Headquarters Safety, Health and Environmental Procedures	NUMBER: 2010-002
SUBJECT: Lockout/Tagout Standard Operating Procedure at Department of Energy (DOE) Headquarters (HQ)	Office of Administration, Headquarters Safety, Health and Security
Subject Matter Expert: Brian S. Stewart	Effective Date: June 15, 2010

A. PURPOSE:

The purpose of this Standard Operating Procedure (SOP) is to prevent injury from the unexpected start-up or release of energy, including, electrical, chemical, physical, stored, etc., during equipment service or maintenance. Normal production operations are not covered by this policy. This SOP establishes minimum safety requirements for the lockout and tag out (LOTO) of hazardous energy sources and the verification of energy isolation through the use of isolating devices and techniques during service or maintenance on equipment.

1. Conformance to this procedure ensures that hazardous energy sources are properly isolated and controlled.

2. The use of this procedure will ensure consistent application of LOTO requirements across work activities.

3. The use of this procedure prevents unexpected start-up or release of stored energy that could result in injury or hazardous material exposure.

4. This procedure provides a method to protect equipment and systems controls from damage, and maintains integrity of physical boundaries.

Definitions for the terms used within this SOP can be found in Appendix A of this document.

B. SCOPE:

1. The scope of this procedure applies to DOE and NNSA Federal and/or contractor employees performing work in the DOE Forrestal and Germantown Complexes. These procedures shall also be used when DOE is performing work in Headquarters leased facilities where the Property Manager does not have established procedures. Contractors will comply with these procedures unless they have an approved safety and health plan, submitted and approved in advance of performing work and in accordance with Title 10, CFR Part 851, and the plan

includes more stringent LOTO procedures than those described within this document.

In addition, this SOP requires that all workers who may be exposed to hazardous energy while performing any servicing, maintenance, or modification activity to:

a. Comply with all state and federal regulations regarding LOTO.

b. Identify, evaluate, and eliminate potential hazards from LOTO operations.

c. Ensure that employees who are required to conduct LOTO operations are all trained on proper procedures and techniques.

2. Persons who fail to follow established these written procedures and other applicable regulations (Section D.) for lockout of equipment and machinery, or who fail to take appropriate steps to protect the safety of all persons who are performing work under locked out conditions are subject to disciplinary action in accordance with DOE HQ Order 442.1. Under certain circumstances only, adherence to this LOTO procedure is not required, for example:

   a. When Servicing or maintenance of equipment that is powered through an electrical cord and plug. Such equipment shall be worked on with the cord unplugged, and the person performing the work must have exclusive control of the plug at all times. If necessary, this can be accomplished by applying a plug lock or cord cap lock-over device that is secured with the worker's personal lock and tag.

   b. When performing hot tap operations involving transmission and distribution systems when they are performed on pressurized pipelines, provided that it has been demonstrated to the manager responsible for the project that (1) continuity of service is essential; (2) shutdown of the system is impractical; (3) approved, documented procedures are followed; and, (4) special equipment is used which will provide proven effective protection for employees.

   c. When continuity of service is essential or shutdown of the system is impractical, documented procedures are followed, and special equipment is used which will provide proven effective protection for employees.

   d. When inspecting, adjusting or testing electronic equipment and the work being performed requires the system to be energized, electrical safety protocols, (proper grounding/isolation and use of insulated tools and probes) shall be followed.

C. AUTHORITY:

This guidance is issued in accordance with building management delegation from General Service Administration (GSA).

D. APPLICABLE REGULATIONS:

1. Occupational Safety and Health Administration (OSHA) Standards for General Industry, Title 29 of CFR Part 1910.147, the Control of Hazardous Energy Sources, General Environmental Controls, 1910.147 Appendix A, Typical Minimal lockout procedures.

2. Title 29 of the CFR Part 1910.150 – The Control of Hazardous Energy, Machinery, Equipment Maintenance, Final Rule. This standard establishes minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment.

3. Title 29 CFR 1910.269 (d) – The Control of Hazardous Energy (Lockout/Tagout) for High Voltage Distribution Systems, Electrical Power Generation, Transmission.

4. Title 29 CFR 1910.333 – Selection and Use of Safe Work Practices – Mandates the use of locks and/or tags to control potential hazardous energy.

5. Title 10, Code of Federal Regulation Part 851 - DOE Worker Safety Health Program

6. OSHA Standards for Construction, Title 29 of CFR Part 1926.417, Lockout and tagging of circuits

7. NFPA 70, National Electrical Code, Latest Edition NFPA 70E, Standard for Electrical Safety in the Workplace, Latest Edition.

8. DOE O 440.1A Worker Protection Management for DOE Federal and Contractor Employees

9. DOE P 450.4, Safety Management System Policy

10. DOE M 450.4-1, Integrated Safety Management System Manual

11. Executive Order 12196 Occupational Safety and Health Programs for Federal Employees

E. IMPLEMENTATION:

Effective June 1, 2010, implementation of this procedure commences.

F. RESPONSIBILITIES AND GENERAL ADMINISTRATIVE REQUIREMENTS

A variety of organizations and individuals have responsibilities for implementing and managing the LOTO Program as it applies to the operations within HQ DOE Facilities. The success of the program depends on the effective communication and coordination of these affected organizations and individuals. The remainder of this section identifies the responsibilities for the various affected organizations and individuals.

1. Director, Safety, Health and Security Office (MA-41)

   The director is responsible for overall coordination, administration, and evaluation of the LOTO Program to include:

   a. Ensuring DOE is in compliance with the Occupational Safety and Health Act, Regulations and current with industry standards.

   b. Reviewing Contractor's LOTO Safety Plans for accuracy and completeness.

   c. Reviewing Contractor's LOTO Permit to ensure that the permit provides a level of LOTO safety equivalent to this SOP and 29 CFR 1910.147 (c)-(f).

   d. Providing final approval of DOE HQ Contractor's LOTO Permits. (an example of a DOE HQ LOTO Permit can be found in Appendix D of this SOP.)

   e. Ensuring that once LOTO accidents/injuries are reported, they are investigated and documented. Also, ensuring that the results of the investigation are reported to all necessary parties.

   f. Ensuring that LOTO equipment is utilized, available and consistent with DOE's standards.

   g. Revising, reviewing and administering LOTO Facility program elements annually or as needed.

2. Director, Office Logistics and Facility Operations (MA-43)

   The director is responsible for funding and supporting the LOTO programs as necessary for their employees and contractors. The director is also responsible for:

   a. Ensuring consistent policy implementation and reinforcing LOTO rules.

b. Providing training for all building managers, facilities personnel, and facilities contractors that are affected by the LOTO program.

c. Ensuring that the facility's LOTO safety policies are widely distributed, implemented and understood by all building managers and contractors.

d. Ensuring that all outside contractors/subcontractors operating within HQ DOE's Facilities are informed of, and adhere to DOE's LOTO policies and procedures.

3. Heads of HQ Program Elements

In accordance with DOE P 450.4, *Safety Management System Policy*, dated 10-15-1996, and DOE M 450.4-1, *Integrated Safety Management System Manual*, approved 11-1-2006, Heads of HQ Program Elements are responsible to ensure that contractors working for them comply with the safety requirements outlined in this policy, are aware of the location and hazards associated with energized equipment, and complete a LOTO Permit prior to working on equipment requiring a LOTO Permit under this SOP.

The program element manager is also responsible for coordinating this work with Director, Office Logistics and Facility Operations (MA-43) in accordance with the workflow management system. Lastly, the program element manager is responsible for:

a. Ensuring all contractors performing LOTO work for the program element are properly trained and can provide proof of the required training prior to performing the work.

b. Ensuring that the facility's LOTO safety policies are widely distributed, implemented and understood by all program element contractors.

c. Ensuring that all outside program element contractors/subcontractors operating within HQ DOE's Facilities are informed of, and adhere to DOE's LOTO policies and procedures.

4. Building Managers

DOE Building Managers/Supervisors are responsible for reading and being familiar with the requirements of this LOTO SOP. They must implement the provisions of this SOP in their routine operations to include:

a. Controlling emergency keys for LOTO locks.

b. Removing LOTO devices in case of emergency.

c. Ensuring that DOE's Contractor safety plans and LOTO Permit is available and forwarded to the Safety, Health and Security Office for review and approval

d. Keeping accurate LOTO logs as required.

e. Ensuring that necessary LOTO hardware is available.

f. Prohibiting employees from working on equipment requiring LOTO until the worker is trained in and authorized to perform LOTO.

g. Ensuring that equipment-specific written procedures are generated and maintained where required, and inspecting these procedures at least bi-annually. These procedures shall be developed during an initial assessment of the equipment. If an individual piece of equipment has not been assessed and does not have written LOTO procedures, these procedures will be developed prior to the equipment being serviced. (A LOTO Equipment Assessment Form can be found in Appendix C of this SOP.)

h. Designating specific equipment or categories of equipment to be controlled.

i. Verifying that workers are qualified to perform the necessary energy-control procedures.

j. Providing employees with access to accident/incident reporting forms, safety documents and publications.

5. Employees (including Contractor Employees)

All DOE HQ Employees (including Contractor Employees) are responsible for compliance with the restrictions and limitations imposed upon them during the use of LOTO. Each worker is responsible for his or her own safety. All employees, upon observing a machine or piece of equipment, which is locked out or tagged out shall not attempt to start, energize, or use that machine or equipment. Employees affected by the LOTO Program are required to attend LOTO training provided by the Office Logistics and Facility Operations (MA-43).

Employees must recognize when LOTO is being used, the general reasons for LOTO, and the importance of not tampering with or removing a lock and tag. Specific employees also have the following responsibilities:

a. *Authorized Worker (AW)* as defined in the definitions section of this policy, is responsible for:

- Recognizing the conditions of work that require LOTO, assessing all of the hazardous energy sources, using correct procedures and materials to implement LOTO, and maintaining control over their key.
- Applying his or her own lock and tag when performing services, maintenance, or modification.

b. *Conttractor's Project Manager* is responsibilities for:
- Ensuring that all construction contractors and subcontractors adhere to this DOE HQ LOTO SOP.
- Communicating information about the contractors and subcontractor's LOTO procedures to DOE Building Managers and workers who are affected by the LOTO activities "affected workers".

G. LOTO PRINCIPLES, VERIFICATION PROCEDURES AND DANGER TAGS

1. All LOTO operations shall utilize either an equipment-specific written procedure or the general LOTO procedure, as applicable. Regardless of the procedure used, it is important that the following LOTO principles are strictly adhered to:

   a. All sources of hazardous energy must be shut off and secured.

   b. LOTO must be performed at each identified hazardous energy control point by each LOTO AW who works on the equipment.

   c. Each LOTO AW must apply their personal LOTO device whenever servicing, maintaining, or modifying machinery or equipment, regardless of the duration of the job or their proximity to the energy-isolating device (e.g., circuit breaker, switch, or valve).

   d. Each LOTO AW must personally witness or verify the absence of hazardous energy, or assure that the verification has been performed.

2. The LOTO verification procedures identified in this SOP must be strictly followed when it is necessary to work on any equipment that generates, holds, or may release, any form of hazardous energy, including, but not limited to:

   a. Performing servicing or maintenance activities, to include construction.

   b. Removing damaged equipment from service pending corrective maintenance.

   c. Protecting equipment from damage and preventing potential inadvertent release to the environment, and maintain integrity of physical boundaries.

3. Danger Tag or Do Not Operate Tag and associated lock shall be the only devices used by the AW for controlling hazardous energy during servicing and maintenance activities and shall not be used for other purposes.

4. Hazardous energy/material examples that should be controlled to avoid personnel exposure during service and maintenance are:

   a. Electrical / Mechanical / Hydraulic / Pneumatic / Thermal / Chemical Energy, and/or,

   b. Potential energy (ex., springs, compressed gases, suspended objects), and/or,

   c. Potential release of hazardous material (ex., contaminated fluids, etc.), and/or

   d. Radiation Generating Devices (ex., magnetometers).

5. Electrical Utilities (EU) operations are addressed in 29 CFR 1910.269. When performance of the work requires locking/tagging of the EU, ensure that a licensed electrician is available to provide instruction and oversight before locking/tagging electrical equipment. This work must be coordinated with the electrical utility supplier.

H. GENERAL LOTO PROCEDURE

Before starting any LOTO procedure, the LOTO AW(s) performing the work shall physically locate and identify all isolating devices (switches, valves, etc.) which apply to the equipment or apparatus to be locked out. Any questionable identification of electrical or other energy sources shall be resolved by the LOTO AW(s) with their supervisor before proceeding.

If safety would be compromised by following this prescribed sequence of procedures, the LOTO AW, with supervisor approval, may modify the sequence. However, all steps must be performed. The general process steps for application of LOTO devices can be found in Appendix B of this SOP.

I. EQUIPMENT-SPECIFIC WRITTEN ENERGY CONTROL PROCEDURE

1. An equipment-specific written energy control procedure shall be developed and used whenever:

   a. Equipment or apparatus undergo servicing, modification, or maintenance, or has more than one hazardous energy source;

   b. Requires the operation of more than one device to isolate the hazardous energy; or,

   c. Has potential for stored, residual, or accumulated hazardous energy.

2. DOE building managers must ensure that equipment under their control requiring written procedures is identified and that the procedure is posted on the equipment or is readily available to the worker(s) authorized to LOTO the equipment.

   The procedure must be posted on or near the equipment, or provided in such a manner as to ensure that all LOTO AW(s) are provided this information before starting the work.

   The procedure must be reviewed and updated as necessary any time there is a change in the equipment or associated hazards.

   If the written procedure is not posted on the equipment, the equipment must be clearly labeled to indicate the availability and location of the procedure. The supervisor or worker responsible for the equipment may determine the appropriate format and content of the label.

3. Equipment-specific written procedures must incorporate all of the applicable elements of each step in the General LOTO Procedure found in Appendix B of this SOP. (LOTO Application and Release Steps can be found in Appendix B of this SOP.) It is essential that the specific application of each LOTO step be clearly explained in the context of the specific equipment or apparatus.

4. The written hazardous energy control procedure must be specific to each piece of equipment (by model number or serial number) or apparatus, and must be inclusive of all energy types it contains. It may require a separate procedure for each type of hazardous energy to be controlled, or a separate procedure for each type of maintenance or servicing task expected to take place. Maintenance and service manuals must be consulted to ensure accuracy and sufficient level of detail.

5. Each written Hazardous Energy Control procedure must identify the specific equipment or apparatus to which the procedure applies, and must identify the following elements:

   a. The procedure that will be performed which requires the control of hazardous energies.

   b. The components or locations that generate the hazardous energies to be controlled.

   c. The energy types that will need to be controlled.

   d. The specific locations for shutting down, isolating, blocking, safe releasing, and securing all potentially stored or residual hazardous energies.

   e. Indicate type of LOTO hardware to use.

f. Describe how to test for verification of hazardous energy control.

J. GROUP LOTO PROCEDURE

When multiple LOTO AWs are performing servicing, maintenance, or modification on the same piece of equipment or apparatus, the contractor's project manager:

1. Determines that the use of a group LOTO procedure is appropriate.

2. Must convene a meeting of all members of the group to be covered under the procedure.

3. Must describe the tasks to be performed.

4. Must delegate primary responsibility to a designated LOTO AW for a specified group of employees working under the protection of the group LOTO procedure.

5. Ensures each member of the specified group is trained and LOTO-Authorized, as described in (Section 16 Training and Authorization).

6. Designates the LOTO AW responsible for ensuring that each step of the equipment-specific written procedure has been completed.

7. Each designated LOTO AW must apply his or her personal LOTO lock(s) and tag(s) to the energy-control device(s) and indicate on the tag(s) that a group LOTO is in effect.

8. Designates which LOTO AWs place his/her key(s) inside of a gang lock box. The gang lock box shall be constructed in such a way as to permit multiple locks to be attached to the outside of the enclosure, preventing it from being opened until all locks are removed.

9. Ensures that a LOTO AW places a LOTO lock and tag on the outside of the gang lock box.

10. Ensures all other workers performing work on the equipment is assured that each step of the equipment-specific written procedure has been completed, and then lock and tag the gang lock box in a manner that prevents access to the key inside until all locks have been removed.

11. Ensures the work has been completed and after each worker has removed his/her respective lock from the gang lock box, the designated LOTO AW removes his or her LOTO lock from the outside of the gang lock box, obtains the keys from the lock box, and returns the equipment to service as described above.

K. TEMPORARY REMOVAL OF LOTO DEVICES

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

1. Notify the affected employees and area supervisor. Also, communicate to all employees working in the area what actions are taking place.

2. Clear the equipment of tools and materials.

3. Remove all 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, hooks, or wands.

6. Put on any required personal protective equipment (PPE). Also, ensure that all personnel in the work area are protected against the sudden release of energy, chemicals, steam, radiation, etc.

7. Energize and proceed with testing or positioning.

8. De-energize all systems and reapply lockout/tagout measures to continue the servicing, maintenance, or modification of the equipment.

L. EMERGENCY REMOVAL OF LOTO DEVICES

WARNING: This is considered to be an emergency procedure, only to be undertaken in extreme circumstances and with DOE approval. This approval must come from the Building Manager or above.

When the LOTO AW who applied a LOTO device is not available to remove it, that device may be removed by his or her Supervisor if it is safe to do so, and only after the following emergency removal procedure has been implemented. Extreme care must be taken, and the following four steps must be performed:

1. The Supervisor must verify that the LOTO AW is not at the DOE facility.

2. The Supervisor must make every reasonable effort to contact the LOTO AW.

3. These efforts must be documented (email, registered letter, voicemail, telephone memo to the AW and one other person, etc.).

4. If the employee is contacted, the Supervisor must inform the employee that his or her LOTO devices are being removed.

5. The supervisor must obtain the approval of the Building Manager.

6. The Supervisor must verify that it is safe to remove the LOTO devices.

7. The Supervisor may then cut off the lock, or have it cut off by authorized maintenance department.

8. Before the worker returns to any work duty, the Supervisor must ensure that the LOTO AW is presented with the removed lock upon returning to work and is informed of the reasons for the emergency removal.

9. The emergency procedure must be duly recorded in the organization's LOTO records and signed by the Supervisor, LOTO AW, and the approving official.

   Note: If the LOTO AWs immediate supervisor is not available, the emergency removal may be performed by a level of management above the LOTO AW's Supervisor. Contact the DOE Electrical Safety Officer if no authorized person is available to implement the emergency removal procedure.

M. SHIFT CHANGES

If equipment will remain de-energized after the end of a shift and work will continue by the oncoming shift, an orderly transfer of LOTO devices between LOTO AWs from the off going and oncoming shifts must be performed, subject to the following conditions:

1. The following criteria must be met before using a shift change procedure:

   a. A justifiable and verifiable need must be identified; and

   b. Building Manager formal approval must be obtained.

2. Shift Change LOTO Procedure

   a. The LOTO AW from both shifts must both be present at the lockout device.

   b. The off-going LOTO AW must remove his or her lock and tag, and the oncoming LOTO AW must immediately place his or her lock and tag on the group LOTO device.

   c. The LOTO-Authorized off-going employee must inform the LOTO-Authorized oncoming employee of any potential hazards.

d. Before work begins, the oncoming worker(s) shall:
   - Re-verify that all safety devices (such as blocking) are in place, and
   - Re-verify that there is zero energy in the system, and
   - Attempt to restart or re-energize the system before anyone enters the hazard zone.

3. Unforeseen Shift Change Problems

   If the meeting between off-going and oncoming shift workers does not occur, the off-going shift employee's LOTO devices shall remain in place. The oncoming employee who will be working on that equipment shall add his/her LOTO lock and tag to a multiple lock adaptor and proceed with the work, following the requirements of this document. This worker shall remove his/her LOTO when finished working on the equipment.

N. TAG-OUT-ONLY

Sump pumps, emergency lights, refrigerators, or equipment that must be shut down in a controlled manner fall into a class of equipment that should not be accidentally de-energized.

1. When a circuit breaker, disconnect switch, or energy-securing device is readily accessible to any employee, the circuit breaker or disconnect switch may be tagged to indicate that it is not to be turned off.

2. The energy-securing device must not be locked by any means that would prevent the device from being used as an emergency disconnect.

   The tag must include the name of the responsible person and an alternate, date, and phone number.

O. TRAINING AND AUTHORIZATION

All HQ DOE LOTO training shall be provided by the Office Logistics and Facility Operations (MA-43) in coordination with the Safety, Health and Security Office (MA-41).

1. General Requirements – LOTO may only be performed by LOTO AW who have completed formal classroom training; and have received task equipment-specific on-the-job training; and have been authorized by their Supervisor to perform work. Also, training shall also be provided by the contractor to ensure that affected employees are aware that tampering with or removing someone else's LOTO devices can cause serious injury or fatalities, and is a serious safety violation.

2. General Awareness Training – Shall be provided by the contractor to ensure that every employee knows and understands the purpose, contents, and application of this program to the level necessary for their job requirements.

3. Awareness Level Course – LOTO awareness training must be obtained through the DOE contractor. Employees that are required to be trained in LOTO awareness level are taught the use of the energy control program, how to recognize LOTO situations, why LOTO is implemented, and about the prohibition of attempts to restart or re-energize equipment that has been locked and tagged out.

4. As the outcome of LOTO training, LOTO AW must be able to recognize applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and procedures for their isolation and control. *LOTO AW will also need to consult with a qualified **Authorized Electrical Worker** to perform verification of electrical de-energization.*

5. Reauthorization and Retraining

   a. Reauthorization is required when:
      - A LOTO AW's job changes, LOTO AW is reassigned; or
      - New equipment is to be used; or
      - New hazards are introduced; or
      - New energy-control procedures are to be implemented.

   b. Retraining and/or reauthorization may be required when:
      - A supervisor has reason to believe that an employee has insufficient knowledge of LOTO procedures or policy; or
      - A periodic inspection shows a deficiency in the LOTO AW ability or interest to implement LOTO policy correctly.

8. Training Documentation

   Documentation of equipment-specific training must be in writing. Training documentation must be retained for 3 years, and be readily available for inspection by the DOE HQ Health, Safety and Security Office representative upon request.

P. DOE CONSTRUCTION CONTRACTORS/SUBCONTRACTORS

1. When work will include an activity requiring LOTO, Construction Contractors are required, in accordance with this document, to include their company's LOTO procedures in their construction safety plans, supplemented by a LOTO Permit unless this requirement has been waived by the DOE Headquarters Safety, Health and Security Office. A construction contractor operating under an approved safety plan will provide their own LOTO equipment.

a. All Contractors/Subcontractor employees are responsible for personally locking out and tagging out the equipment that they work on.

b. All Contractor LOTO locks shall be red.

c. During LOTO procedures, there shall be only be one key per lock. Spare, master or emergency keys are not permitted on the site.

d. Subcontractor employees must be trained in their company's LOTO procedure and be informed of DOE's LOTO procedure.

2. Construction Subcontractors are responsible for obtaining an approved LOTO Permit from the HQ Safety, Health and Security or Building Manager's Office before performing LOTO, and posting it at the job site. All construction subcontractor employees have the responsibility to implement LOTO procedures for equipment that they are working on. All construction subcontractor employees have potential exposure to LOTO activities and must be trained in the recognition of the procedure and the importance of respecting locks and tags.

3. The LOTO Permit may specify that the DOE Building Manager will have local oversight of a utility or other system that is associated with subcontract work. This does not relieve the subcontractor from their LOTO responsibilities. In such instances, the DOE Building Manager will implement the following procedure:

a. Apply an administrative lock (an administrative lock shall not be labeled with a danger tag or sticker) on a multiple lockout device on the energy isolation device after securing the system.

b. Ensure the subcontractor's LOTO AW's hazardous energy has been appropriately isolated, and that their individual LOTO locks are applied while they are working on that system.

c. After the work is completed, and all of the contractor's and subcontractor's locks are removed, DOE Facilities removes the administrative lock and, after verifying it is safe to do so, reenergizes or allows the contractor to reenergize the system.

Q. LOTO EQUIPMENT

Locks

1. Only RED padlocks may be used when performing LOTO. All **red** padlocks, regardless of manufacturer, shape, size, etc., are considered personal LOTO locks. Any other lock may be used for configuration management or other administrative purposes. It is permissible to paint or tape a padlock red.

   LOTO locks may *not* be used for any purpose other than LOTO.

2. A LOTO lock must always be accompanied by a DOE approved tag.

3. Supervisors may purchase a group of locks to be distributed to his or her LOTO AWs.

4. A supervisor may elect to use a checkout system that allows LOTO AWs to borrow locks from a common local supply.

Key Control

1. Personal Locks

   Each DOE approved LOTO padlock shall have one key only. The key must be in the control of the LOTO AW who applied the lock. There are to be no spare or emergency keys.

2. Personal Locks Keyed Alike

   A group of locks with a common key may be used for equipment with multiple energy-isolation devices, if desired. If a group of locks are keyed alike for this purpose, one key only may be issued for use by the LOTO AWs.

R. LOTO TAG REQUIREMENTS

1. The following are requirements for LOTO tags:

   a. Only DOE-approved LOTO tags may be used.

   b. The DOE-approved LOTO tag is 140 mm X 76 mm (5-1/2" X 3"), states **"DANGER DO NOT OPERATE"** on the front, and **"This Energy Source Has Been Locked Out"** on the back. The tag is reusable.

   c. A tag must <u>always</u> be used in conjunction with a lock unless the energy-isolating device is not physically capable of being locked.

d. The LOTO AW performing LOTO must write his/her name, telephone number, and other relevant information.

2. Tagout Only – In the rare cases that a device is not capable of being locked out, a "tagout only" procedure may be used, subject to the following conditions:

   a. A justifiable and verifiable need must be identified; and

   b. Formal approval must be obtained from the immediate Supervisor or Building Manager.

   c. When conducting a tagout only procedure, the LOTO AW must follow all of the steps outlined in (section 13.0, General LOTO Procedure), with the following two changes:
      - Omit the placement of the lock – Instead, the LOTO AW 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 the tag must be affixed as noted in Step 8 of the General LOTO Procedure.

      Note: ***Extra caution must be exercised when using a Tagout Only Procedure. Tags may evoke a false sense of security by the at-risk employee. Tags are warning devices and do not provide the physical restraint provided by a lock.***

Approved: Date: 6/11/2010

Cherylynne K. Williams

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Director, Headquarters Safety, Health and Security Office

Approved: Date:

Rebecca L. Montoya 6/4/10

for Brian D. Costlow

Director, Office of Administration
Headquarters Safety and Health Official

APPENDIX A
Definitions and Acronyms

Administrative Lock: Any lock that is used for a purpose other than LOTO. The lock may serve a safety function other than LOTO, a configuration control function, or other purpose. An administrative lock, unlike a LOTO lock, may be controlled by one or more individuals. An administrative lock shall not be labeled with a danger tag or sticker. An administrative lock is not a substitute for a LOTO lock. A LOTO lock cannot be used as an administrative lock.

Affected Employee: A person whose job requires him/her to be near or around the hazard zone (but not within the hazard zone) when equipment or apparatus is being maintained or serviced under a locked-out or tagged-out condition. See also the definitions for LOTO AW and Other Employee.

Authorized Worker: 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 worker when that employee's duties include performing servicing or maintenance covered under this section. Each authorized worker shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

Blocked: A condition where a mechanical device is inserted into the energy path to physically prevent movement, most commonly used with mechanical machinery or fluid filled lines.

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 with the device in the "off" or de-energized position, or it otherwise 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.

Contractor's Project Manager: A person who has completed the required hazardous energy control training (general and procedure-specific), and is responsible for assigning work involving LOTO to authorized workers to perform service or maintenance. A person must be an LOTO-Authorized Worker to apply a lock or tag to control hazardous energy.

Emergency Removal of LOTO Devices: A procedure for the removal of a lock and tag, including any energy isolating device to be removed by someone other than the employee who applied them. Only the Supervisor can remove an LOTO AWs lock and tag with approval from the Building Manager or higher authority.

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:

- Manually operated electrical circuit breaker
- Manually operated disconnect switch
- 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
- Line valve, block, or any similar device used to block or isolate energy

Energy-isolating devices must be capable of allowing a lock to be installed. Push buttons, selector switches, software interlocks or control circuit type devices are not energy isolating devices and cannot be used to isolate hazardous energy.

Energy source: Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy, including ionizing and non-ionizing radiation.

Equipment or Apparatus: Commercially purchased, non-purchased, or custom built devices that utilize energy to operate.

Exposure: Being subjected to a source of risk presented by hazardous energy sources.

Gang Lock Box: A box used to contain the LOTO lock key(s) of designated LOTO AW(s) during a group LOTO procedure. Individual LOTO locks are placed on the gang box by each LOTO AW covered under the designated LOTO AW. The gang lock box shall be constructed in such a way as to permit multiple individual LOTO locks to be attached to the outside of the enclosure, preventing it from being opened except by removal of every individual LOTO lock.

Group Lockout/Tagout: A procedure to coordinate the servicing or maintenance work assignment of several groups performing LOTO on a single piece of equipment.

Hazardous Energy: Energy, that if not controlled is of such a magnitude that it is capable of causing harm to a person or loss of resources.

Hazardous Energy Control: The process of systematically implementing mechanical means to prevent hazardous energy from flowing to a person.

Hazardous Energy Control Procedure: A written document that contains equipment-specific information and procedural steps that a LOTO-Authorized Worker must follow in order to safely control hazardous energy during servicing or maintenance of equipment or apparatus. Procedures must be reviewed annually.

Isolated: A condition where all sources of hazardous energy have been controlled by physically stopping the energy path so that the energy cannot flow to workers. The term "isolated" is commonly used with electrical circuits and fluid lines.

LOTO-Authorized Worker: A person who has completed the required hazardous energy control training (general and procedure-specific), and is LOTO-Authorized by the Supervisor to lockout and tagout energy control points for a specific equipment or apparatus to perform service or maintenance. A person must be an LOTO-Authorized Worker to apply a lock or tag to control hazardous energy. See also the definitions for Affected Employee and Other Employee.

LOTO Lock (See also Individual Lock): A lock issued to an LOTO-Authorized Worker for which no other employee has the key or means of opening without using destructive force. Locks used for control of hazardous energies shall be unique in design and color, shall not be used for any other purpose, and shall be easily distinguishable from other standard locks (Administrative Lock, multi-key, combination, and other non-LOTO locks).

Lockout/Tagout: The method of applying a mechanical lockout device and a tag on an energy isolating device by an LOTO-Authorized Worker in accordance with established written procedures, in order to control hazardous energies and prevent the equipment from being operated until the lockout device is removed.

Lockout Device: A device that utilizes a positive means, such as a single key LOTO lock, to hold an energy isolating device in the safe position and prevent the energizing of equipment or apparatus. Included are lockout hasps, blank flanges and bolted slip blinds.

Lockout Tag: A distinctive, durable tag attached to the LOTO lock shackle, that identifies it as a lockout device and identifies the individual who placed the lock, the individual's phone number, and the time and date it was placed. The tag shall be of a standard shape and size for use throughout HQ. A lockout tag is not a substitute for a lockout device.

LOTO: Lockout/Tagout and verification.

Routine Operations: Safe service, maintenance, adjustments and inspections taking place during normal production operations.

Stored Energy Source: Any device that is capable of holding energy after equipment is shutdown. This includes, but is not limited to, capacitors, tanks, pipes, springs, and flywheels.

Supervisor: An employee designated in writing and properly trained as outlined in this procedure that is responsible for determining if proper LOTO procedures are being implemented prior to a during equipment maintenance operations.

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.

Using tag out alone as a form of hazardous energy control is not a positive means of controlling hazardous energy, however can be used in certain circumstances as defined in the SOP.

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. The tag shall include the reason for placing the tag, name of employee placing the tag, how that employee may be contacted, and date the tag was placed. Tags must be durable and able to withstand the environment to which they are exposed for the maximum time exposure is expected. These tags shall not be used for other purpose.

Zero Energy State: A condition that is reached when all energy sources to or within equipment are isolated, blocked, or otherwise relieved, with no possibility of re-accumulation. Equipment is not safe to work on until it is in a zero energy state.

APPENDIX B
LOTO APPLICATION AND RELEASE STEPS

This section establishes the steps for performing LOTO activities.

1. Preparation

   a. *Review available written procedures.* The LOTO AW must determine if an Equipment-Specific Written Energy Control Procedure is available for the equipment to be worked on. If so, the LOTO AW must obtain and follow the equipment-specific written procedure. If a written procedure is not available the LOTO AW must contact his or her Supervisor and a written procedure must be generated.

   b. *Assess energy type and magnitude.* The LOTO AW must assess the type, magnitude, and hazards of the energy to be controlled

   c. *Determine methods of energy isolation.* The LOTO AW must determine the appropriate methods of controlling the hazardous energy. Methods for energy isolation may include such things as circuit breakers, disconnect switches, or valves (See example in Figure B.1). Push buttons, selector switches, and control circuits are *not* energy-isolating devices.

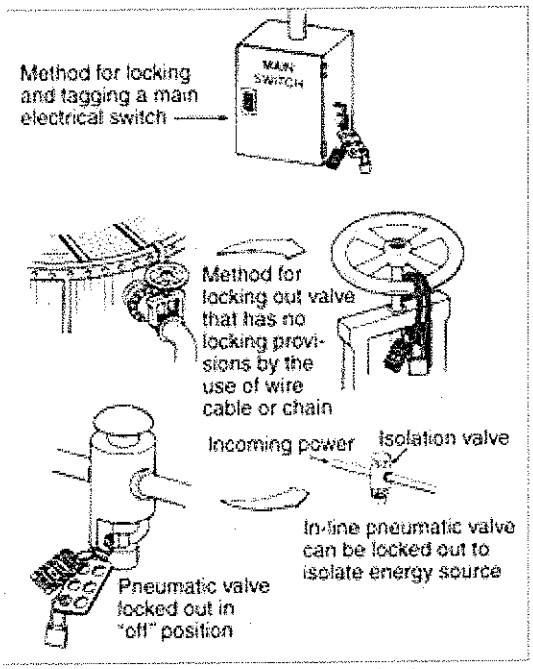


Figure B.1 - LOTO Methods

2. Notification

   Notify all affected employees: The LOTO AW must notify all Affected Employees of the impending shutdown. These persons must be informed that they are not to disturb the lockout device or attempt to re-start the equipment until they

are informed that the lockout has been cleared and it is safe to resume normal operations.

3. Shutdown

   a. *Verify that it is safe to shut down equipment.* The LOTO AW must verify that it is safe to shut down the equipment.

   b. *Perform normal equipment shutdown.* The LOTO AW must turn off or shut down the equipment using established methods for that equipment.

4. Isolation and Verification

   a. *Isolate all energy sources.* The LOTO AW must do what is necessary to isolate all energy sources from the equipment. (switch off, valve off, etc.).

   b. *Verify that the correct energy isolation device has been operated.* The LOTO AW must take steps to ensure that the means used (disconnect, valve, etc.) for energy isolation correctly correspond to the equipment on which LOTO is being performed.

      Note: For verification of electrical energy isolation, a best practice procedure (if safe to do so) may include an "on-off-on" procedure, wherein:
      - The equipment is placed in an operating condition
      - The disconnect is operated
      - The equipment is confirmed to have switched off
      - The disconnect is re-energized
      - The equipment is confirmed to have switched on
      - The disconnect is operated
      - Equipment is confirmed to have switched off

5. LOTO Device Application

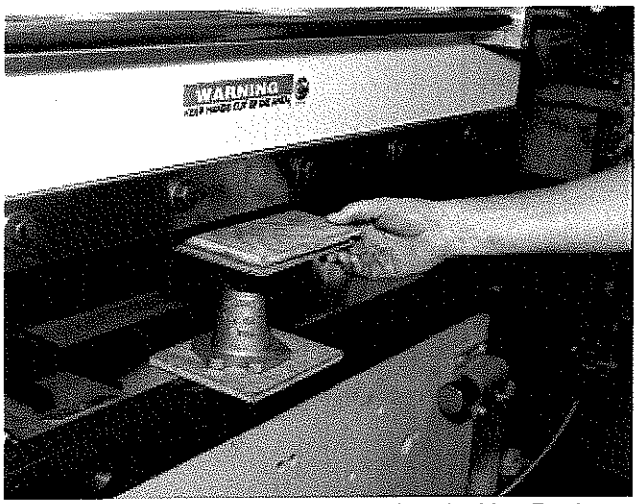
   a. Lock out energy sources. A **red lock** must be affixed so as to hold the energy-isolating device in an off or safe position that physically prohibits normal operation of the energy-isolating device.

   b. *Write name, date, contact number, purpose of LOTO, and any other relevant information on the tag, and apply with lock or plastic locking tie.* If the placement of the tag would compromise safety by obscuring indicator lights or controls, the tag may be located as close as is safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

6. Additional Measures If Necessary

   a. *Insert physical restraints or disconnect components.* Insert blocks or chocks for moving or raised parts, insert blind flanges for pressurized piping, disconnect springs (only if safe to do so), etc., to ensure potential moving parts are physically restrained or disconnected.

   b. *Release stored energy.* The LOTO AW must completely release or otherwise control any stored energy and block any unexpected motion. The presence of stored energy usually indicates that an Equipment-Specific Written Procedure is required. The equipment must be in a zero energy state (See Definitions and Acronyms).
      - In the case of stored mechanical energy, vent valves, spring releases, blocking devices, or equipment repositioning (as appropriate) must be utilized (See Figure B.2).
      - In the case of stored electrical energy, approved grounding wands or discharge devices must be used. If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation (such as leaving the ground wand in place) must be continued until the servicing, maintenance, or modification is completed. This can only be accomplished by an electrically Qualified and LOTO-Authorized Worker (see *Electrical Safety,* Title 29 CFR 1910.269 (d).



c. ***Figure B.2 Placement of a Blocking Device***

7. Isolation Verification Confirmation

   a. *Attempt to restart the equipment*. The LOTO AW must physically attempt to operate the energy-isolating device and attempt to restart the equipment using the normal equipment controls.

   b. *Test equipment for zero-energy state.* The LOTO AW must test potential energy sources using appropriately rated instruments. Any instrument used to

test for voltage, pressure, or temperature must be checked for proper operation both before and after use. If the LOTO-Authorized Worker is not qualified to test the energy being isolated, he or she must ensure that the energy is tested by a qualified person.

c. *Only an electrically qualified LOTO Authorized Worker can test for verification of electrical de-energization (see PUB 3000, Chapter 8 (Electrical Safety).* The qualified tester, if other than the LOTO AW must be identified in the Remarks section on the tag. All energy is to be treated as present until positively proven otherwise.

8. Keeping Devices in Place

The lock and tag shall remain in place until work on the equipment is 100 percent complete. In rare circumstances, it may be necessary to temporarily remove LOTO devices before work is 100 percent completed (such as for adjustment or repositioning equipment). (See Temporary Removal of LOTO Devices).

9. Release Preparation & Notification

a. *Notify all Affected Persons that the system is to be returned to service:* Ensure all persons remain clear of the equipment point of operation and out of the hazard zone.

b. *Clear all tools and personnel:* The LOTO AW must check the work area to ensure that all tools, debris and personnel are at a safe distance from the equipment.

c. *Replace safety guards:* The LOTO-Authorized Worker must check the equipment to ensure that any removed guards are reinstalled.

10. Removal of Additional Devices

a. The LOTO AW must remove any additional devices applied under LOTO Application, Step 6.

b. Remove all safety grounding devices.

c. *Verify that it is safe to reenergize.* The LOTO AW must verify that the work for which the LOTO was applied has been completed and that it is safe to reenergize equipment.

11. Removal of All Locks and Tags

a. Remove lock(s) and tag(s). Each LOTO device must only be removed by the LOTO AW who applied it. If the person who placed the locks and tags is not

available, the procedure for Emergency Removal of LOTO Devices must be followed (see Section 7.0).

b. Notify all Affected Employees that the lockout condition has been cleared.

Energize the equipment and restore the equipment to the normal condition.

APPENDIX C
LOTO EQUIPMENT ASSESSMENT FORM

Identification	Equipment #	Building	Purpose for Assessment [ ] Initial Assessment [ ] Reassessment
	Apparatus: Manufacturer: Model: S/N:	Location	Responsible Owner: Contact Information:
Classification	This piece of equipment *(mark all that apply)*… [ ] 1. Has one corded electrical energy source (i.e. plugs into a wall outlet) [ ] 2. Has one hard-wired electrical energy source [ ] 3. Has more than one hard-wired electrical energy source [ ] 4. Has a high voltage electrical energy source [ ] 5. Could have stored/built up electrical energy [ ] 6. Has hydraulic parts [ ] 7. Has pneumatic parts [ ] 8. Uses compressed air or compressed gases [ ] 9. Has other mechanical energy (moving parts) [ ] 10. Has thermal energy (steam/heat/cold) [ ] 11. Contains chemicals (oils, fluids, powders, etc.) [ ] 12. Contains potential energy (springs, compressed gases, suspended objects) [ ] 13. Other (specify) *If any statement is checked, a work permit is required to perform maintenance, service, repair, or other work on this equipment.*		Location/Type/Magnitude: 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13.
	Location of manufacturer's operations, maintenance, and/or service manual		
LO	Procedures which requires control of hazardous energies.		

Identification	Equipment #	Building	Purpose for Assessment [ ] Initial Assessment [ ] Reassessment
	Apparatus: Manufacturer: Model: S/N:	Location	Responsible Owner: Contact Information:

	Components or locations that generate the hazardous energies to be controlled.	
	The energy types that will be controlled.	
	Other equipment/devices/areas that may be affected when this equipment is de-energized.	
	Specific locations for shutting down, isolating, blocking, safe releasing, and securing all potentially stored or residual energies.	
	Type of LOTO hardware to use.	
	Special Notes	
	How to verify hazardous energy control.	
	Work Permit	[ ] is required when performing any work on this equipment [ ] must be signed by a qualified electrician [ ] must be signed by the Building Manager

Name of Evaluator:	Signature	Date of Assessment

APPENDIX D
DOE HQ LOTO PERMIT

To be completed when locking out or tagging out equipment to perform maintenance, service, or repair. A separate permit is required for each piece of equipment and for each shift.

Permit Information	Permit Number:	Requestor:	DOE Sponsor
	Date of Request	Requestor's Phone Number	Sponsor's Phone
		Requestor's Organization/Company	Sponsor's Org
LOTO Info	Equipment #	Location	Classification
	Existing Hazards		
Initial Assessment	Reason for Work		
	Type of work to be done		
	Is there an assessment for this equipment? [ ] Yes [ ] No Is a manual available? [ ] Yes [ ] No Can equipment be de-energized? [ ] Yes [ ] No Have conditions changed from date of last assessment? [ ] Yes [ ] No Are there additional hazard associated with the work? [ ] Yes [ ] No Does an SOP exist for this type of work at this location? [ ] Yes [ ] No Is this work routine? [ ] Yes [ ] No Is this work emergency work? [ ] Yes [ ] No		
Temporary Mitigation	**Hazard**	**Mitigation (specify how & what)**	
	[ ] Electrical hazard [ ] Lock out [ ] Other (specify) [ ] Tag out		
	[ ] Physical hazards (moving parts, noise, thermal) [ ] Lock out [ ] Other (specify) [ ] Tag out		
	[ ] Chemical hazards (including compressed gases)		
	[ ] Hazards associated with physical space, dimensions, access, or egress		
	[ ] Hazardous atmosphere potential		
	[ ] Other Hazards (specify)		
	Verification:		Temporary New Classification
	Date Mitigation	Name of Supervisor	Signature of Supervisor

	Permit Number	Date	**Page 2**
Work Plan	Start Date	**Not to exceed 1 shift**	___During business hours (6am-6pm M-F) ___After business hours ___Holiday/Weekend Work
	Start Time	Stop Time	
	Protection of Others (traffic control): _____Barricades _____Vests _____Flags **Impact on Others:** ___Security Systems ___Utilities ___Telephones/Computers	**Communication Methods with Workers:** _____Voice _____Radio _____Phone _____Visual _____Other _____	**Method to Contact Emergency Services:** _____Phone _____Radio _____Other _____ **Emergency Procedures:**
	Personal Protective Equipment: _____Coveralls _____Tyvek suit _____Leather Gloves _____Chemical Resistant Gloves _____Welding Gloves _____Electrical Gloves	 _____Welding Hood _____Eye Protection _____Hearing Protection _____Respiratory Protection	 _____Safety shoes/boots _____Electrical resistant boots _____Hard Hat _____Other_____

Personnel

Each person must be listed below and must initial that hey have read and agree with this permit AND that they have verified that all of LOTO controls are in place.

Name and Organization or Company	Training	Initials
Supervisor		
LOTO Authorized Worker		
LOTO Authorized Worker		
LOTO Authorized Worker		

Approvals

For LOTO with only one energy source and no other hazards, only the Supervisor must sign. For high voltage or multiple or complex electrical sources, a qualified electrician must also sign. For all other LOTO permits, the Building Manager and the HQ Safety and Health Director must review and sign.

Name	Signature	Date
Supervisor		
Qualified Electrician		
DOE Building Manager (When Required)		
Program Element Manager (When Required)		
DOE HQ Safety & Health		

	Permit Number	Date	**Page ____**
Inspection	**Requirement**	**Assessment**	**Notes**
	Assessment was created or reviewed prior to work beginning	[ ] Yes [ ] No	
	Equipment manual and other documentation was reviewed	[ ] Yes [ ] No	
	SOP available and reviewed	[ ] Yes [ ] No	
	Employees are trained	[ ] Yes [ ] No	
	LOTO procedures were followed	[ ] Yes [ ] No	
	All hazardous energy sources were controlled or eliminated.	[ ] Yes [ ] No	
	LOTO procedures were adequate	[ ] Yes [ ] No	
	Lockout/Tagout verified	[ ] Yes [ ] No	
	Work was effectively coordinated	[ ] Yes [ ] No	
	Affected parties were notified	[ ] Yes [ ] No	
	Other		

Inspector's Name	**Signature**	**Date**

Cancellation		
Reason for Cancellation of Permit:	[ ] Unauthorized LOTO [ ] Hazard Uncovered [ ] Site conditions changed [ ] Work was stopped [ ] Work was completed	Explain:

Notes/Additional Information:

Name	**Signature**	**Date**
Supervisor		
Other		