Universidad de Puerto Rico
Arecibo, Puerto Rico

Programa para el Control de Energía Peligrosa

Preparado por:

Oficina de Salud, Seguridad Ocupacional y Protección Ambiental

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TABLA DE CONTENIDO

UNIVERSIDAD DE PUERTO RICO EN ARECIBO

Oficina de Salud y Seguridad Ocupacional y Protección Ambiental

Programa para el Control de Energía Peligrosa

I. INTRODUCCIÓN

La Administración Federal para la Seguridad y Salud Ocupacional ("OSHA" por sus siglas en inglés) ha promulgado en el Código de Reglamentación Federal la Norma para el Control de Energía Peligrosa (Cierre y Rotulación) 29 CFR 1910.147 (*Ver Anejo A*). Esta norma ha sido puesta en vigor para proteger a los empleados de los efectos peligrosos de la energía (eléctrica, mecánica, química, térmica, neumática e hidráulica) durante los procesos de mantenimiento o reparación de equipo, maquinaria o sistemas.

II. PROPÓSITO

La Universidad de Puerto Rico en Arecibo, consciente de su responsabilidad y para cumplir con la Norma 29 CFR 1910.147, ha desarrollado este Programa para el Control de Energía Peligrosa. Este programa provee los elementos y asigna las responsabilidades que se necesitan para controlar los riesgos que pueden producir lesiones a los empleados que proveen mantenimiento o reparan equipo, maquinaria o sistemas. Los elementos de este programa tienen que aplicarse y las responsabilidades descargarse a cabalidad para asegurar que:

1. La operación de cualquier equipo, maquinaria o sistema se detenga y se aisle de cualquier fuente de energía antes de que cualquier empleado realice actividad alguna durante la cual el arranque o energización inesperada del equipo, maquinaria o sistema y pueda causar la pérdida de propiedad, una lesión o en el peor de los casos la muerte de alguna persona.

2. Se aplicarán los dispositivos de cierre y rotulación necesarios para impedir que el equipo, maquinaria o sistema pueda ser puesto en operación mientras duren las actividades de mantenimiento o reparación.

III. ALCANCE Y APLICACIÓN

A. Esta norma aplica a la Universidad de Puerto Rico en Arecibo cuando:

   1. Se le requiera a un empleado remover o pasar por alto las guardas o dispositivos de seguridad (cualquier mecanismo de seguridad) durante el proceso de reparación o mantenimiento de equipo, maquinaria o sistema.

   2. Se le requiera a un empleado que coloque cualquier parte de su cuerpo dentro del equipo o maquinaria o donde exista cualquier zona de peligro durante el ciclo de operación de éstos, o sea, que exista una condición que

pueda exponer al empleado o parte de su cuerpo a ser atrapado si el sistema se pone en movimiento de manera inesperada.

B. Esta norma no aplica a:

1. Equipos eléctricos cuya exposición a peligros de la energía sean controlados a través de acciones de conectar o desconectar un enchufe y éste se encuentra bajo el control exclusivo del empleado que está brindando los servicios de reparación o mantenimiento.

NOTA: ***EL DESVIO DEL CUMPLIMIENTO DE ESTE PROGRAMA POR PARTE DE CUALQUIER FUNCIONARIO O EMPLEADO PUEDE LLEVAR SANCIONES ADMINISTRATIVAS SEGÚN LO ESTABLECE LA SECCIÓN 35.2.1 DEL REGLAMENTO GENERAL DE LA UPR.***

IV. DEFINICIONES

A. Empleados autorizados: Empleados que tienen dentro de sus responsabilidades dar mantenimiento o reparar equipos, maquinarias o sistemas e implantar el Programa para el Control de Energía Peligrosa de la UPR.

B. Empleados afectados: Empleados que operan el equipo, maquinaria o sistema, pero no participan en los procesos de mantenimiento o reparación de éstos.

C. Dispositivos de aislación de energía: Cualquier artefacto mecánico que físicamente evita la transmisión o descarga de energía. Tales como: cortacircuitos, válvulas de línea, bloques de madera o artículos similares que prevengan la caída de objetos pesados o el cierre de mecanismos.

D. Cierre: Proceso de colocación de algún dispositivo para prevenir lesiones por causa de la operación o movimiento inesperado de equipo, maquinaria o sistema durante actividades de mantenimiento o reparación.

E. Rotulación: Proceso de colocar un aviso de advertencia indicando que el equipo, maquinaria o sistema está en mantenimiento o reparación y no deberá ser activado. Dicho aviso y la escritura de éste deben ser de materiales durables para que la humedad u otras condiciones ambientales no lo deterioren y el mensaje escrito se mantenga legible.

F. Dispositivo de Cierre: Dispositivo que utiliza una cerradura o candado (de llave o combinación) para mantener un dispositivo de aislación de energía en su posición segura, previniendo la energización del equipo, maquinaria o sistemas.

G. Dispositivo de Rotulación: Dispositivo de aviso prominente, tal como un rótulo o etiqueta que se fija a los dispositivos de aislación de energía. Éste se utiliza para indicar que tanto el dispositivo de aislación de energía como el equipo, maquinaria o sistema no se deben operar hasta que se remueva el dispositivo de rotulación.

V. RESPONSABILIDADES

A. Oficina de Salud y Seguridad Ocupacional de UPRA

1. Asegurarse que la Universidad de Puerto Rico en Arecibo ha implantado efectivamente el Programa para el Control de Energía Peligrosa.

2. Coordinar los adiestramientos, re-adiestramientos y cualquier otra actividad similar necesaria para cumplir con la Norma para el Control de Energía Peligrosa e implantarla.

3. Ofrecer ayuda técnica sobre la implantación del Programa para el Control de Energía Peligrosa a las diferentes áreas del Recinto que les aplique.

4. Colaborar con los supervisores en la evaluación de los Procedimientos Operacionales de Cierre y Rotulación e incorporar las revisiones, producto de dichas evaluaciones.

B. Supervisores

1. Supervisar y verificar la implantación del Programa para el Control de Energía Peligrosa del UPRA en el área bajo su responsabilidad.

2. Asegurarse que todo equipo, maquinaria o sistema bajo su responsabilidad y al cual le aplique la Norma para el Control de Energía Peligrosa esté cubierto por este Programa.

3. Desarrollar e implantar los Procedimientos Operacionales de Cierre y Rotulación.

4. Adquirir y mantener los Dispositivos de Cierre y Rotulación necesarios para implantar los Procedimientos Operacionales de Cierre y Rotulación.

5. Vigilar que todos los empleados bajo su supervisión, cubiertos por la Norma para el Control de Energía Peligrosa reciban el adiestramiento que requiere la misma.

C. Empleados

1. Cumplir con los procedimientos establecidos en este programa.

2. Mantener en buen estado los Dispositivos de Cierre y Rotulación y usarlos adecuadamente, cuando sea requerido.

3. Bajo ningún concepto, un empleado deberá tratar de poner en operación, energizar o utilizar maquinaria o equipo que esté bajo un procedimiento operacional de cierre y rotulación.

VI. ELEMENTOS DEL PROGRAMA PARA EL CONTROL DE ENERGÍA PELIGROSA DEL UPRA

A. Identificación de Equipos, Maquinaria y Sistemas

Todos los equipos, maquinarias y sistemas que le aplica la Norma para el Control de Energía Peligrosa han sido identificados. *Ver el Anejo B: Lista de Equipo, Maquinaria o Sistemas donde aplica la Norma para el Control de Energía Peligrosa (29 CFR 1910.147).* Además, en dicho Apéndice se identifica el lugar donde se encuentra localizado el equipo, los dispositivos de Aislación de Energía y de Cierre y Rotulación para cada uno de ellos.

B. Personal

Se ha identificado el personal cubierto por la Norma y al cual le aplica este Programa. *Ver Anejo C: Lista de Empleados Autorizados*.

C. Control de los Dispositivos de Cierre y Rotulación

1. Solicitud, Recibo y Entrega de los Dispositivos

a. Empleados autorizados

i. Antes de comenzar los Procedimientos Operacionales de Cierre y Rotulación los empleados verificarán cuántos y que tipo de dispositivos de cierre y rotulación necesitan.

ii. Solicitarán los dispositivos que necesitan a los supervisores. Recogerán los mismos en el almacén del Taller y firmarán una hoja de recibo. *Ver Anejo D: Hoja de Control para Dispositivos de Cierre y Rotulación*.

b. Supervisores

i. Tendrán disponible los dispositivos de cierre y rotulación requeridos por los empleados autorizados. Esto incluye hacer las requisiciones de dichos dispositivos.

ii. Se asegurarán de llevar un control adecuado sobre los dispositivos de cierre y rotulación. *Ver Anejo D: Hoja de Control para Dispositivos de Cierre y Rotulación*.

2. Devolución de los Dispositivos de Cierre y Rotulación

a. Empleados Autorizados

i. Devolverán los dispositivos que le suministren para realizar los Procedimientos Operacionales de Cierre y Rotulación

ii. Deberán asegurarse de que el supervisor o el encargado del almacén del Taller firme la Hoja de Control (*Ver Anejo D*), como que recibió los dispositivos.

b. Supervisores

i. Deberán asegurarse de que reciben los dispositivos de cierre y rotulación que le suministraron a los empleados.

ii. Firmarán la Hoja de Control (*Ver Anejo D*) como que recibieron los dispositivos.

iii. Evaluarán las condiciones en que se encuentran los dispositivos de cierre y rotulación para determinar cuando sea necesario sustituirlos.

D. Procedimientos Operacionales de Cierre y Rotulación

La Norma para el Control de Energía Peligrosa requiere que se utilicen Procedimientos Operacionales de Cierre y Rotulación para equipo, maquinaria o sistema donde aplique ésta. Éstos son los que se identificaron en la Lista de Equipo, Maquinaria o Sistemas que se encuentra en el *Anejo B* de este programa. *Ver Anejo E: Procedimientos Operacionales de Cierre y Rotulación* de nuestra Unidad.

E. Situaciones Especiales

1. Trabajos en Turnos

Cuando una tarea donde se esté utilizando un Procedimiento de Cierre y Rotulación se extienda por más de una jornada de trabajo regular y otro grupo de empleados la continuará, los empleados que completaron su jornada NO removerán sus candados y rótulos hasta que los que están

llegando al próximo turno estén listos para instalar los suyos. La protección con candados y avisos no deberá ser interrumpida.

3. Contratistas en la UPR

Todo contratista que realice trabajos que conllevan la transmisión o descarga de energía, en las instalaciones de la UPR en Arecibo, tendrá un Programa escrito para el Control de Energía Peligrosa. Copia de este Programa será entregado al Decanato de Administración y/o al Ingeniero a cargo de los trabajos y en la Oficina de Salud, Seguridad Ocupacional y Protección Ambiental de UPRA. Los contratistas y los supervisores responsables de la reparación o mantenimiento de equipo, maquinaria y sistemas deberán intercambiar información acerca de los Programas para el Control de Energía Peligrosa de cada una de las partes. Cada cual se asegurará que los empleados conocen y cumplen con los Procedimientos Operacionales de Cierre y Rotulación del equipo, maquinaria o sistema afectado.

VII. ADIESTRAMIENTOS

La Norma para el Control de Energía Peligrosa (Cierre y Rotulación) requiere que se les provea a los empleados cubiertos por ésta un adiestramiento inicial y de ser necesario, un re-adiestramiento. La Oficina de Salud, Seguridad Ocupacional y Protección Ambiental del Colegio mantendrá los documentos que certifican que estos adiestramientos se llevaron a cabo. Dicha certificación tendrá la siguiente información: nombre, posición del empleado, fecha y lugar del adiestramiento.

El tipo de adiestramiento dependerá de la relación que posea el empleado con la maquinaria o equipo al cual se le aplicará un procedimiento operacional de cierre y rotulación.

A. Adiestramientos a Empleados Autorizados

1. Tipos y magnitud de las fuentes peligrosas de energía en sus áreas de trabajo.

2. Programa para el Control de Energía Peligrosa de UPR en Arecibo.

B. Adiestramiento a Empleados afectados

1. Programa para el Control de Energía Peligrosa de UPR en Arecibo.

2. Se les deberá orientar sobre la importancia de no interferir ni intentar poner en operación o activar algún equipo, maquinaria o sistema que se encuentre bajo un procedimiento operacional de cierre y rotulación.

C. Re-Adiestramiento

1. Cuando los empleados cambian de posición

2. Si se asignan otros deberes a los empleados

3. Si hay cambios en el equipo, maquinaria o sistema

4. Si el supervisor tiene razones para creer que algún empleado no adquirió los conocimientos necesarios para implantar efectivamente el Programa para el Control de Energía Peligrosa.

ANEJOS

ANEJO A

NORMA PARA EL CONTROL DE ENERGÍA PELIGROSA (CIERRE Y ROTULACIÓN) 29 CFR 1910.147

• Part Number:	1910
• Part Title:	Occupational Safety and Health Standards
• Subpart:	J
• Subpart Title:	General Environmental Controls
• Standard Number:	1910.147
• Title:	The control of hazardous energy (lockout/tagout).
• Appendix:	A
• GPO Source:	e-CFR

1910.147(a) *Scope, application, and purpose—*
1910.147(a)(1) *Scope*
1910.147(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 harm employees. This standard establishes minimum performance requirements for the control of such hazardous energy.
1910.147(a)(1)(ii) This standard does not cover the following:
1910.147(a)(1)(ii)(A) Construction and agriculture employment;
1910.147(a)(1)(ii)(B) Employment covered by parts 1915, 1917, and 1918 of this title;
1910.147(a)(1)(ii)(C) Installations under the exclusive control of electric utilities for the purpose of power generation, transmission and distribution, including related equipment for communication or metering;
1910.147(a)(1)(ii)(D) 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
1910.147(a)(1)(ii)(E) Oil and gas well drilling and servicing.
1910.147(a)(2) *Application*.
1910.147(a)(2)(i) This standard applies to the control of energy during servicing and/or maintenance of machines and equipment.
1910.147(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:
1910.147(a)(2)(ii)(A) An employee is required to remove or bypass a guard or other safety device; or
1910.147(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).
1910.147(a)(2)(iii) This standard does not apply to the following:
1910.147(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.
1910.147(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-
1910.147(a)(2)(iii)(B)(1) continuity of service is essential;
1910.147(a)(2)(iii)(B)(2) shutdown of the system is impractical; and
1910.147(a)(2)(iii)(B)(3) documented procedures are followed, and special equipment is used which will provide proven effective protection for employees.
1910.147(a)(3) *Purpose*.
1910.147(a)(3)(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, start up or release of stored energy in order to prevent injury to employees.
1910.147(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.
1910.147(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 servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

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

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

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

Energy source. Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, 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 the 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.

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

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.
1910.147(c) *General* -
1910.147(c)(1) *Energy control program*. The employer shall establish a program consisting of 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, startup or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative.
1910.147(c)(2) *Lockout/tagout*.
1910.147(c)(2)(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.
1910.147(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.
1910.147(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 machine or equipment shall be designed to accept a lockout device.
1910.147(c)(3) *Full employee protection*.
1910.147(c)(3)(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.
1910.147(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.
1910.147(c)(4) *Energy control procedure*.
1910.147(c)(4)(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 deenergize 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 reenergization of the machine or equipment during servicing or maintenance.
1910.147(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:
1910.147(c)(4)(ii)(A) A specific statement of the intended use of the procedure;
1910.147(c)(4)(ii)(B) Specific procedural steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy;
1910.147(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
1910.147(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.
1910.147(c)(5) *Protective materials and hardware*.
1910.147(c)(5)(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.

1910.147(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:
1910.147(c)(5)(ii)(A) *Durable.*
1910.147(c)(5)(ii)(A)(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.
1910.147(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.
1910.147(c)(5)(ii)(A)(3) Tags shall not deteriorate when used in corrosive environments such as areas where acid and alkali chemicals are handled and stored.
1910.147(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.
1910.147(c)(5)(ii)(C) *Substantial* -
1910.147(c)(5)(ii)(C)(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.
1910.147(c)(5)(ii)(C)(2) *Tagout devices*. Tagout devices, including 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.
1910.147(c)(5)(ii)(D) *Identifiable*. Lockout devices and tagout devices shall indicate the identity of the employee applying the device(s).
1910.147(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*.
1910.147(c)(6) *Periodic inspection*.
1910.147(c)(6)(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.
1910.147(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.
1910.147(c)(6)(i)(B) The periodic inspection shall be conducted to correct any deviations or inadequacies identified.
1910.147(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.
1910.147(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.
1910.147(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.
1910.147(c)(7) *Training and communication*.
1910.147(c)(7)(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 acquired by employees. The training shall include the following:
1910.147(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.
1910.147(c)(7)(i)(B) Each affected employee shall be instructed in the purpose and use of the energy control procedure.
1910.147(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.
1910.147(c)(7)(ii) When tagout systems are used, employees shall also be trained in the following limitations of tags:
1910.147(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.
1910.147(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.
1910.147(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.
1910.147(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.
1910.147(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.
1910.147(c)(7)(ii)(F) Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.
1910.147(c)(7)(iii) Employee retraining.
1910.147(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.
1910.147(c)(7)(iii)(B) 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.
1910.147(c)(7)(iii)(C) The retraining shall reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.
1910.147(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.
1910.147(c)(8) *Energy isolation*. Lockout or tagout shall be performed only by the authorized employees who are performing the servicing or maintenance.

1910.147(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.
1910.147(d) *Application of control*. The established procedures 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:
1910.147(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.
1910.147(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 the equipment stoppage.
1910.147(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).
1910.147(d)(4) *Lockout or tagout device application*.
1910.147(d)(4)(i) Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees.
1910.147(d)(4)(ii) Lockout devices, where used, shall be affixed in a manner to that will hold the energy isolating devices in a "safe" or "off" position.
1910.147(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.
1910.147(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.
1910.147(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.
1910.147(d)(5) *Stored energy*.
1910.147(d)(5)(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.
1910.147(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.
1910.147(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 deenergization of the machine or equipment have been accomplished.
1910.147(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:

1910.147(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.
1910.147(e)(2) *Employees*.
1910.147(e)(2)(i) The work area shall be checked to ensure that all employees have been safely positioned or removed.
1910.147(e)(2)(ii) 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.
1910.147(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:
1910.147(e)(3)(i) Verification by the employer that the authorized employee who applied the device is not at the facility:
1910.147(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
1910.147(e)(3)(iii) Ensuring that the authorized employee has this knowledge before he/she resumes work at that facility.
1910.147(f) *Additional requirements*.
1910.147(f)(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:
1910.147(f)(1)(i) Clear the machine or equipment of tools and materials in accordance with paragraph (e)(1) of this section;
1910.147(f)(1)(ii) Remove employees from the machine or equipment area in accordance with paragraph (e)(2) of this section;
1910.147(f)(1)(iii) Remove the lockout or tagout devices as specified in paragraph (e)(3) of this section;
1910.147(f)(1)(iv) Energize and proceed with testing or positioning;
1910.147(f)(1)(v) Deenergize all systems and reapply energy control measures in accordance with paragraph (d) of this section to continue the servicing and/or maintenance.
1910.147(f)(2) *Outside personnel (contractors, etc.)*.
1910.147(f)(2)(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.
1910.147(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.
1910.147(f)(3) *Group lockout or tagout*.
1910.147(f)(3)(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.

1910.147(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:
1910.147(f)(3)(ii)(A) Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group lockout or tagout device (such as an operations lock);
1910.147(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
1910.147(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
1910.147(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.
1910.147(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 start-up of the machine or equipment, or the release of stored energy.

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.
[54 FR 36687, Sept. 1, 1989, as amended at 54 FR 42498, Oct. 17, 1989; 55 FR 38685, 38686, Sept. 20, 1990; 61 FR 5507, Feb. 13, 1996; 76 24698, May 2, 2011]

ANEJO B

LISTA DE EQUIPO, MAQUINARIA O SISTEMAS DONDE APLICA LA NORMA PARA EL CONTROL DE ENERGÍA PELIGROSA (29 CFR 1910.147)

UNIVERSIDAD DE PUERTO RICO
UNIVERSIDAD DE PUERTO RICO EN ARECIBO
Oficina de Salud, Seguridad Ocupacional y Protección Ambiental

LISTA DE EQUIPO, MAQUINARIA O SISTEMAS DONDE APLICA LA NORMA PARA EL CONTROL DE ENERGÍA PELIGROSA (29 CFR 1910.147)

_____
Departamento u Oficina

Equipo, Maquinaria o Sistema	**Localización**	**Dispositivos de Aislación de Energía**	**Dispositivos de Cierre y Rotulación**

Inventario preparado por: _____ Fecha: _____
(Nombre y Firma del Funcionario)

Posición que ocupa: _____

ANEJO C

LISTA DE EMPLEADOS AUTORIZADOS

Oficina de Salud, Seguridad Ocupacional y Ambiental / UPRA

LISTA DE EMPLEADOS AUTORIZADOS
PROGRAMA PARA EL CONTROL DE ENERGÍA PELIGROSA

Nombre	Departamento/ Oficina	Posición

ANEJO D

HOJA DE CONTROL PARA DISPOSITIVOS DE CIERRE Y ROTULACIÓN

Oficina de Salud, Seguridad Ocupacional y Ambiental / UPRA

UNIVERSIDAD DE PUERTO RICO EN ARECIBO
Oficina de Salud, Seguridad Ocupacional y Protección Ambiental

HOJA DE CONTROL PARA DISPOSITIVOS DE CIERRE Y ROTULACIÓN
PROGRAMA PARA EL CONTROL DE ENERGÍA PELIGROSA

Nombre del Empleado	Tipo de Dispositivo	Cantidad	Firma del Empleado	Fecha de Solicitud	Fecha de Devolución	Firma del Supervisor	Comentarios

ANEJO E

PROCEDIMIENTOS OPERACIONALES DE CIERRE Y ROTULACIÓN

Oficina de Salud, Seguridad Ocupacional y Ambiental / UPRA