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Companywide	Program Requirements Document	For Additional Info: http://EDMS	Effective Date: 07/21/14
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*The current revision can be verified on EDMS.

1. PURPOSE

This document establishes CH2M WG Idaho, LLC (CWI or “Company”) requirements for the control of hazardous energy at the Idaho Cleanup Project (ICP).

2. APPLICABILITY

This document applies to activities where there is a potential for personnel injury during equipment servicing, maintenance, or modification activities due to the unexpected energization or start-up of machines or equipment or release of stored energy. MCP-101, “ICP Integrated Work Control Process,” and MCP-3562, “Hazard Identification, Analysis and Control of Operational Activities,” identify when *lockout* (see def.) and *tagout* (see def.) (LO/TO) is applicable to maintenance, operations, and research and development activities.

All employees are required to comply with the restrictions and limitations imposed upon them during the use of LO/TO. The LO/TO process is considered the default and primary means for controlling hazardous energy while performing servicing and maintenance.

Servicing and/or maintenance during normal production operations are covered by this program requirements document (PRD) only if:

- A. An employee is required to remove or bypass a guard or other safety device [29CFR1910.147(a)(2)(ii)(A)]

OR

- 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. [29CFR1910.147(a)(2)(ii)(B)]

Activities listed in Appendix A, Exempt Activities, are exempt from this PRD.

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3. REQUIREMENTS

3.1 Use of Other Company-Level Documents Prior To and Following Lockout and Tagout Activities

- 3.1.1 MCP-6203, “Outages,” and MCP-585, “Managing Fire Protection Impairments,” shall NOT be used in place of LO/TO for ensuring personnel safety from hazardous energy.
[Company Requirement CAIP 3.12.4.10 & 3.16.4.14]
- 3.1.2 Trained and qualified personnel shall operate equipment in accordance with MCP-2974, “Shift Routines and Operating Practices.”
[DOE Order 422.1, 2.b.(8).a] [NFPA 70E, 110.6(D)(1)]
- 3.1.3 *Operations Management* (see def) shall control the removal of equipment from service and the return of equipment to service in accordance with MCP-2978, “Control of Equipment and System Status.”
[DOE Order 422.1, 2.h.(5).d]
- 3.1.4 Occasions requiring concurrent dual verification (or witnessing) shall be performed while both individuals are present and are both responsible for ensuring the activity is performed correctly. [DOE Order 422.1, 2.j]
- 3.1.5 The preferred techniques for verifying the position of locked components is witnessing a hands-on check or by position or other indicators. [DOE Order 422.1, 2.i]
- 3.1.6 Equipment startup and shutdown shall be conducted in accordance with work control documents, vendor recommendations or operating procedures as described in MCP-2985, “Technical Procedures.”
[DOE Order 422.1, 2.p]
- 3.1.7 *Isolation devices* (see def.), when they are normally installed permanent fixtures of equipment and piping in facilities, shall be labeled in accordance with MCP-2987, “Component Labeling.” [DOE Order 422.1, Att. 2, 2.r.(2), 2.r.(2).a]

3.2 General Requirements Controlling Lockouts and Tagouts

- 3.2.1 Equipment that has been locked out and/or tagged out **SHALL NOT BE OPERATED** by any employee. [29CFR1910.147(c)(7)(i)(C) & (c)(7)(ii)(B)]
- 3.2.2 LO/TO requirements shall apply to fixed permanently installed equipment, temporarily installed equipment, and portable equipment.
[NFPA 70E 120.2(A)]

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- 3.2.3 LO/TO *lockout devices* (see def.), and other materials required to execute the requirements of this PRD shall be provided by the Company.
[29CFR1910.147(c)(5)(i)][NFPA 70E, 120.2(E)(2)]
- 3.2.4 Lockout devices
- 3.2.4.1 Isolations shall be protected by lockout devices to the maximum extent possible. Locks used for LO/TO shall meet the following requirements: [29CFR1910.147(c)(2)(ii)]
[NFPA 70E, 120.2(F)(2)(k)(4)]
- 3.2.4.1.1 Each lock shall be individually keyed, with no more than one key allowed for each lock. *Job locks* (see def.) may be series locks.
[Company Requirement]
- 3.2.4.1.2 Keys for locks shall be controlled to prevent unauthorized use. [DOE Order 422.1, 2.i.(1)(d)][NFPA 70E, 120.2(E)(3)(g)]
- 3.2.4.1.3 The body of the lock shall be red in color. Red locks are reserved for use with LO/TO and shall not be used for any purpose other than that specified in this PRD.
[29 CFR 1910.147(c)(5)(ii) & (c)(5)(ii)(B)]
[NFPA 70E 120.2(E)(2)]
- 3.2.4.1.4 Lockout devices shall be capable of withstanding the environment to which they are exposed and substantial enough to prevent removal without the use of excessive force or unusual techniques such as bolt cutters or metal cutting tools.
[29CFR1910.147(c)(5)(ii)(A) & (c)(5)(ii)(C)(1)]
[NFPA 70E 120.2(E)(3)(d)&(f)]
- 3.2.4.2 Lockout devices shall be accompanied by a danger tag which serves to identify the authorized employee applying the lockout device(s). [29CFR1910.147(c)(5)(ii)(D)][NFPA 70E 120.2(E)(3)(b)]
- 3.2.4.2.1 **IF** the lockout device is a *personal lock* (see def) **THEN** it **MUST** be marked or labeled “DANGER-DO NOT REMOVE” and the authorized employee placing the personal lock must be identifiable by marking, labeling, a

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sticker on the body of the personal lock or a *personal danger tag* (Form 434.12, see def.) [29CFR1910.147(c)(5)(ii)(D)][NFPA 70E 120.2(E)(3)(b)]

- 3.2.4.3 If an isolating device is capable of being locked out, it shall include a lockout device whenever practicable. [29CFR1910.147(c)(2)(ii)]
- 3.2.4.4 When locks are used, the following limitations shall be understood: [DOE Order 422.1, 2.i.(1)(d)]
 - 3.2.4.4.1 Operation of the facility may be hindered. This is significant when local component operations are necessary, such as remote shutdown or remote control. [DOE Order 422.1, 2.i.(1).(e)]
 - 3.2.4.4.2 Locks and chains installed on small instrument line isolation valves can contribute to seismic loading and may not have been considered during safety analysis. [DOE Order 422.1, 2.i.(1).(e)]
- 3.2.5 *Lockboxes* (see def.) shall be used for Level II LO/TOs. [29CFR1910.147(f)(3)(ii)(D)]
- 3.2.6 Chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware shall be used for securing or blocking machines, equipment, or systems to achieve isolation from energy sources. [29CFR1910.147(c)(5)(i)]

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3.2.7 *Tagout devices* (see def.)

3.2.7.1 Tags used for LO/TO shall be standardized and meet the following requirements:
[29CFR1910.147(c)(5)(ii)(B)]

[NFPA 70E, 120.2(E)(2)]

3.2.7.1.1 The attachment device shall be a single-use, hand-attachable, self-locking, tying device that has a minimum unlocking strength of no less than 50 pounds. It shall have the general design and basic characteristics of a one-piece, environment-tolerant, nylon cable tie. The shackle of a lock may also be used to attach danger tags. [29CFR1910.147(c)(5)(ii)(C)(2)]
[NFPA 70E, 120.2(E)(4)(c)]

3.2.7.1.2 Tags shall be attached to the lockout device or the isolating device.
[29CFR1910.147(c)(7)(ii)(F)]

3.2.7.1.3 Danger tags shall never be used for valve identification, for marking electrical leads, or for any purpose other than that specified in this PRD. [29CFR1910.147(c)(5)(ii)]
[NFPA 70E, 120.2(E)(2)]

3.2.7.1.4 Tags shall be durable, withstanding exposure to the environment for the maximum time exposure is expected. Tags shall be constructed and printed so that exposure to weather conditions or wet/damp locations will not cause the tag to deteriorate or the message on the tag to become illegible. They shall not deteriorate when used in corrosive environments where acid and/or alkali chemicals are handled and/or stored. Additional protection using lamination or protective sleeving may be warranted for extreme exposure conditions.
[29CFR1910.147(c)(5)(ii)(A)(1), (2) & (3)]
[NFPA 70E, 120.2(E)(4)(b)]

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- 3.2.7.1.5 Danger tags shall identify the employee applying the device.
[29CFR1910.147(c)(5)(ii)(D)]
- 3.2.7.1.6 Danger tags warn personnel of hazardous conditions if the machine or equipment is energized and prohibit unauthorized operation of the isolation device or removal of the tag.
[29CFR1910.147(c)(5)(iii)]
[NFPA 70E, 120.2(E)(4)(d)]
- 3.2.7.2 Lockout is the method used to control hazardous energy whenever possible. When the isolation device is not capable of being locked out and tagout is required to support lockout, the following limitations of tagout only shall be understood: [29CFR1910.147(c)(7)(ii)]
[NFPA 70E, 120.2(F)(2)(k)(4)]
- 3.2.7.2.1 Tags are essentially warning devices and do not provide physical restraint on those devices as are provided by a lock.
[29CFR1910.147(c)(7)(ii)(A)]
- 3.2.7.2.2 When a tag is attached, it is not to be removed without authorization of the person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.
[29CFR1910.147(c)(7)(ii)(B)]
- 3.2.7.2.3 Tags must be legible and easily understood by all authorized employees, affected employees or other employees whose work operations are or may be in the area.
[29 CFR 1910.147(c)(7)(ii)(C)]
- 3.2.7.2.4 Tags and their means of attachment will be able to withstand the environmental conditions encountered in the workplace.
[29CFR1910.147(c)(7)(ii)(D)]
- 3.2.7.2.5 Tags may evoke a false sense of security and their meaning needs to be understood as part of the overall energy control program.
[29CFR1910.147(c)(7)(ii)(E)]

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- 3.2.7.2.6 Tags must be securely attached so they cannot be inadvertently or accidentally detached during use. [29CFR1910.147(c)(7)(ii)(F)]
- 3.2.8 Where lock protection is not possible, tagout shall be used to provide full employee protection equivalent to that obtained with lockout. The isolation will accomplish this level of protection by using Steps 3.2.8.1 and 3.2.8.2: [29CFR1910.147(c)(2)(i) & (c)(3)] [NFPA 70E, 120.2(F)(2)(k)(4)]
- 3.2.8.1 Tagout shall be attached by one of the following methods:
- 3.2.8.1.1 The danger tag shall be fastened directly to the isolation device. [29CFR1910.147(b) and (c)]
- OR
- 3.2.8.1.2 The danger tag shall be fastened as close as safely possible to the device, in a position immediately obvious to anyone attempting to operate the device. [29CFR1910.147(b) and (c)]
- 3.2.8.2 Supplemental protective measures such as removing a circuit-isolating element, tagging two isolation points in series, or removing a valve handle shall be employed. [29CFR1910.147(c)(3)(ii)][NFPA 70E, 120.2(F)(4)]
- 3.2.8.2.1 Unusual methods not meeting the above criteria shall be performed using approved procedures (for example, freeze seals or other alternate methods). [29CFR1910.147(c)(3)(ii)]
- 3.2.9 Each employee working under the protection of LO/TO must be protected by a *personal lock* (see def.) under the exclusive control of that employee. [29CFR1910.147(f)(3)(i)] [NFPA 70E, 120.2(E)(3)(g)]

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- 3.2.10 The LO/TO logbook shall contain the following sections:
[Company Requirement]
- 3.2.10.1 Section I shall contain LO/TO Index Sheets, Form 434.39, “ICP Lockout/Tagout Record Sheet.”
[Company Requirement]
- 3.2.10.1.1 LO/TO numbers on the LO/TO Index Sheet shall be composed of three parts.
[Company Requirement]
- 3.2.10.1.1.1 The first part shall be the site area. [Company Requirement]
- 3.2.10.1.1.2 The second part shall be the logbook identifier.
[Company Requirement]
- 3.2.10.1.1.3 The third part shall be the next sequential LO/TO number for example, CPP-7-1000, (CPP - INTEC, Book 7 – Utilities, LO/TO number -1000).
[Company Requirement]
- 3.2.10.2 Section II shall contain active LO/TO Record Sheets, Form 434.38. [Company Requirement]

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NOTE: [MCP-557, “Records Management,” the INL Records Schedule Matrix, and associated record types list\(s\)](#) provide current information on the storage, turnover, and retention requirements for these records.

- 3.2.10.3 Inactive LO/TO Record Sheets shall be retained after closeout in Section III of the book or other retrievable safe storage (currently for 3 months) and then may be destroyed. [Company Requirement]

3.3 Training

- 3.3.1 All employees shall be trained to ensure that the purpose of the LO/TO program is understood. The training program shall ensure that the knowledge and skills required for the safe application, usage, and removal of LO/TO are acquired by authorized employees. Training program requirements are specified in PDD-1066, “Lockout and Tagout Training Program.” [29CFR1910.147(c)(7)(i)] [NFPA 70E, 120.2(B)(2)]
- 3.3.2 Retraining shall be provided to employees, as applicable, whenever any of the following situations are encountered:
[29CFR1910.147(c)(7)(iii)(A) & (B)] [NFPA 70E, 120.2(B)(2)]
- A. There is a change in job assignment requiring increased responsibility for LO/TO [29CFR1910.147(c)(7)(iii)(A)]
 - B. There is a change in the types of hazardous energy sources within the facility [29CFR1910.147(c)(7)(iii)(A)]
 - C. There is a significant or technical change in the LO/TO procedure [29CFR1910.147(c)(7)(iii)(C)]
 - D. Whenever a periodic review or other surveillance indicates or line management has reason to believe that there are negative trends in, deviations from, or inadequacies in employee’s knowledge or use of the LO/TO procedure. [29CFR1910.147(c)(7)(iii)(B)]
- 3.3.3 Records of employee training, retraining, and requalification in the LO/TO program shall be maintained current and up to date. Records shall contain each employee’s name and dates of training. [29CFR1910.147(c)(7)(iv)]

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- 3.3.3.1 The status of authorized employee qualification will be maintained in the TRAIN database. [Company Requirement]

3.4 Periodic Reviews

- 3.4.1 At least annually, the cognizant director shall ensure that a review of the LO/TO program is conducted by an authorized employee other than the one(s) utilizing the LO/TO procedure(s) being reviewed. The reviewer shall be knowledgeable of the requirements of the LO/TO procedures. [29 CFR 1910.147(c)(6)(i) & (i)(A)] [NFPA 70E, 120.2(C)(3)]

- 3.4.1.1 The review shall include each authorized employee.
[29CFR1910.147(c)(6)(i)(C)]
[OSHA Standard Interpretation 09/19/95]

- 3.4.1.1.1 Reviews shall cover the employee's responsibilities under the LO/TO program and the LO/TO Record Sheet(s) being reviewed.
[29CFR1910.147(c)(6)(i)(C)]

- 3.4.1.1.2 The review shall also verify employees understand the limitations of tagout only, and the limitations of locks.
[29CFR1910.147(c)(6)(i)(D)]

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3.4.1.1.3 The review shall evaluate actual LO/TOs being performed and selected LO/TO Record Sheets for execution of and compliance with this PRD and MCP-3651, “Chapter IX—Level I and II Lockouts and Tagouts.”
[29CFR1910.147(c)(6)(i), NFPA 70E, 120.2(C)(3)]

3.4.1.1.3.1 Since CWI utilizes a *Group LO/TO program* (see def) at least one actual LO/TO application per company per year is required to be observed. Random audits and planned visual observations shall be performed and demonstrations of LO/TO observed, when feasible, sufficient to ensure that the energy control procedure is being properly implemented in the multiple CWI projects and sub-projects.
[29CFR1910.147(c)(6)(i)]
[NFPA 70E, 120.2(C)(3)]

3.4.1.1.4 The review shall be documented and contain at least the following information:
[29CFR1910.147(c)(6)(ii)]

- A. Identity of the machine, equipment, or system on which the LO/TO procedure was being used
[29CFR1910.147(c)(6)(ii)]
- B. Date of the review
[29CFR1910.147(c)(6)(ii)]
- C. Employees who were included in the review [29CFR1910.147(c)(6)(ii)]
- D. Person performing the review
[29CFR1910.147(c)(6)(ii)]
- E. Deviations or inadequacies identified for corrections.
[29CFR1910.147(c)(6)(i)(B)]

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- 3.4.1.2 An OSHA Annual Review shall be performed in group sessions with company authorized employees outside of regular training. [OSHA Standards Interpretation and Compliance Letters 04/23/07, Application of Control of Hazardous Energy (LOTO) requirements to compressed gas cylinders][Company requirement]
- 3.4.1.2.1 The review shall emphasize program fundamentals
- 3.4.1.2.2 The review shall include company LO/TO events and lessons learned since the last review.
- 3.4.1.2.3 The review shall solicit and encourage feedback on the program and procedures from the authorized employees.
- 3.4.1.2.4 The review shall be performed by appointed individuals possessing no less than the CWI Primary Authorized Employee qualification.
- 3.4.1.3 The cognizant director shall review the results of the annual review and implement corrective actions as required. [29CFR1910.147(c)(6)(i)(B)]

3.5 Working with Subcontractors

- 3.5.1 When work is performed by a subcontractor (includes all non-Company employees), a dual responsibility exists for the safety of Company and subcontracted employees. [29CFR1910.147(f)(2)]
- 3.5.1.1 Before LO/TO by a subcontractor, Company employees and the subcontractor shall inform each other of their respective LO/TO procedures. [29CFR1910.147(f)(2)(i)]
- 3.5.1.2 Company employees shall understand and comply with the restrictions and prohibitions of the subcontractor's LO/TO procedure. [29CFR1910.147(f)(2)(ii)]
- 3.5.2 The Company's LO/TO procedure shall be used, except when a subcontractor has exclusive control of a system or area. [Company Requirement]

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3.5.2.1 When a subcontractor has exclusive control of a system or area and the Company's LO/TO procedure will not be used, a memorandum of understanding (MOU) between the respective cognizant director and the subcontractor shall define the areas of responsibility for exclusive control of a system or area when the Company's LO/TO procedure is not used. [Company Requirement]

3.5.3 In-town leased facilities may allow subcontractor personnel to perform all aspects of this procedure. Training requirements shall be met and documented. [Company Requirement]

3.6 Escorted Personnel

NOTE 1: *No person shall perform work under the protection of LO/TO without being trained and qualified as an OSHA authorized employee (see def). [29CFR1910.147(c)(7)(i)(A), OSHA Standard Interpretations 04/23/2007]*

NOTE 2: *INTEC Power Operations (IPO) or other electricians who are trained and qualified to perform electrical clearances are considered an OSHA authorized employee. [29CFR1910.269(d), Company requirement]*

3.6.1 CWI company personnel not trained and qualified as an OSHA authorized employee shall not be escorted to perform work under LO/TO. [Company requirement]

3.6.2 Non-company and other personnel who are qualified as an OSHA authorized employee by a compliant LO/TO program in their company that has been confirmed by a company PAE or trained by the company program may be supplied a company personal lock and be escorted or assisted, as required, to perform work (use Form 434.42).

3.6.3 Non-company and other personnel who are NOT qualified as an OSHA authorized employee, by either; a LO/TO program in their company that has been confirmed by a CWI PAE, or trained and qualified by CWI in accordance with PDD-1066, "Lockout and Tagout Training Program," **MAY NOT PERFORM WORK under protection of LO/TO**. They are considered Affected Employees by the standard and may observe, consult or advise CWI personnel, but may not engage in activities that expose them to the hazardous energy being controlled by the LO/TO for the affected system or component. They must be briefed as an Affected Employee to access site areas where LO/TO may be installed. [OSHA Standard Interpretations - 04/23/2007, -11/16/2000][Company requirement]

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3.7 Lockout and Tagout Program Elements

NOTE 1: *Each person who could be exposed directly or indirectly to a source of hazardous energy during servicing or maintenance of equipment or systems shall be involved in the LO/TO process. An example of direct electrical exposure is the qualified electrical worker (see def.) who is to work on a motor starter control, power circuits, or motor. An example of indirect electrical exposure is the person who is to work on the coupling between the motor and driven equipment.*

NOTE 2: *LO/TO shall be coordinated with other applicable procedures for control of exposure to electrical and other hazardous energy sources.*

3.7.1 The control of hazardous energy requires the development, documentation and utilization of procedures. The basic steps critical to performing a LO/TO are as follows: [29CFR1910.147(c)(4)(i)] [NFPA 70E, 120.2(C)(1)]

3.7.1.1 Employees involved in the LO/TO process shall have knowledge of the type and magnitude of energy involved, the hazards of the energy to be controlled, and the method to control the energy. [29CFR1910.147(c)(7)(i)(A)]

NOTE: *The “ICP Lockout/Tagout Record Sheet” (Form 434.38) may be used for the purpose of a LO/TO plan.*

3.7.1.2 A plan shall be developed based on the existing equipment or system and shall utilize up-to-date systems drawings/documents in order to effectively isolate workers from hazardous energy sources. [NFPA 70E, 120.2(F)(1)(a)] [29CFR1910.147(d)(3)]

3.7.1.2.1 Up-to-date drawings/documents shall be consulted to ensure that no electrical circuit interlock operation can result in re-energization of the circuit upon which work is being performed. [NFPA 70E, 120.2(B)(3)]

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NOTE: During the LO/TO planning process, Operations Management and System Engineering should be cognizant of and prepared for the impact of the LO/TO on systems and operations not directly associated with the LO/TO work activity for the anticipated duration of the LO/TO.

- 3.7.1.2.2 Where there are no accessible exposed points to take voltage measurements, planning considerations shall include alternate methods of verification. [NFPA 70E, 120.2(F)(2)(f)(5)]
- 3.7.1.3 Before LO/TO devices are applied, affected employees shall be notified. [29CFR1910.147(c)(9)]
- 3.7.1.4 The cognizant manager or designee shall coordinate jobs or tasks in progress to prevent adverse impact of installation of a LO/TO. [NFPA 70E, 120.2(F)(2)(i)]
- 3.7.1.5 The machine or equipment shall be shut down by trained and qualified personnel using approved procedures or other instructions, as applicable.
[29CFR1910.147(d)(2)]
- 3.7.1.6 All energy isolation devices that are needed to control the energy to the machine or equipment shall be physically located and operated to isolate the machine or equipment from the energy sources. [29CFR1910.147(d)(3)]
[NFPA 70E, 120.2(B)(4)]
- 3.7.1.7 LO/TO devices shall be affixed to energy isolating devices only by authorized personnel. [29CFR1910.147(d)(4)(i)]
[DOE Order 422.1, 2.i.(1)(a)]
- 3.7.1.7.1 Lockout devices shall be affixed to hold the energy isolating devices in a safe or off position. [29CFR1910.147(d)(4)(ii)]
[NFPA 70E, 120.2(F)(2)(k)(1)]
- 3.7.1.7.2 Tagout devices shall be affixed to clearly indicate that the operation of the energy isolating devices is prohibited.
[29CFR1910.147(d)(4)(iii)][NFPA 70E, 120.2(E)(4)(d)]

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3.7.1.7.3 LO/TO devices used for electrical isolations shall only be installed on circuit disconnecting means (examples include a circuit breaker, disconnect switch, fuse block).
[NFPA 70E, 120.2(E)(6)]

3.7.1.8 Prior to starting work on machines or equipment that have been locked out and tagged out; an authorized employee shall verify that isolation and de-energization of the machine or equipment have been accomplished.
[29CFR1910.147(d)(6)] [NFPA 70E, 120.2(F)(2)(f)]

NOTE: *All electrical circuit conductors and circuit parts shall be considered energized until the sources of energy are removed and zero energy verification(s) performed, at which time they may be considered deenergized.*

3.7.1.8.1 Electrical zero-energy verifications shall be performed using adequately rated equipment to verify all conductors or circuit parts are deenergized. [29CFR1910.147(d)(6)]
[NFPA 70E, 120.1(5)]

3.7.1.8.1.1 All electrical circuit conductors and circuit parts shall not be considered to be in an electrically safe condition until:
[NFPA 70E, 120.2(A)]

- A. All sources of energy are removed
- B. The disconnecting means is under LO/TO
- C. The absence of voltage is verified by an approved voltage measuring device
- D. Exposure to potentially energized electrical conductors, upon which work is being performed (for example, induced voltage equal to or greater than 50 volts), are temporarily grounded.

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- 3.7.1.8.1.2 Zero-energy verifications shall verify conductors or circuit parts are not inadvertently *energized* (see def.) by induced voltage or unrelated voltage backfeed. [NFPA 70E, 120.1(6)]
- 3.7.1.8.1.3 Electrical zero-energy verification shall be performed as applicable whenever:
[NFPA 70E, 120.2(F)(2)(f)(4)]
- A. Circuit conditions change
 - B. The job location has been left *unattended* (see def.).
- 3.7.1.8.1.4 Alternate methods of electrical zero energy verification shall be considered when there are no accessible exposed points to obtain voltage measurements. [NFPA 70E, 120.2(F)(2)(f)(5)]
- 3.7.1.8.1.5 All sources of electrical energy shall be controlled in such a way as to minimize personnel exposure to electrical hazards. [NFPA 70E, 120.2(B)(4)]
- 3.7.1.8.1.6 In establishing an *electrically safe work condition* [see def], all sources of energy are removed, the disconnecting means are under lockout/tagout and the absence of voltage is verified by an approved voltage testing device. [NFPA 70E, 120.2 (A)]
- 3.7.1.8.1.7 The testing will be performed with an approved voltage detector, by a qualified electrical worker and the detector operation verified before and after use. [NFPA 70E 120.2 (F)(2)(f)(1)]

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- 3.7.1.8.1.8 Electrical conductors and circuit parts that have been disconnected, but not under LO/TO, tested, and grounded (when grounding is required) shall not be considered to be in an electrically safe work condition, and safe work practices appropriate for the circuit voltage and energy level will be used.
[NFPA 70E, 120.2(A)]
- NOTE:** *Due to the limitations of proximity testers, their application as an additional method of checking for electrical energy is dependent upon the type of circuit and magnitude of energy (voltage and current) expected to be present, and appropriate precautions shall be exercised in their application and use.*
- 3.7.1.8.1.9 In addition to electrical zero-energy verification using adequately rated equipment, *Safe-to-Work Checks* (see def) for sources of electrical energy or using a proximity tester shall be performed in conjunction with the requirements of Step 3.7.1.8 and before hands-on work begins.
[NFPA 70E, 120.2(F)(2)(f)(3)]
[Company requirement]
- 3.7.1.9 Each person working under the protection of LO/TO must affix a *personal lock* (see def) before beginning work.
[29CFR1910.147(f)(3)(ii)(D)]
- 3.7.1.10 If circumstances are such that the employee must leave, other than for lunch or break, prior to completing the work, specific steps shall be taken to ensure continuity of LO/TO protection. [29CFR1910.147(f)(4)]

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- 3.7.1.11 Before LO/TO devices are removed and energy is restored to the machine or equipment, the work area shall be inspected to ensure that: [29CFR1910.147(e)]
[NFPA 70E, 120.2(F)(2)(m)]
- A. Nonessential items have been removed and the machine or equipment is operationally intact
[29CFR1910.147(e)(1)]
- B. All employees are safely positioned.
[29CFR1910.147(e)(2)(i)]
- 3.7.1.12 At the completion of work, each employee working under the protection of LO/TO will remove his/her personal lock.
[29CFR1910.147(f)(3)(ii)(D)]
- 3.7.1.13 After LO/TO devices are removed and before the machine or equipment is started, affected employees shall be notified. [29CFR1910.147(f)(2)]
[NFPA 70E, 120.2(F)(2)(m)]
- 3.7.1.14 A PAE shall exercise overall responsibility for adherence to the LO/TO procedure. [29CFR1910.147(f)(3)(ii)(A)]
[NFPA 70E, 120.2(D)(3)(c)]
- 3.7.2 **LEVEL I**—Documentation of the LO/TO process on a record sheet is not required. A Level I LO/TO may be used if **ALL** of the conditions listed below are met: [29CFR1910.147(c)(4)(i), Note: Exception]
[NFPA 70E, 120.2(D)(2)]
- 3.7.2.1 The machine, equipment, or system has no potential for stored or residual energy or re-accumulation of stored hazardous energy after shutdown, which could endanger employees. [29CFR1910.147(c)(4)(i), Note: Exception]
- 3.7.2.2 The machine, equipment, or system has a single hazardous energy source that can be readily identified and isolated effectively to remove the identified hazardous energy types. [29CFR1910.147(c)(4)(i), Note: Exception]
- 3.7.2.3 The isolation and locking out of the hazardous energy source will completely de-energize and deactivate the machine, equipment, or system.
[29CFR1910.147(c)(4)(i), Note: Exception]

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- 3.7.2.4 The machine, equipment, or system is isolated and locked out during the *servicing or maintenance* (see def.). [29CFR1910.147(c)(4)(i), Note: Exception]
- 3.7.2.5 A single lockout device will achieve a locked out condition. [29CFR1910.147(c)(4)(i), Note: Exception]
- 3.7.2.6 The lockout device is under the exclusive control of the AE or AE/L performing the servicing or maintenance. [29CFR1910.147(c)(4)(i), Note: Exception]
- 3.7.2.7 The servicing or maintenance does not create hazards for other employees. [29CFR1910.147(c)(4)(i), Note: Exception]
- 3.7.2.8 The facility has not experienced any unexpected activation or re-energization of the machine, equipment, or system during servicing or maintenance. [29CFR1910.147(c)(4)(i), Note: Exception]
- 3.7.3 **LEVEL II**—Level II LO/TOs shall be used for situations where Level I conditions are not met. The methods used to control hazardous energy for Level II LO/TOs are required to be documented on a record sheet. Additional requirements for Level II LO/TOs are as follows:
[29CFR1910.147(f)(3)]
[NFPA 70E, 120.2(D)(3)]
- 3.7.3.1 *Work groups* (see def.) will be represented when accepting or releasing LO/TOs. [29CFR1910.147(f)(3)(ii)(C)]
- 3.7.3.2 A lockbox shall be used for Level II LO/TOs. [29CFR1910.147(f)(3)(ii)(D)]
- 3.7.3.3 Key(s) for job locks shall be controlled to prevent unauthorized use. [29CFR1910.147(f)(3)(ii)(A)]
- 3.7.3.4 After application of LO/TO devices, potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe. [29CFR1910.147(d)(5)(i)] [NFPA 70E, 120.2(F)(2)]
- 3.7.3.5 If there is a possibility of re-accumulation 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. [29CFR1910.147(d)(5)(ii)] [NFPA 70E, , 120.2(F)(2)(b)]

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- 3.7.3.6 *Safe-to-Work Checks* [see def] are performed or witnessed by all personnel working under the protection of a LO/TO: [Company requirement]
- A. Prior to the start of work
 - B. Once per shift
 - C. Prior to starting a new work task during a shift.
- 3.7.3.7 Each employee working under LO/TO protection must affix his/her personal lock to the lockbox when he or she begins work. [29CFR1910.147(f)(3)(ii)(D)]
- 3.7.3.8 Each employee will remove his/her personal lock from the lockbox at the completion of work, other than for lunch or break, or when they are removed from the job. [29CFR1910.147(f)(3)(ii)(D)]
- 3.7.3.9 Danger tags will be returned to the PAE after removal. All danger tags should be accountable. [DOE Order 422.1, 2.i.(1).(a).11]
- 3.7.4 Additional Requirements
- 3.7.4.1 Personal locks will be removed by the employee who installed them. When that employee is not available, the lock may be removed after verifying that the authorized employee who applied the personal lock is not at the facility. [29CFR1910.147(e)(3)] [NFPA 70E, 120.2(F)(2)(1)]
- 3.7.4.1.1 All reasonable measures shall be taken to contact the person. [29CFR1910.147(e)(3)(ii)]
 - 3.7.4.1.2 The employee whose lock is removed shall have knowledge of the removal before resuming work at the affected facility. [29CFR1910.147(e)(3)(iii)]

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4. 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 LO/TO, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed. An affected employee is not trained to perform work under a LO/TO. All CWI employees receive training initially and are annually re-qualified to the level of affected employee by completing Safety and Health Access qualification.

All other employees. Employees who work or may be in an area where LO/TO may be utilized. This group of employees normally includes office workers, administrative and technical staff, custodians and so on. These employees typically operate cord and plug-connected equipment such as computers, copy machines, and custodial equipment that do not normally require LO/TO to perform servicing or maintenance of the equipment. There are no Company employees with access badges in the ICP considered to be in this category due to annual training provided to all employees to the level of *affected employee* (see def.)

Authorized Employee, AE. A CWI authorized employee with current qualification QCLTAUTH who may perform all aspects of a Level I or Level II LO/TO and performs modifications, servicing or maintenance under the protection of LO/TO on machines and equipment.

Authorized Employee Limited), AE/L. An employee trained to the CWI program with qualification QCLTWORK who may perform all aspects of a Level I LO/TO, but who may only accept (for themselves and a work group), release (for themselves and a work group) and work under a Level II LO/TO.

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

Concurrent Dual Verification. A verification technique where two individuals share the responsibility for performing an operation or verifying a condition. The activity is performed while both individuals are present and both individuals are responsible for ensuring that the activity is performed correctly.

Electrically Safe Work Condition. A state in which the conductor or circuit part to be worked on or near has been disconnected from energized parts, locked/tagged in accordance with established standards, tested to ensure the absence of voltage, and grounded if determined necessary.

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

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Group LO/TO Program. A LO/TO program utilizing one common procedure for performance of LO/TO on multiple systems across multiple facilities in accordance with 29 CFR 1910.147(f)(3).

Exclusive Control. Under the exclusive control of the employee means the authorized employee has the authority to and is continuously in a position to prevent (exclude) other individuals from re-energizing the machine or equipment during his servicing or maintenance activity, This can also be accomplished by installation of their personal lock

Hazardous energy types. Electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy identified through the hazard identification and mitigation processes defined by MCP-101, “ICP Integrated Work Control Process,” and MCP-3562, “Hazard Identification, Analysis and Control of Operational Activities.” Examples include:

- Electrical conductors and circuit parts operating at 50 Volts or more. [NFPA 70E]
- Any energy, including mechanical (e.g., power transmission apparatus, counterbalances, springs, pressure, gravity), pneumatic, hydraulic, electrical, chemical, nuclear, and thermal (e.g., high or low temperature) energies, that could cause injury to employees. Danger is only present when energy may be released in quantities or at rates that could injure employees.

NOTE: *Thermal energy may be generated as a result of electrical resistance, mechanical work, radiation, or chemical reaction, such as is the case with anhydrous ammonia, chlorine, or sulfuric acid reacting with skin, lung, or eye tissue causing chemical burns.*

- Hazardous chemical energy, for purposes of this standard, includes chemicals (e.g., flammable and combustible liquids; flammable gases; acids and alkaline chemicals) that may thermally produce burn injury through high or low temperature. [OSHA Directive CPL 02-00-147]

Hot tap. A procedure used in the repair, maintenance, and service activities on a piece of equipment (pipelines, vessels, or tanks) under pressure, in order to install connections or equipment used for a specific purpose or task. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemicals.

Isolation device. A mechanical device that physically prevents the transmission or release of energy. Examples are a manually operated electrical circuit breaker, a fuse block, a fuse, a disconnect switch, a line valve (not a check valve), a slip blind, a wood or metal block, or any similar device used to block or isolate energy. Push buttons, selector switches, and other control circuit type of devices are not isolation devices. Typical isolation devices are valves and breakers or other equipment and piping that are normally installed as permanent fixtures in operating facilities. In this case, they shall be labeled in

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accordance with MCP-2987, “Component Labeling” to ensure accurate identification and posting of LO/TO.

Job lock. A lock used to ensure the continuity of energy isolation during a multi-shift operation. It is placed upon a lockbox. The key to the job lock is controlled by the primary authorized employee.

Lockbox. Individual lockable boxes used for Level II LO/TO into which all keys from the lockout devices securing the machine, equipment, or system are inserted and which would be secured by a job lock. A slot that allows the placement of keys in a permanently mounted lockbox may be used. However, the slot must be small enough to prevent the removal of any keys without removing the job lock.

Lockout. The placing of a lockout device on an isolation device according to the LO/TO procedure, ensuring that the 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 padlock to hold an isolation device in the desired position. Included are blank flanges and bolted slip blinds.

Operations Management (OM). (Also referred to as operations supervisor in DOE Order 422.1, “Conduct of Operations”) Managers, as defined in PDD-1005, “ICP Management and Operations Manual.” OM encompasses titles such as Nuclear Facility Manager, Building/Facility Manager, Operations Manager, Supervisor, Foreman, and others who have line management responsibilities. The OM is responsible for hazard identification, analysis, and control of an operational activity and the point of contact for resolving related issues.

OSHA authorized employee, As defined by OSHA, 29CFR1910.147(b), a person who has been trained and qualified to lock out or tag out machines or equipment in order to perform servicing or maintenance on that machine or equipment. The CWI LO/TO program has three types of OSHA authorized employees:

- *Primary Authorized Employee, PAE* (see def),
- *Authorized Employee, AE* (see def) and
- *Authorized Employee (Limited), AE/L* (see def).

Qualified electrical workers who are trained and qualified to perform clearances under 29CFR1910.269(d) are also considered to be OSHA authorized employees.

Performing work under LO/TO. A vendor or sub-contractor may be escorted to work under CWI LO/TO ONLY if they are an *OSHA authorized employee* (see def) by receiving training in a CWI program, OR, their parent company has documented LO/TO training equivalent to the minimum of a CWI Authorized Employee (Limited) confirmed by a PAE. If neither of these conditions are met, the vendor or sub-contractor may be

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escorted to OBSERVE and ADVISE CWI personnel as an *Affected Employee* (see def), but MAY NOT PERFORM WORK under protection of a CWI LO/TO.

Personal danger tag. A CWI Form 434.12 that may be attached to a personal lock to identify the authorized employee who placed the personal lock and notify others that the lock shall not be removed by anyone other than the authorized employee owning and placing the lock.

NOTE: *CWI or CWI-direct personnel may use the CWI Form 434.12 personal danger tag to identify a personal lock. A BEA or other external contractor under escort may apply their company's personal danger tag if it meets the NFPA 70E warning criteria and OSHA employee identification criteria for a personal lock.*

Personal lock. A lock used to ensure the continuity of energy isolation while work is being performed by an authorized employee. A personal lock **MUST HAVE** labeling to indicate “DANGER – DO NOT REMOVE” **AND** identification of the person placing the lock by either labeling and stickers on the body of the lock or an attached personal danger tag.

NOTE: *A BEA or other external contractor under escort may apply their company's personal lock if it meets CWI criteria of red in color, durable, labeling and single-keyed. Primary Authorized Employee, PAE.* An employee trained to the CWI program with qualification QCLTPRIM who exercises overall responsibility for LO/TO development, approval, installation, modification and removal in the company program.

Qualified electrical worker. An individual who is trained and qualified to perform electrical work as defined by PRD-5099, “Electrical Safety.” Qualified electrical workers who are trained and qualified to perform clearances under 29CFR1910.269(d) are also considered to be *OSHA authorized employees* (see def).

Qualified person. A trained or experienced individual authorized to startup, operate, shut down equipment or perform zero energy verifications in accordance with approved procedures or other instructions. The qualified person is trained and qualified to perform the zero energy confirmation but may or may not be an *OSHA Authorized Employee* (see def.) for working under LO/TO. Personnel must be designated by appropriate *Operations Management* (see def).

Safe-to-Work Checks. A “test before touch” evaluation (ie. observation, gauges, venting, proximity testers, thermal sensors, etc.) and is performed or witnessed by each worker working under protection of a LO/TO. Individual workers should perform a safe-to-work check before beginning a work task under LO/TO and continually observe conditions in the work area, recognize the purpose of the LO/TO and practice a questioning attitude about potential hazardous energy or work steps that may challenge the integrity of the LO/TO during work tasks.

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Servicing or maintenance. Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines, equipment, or systems. 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.

Tagout. Placing a danger tag on an isolation device, in accordance with the LO/TO procedure, to indicate that the isolation device and the equipment being controlled cannot be operated until the danger tag is removed.

Tagout device. A tag and its means of attachment, that can be securely fastened to an isolation device in accordance with the LO/TO procedure, to indicate that the isolation device and the equipment being controlled cannot be operated until the tagout device is removed.

Unattended. For the purpose of NFPA 70E, Article 120.2(F)(2)(f)(4), electrical equipment that has been placed in an “electrically safe work condition” (locked/tagged out) shall be considered attended per NFPA 70E, Article 120.2(F)(2)(f)(4). Therefore, retesting for the absence of voltage is not required for equipment that has been placed in an “electrically safe work condition” using LO/TO, shall personnel leave the equipment, so long as the LO/TO has not been removed or modified or circuit conditions changed.

Work group. The work group is the group assigned to and pre-job briefed for the work to be performed under the protection of the LO/TO and may be individual crafts, operations, or support work groups such as radiological control technicians, safety engineers, quality inspectors, systems engineers, escorted persons, etc.

Work group representative. An AE, AE/L, Job Supervisor/Foreman, or designee representing a work group. This person represents the employees of his or her respective work group, when accepting and releasing LO/TOs. The work group may be individual crafts, operations, or individual support work groups such as radiological control technicians, safety engineers, quality inspectors, systems engineers, and so on.

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5. REFERENCES

- DOE Order 422.1, “Conduct of Operations,” Chapter 2, “Lockouts and Tagouts”
- Form 434.39, “ICP Lockout/Tagout Index Sheet”
- MCP-3562, “Hazard Identification, Analysis, and Control of Operational Activities”
- MCP-2974, “Shift Routines and Operating Practices”
- MCP-2978, “Control of Equipment and System Status”
- MCP-2985, “Technical Procedures”
- MCP-2987, “Component Labeling”
- MCP-3651, “Level I & II Lockouts and Tagouts”
- PDD-1066, “Lockout and Tagout Training Program”
- NFPA 70E, “Standard for Electrical Safety in the Workplace,” 2004 and Article 130.7, (E)(4) of 2009
- “OSHA Standards Interpretation and Compliance Letters 09/19/95, Certain provisions of the Occupational Safety and Health Administration’s (OSHA’s) lockout/tagout standard,”
- “OSHA Standards Interpretation and Compliance Letters 11/16/00, Applicability of OSHA’s LOTO Standards; Isolation and Verification Procedures”
- “OSHA Standards Interpretation and Compliance Letters 04/23/07, Application of Control of Hazardous Energy (LOTO) requirements to compressed gas cylinders”
- MCP-101, “ICP Integrated Work Control Process”
- U.S. Department of Labor, Occupational Safety & Health Administration, Standards – Title 29 Code of Federal Regulations, “The Control of Hazardous Energy (Lockout/Tagout)” – 1910.147 and “Safety and Health Regulations for Construction” - 1926.417.
- U.S. Department of Labor, Occupational Safety & Health Administration, Standards – Title 29 Code of Federal Regulations, “Electric Power Generation, Transmission and Distribution” – 1910.269

6. APPENDIXES

- Appendix A, Exempt Activities

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Appendix A

Exempt Activities

1. Installations under the exclusive control of electrical utilities, for the purpose of electrical power generation, transmission, and distribution, including related equipment for communication or metering, which is covered by PMMP-3508, “Clearances and Work Permits.” Blanket service agreements between Power Management and the individual site areas define operating and maintenance responsibilities, including clearance, for high voltage electrical equipment. [29 CFR 1910.269, (d)][29 CFR 1910.147, (a) (1) (ii) (B)]
2. Installations under the exclusive control of electrical utilities, for the purpose of electrical power generation, transmission, and distribution, including related equipment for communication or metering, which is covered by MCP-1383, “INTEC Power Operations Clearances.” [29 CFR 1910.269, (d)][29 CFR 1910.147, (a) (1) (ii) (B)]
3. Exposure to electrical hazards from work on, near, or with conductors or equipment in electric utilization installations, which is covered by PRD-5099, “Electrical Safety.” [29 CFR 1910.147, (a) (1) (ii) (C)] [29 CFR 1910.269, (d)]
4. Servicing or maintenance that involves minor tool changes and adjustments, and other minor servicing activities during normal production operations, which are covered by PRD-5104, “Safeguarding Equipment.” Lockout and tagout is not required as long as the following criteria are met: [29 CFR 1910.147, (a) (2) (ii) (B) (Note)]
 - A. The activities are routine, repetitive, and integral to the use of the equipment for production [29 CFR 1910.147, (a) (2) (ii) (B) (Note)]
 - B. The activities are performed using alternative measures that provide effective protection. [29 CFR 1910.147, (a) (2) (ii) (B) (Note)]
5. Work on cord and plug-connected electrical 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. [29 CFR 19210, 147, (a) (2) (iii) (A)]

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6. Electrical work under individual qualified employee control may be permitted when equipment with exposed conductors or circuit parts is de-energized for minor maintenance, servicing, adjusting, cleaning, inspection, operating conditions, and the like. The work may be permitted to be performed without the placement of lockout/tagout devices on the disconnecting means, provided the disconnecting means is adjacent to the conductor, circuit parts, and equipment on which the work is performed, the disconnecting means is clearly visible to the individual qualified employee involved in the work, and the work does not extend beyond one shift. [NFPA 70E, Article 120.2(D)(1)]

7. *Hot tap* (see def.) 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 **ALL** the following criteria are met: [29 CFR 1910.147, (a) (2) (iii) (B)]
 - A. The appropriate facility manager or supervisor determines that continuity of service is essential [29 CFR 1910.147, (a) (2) (iii) (B) (1)]
 - B. Shutdown of the system is impractical [29 CFR 1910.147, (a) (2) (iii) (B) (2)]
 - C. Documented procedures are followed [29 CFR 1910.147, (a) (2) (iii) (B) (2)]
 - D. Special equipment is used that provides proven effective protection for employees. [29 CFR 1910.147, (a) (2) (iii) (B) (2)]