



DOCUMENT NO.: FBP-OS-PRO-00068	REV. NO. 18	EFFECTIVE DATE: <u>5/1/23</u>
TITLE: Instructions for Lockout/Tagout	<u>5</u> YR PERIODIC REVIEW DATE: <u>11/18/2026</u>	
	APPROVED BY: DATE:	Elise Allison 4/26/23 (Signature on File)

USE CATEGORY:	INFORMATION USE	Page 1 of 48
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Level 2 Administrative Procedure

Revision	Record of Issue/Revision	Affected Pages
18	Minor Revision: Change the name of the SME to Dave Lipinski	Title page

Previous Record of Issue/Revision information is available from the history files.

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1.0 PURPOSE

WARNING

Failure to follow the requirements of this procedure could result in the bodily harm or death to yourself or a co-worker.

- 1.1 This procedure has been developed to provide hazardous energy controls for the protection of personnel while performing servicing and maintenance of machines or equipment in which the unexpected energization or start-up of the machines or equipment, or release of stored energy, could harm employees. This procedure covers applicable parts of Occupational Safety and Health Administration (OSHA) 1910 regulations, applicable parts of National Fire Protection Association (NFPA) 70E standard, National Electrical Safety Code (NESC), and Department of Energy (DOE) O 422.1, *Conduct of Operations*.
- 1.2 This document implements applicable regulatory requirements. They are listed in Appendix A, *Regulatory Requirements Flow Down*.

2.0 SCOPE AND APPLICABILITY

- 2.1 This Level 2 procedure applies to the control of all forms of energy both latent and residual including electrical, hydraulic, pneumatic, mechanical, chemical, thermal, radiation from radiation generating machines, and other potentially hazardous sources such as toxic substances contained within a system.
- 2.2 This procedure applies to all Fluor-BWXT Portsmouth LLC (FBP) personnel, contract labor resource personnel, and contractors/subcontractors at the Portsmouth Gaseous Diffusion Plant (PORTS).
- 2.3 Where electrical hazards are present on the premises wiring side of the service point, employees shall also refer to and comply with FBP-OS-PRD-00001, *Electrical Safety*.
- 2.4 Where electrical hazards are present on the supply side of the service point, employees shall also refer to and comply with FBP-OS-PRD-00003, *Electrical Utility Safety Program*.
- 2.5 The Danger Do Not Operate tag (DDNO) and associated lock(s) mentioned in this procedure, shall be the only devices used for controlling hazardous energy during servicing and maintenance activities and shall not be used for any other purpose.

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2.6 Exceptions:

- A.** This program does not apply to hot-tap operations involving transmission and distribution systems for substances such as gas, water, steam, or petroleum products when performed on pressurized pipelines provided that all of the following conditions are met:
- Continuity of service is essential
 - Shutdown of the system is impractical
 - Documented programs are followed and special equipment is used which will provide proven effective personnel protection
- B.** Lockout/Tagout (LOTO) shall not be used to secure systems or equipment for normal operations, system lineup, or placing equipment in an out-of-service condition for purposes other than activities that could expose a worker to hazardous energy during servicing and maintenance.
- C.** Other federal standards that involve employee protection may be used when the requirements of this procedure cannot be met as long as they provide the same amount of protection for the worker. These situations shall be reviewed, approved and documented by Occupational Safety & Health (OS&H) with the advisement from the LOTO Committee.
- D.** Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs.
- E.** Work on cord-and-plug-connected electric equipment for which exposure to the hazards of unexpected energization or startup 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.
- F.** Use of locks and/or tags for purposes of long-term equipment shutdown or deactivation.
- G.** The control of hazardous energies while servicing motor vehicles will be performed by the steps documented in the Job Hazard Analysis(JHA) FBP-JHA-15-0642, *Garage Vehicle and Equipment Maintenance*.

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- H.** Hazardous energy control for work on heavy construction equipment will be performed using the manufacturer’s recommendations for energy isolation and/or an equipment specific energy control process.

NOTE

Activities requiring machine or equipment shutoff and disassembly, such as changing a machine tool or cutting blade, replacement of belts, valves, gauges, linkages, support structure, etc., which take place outside of the normal production process **DO NOT QUALIFY** for this exception to LOTO requirements.

- I.** Minor tool changes, adjustments and other minor service activities which take place during normal production operation, if they are routine, repetitive, and integral to the use of the equipment and alternative protective measures are employed. In such cases, the employee is not permitted to remove or bypass a guard or other safety device, or place any part of the body within the point-of-operation or danger zone during an operating cycle.
- J.** Work involving energized electrical equipment in accordance with FBP-OS-PRO-00102, *Energized Electrical Work Permit*.
- K.** Overhead cranes may be placed out of service by the Facility Manager and are not required to be under LOTO when other tasks are being performed in the area or path of the crane. When placed out of service, FBP-OS-PRO-00014, *Accident Prevention/Equipment Control Tags*, shall be followed.

3.0 GENERAL INFORMATION

3.1 Section 6.0, *Actions*, dictates the requirements for initiating, preparing, issuing, accepting, working, and releasing LOTO. It is separated into four sections:

- A.** Determining LOTO Requirements
- B.** Implementing LOTO
- C.** Guidelines for performing System Isolation Verification (SIV)
- D.** Special Conditions

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- 3.2** Specific situations, or unusual conditions, may require an interpretation of this procedure and its requirements. In order to ensure consistency of application across the Site and monitor for adverse trends, a LOTO Committee has been designated by the Executive Safety Council. The purpose of this committee is to review LOTO events for trends and recommend changes and to review requests for an interpretation from a facility or individual to determine compliance with the requirements of this procedure from the request, and to approve or disapprove the request in conjunction with OS&H. All approved interpretations will be communicated to the site through the daily safety sheet or alerts, and will include distribution to the Facility Managers.
- 3.3** LOTO hardware such as locking devices, locks, tags, and keys which are applied in the field but are no longer part of an active LOTO Permit, will be addressed as a legacy issue and managed by the Facility Manager and/or Plant Shift Supervisor (PSS).
- 3.4** Upon issuance of the revision of this procedure, all existing active permits will remain valid until such time that they are revised, reissued, or closed. When a revision or reissuance is required, the permit must comply with the requirements of this procedure.
- 3.5** Engineering will assist Issuing Authorities in determining isolation points and/or develop additional engineering controls as required when systems are determined to be complex and additional information is needed to ensure all isolation points are captured.
- 3.6** Managers will designate employees to serve as Issuing Authorities (IAs), System Operators, and Supervisors for the purpose of this procedure and ensure the requirements of this procedure are met. Managers will also verify annual LOTO assessments are complete and LOTO records are managed according to Section 7.0, *Records*, of this procedure.
- 3.7** To confirm employees receive the appropriate level of LOTO training when required, managers will ensure:
- Authorized Employees (AEs) receive LOTO classroom training in recognition of hazardous energy sources, type of hazardous energy available in the workplace, and methods and means necessary for energy isolation.
 - IAs who designate system alignment, determine SIVs, issue, or close permits receive additional training (e.g., mentoring, demonstrated proficiency) on these requirements to be a competent IA for their assigned area.
 - Employees who perform system alignments (System Operators) are competent to perform the tasks of aligning Energy Isolation Devices (EIDs) through additional training such as mentoring and/or demonstrated proficiency.

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- Supervisors who accept LOTO Permits are trained to the level of understanding proper placement of locking devices, LOTO perimeters, and SIV techniques.

3.8 OS&H will serve as the contact point for resolution/questions to the LOTO procedure and assist, when needed, in determining secondary safety measures as it applies to premises wiring isolations in this procedure. OS&H will also define the level of training for each employee who may be required to perform a role under the requirements of this procedure.

3.9 OS&H will be responsible for initiating revisions to the LOTO procedure, ensure a periodic inspection of the LOTO procedure is performed, and designates what locking devices and locks are to be used.

3.10 Personnel in charge of lock assignments will maintain the records of lock codes and group key assignments issued for lockout and verify that locks used for lockout meet the following requirements:

- Substantial in construction
- Red in color
- Uniquely marked to identify user's personal LOTO lock
- Personal locks have one key per lock(s). Up to three keyed alike locks are allowed per Authorized Employee.
- Permit Locks have one key per lock
- Department Locks have multiple keys per set of locks
- Tag Locks have one key per set of locks
- Reserved exclusively for the LOTO Program

3.11 The Training department will develop and conduct training for the following levels of need:

- Provide training to IAs on understanding the controls and isolation of hazardous energy and implementing a LOTO Permit.
- Provide training to Supervisors on the acceptance of a LOTO Permit and the process for Independent Verification.

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- Provide the necessary training to AEs on their role as it relates to working under LOTO while performing servicing and maintenance on machines or equipment.
- Provide re-training for employees whenever, as identified by Management and/or OS&H there is a change in the equipment or processes that present a new hazard, when there is a change in the energy control procedures, or when there are deviations or inadequacies in the employee's knowledge or use of the procedure.

3.12 Power Operations serves as IA when multiple groups are involved in an electrical isolation/de-energization function which encompasses feeder outages throughout multiple buildings.

3.13 Utility Operations serves as IA when multiple groups are involved in a mechanical isolation/de-energization function such as water, steam, or air which encompasses outages throughout multiple buildings.

3.14 Appendix B, *Hazardous Energy Assessment* and Appendix C, *Pneumatic Energy Limits Requiring LOTO*, provides guidance to the Issuing Authority for determining if a hazardous energy exists. While the tables do provide minimum values for when lockout is required, it is the responsibility of the Issuing Authority to make a determination based on their knowledge of the system and the task that is being performed if a hazardous energy exists at lower levels below the values listed.

3.15 Attachment A, FBP-OS-PRO-00068-F01, *Lockout/Tagout Work Permit*, provides the permit and field instructions for working under a permitted LOTO.

3.16 Appendix E, *LOTO Permit Checklist*, included in this procedure may be used as an additional check while preparing a LOTO Permit or as a guide when performing LOTO assessments. It is not intended to be implemented as part of the LOTO procedure.

4.0 USE REFERENCES

- A. FBP-BS-PRO-00062, *Records Management Process*
- B. FBP-JHA-15-0642, *Garage Vehicle and Equipment Maintenance*
- C. FBP-OS-PRD-00001, *Electrical Safety*
- D. FBP-OS-PRD-00003, *Electrical Utility Safety Program*
- E. FBP-OS-PRO-00014, *Accident Prevention/Equipment Control Tags*
- F. FBP-OS-PRO-00102, *Energized Electrical Work Permit*

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5.0 RESPONSIBILITIES

5.1 Issuing Authority (IA)

- 5.1.1** Reviews this procedure and completes any required training prior to performing any action step in this procedure.
- 5.1.2** Demonstrates knowledge of the equipment or machine that is being serviced or maintained for their assigned area and understands the hazards of the energy to be controlled and how to isolate them.
- 5.1.3** Reviews and understands applicable system drawings to determine and establish energy isolation points.
- 5.1.4** Reviews job scope and determines whether a hazardous condition exists or may develop.
- 5.1.5** Assists in determining whether work can be performed under non-permitted (single source) or permitted LOTO with the Supervisor and AE.
- 5.1.6** Determines isolation points and position of EIDs.
- 5.1.7** Determines SIV method to be used to ensure system has been isolated.
- 5.1.8** Defines location of SIV method to be performed.
- 5.1.9** Ensures LOTO Permit and isolation includes stored energy release checks and prevention of accumulation of energy during period of LOTO.
- 5.1.10** Obtains assistance, as needed, to determine additional protection and appropriate engineering controls when hazardous conditions cannot be completely isolated.
- 5.1.11** Ensures affected employees are notified whenever LOTO might affect their work activity.
- 5.1.12** Performs annual assessment on active permits 90 days and older as directed by the Manager.
- 5.1.13** Establishes the permit protection and issues, maintains, and closes FBP-OS-PRO-00068-F01, or electronic LOTO Permit.

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5.1.14 Logs all permits issued on FBP-OS-PRO-00068-F04, *LOTO Permit Log* or electronic LOTO Permit log.

5.1.15 Assists with action steps under Section 6.5, *Special Conditions*, of this procedure when applicable.

5.2 System Operator

5.2.1 Reviews this procedure and completes any required applicable training prior to performing any action steps in this procedure.

5.2.2 Demonstrates knowledge on aligning systems or equipment to isolate and control hazardous energy in preparation for servicing or maintenance.

5.2.3 Assists the Concurrent Verifier when aligning the system to ensure locking devices and lock/tags are placed properly on EIDs.

5.2.4 Assists with action steps under Section 6.5 of this procedure when applicable.

5.3 Concurrent Verifier

5.3.1 Reviews this procedure and completes any required applicable training prior to performing any action steps in this procedure.

5.3.2 Assists the System Operator to concurrently verify the correct alignment of EID's locking devices and locks and/or tags are properly installed.

5.3.3 Demonstrates knowledge on aligning systems or equipment to isolate and control hazardous energy in preparation for servicing or maintenance.

5.4 Supervisor

5.4.1 Reviews this procedure and completes any required applicable training prior to performing any action steps in this procedure.

5.4.2 Reviews job scope and assists in determining with the IA or AE whether a hazardous condition exists or may develop.

5.4.3 Assists in determining whether work can be performed under non-permitted (single source) or permitted LOTO with the IA and AE.

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- 5.4.4 Documents job scope on permit, reviews FBP-OS-PRO-00068-F01 or Electronic LOTO Permit, performs Independent Verification of locking devices and locks/tags, overlocks lockboxes, and accepts permit.
- 5.4.5 Ensures work performed is within perimeter of LOTO protection.
- 5.4.6 Ensures the continuity of LOTO protection is communicated between shifts.
- 5.4.7 Determines the isolation verification method to be performed under a non-permitted (single source) LOTO or may assist the IA in determining the SIV under a permitted LOTO.
- 5.4.8 Coordinates with IA to obtain the protection needed for LOTO Permit handling purposes involving vendors and/or subcontractors.
- 5.4.9 Assists with action steps under Section 6.5 of this procedure when applicable.

5.5 Authorized Employee (AE)

- 5.5.1 Reviews applicable sections of this procedure and completes any required training prior to performing any action steps in this procedure.
- 5.5.2 Reviews job scope and assists in determining with the IA or supervisor whether a hazardous condition exists or may develop.
- 5.5.3 Complies with the requirements of this procedure while performing work within the perimeter of protection for non-permitted (single source) or permitted LOTO.
- 5.5.4 Assists in determining whether work can be performed under non-permitted (single source) or permitted LOTO with the IA and the Supervisor.
- 5.5.5 Understands the perimeter of protection that EIDs provide so work task does not exceed that boundary.
- 5.5.6 Ensures personal lock(s) are not accessible to other employees when not in use. AEs may not share personal locks with other employees.
- 5.5.7 Applies a personal lock(s) to either an EID while performing a single source LOTO or to a group lockbox for permitted LOTO's when work begins, and removes the personal lock(s) when work has been completed or at the end of shift, on the machine or equipment being serviced or maintained.

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5.5.8 Verifies the presence of a Department lock on a Permit or Satellite box.

5.6 Project Supervisor

5.6.1 Reviews this procedure and completes any required applicable training prior to performing any action steps in this procedure.

5.6.2 Ensures contractor/subcontractor employees receive appropriate training for performing work under LOTO as applicable.

5.6.3 Walks the perimeter of protection and EID points with the contractor/subcontractor personnel to ensure protection is adequate.

5.7 Plant Shift Superintendent (PSS)

5.7.1 Directs and authorizes removal of locks/tags under special conditions or circumstances that are not covered under this procedure.

5.7.2 Assists with action steps under Section 6.5 of this procedure when applicable.

5.8 System Isolation Verifier

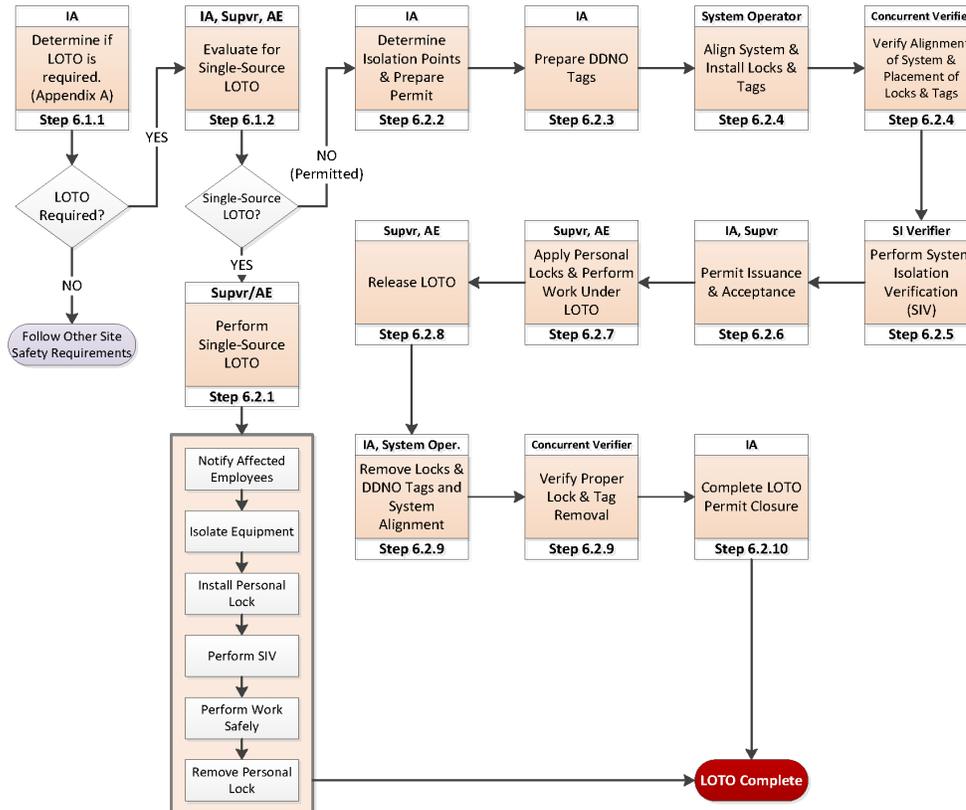
5.8.1 Reviews this procedure and completes any required applicable training prior to performing any action steps in this procedure.

5.8.2 Ensures hazardous energy sources have been effectively isolated, residual or stored energy has been blocked, and equipment will not start from inadvertent activation of operating controls.

5.8.3 Ensures appropriate training to the requirements of NFPA 70E for shock/arc flash hazards have been met and the proper selection and use of voltage test equipment is used when performing absence of voltage tests.

6.0 ACTIONS

6.1 Determining LOTO Requirements



IA

6.1.1 Determine whether a hazardous energy exists.

IA/Supervisor/AE

6.1.2 Determine, based on the scope of the work, if task can be performed under a non-permitted (single-source) LOTO and ensure communication is established with the affected employees based on the following criteria:

- A. Machine or equipment has no potential for latent or residual energy or re-accumulation of stored energy after shutdown which would endanger employees.
- B. Machine or equipment has a single energy source, which can be readily identified and isolated.

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- C. Isolation of the energy source completely de-energizes and deactivates the machine or equipment.
- D. LOTO device will be installed and under exclusive control of the AEs performing the servicing or maintenance (i.e., each AE must apply his/her lock).
- E. A single locked out device will achieve a locked out condition for the task being performed.
- F. A reasonable effort is made through document reviews and interviews to ensure there is no known history of any incidents involving unexpected activation/re-energization of subject equipment or related system during servicing/maintenance.
- G. Work will be completed in a single shift, or continuous shift with overtime.
- H. For the purpose of this procedure, electrical utility cutouts shall be considered as a locked out device when the fuse links are removed from the fuse holder and locked to the base of the pole or readily visible location on the closest structure.

6.1.3 IF all of the conditions of Step 6.1.2 for a non-permitted (single-source) LOTO are met, **THEN** proceed to Step 6.2.1.

6.1.4 IF all of the conditions of Step 6.1.2 are **NOT** met, **THEN** proceed to Step 6.2.2 for a permitted LOTO.

6.2 Implementing LOTO

6.2.1 Non-Permitted (Single-Source) LOTO

Supervisor/AE

- A. Determine the isolation verification method to be performed.
- B. Notify affected employees, if applicable, prior to application of controls.

AE

- C. Isolate the equipment to a safe energy state.
- D. Each AE shall install his/her personal lock to secure the EID.
- E. Assume the system contains hazardous energy until proven otherwise. Appropriate Personal Protective Equipment (PPE) must be worn until the SIV is completed.
- F. Witness or perform an SIV of the equipment to ensure a safe working condition.

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- G. Commence work on the isolated equipment.
- H. Remove personal lock upon task completion.
 - All AEs shall apply/remove their own personal locks. Under no circumstances is it permitted to remove another AE's lock.
- I. Ensure system is in a safe condition prior to removing personal locks.

6.2.2 LOTO Work Permit Preparation

NOTE

If valves or other system configurations are relied upon for system isolation verification during the Lockout/Tagout process, (ensuring flow/no flow) the energy isolation devices shall be included in the LOTO process and locked/tagged accordingly using appropriate LOTO locks or tags. Valves relied upon to prevent the possibility of re-accumulation of stored or residual energy to a hazardous level, shall be locked/tagged accordingly using appropriate LOTO locks or tags after the energy has been dissipated.

IA

- A. Determine EID points, position of EIDs, and SIV method(s) to be performed according to equipment and/or job description.
- B. **IF** the condition of the system cannot be accurately determined or if the system's energy state is unknown, **THEN** use expanded protection in the issuance of FBP-OS-PRO-00068-F01. Examples of expanded protection include the following:
 - Redundant safety precautions, such as isolating hazardous energy sources further up/down stream, installation of blinds, or blanks, complete system outage, double blocking, isolating electrical energy sources further upstream etc.
- C. **IF** equipment cannot be completely isolated/de-energized to eliminate hazardous energy, **THEN** request Engineering assistance in determining/developing additional engineered controls.
- D. Record the following information on FBP-OS-PRO-00068-F01 and enter "N/A" in applicable unused blocks.

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NOTE

The sequence of steps taken in the issuance of the LOTO Permit may be determined by the IA. Section numbers in action steps below correspond to Section numbers for each field on the LOTO Permit.

- 1) Document location of equipment and/or area where work is to be performed (**Section 1**).
- 2) List brief job description of work to be performed (**Section 2**).
- 3) List specific equipment to be worked on (**Section 3**).
- 4) Check “Yes” on *Tagout Sequence to Be Followed* Section, if protection applied is to follow the order listed on the permit or “No” if sequence is not needed (**Section 4**).
- 5) Enter the tag number to be applied on each device (**Section 5**).
- 6) List Energy Isolating Device(s) (**Section 6**).
- 7) State required alignment position of component to provide energy isolation (**Section 7**).
- 8) State “Yes” if a lock is to be applied and “No” if not lockable (**Section 8**).

NOTE

Electrical utility cutout fuse links that are opened but not removed from the cutout assembly are considered not lockable. DDNO tags shall be prominently displayed at the base of the pole.

- 9) **IF** devices are not lockable when isolating on the premise wiring side of the service point and the tagout method is used, **THEN** implement additional safety measure(s) such as removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device. The additional safety measure shall be documented in the *Remarks Section* of the LOTO Permit (**Section 12**).
- 10) Check “Yes” if additional Energy Isolation Device pages are needed or check “No” if additional Energy Isolation Device pages are not needed. (**Section 9**).
- 11) Document applicable cautions. This identifies other hazards (e.g., high noise area, overhead power lines, fall hazards) as well as conditions where specific points/circuits were not de-energized and isolation steps such as blanks and/or covers were used (**Section 10**).

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- 12) Determine and document SIV method(s) to be performed to ensure isolation of each system. (i.e., Visual, Functional, Absence of Voltage Test) (**Section 11**).
- 13) Enter any abnormal conditions, anomalies, or other information as needed (**Section 12**).
- 14) Enter Name (**Section 13**).
- 15) Enter LOTO Work Permit Number (**Section 14**). (Example: 16-326-001; year, building/area, sequential number) Ensure all applicable pages include the LOTO Permit number.
- 16) Log permit number and all applicable information on *LOTO Permit Log*, FBP-OS-PRO-00068-F04.

6.2.3 DDNO Tag Preparation

IA

- A. Enter the name of the group applying the tag.
- B. Enter the position of the component.

NOTE

Tag number consists of LOTO Work Permit number, dash, and sequential number for each tag. (Example: permit number 10-326-1 is tag numbered 10-326-1-1, 10-326-1-2, etc. [10 - the year; 326 - location; 1 - permit sequence, and 1 or 2 - the tag sequence]).

- C. Enter tag number.
- D. Enter the name and number, if applicable, of the device being used as an EID to which the tag is applied.
- E. DDNO tear-off tabs for EIDs that are lockable shall not be filled in or removed.
- F. For devices that are not lockable:
 - 1) Enter tag number on tear-off tab (same as tag number).
 - 2) Enter the device identification on tear-off tab (same as the device identification entered in Step 6.2.3D above).
- G. Notify affected employees prior to application of controls if applicable.

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6.2.4 Placement of Tag Locks and DDNO Tags, Performing Concurrent Verification, and Placement of Tag Lock Keys/Tabs

System Operator

NOTE

When applying a tag to a non-lockable EID, the 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.

- A. Perform machine or equipment shutdown if necessary.
- B. Align the EID(s) in accordance with LOTO Permit.
- C. **IF** alignment cannot be made, **THEN STOP** and notify IA.
- D. Dissipate stored energy by appropriate methods when necessary.

Concurrent Verifier

- E. Verify alignment of EID(s) in accordance with LOTO Permit.

System Operator

- F. Apply locking device and lock, when capable of being locked out, to EID(s) identified on FBP-OS-PRO-00068-F01 or apply tag to EID(s) not capable of being locked out and ensure tear-off tab is removed from tag. **IF** it cannot be determined that an EID is capable of being locked out, **THEN** contact the LOTO SME or OS&H.
- G. **IF** a tag cannot be affixed directly to the EID, **THEN** 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.
- H. Document by initialing the *Aligned/Locked/Tagged By* Section (**Section 15**).

Concurrent Verifier

- I. Verify placement of locking device and lock/tag.
- J. Document by initialing the *Status/Lock/Tag Verified By* Section (**Section 16**).

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NOTE

System Isolation Verifications may be performed concurrently during alignment of the system while placing locking devices and lock/tags.

IA

- K.** Place all tag lock keys and/or DDNO tabs in permit lockbox and document building, box number, and key number(s) upon completion of system alignment and lock/tag placement (**Section 17**).
- L.** Verify tag-lock key(s) and tear-off tabs are visibly displayed in permit lockbox.
- M.** Apply the Department Lock to permit lockbox.

6.2.5 System Isolation Verification

System Isolation Verifier

- A.** Assume the system contains hazardous energy until proven otherwise. Appropriate PPE must be worn until the SIV is completed.
- B.** Perform System Isolation Verification(s) as specified on FBP-OS-PRO-00068-F01 (**Section 11**).
- C.** Ensure a signature and date are documented when specified SIV is completed. Document N/A on second signature line if only one SIV is required (**Section 18**).

6.2.6 Permit Issuance/Acceptance

Supervisor

- A.** Meet with the IA to discuss and agree that the protection is adequate for the job scope and craft performing the work.
- B.** Document job scope and craft performing the work in *Job Scope* Section (**Section 19**).
- C.** Review the “System Isolation Verification” Step(s) that were performed to determine if actions taken were adequate to determine isolation.

IA

- D.** Complete the *IA Confirms Protection for Job Scope/Craft* Section (**Section 20**).
 - For electrical utility isolations, this step will be considered the Clearance for Work where absence of voltage tests and grounding may be applied.

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- E. Maintain the original FBP-OS-PRO-00068-F01.
- F. Make a single working photo copy of the pages entitled *General Information Section* and *Protection Applied Section* of FBP-OS-PRO-00068-F01.
- G. Stamp or write COPY or WORKING COPY (in red ink) on the FBP-OS-PRO-00068-F01 copy.
- H. Give the FBP-OS-PRO-00068-F01 copy to the Supervisor.

Supervisor

- I. Apply personal/permit lock to permit lockbox.

WARNING
Do not attempt to manipulate or change status on any EID during verification process.

- J. Perform a walkdown of the EID(s) to verify each point of protection has been locked and/or tagged.
- K. **IF** protection is adequate, **THEN** initial the shaded *Lock/Tag Verified By* Section on FBP-OS-PRO-00068-F01 copy (**Section 21**).
- L. **IF** protection is not adequate (wrong tag is on device, lock is not correctly applied, etc.), **THEN STOP** and return permit to IA.
- M. Complete the *Independent Verification Performed By* Section of original FBP-OS-PRO-00068-F01 (**Section 22**).
- N. **IF** using a permit lockbox for overlocking, **THEN** replace personal lock with Department Lock.
- O. **IF** using a satellite lockbox for overlocking, **THEN** replace personal lock, if used with permit lock and perform the following:
 - 1) Place the permit lock key in the appropriate satellite lockbox and ensure the key number is visible.
 - 2) Overlock the satellite lockbox with a Department Lock.
- P. Complete the *Satellite Box I.D.* Section of FBP-OS-PRO-00068-F01 copy (**Section 23**).
- Q. Complete *System Alignment Accepted By* Section on original FBP-OS-PRO-00068-F01 (**Section 24**).

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NOTE

ALL applicable sections of permit and Permit Log MUST be filled out or marked as Not Applicable

IA

- R.** Complete *Permit Issued by (Issuing Authority)* Section on original FBP-OS-PRO-00068-F01 (**Section 25**).
- S.** Make a working copy of the *Permit Issue* Section of FBP-OS-PRO-00068-F01.
- T.** Stamp/write COPY or WORKING COPY (in red ink) on the permit copy.
- U.** Give copy of FBP-OS-PRO-00068-F01 to the Supervisor.
- V.** Document LOTO Permit information on LOTO Permit Log FBP-OS-PRO-00068-F04 or verify information in electronic version.

6.2.7 Performing Work Under LOTO

NOTE

When work is requested of a support group by a Supervisor who has been issued a permit, and the scope of work is within the perimeter of protection for the support group; the support group AE may work under the requesting Supervisor's permit and is not required to perform an Independent Verification, but is required to lock onto the requesting Supervisor's permit lockbox (or satellite lockbox, if used).

AE

- A.** Review FBP-OS-PRO-00068-F01.
- B.** Ensure the presence of the correct Department Lock and permit/satellite box number.
- C.** Apply personal lock to the permit lockbox or satellite lockbox prior to starting work or ensure personal lock is still applied when returning to work.
- D.** Perform an Independent Verification of the isolated system if desired.

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NOTE

Qualified employees may choose to perform an absence of voltage test themselves if they are not present for the initial voltage test.

- E. WHEN** there are exposed electrical conductors or circuit parts present when working on premises wiring, **THEN** an absence of voltage test shall be performed by at least one qualified electrical worker performing the work before touching exposed conductors, when circuit conditions change, or when the job location has been left unattended.
- F. WHEN** there are exposed electrical conductors or circuit parts present when working on the supply side of the service point, **THEN** an absence of voltage test shall be performed by at least one qualified electrical worker performing the work before touching exposed conductors. Conductors shall not be considered de-energized until grounds are applied.
- G.** Perform work as required by work package or procedure.
- H. WHEN** work is completed, **THEN** remove personal lock.
- I.** All AEs shall remove their own personal locks. Under no circumstances is it permitted for an AE to remove another AEs lock unless directed under the supervision of the PSS.
- J.** Repeat Steps 6.2.7(A) thru 6.2.7(D) at the start of each work assignment or when conditions change.

6.2.8 Releasing LOTO When Work is Complete

AE

- A.** Inspect the work area to ensure nonessential items have been removed and to ensure machine or equipment components are operationally intact, as applicable.
- B.** Remove personal locks.

Supervisor

- C.** Inspect the work area to ensure it is safe to release FBP-OS-PRO-00068-F01.
- D.** Verify all personal locks have been removed from permit or satellite lockbox.
- E.** Remove Department Lock from permit box.
- F. IF** a satellite lockbox is used, **THEN** retrieve permit lock key from the satellite lockbox and remove permit lock from permit lockbox.

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- G. Return FBP-OS-PRO-00068-F01 copy to the IA.
- H. Document number of grounds applied in the Number Grounds Applied Section of the original FBP-OS-PRO-00068-F01 (**Section 26**).
- I. **IF** no grounds are applied, **THEN** enter “0.”
- J. Document number of grounds removed in the *Number Grounds Removed* Section of the original FBP-OS-PRO-00068-F01 (**Section 27**).
- K. **IF** no grounds were removed, **THEN** Enter “0.”
- L. Complete the *Permit Released by (Supervisor)* Section of the original FBP-OS-PRO-00068-F01 (**Section 28**).
- M. Ensure Craft, Time, and Date have been entered.

6.2.9 Removal of Tag Locks, DDNO Tags, and EID Alignment

IA

- A. Verify all the Supervisors have signed off on FBP-OS-PRO-00068-F01.
- B. Inspect the work area and determine whether it is safe to remove the LOTO protection.
- C. Remove Department Lock from permit lockbox.
- D. Retrieve tag lock key(s) and/or DDNO tab(s) from permit lockbox.
- E. Initial *Tag Removal Authorization* Section of original FBP-OS-PRO-00068-F01 indicating alignment and sequence if applicable (**Section 29**).

System Operator

- F. Ensure permit tag numbers and/or tear-off tabs being removed match with FBP-OS-PRO-00068-F01.
- G. Remove locking device(s) and lock/tag(s).

NOTE

The following includes components not previously locked/tagged that are necessary to support restoring equipment to service. Component alignment or repositioning must be in accordance with valving orders, operating procedures, or other approved means outside the LOTO procedure.

- H. Ensure component position or status is not changed during clearing of locks and tags.

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- I. Initial the *Lock/Tag Removed By* Section of original FBP-OS-PRO-00068-F01 for each isolation point (**Section 30**).

Concurrent Verifier

- J. Verify and initial the Tag Removal Verified By Section of original FBP-OS-PRO-00068-F01 (**Section 31**).

6.2.10 Closing FBP-OS-PRO-00068-F01

IA

- A. Fill in appropriate page numbers for permit on the bottom of each page of the permit.
- B. Complete the Permit Closure Section of original FBP-OS-PRO-00068-F01 closing out the permit (**Section 32**).
- C. Document the date of closure on FBP-OS-PRO-00068-F04 or verify information in electronic version.
- D. Maintain the original FBP-OS-PRO-00068-F01 and copies returned in Step 6.2.8G for one year or according to FBP-BS-PRO-00062, *Records Management Process*.
- E. Dispose of LOTO tags.

6.3 Assessments and Inspections

6.3.1 Periodic Inspection

OS&H Professional

- A. Ensure a periodic inspection is performed of the energy control procedure at least annually.
- B. Perform the annual inspection or direct appropriate IAs and AEs in performance of this inspection. Refer to OSHA-CPL-02-00-147, *The Control of Hazardous Energy – Enforcement Policy and Inspection Procedures*, for guidance on developing an inspection plan.
- C. Determine active permits targeted for inspection.
- D. Review permits selected for inspection to ensure the procedure is being followed.
- E. Review responsibilities with AEs working under the permits selected for inspection.
- F. Review the interaction between AEs and affected employees prior to LOTO installations and removals.

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6.3.2 Annual Assessment

Manager

- A. Assign IA to perform an annual assessment of active permits 90 days and older. The assessments should be conducted every 12 months and shall cover at least the following areas:
- 1) Continuing need for the permit
 - 2) Accuracy of permits and logs including component positions
 - 3) Condition of tags/hardware (legibility, secure attachment, etc.)

6.4 Guidelines for Performing System Isolation Verifications

6.4.1 System Isolation Verifications for Mechanical, Pneumatic, or Fluid Systems

System Isolation Verifier

- A. For systems that operate at high temperatures (e.g., greater than 200°F for a water/steam system) or high pressures (e.g., greater than 500 psig) or hazardous materials, the following shall apply:
- 1) Isolate systems by two valves in series and vent the isolated section.
 - 2) Open a telltale vent or drain valve between the isolation valves.
 - 3) **WHEN** any of these conditions exists and two-valve isolation cannot be provided, **THEN** obtain IA and Facility Manager approval before performing work.
 - 4) Document exceptions to the two-valve isolation in the cautionary notes of the LOTO Permit and in the work package. Obtain approval from the Facility Manager and document on permit (**Section 10**).
- B. Ensure personnel are not exposed, then verify the isolation of the equipment by:
- Operating the push button or other normal operating control(s) (if the controls are not DDNO tagged).
 - Testing to make certain the equipment will not operate and residual energy has been released.
 - Considering whether there are any interlocks or permissives that may prevent operation of the equipment.
- C. Check position indicators on electrical isolation devices or disconnecting devices to verify the devices are open.

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- D. Verify gauges that monitor temperature, pressure, flow, etc., are operational before isolating system if they will be used to verify isolation of the system.
- E. Verify depressurization by visual verification to avoid breaking flanged connections, loosening valve bonnets, removing instrument tubing, or other similar actions unless no other means for verifying depressurization exist. Strict supervisory controls and advance planning are required if these methods are used.
- F. Monitor vent(s) and/or drain valve(s) after the system is drained or vented, as appropriate, to verify system pressure is released.
- G. For chemical hazards, ensure the system/equipment has been purged, evacuated and/or prepared per the applicable procedure.

6.4.2 System Isolation Verifications for Premises Wiring

System Isolation Verifier

NOTE

A Limited Approach Boundary shall be established prior to a System Isolation Verification (voltage test) being performed by a qualified electrical worker. The proper PPE as defined by the electrical hazard analysis, and/or the Work Control Document (WCD) for the work to be performed must be worn during the SIV.

- A. **IF** isolating electrical energy for the purpose of performing servicing or maintenance on mechanical equipment, **THEN** perform a functional test, such as the operation of pushbuttons, selector switches or electrical interlocks to verify isolation and de-energization of the machine or equipment has been accomplished.
- B. **IF** isolating electrical energy for the purpose of exposing employees to exposed conductors or circuit parts, **THEN** complete an absence of voltage test by performing the following:
 - 1) Use an adequately rated voltage detector to test each phase conductor or circuit part to verify they are de-energized.
 - 2) Test each phase conductor or circuit part both phase-to-phase and phase-to-ground.
 - 3) Before and after each test, determine the voltage detector is operating satisfactorily.

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- 4) Except in cases where not practical, or in the presence of a greater hazard (e.g., unnecessary exposure), perform an absence of voltage test at the physical work location or the closest accessible isolation device, component, or test point that will allow for a comprehensive test of the LOTO perimeter. Additional checks are allowable at the EID, when desired or deemed necessary.
- 5) **WHEN** planning and there is no accessible exposed point to take voltage measurements, **THEN** include alternate methods of verification.

6.4.3 System Isolation Verifications for Electrical Utility

System Isolation Verifier

NOTE

Qualified employees may choose to perform an absence of voltage test themselves if they are not present for the initial voltage test.

- A. Visually verify all blades of the disconnecting devices are fully open or draw-out type circuit breakers are withdrawn to the fully disconnected position.
- B. An electrically qualified person shall perform a voltage test using a rated contact meter, proximity detector, or other capacitive sensor-type testing devices before being exposed to contact of conductors by means of crossing the minimum approach distance.
- C. Visually verify fuses have been removed.
- D. Visually verify jumpers have been removed or isolated from circuit and secured.

6.5 Special Conditions

6.5.1 Temporary Clearance of LOTO Tags for Testing of Equipment

NOTE

Where necessary locks/tags may need to be cleared on permitted systems to allow testing to be performed. This section is intended to cover permitted systems that are to be tested. Such tests may be electrical, pressurized, etc. The intent is to assess the potential hazard testing may pose to other permit holders.

Supervisor

- A. **IF** equipment is to be test run, **THEN** notify IA equipment is ready to be tested.

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IA

- B.** Coordinate with all LOTO Permit Holders to perform the following:
 - 1) Confirm the component/system is ready/safe to be tested.
 - 2) Contact LOTO Permit Holders to release permit.

Supervisor

- C.** Remove installed grounds if applicable (**Section 27**).
- D.** Confirm the component/system is ready/safe to be tested.
- E.** Sign off on FBP-OS-PRO-00068-F01 to allow testing (**Section 28**).

IA

- F.** Confirm all LOTO Permit Holders have released the permit prior to testing.
- G.** Do not allow additional personnel to sign onto FBP-OS-PRO-00068-F01 during testing.
- H.** Authorize the removal of necessary isolation points to accomplish the testing.

Supervisor

- I.** Clear/inspect the area to ensure nonessential items have been removed and machine or equipment is operationally intact.
- J.** Secure the area where activity is or any area affected with ropes, tape, warning signs, or manned surveillance.
- K.** Conduct testing.

IA

- L.** Cross out first blank line on *Protection Applied* Section of FBP-OS-PRO-00068-F01.
- M.** Re-list removed tags or list added tags in the *Protection Applied* Section of FBP-OS-PRO-00068-F01. Original tags may be used.
- N.** Ensure applicable Sections of 6.2.2D (5) thru 6.2.6 (Q) are complete on LOTO Permit for re-issue.
- O.** Verify status of LOTO permit has not been modified (i.e., closed) prior to re-issuance.
- P.** Re-issue the LOTO Permit.

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6.5.2 Adding Additional Isolation Points to Existing LOTO Permit

IA

- A. Confirm all LOTO Permit Holders have released the permit.
- B. Do not allow additional personnel to sign onto FBP-OS-PRO-00068-F01 when adding additional isolation points.
- C. Cross out first blank line on Protection Applied Section of FBP-OS-PRO 00068-F01.
- D. List added tags in the Protection Applied Section of FBP-OS-PRO-00068-F01.
- E. Ensure applicable Steps 6.2.2D (5) thru Step 6.2.6 (Q) are complete on LOTO Permit for re-issue.

6.5.3 LOTO Work Permit Error/Inadequate Protection Prior to LOTO Being Issued

IA

- A. Correct minor errors noted on FBP-OS-PRO-00068-F01 by drawing a single line through the error, writing in the correction, initialing, and dating the correction.
- B. **IF** inadequate protection is detected after the verification steps have been completed, **THEN** the IA shall re-evaluate the steps needed to determine and verify adequate protection and apply them accordingly.

6.5.4 LOTO Work Permit Error/Inadequate Protection After LOTO is Issued

IA/Supervisor

- A. Direct work stoppage and ensure the equipment/system is in a safe condition.

Supervisor

- B. Release permit back to the IA.

IA

- C. Re-evaluate the steps needed to correct the work permit and/or determine and verify adequate protection and apply them accordingly.
- D. Cross out first blank line on *Protection Applied* Section of FBP-OS-PRO-00068-F01.

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- E. Re-list removed tags or list added tags in the *Protection Applied* Section of FBP-OS-PRO-00068-F01. Original tags may be used.
- F. Ensure applicable Sections of 6.2.2 D (5) thru 6.2.6 Q are complete on LOTO Permit for re-issue.

6.5.5 Lost LOTO Work Permit, Work Not Completed

IA

- A. Direct Supervisor to stop work and ensure the equipment/system is in a safe condition.
- B. Notify the PSS concerning the lost FBP-OS-PRO-00068-F01.
- C. Authorize utilization of FBP-OS-PRO-00068-F01 copy to remove the existing locks and tags.
 - 1) Note event in the *Remarks* Section of FBP-OS-PRO-00068-F01 copy (**Section 12**).
 - 2) Sign/date the notation.
 - 3) Follow all steps for removal of protection using the FBP-OS-PRO-00068-F01 copy.

6.5.6 Missing Tags and Lost Tabs

Supervisor

- A. Notify IA.
- B. Release FBP-OS-PRO-00068-F01.

IA

- C. Re-verify the position of component using concurrent verification.
- D. Replace missing tag or tab.
- E. Re-verify all tags/locks prior to the Supervisor signing back onto FBP-OS-PRO-00068-F01.
- F. Note the occurrence in *Remarks* Section of FBP-OS-PRO-00068-F01 (**Section 12**).
- G. Re-issue the LOTO Permit.

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6.5.7 Lost Tab to a DDNO Tag During the Tag Removal Process

System Operator

- A. Notify the IA.

IA

- B. Authorize the removal of the tag by noting, signing, and dating in the *Remarks* Section of FBP-OS-PRO-00068-F01.

6.5.8 Personal Lock Removal Under the Direction of the PSS

PSS

- A. Remove a personal lock on a lockbox applied by an AE who is not on-site by performing the following:

- 1) Verify the AE whose lock(s) are to be removed is not on-site.
- 2) Make all reasonable efforts to contact the AE.
- 3) Ensure the system is in a safe condition.
- 4) Remove or monitor removal of lock.

IA

- 5) Note the actions taken in the *Remarks* Section of FBP-OS-PRO-00068-F01 (**Section 12**).
- 6) Sign and date the entry.
- 7) Verify the AE Supervisor has been informed the AE lock has been removed.

Supervisor

- 8) Ensure the AE is informed of the removal of his/her personal lock upon returning to work.

7.0 RECORDS

7.1 Records Generated

- A. FBP-OS-PRO-00068-F01, *Lockout/Tagout Work Permit*
- B. FBP-OS-PRO-00068-F04, *LOTO Permit Log*
- C. LOTO Permit Checklist

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7.2 Requirements

Records generated or received as a result of performing this procedure shall be managed according to FBP-BS-PRO-00062, *Records Management Process*.

8.0 DEFINITIONS/ACRONYMS

8.1 Definitions

- A. **Affected Employee** - An affected employee is one who works in or around the area in which service or maintenance is being performed. An affected employee is not permitted to work on the equipment that is under LOTO.
- B. **Authorized Employee (AE)** - An employee trained to the requirements of this procedure and is required to work under the protection of FBP-OS-PRO-00068-F01.
- C. **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. Equipment that accepts bolted blank flanges or slip blinds are considered to be capable of being locked out.
- D. **Clearance for Work** - Authorization to perform specified work such as System Isolation Verifications and grounding.
- E. **Concurrent Verification** - A system operator and concurrent verifier working together to ensure the alignment position of an EID and is part of the isolation/de-energization process.
- F. **Concurrent Verifier** - An individual who works with the System Operator to concurrently verify the alignment of EID's, locking devices, locks and/or tags are properly aligned and installed.
- G. **Electrical Hazard** - A dangerous condition such that contact or equipment failure can result in electrical shock, arc flash burn, thermal burn, or blast.
- H. **Energy Isolating Device (EID)** - 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 EIDs.

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- I. Hazardous Energy** - Includes electrical, mechanical, hydraulic, pneumatic, chemical, and thermal. Energy can also mean movement or the possibility of movement.
- J. Independent Verification** - For the purpose of this procedure, Independent Verification is the act of visually verifying that locking devices along with locks and/or tags are in place as designated by the LOTO Permit being issued.
- K. Issuing Authority (IA)** - Employee who is authorized to issue the LOTO Permit and has knowledge of the equipment or machine that is being serviced and understands the hazards of the energy to be controlled, determines the SIV and closes the permit.
- L. Lock** - Four classes or uses of locks associated with the LOTO Program:
 - 1) Tag Lock - Used to lock energy isolation components. Key is placed in a permit lockbox, and presence of a Department Lock on a lockbox indicates protection has been verified by the group owning the Department Lock.
 - 2) Permit Lock - Used by Supervisor to lock onto a permit lockbox and is unique (no series locks). Key is placed in a satellite lockbox.
 - 3) Department Lock - Used by IA and Supervisor to overlock lockboxes and are unique to each group. These locks are used for administrative purposes only and do not provide exclusive control.
 - 4) Personal Lock - Used by AEs to overlock lockboxes and energy isolation point (LOTO non-permitted). Lock(s) are identified by AE badge number or a completed Individual Lock Tag. These locks are used for exclusive control.
- M. Lockbox** - Two types of lockboxes used as part of the LOTO Program:
 - 1) Permit Lockbox - Under control of IA. Keys to tag-locks and tear-off tabs are visibly displayed in permit lockbox.
 - 2) Satellite Lockbox - Lockbox normally located in a shop or office area. Key to permit lock is placed in a satellite lockbox.
- N. Lockout** - Placement of personal lock (non-permitted) or tag lock (permit required) on an isolating device. Installing a lockout device on all sources of hazardous energy such that operation of the disconnecting means is prohibited and forcible removal of the lock is required to operate the disconnecting means.
- O. Overlocking** - The process of controlling lock(s) and/or tag(s) by placing a lock on a lockbox.
- P. Premises Wiring** - For the purpose of this procedure, premises wiring is considered wiring and electrical components that are supplied from the service point to feeder and branch circuits.

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- Q. Project Supervisor** - FBP personnel assigned responsibility as a technical liaison between FBP and supplier/contractor personnel.
- R. Service Point** - The point of connection between the facilities of the serving utility and the premises wiring. Locations other than that established below shall be permitted to be identified as the service point with special permission in writing by the Electrical AHJ. The service point shall be as follows:
- 1) For electrical service to a building or other structure that operates at a nominal voltage less than 13,000 volts and is provided from an overhead drop, the service point shall be the splice point near the weather head of the service raceway containing the service entrance conductors.
 - 2) For electrical service to a building or other structure that operates at a nominal voltage less than 13,000 volts and is provided from an underground service lateral supplied from an elevated transformer, the service point shall be the connection of the lateral conductors at the first equipment mounted on or near the building or other structure served.
 - 3) For electrical service to a building or other structure that operates at a nominal voltage less than 13,000 volts and is provided from a pad-mounted transformer, the service point shall be the connection of the secondary conductors to the secondary terminals of the transformer.
- S. Supervisor** - Employee who is authorized to accept and release the LOTO Permit. Supervisor may have multiple crafts in his/her own group.
- T. Supply Side** - Conductor's or circuit's designated on the upstream side of the service point and;
- 1) Any equipment or electrical circuits that control or monitor transmission or distribution systems.
 - 2) Additionally, the 2400 volt security and street lighting system is considered on the supply side of the service point.
- U. Support Group** - Examples include, but are not limited to; OS&H, Radiation Protection, Chemical Operations, Engineering, or Code Inspections. Support Groups do not include maintenance crafts.

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- V. **System Isolation Verification (SIV)** - An action performed before the issuance of a LOTO Permit that is intended to ensure hazardous energy sources have been effectively isolated, residual or stored energy has been blocked, and equipment will not start from inadvertent activation of operating controls. SIVs will consist of functional and/or visual verifications depending on the equipment and work scope.
- 1) **Functional SIVs** - Physical tests performed to ensure isolation of the component or system on which employees are to work. Functional SIVs include but are not limited to:
 - Verifying equipment does not start by pushing a start button or other normal actuating controls.
 - Use of test instrumentation to test for temperatures, pressure, flow, voltage, etc.
 - 2) **Visual SIVs** - Positive visual confirmations that hazardous energy sources have been removed or isolated. Visual SIV's are direct observations that verify:
 - All motion has stopped and all coasting parts such as flywheels, pulleys, or saw blades have come to rest.
 - Valves are correctly positioned based on position of valve stems or other direct indications.
 - Flow has stopped such as by direct observation at a sight glass or visual observation of insertion of a blind flange.
 - Blades or arms are disengaged from electrical switches.
- W. **System Isolation Verifier** - An individual who performs the System Isolation Verifications, who is either qualified to the requirements of NFPA 70E for shock/arc flash hazards and the proper selection and use of voltage test equipment when performing absence of voltage tests, or has competent knowledge for verifying the isolation of a system.
- X. **System Operator** - An individual, who aligns the system in preparation for servicing or maintenance, applies the locking device and lock and/or tag.
- Y. **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.
- Z. **Unattended** - For the purpose of this procedure, unattended is defined as no longer being present at the immediate work task location.

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AA. Utility (Electrical) - The wiring and components used to supply power to the service point.

8.2 Acronyms

- A. DDNO** – Danger Do Not Operate
- B. FBP** – Fluor-BWXT Portsmouth LLC
- C. LOTO** – Lockout/Tagout
- D. OS&H** – Occupational Safety & Health
- E. PORTS** – Portsmouth Gaseous Diffusion Plant
- F. PPE** – Personal Protective Equipment
- G. PSS** – Plant Shift Superintendent
- H. WCD** – Work Control Document

9.0 SOURCE REFERENCES

- A.** 10 CFR 851, *Worker Safety and Health Program*
- B.** 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)*
- C.** 29 CFR 1910.269, *Electric Power Generation, Transmission, and Distribution*
- D.** 29 CFR 1910.333, *Selection and Use of Work Practices*
- E.** 29 CFR 1926.417, *Lockout and Tagging of Circuits*
- F.** DOE O 422.1, *Conduct of Operations*
- G.** NFPA 70E, *Standard for Electrical Safety in the Workplace*
- H.** OSHA CPL 02-00-147, *The Control of Hazardous Energy – Enforcement Policy and Inspection Procedures*

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Appendix A
REGULATORY REQUIREMENTS FLOW DOWN

1. 10 CFR 851, *Worker Safety and Health Program*

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Appendix B HAZARDOUS ENERGY ASSESSMENT GUIDANCE TABLE

Hazardous Energy Assessment Guidance Table

Any exemption to the LOTO required portion of this table requires HHRB approval

Energy Form	Evaluate Hazard	Lockout Required
Electrical (AC or DC)	Ensure there is no increased exposure to electrical burns or, explosions due to electrical arcs.	≥ 50 V and ≥ 5 mA
Thermal (Hot) (1)	Severity is dependent on temperature and duration or contact.	Liquids or gases > 125°F (52°C)
Thermal (Cold) (1)	Severity is dependent on temperature and duration or contact.	Liquids and surfaces < 27°F (-3°C)
Kinetic	No threshold; each situation must be evaluated for motion of object. I.E. Fan blades, flywheels, etc.	
Potential	No threshold; each situation must be evaluated for stored energy. I.E. Compressed springs, gravity, pressure etc.	
Pneumatic Energy (1) (Compressed Gas) *Does not apply to cylinder changeout	Sources directed at open wounds or body openings can occur at lower pressures.	> 150 psi for piping < ½" > 40 psi for piping ≥ ½" but ≤ 1" > 15 psi for piping > 1" but ≤ 2" <i>Hazardous gases and liquids at any pressure must be locked out due to their chemical hazards (for example toxic, flammable, reactive)</i>
Hydraulic Energy (1) (Fluids)	Sources directed at open wounds or body openings can occur at lower pressures. In larger piping systems, a hazard may be present if the fluid momentum is sufficient to knock a worker down.	> 85 psi and ≥ 1 ¼" piping <i>Hazardous gases and liquids at any pressure must be locked out due to their chemical hazards (for example toxic, flammable, reactive)</i>
Chemical (2)	No threshold: each situation must be evaluated based on the chemical's hazardous properties	
Lasers (180 nm to 1 mm)	Class 3B or Class 4 lasers: use lockout or controls equivalent to lockout approved by the laser safety officer.	
Ionizing Radiation	For equipment that could potentially expose a worker to ionizing radiation above an administrative control level in a short time period during servicing and maintenance on that equipment, the use of lockout should be considered as part of the work planning phase.	

(1) Double block and bleed valve isolation is required when the operating temperature exceeds 200°F or the operating pressure exceeds 500 psig. When conditions exist and double block and bleed valve isolation cannot be provided, approval must be obtained by Issuing Authority or Facility Manager.

(2) Leachate systems are considered to contain hazardous substances and shall be locked out regardless of pipe size or pressure.

Evaluating combinations of possible hazardous energies:

- **Water and electricity.** Consider the potential for shock or arc flash hazard when working on water lines over electrical components.
- **Inert gas in a confined space.** Consider asphyxiation hazards in a work location with poor or no ventilation; locking out the gas source avoids oxygen depletion.
- **Pneumatic and thermal.** Consider thermal and pneumatic hazards near live steam or pressure relief valves.

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**Appendix C
PNEUMATIC ENERGY LIMITS REQUIRING LOTO**

Pneumatic Energy Limits Requiring LOTO



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Appendix D
DANGER “DO NOT OPERATE” TAG (LOCKOUT/TAGOUT)
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Completion of tag placed with a LOTO work permit.

- 1. Issuing Group:** Name of the group applying the tag.
- 2. Device Status:** Position of the component.
- 3. Tag No.:** Enter tag number.
- 4. Device Identification:** Name and number (if applicable) identifying the control point to which the tag is applied.

Tear-off Tab (Complete 5 and 6 for tags applied to devices not lockable).

- 5. Tag No.:** Same as the tag number assigned in Step 3.
- 6. Device Identification:** (On tear-off tab) Same as the identification in Step 4.

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Appendix E LOTO PERMIT CHECKLIST



LOTO Permit Checklist

Date _____

LOTO No. _____

PERMIT PREPARATION		✓	ENSURE EID'S ARE NOT BEING WORKED ON AND ARE ABLE TO CONTROL ENERGY.	□
LOGGED BY	Complete	□	ENSURE "CAUTIONARY NOTES" CLEARLY IDENTIFIES POTENTIAL SAFETY HAZARDS AND/OR SPECIAL EQUIPMENT NEEDED.	□
WORK PERMIT No.	Complete	□	ENSURE SIV'S ARE CLEARLY DEFINED TO ENSURE COMPONENTS ARE PROPERLY VERIFIED	□
LOCATION	Complete	□	IDENTIFY POTENTIALLY STORED ENERGY SOURCES AND DOCUMENT.	□
JOB DESCRIPTION	Complete	□	ISSUANCE	✓
ISSUED ON THE FOLLOWING EQUIPMENT	Complete	□	JOB SCOPE AND CRAFT	Complete □
TAGOUT SEQUENCE TO BE FOLLOWED Yes or No Checked?		□	IA CONFIRMS PROTECTION FOR JOB SCOPE AND CRAFT	Complete □
TAG No.	Complete	□	LOCK/TAG VERIFIED BY	Complete □
ENERGY ISOLATION DEVICE	Complete	□	INDEPENDENT VERIFICATION PERFORMED BY	Complete □
DEVICE STATUS	Correct?	□	SYSTEM ALIGNMENT ACCEPTED BY	Complete □
LOCKABLE	Yes or No Entered	□	PERMIT ISSUED BY	Complete □
ADDITIONAL ENERGY ISOLATING DEVICES ARE LISTED ON ATTACHED PAGE Complete if Pages are Added		□	TIME SECTION(S) ENTERED	Complete □
CAUTIONARY NOTES	Listed if necessary	□	DATE SECTION(S) ENTERED	Complete □
SIV(s) STEPS TO BE PERFORMED	Complete	□	ADDITIONAL SIGNATURES ARE LISTED ON ATTACHED PAGE	Complete □
REMARKS	Listed if necessary	□	RELEASE	✓
TAGS MATCH ENERGY ISOLATING DEVICES	Yes/No	□	PERMIT RELEASED BY	Complete □
ALIGNED/LOCKED/TAGGED BY	Complete	□	CRAFT/TIME/DATE ENTERED	Complete □
STATUS/LOCK/TAG VERIFIED BY	Complete	□	NUMBER OF GROUNDS APPLIED/REMOVED	Complete □
SIV FUNCTIONAL/VISUAL PERFORMED BY	Complete	□	GROUND LOG ATTACHED	Complete □
PERMIT BOX ID	Complete	□	TAG REMOVAL AUTHORIZATION	Complete □
SATELLITE BOX ID (if applicable)	Complete	□	LOCK/TAG REMOVED BY	Complete □
LOTO NO./PAGE NO. complete for all pages	Complete	□	TAG REMOVAL VERIFIED BY	Complete □
EVALUATE IF WORK REQUIRES ISOLATING ANY SUPPORT SYSTEMS.		□	PERMIT CLOSURE	Complete □

NOTE:
ALL applicable sections of permit and Permit Log MUST be filled out or marked as Not Applicable

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LOCKOUT/TAGOUT WORK PERMIT
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LOCKOUT/TAGOUT WORK PERMIT

Note: Corresponding section numbers in FBP-OS-PRO-00068 are listed in parentheses.

Logged By: (13) _____

LOTO Work Permit Number: (14) _____

General Information					
Location (1):					
Job Description (2):					
Issued On The Following Equipment (3):					
Tagout Sequence To Be Followed: Yes <input type="checkbox"/> No <input type="checkbox"/> (4)					
Cautionary Notes (10):					
List the System Isolation Verification (SIV) Method(s) to be Performed: (11)					
SIV Functional Test and/or Visual Verification(s) Performed By: (18)					
Name:		Date:		Name:	
Permit Box I.D. (17):		Tag/Lock:		Satellite Box I.D.(23):	
Bldg: Box#:		Key No.(s):		Bldg: Box#: Key No.(s):	
Remarks: (12)					
Permit Closure:					
Permit Closed By:		Group:		Date:	

Note: Shaded areas remains blank on original permit.

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LOCKOUT/TAGOUT WORK PERMIT

LOTO Work Permit Number: (14) _____

Permit Issue Section				
Steps Taken To Issue Permit		Grounding		
Supervisor documents Job Scope and the Craft performing work: (19)		(26) Number of Grounds Applied:		
		(27) Number of Grounds Removed:		
		Permit Released (Permit copy must be returned to IA)		
IA Confirms Protection for Job Scope/Craft: (20)	Time	Date	(28) Permit Released By (Supervisor):	
Independent Verification Performed By: (22)			Craft:	
System Alignment Accepted By (Supervisor): (24)			Time	Date
Permit Issued By (Issuing Authority): (25)				
Grounding				
SIV Functional Test and/or Visual Verification Performed By: (18a) (When Reissued)		(26) Number of Grounds Applied:		
Name:	Date:	Name:	Date:	
Supervisor documents Job Scope and the Craft performing work: (19)		(27) Number of Grounds Removed:		
		Permit Released (Permit copy must be returned to IA)		
		(28) Permit Released By: (Supervisor):		
IA Confirms Protection for Job Scope/Craft: (20)	Time:	Date:	Craft:	
Independent Verification Performed By: (22)				
System Alignment Accepted By (Supervisor): (24)			Time:	Date:
Permit Issued By (Issuing Authority): (25)				
Additional Signatures are listed on Attached Page.: <input type="checkbox"/> Yes <input type="checkbox"/> No.				

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LOCKOUT/TAGOUT WORK PERMIT

LOTO Work Permit Number: (14) _____

Permit Issue Section			
SIV Functional Test and/or Visual Verification Performed By: (18a) (When Reissued)		Grounding	
Name: _____	Date: _____	Name: _____	Date: _____
Supervisor documents Job Scope and the Craft performing work: (19)		(26) Number of Grounds Applied:	
		(27) Number of Grounds Removed:	
		Permit Released (Permit copy must be returned to IA)	
IA Confirms Protection for Job Scope/Craft: (20)	Time: _____	(28) Permit Released By: (Supervisor): _____	
Independent Verification Performed By: (22)		Craft: _____	
System Alignment Accepted By (Supervisor): (24)		Time: _____	Date: _____
Permit Issued By (Issuing Authority): (25)			
Grounding			
SIV Functional Test and/or Visual Verification Performed By: (18a) (When Reissued)		Grounding	
Name: _____	Date: _____	Name: _____	Date: _____
Supervisor documents Job Scope and the Craft performing work: (19)		(26) Number of Grounds Applied:	
		(27) Number of Grounds Removed:	
		Permit Released (Permit copy must be returned to IA)	
IA Confirms Protection for Job Scope/Craft: (20)	Time: _____	(28) Permit Released By: (Supervisor): _____	
Independent Verification Performed By: (22)		Craft: _____	
System Alignment Accepted By (Supervisor): (24)		Time: _____	Date: _____
Permit Issued By (Issuing Authority): (25)			

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LOCKOUT/TAGOUT WORK PERMIT

Instructions for Completing FBP-OS-PRO-00068-F01-LOTO Work Permit		
IA	Section 1:	Document location of equipment and/or area where work is to be performed.
IA	Section 2:	List brief job Description of work to be performed.
IA	Section 3:	List specific equipment and/or system being placed under permit.
IA	Section 4:	Check "Yes" on "Tagout Sequence to be followed" section, if protection applied is to follow the order listed on the permit, or "No" if sequence is not needed.
IA	Section 5:	Enter the tag number to be applied on each Energy Isolation Device.
IA	Section 6:	Component providing the boundary isolation point. (Use of additional information such as the valve, breaker number, pole number, panel number or other information as needed to positively identify the correct component is acceptable.
IA	Section 7:	Position of the component required to provide energy isolation (i.e., Open, Closed, On, Off, etc.).
IA	Section 8:	State "Yes" if a lock is to be applied and "No" if not lockable.
IA	Section 9:	When more isolating devices are required than can be listed on the LOTO Work Permit, use the Additional Energy Isolation Devices page. Check "Yes", or check "No"
IA	Section 10:	This identifies other applicable energy hazards (e.g. high noise area, overhead power lines, fall hazards, etc.) which have not been isolated. Additional safety precautions may be necessary before performing work.
IA	Section 11:	Determine and document SIV method(s) to be performed for EID(s). (I.E. Visual, Functional, Absence of Voltage Test from Section 6.4)
IA	Section 12:	Enter any abnormal conditions, anomalies, or other information as needed.
IA	Section 13:	Enter Name in "Logged By" section.
IA	Section 14:	Enter LOTO Work Permit Number. (Example: 16-326-1; year, building/area, sequential number).
SO	Section 15:	Initial on the LOTO work permit signifying that the corresponding EID has been aligned, locked, and tagged as required.
CV	Section 16:	Concurrently verify by initialing on the LOTO work permit signifying that the corresponding EID has been aligned, locked, and tagged as required.
CV/IA	Section 17:	Upon completion of system alignment and lock/tag placement, place all tag locks and/or DDNO tabs in permit lockbox and document building, box number, and key number(s).
SIVE	Section 18:	Enter name and date following the successful completion of the system isolation verification.
SIVE	Section 18a:	Enter name and date following the successful completion of the additional system isolation verification
SUPVR.	Section 19:	Document job scope and craft performing the work in "Job Scope" section.
IA	Section 20:	After IA confirms protection for Job Scope/Craft, enter name, time, and date (Issuance of Clearance for Utility Work)
SUPVR.	Section 21:	After verifying lock/tag placement, initial the "Lock/Tag Verified By" section on FBP-OS-PRO-00068-F01 copy.
SUPVR.	Section 22:	After independent verification is performed, enter name, time and date.
SUPVR.	Section 23:	Complete the "Satellite Box I.D." section of the FBP-OS-PRO-00068-F01 copy.
SUPVR.	Section 24:	Enter name, time, and date in "System Alignment Accepted By" section on original FBP-OS-PRO-00068-F01.
IA	Section 25:	Enter name, time, and date in "Permit Issued by (Issuing Authority)" section on original FBP-OS-PRO-00068-F01.
SUPVR.	Section 26:	Document number of grounds applied in the "#Grounds Applied" section of the original FBP-OS-PRO-00068-F01. IF no grounds are applied, THEN enter "0."
SUPVR.	Section 27:	Document number of grounds removed in the "#Grounds Removed" section of the original FBP-OS-PRO-00068-F01. IF no grounds were removed, THEN Enter "0."
SUPVR.	Section 28:	Complete the "Permit Released by (Supervisor)" section of the original FBP-OS-PRO-00068-F01. Ensure Craft, Time, and Date have been entered.
IA	Section 29:	Initial "Tag Removal Authorization" section of original FBP-OS-PRO-00068-F01 indicating alignment and sequence if applicable.
SO	Section 30:	Initial the "Lock/Tag Removed By" section of original FBP-OS-PRO-00068-F01 for each isolation point.
CV	Section 31:	Verify and initial the "Tag Removal Verified By" section of original FBP OS PRO 00068 F01.
IA	Section 32:	Complete the "Permit Closure" section of original FBP-OS-PRO-00068-F01 closing out the permit.
IA: Issuing Authority SO: System Operator CV: Concurrent Verifier SIVE: SIV Employee SUPRV: Supervisor		

