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BOISE STATE UNIVERSITY

HAZARDOUS ENERGY CONTROL PROGRAM
MECHANICAL LOCKOUT, TAGOUT, BLOCKOUT PROCEDURES

Developed by the *Campus Environmental Health and Safety Office*

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SECTION 1.0

INTRODUCTION

Boise State University is committed to providing a safe work environment for its employees and must comply with certain state and federal government regulations. University management personnel at all levels are therefore directly accountable for the health and safety of the employees within the units for which they are administratively responsible. The specific responsibility for developing and enforcing University programs for occupational health and safety resides with the *Campus Environmental Health and Safety Office*. University management personnel are expected to cooperate with required programs, exemplify positive attitudes regarding employee health and safety, and promote an environment where employees are given the resources and training to work safely.

This Hazardous Energy Control Program establishes requirements and procedures to protect employees from the unintended or unexpected release of potentially hazardous energy which could cause injury or death during *set up, adjustment, repair, service, or installation work* on equipment, machinery, processes and circuits. The program must also be enforced to comply with section 150.12 of the Idaho General Safety and Health Standards[1] which requires the University to establish written procedures, training and periodic inspections to ensure that before employees or contractors perform work that exposes them to hazardous energy, the associated equipment or systems are isolated from the their energy source and are rendered inoperative. Management personnel at the University are accountable to make certain that employees under their administrative control who are performing any tasks involving exposure to hazardous energy receive appropriate training, know safe work practice procedures and use correct protective devices. This program and its appendices, properly completed and followed, will provide affected departmental management with an effective means for maintaining these responsibilities.

Any personnel who knowingly disregard the requirements or procedures established in this program will be subject to disciplinary action up to and including termination.

[1]LEGAL AUTHORITY - These rules are promulgated pursuant to the authority granted the Industrial Commission by Sections 72-508, 72-720, 72-721, 72-722, and 72-723, Idaho Code and are applicable to places of public employment as defined in Sections 72-205 and 72-207 (3-23-98).

SECTION 2.0

SCOPE AND EXCEPTIONS

2.1 SCOPE

2.1.1 Types of Hazardous Energy Sources: Potentially hazardous energy at the University can include electrical, pneumatic, hydraulic, chemical, thermal (e.g., steam, hot water), mechanically stored or potential energy (e.g., raised loads, equipment motion, coiled springs), lasers and radioactive sources.

2.1.2 Employees Covered: This program applies to all University academic, research and service units with full-time, part-time, permanent, temporary employees or student-employees, henceforth called *employees,* who at any time install, operate, adjust or service equipment, machinery, processes and circuits containing the hazardous energy sources listed above if they are required to perform any of the following:

- Remove or bypass a guard or other safety device;
- Install or repair electrical circuits;
- Clean, repair, unjam, or maintain machinery with moving parts;
- Place any part of their body into an area on or under equipment, machinery, processes and circuits where work is being performed at the point of operation or other area where an injury potential exists.

2.2 EXCEPTIONS

2.2.1 Cord and plug-type equipment: This program does not apply to cord and plug type equipment if the person servicing such equipment is in the exclusive control of the unplugged cord at all times during the work performed.

2.2.2 Minor tool changes or adjustments: This program does not apply to minor tool changes, adjustments and other minor servicing activities during normal operations if they are routine, repetitive and integral to the use of the equipment AND alternative measures that provide effective protection are also used (e.g., proper use of manufacturer-required and recommended machine guards).

2.2.3 *Hot tap operations* (see definition in Section 3.0): This program does not apply to involving transmission systems from substances such as gas, steam, water, or petroleum, when they are performed on pressurized pipelines. However, it must be demonstrated that the continuity of service is essential, cut off of the system is impractical, and special equipment is used which provides effective protection.

SECTION 3.0

DEFINITIONS

Affected employee - A person who operates or uses a machine or equipment on which servicing or maintenance is being performed under lockout/tagout/blockout by an *authorize employee*, or who is required to work in an area in which such servicing or maintenance is being performed.

Authorized employee - A person who is authorized and trained to lockout/tagout/blockout machines or equipment in order to perform servicing or maintenance.

> IMPORTANT: Note that unless an *authorized employee* is formally trained as a *qualified person* (see definition below), he/she is NOT allowed to work on live, electrically energized parts.

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.

Energized - Connected to an energy source or containing residual or stored energy

Energy isolating devices - A physical device that prevents the transmission or release of energy including but not limited to the following: a manually operated electrical circuit breaker, disconnect switch, manually operated switch, slide gate, slip blind, line valve and similar devices with a visible indication of the position of the device. Note: push buttons, selector switches, and other control circuit type devices are not energy isolating devices.

Energy sources - energy is defined as movement or the possibility of movement. Potential sources are: electrical, mechanical, hydraulic, pneumatic, chemical, thermal, and gravitational.

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 attachments. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam and petrochemical distribution systems.

Lock-out device - A device that uses a lock and key to hold an *energy isolating device* in a safe position and prevent the inadvertent energizing of equipment for the purpose of protecting personnel.

LOTO - An acronym for "lockout/tagout."

Q*ualified person* – One who has received training and work experience in avoiding the electrical hazards of working on or near exposed energized parts and familiar with the State and Federal electrical standards (typically a licensed electrician, an apprentice electrician working under the supervision of a licensed electrician or employees with a State of Idaho "Specialty Electrical License" who works within the limitations of their individual license.) An *unqualified person* is one with little or no such training working on or near exposed energized parts.

Service and/or maintenance - workplace activities such as construction, installation, set up, adjustment, inspection, modification, maintenance and/or service of machines or equipment. These activities include lubricating, cleaning or un-jamming 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.

Setting up - Any work performed to prepare a machine or equipment to perform its normal production operation.

Tag-out - 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.

Tag-out 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. At a minimum, the tag shall indicate the name of the *authorized employee*.

SECTION 4.0
PROGRAM RESPONSIBILITIES: *Management*

Deans, Directors and *Department Heads* or their designated *Supervisors* (hereafter referred to as *Management* in this program) are responsible for the following items if they have employees under their administrative control who are exposed to hazardous energy sources during the performance of their work (for assistance in fulfilling any responsibility, please contact the *Campus Environmental Health and Safety Office at 426-3303*):

4.1 EQUIPMENT INVENTORY: *Management* shall complete, keep current and provide the *Campus Environmental Health and Safety (EHS) Office* with an inventory of all of their department's new or existing equipment, machines and systems that are serviced, maintained or repaired by their employees if such work exposes these employees to potentially hazardous energy sources.

IMPORTANT: The inventory may combine groups of equipment together (for example, "ALL PUMP MOTORS AND ELECTRICAL DISCONNECTS IN FAN ROOM #1"). It is not necessary or recommended to list each individual, similar machine or piece of equipment. The inventory must also list those *energy isolating devices* (see definition in Section 3.0) used for locking/tagging/blocking equipment, machines and systems. Such *energy isolating devices* may include, but are not limited to: electrical disconnect switches, hydraulic valves, pneumatic valves, chemical valves and other energy isolating means. The information obtained from this inventory is the basis for preparing appropriate lockout/tagout/blockout procedures for each item or groups of items (see sub-section 4.5) and helps to determine the appropriate level of training of *authorized* or *affected employees* (see sub-section 4.4).

APPENDIX A may be used to document compliance with this responsibility.

4.2 LABELS AND SIGNS – Where feasible, *Management* shall inform and warn employees or other persons exposed or potentially exposed to hazardous energy contained in

equipment, machines or systems under their administrative control by utilizing labels or signs with the following wording (or similar and equally effective language):

DANGER
HAZARDOUS ENERGY CONTROL PROCEDURES (LOCKOUT/TAGOUT/BLOCKOUT)
MUST BE PERFORMED BEFORE SERVICING OR REPAIRING THIS EQUIPMENT
CALL 426-1409 FOR ASSISTANCE

- or –

DANGER
DE-ENERGIZE AND LOCKOUT/TAGOUT ALL ELECTRICAL SWITCHES, BREAKERS, DISCONNECTS BEFORE WORKING ON CIRCUITS OR SYSTEMS
CALL 426-1409 FOR ASSISTANCE

Where it is not advisable or possible to affix signs on equipment, *Management* shall use other equally effective means to warn workers of potential exposure to hazardous energy source(s) in the workplace (e.g., documented personal instruction or formal training sessions).

4.3 EMPLOYEE LISTS: *Management* shall complete and keep current with a list of all new and existing *authorized employees* and *affected employees* (see definitions in Section 3.0) under their administrative control covered by this program.

4.4 EMPLOYEE TRAINING: *Management* shall ensure that all new and existing *authorized employees*, *affected employees* (see definitions in Section 3.0) under their administrative control and their immediate *Supervisors* receive appropriate hazardous energy control training (see Section 5.0 for more specific employee training requirements). Contact the *Campus Environmental Health and Safety Office* for instructional material resources. The University's *Training and Development* office must then be provided with written documentation of completed employee training required by this program. *Management* shall also ensure that **re-training** is required for all *authorized and affected employees* whenever there is a change in job assignment, a change in machines or equipment that presents a new hazard, or when there is a change in the energy control procedure.

APPENDIX B-1 may be used to document compliance with this responsibility.

4.5 HAZARDOUS ENERGY CONTROL PROCEDURES

4.5.1 Written Procedures: *Management* shall ensure that before being allowed to work on machines, equipment or systems covered by this program, their *authorized employees* and their immediate *Supervisors* are required to strictly follow written lockout/tagout/blockout procedures to protect against accidental or inadvertent operation which could cause injury or death.

APPENDIX C-1, C-2, C-3, and C-4 may be used to document compliance with this responsibility.

4.5.2 Work on Live Electrical Parts: *Management* shall ensure that only *qualified persons* (see definition in Section 3.0) are allowed work on live or energized electric parts (under 600 volts and excluding overhead power lines). This may include employees who hold a current State of Idaho "Specialty Electrical License" if such persons work within the limitations of that license (see APPENDIX E for license information). Depending on the department, the *authorized employee* may also be required to telephone or radio the work order desk (Main Campus Extension 1409) or the immediate supervisor to give notification of both when the work starts and when it is finished.

4.5.3 Work on Moving/Rotating Parts: *Management* shall ensure that when their *authorized employees* must work on moving, rotating or other dangerous equipment or and systems that cannot be shut-down and locked-out or blocked-out, such employees and immediate supervisor write and follow a safe work procedure for that task (e.g., listening and feeling a fan motor casing for the condition of bearings after a guard or other safety device is removed). Depending on the department, the *authorized employee* may also be required to telephone or radio the work order desk (Main Campus Extension 1409) or the immediate supervisor to give notification of both when the work starts and when it is finished. Only designated *authorized employees* who have received training as required by this program are allowed to work on equipment under these operating conditions.

4.6 PROTECTIVE MATERIALS AND HARDWARE: *Management* shall ensure that *authorized employees* secure machines or equipment from hazardous energy sources by using locks, tags, hasps, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware **(henceforth called LOTO devices)** that meet at least the following criteria:

- ***Durable*:** LOTO devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected. Tagout devices shall be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.
- ***Standardized:*** LOTO devices shall be standardized within the facility in at least one of the following criteria: Color, shape, or size and additionally, in the case of tagout devices, print and format shall be standardized.
- ***Substantial*:** LOTO devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools. Tagout devices, including and their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal. The tag's means of attachment shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.
- ***Identifiable*:** LOTO devices shall indicate the identity of the employee applying the device(s) and shall not be used for any other purpose than lockout (for example, using an assigned lock for securing a personal toolbox or locker is prohibited). Tagout devices shall warn against hazardous conditions if the machine or equipment is energized and shall include a legend such as the following: Do Not Start, Do Not Open, Do Not Close, Do Not Energize, Do Not Operate.

4.7 CONTRACTORS: *Management* shall ensure that before using contractors who are to be engaged in activities covered by the scope of this program and in areas or building(s) under their administrative control, written verification is kept on file certifying that the

contractor will perform all work in accordance with applicable provisions of the OSHA[2] standards, 29 CFR 1910.147 (general industry) or 29 CFR 1926.417 (construction). The individual responsible for project management or interface with contractors must take reasonable actions to ensure that affected University employees and the contractor are informed of their respective lockout or tagout procedures and understand the restrictions and prohibitions therein.

APPENDIX D may be used to document compliance with this responsibility.

[2] Private-sector employers (e.g., construction and general industry contractors) in Idaho are covered by federal OSHA standards and must comply with all provisions applicable to their operations when performing work on any host employers' properties.

SECTION 5.0

PROGRAM RESPONSIBILITIES: *Employees*

5.1 REQUIRED USE OF LOCKOUT/TAGOUT/BLOCKOUT PROCEDURES: Before set up, adjustment, repair, service, or installation work on equipment covered by the scope of this program, *authorized employees* must use written lockout/tagout/blockout procedures (see APPENDIX C-1) in order to protect against accidental or inadvertent operation which could cause employee injury or death. **Only designated *authorized employees* who have received training as required by this program may lock out/tag out or block out/tag out machines or equipment on which repair, service or maintenance is to be performed.** Any other employee, upon observing a machine or piece of equipment which is locked/tagged/blocked out to perform servicing or maintenance, shall not attempt to start, energize or operate any hazardous *energy isolating device* (see definition in Section 3.0) or disable any block, blank**,** or restraint device applied to such equipment.

5.2 INTERLOCKS: Interlocks shall not be relied upon by any employee for safety and cannot be used in place of lockout or blockout protective devices.

5.3 TAGOUT PROCEDURES ALONE: Unless documented as unsafe or not practical, lockout and tagout (or where applicable, blockout and tagout) methods shall be used to achieve maximum safety. However, if a tag must be used instead of a lock, block or other restraining device (such as when the *energy isolating device* is incapable of being locked or otherwise secured), the *authorized employee* must still follow the general hazardous energy control procedure (see APPENDIX C-1) except for applying the lockout or other restraining device. In addition, the *authorized employee* must utilize a *second means* of isolating the hazardous energy. Examples of secondary measures include removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnect device or removal of a valve handle. The second means of isolation must be identified on the tag, and tags must be affixed to both the energy-isolating device AND at the point of the second means of isolation.

5.4 WORKING ON ENERGIZED ELECTRICAL PARTS

5.4.1 All energized or live electrical parts or equipment must be de-energized and all disconnected locked/tagged out before an *authorized employee* works on or near them, UNLESS one of the following conditions are met:

- The energized parts operate at less than 50 volts to ground if there is no increased exposure to electrical burns or to explosion due to electric arcs; or
- It is determined and documented by a Boise State University licensed electrician or other *qualified person* (see definition in Section 3.0) that de-energizing introduces an additional or increased hazard[3] or is impractical[4] due to equipment design, operational limitations or the need to perform certain diagnostic tests or maintenance tasks under load conditions.

5.4.2 Only *qualified persons* (see definition in Section 3.0) may work on live or energized electric parts or equipment (except for high voltage work which requires additional high voltage training). This may include employees who hold a current State of Idaho "Specialty Electrical License" if such persons work within the limitations of that license (see **APPENDIX E** for additional information). All such persons shall be capable of working safely on energized circuits and shall be familiar with the proper use of special precautionary techniques and where applicable, personnel protective equipment, insulating and shielding materials and insulated tools. These safe work practices must protect employees against contact with energized circuit parts, directly with any part of their body or indirectly through some other conductive object. The work practices must be suitable for the conditions under which the work is performed and for the voltages of exposed electric conductors or circuit parts.

[3] Examples of increased or additional hazards include deactivation of uninterrupted power supply (UPS), emergency alarm systems, interruption of life support equipment, shutdown of ventilation in hazardous locations or removal of lighting for an area.

[4] Examples of impracticality due to equipment design or operation limitations include deactivation of uninterrupted power supply (UPS), testing of electrical circuits that can only be performed with the circuit energized and work on circuits that form an integral part of a continuous process that would otherwise need to be completely shutdown in order to permit work on one circuit or piece of equipment.

5.4.3 When *qualified persons* work on exposed energized parts in a **confined or enclosed space** (such as a vault or tunnel), they shall provide and use protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with these parts. Doors, hinged panels, and the like shall be secured to prevent their swinging into personnel and causing them to contact exposed energized parts.

IMPORTANT: Note that other requirements may be applicable if the work space in question contains or has the potential to contain other safety or health hazards or has been identified by the *Campus EHS Office* as a "Permit-Required Confined Space."

5.5 WORKING ON MOVING, ROTATING OR OTHER DANGEROUS PARTS OR EQUIPMENT UNDER OPERATING CONDITIONS

All moving, rotating or other dangerous parts, equipment and systems that expose employees to hazardous energy must be shut-down, restrained and locked, tagged, or blocked before an *authorized employee* works on them UNLESS it is necessary to keep the equipment operating for inspection or diagnostic tests. An example of such special situations could include listening and feeling a fan motor casing for the condition of bearings after guard or other safety device was removed. In such special situations, the *authorized employee* and immediate supervisor must put together and follow a safe work procedure. Depending on the department, the authorized *employee* may also be required to notify and log in with the work order desk (Main Campus Extension 1409) or the immediate supervisor when the work starts and when it is finished. Only designated *authorized employees* who have received training as required by this program are allowed to work on equipment under these operating conditions.

5.6 TRAINING

5.6.1 *Authorized employees* (see definition in Section 3.0) and their immediate supervisors must receive initial training and special instructions concerning the scope, purpose, authorization, rules and techniques for lockout/tagout and blockout/tagout of hazardous energy sources. The training shall include, at a minimum, the following items:

- Recognition of the types of hazardous energy sources;
- Intended use of the lockout, tagout, blockout procedure;
- Steps for shutting down, neutralizing, isolating, holding and securing;
- Steps for placement, removal and transfer of lockout, tagout, blockout devices and the associated responsibility;
- Requirements for testing to determine and verify the effectiveness of lockout, tagout, blockout devices; and other appropriate measures necessary to protect employees from hazardous energy;
- Purpose, scope and contents of the *BSU Hazardous Energy Control Program*.

5.6.2 *Affected employees* (see definition in Section 3.0) are required to receive instructions concerning the purpose and use of energy control procedures and that they must never attempt to restart or re-energize machines or equipment which have been locked-out, tagged-out or blocked-out.

SECTION 6.0

PROGRAM RESPONSIBILITIES: *Campus Environmental Health and Safety Office*

6.1. COMPLIANCE ASSISTANCE AND ENFORCEMENT - The *Campus Environmental Health and Safety (EHS) Office* shall ensure that compliance and enforcement assistance and technical consultation are provided to *management* and *employees* covered by the scope of this program.

6.2 TRAINING – In coordination with the *University Training and Development Office*, the *Campus EHS Office* shall ensure that appropriate employee training materials and resources as outlined in APPENDIX B-2 are made available to all *authorized employees, affected employees* and their immediate *Supervisors*.

6.3 PROGRAM DEVELOPMENT, REVISIONS AND PERIODIC INSPECTIONS: The *Campus EHS Office* is responsible for initial program development, written program revisions, periodic inspections and corrective action recommendations for any deviations or inadequacies identified.

SECTION 7.0

RESPONSIBILITIES: *University Training and Development Office*

7.1 TRAINING ASSISTANCE: The University Training and Development Office shall ensure that, when requested, training program assistance and support is provided to *management* and *employees* covered by the scope of this program.

7.2 EMPLOYEE TRAINING RECORDKEEPING AND TRACKING: The University Training and Development Office shall ensure that all initial and any retraining or refresher courses completed by *authorized, affected, and other employees* are properly recorded and tracked.

APPENDIX A
LIST OF DEPARTMENTAL EQUIPMENT, MACHINES OR SYSTEMS CONTAINING HAZARDOUS ENERGY

Instructions: This form may be duplicated as necessary and used by each BSU Department covered by this program to list all of their new or existing building equipment, machines and systems that are serviced, maintained or repaired by their employees if such work exposes these employees to potentially hazardous energy sources. After completion, send a copy of this inventory to the *Campus Environmental Health and Safety Office*.

The list may generalize and combine groups of equipment together. It is not necessary to list each individual, similar machine or piece of equipment.

DEPARTMENT:_____ **DATE:** _____

NAME AND LOCATION(S) OF EQUIPMENT, MACHINES OR SYSTEMS	**TYPE AND MAGNITUDE OF HAZARDOUS ENERGY**	**TYPE OF *ENERGY ISOLATING DEVICE(S) (SEE NOTE 1 BELOW)***
[EXAMPLE]: Boise State Radio Satellite Uplink Facility, Boise Campus	**[EXAMPLE]:** 120/208 VAC primary power, high current low-voltage in UPS.	**[EXAMPLE]:** Disconnects and/or Circuit Breakers

NOTE 1: That is, *energy-isolating devices* (see definition in Section 3.0) used for locking/tagging/blocking equipment, machines and systems. Such *energy isolating devices* may include, but are not limited to: electrical disconnect switches, hydraulic valves, pneumatic valves, chemical valves and other energy isolating means.

APPENDIX B-1

LIST OF *AUTHORIZED and AFFECTED EMPLOYEES*

(Send original of this completed form to BSU Training and Development at Mail Stop 1420)

Department:_____ Trainer: _____ Date: _____

Authorized employees must receive initial training and special instructions concerning the scope, purpose, authorization, rules and techniques for lockout, tagout, or blockout of hazardous energy sources including, but not limited to:

1. Recognition of the types of hazardous energy sources;
2. Intended use of the lockout, tagout, blockout procedures;
3. Steps for shutting down, neutralizing, isolating, holding and securing;
4. Steps for placement, removal and transfer of lockout, tagout, blockout devices and the associated responsibility;
5. Requirements for testing to determine and verify the effectiveness of lockout, tagout, blockout devices; and
6. Other appropriate measures necessary to protect employees from hazardous energy.
7. Contents of the BSU Hazardous Energy Control (Lockout/Tagout) Program.

Each *affected employee* shall be instructed in the purpose and use of the hazardous energy control procedures. All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

Refer to the attached **APPENDIX B-1** for a recommended training outline and agenda.

EMPLOYEE NAME and JOB TITLE	***Authorized*** **(check)**	***Affected*** **(check)**	**TRAINING or INSTRUCTION COMPLETED?**
			Yes __ Date:
			Yes __ Date:
			Yes __ Date:
			Yes __ Date:
			Yes __ Date:
			Yes __ Date:
			Yes __ Date:
			Yes __ Date
			Yes __ Date:
			Yes __ Date:
			Yes __ Date:

APPENDIX B-2
TRAINING OUTLINE/AGENDA FOR *AUTHORIZED EMPLOYEES*
Hazardous Energy Control (Lockout/Tagout/Blockout) Program

GOAL: To ensure authorized employees are given the training resources and opportunity to understand the purpose and function of the University's Hazardous Energy Control Program.

OBJECTIVE: *Authorized employees* will obtain the knowledge and skills required for safe application, usage, and removal of hazardous energy controls where required.

TRAINING PROGRAM ELEMENTS:

I. Obtain and prepare training materials such as appropriate videos, booklets, other training aides and examples of locks, tags, blocks or other devices commonly used by the departments on campus. Contact the *Campus EHS Office* for assistance and materials.

II. Read and review the University's *Hazardous Energy Control Program* to the authorized employee(s) and immediate supervisor(s); discuss all the program elements either individually or together as a class and answer employees' questions on the program.

III. Show video and/or, if available, start the Interactive Computer-based Training Module. Ensure that *authorized employees* complete the program(s) to adequately cover the scope, purpose, authorization, rules and techniques for lockout, tagout, blockout of hazardous energy sources including at a minimum the following:

A. Recognition of the types of hazardous energy sources;
B. Intended use of the lockout, tagout, blockout procedure;
C. Steps for shutting down, neutralizing, isolating, holding and securing;
D. Steps for placement, removal and transfer of lockout, tagout, blockout devices and the associated responsibility;
E. Requirements for testing to determine and verify the effectiveness of lockout, tagout, blockout devices; and
F. Other appropriate measures necessary to protect employees from hazardous energy.
G. Contents of the BSU Hazardous Energy Control (Lockout/Tagout) Program.

Ensure that each *affected employee* is instructed in the purpose and use of the hazardous energy control procedures. Ensure that all other employees whose work operations are in an area with energy control procedures in place are instructed about the procedure and that it is prohibited to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

IV. Test and Review: If showing video, use booklet in video package to test the employees; require all employees to review and understand all incorrect answers. If using Computer Training Module, the employee is tested throughout the program and must answer all questions correctly to finish. Document the name and department employees' who completed the training program in Appendix B-1.

APPENDIX C-1
WRITTEN PROCEDURES FOR LOCKOUT/TAGOUT/BLOCKOUT: INSTRUCTIONS

1. Before any employee is allowed to perform service on equipment or systems containing hazardous energy, *authorized employees* (see definition in Section 3.0 of this program) or their immediate *supervisors* must develop general or where needed, specific procedures[5] to isolate it from the energy source, render it inoperative and safely lockout, tagout, blockout all of its hazardous energy. *Authorized employees* are required to perform the lockout/tagout/blockout in accordance with these written procedures and to inform supervision. Where applicable, all other affected employees are required to comply with the restrictions and limitations imposed upon them by these procedures.

2. Figure 1 shown below provides a convenience means for workers to **certify that procedures are provided in writing and are being followed in a logical sequence**. Contact a safety product vendor to order these polyester, re-usable tags and specify the wording shown in Figure 1. When more detailed written procedures are needed for complex equipment, machines or systems (e.g., a boiler or other equipment with multiple energy sources or containing stored energy), the attached form Appendix C-2 may be used.

Figure 1- Lockout/Blockout Procedures, Certification and Danger Tag

[5] **Exception:** When a department can document that ALL of the following eight (8) conditions are met, a written procedure may not be required for a particular machine or equipment (contact the Campus EHS Office for assistance): (1) The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees; (2) the machine or equipment has a single energy source which can be readily identified and isolated; (3) the isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment; (4) the machine or equipment is isolated from that energy source and locked out during servicing or maintenance; (5) a single lockout device will achieve a locker-out condition; (6) the lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance; (7) the servicing or maintenance does not create hazards for other employees; and (8) the University, in utilizing this exception, has had no accidents involving the unexpected activation or re-energization of the machine or equipment during servicing or maintenance. to help you determine if this exception may apply to your operation or equipment.

APPENDIX C-2
LOCKOUT/TAGOUT/BLOCKOUT PROCEDURES FORM FOR EQUIPMENT OR SYSTEMS WITH MULTIPLE ENERGY SOURCES OR RESIDUAL/STORED ENERGY

Instructions: Use this form to write LOTO procedures for complex systems or equipment with multiple energy sources or residual/stored energy. Where needed, space has been provided below each of the nine steps of this form to write in specific information and instructions.

ANY EMPLOYEE WHO KNOWINGLY DISREGARDS THE ESTABLISHED PROCEDURE ON THIS FORM MAY BE SUBJECT TO DISCIPLINARY ACTION UP TO AND INCLUDING TERMINATION.

NAME OF DEPARTMENT: _____ DATE:____/_____/_____

THE FOLLOWING EQUIPMENT, SYSTEMS OR PROCESSES ARE COVERED BY THIS PROCEDURE:

_____	_____	_____
Equipment/Machine(s)/Process	Building(s)	Location(s)

(use separate sheet if needed to list additional equipment covered by this procedure)

- **1. IDENTIFY all hazardous energy sources on this equipment:** The *authorized employee* shall identify the type and magnitude of the energy sources that the machine or equipment utilizes, understand the hazards of each energy source, and know the methods to control the energy.

  HAZARDOUS ENERGY PRESENT IN THIS EQUIPMENT(CHECK ALL THAT APPLY):

  ___**Moving Parts** ____**Pneumatic** ___**Thermal (Steam/hot water)** ____**Raised Load**

  ___**Coil/Spring** ____**Hydraulic** ___**Chemical** ___**Electrical [max. voltage(s):**_____**]**

  ___**Other [list and include type and magnitude:** _____**]**

- **2. NOTIFY and PREPARE all affected employees for shutdown:** The *authorized employee* shall notify and warn all affected employees that servicing or maintenance is required on the machine or equipment and that the machine or equipment must be shut down and locked out/tagged out/blocked out. Subsequent notification must be given after the lockout, tagout, blockout devices are removed. NOTE: Follow any other departmental requirements (e.g., FO&M requires authorized employees to call Work Order Service Desk x1409 for logging in/out a LOTO procedure). List here all individual or groups of affected employees that must be notified :_____
  _____
  _____
  _____

- **3. SHUT DOWN the machine or equipment using normal shut down procedures:** If the machine or equipment is operating or has material flowing, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.). Specific instructions:_____
  _____
  _____

FORM CONTINUED ON THE NEXT PAGE

- **4. TURN OFF and isolate all energy sources listed above:** De-activate the *energy isolating device(s)* (see definition in section 3) so that the equipment is physically separated from the energy source(s). Specific Instructions (types, locations and how to deactivate all *energy isolating devices*):_____

- **5. ATTACH or APPLY** locks/tags/chains to all *energy isolating devices* or install blocks; lock out the energy isolating device(s) with assigned individual lock(s). IMPORTANT NOTE: If a tag is used instead of a lock when the *energy isolating device* is incapable of lockout, the *authorized employee* must utilize a second means of isolating the hazardous energy. Removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnect device, or removal of a valve handle are all examples of secondary measures. The second means of isolation must be identified on the tag, and tags must be affixed to both the energy-isolating device AND at the point of the second means of isolation. If a tag is used instead of a lock, the following additional safety precautions shall be also be taken:_____

- **6. RELEASE, DISSIPATE, RESTRAIN OR BLOCK** all stored or residual energy (such as that in capacitors, springs, elevated machine members (raised loads), rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) by methods such as *grounding, repositioning, blocking, bleeding down*, etc. List the type(s) of stored energy and specific methods to dissipate or restrain:_____

- **7. VERIFY** that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate. WARNING! RETURN ALL CONTROLS TO THE "NEUTRAL" OR "OFF" POSITION AFTER TESTING. Specific method of verifying the isolation of the equipment:_____

- **8. PERFORM service work:** The equipment is now ready for service work to proceed.

- **9. RESTORE** equipment, machine or system to service. When the servicing or maintenance is completed and the machine, equipment or system is ready to return to normal operating condition, the following steps shall be taken:
  - Check the machine, equipment or system to be sure it is operationally intact, tools have been removed, and guards have been replaced. Specific Instructions:_____
  - Check to be sure all employees are safely positioned or removed from the area and notify all *affected employees* that that the servicing or maintenance is completed and that locks/tags/blocks are going to be removed. Specific Instructions:_____
  - Remove all locks, blocks, or other energy restraints and restore all energy to the machine or equipment and notify affected employees and the machine or equipment is again ready for operation. Specific Instructions:_____

END OF HAZARDOUS ENERGY CONTROL PROCEDURE FORM (Appendix C-2)

APPENDIX C-3

SPECIAL PROCEDURE FOR SHIFT CHANGE
ORDERLY TRANSFER OF LOCKOUT/TAGOUT (LOTO) DEVICES DURING SHIFT OR PERSONNEL CHANGES

A. Shift Changes: To ensure the continuity of lockout/tagout (LOTO) protection during shift or personnel changes when work is to be continued by the next shift, an orderly transfer of LOTO devices between *authorized employee*s from both shifts must be performed. At the end of their shift, *authorized employees* must remove their lock and tag, and the next shift's *authorized employees* must immediately place their lock and tag on the *energy isolating device*.

B. Gaps between Shifts: If the orderly transfer of LOTO devices is not possible because of a gap in shifts, the following procedure must be implemented to provide continuity of LOTO protection:

1. If the *authorized employees* from both shifts cannot be present simultaneously at the lockout device because there is a gap between their shifts, the *authorized employee* of the off-going shift may acknowledge, by written logbook entry, prior consent for a supervisor or manager to remove his or her LOTO devices during the oncoming shift. The supervisor of the *authorized employee* must make a corresponding logbook entry that must include the *authorized employee's* and supervisor's printed names and signatures, the equipment identification, maintenance procedure being performed, and all other pertinent safety information regarding the equipment and/or procedure.

2. The supervisor or manager of the oncoming shift must read and understand the logbook entries, and is the only person authorized to remove the LOTO device of the *authorized employee* from the off-going shift.

3. The *authorized employee* of the oncoming shift must then immediately apply his/her LOTO devices.

4. Both the oncoming *authorized employee* and his/her supervisor or manager must make logbook entries acknowledging the performance of this special procedure.

5. All subsequent LOTO actions must conform to the standard BSU Hazardous Energy Control Program.

6. Before resuming work, the *authorized employee* who gave prior consent for removal of his/her LOTO devices must be personally informed by the supervisor or manager that the *authorized employee's* devices have been removed. This *authorized employee* and supervisor/manager must make confirming logbook entries, and the supervisor/manager must then return the LOTO devices to the employee.

APPENDIX C-4
TEMPORARY OR EMERGENCY REMOVAL OF LOCKOUT/TAGOUT (LOTO) DEVICES PROCEDURE

A. Temporary Removal of Lockout/Tagout (LOTO) Devices

When LOTO devices must be temporarily removed from the energy-isolating device so that the equipment or component can be energized for testing or positioning, the following sequence of actions must be taken:

1. Notify the *affected employees* and their *Supervisors*.
2. Clear the equipment of tools and materials.
3. Remove employees from the machine or equipment area and ensure that required tools are safely and properly positioned.
4. Remove all repositioning and blocking devices and return all vents and valves to their normal operating positions.
5. Remove all grounding/shorting conductors.
6. Energize and proceed with testing or positioning.
7. De-energize all systems and reapply lockout/tagout measures to continue the servicing, maintenance or modification of the equipment. The original tag may be reused.

B. Emergency Removal of LOTO Devices

When the *authorized employee* who applied a LOTO device is not available to remove it, a supervisor or manager may remove the device. **This is considered an emergency procedure; extreme care must be taken and the following steps must be performed:**

1. The supervisor or manager must verify that the *authorized employee* is not at the University facilities. **If the employee's location cannot be determined, no further action shall be taken.**
2. The supervisor or manager must make every reasonable effort to contact the *authorized employee*. This may include a telephone call to the employee's home or other location.
3. If the employee is contacted, the supervisor or manager must inform the employee that his/her LOTO devices are being removed.
4. The supervisor or manager must verify that it is safe to remove the LOTO devices.
5. If the department allows an *authorized employee's* supervisor or manager to keep an emergency duplicate key, he/she may then remove the LOTO device, or the lock may be physically cut off.
6. The supervisor or manager must ensure that the *authorized employee* is presented with the removed lock immediately upon returning to work, and is informed of the reasons for the emergency removal. **IMPORTANT: The *Cut Lock or Removed Tag Report* shown below must be filled out and kept in the department's lockout/tagout records.**

CUT LOCK OR REMOVED TAG REPORT (for Supervisor use ONLY)

Location of lock or tag removed: _____
Reason for removal: _____
_____
Lock/tag to be removed belongs to: _____
Has this person been notified that his/her lock/tag is being removed? Yes ____ No ____
If no, why and what further action will be taken to warn the person that this the lock has been removed:_____

_____ _____
Name (please print) and signature (required) of Supervisor/Manager **Date/Time**

APPENDIX D

Outside Contractor Notification

Project Identification:
_____

Description of Work:
_____
_____
_____
_____

BSU Project Representative: _____

BSU Department: _____

Contractor Representative: _____

Contractor Company Name: _____

The contractor and BSU representative have informed each other of their respective lockout/tagout or blockout/tagout procedures. A copy of the BSU Hazardous Energy Control Program has been made available to the contractor. The contractor and BSU representative agree to ensure that their personnel understand and comply with any restrictions and prohibitions of the energy control procedures that will be in place during this project.

_____ _____
Contractor Representative Signature Date

_____ _____
BSU Representative Signature Date

APPENDIX E
STATE OF IDAHO DIVISION OF BUILDING SAFETY - ELECTRICAL BUREAU SPECIALTY ELECTRICAL LICENSE INFORMATION

The following shall be considered as electrical specialties, the practice of which shall require a specialty license:

(A) Elevator, Dumbwaiter, Escalator or Moving Walk Electrical Licenses:

Any person qualifying for and having in his/her possession a current elevator electrical license may install, maintain, repair and replace equipment, controls and wiring beyond the disconnect switch in the machine room of the elevator and pertaining directly to the operation and control thereof when located in the elevator shaft and machine room. He/she shall be employed by a licensed elevator electrical contractor and his/her installation shall be limited to this category. The holder of such specialty license may not countersign a contractor's license application as supervising journeyman except for work within his/her specialty.

(B) Sign Electrical Licenses:

Any person qualifying for and having in his/her possession a current sign electrical license may install, maintain, repair and replace equipment, controls and wiring on the secondary side of sign disconnecting means providing the disconnecting means is located on the sign or within a distance of two feet and in sight there from. He/she shall be employed by a licensed sign electrical contractor, whose installations shall be limited to this category. The holder of such specialty license may not countersign a contractor's license application as supervising journeyman except for work within his/her specialty.

(C) Manufacturing or Assembling Equipment Electrical Licenses:

Effective July 1, 1994, the category of licensed specialty manufacturing or assembling equipment contractor is created. Effective July 1, 1995 any person qualifying for and having in his/her possession a current license in the category of specialty manufacturing or assembling equipment electrician must be employed by a licensed specialty manufacturing or assembling equipment contractor in order to work in this category. The holder of a specialty license in this category may not countersign a contractor's license application as a supervising journeyman except for work within this specialty. Any person licensed pursuant to subsection 014.03.a may install, repair and replace equipment, controls, and accessory wiring, integral to the specific equipment, on the load side of the equipment disconnecting means. Electrical service and feeder are to be installed by others. The licensee may also install circuitry in modules or fabricated enclosures for the purpose of connecting the necessary components which individually bear a label from a nationally recognized testing laboratory when such equipment is designed and manufactured for a specific job installation. All wiring completed shall meet all requirements of title 54, chapter 10, Idaho code, all rules promulgated pursuant thereto, and the most current edition of the National Electric Code.

(D) Limited Energy Electrical Licenses:

Limited energy systems are defined as fire and security alarm systems, class 2 and class 3 signaling circuits, landscape sprinkler controls, key card operators, nurse call systems, motor and electrical apparatus controls, and other limited energy applications covered by the NEC. Limited energy systems do not include, and no license of any type is required for, the installation of communication circuits, wires, and apparatus that include telephone systems, telegraph facilities, outside wiring for fire and security alarm systems which are used for communication purposes, and central station systems of a similar nature, PBX systems, audio-visual and sound systems, public address and intercom systems, data communication systems, radio and television systems, antenna systems and other similar systems. Unless exempted by Idaho Code 54-1016, any person who installs, maintains, replaces or repairs electrical wiring and equipment for limited energy systems in facilities other than one (1) and two (2) family dwellings shall be required to have a valid limited energy specialty electrical license and must be

employed by a licensed limited energy specialty electrical contractor. The holder of a specialty license may only countersign a contractor' s application as a supervising journeyman for work within his specialty.

(E) Irrigation Sprinkler Electrical Licenses:

Any person qualifying for and having in his or her possession, an irrigation system electrical license may install, maintain, repair and replace equipment, controls and wiring beyond the disconnect switch supplying power to the electric irrigation machine. The irrigation machine is considered to include the hardware, motors and controls of the irrigation machine and underground conductors connecting the control centers on the irrigation machine to the load side of the disconnecting device. (Disconnect device to be installed by others.) All such installations performed by individuals under this section shall be done in accordance with the applicable provisions of the National Electrical Code. He shall be employed by a licensed electrical contractor whose license is contingent upon the granting of a specialty electrical license to an employee and whose installations shall be limited to this category. The holder of a specialty license may not countersign a contractor's license application as supervising specialty journeyman except for work in his specialty.

(F) Well Driller and Water Pump Installer Licenses:

All such installations performed by individuals under this section shall be done in accordance with the applicable provisions of the approved National Electrical Code. He shall be employed by a licensed well driller and water pump installer electrical contractor whose installations shall be limited to this category. The holder of such specialty license may not countersign a contractor's license application as supervising specialty journeyman except for work in his specialty. Any person currently licensed in this category may perform the following types of installations:
(1) Single or three phase well pumps: install all electrical equipment, wires, and accessories from the pump motor up to the load side (including fuses) of the disconnecting device (disconnecting device installed by others).
(2) Domestic water pumps, 120/240 volt, single phase, sixty (60) amps or less: install, maintain, repair and replace all electrical equipment, wires, and accessories from the pump motor up to and including the disconnecting device.
(3) Temporarily connect into a power source to test the installations, provided that all test wiring is removed before the installer leaves the site.

(G) Refrigeration, Heating and Air Conditioning Electrical Licenses:

Any person qualifying for and having in his/her possession a current license in this category may perform the following types of installations:
(1) Heating units (single phase): install, repair and maintain all electrical equipment, wires and accessories from the unit up to the load side (including fuses) of the disconnecting device (disconnecting device to be installed by others).
(2) Refrigeration, air conditioning equipment and heat pumps (single phase): install, repair and maintain all electrical equipment, wires and accessories from the unit up to the load side (including fuses) of the disconnecting device (disconnecting device to be installed by others).
(3) Refrigeration, air conditioning and heating systems (three phase): maintain and repair all electrical equipment and accessories up to the load side (including fuses) of the disconnecting device (disconnecting device to be installed by others). All such installation, maintenance, and repair performed by individuals under this section shall be done in accordance with applicable provisions of the National Electrical Code. He/she shall be employed by a licensed electrical contractor whose license shall be covered by this category. The holder of such specialty license may not countersign a contractor's license application as supervising specialty journeyman except for work in his specialty.