilities under the energy control procedure being inspected.

iii. Certify that periodic inspections have been performed (see RECORDKEEPING and
Attachment B LOCKOUT/TAGOUT INSPECTION FORM)

4.2 DIRECTORS and ASSISTANT DIRECTORS
   a. Ensure that each supervisor and manager adheres to procedures.

4.3 MANAGERS and SUPERVISORS
   a. Identify each UD crew member that engages in work requiring locking/tagging out of
      energy sources to ensure understanding and adherence to adopted procedures.
   b. Ensure that each UD employee receives training in energy control procedures prior to
      servicing the machinery or equipment.
   c. Provide and maintain necessary equipment and resources, including safety locks, tags,
      lockout devices and/or other similarly effective means to isolate and lockout energy
      sources.
   d. Where possible, perform a pre-use examination of new or revised equipment,
      machinery, or operations that require the use of lockout/tagout devices during servicing,
      maintenance, or repair. Ensure that lockout isolation points of this new or modified
      equipment are identified and that employees are instructed on the proper lockout
      process regarding this equipment.
   e. Whenever outside servicing personnel are to be engaged in activities covered by the
      scope and application of this standard, managers, supervisors, or project managers and
      the outside employer shall inform each other of their respective lockout or tagout
      procedures. Additionally, the managers and supervisors shall ensure that his/her
      employees understand and comply with the restrictions and prohibitions of the outside
      employer's energy control program if they impose requirements above this program.

4.4 EMPLOYEES
   a. Adhere to specific safety Lockout/Tagout procedures as outlined in this document for
      all tasks that require the use of lockout/tagout procedures as defined.
   b. Insure that they have sufficient safety lockout equipment (safety locks, tags, personal
      protective equipment, specialized lockout devices) with them on the job to safely de-
      energize and secure equipment per procedures before it is worked on.
4.5 CONTRACTORS

a. Adhere to specific safety Lockout/Tagout procedures as outlined in this document for all tasks that require the use of lockout/tagout procedures as defined.

b. Insure that they have sufficient safety lockout equipment (safety locks, tags, personal protective equipment, specialized lockout devices) with them on the job to safely de-energize and secure equipment per procedures before it is worked on.

c. Submit a LO/TO points list to the Project Manager and cognizant Maintenance & Operations Shop Manager for their review and approval. This request can be in the form of an email (See Attachment F) and must be submitted for the initial identification of LO/TO points (boundaries), and each time a revision, addition or removal of any point is necessary.

5.0 BASIC SAFETY LOCKOUT/TAGOUT PROCEDURES

5.1 PREPARATION FOR LOCKOUT/TAGOUT

a. Make a survey to locate and identify all isolating devices to be certain which switch(es), valve(s), or other energy isolating devices apply to the equipment to be locked and tagged out. More than one energy source (electrical, mechanical, stored energy, or others) may be involved.

b. Review shop Lockout/Tagout files to determine if Equipment Specific LO/TO Instructions have been created for the asset/equipment that you will be servicing. If this document is on file, enter required information and signoff as determine by your Shop Manager.

c. If Equipment Specific LO/TO Instructions have not been issued, create new instructions using Attachment C, (or) record lock out points in a Log Entry on the associated work order.

d. All LO/TO’s exceeding 48 hours in duration, or as directed by the Shop Manager, will be recorded in the Shop LO/TO Book which will be accessible to all Maintenance & Operations personnel, and available in the Operations Center on a 24x7 basis. See Attachment E.

e. (Sub)Contractors shall submit a list of all lock out points to the project manager prior to the start of work on any UD equipment or system. This list will be maintained by the contractor and available for audit by UD personnel.
5.2 INSTALLATION SEQUENCE FOR LOCKOUT/ TAGOUT

a. Issue Utility Outage Request Form for maintenance activities where lockout will impact utility services. Notify affected employees that a lockout/tagout process is going to be utilized and the reason for the lockout. The authorized employee shall know the type and magnitude of energy that the machine or equipment utilizes and shall understand the hazards related to the lockout.

b. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open toggle switch, etc.).

c. Don appropriate PPE and operate the switch, valve, or other energy isolating device(s) so that the equipment is isolated from its energy source(s). Stored energy (such as that in springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as repositioning, blocking, bleeding down, etc.

d. Lockout/Tagout the energy isolation devices with assigned individual lock(s) and tag(s). All UD personnel shall use the tags 1 and/or 2 as designated in Attachment D.

i. Tag-1 (reusable) shall be used for daily lockouts required for routine maintenance activities.

ii. Tag-2 (two-part) shall be used for multi-shift, multi-day lockouts when a Shop LO/TO Book entry is required, or as designated by the Shop Manager. The mechanic should record the tag number in a work order log entry and place the tear-away portion of the tag in his personnel log book, or if it is a Group LO/TO, with the Shop LO/TO Book.

iii. Tag-1 can be used in combination with Tag-2 if the mechanic is concerned that Tag-2 might become damaged by the environment or otherwise compromised. If the two tags are used together, the tag number from Tag-2 must be hand written onto Tag-1, and this tag must then be discarded after the LO/TO is removed.

e. All (Sub) Contractor personnel must use Tag-3 as designated in Attachment D.

Contractors can also utilize tags as required by their company Safety Programs in combination with Tag-3, however Tag-3 must be prominently displayed at all times. The contractor shall write down his/her name, company and phone number on the back of the top (hung) portion of the tag. The bottom (tear-away) portion of the tag should be placed in a central location designated by the project.
f. Enter the required LO/TO information into the Shop LO/TO Book as required. Contractors must record and maintain all LO/TO information as part of their project requirements.

g. After ensuring that no personnel are exposed, and as a check on having disconnected the energy sources, verify that it is de-energized by operating the push button or other normal operating controls to make certain the equipment will not operate. Use voltage meter to ensure the absence of current before performing maintenance routines. Be aware that some control current may remain energized within electrical disconnect boxes. CAUTION: Return operating control(s) to neutral or off position after the test.

h. The equipment is now locked out or tagged out.

i. Wear appropriate level of PPE to conduct repair work.

5.3 RESTORING MACHINES OR EQUIPMENT TO NORMAL OPERATIONS

a. After the servicing and/or maintenance is complete and equipment is ready for normal operations, check the area around the machines or equipment to ensure that no one is exposed.

b. After all tools have been removed from the machine or equipment, guards have been reinstalled and employees are in the clear, remove all lockout or tagout devices. Operate the energy isolating devices to restore energy to the machine or equipment.

c. Wear appropriate PPE to re-energize equipment.

5.4 GROUP LOCKOUT PROCEDURE: INVOLVING MULTIPLE PERSONS/MULTIPLE ISOLATION POINTS

a. In the preceding steps, if more than one individual is required to lockout or tagout equipment, each shall place his/her own personal lockout/tagout device on the energy isolating device(s). When an energy isolating device cannot accept multiple locks or tags, a multiple lockout or tagout device(hasp) may be used.

b. If a group lockout is used, a group safety lock key for the set of group locks may be used to lockout multiple energy isolation points. The key for the group locks is placed in a lockout box that is designed to allow the use of multiple locks to secure it. Each employee will then use his/her own lock to secure the group lock box. As each person
no longer needs to maintain his or her lockout protection, that person will remove his/her lock from the box or cabinet. When all personal locks have been removed, the machinery may be restored to normal operation (see section 5.3 of this procedure).

5.5 TEMPORARY REMOVAL OF LOCKOUT/TAGOUT DEVICES

a. In situations where lockout/tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment or component thereof, the following sequence of actions will be followed:
   i. Remove non-essential items and ensure that machine or equipment components are operationally intact.
   ii. Notify affected employees that lockout/tagout devices have been removed and ensure that all employees have been safely positioned or removed from the area.
   iii. Have employees who applied the lockout/tagout devices remove the lockout/tagout devices.
   iv. Wear appropriate PPE to re-energize equipment.
   v. Energize and proceed with testing or positioning.
   vi. De-energize all systems and reapply energy control measures in accordance with section 5.2 of these procedures.

5.6 LOCKOUT/TAGOUT DEVICE REMOVAL PROCEDURE

a. Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied the device.

b. Exception to paragraph (5.6a): When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under the direction of the employer, provided that specific procedures and training for such removal have been developed, documented and incorporated into the employer’s energy control program. The employer shall demonstrate that the specific procedure provides equivalent safety to the removal of the device by the authorized employee who applied it.

c. The specific SAFETY LOCK REMOVAL procedure steps are:
   i. Verification by the employer that the authorized employee who applied the device is not at the facility:
ii. Making all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed:

iii. Authorization by the Director/Assistant Director of Maintenance and Operations; and

iv. Ensuring that the authorized employee has the knowledge that their lock has been removed in their absence before he/she resumes work at that facility.

5.7 MAINTENANCE REQUIRING UNDISRUPTED ENERGY SUPPLY

a. Where maintenance, repairing, cleaning, servicing, adjusting, or setting up operations cannot be accomplished with the prime mover or energy source disconnected, such operations may only be performed under the following conditions:
   
   i. The operating station (e.g. external control panel) where the machine may be activated must at all times be under the control of a qualified operator.
   
   ii. All participants must be in clear view of the operator or in positive communication with each other.
   
   iii. All participants must be beyond the reach of machine elements which may move rapidly and present a hazard.

   iv. Where machine configuration or size requires that the operator leave the control station to install tools, and where there are machine elements which may move rapidly, if activated, such elements must be separately locked out.

   v. During repair procedures where mechanical components are being adjusted or replaced, the machine shall be de-energized or disconnected from its power source.

5.8 ENERGY ISOLATION DEVICE HARDWARE

a. Safety lock types

   i. Personal Safety Lock: (1key/1-lock) Every employee assigned to work on a piece of equipment requiring lockout will be issued one or more uniquely-keyed personal safety locks. These locks are registered to an individual and are to be used only for safety lockout applications. The concept of 1-key/1-lock for employee personal safety locks is the foundation of the security a successful lockout procedure. These locks are marked with the employee’s name for easy field identification. These locks should be color-coded by shop when possible. (See Attachment A)
ii. **Shop Safety Lock:** (1-key/1-lock) When an employee determines that the repairs are going to be delayed (e.g., waiting parts) or they are leaving the end of their assigned shift and the work is incomplete, then they should remove their personal safety lock and replace it with a shop safety lock. Shop safety locks are registered to the shop and are individually-keyed. When a shop safety lock is placed on an energy isolation point for a piece of equipment, the reason for its use needs to be logged in the shop lockout book. This book serves as a reference for other employees who may be assigned to finish the job at a future date (e.g., when parts are available).

iii. **Group Safety Lock:** (1-key/multiple locks) Where the service or repair of equipment requires multiple energy isolation points, the use of multiple keyed-alike locks (Group Locks) may be used to facilitate the process. Every lock in a set of group locks is keyed-alike and there is only one key for a particular set of group locks. When this group lock key for the series of keyed-alike locks is placed in a group lockout box and secured by an employee’s personal safety lock, they are in effect affixing their personal lock to all of the multiple energy isolation points because their personal lock controls the only key to the particular series of group locks. Shops which experience the need to lockout multiple energy isolation points as part of locking out a system(s) or for shutdown work, may wish to have multiple sets of group locks, e.g., for steam, water, air, electrical, etc.

5.9 **MISCELLANEOUS HARDWARE**

- **a. Safety lock hasps:** hardware used which allows multiple employees to affix their personal safety locks to a single isolation lockout point. Specific make and model of personal lock is attached.

- **b. Group lockout boxes:** A box which is used to secure the group lock key to a series of group safety locks that are being used in the field to lockout multiple isolation points. The specific make and model of the Group Lockout Box used by Facilities is attached.

- **c. Do Not Operate Tags:** A tag used to indicate an energy isolation point for lockout applications. The specific make and model of authorized Facilities tags is attached.

6.0 **EMPLOYEE TRAINING**

UD Employees will receive lockout/tagout training from qualified training personnel. Note:
University of Delaware Contractor Safety Advisor

training requirements outlined in 29CFR [Specifically 1910.147 (c)(7)(i),(ii), & (iii)].

7.0 RECORDKEEPING

7.1 INSPECTION RECORDS
   a. Facilities will maintain inspection records in accordance with 4.1C.ii of this document.
   b. Facilities will complete and maintain all LOCKOUT/TAGOUT INSPECTION FORMS.

7.2 TRAINING RECORDS
   a. Training records will be maintained by the Facilities Department. Training records will include an outline of topics covered and a sign in sheet of those employees attending.

8.0 REFERENCE


Effective Date: 1/1/13
Approved by: B.L. Schuster

Attachments:
   A. Sample Hardware for Safety
   B. UD Lockout/Tagout Inspection Form
   C. Equipment Specific Lockout/Tagout Instruction Form
   D. Approved Lockout/Tagout Tags
   E. Shop Lockout/Tagout Book Index Form
   F. Sample Email Request For Contractor Lockout/Tagout Points
ATTACHMENT A
APPROVED HARDWARE FOR SAFETY LOCKOUT

SAFETY LOCKS: PERSONAL

**Padlock, Xenoy, Red, Length 1 3/4 In**

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<th>Lockout Devices</th>
<th>Lockout Padlocks</th>
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SAFETY LOCKS: SHOP SAFETY LOCK

**Padlock, Key Type Different, Red, 2 Keys**

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LOCK HASPS:

Lockout Hasp
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APPROVED HARDWARE FOR SAFETY LOCKOUT

GROUP LOCKOUT BOXES:

Lock Box
Safety > Lockout Devices > Lockout Centers and Stations

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UD LOCKOUT/TAGOUT INSPECTION FORM

1. Inspection Date:___________________      Maximo WO#

2. Inspector (Printed Name/Signature):__________________________/___________________

3. Employee(s) Inspected (Printed/Signature):_____________________/___________________

                                   /___________________
                                   /___________________
                                   /___________________
                                   /___________________
                                   /___________________
                                   /___________________

5. Machine/equipment on which the energy control procedure was being utilized:

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

YES  NO Has employee tested the effectiveness of his/her lockout/tagout devices?

YES  NO Have all procedures been followed?
YES  NO Were tagouts legible and clearly displayed?

6. Comments/Observations:_____________________________________________________

                                   __________________________________
                                   __________________________________
                                   __________________________________
                                   __________________________________
                                   __________________________________
                                   __________________________________
                                   __________________________________
# Equipment Specific Lockout/Tagout Instruction Form

**Date LOTO:**

**Supervisors Name:**

**Building or Area:**

**Shop:**

**Supervisors Phone#:**

**WO #:**

**LOT0 BY? Mechanics Name & Unit #**

**Number of Energy Sources:**

**Instructions Issued Date:**

**Date to be Reenergized:**

**(List Below)**

**General Instructions:**

1. Provide verbal notification of LOTO to affected employees.
2. Shut down equipment using standard stopping instructions.
3. Isolate all energy sources and apply devices for each energy source.
4. Release all residual and stored energy. Follow any special instructions below.
5. Attach warning tags with names of employees and WO# at each lock point.
6. Verify all sources have been de-energized.

**Specific Instructions:** (page _ of _)

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**LOT0 Removal Instructions:**

1.  
2.  
3.  

**Signoff/Approval:**

**Date:**
ATTACHMENT D

APPROVED LOCKOUT/TAGOUT TAGS

Tag 1, Tag 2, & Tag 3
### SHOP LOCKOUT/TAGOUT BOOK INDEX FORM

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<th>ASSET DESCRIPTION</th>
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<th>TAG NUMBER (Number from 1 part tag)</th>
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SAMPLE EMAIL REQUEST FOR CONTRACTOR LOCKOUT/TAGOUT POINTS

From: Schuster, Brian  
Sent: Wednesday, December 19, 2012 8:54 AM  
To: Schuster, Brian  
Subject: FW: (SAMPLE) LO/TO Information

From: Murphy, Randy  
Sent: Tuesday, November 27, 2012 4:09 PM  
To: Schuster, Brian  
Subject: RE: (SAMPLE) LO/TO Information

Project Manager & all M&O Shop Managers,

A total of 3 initial lockout/tagout points (boundaries) have been established for the Chilled Water Project #155123 and are identified as follows:

POINT No.: 1  
BUILDING/AREA: Laird Utility Plant  
SYSTEM/ASSET: Chill water  
ENERGY TYPE: Water at @ 75 psi  
BOUNDARY TYPE: Valve  
FIELD LOCATION: North Valve pit  
LO/TO METHOD: Close valve and lock  
LO/TO DEVICE: chain and padlock  
APPLY/REMOVE: Jan 4 2013 / remove May 2013  
NOTES:

POINT No.: 2  
BUILDING/AREA: Laird Utility Plant  
SYSTEM/ASSET: Chill water secondary pump #1  
ENERGY TYPE: 480 VAC  
BOUNDARY TYPE: Disconnect at Pump  
FIELD LOCATION: Next to pump #1  
LO/TO METHOD: Secure disconnect switch with padlock  
LO/TO DEVICE: Padlock and tag  
APPLY/REMOVE: Jan 4 2013 / remove May 2013  
NOTES:

POINT No.: 3  
BUILDING/AREA: Laird Utility Plant  
SYSTEM/ASSET: Chill water secondary pump #2  
ENERGY TYPE: 480 VAC  
BOUNDARY TYPE: Disconnect at Pump  
FIELD LOCATION: Next to pump #2  
LO/TO METHOD: Secure disconnect switch with padlock  
LO/TO DEVICE: Padlock and tag  
APPLY/REMOVE: Jan 4 2013 / remove May 2013  
NOTES: Call BAS at x1287 notify on / off