

OSHA 1910.147:
THE CONTROL OF HAZARDOUS ENERGY
OSHA 1910.333

LOCKOUT/ TAGOUT

2022-2023

**Vestal Central
School District**

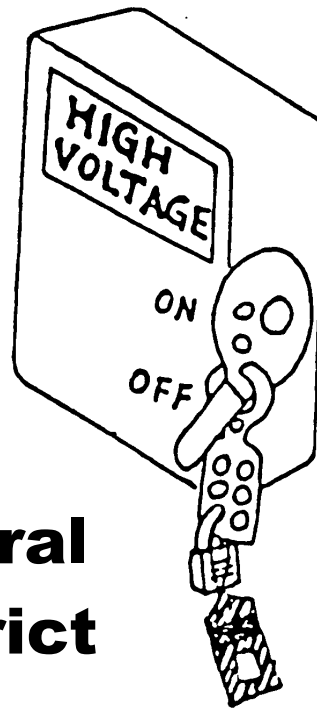


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I. INTRODUCTION

New York State Department of Labor regulations mandate school districts and other public employers to comply with Federal Occupational Safety and Health Regulation 29 CFR 1910.147: Control of Hazardous Energy source (Lockout/Tagout: Final Rule) and 29 CFR 1910.333 Selection and use of work practices.

II. PURPOSE

This lockout/tagout program has been prepared to provide guidelines and operating procedures for all affected and authorized employees of the Vestal Central School District in meeting the requirements of the regulations.

This program establishes the minimum requirements for the lockout or tagout of energy isolating devices.

This program is written to help safeguard Vestal Central School District employees from hazardous energy while they are performing servicing or maintenance on machines and equipment and hand tools or working on or near circuits that are or may be energized. It identifies the practices and procedures necessary to shut down and lockout or tagout machines and equipment or de-energize parts; identifies the training employees receive in their role in the lockout/tagout program; and mandates that periodic inspections be conducted to maintain or enhance the district's energy control program.

III. SCOPE and APPLICATION

The lockout/tagout standard covers the servicing and maintenance of machines and equipment in which the unexpected startup, or the release of stored energy, could cause injury to employees. Also included in this program are procedures to follow to protect employees against contact with energized circuit parts directly with any part of their body or indirectly through some other conductive object.

IV. RESPONSIBILITIES

A. Vestal Central School District

- develop a written Lockout/Tagout program
- provide all authorized employees with personal protective equipment and lockout/tagout devices necessary to fulfill requirements of the standard
- Notify the BOCES Health and Safety Specialist of new hires or the need for retraining
- Provide for retraining, as necessary, for those employees affected under this program

B. VCSD & BOCES Health and Safety Specialist

- implement the written Lockout/Tagout program
- review specific procedures for lockout/tagout and determine appropriateness and compliance with the standard
- provide for initial training as necessary, for those employees affected under this program

C. Authorized Employees

- become familiar with the written Lockout/Tagout program
- attend and complete training in lockout/tagout activities
- comply with lockout/tagout procedures as identified in the written program and as demonstrated during training

D. Affected Employees

- become familiar with the districts written Lockout/Tagout program

- comply with the directions of any and all authorized employee(s) identified in the program with regard to the lockout/tagout procedure(s)
- do not attempt to start, energize, or use that machine or equipment

Note: if the employee believes that following such directions may place his/her safety in jeopardy, he/she is to notify their supervisor and/or the BOCES Health and Safety Specialist, immediately.

V. DEFINITIONS

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

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

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;
- a disconnected switch;
- a slide gate;
- a slip blind;
- a line valve;
- a block;
- a manually operated switch by which the conductors of a circuit can be disconnected from all underground supply conductors and, in addition, no pole can be operated independently.

Note-The definition DOES NOT INCLUDE a push button, selector switch, and other control circuit type devices.

Energy Source: any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Hot Tap: a procedure used in the repair, maintenance and services activities, which involves welding on a piece of equipment (pipelines, vessels, or tanks) under pressure in order to install connections or appurtenances.

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

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

Qualified Person: trained and knowledgeable in the construction and operation of equipment or a specific work method and be trained to identify and avoid the electrical hazards that might be present with respect to that equipment or work method.

Servicing and/or Maintenance: workplace activities, such as constructing, installing, setting up, adjusting inspecting, modifying, and maintaining and/or servicing machinery or equipment. These activities include, but are not limited to lubrication, cleaning or unjamming of machines or equipment, 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.

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

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

Single Person Lockout: one person applies a lockout device; only that one person is working on the machine/equipment or in the affected area.

Group Lockout: (more than one person applies a lockout device) During this procedure, an authorized employee of the Vestal Central School District shall be designated Supervisor to oversee the activities of the group and to help insure the safety of all authorized employees of the group.

VI. EMPLOYEE TRAINING

A. Authorized Employees

- B.** Each authorized employee shall receive training in the recognition of hazardous energy sources, the type and magnitude of the energy in the workplace, and the methods and means necessary for energy isolation and control.

Each affected employee shall be instructed in the purpose and use of the energy control procedure.

All authorized employees charged with the responsibility for implementing the energy control procedures and performing the servicing or maintenance:

Maintenance Department
Head Custodians
Transportation Maintenance Department
Cafeteria Cook Managers
Technology Teachers

A list of authorized employees is kept in the Supervisor's Files. VCSD and the Health and Safety Specialist will coordinate training sessions for those affected employees as identified in this written Energy Control program.

There is to be NO servicing or maintenance done unless you possess all of the following:

- (a) Training and skills of lock out / tag out procedure.
- (b) Knowledge of the equipment and associated magnitude of the energy sources.
- (c) Proper personal protective equipment required for the associated magnitude of energy.

VII. MECHANICAL PROCEDURES 1910.147

Machinery and equipment requiring detailed procedures can be found in the Appendix. Check this list before proceeding. Where applicable, always review the equipment service manual.

Exception

Cord and Plug connected equipment and machinery do not require lockout/tagout procedures as long as the attachment cord and plug has been disconnected and is under the sole control of the individual performing maintenance/repairs, e.g., hand tools, kitchen appliances, etc.

A. Mechanical Exception to Lockout/Tagout Procedures 1910.147

When ALL of the following exceptions are met, specific equipment and machinery is NOT required to have detailed lockout-tagout procedures:

- (1) The machine or equipment has no potential for stored or residual energy or reaccumulation of energy after equipment is shut down.
- (2) Machine or equipment has a single energy source which can be readily identified and isolated.
- (3) Isolation and locking out of the energy source shall 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 and maintenance.
- (5) A single lockout device will achieve a locked out condition.
- (6) A lockout device is under the exclusive control of the authorized employee performing the servicing
- (7) The servicing or maintenance does not create hazards for other employees.
- (8) The employer, in using this exception to the standard has no accidents involving the unexpected activation or re-energization of the equipment during servicing.

B. Mechanical Lockout Procedure 1910.147

- (1) Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.
- (2) The authorized employee shall refer to the equipment service manual and district procedures (pg. 12-17) to identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.
- (3) If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open switch, close valve, etc.).
- (4) Disconnect/Deactivate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).
- (5) Lockout the energy isolating device(s) with assigned individual lock(s).
- (6) Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and chemical, air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.
 - Relieve trapped pressure.
 - Release the tension on springs or block movement of spring driven parts.
 - Block or brace parts that could fall due to gravity.
 - Bleed lines and leave vent valves open.
 - Drain process piping systems and close valves to prevent flow of hazardous materials.
 - If a line must be blocked where there is no valve, use a blank flange.
 - Purge tanks and process lines.
 - Dissipate extreme cold or heat, wear protective clothing.
- (7) Ensure 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.

Caution: Return operating control(s) to neutral or “off” position after verifying the isolation of the equipment.

- (8) The machine or equipment is now locked out.

***Caution:** If maintenance will require the authorized employee to perform electrical repairs, maintenance, installation, or disconnections of electrical conductors prior to removing other equipment or machinery, the authorized employee **shall test for an energy-free state with an electrical testing device.**

*If the service or repair requires exposing live parts of electric equipment, a tag used without a lock shall be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock. **(e.g., removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device.)**

Authorized employees must check for electrical de-energization of electrical circuits and equipment by use of an electrical testing device.

C. Mechanical Restoring Equipment to Service Procedure.

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken.

- (1) Check the machine or equipment and the immediate area around the machine or equipment to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact (tools removed and guards intact).
- (2) Check the work area to ensure that all employees have been safely positioned or removed from the area.
- (3) Verify the controls are in neutral.
- (4) Remove the lockout or tagout devices and reenergize the machine or equipment.
Note: The removal of some forms of blocking may require re-energization of the machine before safe removal.
- (5) Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

D. Removal of Locks and Tags by Others

When the authorized employee who applied the lockout/tagout device is not available to remove it, that device may be removed under the direction of the Director of Facilities and Operations. The following procedure will be used.

- (1) Verification by the Director that the authorized employee who applied the device is not in the facility
- (2) Making all reasonable efforts to contact the authorized employee to inform him/her that the lockout/tagout will be removed.
- (3) Have an authorized employee inspect the equipment to assure that the re-energization of the equipment will not expose employees to a hazard or damage the equipment
- (4) Ensure that the authorized employee is informed that his/her lockout or tagout device has been removed before he/she resumes work at the workplace

E. Procedure Involving More Than One Person

In the preceding steps, if more than one individual is required to lockout and/or tagout equipment, each shall place his/her personal lockout and/or tagout device on the energy isolating device(s). When an energy isolating device cannot accept multiple lock or tags, a multiple lockout or tagout device (hasp) shall be used. If lockout is used, a single lock may be used to lockout the machine or equipment with the key being placed in a lockout box or cabinet which allows the use of multiple locks to

secure it. Each employee will then use his/her own lock to secure the box or cabinet. As each person no longer needs to maintain his/her lockout protection, that person will remove his/her lock from the box or cabinet. All authorized employees are also authorized for joint or team lockout.

F. BASIC RULES FOR USING LOCKOUT OR TAGOUT SYSTEM PROCEDURE:

All equipment shall be locked out or tagged out to protect against accidental or inadvertent operation when such operation could cause injury to personnel. **DO NOT ATTEMPT TO OPERATE ANY SWITCH, VALVE OR OTHER ENERGY ISOLATING DEVICE WHERE IT IS LOCKED OR TAGGED OUT.**

VIII. ELECTRICAL PROCEDURES

General. Safety-related work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, when work is performed near or on equipment or circuits which are or may be energized. The specific safety-related work practices shall be consistent with the nature and extent of the associated electrical hazards.

De-energized parts. Live parts to which an employee may be exposed shall be De-energized before the employee works on or near them, unless the employer can demonstrate that de-energizing introduces additional or increased hazards or is infeasible due to equipment design or operational limitations. Live parts that operate at less than 50 volts to ground need not be De-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs.

Where applicable, always review the equipment service manual. Machinery and equipment requiring detailed procedures can be found on pages 12-17 in the Appendix. Check this list before proceeding.

A. Equipment De-energizing Procedures 1910.333.

Safe procedures for de-energizing circuits and equipment shall be determined before circuits or equipment are de-energized.

- (1) The circuits and equipment to be worked on shall be disconnected from all electric energy sources. Control circuit devices, such as push buttons, selector switches, and interlocks, may not be used as the sole means for de-energizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures.
- (2) Stored electric energy which might endanger personnel shall be released. Capacitors shall be discharged and high capacitance elements shall be short-circuited and grounded, if the stored electric energy might endanger personnel.
Note: If the capacitors or associated equipment are handled in meeting this requirement, they shall be treated as energized.
- (3) Stored nonelectrical energy in devices that could reenergize electric circuit parts shall be blocked or relieved to the extent that the circuit parts could not be accidentally energized by the device.

B. Application of Locks and Tags. 1910.333

- (1) A lock and a tag shall be placed on each disconnecting means used to de-energize circuits and equipment on which work is to be performed. The lock shall be attached so as to prevent persons from operating the disconnecting means unless they resort to undue force or the use of tools.
- (2) Each tag shall contain a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag.

- (3) If a lock cannot be applied, or if the employer can demonstrate that tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock, a tag may be used without a lock.
- (4) A tag used without a lock shall be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock. Examples of additional safety measures include the removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device.
- (5) A lock **may be placed without a tag only under the following conditions:**
 - (a) Only one circuit or piece of equipment is de-energized, and
 - (b) The lockout period does not extend beyond the work shift, and
 - (c) Employees exposed to the hazards associated with reenergizing the circuit or equipment are familiar with this procedure.

C. Verification of De-energized Condition 1910.333.

The requirements of this paragraph shall be met before any circuits or equipment can be considered and worked as de-energized.

- (1) A qualified person shall operate the equipment operating controls or otherwise verify that the equipment cannot be restarted.
- (2) A qualified person shall use test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and equipment parts de-energized. The test shall also determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage backfeed even though specific parts of the circuit have been de-energized and presumed to be safe if the circuit to be tested is over 600 volts, nominal, the test equipment shall be checked for proper operation immediately before and immediately after this test.

D. Re-energizing Equipment.

These requirements shall be met, in the order given, before circuits or equipment are reenergized, even temporarily.

- (1) A qualified person shall verify to be sure all components worked on are complete. Also, shall conduct tests and visual inspections, as necessary, to verify that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed, so that the circuits and equipment can be safely energized.
- (2) Employees exposed to the hazards associated with reenergizing the circuit or equipment shall be warned to stay clear of circuits and equipment.
- (3) Verify control switches are place in the off position.
- (4) Each lock and tag shall be removed by the employee who applied it or under his or her direct supervision. However, if this employee is absent from the workplace the lock or tag may be removed under the direction of the Director of Facilities and Operations, Assistant Director of Facilities and Operations or the Director of Transportation.
 - (a) Verification by the Director that the employee who applied the lock or tag is not available at the workplace, and

- (b) The Director ensures that the employee is aware that the lock or tag has been removed before he or she resumes work at that workplace.
- (5) There shall be a visual determination that all employees are clear of the circuits and equipment.

IX. ENERGIZED EQUIPMENT

Work on energized equipment may not proceed without the Director's approval.

NOTE: Examples of work that may be performed on or near energized circuit parts because of infeasibility due to equipment design or operational limitations include testing of electric circuits that can only be performed with the circuit energized and work on circuits that form an integral part of a continuous industrial process in a chemical plant that would otherwise need to be completely shut down in order to permit work on one circuit or piece of equipment.

Energized Parts. If the exposed live parts are not De-energized (i.e., for reasons of increased or additional hazards or infeasibility), other safety related work practices shall be used to protect employees who may be exposed to the electrical hazards involved. Such work practices shall 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 that are used shall be suitable for the conditions under which the work is to be performed and for the voltage level of the exposed electric conductors or circuit parts.

NOTE: Only qualified persons may work on electric circuit parts or equipment that have not been de-energized under the procedures of VII above. Such persons shall be capable of working safely on energized circuits and shall be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

- A qualified person is familiar with the safety related work practices required in NFPA 70E
- Determines all electrical energy sources
- Identifies the degree and extent of the electrical hazards and required controls
- If non-electrical hazardous energies are present, coordinates with an authorized worker to ensure they are identified
- Conducts a field survey to verify the accuracy of the documentation and correct any discrepancies
- Reads all arc flash and other warning labels posted on the equipment
- Gathers all test meters and test voltage sources
- Dons the personal protective equipment (PPE) stipulated on the arc flash hazard label and any additional required PPE

X. OUTSIDE CONTRACTORS

Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this written program, and in accordance with 29 CFR 1910.147(f) (2) (i) and 29 CFR 1910.147 (f) (2) (ii)

- the Vestal Central School District and the outside contractor, shall inform each other of their respective lockout or tagout procedures.
- the Vestal Central School District on-site authorized employee(s) shall ensure that all district employees in the affected area understand and comply with restrictions and prohibitions of the Outside Contractor's Energy Control program and lockout/tagout procedures.
- use of the form in the Appendix.

XI. INSPECTIONS AND RECORDKEEPING

A. Periodic Inspections.

The Assistant Director of Facilities and Operations/Director of Transportation/Transportation Head Mechanic/or designee shall conduct periodic inspections, at least annually, to assure that the lockout/tagout procedures continue

to be implemented properly and to ensure that the employees are familiar with their responsibilities under those procedures. The district shall maintain documentation that such inspections are being performed. See form located in the Appendix.

The documentation shall include the following:

- (1) the machine or equipment on which the energy control procedure was used
- (2) the date on which the inspection was made
- (3) the employee(s) included in the inspection
- (4) the name and signature of the person performing the inspection

Lockout Inspection: When a periodic inspection is made for a lockout procedure, the inspection must include a review, (between the inspector and the authorized employee), of the authorized employee(s) responsibilities under the lockout procedure being inspected.

Tagout Inspections: When a tagout procedure is inspected, a review on the limitation of tags in addition to the authorized employee(s) responsibilities under the tagout procedure being inspected must be included.

Training: Training / retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processed that present a new hazard, or when there is a change in the energy control procedures.

Additional retraining shall also be conducted whenever a periodic inspection reveals, or whenever the employer has reason to believe, that there are deviations or inadequacies in the employee's knowledge or use of the energy control procedures.

The retraining shall re-establish employee proficiency and introduce new or revised control methods and procedures as necessary.

B. Recordkeeping.

The Facilities and Operations office will maintain all forms and training records in accordance with the Federal 29 CFR 1910.120 (Hazard communication Standard) and in accordance with 29 CFR 1910.147; and in accordance with 29 CFR 1910.333, which shall include but not be limited to:

1. Removal of Lock/Tag - authorized employee missing
2. Outside Contractor Notification
3. Lockout/Tagout Inspection Report
4. Training records including employee name and date
5. Periodic Inspection Form

APPENDIX

Specific LOCK OUT TAG OUT Procedures

Vestal Central School District
LOCKOUT TAGOUT PROCEDURES
HAZARDS OF EQUIPMENT OR MACHINES

EQUIPMENT	HAZARDS
Air Compressor	High pressure, Eye Injury, Hand Injury, always wear Eye Protection
Air Handler/Unit Ventilators	Electric Shock, Electrocutation, Burn Hazard, Carbon Monoxide
Ballasts, Receptacles, Switches, all other electrical equipment	Electric Shock, Electrocutation, Burn Hazard, Fall hazard, Chemical exposure, Eye Protection, if fluorescent bulb breaks follow Fluorescent lamp guidelines
Boiler, burners	High temperature, Burn Hazard , Chemical exposure, Carbon Monoxide Possible asbestos exposure
Circuit Breakers	Electric Shock, Electrocutation, Burn hazard
Handheld Electric or Pneumatic Tools	Hand Injury, Eye Injury, always wear eye protection
Hydraulic Lines	Pressure, Burn or Chemical Hazard
Kitchen Equipment: Mixers, Slicers, Grinders, Shredders, Dishwashers	Entanglement, Hand Injury
Kitchen Steam Equipment	High temperature, Burn Hazard
Main Water Lines & Bathroom Plumbing	Fall hazards, Slip Hazards, Blood Borne Pathogens, always wear eye protection
Mowers, Chain Saws, Small engines, Weed Eaters, Leaf and Snow Blowers, Hedge Trimmers	Fire/Explosion Hazard, Burn Hazard, Carbon Monoxide, Chemical Hazard, Eye Injury, Body Injury, always wear long pants, Goggles or Face Shield
Natural Gas Lines	Explosion/fire hazard , Carbon Monoxide
Pneumatic/Hydraulic Lifts	Pinch and Crush Hazard, Head & body injury, always wear eye protection
Pumps	Fall hazards, Slip Hazards, Chemical Hazard, Blood Borne Pathogens, always wear eye protection
Shop Equipment: grinders, saws, drills, sander, air: impact wrench, chisel	Eye injury, hand injury
Loaders, Vehicles and Snow Removal Equipment Repair	Chemical exposure, Explosion/fire hazard, Carbon Monoxide, Burn Hazard, Eye Injury, Body Injury, pinch and crush hazard. Always wear eye protection
Steam Equipment, Steam Systems	High Temperature, High Pressure, Burn Hazard

**LOCKOUT TAGOUT PROCEDURES
VESTAL CENTRAL SCHOOL DISTRICT**

NOTE: Any equipment or machine that has electric/battery service presents an Electric Shock, Electrocutation or Burn Hazard

EQUIPMENT	LOCATION	PROCEDURE	OTHER HAZARDS	SURVEY BY
Ballasts, Outlets, switches and all other electrical equipment	Senior High African Road Vestal Hills Glenwood Clayton Avenue Tioga Hills Central Junior Bus Garage Maintenance Bldg.	LO/TO electrical panel and circuit breaker, or LOTO at the switch, verify lack of voltage with a meter	Fall hazard, Slip Hazard. ALWAYS wear eye protection, if fluorescent bulb breaks follow Fluorescent lamp Guidelines. Use fiberglass ladder	JG & MC
Shop Equipment	Senior High African Road Bus Garage Maintenance Bldg.	LO/TO equipment, verify lack of voltage with a meter	Eye Injury, Hand Injury	JG & MC
Boilers	Senior High African Road Vestal Hills Glenwood Clayton Avenue Tioga Hills Central Junior Maintenance Bldg.	LO/TO main disconnect, shut off supply valves and pumps, Bolt on blank cover, bleed the pressure from system, verify lack of voltage with a meter, allow system to cool	Confined Space, High Temperature, possible Asbestos Containing Material, Burn Hazard	JG & MC
Generator	Senior High	Allow unit to cool, remove the positive battery cable, LO/TO at the panel	Burn hazard, Carbon Monoxide, Chemical Exposure, Fire-explosion Hazard	JG & MC
Temperature Control Lines	Central Junior	LO/TO, bleed off air pressure	none	JG & MC
Hydraulic Lines	Maintenance Bldg. Bus Garage		Pressure, burn or chemical hazard	JG & MC
Air Handlers	Senior High African Road Vestal Hills Glenwood Clayton Avenue Tioga Hills Central Junior Bus Garage Maintenance Bldg.	LO/TO at the unit or in close proximity, verify lack of voltage with a meter	Permit Required Confined Space at CJ. Non Permit Confined Space at other buildings	JG & MC
Air Compressors	Senior High African Road Clayton Ave Central Junior Bus Garage Maintenance Bldg.	LO/TO main disconnect, bleed off air, verify lack of voltage with a meter	High pressure, Eye Injury, ALWAYS wear Eye Protection, hand injury	JG & MC
Steam Systems	Central Junior Bus Garage	LO/TO main shut off valve, shut down boiler, bleed system, allow system to cool	High Temperature, High Pressure, Burn Hazard	JG & MC
Natural Gas Lines	Senior High African Road Vestal Hills Glenwood Clayton Avenue Tioga Hills Central Junior Bus Garage Maintenance Bldg.	LO/TO of gas valve closest to the equipment, check for leakage with the leak detector monitor, LO/TO the main valve, if leaks are detected, bleed system Bolt on blank cover as needed,	Explosion/fire hazard, Carbon Monoxide	JG & MC

**LOCKOUT TAGOUT PROCEDURES
VESTAL CENTRAL SCHOOL DISTRICT**

NOTE: Any equipment or machine that has electric/battery service presents an Electric Shock, Electrocutation or Burn Hazard

EQUIPMENT	LOCATION	PROCEDURE	OTHER HAZARDS	SURVEY BY
Lifts	Senior High African Road Vestal Hills Glenwood Clayton Avenue Tioga Hills Central Junior Bus Garage Maintenance Bldg.	Review Safety Check List, LOTO, Bleed off pressure	High Pressure, Crush Hazard, wear head protection while working overhead, wear eye protection	JG & MC
Water Lines & Bathroom Plumbing	Senior High African Road Vestal Hills Glenwood Clayton Avenue Tioga Hills Central Junior Bus Garage Maintenance Bldg.	LO/TO valve check for leaks, go back to the next valve and LO/TO if a leak is found, drain water	Fall hazards, Slip Hazards, Blood Borne Pathogens, ALWAYS wear eye protection & gloves	JG & MC
Pumps	Senior High African Road Vestal Hills Glenwood Clayton Avenue Tioga Hills Central Junior Bus Garage Maintenance Bldg.	LO/TO switch or circuit breaker AND follow water lines procedure, verify lack of voltage with a meter	Fall hazards, Slip Hazards, Chemical Hazard, Blood Borne Pathogens, ALWAYS wear eye protection & gloves	JG & MC
Kitchen Equipment: Mixers, Slicers, Grinders, Shredders, Dishwashers	Senior High African Road Vestal Hills Glenwood Clayton Avenue Tioga Hills	LO/TO, verify lack of voltage with a meter. Plug end enclosed with lock & tag	Entanglement, Hand Injury	JG & MC
Kitchen Steam Equipment	Senior High African Road Vestal Hills Glenwood Clayton Ave. Tioga Hills	LOTO electric/gas line, release steam pressure, allow equipment to cool, verify lack of voltage with a meter	High temperature, Burn Hazard	JG & MC
Mowers, Chain Saws, Weed Eaters, Leaf and Snow Blowers, Hedge Trimmers	Senior High African Road Vestal Hills Glenwood Clayton Ave. Tioga Hills Maintenance Bldg.	Remove Safety Key(where applicable), Allow engine to cool, Remove the spark plug wire, Remove all fuel if system is being worked on or may be tipped, Store fluids (fuel, oil etc.) in approved containers only	Fire/Explosion Hazard, Burn Hazard, Chemical Hazard, Eye Injury, Body Injury, ALWAYS wear long pants, Goggles or Face Shield	JG & MC
Hand Held Electric or Pneumatic Tools	Senior High African Road Vestal Hills Glenwood Clayton Avenue Tioga Hills Central Junior Bus Garage Maintenance Bldg.	LO/TO, UNLESS under the sole control of the individual performing the maintenance, then disconnect from the power source, if you walk away use Plug end enclosed with lock & tag	Hand Injury, Eye Injury, ALWAYS wear eye protection	JG, KS & MC

**LOCKOUT TAGOUT PROCEDURES
VESTAL CENTRAL SCHOOL DISTRICT**

NOTE: Any equipment or machine that has electric/battery service presents an Electric Shock, Electrocutation or Burn Hazard

EQUIPMENT	LOCATION	PROCEDURE	OTHER HAZARDS	SURVEY BY
Overhead Lift/Crane	Bus Garage Maintenance Bldg.	Turn off circuit breaker and LO/TO panel box, verify lack of voltage with a meter	Head Injury, Eye Injury, Crush and Pinch Hazard, ALWAYS wear eye protection and hard hat	KS, SD & MC
Fuel Dispenser Filter Replacement	Bus Garage	Turn off circuit breaker and LO/TO panel box, depressurize fuel lines, verify lack of voltage with a meter	Fire/Explosion Hazard, Chemical Hazard, ALWAYS wear gloves & eye protection	KS & MC
Pneumatic Lifts	Bus Garage	If needed- support Lift, If device doesn't have its own support, install properly rated safety supports at the manufacturer's specified locations, shut off the supply air valve, bleed lines, LO/TO air connection, verify lack of voltage with a meter	Pinch and Crush Hazard, Head & body injury, ALWAYS wear eye protection, wear head protection while working overhead	SD, KS & MC
Hydraulic Lifts	Bus Garage SH Loading Dock	If needed- support lift, If device doesn't have its own support, install properly rated safety supports at the manufacturer's specified locations, Turn off circuit breaker, LO panel box, Tagout operating switch, (or if applicable unplug and LOTO plug end) Bleed Lines, verify lack of voltage with a meter	Pinch and Crush Hazard, ALWAYS wear eye protection	KS, SD & MC

Vestal Central School District
LOCKOUT TAGOUT PROCEDURES
MAINTENANCE DEPARTMENT

TRUCKS, MOWERS, IMPLIMENTS

General Procedures:

Keys will be removed
Install steering wheel shroud or “Out of Service” sign mounted in a visible location
Wheels will be blocked
Allow equipment to cool down
Store fluids (fuel, oil, etc.) in approved containers

Specific Procedures:

Working Under Vehicle:

- When working under the vehicle with the wheels off or on jacks, the vehicle will be cribbed.

If lifted by floor jacks or on ramps, engage parking brake

Block wheels on a level solid surface

Use an approved jack at the specified lifting points

Install properly rated safety jacks

Let the weight from the lifting jack down onto the safety supports

Be sure the unit is stable

Hydraulic Lines:

- When working on hydraulic lines or cylinders, pressure will be released before fittings are loosened.

Compressed Air Systems:

- When working on air lines, pressure will be released before fittings are loosened.

Electrical System:

- When working with electrical circuits, de-energize by disconnecting the battery terminal
- Test to assure that complete de-energization is accomplished- verify lack of voltage with a meter.

Dump Box:

- When working under the elevated dump box, the safety legs will be in place or the box will be cribbed.

Plow Blade

When working under or around a plow blade it will be blocked or in the down position

FRONT END LOADER, TRACTOR, TRAILER

General Procedures:

- Keyes will be removed
- Install steering wheel shroud or “Out of Service” sign mounted in a visible location
- Wheels will be blocked
- Articulating safety arm will be installed
- Allow equipment to cool down
- Store fluids (fuel, oil, etc.) in approved containers

Specific Procedures:

Working Under Vehicle:

- When working under the vehicle with the wheels off or on jacks, the vehicle will be cribbed.

If lifted by floor jacks or on ramps, engage parking brake

Block wheels on a level solid surface

Use an approved jack at the specified lifting points

Install properly rated safety jacks

Let the weight from the lifting jack down onto the safety supports

Be sure the unit is stable

Hydraulic Lines:

- When working on hydraulic lines or cylinders, pressure will be released before fittings are loosened.

Electrical System:

- When working with electrical circuits, de-energize by disconnecting the battery terminal
- Test to assure that complete de-energization is accomplished- verify lack of voltage with a meter.

Bucket, Implement:

- When working on the vehicle with the bucket or implement in the up position, the cylinders will be locked out or the item will be cribbed.

Servicing Mechanic:

- When leaving vehicle, take the keys with you

Vestal Central School District
LOCKOUT TAGOUT PROCEDURES
TRANSPORTATION DEPARTMENT

TRUCKS/BUSSES

General Procedures:

- Keys will be removed
 - Install steering wheel shroud or “Out of Service” sign mounted in a visible location
- Wheels will be blocked
Allow equipment to cool down
Store fluids (fuel, oil, etc.) in approved containers

Specific Procedures:

Working Under Vehicle:

- When working under the vehicle with the wheels off or on jacks, the vehicle will be cribbed.
- If lifted by floor jacks or on ramps, engage parking brake
Block wheels on a level solid surface
Use an approved jack at the specified lifting points
Install properly rated safety jacks
Let the weight from the lifting jack down onto the safety supports
Be sure the unit is stable

Hydraulic Lines:

- When working on hydraulic lines or cylinders, pressure will be released before fittings are loosened.

Compressed Air Systems:

- When working on air lines, pressure will be released before fittings are loosened.

Electrical System:

- When working with electrical circuits, de-energize by disconnecting the battery terminal
- Test to assure that complete de-energization is accomplished- verify lack of voltage with a meter.

Dump Box:

- When working under the elevated dump box, the safety legs will be in place or the box will be cribbed.

Plow Wings/ Wheelchair Lifts:

When working under or around plow wings or wheelchair lifts, they will be blocked or in the down position.

Servicing Mechanic:

- When leaving vehicle, remove the keys from the ignition and take with you

FRONT END LOADER:

General Procedures:

- Keys will be removed
Install steering wheel shroud or “Out of Service” sign mounted in a visible location
- Wheels will be blocked
 - Articulating safety Arm will be installed
- Allow equipment to cool down
Store fluids (fuel, oil, etc.) in approved containers

Specific Procedures:

Hydraulic Lines:

- When working on hydraulic lines or cylinders, pressure will be released before fittings are loosened.

Working Under Vehicle:

- When working under the vehicle with the wheels off or on jacks, the vehicle will be cribbed.
- If lifted by floor jacks or on ramps, engage parking brake
Block wheels on a level solid surface
Use an approved jack at the specified lifting points
Install properly rated safety jacks
Let the weight from the lifting jack down onto the safety supports
Be sure the unit is stable

Electrical System:

- When working with electrical circuits, de-energize by disconnecting the battery terminal
- Test to assure that complete de-energization is accomplished- verify lack of voltage with a meter.

Bucket, Implements:

When working on the vehicle with the bucket or implement in the up position, the cylinders will be locked out or the item will be cribbed.

Servicing Mechanic:

- When leaving vehicle, take the keys with you

**Vestal Central School District
LOCKOUT TAGOUT PROCEDURES
Transportation Department**



TAGOUT DEVICE



TAGOUT DEVICE



TAGOUT DEVICE

OSHA defines LOCKOUT TAGOUT as the placement of a Lockout/Tagout device (see above), in accordance with an established procedure, to indicate and ensure that the vehicle/equipment being controlled cannot be operated until the lockout/tagout device is removed. In other words, when a mechanic is servicing or maintaining a vehicle, he will place a shroud and or a tag on the steering wheel, the keys will be in his control and that vehicle CAN NOT be driven by anyone else when the devices similar to the pictures above are in place on/near a vehicle's steering wheel.

Bus Mechanics are AUTHORIZED EMPLOYEES meaning that they are a person whose job requires them to service or maintain a vehicle while using OSHA's lockout tagout procedures.

Bus Drivers are AFFECTED EMPLOYEES meaning that they are a person whose job requires them to NOT operate vehicles that are being serviced and maintained while under LOCKOUT TAGOUT procedures.

As Affected employees, **Bus drivers must never do** the following;

- NEVER operate a vehicle that has a shroud or a tag (similar to above) still in place on the steering wheel
- NEVER remove vehicle keys from the Out of Service Hanger located in the Head Bus Mechanic's Office
- NEVER remove vehicle keys from the Head Mechanic's Desk
- Never operate a vehicle that still has a DEFECT REPORT without a Mechanic's corrective action and signature present

ONLY specific Bus Mechanics (AUTHORIZED EMPLOYEES) who locked out/tagged out a particular vehicle may put it back in service. NOTE: In certain special situations, a supervisor may do so, but a Bus Driver may NEVER DO SO!



**Vestal Central School District
LOCKOUT TAGOUT PROCEDURES**

TRANSPORTATION LIFT USE

ADJUSTABLE TWIN POST LIFTS WITH AUTO SAFETY LOCKS

- Position vehicle to centerline of the lift pit area.
- Position 1 axle over the fixed post. The vehicle should be in neutral, no brake applied.
- Raise the fixed post to contact.
- Now position the moveable post to centerline of the other axel. Raise lift to contact.
- Before raising the vehicle any further than necessary, check contact points, if they are not right, lower and reposition as necessary.

If all contact points are solid, raise the vehicle to the necessary work height. Listen for click of locks while raising.

If more clearance is needed to support the vehicle, while it's being raised

- Position the support stands fore and aft of the lift post to be lowered.
- Position stands, lower vehicle to contact all stands at once.
- Lower the post from interference area. Perform necessary work and re-raise the post to support vehicle as soon as possible.
- Raise vehicle

When finished, remove stands and lower vehicle.

USE OF END LIFTS

- Position the vehicle to provide necessary clearance all around the vehicle.
- Set parking the brake or put the transmission in park.
- Position the end lift to contact the sturdy or solid frame areas.
- Raise the lift to contact points. Check and inspect contact areas.
- If all looks good- release the parking brake or put the transmission to the neutral position.
- Position safety stands before performing any work on the vehicle.

To lower:

Remove safety stands and raise the End Lift off or safety lock and then lower the vehicle to just touching the ground and stop.

Re-apply the parking brake and put the transmission into park. Now completely lower the End Lift to remove.

Vestal Central School District
CONTROL OF HAZARDOUS ENERGY SOURCES
LOCKOUT/TAGOUT PROGRAM

DETAILED PROCEDURE CREATION

EQUIPMENT TYPE _____

LOCATION _____

TYPES and MAGNITUDES of ENERGY:

TYPES/LOCATIONS OF ISOLATING MEANS:

TYPES OF STORED ENERGY/METHODS TO DISSIPATE:

METHOD OF ENERGY CONTROL: (e.g., lock, tag, valve, block, blind)

SPECIAL EQUIPMENT: (e.g., circuit tester, air monitor, PPE)

PERSON WHO CONDUCTED SURVEY: _____

DATE: _____

Note: Reference equipment service manual when available.

Vestal Central School District

**CONTROL OF HAZARDOUS ENERGY SOURCES
LOCKOUT/TAGOUT**

EMERGENCY LOCKOUT/TAGOUT DEVICE REMOVAL

If an authorized employee, who applied any lockout or tagout device, is not able to remove it, then his/her device may be removed under the direction of the Director of Facilities and Operations by an authorized designee, provided that all other requirements of 29 CFR 1910.147(e) (3) have been met.

Authorized employee who applied the energy control device

_____ Date: ____/____/____

Authorized person who removed the energy control device

_____ Date: ____/____/____

Verification of efforts to locate, at the facility, the authorized employee who applied the energy device.

Verification of efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed.

Authorized person who removed the device

Signature: _____ Date: ____/____/____

Verification that the authorized employee was informed that his/her lockout or tagout device has been removed.

Signature: _____ Date: ____/____/____

When completed, please send this form to the office of the Director Facilities and Operations.

**Vestal Central School District
CONTROL OF HAZARDOUS ENERGY SOURCES
LOCKOUT/TAGOUT**

Periodic Inspections:

The Employer shall conduct a periodic inspection of the energy control program at least annually to ensure that the program and the requirements of the standard are being followed.

The periodic inspection shall be performed by an authorized employee (supervisor) other than the one(s) utilizing the energy control program being inspected.

The periodic inspection shall be designed to correct any deviations or inadequacies observed.

Where lockout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized employee, of that employee=s responsibilities under the energy control program being inspected.

Date of inspection:_____

Supervising employee

Inspecting program:_____

Authorized employee

Implementing procedure:_____

Equipment/machine:_____

Notes/recommendations:

**Vestal Central School District
CONTROL OF HAZARDOUS ENERGY SOURCES
LOCKOUT/TAGOUT**

Employee Training and/or Re-training Record

Training and/or Re-training shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures.

Additional re-training shall be conducted whenever a periodic inspection reveals, or whenever the employer has reason to believe that there are deviations or inadequacies in the employee's knowledge or use of the energy control procedures.

The re-training shall re-establish employee proficiency and introduce new or revised control methods and procedures, as necessary.

Upon completion, the employee shall sign the following acknowledgment:

I have received training in my Employer's Lockout/Tag-out Program, and this Employer's program has been explained to me, that I have had an opportunity to ask questions, that I thoroughly understand these guides and the use of materials and have been given a copy of this form.

Date: _____

Authorized Employee

Affected Employee

Name: _____

(print)

Signature: _____

**Vestal Central School District
CONTROL OF HAZARDOUS ENERGY SOURCES
LOCKOUT/TAGOUT**

OUTSIDE CONTRACTOR NOTIFICATION

This form must be completed whenever outside servicing personnel are to be engaged in activities covered, by the scope and application of the Vestal Central School District written Lockout/Tagout program and in accordance with Federal 129 CFR 1910.147(f)(2)(i) and 1910.147(f)(2)(ii).

As an outside contractor, I have been informed of lockout/tagout procedures as written in the District's Energy Control program. I will assure that all of my employees, working in the affected area, understand and comply with restrictions and prohibitions of the Energy Control program and lockout/tagout procedures.

My reason for being in the building _____

Name (please print) _____ Date ___/___/___

Signature _____

Utility/Company _____

On behalf of the Vestal Central School District, I have been informed of lockout/tagout procedures as written in the above contractor's Energy Control program. I will assure that all Vestal Central School District employees working in the affected area understand and comply with restrictions and prohibitions of the Contractor's Energy Control program and lockout/tagout procedures.

Name (please print) _____ Date ___/___/___

Signature _____ Building _____

Area Affected _____

When completed, please send this form to the office of the Director of Facilities and Operations

OSHA 29 1910. 147

The control of hazardous energy (Lockout/tagout).

(a) Scope, application and purpose--(1) Scope.

(a)(1)(i) This standard covers the servicing and maintenance of machines and equipment in which the unexpected energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. This standard establishes minimum performance requirements for the control of such hazardous energy.

(a)(1)(ii) This standard does not cover the following:

(a)(1)(ii)(A) Construction, agriculture and maritime employment;

(a)(1)(ii)(B) Installations under the exclusive control of electric utilities for the purpose of power generation, transmission and distribution, including related equipment for communication or metering; and

(a)(1)(ii)(C) Exposure to electrical hazards from work on, near, or with conductors or equipment in electric utilization installations, which is covered by Subpart S of this part; and

(a)(1)(ii)(D) Oil and gas well drilling and servicing.

(a)(2) Application. (i) This standard applies to the control of energy during servicing and/or maintenance of machines and equipment.

(a)(2)(ii) Normal production operations are not covered by this standard (See Subpart O of this Part). Servicing and/or maintenance which takes place during normal production operations is covered by this standard only if:

(a)(2)(ii)(A) An employee is required to remove or bypass a guard or other safety device; or

(a)(2)(ii)(B) An employee is required to place any part of his or her body into an area on a machine or piece of equipment where work is actually performed upon the material being processed (point of operation) or where an associated danger zone exists during a machine operating cycle.

Note: Exception to paragraph (a)(2)(ii): Minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations, are not covered by this standard if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection (See Subpart O of this Part).

(a)(2)(iii) This standard does not apply to the following:

(a)(2)(iii)(A) Work on cord and plug connected electric equipment for which exposure to the hazards of unexpected energization or start up of the equipment is controlled by the unplugging of the equipment from the energy source and by the plug being under the exclusive control of the employee performing the servicing or maintenance.

(a)(2)(iii)(B) Hot tap operations involving transmission and distribution systems for substances such as gas, steam, water or petroleum products when they are performed on pressurized pipelines, provided that the employer demonstrates that (1) continuity of service is essential; (2) shutdown of the system is impractical; and (3) documented procedures are followed, and special equipment is used which will provide proven effective protection for employees.

(a)(3) Purpose. (i) This section requires employers to establish a program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energization, startup or release of stored energy in order to prevent injury to employees.

(a)(3)(ii) When other standards in this part require the use of lockout or tagout, they shall be used and supplemented by the procedural and training requirements of this section.

(b) Definitions applicable to this section.

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

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

Capable of being locked out. An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or if 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 device. A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following:

A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy.

Push buttons, selector switch, and other control devices are not energy isolating devices.

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

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

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

Lockout device. A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in a safe position and prevent the

energizing of a machine or equipment. Included are blank flanges and bolted slip blinds. Normal production operations. The utilization of a machine or equipment to perform its intended production function.

Service and/or maintenance. Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

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

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

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

(c) General--(l) Energy control program. The employer shall establish a program consisting of an energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, start up or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source, and rendered inoperative.

(c)(2) Lockout/tagout. (i) If an energy isolating device is not capable of being locked out, the employer's energy control program under paragraph (c)(1) of this section shall utilize a tagout system.

(c)(2)(ii) If an energy isolating device is capable of being locked out, the employer's energy control program under paragraph (c)(1) of this section shall utilize lockout, unless the employer can demonstrate that the utilization of a tagout system will provide full employee protection as set forth in paragraph (c)(3) of this section.

(c)(2)(iii) After January 2, 1990, whenever replacement or major repair, renovation or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machines or equipment shall be designed to accept a lockout device.

(c)(3) Full employee protection. (i) When a tagout device is used on an energy isolating device which is capable of being locked out, the tagout device shall be attached at the same location that the lockout device would have been attached, and the employer shall demonstrate that the tagout program will provide a level of safety equivalent to that obtained by using a lockout program.

(c) (3) (ii) In demonstrating that a level of safety is achieved in the tagout program which is equivalent to the level of safety obtained by using a lockout program, the employer shall demonstrate full compliance with all tagout-related provisions of this standard together with such additional elements as are necessary to provide the

equivalent safety available from the use of a lockout device. Additional means to be considered as part of the demonstration of full employee protection shall include the implementation of additional safety measures such as the removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, or the removal of a valve handle to reduce the likelihood of inadvertent energization.

(c)(4) Energy control procedure. (i) Procedures shall be developed, documented and utilized for the control of potentially hazardous energy when employees are engaged in the activities covered by this section.

Note: Exception: The employer need not document the required procedure for a particular machine or equipment, when all of the following elements exist: (1) The machine or equipment has no potential for stored or residual energy or reaccumulation 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 locked-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 employer, in utilizing this exception, has had no accidents involving the unexpected activation or re-energization of the machine or equipment during servicing or maintenance.

(c)(4)(ii) The procedures shall clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be utilized for the control of hazardous energy, and the means to enforce compliance including, but not limited to, the following:

(c)(4)(ii)(A) A specific statement of the intended use of the procedure;

(c)(4)(ii)(B) Specific procedural steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy;

(c)(4)(ii)(C) Specific procedural steps for the placement, removal and transfer of lockout devices or tagout devices and the responsibility for them; and

(c)(4)(ii)(D) Specific requirements for testing a machine or equipment to determine and verify the effectiveness of lockout devices, tagout devices, and other energy control measures.

(c)(5) Protective materials and hardware. (i) Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware shall be provided by the employer for isolating, securing or blocking of machines or equipment from energy sources. (c)(5)(ii) Lockout devices and tagout devices shall be singularly identified; shall be the only devices(s) used for controlling energy; shall not be used for other purposes; and shall meet the following requirements:

(c)(5)(iii)(A) Durable. (1) Lockout and tagout devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.

(c)(5)(ii)(A)(2) 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.

(c)(5)(ii)(A)(3) Rags shall not deteriorate when used in corrosive environments such as areas where acid and alkali chemicals are handled and stored.

(c)(5)(ii)(B) Standardized. Lockout and tagout 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.

(c)(5)(ii)(C) Substantial (1) Lockout devices. Lockout 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.

(c)(5)(ii)(C)(2) Tagout devices. Tagout devices, including and their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment means 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.

(c)(5)(ii)(D) Identifiable. Lockout devices and tagout devices shall indicate the identity of the employee applying the device(s).

(c)(5)(iii) 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.

(c)(6) Periodic inspection. (i) The employer shall conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are being followed.

(c)(6)(i)(A) The periodic inspection shall be performed by an authorized employee other than the ones(s) utilizing the energy control procedure being inspected.

(c)(6)(i)(B) The periodic inspection shall be conducted to correct any deviations or inadequacies identified.

(c)(6)(i)(C) Where lockout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected.

(c)(6)(i)(D) Where tagout is used for energy control, the periodic inspection shall include a review between the inspector and each authorized and affected employee, of that employee's responsibilities under the energy control procedure being inspected, and the elements set forth in paragraph (c)(7)(ii) of this section.

(c)(6)(ii) The employer shall certify that the periodic inspections have been performed. The certification shall identify the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection.

(c)(7) Training and communication. (I) The employer shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy

controls are required by employees. The training shall include the following:

(c)(7)(i)(A) Each authorized employee 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.

(c)(7)(i)(B) Each affected employee shall be instructed in the purpose and use of the energy control procedure.

(c)(7)(i)(C) 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.

(c)(7)(ii) When tagout systems are used, employees shall also be trained in the following limitations of tags:

(c)(7)(ii)(A) Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock.

(c)(7)(ii)(B) When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.

(c)(7)(ii)(C) Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective.

(c)(7)(ii)(D) Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.

(c)(7)(ii)(E) Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.

(c)(7)(ii)(F) Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.

(c)(7)(iii) Employee retraining.

(c)(7)(iii)(A) Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures.

(c)(7)(iii)(S) Additional retraining shall also be conducted whenever a periodic inspection under paragraph (c)(6) of this section reveals, or whenever the employer has reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures.

(c)(7)(iii)(C) The retraining shall reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

(c)(7)(iv) The employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

(c)(8) Energy isolation. Lockout or tagout shall be performed only by the authorized employees who are performing the servicing or maintenance.

(c)(9) Notification of employees. Affected employees shall be notified by the employer or authorized employee of the application and removal of lockout devices or tagout devices. Notification shall be given before the controls are applied, and after they are removed from the machine or equipment.

(d) Application of control. The established procedure for the application of energy control (the lockout or tagout procedures) shall cover the following elements and actions and shall be done in the following sequence:

(d)(1) Preparation for shutdown. Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

(d)(2) Machine or equipment shutdown. The machine or equipment shall be turned off or shut down using the procedures established for the machine or equipment. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of equipment stoppage.

(d)(3) Machine or equipment isolation. All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).

(d)(4) Lockout or tagout device application. (i) Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees.

(d)(4)(ii) Lockout devices, where used, shall be affixed in a manner that will hold the energy isolating devices in a "safe" or "off" position.

(d)(4)(iii) Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited.

(d)(4)(iii)(A) Where tagout devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.

(d)(4)(iii)(B) Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device in a position that will be immediately obvious to anyone attempting to operate the device.

(d)(5) Stored energy. (i) Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe.

(d)(5)(ii) If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

(d)(6) Verification of isolation. Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and de-energization of the machine or equipment have been accomplished.

(e) Release from lockout or tagout. Before lockout or tagout devices are removed and energy is restored to the machine or

equipment, procedures shall be followed and actions taken by the authorized employee(s) to ensure the following:

(e)(1) The machine or equipment. The work area shall be inspected to ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.

(e)(2) Employees. (i) The work area shall be checked to ensure that all employees have been safely positioned or removed.

(e)(2)(ii) Before lockout or tagout devices are removed and before machines or equipment are energized, affected employees shall be notified that the lockout or tagout devices have been removed.

(e)(2)(iii) After lockout or tagout devices have been removed and before a machine or equipment is started, affected employees shall be notified that the lockout or tagout device(s) have been removed.

(e)(3) Lockout or tagout devices removal. Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied the device. Exception to paragraph (e)(3): When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under the direction of the employer, provided that specific procedures and training for such removal have been developed, documented and incorporated into the employer's energy control program. The employer shall demonstrate that the specific procedure provides equivalent safety to the removal of the device by the authorized employee who applied it. The specific procedure shall include at least the following elements:

(e)(3)(i) Verification by the employer that the authorized employee who applied the device is not at the facility;

(e)(3)(ii) Making all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and

(e)(3)(iii) Ensuring that the authorized employee has this knowledge before he/she resumes work at that facility.

(f) Additional requirements. (1) Testing or positioning of machines, equipment or components thereof. In situations in which lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment or component thereof, the following sequence of actions shall be followed:

(f)(1)(i) Clear the machine or equipment of tools and materials in accordance with paragraph (e)(1) of this section;

(f)(1)(ii) Remove employees from the machine or equipment area in accordance with paragraph (e)(2) of this section;

(f)(1)(iii) Remove the lockout or tagout devices as specified in paragraph (e)(3) of this section;

(f)(1)(iv) Energize and proceed with testing or positioning;

(f)(1)(v) De-energize all systems and reapply energy control measures in accordance with paragraph (d) of this section to continue the servicing and/or maintenance.

(f)(2) Outside personnel (contractors, etc.). (i) Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this standard, the on-site employer and the outside employer shall inform each other of their respective lockout or tagout procedures.

(f)(2)(ii) The on-site employer shall ensure that his/her employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program.

(f)(3) Group lockout or tagout. (i) When servicing and/or maintenance is performed by a crew, craft, department or other group, they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.

(f)(3)(ii) Group lockout or tagout devices shall be used in accordance with the procedures required by paragraph (c)(4) of this section including, but not necessarily limited to, the following specific requirements:

(f)(3)(ii) (A) Primary responsibility is vested in an authorized employees working under the protection of a group lockout or tagout device (such as an operations lock);

(f)(3)(ii)(B) Provision for the authorized employee to ascertain the exposure status of individual group members with regard to the lockout or tagout of the machine or equipment and

(f)(3)(ii)(C) When more than one crew, craft, department, etc., is involved, assignment of overall job-associated lockout or tagout control responsibility to an authorized employee designated to coordinate affected work forces and ensure continuity of protection; and

(f)(3)(ii)(D) Each authorized employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work, and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

(f)(4) Shift or personnel changes. Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection, including provision for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees, to minimize exposure to hazards from the unexpected energization or startup of the machine or equipment, or the release of stored energy.

(The information collection requirements contained in this section are approved by the Office of Management and Budget (OMB) and listed under OMB control number 1218-0150.)

Note: The following Appendix to §1910.147 services as a non-mandatory guideline to assist employers and employees in complying with the requirements of this section, as well as to provide other helpful information. Nothing in the Appendix adds to or detracts from any of the requirements of this section.

OSHA 29 1910.147A

Appendix Atypical Minimal Lockout Procedure

General

The following simple lockout procedure is provided to assist employers in developing their procedures so they meet the requirements of this standard. When the energy isolating devices are not lockable, tagout may be used, provided the employer complies with the provisions of the standard which require additional training and more rigorous periodic inspections. When tagout is used and the energy isolating devices are lockable, the employer must provide full employee protection (see paragraph (c) (3)) and additional training and more rigorous periodic inspections are required. For more

complex systems, more comprehensive procedures may need to be developed, documented and utilized.

Lockout Procedure

Lockout procedure for

(Name of Company for single procedure or identification of equipment if multiple procedures are used)

Purpose

This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance With This Program

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize or use that machine or equipment.

Type of compliance enforcement to be taken for violation of the above.

Sequence of Lockout

- (1) Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance. Name(s)/Job Title(s) of affected employees and how to notify.
- (2) The authorized employee shall refer to the company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy. Type(s) and magnitude(s) of energy, its hazard(s) and the methods to control the energy.
- (3) If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open switch, close valve, etc.). Type(s) and location(s) of machine or equipment operating controls.
- (4) Deactivate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s). Type(s) and location(s) of energy isolating devices.
- (5) Lock out the energy isolating device(s) with assigned individual lock(s).
- (6) Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc. Type(s) of stored energy methods to dissipate or restrain.
- (7) Ensure 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.

Caution: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment. Method of verifying the isolation of the equipment.

(8) The machine or equipment is now locked out. Restoring Equipment to Service. When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken.

(1) Check the machine or equipment and the immediate area around the machine or equipment to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.

(2) Check the work area to ensure that all employees have been safely positioned or removed from the area.

(3) Verify that the controls are in neutral.

(4) Remove the lockout devices and reenergize the machine or equipment.

Note: The removal of some forms of blocking may require re-energization of the machine before safe removal.

(5) Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

29 1910.333 Selection and use of work practices.

(a) General. Safety-related work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, when work is performed near or an equipment or circuits which are or may be energized. The specific safety-related work practices shall be consistent with the nature and extent of the associated electrical hazards.

(a)(1) De-energized parts. Live parts to which an employee may be exposed shall be de-energized before the employee works on or near them, unless the employer can demonstrate that de-energizing introduces additional or increased hazards or is infeasible due to equipment design or operational limitations. Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electrical arcs.

Note 1: Examples of increased or additional hazards include interruption of life support equipment, deactivation of emergency alarm systems, shutdown of hazardous location ventilation equipment, or removal of illumination for an area.

Note 2: Examples of work that may be performed on or near energized circuit parts because of infeasibility due to equipment design or operational limitations include testing of electric circuits that can only be performed with the circuit energized and work on circuits that form an integral part of a continuous industrial process in a chemical plant that would otherwise need to be completely shut down in order to permit work on one circuit or piece of equipment.

Note 3. Work on or near de-energized parts is covered by paragraph (b) of this section.

(a)(2) Energized parts. If the exposed live parts are not de-energized (e.g., for reasons of increased or additional hazards or infeasibility), other safety-related work practices shall be used to protect employees who may be exposed to the electrical hazards involved. Such work practices shall 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 that are used shall be suitable for the conditions under which the work is to be performed and for the voltage level of the exposed electric conductors or circuit parts. Specific work practice requirements are detailed in paragraph (c) of this section.

(b) Working on or near exposed de-energized parts. (1) Application. This paragraph applies to work on exposed de-

energized parts or near enough to them to expose the employee to any electrical hazard they present. Conductors and parts of electric equipment that have been de-energized but have not been locked out or tagged in accordance with paragraph (b) of this section shall be treated as energized parts, and paragraph (c) of this section applies to work on or near them.

(b)(2) Lockout and tagging. While any employee is exposed to contact with parts of fixed electric equipment or circuits which have been de-energized, locked out or tagged or both in accordance with the requirements of this paragraph. The requirements shall be followed in the order in which they are presented (i.e., paragraph (b)(2)(i) first, then paragraph (b)(2)(i), etc.).

Note 1: As used in this section fixed equipment refers to equipment fastened in place or connected by permanent wiring methods.

Note 2: Lockout and tagging procedures that comply with paragraphs (c) through (f) of 91910.147 will also be deemed to comply with paragraph (b)(2) of this section provided that:

(1) The procedures address the electrical safety hazards covered by this Subpart; and
(2) The procedures also incorporate the requirements of paragraphs (b)(2)(iii)(D) and (b)(2)(B) of this section.

(b)(2)(i) Procedures. The employer shall maintain a written copy of the procedures outlined in paragraph (b)(2) and shall make it available for inspection by employees and by the Assistant Secretary of Labor and his or her authorized representatives.

Note: The written procedures may be in the form of a copy of paragraph (b) of this section.

(b)(2)(ii) De-energizing equipment. (A) Safe procedures for de-energizing circuits and equipment shall be determined before circuits or equipment are de-energized.

(b)(2)(ii)(B) The circuits and equipment to be worked on shall be disconnected from all electric energy sources. Control circuit devices, such as push buttons, selector switches, and interlocks, may not be used as the sole means for de-energizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures.

(b)(2)(ii)(C) Stored electric energy which might endanger personnel shall be released. Capacitors shall be discharged and high capacitance elements shall be short-circuited and grounded, if the stored electric energy might endanger personnel.

Note: If the capacitors or associated equipment are handled in meeting this requirement, they shall be treated as energized.

(b)(2)(ii)(D) Stored nonelectrical energy in devices that could reenergize electric circuit parts shall be blocked or relieved to the extent that the circuit parts could not be accidentally energized by the device.

(b)(2)(iii) Application of locks and tags. (A) A lock and a tag shall be placed on each disconnecting means used to de-energize circuits and equipment on which work is to be performed, except as provided in paragraphs b)(2)(iii)(C) and (b)(2)(iii)(E) of this section. The lock shall be attached so as to prevent persons from operating the disconnecting means unless they resort to undue force or the use of tools.

(b)(2)(iii)(B) Each tag shall contain a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag.

(b)(2)(iii)(C) If a lock cannot be applied, or if the employer can demonstrate that tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock, a tag may be used without a lock.

(b)(2)(iii)(D) A tag used without a lock, as permitted by paragraph (b)(2)(iii)(C) of this section, shall be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock. Examples of additional safety measures include the removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device.

(b)(2)(iii)(E) A lock may be placed without a tag only under the following conditions:

(b)(2)(iii)(E)(1) Only one circuit or piece of equipment is de-energized, and

(b)(2)(iii)(E)(2) The lockout period does not extend beyond the work shift, and

(b)(2)(iii)(E)(3) Employees exposed to the hazards associated with reenergizing the circuit or equipment are familiar with this procedure.

(b)(2)(iv) Verification of de-energized condition. The requirements of this paragraph shall be met before any circuits or equipment can be considered and worked as de-energized.

(b)(2)(iv)(A) A qualified person shall operate the equipment operating controls or otherwise verify that the equipment cannot be restarted.

(b)(2)(iv)(B) A qualified person shall use test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and equipment parts are de-energized. The test shall also determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage backfeed even though specific parts of the circuit have been de-energized and presumed to be safe. If the circuit to be tested is over 600 volts, nominal, the test equipment shall be checked for proper operation immediately before and immediately after this test.

(b)(2)(v) Reenergizing equipment. These requirements shall be met, in the order given, before circuits or equipment are reenergized, even temporarily.

(b)(2)(v)(A) A qualified person shall conduct tests and visual inspections, as necessary, to verify that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed, so that the circuits and equipment can be safely energized.

(b)(2)(v)(B) Employees exposed to the hazards associated with reenergizing the circuit or equipment shall be warned to stay clear of circuits and equipment.

(b)(2)(v)(C) Each lock and tag shall be removed by the employee who applied it or under his or her direct supervision. However, if this employee is absent from the workplace, then the lock or tag may be removed by a qualified person designated to perform this task provided that:

(b)(2)(v)(C)(1) The employer ensures that the employee who applied the lock or tag is not available at the workplace, and

(b)(2)(v)(C)(2) The employer ensures that the employee is aware that the lock or tag has been removed before he or she resumes work at that workplace.

(b)(2)(v)(D) There shall be a visual determination that all employees are clear of the circuits and equipment.

(c) Working on or near exposed energized parts. (1) Application. This paragraph applies to work performed on exposed live parts (involving either direct contact or contact by means of tools or materials) or near enough to them for employees to be exposed to any hazard they present.

(c)(2) Work on energized equipment. Only qualified persons may work on electric circuit parts or equipment that have not been

de-energized under the procedures of paragraph (b) of this section. Such persons shall be capable of working safely on energized circuits and shall be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

(c)(3) Overhead lines. If work is to be performed near overhead lines, the lines shall be de-energized and grounded, or other protective measures shall be provided before work is started. If the lines are to be de-energized, arrangements shall be made with the person or organization that operates or controls the electric circuits involved to de-energize and ground them if protective measures, such as guarding, isolating, or insulating, are provided, these precautions shall prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

Note: The work practices used by qualified persons installing insulating devices on overhead power transmission or distribution lines are not covered by if S1910.332 through S1910.335. Under paragraph (c)(2) of this section, unqualified persons are prohibited from performing this type of work.

(c)(3)(i) Unqualified persons. (A) When an unqualified person is working in an elevated position near overhead lines, the location shall be such that the person and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the following distances:

(c)(3)(i)(A)(1) For voltages to ground 50kV or below--10ft. (305 cm);

(c)(3)(i)(A)(2) For voltages to ground over 50kV--10 ft. (305 cm) plus 4 in. (10 cm) for every 10kV over 50kV.

(c)(3)(i)(B) When an unqualified person is working on the ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded, energized overhead lines than the distances given in paragraph (c)(3)(i)(A) of this section.

Note: For voltages normally encountered with overhead power lines, objects which do not have an insulating rating for the voltage involved are considered to be conductive.

(c)(3)(ii) Qualified persons. When a qualified person is working in the vicinity of overhead lines, whether in an elevated position or on the ground, the person may not approach or take any conductive object without an approved insulating handle closer to exposed energized parts than shown in Table S-5 unless:

(c)(3)(ii)(A) The person is insulated from the energized part (gloves, with sleeves if necessary, rated for the voltage involved are considered to be insulation of the person from the energized part on which work is performed), or

(c)(3)(ii)(B) The energized part is insulated both from all other conductive objects at a different potential and from the person, or

(c)(3)(ii)(C) The person is insulated from all conductive objects at a potential different from that of the energized part.

TABLE S-5.--APPROACH DISTANCES FOR QUALIFIED EMPLOYEES
ALTERNATING CURRENT

Voltage range (phase to phase)	Minimum approach distance
300V and lessAvoid contact.
Over 300 V, not over 750 kV 1 ft. 0 in. (30.5 cm).
Over 750 V, not over 2 kV 1 ft. 6 in. (1,46 cm).
Over 2 kV, not over 15 kV 2 ft. 0 in. (61 cm).
Over 15 kV, not over 37 kV 3 ft. 0 in. (91 cm).
Over 37 kV, not over 87.5 kV	3 ft. 6 in. (107 cm).
Over 87.5 kV, not over 121 kV	4 ft. 0 in. (122 cm).
Over 121 kV, not over 140 kV	4 ft. 6 in. (137 cm).

(c)(3)(iii) Vehicular and mechanical equipment. (A) Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a clearance of 10 ft. (305 cm) is maintained. If the voltage is higher than 50kV, the clearance shall be increased 4 in. (10 cm) for every 10kv over that voltage. However, under any of the following conditions, the clearance may be reduced:

(c)(3)(iii)(A)(1) if the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. (122 cm). If the voltage is higher than 50kV, the clearance shall be increased 4 in. (10 cm) for every 1.0kV over that voltage.

(c)(3)(iii)(A)(2) If insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.

(c)(3)(iii)(A)(3) If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified person, the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance given in Table S-5.

(c)(3)(iii)(B) Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments, unless:

(c)(3)(iii)(B)(1) The employee is using protective equipment rated for the voltage; or

(c)(3)(iii)(B)(2) The equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than permitted in paragraph (c)(3)(iii) of this section.

(c)(3)(iii)(C) If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

(c)(4) Illumination. (i) Employees may not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely.

(c)(4)(ii) Where lack of illumination or an obstruction precludes observation of the work to be performed, employees may not perform tasks near exposed energized parts. Employees may not reach blindly into areas which may contain energized parts.

(c)(5) Confined or enclosed work spaces. When an employee works in a confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, the employer shall provide, and the employee shall 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 an employee and causing the employee to contact exposed energized parts.

(c)(6) Conductive materials and equipment. Conductive materials and equipment that are in contact with any part of an employee's body shall be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts. If an employee must handle long dimensional conductive objects (such as ducts and pipes) in areas with exposed live parts, the employer shall institute work practices (such as the use of insulation, guarding, and material handling techniques) which will minimize the hazard.

(c)(7) Portable ladders. Portable ladders shall have nonconductive side rails if they are used where the employee or the ladder could contact exposed energized parts.

(c)(8) Conductive apparel. Conductive articles of jewelry and clothing (such as watch bands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear) may not be worn if they might contact exposed energized parts. However, such articles may be worn if they are rendered nonconductive by covering, wrapping, or other insulating means.

(c)(9) Housekeeping duties. Where live parts present an electrical contact hazard employees may not perform housekeeping duties at such close distances to the parts that there is a possibility of contact, unless adequate safeguards (such as insulating equipment or barriers) are provided. Electrically conductive cleaning materials (including conductive solids such as steel wool, metalized cloth, and silicon carbide, as well as conductive liquid solutions) may not be used in proximity to energized parts unless procedures are followed which will prevent electrical contact.

(c)(10) Interlocks. Only a qualified person following the requirements or paragraph (c) of this section may defeat an electrical safety interlock, and then only temporarily while he or she is working on the equipment. The interlock system shall be returned to its operable condition when this work is completed.