THE NATION'S URANIUM PROCESSING FACILITY

UPF PAGE/PROCEDURE CHANGE NOTICE (PRCN)

PRCN Number:	PRCN-Y17-95-64-801-R05-02	PRCN Rev:	0	Effective Date:	08/13/2021

NOTE: PRCN Effective Date cannot precede effective date of associated document.

☒ PRCN Eligible Intent Change ☐ Non-Intent Change

Associated Document Number:	Y17-95-64-801	Rev:	05

Associated Document Title: UPF Energy Isolation Management (EIM) – Lockout/Tagout (LOTO)

Identify the scope of the change, including any new, removed, or changed content. Notate any references, such as Condition Reports, that are driving the change

From:

3.3 Authorized Employee

- Placing their personal lock or tag on the lockbox prior to performing work and removing their lock or tag on completion of work, in cases where applicable.
- Removing their personal lock or tag before signing off the CFN-1312, energy isolation permit

To:

3.3 Authorized Employee

- Placing their personal lock on the lockbox prior to performing work and removing their lock on completion of work, in cases where applicable.
- Removing their personal lock before signing off the CFN-1312, energy isolation permit

From:

3.13 Work Group Supervisor

- Ensuring all AEs involved with the work 1) place locks on and remove locks (when personal lock is applicable) with legible isolation tags from the lockbox or isolation point, and 2) sign on/off the EIP as required.

To:

3.13 Work Group Supervisor

- Ensuring all AEs involved with the work 1) place locks on and remove locks (when personal lock is applicable) from the lockbox or place locks on and remove locks with legible isolation tags from the isolation point, and 2) sign on/off the EIP as required.

From:

4.3.2 EIP Change/Modification (see **Appendix C, *Change to Existing EIP Work Process***)

- If the modification requires changes in isolation points and protective measures, the WGS ensures work is ceased and all AEs sign-off, then the WGS signs-off the EIP.

To:

4.3.2 EIP Change/Modification (see **Appendix C, *Change to Existing EIP Work Process***)

- If the modification requires changes in isolation points and protective measures, the WGS ensures work is ceased and all AEs remove their lock from lockbox then sign-off, then the WGS removes their lock from lockbox then signs-off the EIP.

From:

4.3.4 Implementing an Emergency Change

- All AEs and available WGSs shall approve the EIP change by signing-off the EIP.

To:

4.3.4 Implementing an Emergency Change

- All AEs and available WGSs shall approve the EIP change by removing their lock from lockbox then signing-off the EIP.

From:

RC-UPF DMC
07/14/21 11:38

THE NATION'S URANIUM PROCESSING FACILITY

UPF PAGE/PROCEDURE CHANGE NOTICE (PRCN)

4.3.5 Implementing an Emergency Closure

- All available AE working under the EIP shall sign-off and available WGS shall release the EIP by signing-off.

To:

4.3.5 Implementing an Emergency Closure

- All available AE working under the EIP shall remove locks from the lockbox then sign-off and available WGS shall remove their lock from lockbox then release the EIP by signing-off

From:

4.5 EIP Closure

- All AEs remove personal locks/tags and sign-off the EIP.

To:

4.5 EIP Closure

- All AEs remove personal locks from lockbox and sign-off the EIP

From:

APPENDIX A
Acronyms and Definitions

(Page 5 of 7)

Lockbox/Key Control
A lockbox is a metal box designed to accommodate multiple locks, keys, and tags. The lockbox is configured so it cannot be opened until all locks have been removed from the box. Key control is established via the lockbox system (keys are placed in the box prior to locking) or by utilizing a central key safe in conjunction with lockboxes. One or both methods (lockbox/key safe) for key control may be used.

To:
APPENDIX A
Acronyms and Definitions

(Page 5 of 7)

Lockbox/Key Control
A lockbox is a metal box designed to accommodate multiple locks and keys. The lockbox is configured so it cannot be opened until all locks have been removed from the box. Key control is established via the lockbox system (keys are placed in the box prior to locking) or by utilizing a central key safe in conjunction with lockboxes. One or both methods (lockbox/key safe) for key control may be used.

From:
APPENDIX A
Acronyms and Definitions

(Page 5 of 7)

Personal Lock/Tag Device
A person's project-provided unique isolation device used as a secondary means of energy control, such as a lock and/or tag and a means of attachment, which can be securely fastened to a lockbox or component.
Commentary *The tag identifies the AE and indicates that the equipment or system being controlled is not energized or operated until the isolation device is removed.*
*One personal device is allowed per person, per lockbox or component(s) as designated by the TA.

To:
APPENDIX A
Acronyms and Definitions

THE NATION'S URANIUM PROCESSING FACILITY

UPF PAGE/PROCEDURE CHANGE NOTICE (PRCN)

(Page 5 of 7)

Personal
Lock/Tag Device
A person's project-provided unique isolation device used as a secondary means of energy control, such as a lock and/or tag and a means of attachment, which can be securely fastened to a component. Lock only is applied to the lockbox

Commentary *The tag identifies the AE and indicates that the equipment or system being controlled is not energized or operated until the isolation device is removed.*

*One personal device is allowed per person, per lockbox or component(s) as designated by the TA.

Preparer		
UPF Issues Management:	Jill S. Logsdon *Printed Name/Signature*	07/13/21 Date
Concurrence		
CNS ES&H Director :	Jan M. West Samuel D (SE2) Easterling Digitally signed by Samuel D (SE2) Easterling Date: 2021.07.13 12:40:29 -04'00' for *Printed Name/Signature*	Date
Approval		
UPF Project Field Engineer :	Joseph R. Bucci *Printed Name/Signature*	07/13/21 Date
UPF ES&H Manager, BNI:	Kieran S. Kelly *Printed Name/Signature*	07/13/21 Date
UPF Startup Manager:	Jeremy D. Wilkins *Printed Name/Signature*	07/13/21 Date
UPF Site Manager:	R. Steve Solberg *Printed Name/Signature*	07/13/21 Date

THE NATION'S URANIUM PROCESSING FACILITY

UPF PAGE/PROCEDURE CHANGE NOTICE (PRCN)

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NOTE: PRCN Effective Date cannot precede effective date of associated document.		
Associated Document Number: Y17-95-64-801		Rev: 05
Associated Document Title: UPF Energy Isolation Management (EIM) - Lockout/Tagout (LOTO)		

Identify the scope of the change, including any new, removed, or changed content. Notate any references, such as Condition Reports, that are driving the change

Section 3.3 Fourth Bullet

From:

- Placing their personal lock or tag on the lockbox prior to performing work and removing their lock or tag on completion of work, in cases where applicable.

To:

- Placing their personal lock and tag on the lockbox prior to performing work and removing their lock and tag on completion of work, in cases where applicable.

Section 4.3 Text Addition

From:

4.3 Work Process for Isolation

Locks are the preferred isolation devices; however, there may be exceptions to this requirement (e.g., when customer procedures prohibit locks or situations where no physical means of locking isolation devices exist, such as removing fuses). It should be noted that this procedure ensures a tag affords the user the same level of protection as a lock.

NOTE 2 *Master keys are under the control of the TA and are only used in emergency situations or as described above.*

NOTE 3 *An STT can be carried across shifts if a WGS is present and in control of the work (e.g., transfer at shift change from one WGS to another WGS).*

To:

4.3 Work Process for Isolation

Locks are the preferred isolation devices; however, there may be exceptions to this requirement (e.g., when customer procedures prohibit locks or situations where no physical means of locking isolation devices exist, such as removing fuses). It should be noted that this procedure ensures a tag affords the user the same level of protection as a lock.

OSHA 29 CFR 1910.147(c)(3)(ii) When a Lock and Tag is not used states: "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." (Underline added to the OSHA standard text for emphasis.)

Examples of Additional Elements: Removal of isolating circuit element, blocking of a control switch, opening of an extra disconnect switch, removal of a valve handle and thus would reduce the likelihood of inadvertent energization.

Following are general administrative requirements for energy isolation

This document has been reviewed by a Y-12 DC/RO and has been determined to retain its current classification.
Name : A. L. Glover Date: 04/12/21
Title : Y-12 Classification Specialist

This document has been reviewed by a Y-12 DC / UCNI-RO and has been determined to be UNCLASSIFIED and contains no UCNI. This review does not constitute clearance for Public Release.
Name: A. L. Glover Date: 03/09/21

RC-UPF DMC
04/12/21 13:43

THE NATION'S URANIUM PROCESSING FACILITY

UPF PAGE/PROCEDURE CHANGE NOTICE (PRCN)

NOTE 2 *An STT can be carried across shifts if a WGS is present and in control of the work (e.g., transfer at shift change from one WGS to another WGS).*

Section 4.3.1 Add Bullet

- In the instance where a Temporary Ground is required on any equipment or cable, the ground is tagged with a **DANGER tag** and included on the EIP. The Panel cover where the Temporary Ground is installed and the Circuit Breaker cover which isolates the circuit should have a **Danger sign** attached to them stating that a Temporary Ground has been installed

Section 6.2 Add Reference

TPST-SU-801768-A004, *Line Containment Break*

APPENDIX A Add Definitions:

Additional Element	An additional safety measure 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.
Affected Employee (AFE)	A person whose job requires them to work or traverse in an area in which isolation management is being performed or whose work requires them to operate or use a machine, system, or equipment on which work is being performed under isolation management, but is not signed on to an EIP (i.e., any individual on a jobsite). An AFE does not work on isolated equipment and cannot sign onto a permit unless they become an AE. ***Commentary*** *An AFE must be aware of the tags used on a Project site to control hazardous energy, and:* • *An AFE must be aware of the rules associated with such tags and the potential consequences for violating such;* • *This shall be part of the jobsite orientation training to obtain unescorted access to the project site.* An AFE may work on equipment downstream of a project-wide master boundary clearance (**Section 4.7.1**).

APPENDIX N Add Header Note:

NOTE 1: *Requirements of TPST-SU-801768-A004, Line/ Containment Break, apply regardless of the whether the component/ system is isolated by a LOTO or under means of direct control.*

THE NATION'S URANIUM PROCESSING FACILITY

UPF PAGE/PROCEDURE CHANGE NOTICE (PRCN)

Implements Quality Requirements (Select One)			
☐ None	☒ BNI	☐ CNS	☐ BNI & CNS

Preparer			
UPF Construction Issues Management Procedure Compliance:	Jill S. Logsdon		03/08/21
	Printed Name/Signature		Date
Concurrence			
CNS ES&H Director:	Jan M. West	JAN WEST (Affiliate) Digitally signed by JAN WEST (Affiliate) Date: 2021.04.06 07:33:08 -04'00'	
	Printed Name/Signature		Date
Approval			
UPF Project Field Engineer	Bryan C. Leber		03/08/21
	Printed Name/Signature		Date
UPF BNI ES&H Manger:	Kieran S. Kelley		04/12/21
	Printed Name/Signature		Date
UPF Startup Manager:	Jeremy D. Wilkins		03/09/21
	Printed Name/Signature		Date
UPF Site Manager:	R. Steve Solberg		03/04/21
	Printed Name/Signature		Date

THE NATION'S URANIUM PROCESSING FACILITY

Preparer:	Jill S. Logsdon UPF Construction Issues Management Procedure Compliance	12/18/20 Date
Concurrence:	Jan M (H2Z) West Digitally signed by Jan M (H2Z) West Date: 2020.12.29 14:01:10 -05'00' Jan M. West CNS ES&H Director	12/29/2020 Date
Approval:	Bryan C. Leber UPF Project Field Engineer	12/29/20 Date
	David B. Harold UPF BNI ES&H Manager	12/21/20 Date
	Jeremy D. Wilkins UPF Startup Manager	12/22/20 Date
	W. Dave Ross UPF Site Manager	12/21/20 Date
		01/28/21 Effective Date

Implements Quality Requirements

☐ None ☒ BNI ☐ CNS ☐ BNI and CNS

RC-UPF DMC
01/04/21 08:47

This document has been reviewed by a Y-12 DC / UCNI-RO and has been determined to be UNCLASSIFIED and contains no UCNI. This review does not constitute clearance for Public Release.
Name: A. L. Glover Date: 12/29/20

REVISION LOG

Revision 5 ☒ Intent ☐ Non-Intent

- The title of this procedure was updated with this revision to "*UPF Energy Isolation Management (EIM) – Lockout/Tagout (LOTO).*"
- The following forms were obsolete with this revision:
  - CFN-1059, *UPF Lockout/Tagout Permit Log*
  - CFN-1061, *UPF Lockout/Tagout Temporary Suspension*
  - CFN-1062, *UPF Lockout/Tagout Temporary Suspension Log*
  - CFN-1105, *UPF Lockout/Tagout Permit*
  - CFN-1216, *UPF Lockout-Tagout Permit Modification*
  - CFN-1217, *UPF System Specific Energy Control*
  - CFN-1247, *UPF System Specific Energy Control Modification*
- The following forms were created with this revision:
  - CFN-1311, *Energy Isolation Permit/Lockout Permit Log*
  - CFN-1312, *Energy Isolation Permit Sign-on Sheet*
  - CFN-1313, *Energy Isolation Permit*
  - CFN-1314, *Safety Tagging for Sanction To Test*
  - CFN-1315, *Sanction To Test Cover Sheet*
  - CFN-1316, *Sanction To Test Log*
- An evaluation determination has been performed confirming that this Command Media implements BNI quality requirements as tracked in the Programmatic Requirements Management System (PRMS).
- Changes include:
  - Deleted **Section 2.3, *Deviations***.
  - Complete rewrite to align with corporate procedure.
  - Updated references.
  - Updated acronyms.
  - Editorial changes.
- This revision is a total rewrite; because of the extent of changes, revision bars are not shown.

Revision 4 ☒ Intent ☐ Non-Intent

- Revised to clarify actions for Permit Modification.
- Clarified role of an additional AE, a separate qualified AE or, AE independent of hanging the LOTO may be filled by the PR.
- Added new form, CFN-1247, UPF System Specific Energy Control Modification.
- Obsoleted the use of CFN-1060, UPF Lockout/Tagout Personal Lock Log.
- Reordered steps for using a Personal Lock.

Previous revisions on record

CONTENTS

1.0 PURPOSE

NOTE 1: *Current active Lockout/Tagout (LOTO) permits issued prior to Revision 5 will require closure and must be converted to the requirements of Revision 5 within 14 days after effective date of Revision 5. Until conversion, legacy LOTO permits will be managed in accordance with Revision 4. All new LOTO permit requests shall be completed in accordance with Revision 5.*

This procedure defines the work process for the control/isolation of systems and equipment containing hazardous energy. The work process within this procedure standardizes the approach for controlling hazardous energy from different entities (Environmental, Safety and Health [ES&H], Engineering, Construction, and Startup). This procedure meets or exceeds the applicable requirements of Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1926, Subpart K, *Electrical Standards for Construction*. This implantation of this procedure will:

- Protect personnel and equipment from hazardous energy sources during the construction and Startup phases of the Project.
- Provide a means for describing and documenting the status of equipment, components, and systems that are out of service, or are in limited service under the control of an Energy Isolation Permit (EIP) (CFN-1313, *Energy Isolation Permit)*.
- Include all mandatory requirements required by the United States Department of Labor OSHA CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)*.

NOTE 2: *Commentary in this procedure is to provide clarification or supporting information.*

Commentary *This procedure provides Authorized Employees (AEs) with a level of protection equal to the use of a personal lock or tag, with the following considerations:*

- *The preferred method for providing this type of protection involves the use of locks and key control as described further in this procedure.*
- *When an energy-isolating device is not capable of being locked out, the energy control program utilizes tagout(s).*
- *Other alternatives to this method are acceptable if they require the AE or supervisor to take a physical step (e.g., signing on to a permit) that uniquely identifies that employee before starting work.*
- *The same method (e.g., signing off the permit) is utilized before the energy isolating device is released and the equipment reenergized.*
- *A personal sign-in/sign-out log or permit is acceptable in lieu of lock and tag and considered a personal tagout device if:*
  - *The log or permit identifies each AE being protected.*
  - *The Work Group Supervisor (WGS) can reliably account for each individual AE who is being protected.*

OSHA 29 CFR 1910.147(f)(3)(i) Group lockout tagout states: "*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.*" (Underline added to the OSHA standard text for emphasis.)

- *In many cases, especially with large work groups (e.g., Project-Wide Master Clearance, System Boundary Master Clearance), it is impractical to install lockout or tagout devices for every person. Implementing this procedure will provide the same level of*

protection (e.g., keys to lockout devices are isolated and cannot be tampered with) as if every person had installed a lockout or tagout device on every component.

2.0 SCOPE

2.1 Applicability

This procedure is applicable to all employees, contractors, and visitors at the Uranium Processing Facility (UPF) who are engaged in construction, modification, maintenance, startup, or demolition where the administration of the energy isolation management (EIM) is under the jurisdictional control of Bechtel National, Inc. (BNI). Scope includes permanent plant systems and equipment and associated test equipment (e.g., test rigs and temporary piping and power installations).

This procedure addresses work performed on a system or equipment that contains or has the potential to contain energy/substance that could expose a worker to injury or cause damage to equipment if released and where the worker is not in direct control of the energy isolating means.

Engica Q4 Safety is Bechtel's standard electronic EIP/LOTO Program.

If Q4 is unavailable, hard copies can be printed from the Just-in-Time Forms (JIT) link on the UPF website.

This procedure is not applicable to:

- Isolation management of components or systems after jurisdictional turnover to a third-party or to the customer.
- Maintenance and operations working under customer or owner isolation management control.
- Project-Wide Master Boundary Clearances that are used for EIM of the main UPF terminal points (e.g., main power feeds, gas supplies, and connections to existing Consolidated Nuclear Security [CNS] Y-12 facilities outside the scope of the UPF). These UPF main terminal points are isolated in accordance with Y18-107, *Lockout/Tagout Execution for Personnel Protection*.
    - Example: Power Distribution Work Permits (PDWPs), where UPF work scope interfaces with Y-12 Power Operations (Transmission and Distribution lines).
- Testing activities performed where a device or equipment is required to be continuously energized.
- Work performed on cord and plug connected electric equipment. Exposure to the hazards of unexpected energization or startup of the equipment is controlled by unplugging the equipment from the energy source so that the plug is under the direct control of the employee performing the servicing or maintenance.

- Hot tap operations performed on pressurized pipelines involving transmission and distribution systems for substances such as gas, steam, water, or petroleum products, provided that:
  - Continuity of service is essential.
  - Shutdown of the system is impractical.
  - Documented procedures are followed, and special equipment is used which will provide proven effective protection for employees.
- Minor tool changes and adjustments, and other minor servicing activities that 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 performed uses alternative measures that provide effective protection.
- A Red Tag (sometimes called “Car Seal”) installed to lock a component in a normal operating position as designated on a Piping and Instrument Diagram (P&ID), drawing, or procedure is NOT part of the EIM Program. Red Tags are only utilized to identify a component placed in a locked position (open, throttled, closed) because of operational requirements, (e.g., CSO, CSC, LO, LC, LT as indicated on the P&ID). These component positions are tracked on a locked valve/component list issued by Startup or the owner/customer organization.
- Where UPF personnel perform work according to another organization’s (e.g., CNS Y-12, City of Oak Ridge) EIM system, the Site Manager/Project Startup Manager (PSUM) and Project ES&H Manager collectively ensure that the requirements of this procedure are met.
- Single point isolations (i.e., an isolation performed by the individual doing the work where a LOTO device is applied to an energy isolating device that is not under direct control of the individual performing the work), are not governed by this procedure.

Commentary *Single point isolations are specifically not permitted under this procedure because a Single Point Isolation removes the independent reviews to ensure the adequacy of the isolation and the proper implementation of the isolation.*

Mobile and towed equipment isolation for maintenance will be performed in accordance with Y17-95-64-851, *UPF Construction Equipment Maintenance*.

2.2 Subcontractor Applicability

Subcontractors shall comply with this procedure. The requirements of this procedure will be communicated to subcontractors, as appropriate, through subcontract language.

3.0 RESPONSIBILITIES

NOTE: *Individuals can have multiple responsibilities under their job title depending on their training and how the Project structures Control of Work (e.g., a Permit Requestor [PR] could perform AE/Responsible Field Engineer [RFE]/Startup Test Engineer [STE] or Authorized Operator [AO] tasks, a WGS could perform AE/PR tasks).*

3.1 Affected Employee

The Affected Employee (AFE) understands the purpose and use of the isolation management procedure and any prohibitions related to energizing systems or components.

AFEs are NOT permitted to:

- Sign onto EIPs, hang personal locks, tags, or other devices as part of this procedure.
- Perform work on any system or component under an EIP unless they become an AE.

An AFE may work on equipment downstream of a Project-Wide Master Boundary Clearance (**Section 4.7.1, *Project-Wide Master Boundary Clearance***).

3.2 Supervision

Supervision is responsible for:

- Selecting personnel for EIM/LOTO roles.
- Verifying that personnel involved in EIM/LOTO activities have successfully completed EIM/LOTO training and Verification of Competency (VOC), as applicable, for their respective role in accordance with this procedure.

3.3 Authorized Employee

The AEs are responsible for:

- Verifying, prior to performing work, the equipment or system being worked on has been properly isolated and verified on the EIP.
- Verifying Zero-Energy Check has been completed on the EIP.
- Signing onto the EIP and implementing work in accordance with this procedure and the conditions of the permit.
- Placing their personal lock or tag on the lockbox prior to performing work and removing their lock or tag on completion of work, in cases where applicable.
- Removing their personal lock and tag before signing off the CFN-1312, *Energy Isolation Permit Sign-On Sheet*:
  - If there is an extended break in work.
  - If they transfer to another work area.
  - If there is a Sanction to Test (STT) of Isolation(s) (see **Section 4.6, *Sanction to Test Instructions***)
  - If the permit is revoked.
  - At the end of each shift, prior to leaving site if required by Site Manager or PSUM.
  - Upon completion of the work.
- Stopping all work and notifying the WGS if conditions change and/or have the potential to void the conditions of the permit or if any isolation point is compromised
- Stopping all work, ensuring the work is in a safe, secure condition, and signing off the permit upon notification the EIP will be released.

3.4 Authorized Operator

The AO is responsible for:

- Performing lockout or tagout of equipment, processes, and system components to allow servicing, maintenance, or testing.
- Reviewing EIPs for accuracy.
- Positioning or configuring components as specified on the permit (implementing the protective measures) to establish zero-energy conditions within the isolation boundary.
- Hanging locks and confirming isolations.
- Removing locks or tags for STT or upon completion of tasks prior to closure of the permit.
- Positioning or configuring components in a safe mode upon removal of tags and locks.

3.5 Independent Verifier

The Independent Verifier (IV) is responsible for:

- Independently verifying the protective measures have been installed on the isolations as listed on the EIP.
- Independently verifying the isolation points are placed in the position as listed on the EIP.
- Verifying that zero-energy conditions exist within the isolation boundary.

NOTE: ***Section 3.5,*** **Independent Verifier***, requires physical field walk down as a best practice. This role is typically performed by the WGS, but can be performed by anyone with IV training and competency.*

3.6 Startup Shift Supervisor

The Startup Shift Supervisor (SSS) is responsible for:

- Establishing conditions on operating systems to implement isolations.
- Coordinating the activities of the various STEs and others as they affect facility operation.

NOTE: *The SSS is given authorization to concur for the STE on off-hours. The SSS notifies the STE or their lead of the permit status upon their return.*

- Confirming, in conjunction with the RFE/STE, as required, that equipment/systems are ready to be de-isolated after work is complete.

3.7 Permit Requestor

The PR is responsible for:

- Completing the permit for defining the work or testing to be performed, providing enough detail to allow adequate evaluation of the isolation boundary.
- Recommending the equipment and/or electrical circuits to be tagged or locked out.

- Requesting guidance and assistance from the RFE/STE and Tagging Authority (TA), as needed, to understand all potential energy sources.
- Submitting the permit to TA for review.
- Assisting the AO in establishing zero-energy within the isolation boundary, if needed.
- Involving the WGS if applicable and/or as required.

3.8 BNI ES&H Manager

The BNI ES&H Manager is responsible for:

- Ensuring workers have been trained in this procedure to perform job duties in accordance with this procedure.
- Ensuring certification/documentation of worker training, including name, date, and content, is current.
- Providing technical assistance to support the implementation and sustainability of this procedure, ensuring safety equipment necessary to perform the work tasks required are identified and provided.
- Ensuring accident and incident data related to this procedure is analyzed to identify issues and trends and that this data is communicated to all relevant parties.
- Ensuring procedures are performed in a way that provides each individual AE full protection.
- Participating in inspections, audits, and investigations pertinent to this procedure.
- Providing the results of the field observations to the Site Manager/PSUM.
- Ensuring workers affected by this procedure (i.e., AFE) receive training on the applicable aspects of this procedure (see **Section 3.1, *Affected Employee***) during site orientation.

3.9 Site Manager/Project Startup Manager

Typically, the EIM/LOTO program falls under control of the Site Manager prior to turnover of systems from Construction to Startup and under the PSUM after turnover, but transfer of the program can occur at any time mutually agreed to by the Site Manager and PSUM.

The Site Manager or PSUM is responsible for:

- Implementing the requirements of this procedure.
- Ensuring, at minimum, the protection provided by this procedure is met when the Project is working under another organization's tagging procedure (e.g., owner/customer).
- Ensuring equipment and systems under their jurisdictional control are properly protected from inadvertent operation, energization, or pressurization.
- Ensuring individuals authorized to request and release EIPs are trained and competent, as applicable.
- Ensuring all TAs are trained and competent to perform their duties in accordance with this procedure.
- Approving VOC for personnel assigned TA responsibilities.

- Ensuring all AEs are trained to this procedure.
- Reviewing the open and closed EIP files and requesting random EIP verifications.
- Authorizing emergency releases, emergency changes, and forced lock removal.
- Ensuring periodic field audits of the implementation and adherence to this procedure are completed.

3.10 Responsible Field Engineer/Startup Test Engineer

NOTE: *For Subcontractor SSCs work, the Subcontract Technical Representative is equivalent to the RFE role.*

The RFE/STE is responsible for:

- Concurring with the protective measures, safety tagging and lockouts defined in the EIP (with special emphasis on any interlocks, backfeeds or temporary energy sources) as needed.
- Consulting with PR/WGS/AO, as needed, for protective safety measures and isolations on equipment/systems under their responsibility.
- Confirming, as needed, in conjunction with the SSS, that equipment/systems are ready to be de-isolated after work is complete.

3.11 Tagging Authority

The TA is responsible for:

- Issuing, modifying, and closing EIPs as required under this program.
- Advising and consulting with the PR, RFE, and/or STE regarding the protective measures required for component(s) or system(s) identified on the EIP.
- Verifying that the isolations, tags, and protective safety measures have been implemented, and that independent verification and zero-energy check have been completed.
- Considering any known site conditions/conflicts that could impact the work being performed.
- Coordinating with area superintendents and/or customer representatives to obtain approval for any additional isolation.
- Maintaining safety tagging records and the master lockout key.
- Maintaining and controlling the lockbox and/or key safe systems.
- Verifying that the isolations, tags, and protective safety measures have been removed by the AOs when work is complete (on permit paperwork and review of returned isolation devices) so system/components can be restored to the required positions/state.
- Responding to questions and providing clarification regarding this procedure.
- Maintaining the Master Clearance protecting the workforce (see **Section 4.7, *Master Clearance***).
- Functions as the AE for Project-Wide Master Clearances established in accordance with Y18-107.
- Tracking open and closed EIPs.

- Possessing a list of personnel that are trained and competent to perform PR/AO/IV/AE roles, as applicable, in accordance with this procedure.
- Approving (after conducting an assessment with appropriate supervision) and maintaining a list of personnel trained and competent to complete AO and IV EIP duties.
- Revoking EIPs where any unsafe or unsatisfactory isolation or work practice has been identified during inspections or work performed under the permit.
- Informing the Site Manager/PSUM about the overall state of any isolations within a designated work area.
- Participating in any audits and investigations relative to the isolation procedures.
- Establishing guidance for control of lockboxes where there is a need to allow lockboxes and permits to be taken to the field.

3.12 Startup Completion Lead

In accordance with Y15-95-912, *UPF Completion and Turnover*, the Startup Completion Lead, or designee, is responsible for:

- Issuing Work Authorizations (WAs) and the associated permits to work.
- Rescinding authority to work on an open WA if plant conditions change, making a WA or one of its associated permits to work invalid.
- Coordinating construction completion activities on systems that have been jurisdictionally transferred to Startup.
- Acting as the single point of contact for coordinating construction punch list and completing efforts on systems that have been transferred for testing.
- Acting as work approval authority for punchlist work or maintenance activities on tested SSCs.
- Reviewing and processing all turnover packages for subsequent turnover to facility/system owners.

3.13 Work Group Supervisor

The WGS is responsible for:

- Performing, witnessing, or verifying a zero-energy check was performed in accordance with the permit requirement prior to issuance of the EIP.
- Ensuring a trained and competent IV performs the independent verification (the WGS can perform if trained and competent as AO/IV).
- Functioning as the AE for System Boundary Master Clearances.
- Signing the EIP signifying the boundary is adequate before starting the work.
- Verifying personnel under their supervision are aware of the area hazards and verifying controls are in place to manage those hazards.
- Coaching all personnel they supervise in all aspects of isolations, ensuring they are competent (verifying with TA) and conducting all work in accordance with Project requirements.
- Ensuring AEs working under this procedure receive the same level of protection otherwise afforded them by using a personal lock (i.e., in cases where WGS hangs lock on behalf of work group) for System Boundary Master Clearances.

- Ensuring all AEs involved with the work 1) place locks on and remove locks (when personal lock is applicable) with legible isolation tags from the lockbox or isolation point, and 2) sign on/off the EIP as required.
- Verifying all work is performed in accordance with the relevant Project procedure(s).
- Monitoring the effectiveness of controls imposed by the EIP.
- Stopping all work and notifying the TA, or designee, if conditions change that have the potential to void the conditions of the isolation(s) or if isolation point(s) are compromised.
- Placing a lock on the lockbox containing the key(s) to the locks used in the energy isolations, when using a lockbox.

Commentary *Workers (at their personal request) may always elect to place a personal lock on the lockbox if they feel the need for another layer of protection. If workers place personal locks on lockboxes, it is the WGS's responsibility to manage the workers placing/removing their personal locks.*

- Submitting the lockbox to the TA, when using a lockbox, at the appropriate time in the work flow.
- Ensuring work is complete and signing the EIP when the work is completed.
- Manipulating, as required, components tagged with a CAUTION – RESTRICTED OPERATION tag or designating specific individuals in the work group to do so.
- Leading, facilitating, and coordinating weekly inspections to identify any unsafe or unsatisfactory isolation or work practice.
- Participating in auditing and investigations pertinent to this procedure.
- Attending EIM/LOTO training.
- Ensuring planning and coordination required for this procedure is performed in a safe, efficient manner, including, but not limited to, safety of personnel, protection of the environment and adherence to all aspects of this procedure.

4.0 REQUIREMENTS

4.1 General

All potentially hazardous energy sources are to be removed or controlled before commencing work.

Refer to **Appendix A, *Acronyms and Definitions*,** for a description of the positions in EIM (e.g. AFE, AE, AO) including the level of training, competence, and qualification. The work process for EIM is shown in the flow diagrams in **Appendix B, *EIP Work Process*,** through **Appendix G, *Sanction to Test (STT) Work Process***. **Appendix H** is an example of the means by which VOC will be tracked for key positions within the EIM process. **Appendix M, *Methods of Isolation*,** and **Appendix N, *Guidance on Application of LOTO*,** give examples of energy isolation and guidance on application of LOTO, respectively.

4.2 Prerequisites to Isolation

The following are prerequisites to isolation:

- Personnel shall not isolate a piece of plant or equipment until they possess the appropriate training, competencies, and authorization to isolate a specific item of plant or equipment.
- Personnel shall not work on or within safe approach boundaries of a piece of plant equipment until they possess the appropriate training, competencies, and authorization.
- Any personnel escorting a visitor ensures that the visitor does not manipulate or otherwise tamper with any plant component under control of this procedure.
- As specified in **Appendix N**, an EIP is not always required for certain work scopes that can be executed by isolation under direct control of the individual performing the work.
- Personal locks shall only be attached and removed by their owner utilizing the lock's uniquely matched key.

Commentary

- *In the rare occurrence that workers who have signed on to permits and/or have placed LOTO devices are not available for the close or change of those permits, OSHA allows the employer to remove their LOTO devices.*
- *In the scenario above and as discussed in **Section 4.3.5,** **Implementing an Emergency Closure**, the Site Manager or PSUM will designate the unavailable person's Supervisor/Foreman as the person to remove any locking devices on that person's behalf and close-out any necessary paperwork, subject to following the correct procedural steps.*

4.3 Work Process for Isolation

Locks are the preferred isolation devices; however, there may be exceptions to this requirement (e.g., when customer procedures prohibit locks or situations where no physical means of locking isolation devices exist, such as removing fuses). It should be noted that this procedure ensures a tag affords the user the same level of protection as a lock. Following are general administrative requirements for energy isolation:

NOTE 1: *If isolation tags are found loose in the facility, notify the TA immediately. **DO NOT REMOVE** tags from the area; the TA will determine the disposition of the tag.*

- The TA ensures lockout keys are kept in a lockbox and/or key safe under their control.
- Company-provided personal locks shall not be placed without signing onto the permit. All locks need to be traceable to name and badge number.

Commentary *Alternative methods such as key safes and peg boards may be utilized if they provide equivalent protection.*

- The TA issues all locks. Individual locks (if required) will be allowed only on the lockbox. Unauthorized locks will be removed and documented.
- If any lockout keys are lost or misplaced, the TA removes affected lock(s) utilizing the master key and installs a replacement lock. If the lost or misplaced keys are not found, the lock shall be destroyed. The EIP shall be updated with the NEW lock number.

NOTE 2: *Master keys are under the control of the TA and are only used in emergency situations or as described above.*

- The PR/STE/TA/RFE or AO (with the permission of the PR/TA and the RFE/STE) may temporarily lift and replace safety tags to support work or testing (see **Section 4.6**).
- DANGER – DO NOT OPERATE tags (**Appendix J, *Danger – Do Not Operate/Do Not Remove Tag [Example]***) and Caution – Restricted Operation tags (**Appendix K, *Caution – Restricted Operation Tag [Example]***) shall not be hung on the same component.
- CAUTION – RESTRICTED OPERATION tags shall not be used for personnel protection for isolating hazardous energy sources.
- Components tagged with CAUTION – RESTRICTED OPERATION tags shall only be operated with the permission of the PR. The PR may delegate this authority to the WGS.
- No one shall remove a component with a CAUTION – RESTRICTED OPERATION tag.
- No one shall operate a component with a DANGER – DO NOT OPERATE/REMOVE tag or DANGER – DO NOT OPERATE/REMOVE tag and lock attached.
- No one shall remove a component with a DANGER – DO NOT OPERATE/REMOVE tag or DANGER – DO NOT OPERATE/REMOVE tag and lock attached.

WARNING

Violations of the above are life critical violations and may result in serious injury to personnel, including death

- An STT shall only be performed while a WGS is in control of the lift.

NOTE 3: *An STT can be carried across shifts if a WGS is present and in control of the work (e.g., transfer at shift change from one WGS to another WGS).*

4.3.1 EIP – Preparation, Issue, and Implementation (see **Appendix B** for workflow)

The intent of CFN-1312 and CFN-1313, is to protect people. If any doubt exists regarding the level of protection that an isolation might provide, any potential hazards and mitigation necessary shall be fully addressed via the Job Hazard Analysis (JHA) process. Following are requirements for positions within the EIP process:

NOTE 1: *No work shall proceed within the boundary of the EIP until the isolation points are verified, the permit has been signed as issued by the TA, and the PR and/or AE for the working group have signed on the permit accepting the permit and zero-energy has been verified.*

- The PR performs a walkdown of the equipment or system boundary and identifies the recommended protective measures and safety isolation management measures.

NOTE 2: *Temporary grounding is a protective measure. If a temporary ground (earth) is required on any equipment or cable, the ground is tagged with a DANGER tag and included on the EIP.*

- The PR completes the applicable sections of the EIP (CFN-1312 and CFN-1313) to request safety tagging or lockout of equipment, component(s), or system(s).
- The PR consults with the RFE/STE, as required, to ensure adequacy of the isolation points for the scope of work to be performed.
- The PR signs the permit and submits the permit with supporting documentation (drawings, P&ID mark-ups, etc.) to the TA for approval.
- The TA confirms PRs are authorized to request EIPs.
- The TA confirms the isolation boundary and required protective measures recommended by the RFE/STE/PR are adequate for the work or testing identified in the EIP.
- The TA uses an appropriate subject matter expert (SME) for independent review of EIP isolation designs, as required.
- The TA reviews the EIP and associated tags and may assist the PRs with preparation. The safety tags shall be numbered using the EIP number and a sequential number (e.g., 201-1, 201-2, and 201-3).
- The TA consults with the RFE/STE/PR about the EIP request, if necessary, to verify that the EIP is adequate for the scope of work to be performed.
- The TA gives the required energy isolation devices to the AO, as appropriate, after verifying the adequacy of the EIP.
- The AO implements the protective measures (install energy isolation devices) as required by the EIP.
- After required tags and locks are placed, the keys are placed in a lockbox or key safe. Where a lockbox is used, it shall be returned to the TA for retention and control. The TA places a TA lock on the lockbox latch hasp position.

Commentary

- *Generally, the lockboxes should be kept in a central location (e.g., in the tagging office).*
- *The TA may allow the lockbox and permit to go out on a per shift basis if the work location is remote.*
- *Lockboxes must be returned to the permit office at end of each shift or they must be physically controlled in the field (e.g., lock the lockbox down to a physical location in the field).*

- The IV (typically WGS, as best practice) independently *(*not side-by-side with the AO*)* verifies all energy isolation points. Where the WGS or delegates are not trained and competent as an IV, the WGS shall utilize a trained and competent IV to perform the independent verification. (This is the independent field verification of energy isolation points).
- In rare instances, independent verification may not be possible (e.g., underground valves where the hole cover is locked after orientation of valve in accordance with the EIP). In these instances, the TA may allow concurrent verification to be completed by the AO and IV.
- The WGS ensures the zero-energy check has been performed and signs and dates where applicable on the permit form and submits paperwork to the TA.

Commentary *Verifying versus challenging an isolation: The intent of the verification process is to verify, not challenge, the isolation. Challenging the isolation could lead to potentially unsafe conditions for those working on or near the equipment under isolation or potentially impact plant operations:*

Verifying (allowed):

An IV may verify an isolated component's position by turning or moving it to the "off" and/or isolated condition.

- *Example: Pulling a hand wheel of a tagged closed valve in the close direction to ensure it is fully closed.*

Challenging (not allowed):

An IV CANNOT try to challenge an isolated component by turning or moving it to "on" and/or non-isolated position.

- *Example: Trying to open a locked closed valve to challenge if the chain and lock will prevent it from opening.*
- *Example: Trying to close a locked open circuit breaker.*

- The TA signs and dates the permit to issue the permit after all component positions and zero-energy has been verified.
- The TA issues personal LOTO devices (if applicable) to AEs and ensures the individual's name and entity are clearly identified.

NOTE 3: *No work on the system will be started until the TA has issued the permit AND AEs have verified isolation boundary on the EIP and signed on to the permit.*

- When any of the following conditions are met during execution of the work, an informal, undocumented zero-energy follow-up is performed:
  - Prior to the start of work each shift.
  - When returning to the job location after it has been left unattended.
  - If there is a circuit condition change, system configuration change, or work conditions have changed.
- Use one or more of the following methods to complete an informal, undocumented zero-energy follow-up under guidance of the WGS:
  - Ensure personnel are clear of potential hazard and then attempt to start equipment via local or remote controls.
  - Conduct voltage checks.
  - Verify equipment or system instrumentation indicate no energy.
  - Verify blocking devices still installed properly.
  - Verify drain and vent valves indicate no flow.

NOTE 4: *DANGER – DO NOT OPERATE tagged components that are in areas (e.g., confined spaces) that pose an additional safety hazard may be excluded from periodic zero-energy follow-up.*

NOTE 5: *Formal zero-energy check requirements do not apply for a zero-energy follow-up (e.g., voltage PPE, M&TE).*

4.3.2 EIP Change/Modification (see **Appendix C, *Change to Existing EIP Work Process***)

Commentary *Personnel preparing EIPs should consider the structuring of permits (see **Section 4.7.2, System Boundary Master Clearance**, and **Figure 1** for an explanation of Master/Subordinate Boundary Clearances) to minimize the need for permit modifications in the future. Large numbers of permit modifications create opportunities for human performance issues that may lead to inadvertent release of an isolation point or permit. Examples include:*

- *Permits to isolate all downstream loads on an MCC that is to be energized may be written as an individual permit for each MCC breaker. This way, each individual breaker permit may be released when the load is energized, rather than a single permit with all MCC loads on it that must be modified as many times as required to clear each individual breaker on the MCC.*
- *Permits to isolate all downstream loads on a distribution panel board that is to be energized may be written as an individual permit for each panel board breaker; this allows each individual breaker permit to be released when the load is energized, rather than a single permit with all panel board loads on it that must be modified as many times as required to clear each individual breaker on the panel board.*
- *Permits to isolate all downstream loads on a cooling water system that is to be energized should be written as an individual permit for each cooling system user; this allows each individual user to be released when it is placed in service, rather than a single permit with all users on it that must be modified as many times as required to clear each individual cooling water user on the system.*

There may be multiple similar examples in the facility to which this philosophy applies.

- The WGS, in conjunction with the RFE/STE, as required, continuously monitors the effectiveness of established protective measures, changing plant conditions, and EIP boundaries to determine if there is a need to modify the EIP.
- If it is determined an EIP requires change or modification, the PR and WGS discuss the need for change and consult with RFE, STE, and TA, as required, to modify the EIP.
  - If the modification is administrative only (e.g., change in description or scope/type of work within current isolations), the paperwork is updated and the WGS informs personnel working under the EIP of the changes.
  - If the modification requires changes in isolation points and protective measures, the WGS ensures work is ceased and all AEs sign-off, then the WGS signs-off the EIP.
- The TA provides any new locks/tags required for the modification.
- Isolation points and protective measures are changed and verified (including zero-energy check) and permitting/work continues in accordance with the standard process.
- If the change is an emergency change, see **Section 4.3.4, *Implementing an Emergency Change***.

NOTE: *If one or more of AEs or WGSs is not available, the TA may authorize an emergency closure or change (with the Site Manager/PSUM approval).*

4.3.3 Offsite Authorizations

Available

If a WGS and/or AE is off-site but can be contacted by telephone, the individual is considered available and shall verbally authorize the closure or change.

If the WGS and/or AE agrees with the closure or change, the TA shall document the agreement over teleconference, then proceed with a permit closure or change as outlined in **Appendix C**.

This verbal authorization to close or change the EIP shall be documented (CFN-1312 and CFN-1313).

Unavailable

If the agreement of the unavailable WGS and/or AE cannot be obtained, the supervisor of the unavailable WGS and/or AE shall be contacted to discuss the boundary changes or EIP release with the TA.

If the TA agrees the change or release is necessary, the TA will proceed as outlined in **Appendix C**.

4.3.4 Implementing an Emergency Change

See **Appendix D, *Emergency Change to EIP Work Process***.

When implementing an emergency change:

- The TA and the Site Manager/PSUM, or designee, approve the emergency change.
- All AEs and available WGSs shall approve the EIP change by signing-off the EIP.
- The supervisor (with training equivalent to WGS) of the unavailable WGS and/or AE ensure the WGS and/or AEs working under the EIP held by the unavailable WGS are signed-off the EIP by the supervisor and locks are removed by the TA, as applicable.
- The supervisor ensures correct boundaries are established and forwards the signed EIP to the TA.
- The TA, RFE/STE, and AO, as required, modify isolation points and protective measures to incorporate the change.
- The TA identifies the emergency change on the EIP.
- The supervisor of the unavailable WGS and/or AE notifies the unavailable WGS and/or AE upon their return to site.

4.3.5 Implementing an Emergency Closure

See **Appendix E, *Emergency Closure of EIP Work Process***.

When implementing an emergency closure:

- The TA and the Site Manager (Construction jurisdiction)/PSUM (Startup jurisdiction), or their designee, shall approve the emergency closure. The TA shall document the approval including the unavailability of any personnel signed on the EIP and circumstances affecting their unavailability (CFN-1312 and CFN-1313).
- All available AE working under the EIP shall sign-off and available WGS shall release the EIP by signing-off.
- The supervisor (with training equivalent to WGS) of the unavailable WGS and/or AE ensures the available WGS and AE working under the EIP are signed-off the EIP by the supervisor, locks are removed from the lockbox by the TA, as applicable.
- The TA ensures that AOs remove all tags and locks.
- The TA closes the permit after ensuring all LOTO devices have been removed.
- The TA identifies the permit as an emergency closure.
- The supervisor of the unavailable WGS/AE shall notify the unavailable WGS/AE of the emergency closure upon their return to site.

NOTE: *The notification from the supervisor to unavailable WGS/AEs after emergency changes/closures is accomplished prior to the re-start of work on the closed system, (i.e., when the unavailable WGS or AE returns to work at the start of his next scheduled shift).*

4.4 Performing Isolations

Isolating involves the disconnection, de-energization, or de-activation at the designated isolation point and removal of hazardous energy from all possible sources at the point where work is being performed on the system.

Regardless of the hazardous energy type, all isolations involve five common steps:

1. Isolation and removal of energy source (closing and/or opening valves).
2. Removal of stored/residual energy (draining, inerting, clearing piping).
3. Implementing protective measures (hanging locks/tags, electrical disconnects, installing blinds).
4. Verification (independent or concurrent).
5. Proof (Zero-Energy Check).

Commentary *The means of achieving each step varies according to the plant or equipment and energy source involved. It may be the act of implementing an isolation requires in itself an isolation to be performed (such as a valve isolation for the placement of a spade into pipework).*

4.5 EIP Closure

See **Appendix F** for the EIP Closure work process.

When the work is completed:

- The WGS verifies the work is complete.
- All AEs remove personal locks/tags and sign-off the EIP.
- The WGS notifies the RFE/STE work is complete.
- The RFE/STE /SSS (as applicable for operating systems) verifies work is complete in accordance with the scope and the system is safe to return to service.
- The WGS signs off the EIP and surrenders it to the TA.
- The TA ensures all WGS/AE on the permit have signed-off.

NOTE: *If all AEs have not signed-off, the EIP shall remain active.*

- The RFE/STE/SSS (as applicable) confirms that the equipment is ready to be de-isolated. The TA removes their lock from the lockbox.
- The AO removes all protective measures and restores the isolation points to the position designated by the RFE/STE/SSS (as applicable).

NOTE: *De-isolation of the EIP should be performed in the reverse order (i.e., bottom-up) following the listing of the isolation points/protective measures on the EIP. Deviations/hold points to this sequence need to be explained in the special conditions section of the EIP.*

- The TA closes the EIP after ensuring all LOTO devices have been returned and protective measures have been restored.

- After the permit is closed, the TA destroys or removes the labels (Q4 system) from all released tags, submits the closed permit to the UPF Document Management Center (DMC) and stores the locks and keys.

4.6 Sanction to Test Instructions

See **Appendix G**, CFN-1314, *Safety Tagging for Sanction To Test*, CFN-1315, S*anction to Test Cover Sheet*, and CFN-1316, *Sanction to Test Log*. Following are requirements for personnel involved in the STT work process:

- The STT requestor completes the STT forms and submits it to the TA (CFN-1315 and CFN-1316).

NOTE: *CFN-1315 is considered a cover sheet and should be conspicuous, unique, and easily identified (e.g., a colored sheet [this color should not be used anywhere else]).*

- The TA reviews the request with the RFE/STE and PR to concur the STT is correct.
- If the STT is correct, the TA assigns the STT number in the STT form (CFN-1315) and the STT log (CFN-1316) and informs the WGS.
- The WGS informs all personnel signed on the affected EIP of the STT and ceases work.
- All personnel signed on the EIP will sign off the EIP and remove their locks (if applied).
- All work on the EIP is stopped and only scope listed on the STT may be executed.
- All personnel involved in the test shall sign-on the STT Form (CFN-1315).
- If personnel listed on the EIP are unavailable, follow the Emergency Change rules in **Section 4.3.3, *Offsite Authorization***.
- The STT will be in force and testing can commence once all persons involved in the test are signed on the STT cover sheet (CFN-1315) and protective measures are removed by an AO and documented on CFN-1314.
- The STT is considered in force until all signatures are in the Lift Release (sign) column and the WGS and TA have signed the cover sheet.
- After testing is complete, the WGS ensures the STT is released and all personnel have signed-off on CFN-1315 PRIOR to leaving the site.
- The TA shall remove the STT Form from the front of the EIP, places it behind the EIP, and close the STT in the STT Log.
- The TA shall maintain CFN-1316 in the same area as CFN-1311, *Energy Isolation Permit/Lockout Permit Log*.
- The TA notifies the AO to use CFN-1314 to restore protective measures to original state as designated in the EIP.
- Once isolations are restored in accordance with the EIP and verifications are complete (CFN-1314), personnel who signed off the EIP during the STT period can sign-on the EIP again and work can continue.

4.7 Master Clearance

A Master Clearance is a process that allows for either a Project-Wide Boundary Clearance (**Section 4.7.1**), System Boundary Clearance (**Section 4.7.2**), or a Master/Subordinate Permit Clearance process that allows group protection through use of a single Isolation Management permit.

4.7.1 Project-Wide Master Boundary Clearance

A Project-Wide Master Boundary Clearance is limited to main terminal points to a site and is designed to ensure construction workforce protection. The TA will function as the AE for Project-Wide Master Clearances and ensures that they are applied correctly. Examples include:

- Main power feeds
- Gas supplies
- Connections to existing owner facilities outside the scope of the Project. These EIPs will be governed by Y18-107, but the Site Manager/PSUM will ensure, at minimum, the same level of protection provided by this procedure is met (e.g., may elect to lock Y-12 PDWP original paperwork in UPF lockbox via a UPF EIP).

When a Project-Wide Master Boundary Clearance LOTO is used, the following minimum requirements apply:

- The TA controls all keys that shall be under lockbox or key control.
- The Site Manager, BNI ES&H Manager, TA, and PSUM, where applicable, place their lock at the Project-Wide Master Boundary Clearance isolation point.

To remove a Master Boundary Clearance:

- Formal notification is sent to AFEs and AEs, including, but not limited to, the following:
  - Published notice (e.g., Notice of Energization, Standard Test and Commissioning Procedure 520-U07-00235, *Notice of Energization*).
  - Meeting announcements
  - Signage.

Downstream EIP (if required) needs to be established prior to release of the Project-Wide Master Boundary Clearance.

The TA performs a physical walkdown and verifies that necessary downstream EIPs are in place and adequate prior to the release of the Project-Wide Master Boundary Clearance.

NOTE: *Formal notice guidelines as outlined in **Section 4.7.1** shall also apply prior to release of such clearance.*

Agreement and release by all personnel recorded on the Project-Wide Master Clearance EIP and removal of their locks.

Commentary *Coordination and agreement is necessary with upstream/downstream infrastructure owners/operators, especially in the case of placing locks on components that are outside of project jurisdiction. Buy-in from external stakeholders supports their adherence to the requirements of this procedure.*

4.7.2 System Boundary Master Clearance

NOTE 1: *See **Section 4.7.1** for notification requirements.*

System Boundary Master Clearances are to isolate systems under testing/commissioning from systems remaining under construction work scope. The WGS will function as the AE for System Boundaries and ensures that they are applied correctly.

While a typical EIP looks at isolating energy out of an area/system, a System Boundary Master Clearance is typically installed at the boundary of an energized system to keep the energy in and provide downstream work force protection.

Commentary *Typical examples of System Boundary Master Clearances are:*

- *The clearance (lock open) of all load breakers on an electrical switchgear/panel that is preparing for test.*
- *A positive mechanical isolation, (e.g., valves, blinds or spades), which enable safe work on upstream/downstream systems/equipment.*
- *Mechanical isolation of an instrument air header at each take-off prior to initial test and Start-up of the header with instrument air. In this case, the boundary may be progressively extended as each sub-header becomes ready for commissioning.*

When a System Boundary Master Clearance is used as an isolation point for work, the following minimum requirements apply:

- The WGS will serve as the AE for System Boundary Master Clearances and will hang a lock and sign on to the permit on their work group's behalf.
- WGSs sign on/off and place their LOTO device on the System Boundary Master Clearance isolation lockbox on behalf of their work group or as designated by the TA (AEs always reserve the right to sign on/off and hang personal lock, if desired), and all verifications shall be completed in accordance with the implementation of the EIP process.
- All keys controlling energy isolation points shall be under a lockbox or key control.

NOTE 2: *System Boundary Master Clearances are planned by the Startup team to correspond to the commissioning and startup evolutions required for systems during the Project life cycle. System Boundary Master Clearances will often extend and be modified as new sections of systems are made ready to energize, such as in the case of instrument air header commissioning.*

NOTE 3: *An AE may always elect to hang their own lock or sign on to a System Boundary Master Clearance if they so choose.*

Releasing a System Boundary Master Clearance

The TA ensures the following requirements apply before releasing a System Boundary Master clearance:

- Formal notification to AFEs and AEs, including, but not limited to, the following:
  - Published notice (e.g., Notice of Energization, Y15-95-915)
  - Meeting announcements
  - Signage
  - WGS notifies their AEs.

- Establishment of any required downstream safety permits prior to release of the System Boundary Master Clearance.
- Physical walkdown and verification that downstream clearances/protection is acceptable and in place prior to the release of the System Boundary Master Clearance.
- Agreement and release by all personnel recorded on the System Boundary Master Clearance EIP and removal of their appropriate locks.

Master/Subordinate Boundary Clearances

NOTE 1: *Master/Subordinate Clearances are isolation permits arranged in a hierarchy to facilitate work generally associated with major facility outages. This process streamlines return to service of systems while minimizing the number of EIPs site personnel need to sign onto.*

NOTE 2: *A master permit in this context has isolation points generally consisting of sub-tier level subordinate isolation permits.*

Subordinate isolation permits generally are permits for individual systems, equipment or groups of such.

The hierarchy of such permits is shown in **Figure 1**.

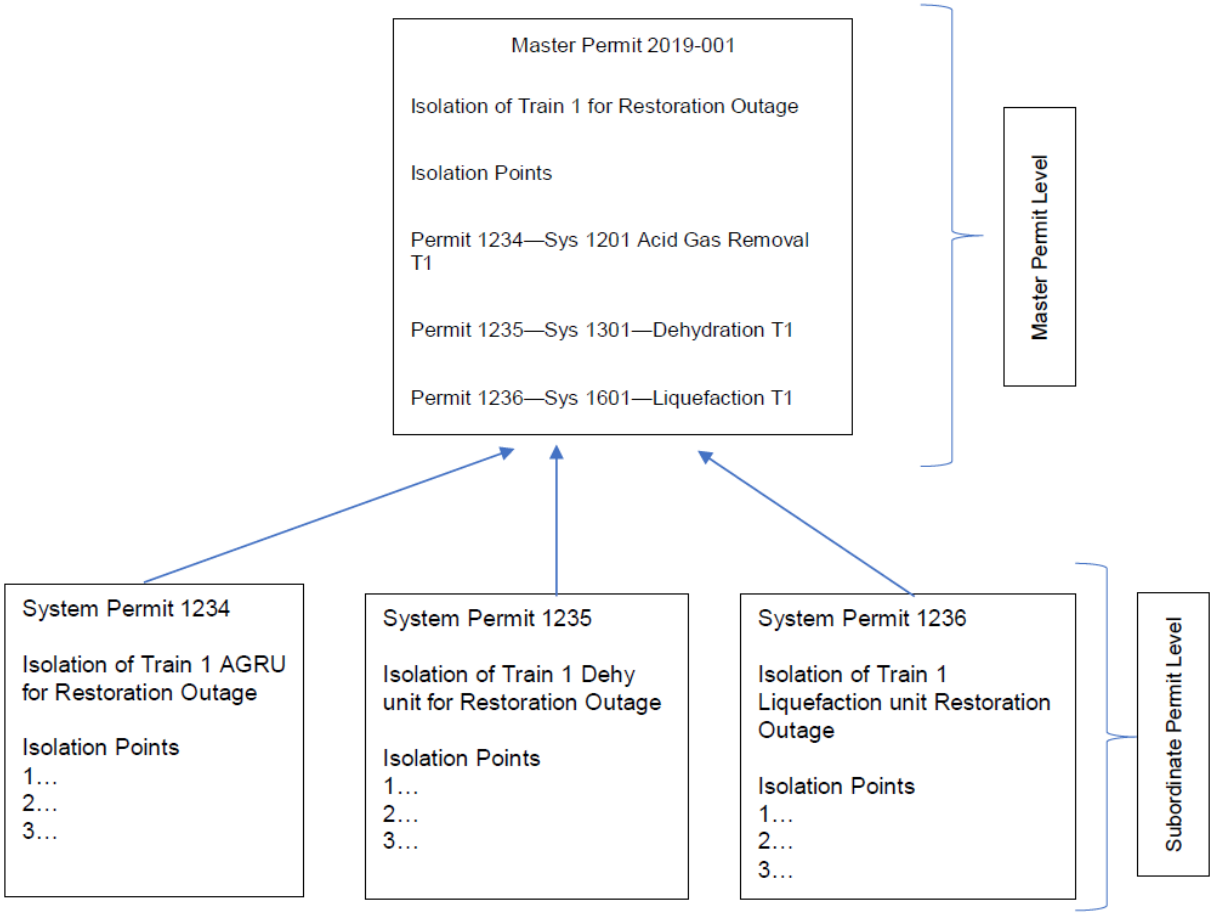

Figure 1. Hierarchy of permits.

- The TA shall sign on to each subordinate permit, noting the number of the master permit in the sign-on.
- The TA shall sign on to the Master permit which has the subordinate permits as the isolation points after they sign on to each subordinate permit.
- WGSs and AEs may then sign on to the Master permit, as applicable.

5.0 RECORDS

List the records generated by this document, along with the appropriate quality level. If none apply, enter "None."

Records generated by this procedure shall be maintained in accordance with Y15-95-800, *UPF Document Management*. Record types for documents submitted to the UPF DMC are identified in ML-PS-801768-A001, *Uranium Processing Facility Project Master Document Type List*. Quality type is listed as Quality-Lifetime (QA-L), Quality-Nonpermanent (QA-NP), or Non-Quality (Non-QA).

Records generated during the performance of this procedure include:

Record or Form Number	Record Title	Record Holder	System/ Location	Document Type	Quality Type
CFN-1311	*Energy Isolation Permit/Lockout Permit Log*	UPF DMC	InfoWorks	EPL	QA-L
CFN-1312	*Energy Isolation Permit Sign-on Sheet*	UPF DMC	InfoWorks	EPSS	QA-L
CFN-1313	*Energy Isolation Permit*	UPF DMC	InfoWorks	EIP	QA-L
CFN-1314	*Safety Tagging for Sanction To Test*	UPF DMC	InfoWorks	STSTT	QA-L
CFN-1315	*Sanction To Test Cover Sheet*	UPF DMC	InfoWorks	STTCS	QA-L
CFN-1316	*Sanction To Test Log*	UPF DMC	InfoWorks	STTL	QA-L

6.0 REFERENCES

6.1 Source References

Core Process, CP-106*: Hazard Analysis*

Core Process, CP-111: *Assessments and Audits*

Core Process, CP-221, *Lockout/Tagout Procedure*

NFPA 70E®, *Standard for Electrical Safety in the Workplace®*

OSHA 29 CFR 1910.147, *Control of Hazardous Energy (Lockout/Tagout)*; Clarification Booklet – Publication 3120

Standard Work Process Procedure 4MP-T81-02303, *Construction Equipment Maintenance*

Standard Work Process Procedure 4MP-T81-01306, *Retention of Construction Records*

Standard Work Process Procedure 4MP-T81N-01308, *Telecommunications System and Equipment Safety Tagging/Lockout*

6.2 Interfacing References

4MP-T11-M105, *Standard Work Process Procedures*

ML-PS-801768-A001, *Uranium Processing Facility Project Master Document Type List*

OSHA 29 CFR 1910.119, *Process Safety Management of Highly Hazardous Chemicals*

OSHA 29 CFR 1910.147, *The Control of Hazardous Energy Standard (Lockout/Tagout)*

OSHA 29 CFR 1926, Subpart K, *Electrical Standards for Construction*

520-U07-00235, *Notice of Energization*

Y15-95-800, *UPF Document Management*

Y15-95-912, *UPF Completion and Turnover*

Y17-95-64-851, *UPF Construction Equipment Maintenance*

Y18-107, *Lockout/Tagout Execution for Personnel Protection*

7.0 SUPPLEMENTAL INFORMATION

Appendix A, *Acronyms and Definitions*

Appendix B, *EIP Work Process*

Appendix C, *Change to Existing EIP Work Process*

Appendix D, *Emergency Change to EIP Work Process*

Appendix E, *Emergency Closure of EIP Work Process*

Appendix F, *EIP Closure Work Process*

Appendix G, *Sanction to Test (STT) Work Process*

Appendix H, *Permitting Competency Tracking (Example)*

Appendix I, *EIP Entry Instructions (Q4 System) (Example)*

Appendix J, *Danger – Do Not Operate/Do Not Remove Tag (Example)*

Appendix K, *Caution – Restricted Operation Tag (Example)*

Appendix L, *EIM Procedure Inspection Instructions*

Appendix M*, Methods of Isolation*

Appendix N, *Guidance on Application of LOTO*

APPENDIX A
Acronyms and Definitions

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Acronyms

AE	Authorized Employee
AFE	Affected Employee
AO	Authorized Operator
BNI	Bechtel National, Inc.
CFR	Code of Federal Regulations
CNS	Consolidated Nuclear Security
DMC	Document Management Center
EIM	Energy Isolation Management
EIP	Energy Isolation Permit
ES&H	Environmental, Safety and Health
IV	Independent Verifier
JHA	Job Hazard Analysis
JIT	Just-in-Time Forms
LOTO	Lockout/Tagout
Non-QA	Non-Quality
OSHA	Occupational Safety and Health Administration
PDWP	Power Distribution Work Permit
P&ID	Piping and Instrument Diagram
PR	Permit Requestor
PSUM	Project Startup Manager
QA-L	Quality-Lifetime
QA-NP	Quality-Nonpermanent
RFE	Responsible Field Engineer
SME	Subject Matter Expert
SSS	Startup Shift Supervisor
STE	Startup Test Engineer
STT	Sanction to Test
TA	Tagging Authority
UPF	Uranium Processing Facility
VOC	Verification of Competency
WA	Work Authorization
WGS	Work Group Supervisor

APPENDIX A
Acronyms and Definitions

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Definitions

Affected Employee (AFE)	A person whose job requires them to work or traverse in an area in which isolation management is being performed or whose work requires them to operate or use a machine, system, or equipment on which work is being performed under isolation management, but is not signed on to an EIP (i.e., any individual on a jobsite). An AFE does not work on isolated equipment and cannot sign onto a permit unless they become an AE. ***Commentary*** *An AFE must be aware of the tags used on a Project site to control hazardous energy, and:* • *An AFE must be aware of the rules associated with such tags and the potential consequences for violating such;* • *This shall be part of the jobsite orientation training to obtain unescorted access to the project site.* • *An AFE may work on equipment downstream of a project-wide master boundary clearance (**Section 4.7.1**).*
Audit	A systematic, independent, and documented assessment of the compliance to, and effectiveness of, this procedure and/or the implementation of this procedure.
Authorized Employee (AE)	A person who has completed the required EIM training to work on isolated systems. A person signed on the EIP and performs or directs work on equipment or systems that have been isolated for personal protection against hazardous energy.
Authorized Operator (AO)	A competent person authorized by the TA and supervision to operate and isolate process equipment (e.g., open/close valves, drain or vent fluids, startup/shutdown equipment, close electrical breakers or circuits) for establishing the safe boundary conditions described in the EIP. Competency will be determined by supervision, and training accreditation.
Caution – Restricted Operation Tag	An all-weather equipment or system tag that controls the methods personnel use to operate, energize, or pressurize equipment and electrical circuits.
Completions Lead	On projects where Bechtel has an operations group within the Startup organization, the Completions Lead/Designee is either an SSS or a dedicated individual reporting to the SSS tasked with the duties of a Completions Lead/Designee. On other projects, the Completions Lead/Designee is a TA designated by the PSUM. The UPF Startup Systems Completion Lead is responsible for the coordination of construction completion activities on systems that have been jurisdictionally transferred to Startup.

APPENDIX A
Acronyms and Definitions

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Competent Person	A person fulfilling a role defined in this procedure who is deemed competent through training accreditation and experience to perform the actions required to satisfy the requirements of their role. Possesses the technical knowledge required to identify and mitigate hazards specific to the work task(s). ***Commentary*** *A person with VOC in a discipline/craft will be considered competent to determine if a component or components have isolated the energy for the work to be performed safely.* *Site supervision will make the final determination of VOC using* ***Appendix H*** *and the definition of Competent Person as the minimum requirement.* VOC requires agreement from a person's Supervision and the Site TA for Permit to Work/LOTO roles.
Component	Uniquely identified hardware installed at a specific location. A component may be an individual device (e.g., a valve or instrument), equipment (e.g., a heat exchanger), or an assembly (e.g., a rack).
Danger – Do Not Operate/Remove Tag	An all-weather tag placed on equipment or components to prevent the position or condition from being altered from the position stated on the tag.
De-Energized	Free from all energy sources within the isolation boundary.
De-Isolate	To remove the isolation lock(s) from the isolation point(s). "De-Isolation in Progress" is when the keys for component locks leave care, custody, and control of the tagging office and locks are removed. De-isolation does not necessarily mean that the state of the control device has been restored to its original position (i.e., a breaker could still be in the open position). NOTE: *From the instance the keys change hands, the LOTO is no longer in use as protection.*
Direct Control	Control of an energy isolating device by the individual(s) performing the work that could be affected by the energy should the energy isolating device be operated. This specifically implies that the individual protected by the energy-isolating device can physically prevent someone from operating said device. ***Commentary*** *Examples include:* *Direct Control:* • *Instrument technician needs to calibrate or remove a pressure transmitter. The manifold block valves are directly on the instrument. Thus, he has direct control.* • *A pipefitter finds a gauge faulty on a pressure test tree for hydro testing. There is a means to bleed off the stored energy in the 2 ft. (60.96 cm) distance of SB pipe between the root valve and the gauge in a controlled manner. This is direct control: bleed-off pressure through a drain point.* *Not Direct Control:* • *Isolating means for the component is within line of sight but not within arm's reach at all times.*
Drain Point	A valve used to drain, vent, or de-pressurize plant or equipment or a process line that releases all stored energy. For the drain point to be used in an isolation procedure, the drain point must have no known deficiencies prior to taking the equipment off-line and serve as a verification point when proving zero-energy.

APPENDIX A
Acronyms and Definitions

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Downstream	For the purposes of isolating energy, downstream means the flow path/direction after or away on a fluid system or towards the load on an electrical system from a single isolation point or system being isolated.
Energy Isolation Permit (EIP) Change	A regular permit change or modification required when altering or shifting the permit boundary as needed without closing the entire permit (e.g., lifting tags no longer required in the boundary).
Emergency Release/ Emergency Change	A release or change of an EIP when the WGS or AE is not available to release the system/component by removing their individual tag or signing off on the permit. ***Commentary*** *An emergency release would entail the complete release of the EIP from being in an isolated state.* An emergency change would only require a change to a portion of the protection boundary without closing the entire permit.
Energized	Connected to an energy source or containing residual or stored energy.
Energy Isolating Device	A device that provides a physical barrier that prevents the transmission or release of energy (e.g., valve, circuit breaker). NOTE: *Interlocks (control circuit) are NOT a means of isolation in accordance with OSHA 1910.147 (b) Definitions: "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 Isolation Permit (EIP)	An authorization form used to request, record, issue, and release EIM protection for equipment and/or systems
Engica Q4 Safety	The Bechtel Standard Application Program used for electronic implementation of EIM (LOTO).
Entity	(Within this procedure) Company or sub-contractor or type of craft, where applicable.
Hazardous Energy Source	A form of electrical, mechanical, hydraulic, pneumatic, chemical, thermal or *other energy that has the potential to harm personnel or damage plant and equipment. **stored batteries, radiation, mass and height (suspended loads), falling, sliding or slipping objects and tension springs, belts, cables, chains or ropes, etc.* See **Appendix N** for a hazardous level table. NOTE: *Personnel, when developing permits, must consider any (not just common or conventional) potential source of energy that could be harmful and the best method of isolating the potential energy source.*
Independent Verifier (IV)	A person (typically the WGS) competent and authorized by the TA and supervision to verify the proper installation of protective measures and safe boundary conditions described in the EIP. Competency is determined by supervision and training accreditation. Must be a different individual from the AO that applied the protective measures on the EIP. An individual trained and competent as an AO is also considered trained and competent as an IV.

APPENDIX A
Acronyms and Definitions

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Isolation/Isolating	The physical act undertaken (e.g., closing a valve and locking it in position, opening a breaker and locking it in position, removing an electrical component to create an energy break, inserting a blind or spade in a segment of piping) to prevent the release of energy that may cause injury to personnel, damage to plant or equipment, or harm to the environment.
Isolation Boundary	Encompasses the physical location of isolations at the perimeter of an energized system to the interface of a non-energized system (e.g., upstream/downstream valves closed, locked and drained/vent valves open to isolate Startup and construction activities; breakers locked open to form an isolation in an electrical supply from Startup to construction).
Isolation Point	A uniquely identifiable physical component (e.g., valve, breaker, spool piece) within a system that meets the criteria of an energy isolating device.
Job Hazard Analysis (JHA)	A process that identifies key job activities/tasks associated with a definable activity, examines key job activities/tasks to determine the foreseeable hazards associated with the task (e.g., chemical, biological, physical, workplace), and establishes criteria to eliminate or control the hazards.
Lockout	The placement of a locking device on an energy isolation component to ensure the related equipment or system cannot be energized or operated until the locking device is removed.
Lockbox/Key Control	A lockbox is a metal box designed to accommodate multiple locks, keys, and tags. The lockbox is configured so it cannot be opened until all locks have been removed from the box. Key control is established via the lockbox system (keys are placed in the box prior to locking) or by utilizing a central key safe in conjunction with lockboxes. One or both methods (lockbox/key safe) for key control may be used.
Lockout/Tagout (LOTO) Device	A device that utilizes a positive means such as a lock, or non-removable tag to hold an isolation point in the safe position. (Also see “Isolation/Isolating.”)
Multi-Locking Device	A locking device with provisions to apply multiple locks. Sometimes called multi-clip, hasp, or scissor.
Startup Shift Supervisor (SSS)	Typically supervises operators who control systems and processes that run simultaneously with project activities.
Permit	A document used to manage specific tasks and/or work areas that require a further degree of control or task preparation (e.g., confined space entry).
Permit Requestor (PR)	A person who submits/requests EIPs who has successfully completed EIM/LOTO training and received VOC. This person may or may not be the WGS.
Personal Lock/Tag Device	A person’s project-provided unique isolation device used as a secondary means of energy control, such as a lock and/or tag and a means of attachment, which can be securely fastened to a lockbox or component. ***Commentary*** *The tag identifies the AE and indicates that the equipment or system being controlled is not energized or operated until the isolation device is removed.* *One personal device is allowed per person, per lockbox or component(s) as designated by the TA.
Piping and Instrument Diagram (P&ID)	A visual representation of plant or equipment, indicating location of vessels, piping, valves, instruments, etc., in diagrammatic form.

APPENDIX A
Acronyms and Definitions

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Protective Measure	The position or configuration in which the isolation point is placed to affect the isolation. Other protective measures may include lockouts, tagouts, barriers, signage, posting sentries, etc., that, when in place, eliminate or reduce the risk to all personnel working on or near the work area.
Prove the Isolation	To demonstrate the integrity of the isolation under the current conditions (e.g. system pressure, temperature, chemical hazard) by ensuring all isolations are in place and the isolation is holding (prove zero-energy). If system conditions are subject to change, best practice is to regularly monitor the isolation.
Return to Service	To bring the plant and/or equipment back into service or operation after work has been completed and the permit has been closed.
Responsible Field Engineer (RFE)/Startup Test Engineer (STE)	An individual that is the SME for the correct installation, pre-commissioning, commissioning, and startup of a system and associated equipment.
Sanction to Test (STT)	The ability to remove and replace isolation devices while performing the work described on the permit. Used for the purposes of testing/commissioning and manipulating/calibrating equipment, components, or systems; this allows work to be completed without opening/closing the permit for the sake of the testing/commissioning activities.
Shall	Mandatory requirement.
Should	Recommended practice to be implemented where circumstances dictate.
Supervision	Persons responsible for supervising Field Non-Manual (FNM) or Field Manual (FM) personnel on a project. Supervision have direct reports (Craft FM, Operators FM, and Engineers FNM). Depending on the project type and staffing, supervision can be of several types and titles (e.g., Site Manager, PSUM, WGS, SSS, and Completions Lead/Designee).
Single Line Drawing	A drawing representing an electrical distribution network.
Tagging Authority (TA)	The individual(s) designated by the Site Manager or PSUM to implement the isolation management of required equipment or systems.
Tagout	The placement of a tagout device on an energy-isolating device (e.g., valve, disconnect switch, circuit breaker, fuse holder, lifted lead) to indicate that the equipment/system being controlled is not operated until the tagout device is removed. This method is used when a lock cannot be installed.
Temporary Energy Source	These are closely inspected to ensure safety of personnel working on systems or equipment; these include, but are not limited to: • Temporary construction or site backfeed electrical power supplies. • Portable generators, batteries or uninterruptible power supplies (UPS). • Temporary pumps, tanks, or boilers. Any other temporary source of energy identified by the owner/customer.
Test	An activity covered by a procedure to prove the functionally or suitability of equipment, systems, a component or group of components. Testing can occur during construction, commissioning, startup, or maintenance activities.

APPENDIX A
Acronyms and Definitions

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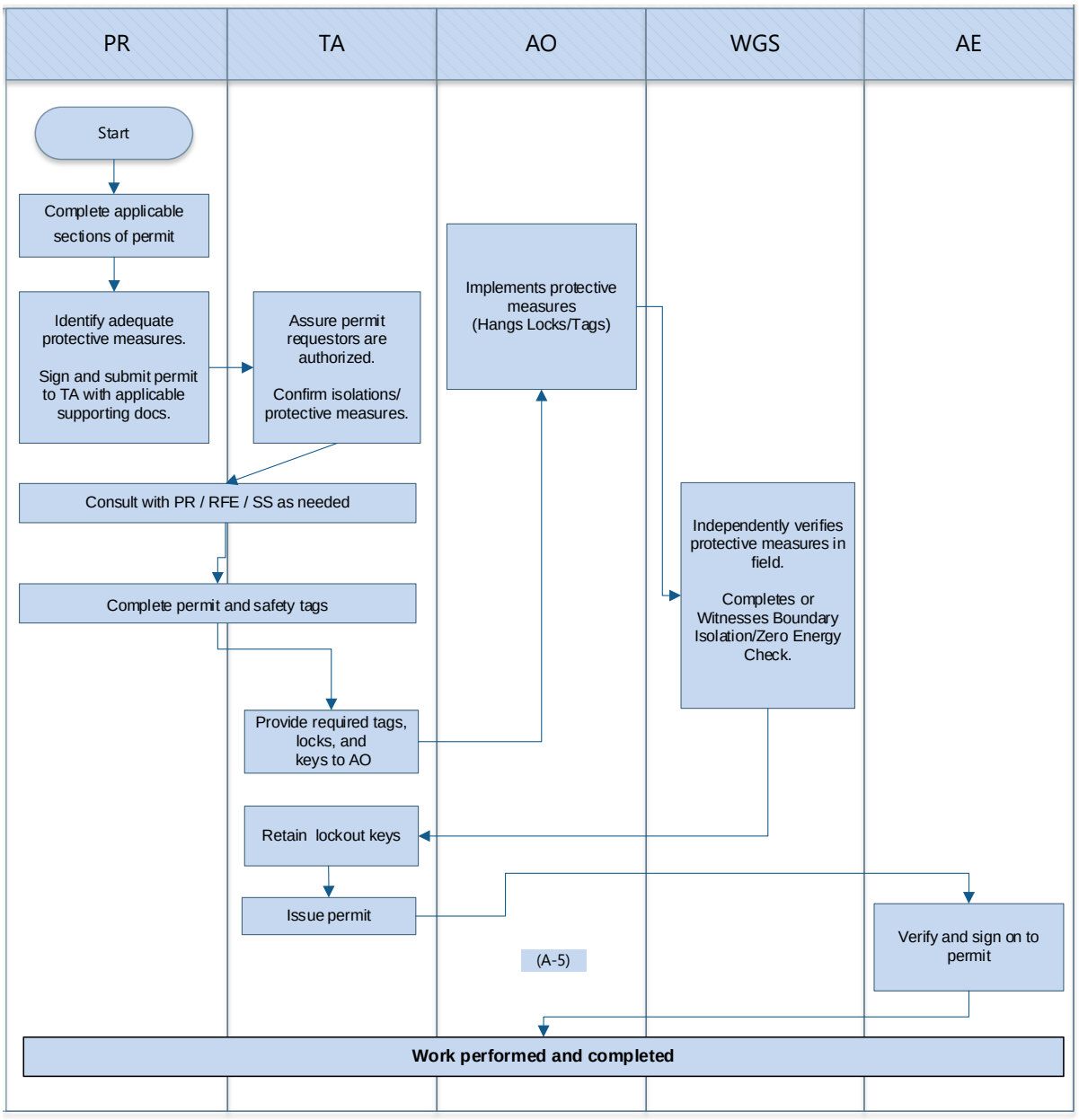
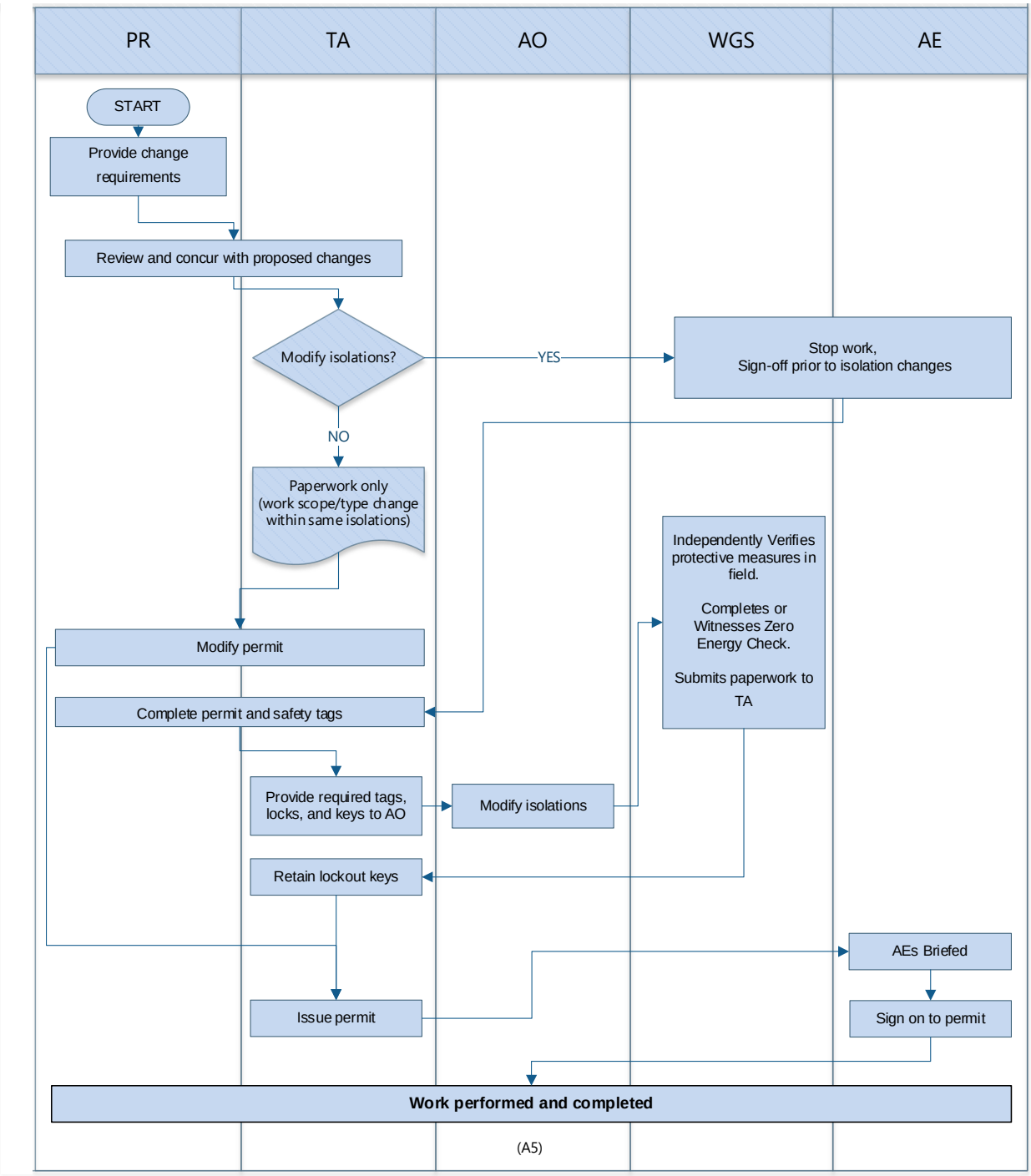
Upstream	For the purposes of isolating energy, upstream means the flow path/direction before or leading up to on a fluid system and away from the load or towards the power supply on an electrical system an energy isolation point or system.
Visitor	A person who gains access to site and has NOT completed the full site orientation. The visitor is always directed and fully supervised by an authorized person.
Work Group Supervisor (WGS)	A person who oversees the work of individuals and work teams.
Work Scope	The description of work detailed on the EIP.
Zero-Energy Check	A term used for checking a potential energy source for zero-energy (e.g., no electricity, no process, pneumatic or hydraulic pressure, no fluid flow, no heat). Workers must be able to verify or have verification shown to them that a system, equipment, or process has no energy prior their start of work. ***Commentary*** *Examples: The verification for piping zero-energy is an open drain or vent, for electricity; a voltage check on a circuit. Zero-energy check on electrical equipment with push buttons or start/stop switches includes trying to start them at local and remote locations by pushing the buttons or activating the switches to ON and AUTO. These are final checks to be performed prior to work.*

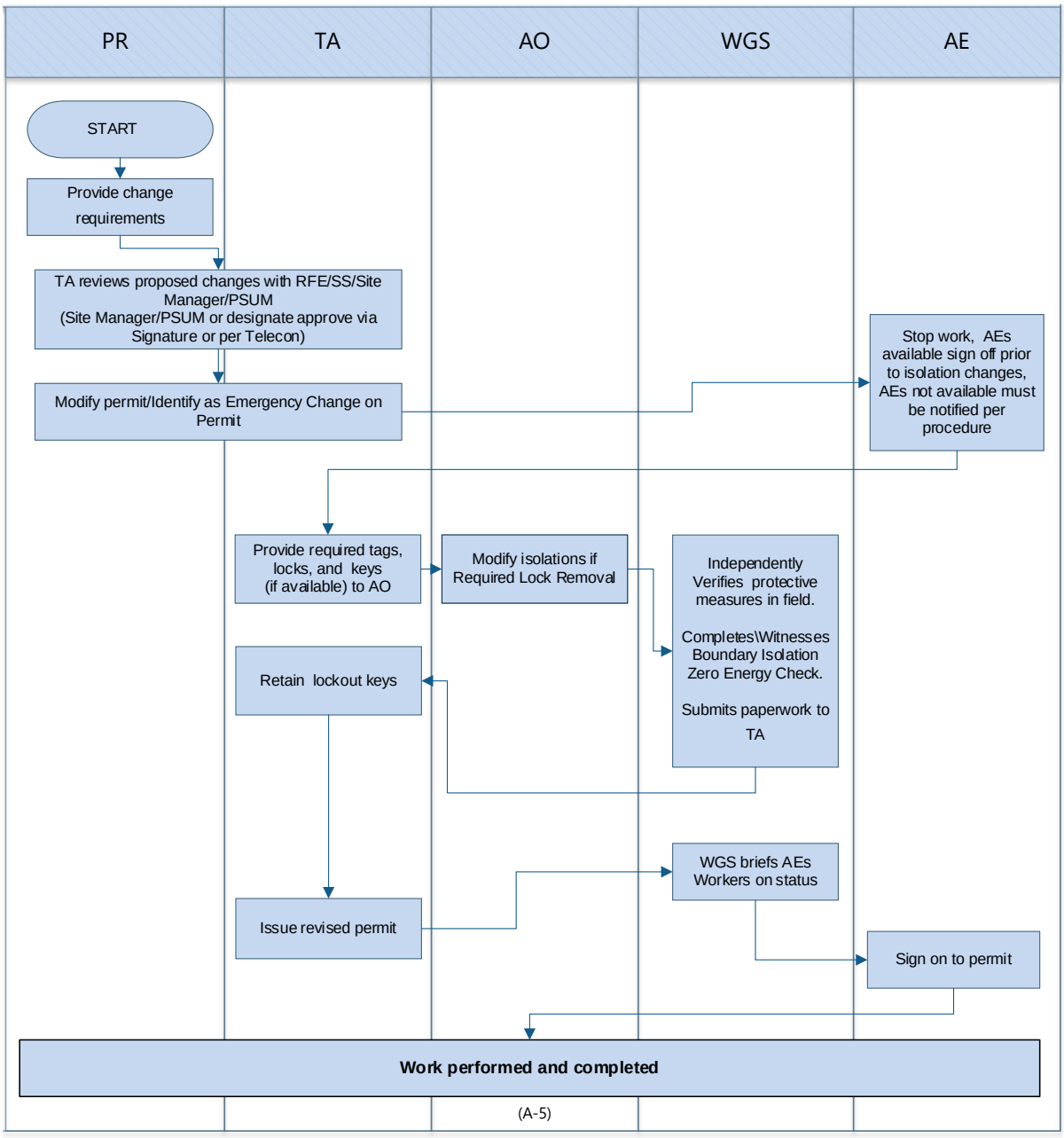
APPENDIX B
EIP Work Process



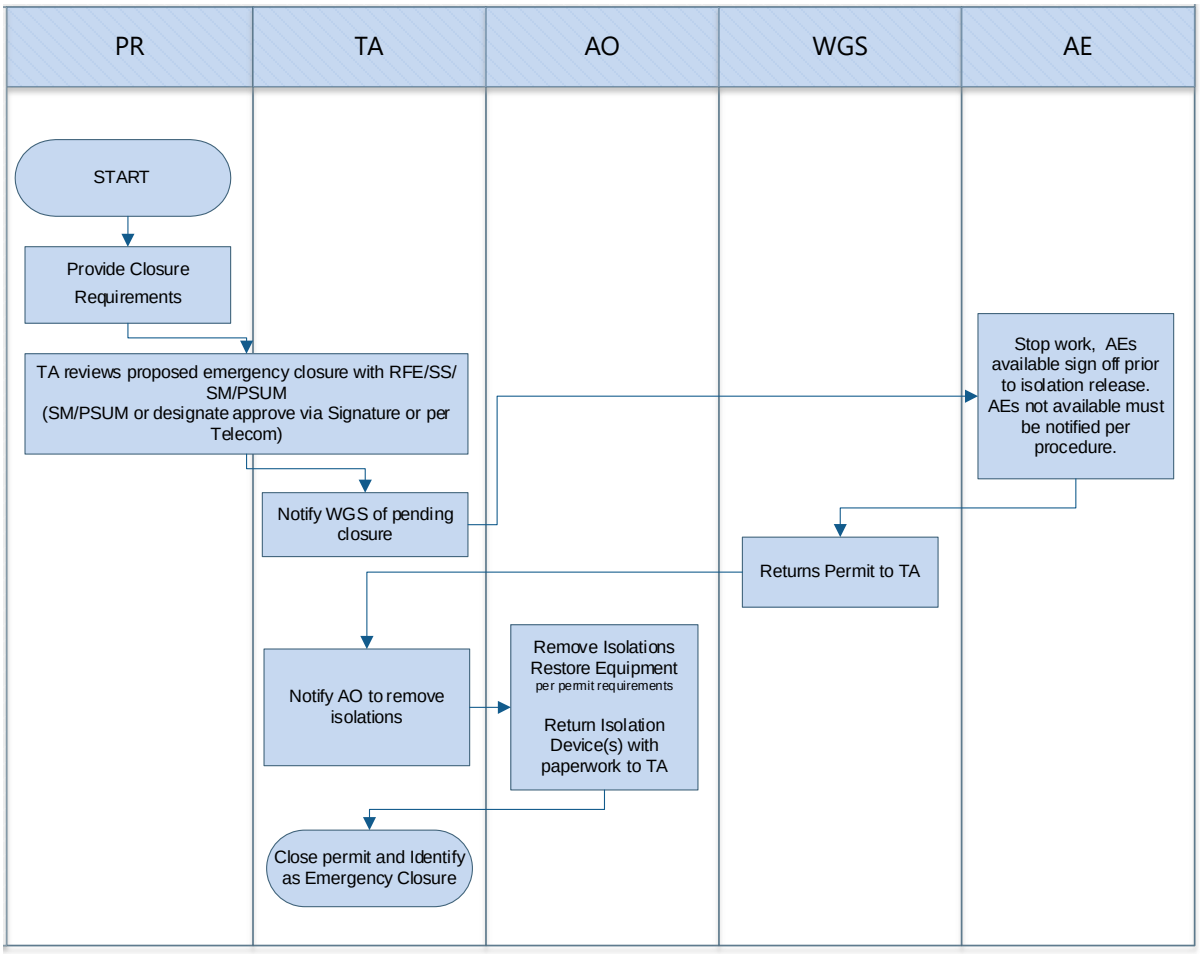
APPENDIX C
Change to Existing EIP Work Process



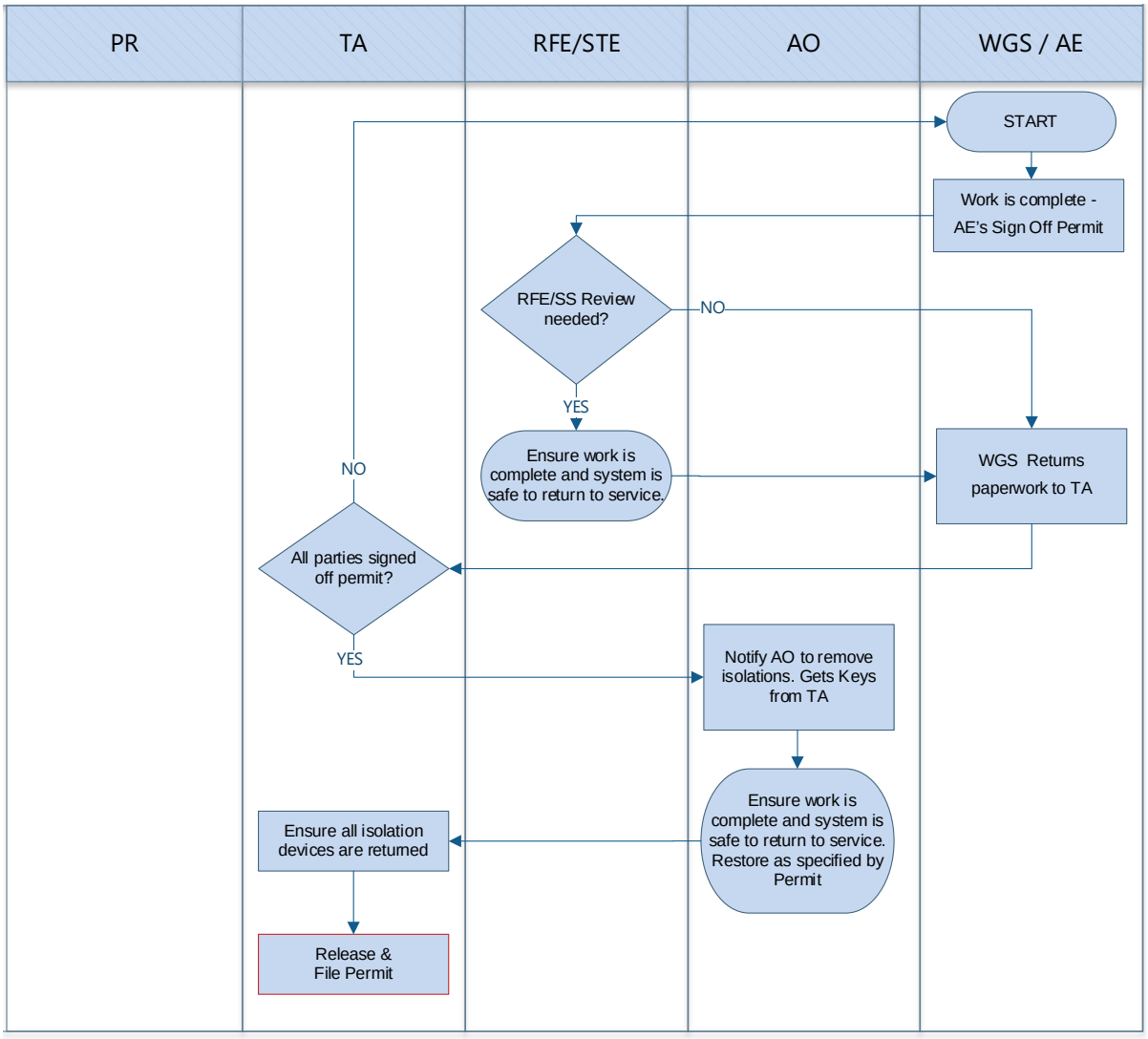
APPENDIX D
Emergency Change to EIP Work Process



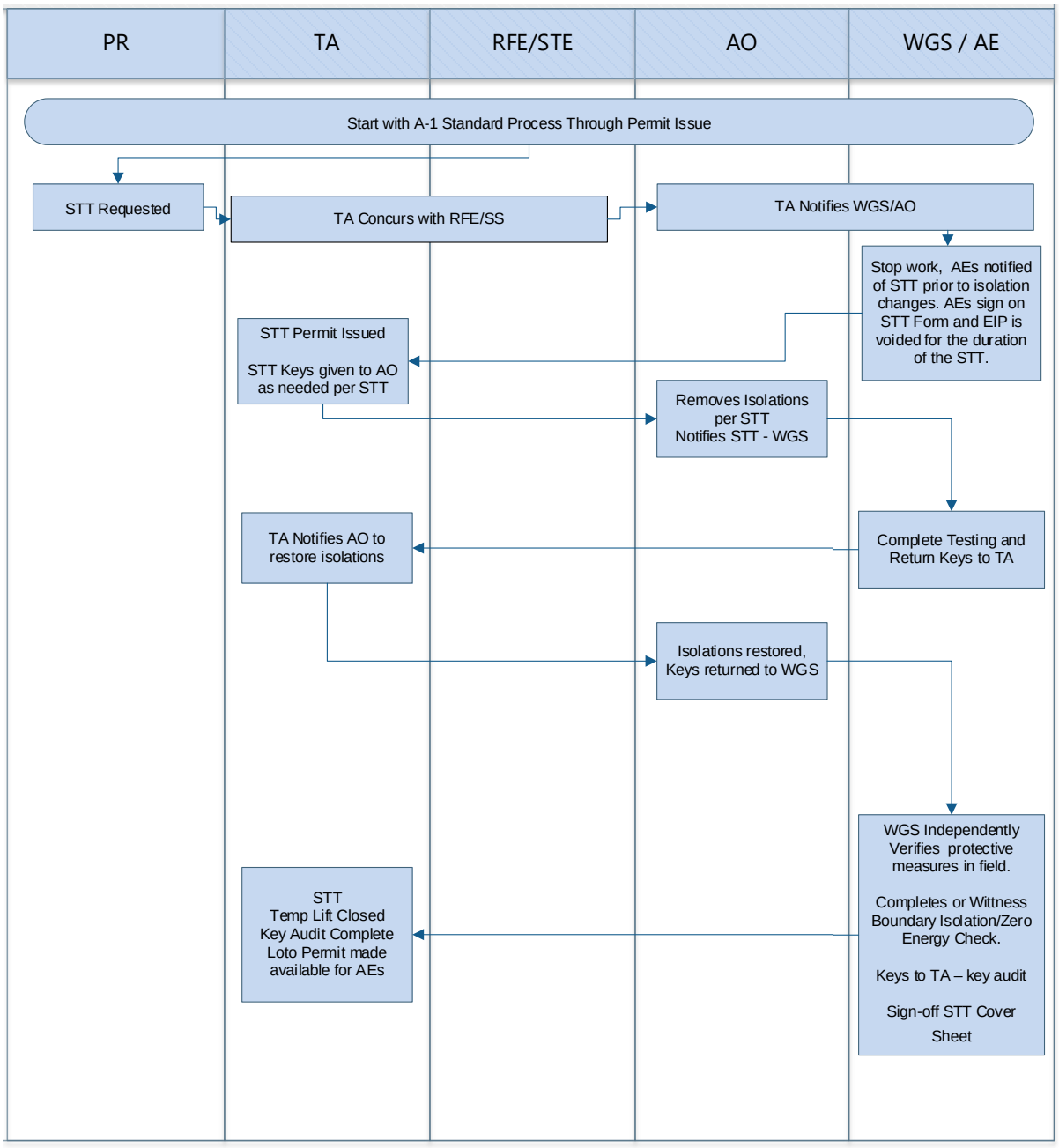
APPENDIX E
Emergency Closure to EIP Work Process



APPENDIX F
EIP Closure Work Process



APPENDIX G
Sanction to Test (STT) Work Process



APPENDIX H
Permitting Competency Tracking (Example)

(Page 1 of 2)

Tagging Authority - Verification of Compentency			
		Discipline	
Name	Selected By (Supervisor)	Electrical	Piping / Mech

SM / PSUM:____ **Date:**_______________

The personnel listed have been deemed competent through training accreditation and experience to perform the actions required to satisfy the requirements of Tagging Authority. The individuals possess the technical knowledge required to identify and mitigate hazards specific to their EIM/LOTO work task(s).

The above Verfication of Competency is dependent on required re-training. Supervisors and employees must confirm re-training is not delinquent prior to performing a LOTO role for which they have been deemed competent.

Supervisors must ensure other applicable training requirements, outside of LOTO training, are completed by personnel assigned to each specific LOTO task (e.g. confined space, Qualifed Electrical Personnel training).

Any member of site management can revoke rights as needed, justified by incident or diminished view of competency as demonstrated by an individual.

APPENDIX H
Permitting Competency Tracking (Example)

(Page 2 of 2)

Authorized Operator / Independent Verifier - Verification of Competency			
		Discipline	
Name	Selected By (Supervisor)	Electrical	Piping / Mech

Tagging Authority:_____ **Date:**_____

SM / PSUM:_____ **Date:**_____

The personnel listed have been deemed competent through training accreditation and experience to perform the actions required to satisfy the requirements of Authorized Operator / Independent Verifier. The individuals possess the technical knowledge required to identify and mitigate hazards specific to their EIM/LOTO work task(s).

The above Verfication of Competency is dependent on required re-training. Supervisors and employees must confirm re-training is not delinquent prior to performing a LOTO role for which they have been deemed competent.

Supervisors must ensure other applicable training requirements, outside of LOTO training, are completed by personnel assigned to each specific LOTO task (e.g. confined space, Qualifed Electrical Personnel training).

Any member of site management can revoke rights as needed, justified by incident or diminished view of competency as demonstrated by an individual.

APPENDIX I
EIP Entry Instructions (Q4 System) (Example)

Illustrated below are entries needed to create a permit request in the Q4 system. Requests must include enough detail that someone new to the jobsite can understand what they need to perform work safely and the energy that is controlled with the EIP. This information may be part of their risk assessment.

OGO Space Part of Q4 Program Not User Editable	**ENERGY ISOLATION PERMIT** Not User Editable										
	Project:	*Project name will be here* – Part of Q4 Program Not User Editable					Permit iD:	Not User Editable			
	iD:	*Project Number here*– Part of Q4 Program Not User Editable					JHA iD:	Not User Editable			
Permit Requester name:	*Required Entry Select from DATA	Request Date:	*Required Entry – Select from DATA	Company Name:	*Required Entry Typed Data	Entity:	*Required Entry – Typed Data	Not User Editable			
Scope of Work:	Not User Editable			Equipment ID:	*Required Entry – Select from DATA	Not User Editable					
*Required Entry -Typed Data Typed Data Typed Data Typed Data				Equipment Description:	Derived from selection above						
				Location:	*Required Entry – Select from DATA	Not User Editable					
				System Number:	*Required Entry -Typed Data	Not User Editable					
				Lock Box:	*Optional Entry Typed Data	Key Safe:	*Optional Entry Typed Data	Not User Editable			
Other Information (1):	*Optional Entry Typed Data							Not User Editable			
Other Information (2):	*Optional Entry Typed Data							Not User Editable			
Notification / Communication Method:	*Required Entry -Typed Data							Not User Editable			
Special Conditions Required:	Not User Editable										
*Optional Entry - Typed Data											
Not User Editable	**Safety Tagging**							Not User Editable			
Tag No.	Tag Type	Lock No.	IP No	Component	Position	Installed	Date/Time	Verified	Date/Time	Removed	As Left Position
Selected data from "Build Permit" page						Managed by User Login – user selectable ☑					
Approved for isolation by: Signature:	Managed by User Login			Date/Time:	Derived from state change Not User Editable						
Zero Energy Check Performed or Witnessed by: Signature: ☐	Managed by User Login			Date/Time:	Derived from ☑ change Not User Editable						
Permit Issued By: Signature:	Managed by User Login			Date/Time:	Derived from state change Not User Editable						
SDN: H-030-02111									Page __of__		

APPENDIX J
Danger – Do Not Operate/Do Not Remove Tag (Example)

Visibility and Language

These are qualities associated with an isolation tag; the tag is visible (in plain sight) and in language(s) understood by the project work force. If the tag is handwritten, the ink is non-erasable, waterproof, and durable. Faded tags are re-written and/or replaced. The handwriting is legible.

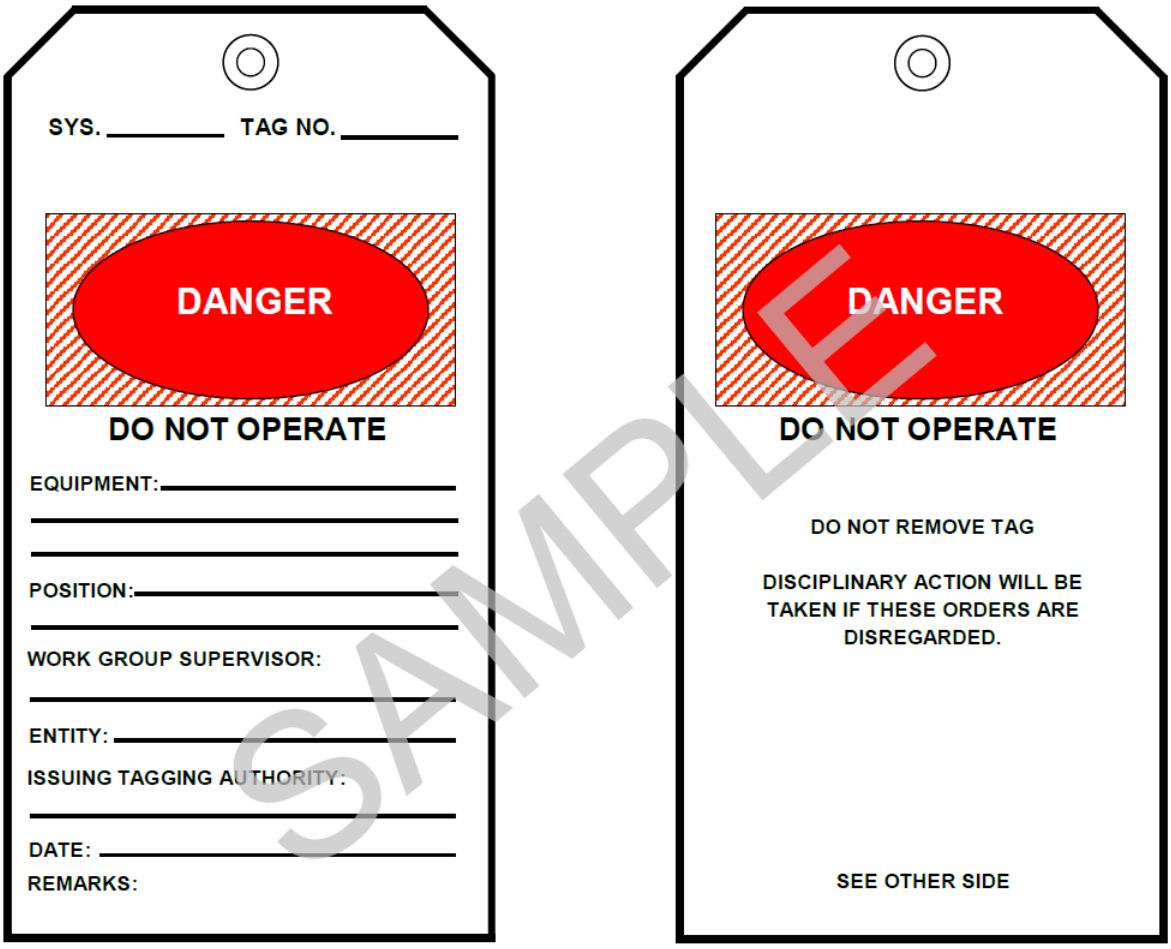
Commentary

- *On projects where English is not the primary language, tags need to be in both English and the common language(s) of the project work force.*
- *Consider using jobsite posters displaying example tags to educate/inform the workforce*

Tags are to have a white background with black letters except for the DANGER area, which should have white letters in a red oval with red diagonal lines inside a black rectangle.

Where possible, one-piece, non-reusable, self-locking cable ties shall be used to attach the tag to the component.

MINI TAGS or MINI STICKERS may be used in close or confined locations (i.e., panels, controls, consoles, where normal size tags cannot be installed).



APPENDIX K
Caution – Restricted Operation Tag (Example)

Restricted Operation Process

- "Caution – Restricted Operation" tags shall be used in situations where a system or component is required to be energized or operated to safely facilitate a work activity (e.g., open/close a vent valve to facilitate a hydrostatic test, or verification of zero-energy at start of shift).

NOTE: *Equipment or systems shall only be energized or operated at direction of the WGS, or person/party indicated on the tag. A sample tag is shown in Figure 2.*

- Where possible, one-piece, non-reusable, self-locking cable ties should be used to attach the tag to the component.
- Caution tags shall **NOT** be used for personnel Protection.
- Systems or components with a Bechtel "Caution - Restricted Operation" tag attached shall be operated only by (or under the direction of) the WGS.
- CAUTION – RESTRICTED OPERATION and DANGER – DO NOT OPERATE tags can be requested on the same EIP Permit but **SHALL NOT** be hung together on the same component. The permit shall clearly indicate components to be tagged with a CAUTION − RESTRICTED OPERATION tag.

Figure 2. CAUTION – RESTRICTED OPERATION tag sample.

APPENDIX L
EIM Procedure Inspection Instructions

(Page 1 of 3)

Inspections of EIM/LOTO Procedure for Compliance

The Site Manager ensures an inspection (annually at minimum) of this procedure is completed and documented by a Hazardous Energy SME, in accordance with OSHA CFR (29) 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."*

The periodic inspection shall include the following (in accordance with OSHA CFR (29) 1910.147 (c)(6)(i)(A-D) and (ii):

- Be conducted by an SME trained and competent in Isolation Management/LOTO who is not governed by this procedure. The SME will be selected by Corporate Manager of Construction, Startup, and ES&H.
- Correction of any deviations (other than those approved) or inadequacies.
- A review between the SME/Inspector and AEs and AFEs of their respective responsibilities.
- Be conducted on a Bechtel site where this procedure is being utilized for isolation management.
- Certification of the review/inspection by including the following documentation:
  - The machine or equipment utilized
  - Date of the review/inspection
  - AEs and AFEs included in the review/inspection
  - Person conducting the review/inspection.
- Documentation of the completion of action items captured in the inspection.
- A copy of EIP being inspected.

NOTE: *The schedule for this inspection will be noted on the appropriate corporate schedule.*

APPENDIX L
EIM Procedure Inspection Instructions
(Page 2 of 3)

EIM/LOTO PROCEDURE INSPECTION FORM

Project No.:	Project Name:	Date:
Equipment or System:	Location:	Permit No.:
Procedure No:	Procedure Title:	Rev. No.:

Authorized Employee (AE) Responsibilities

S = Safe | A = At-Risk | N/A = Not Applicable/Observed

Item	S / A / NA	Comments
Equipment or system being worked on is properly isolated (Valves, electrical devices, etc. are locked in correct position, isolation devices on valves keep valve from moving)?		
Zero Energy Check provided (for piping – bleed open, for electrical - Volt/Ohm Meter)?		
All required safety precautions are in place (correct PPE for electrical and other work, insulated tools where required, proper signage, labeling and barricades, grounding/earthing correct, temporary wiring disconnections protected dielectrically and mechanically, all exposed conductors are contained within approved cabinets, observer present if working on live equipment)?		
EIP (paperwork/signage) completed in accordance with SWPP-1307?		
TA and WGS lock or tag placed on the lock box as applicable before performing work?		
Tags provide correct information and are legible?		
Personnel working under this procedure are trained to the correct competency level for their role?		

Affected Employee (AFE) Responsibilities

Item	Satisfactory Response? Yes/No	Comments
Who is authorized to sign permits, hang personal locks, tags, or other devices as part of the procedure?		
Who is authorized to perform work on any system or component under permit?		

Figure 3. EIM/LOTO Procedure Inspection Form sample.

APPENDIX L
EIM Procedure Inspection Instructions
(Page 3 of 3)

Comments/Action Items:			
Names/Signatures			
Inspection Performed by:	*Print Name/Title*	*Signature*	*Date*
Authorized Employee (only one AE signature required):	*Print Name*	*Signature*	*Date*
Affected Employee (only one AFE signature required):	*Print Name*	*Signature*	*Date*

FORM 4MP-T81-01307-I, EIM/LOTO Procedure Inspection Form

NOTE: Inspector: once completed, forward this form with copy of EIP and Sign-on to Corporate Manager of Construction, Corporate Manager of CSU, Corporate Manager of ES&H for sign-off and assignment of any action items for follow-up.

NOTE: After forms are complete, forward all forms to Corporate ES&H ECMS for filing.

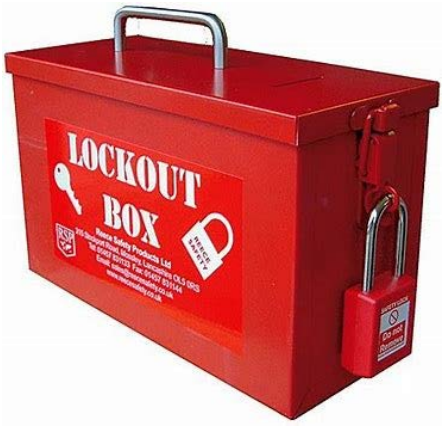
Figure 4. EIM/LOTO Procedure Inspection Form sample continued.

APPENDIX M
Methods of Isolation

Images show typical isolation devices and tags.

Breaker Lockout

Valve Lockout



Lockbox

APPENDIX N
Guidance on Application of LOTO

(Page 1 of 4)

NOTE: *Regardless of whether a LOTO is applied or not, hazardous energies shall always be controlled when work is being performed on a component or system when the component or system is in a configuration that could result in the release of hazardous energy if it were energized.*

Hazardous Energy (energy levels are considered to be nominal values)	LOTO Not Required if Direct Control Maintained	LOTO Required	Examples (application is not limited to those listed)
Biological	Each situation must be evaluated based on the risk of the activity		Sewage
Chemical, mildly toxic/corrosive	Each situation must be evaluated based on the risk of the activity		Aqueous ammonia, water treatment chemicals, hypochlorite (OCl-)
Chemical, highly toxic/corrosive	Not Permitted	Required	ASME B31.3 Category M fluids, e.g. chlorine (Cl_2), dihydrogen sulfide (H_2S), phosgene ($COCl_2$), toxic chemicals listed on OSHA 29 CFR 1910.119, *Process Safety Management of Highly Hazardous Chemicals*, Appendix A, strong acids and bases
Elastic (energy stored in objects that are stretched)	Each situation must be evaluated based on the risk of the activity		Lines and straps under tension
Electrical (AC and DC) < 50V or < 10J (8 mF @ 50V) stored in a capacitor or < 20 Wh stored in a battery	Energy level generally not addressed as hazardous by electrical code, e.g., NFPA 70E, isolation only required as dictated by risk of the work activity.		24 VDC control loops; 1-5 VDC control loops
Electrical (AC/DC) $\geq$ 50 V and < 600 V or $\geq$ 10 J (8 mF @ 50V) stored in a capacitor or $\geq$ 20 Wh stored in a battery	Not Permitted	Required	120/240 VAC control loops; 125 VDC control loops; 120/208/240 VAC circuit breakers; 380/480/600 VAC circuit breakers & MCC buckets; fuses; disconnect switches
Electrical (AC/DC) $\geq$ 600 V	Not permitted	Required	Medium and high voltage switchgear, switchyard equipment, temporary grounds (earths)

APPENDIX N
Guidance on Application of LOTO

(Page 2 of 4)

Hazardous Energy (energy levels are considered to be nominal values)	LOTO Not Required if Direct Control Maintained	LOTO Required	Examples (application is not limited to those listed)
Flammable, flashpoint < 200°F	• ≤ 1" (25mm) NPS when energy isolating means is under the direct physical control of the worker • Compressed gas cylinders, bottles, Dewar's flasks regardless of pressure or temperature, refueling equipment, fuel loading/unloading transfer equipment • Instrumentation calibration ports/connections regardless of pressure/temperature when energy isolating means is under the direct physical control of the worker	> 1" (25mm) NPS or when energy isolating means is NOT under the direct physical control of the worker	Methane, natural gas, LNG, NGLs (C_2, C_3, C_4,…), hydrogen, gasoline, acetone, cryogenic refrigerants, welding gases
Flammable, Flashpoint ≥ 200°F	• ≤ 2" (50mm) NPS when energy isolating means is under the direct physical control of the worker • refueling equipment, fuel loading/unloading transfer equipment, lube oil make-up and filtration equipment • Instrumentation calibration ports/connections regardless of pressure/temperature when energy isolating means is under the direct physical control of the worker	> 2" (50mm) NPS or when energy isolating means is NOT under the direct physical control of the worker	lubricating oils, hydraulic/control oils, diesel, heavy fuel oils, heavy residuals
Gravity	Not permitted	Required	Conveyor gravity take-ups, elevators (lifts), counterweights
Ionizing Radiation/Nuclear	Each situation is evaluated based on the risk of the activity and considered in conjunction with the requirements of the Radiation Protection Program and Jobsite Hazard Control Program		Nuclear systems, nuclear instrumentation, nuclear sources
Lasers/Light	Each situation must be evaluated based on the risk of the activity		Light curtains, communications, distance measuring instrumentation
Magnetic (energy causing push or pull)	Each situation must be evaluated based on the risk of the activity		Strong magnets used in machinery or for carrying metals
Motion/Kinetic	Each situation must be evaluated based on the risk of the activity		Rail car positioners, palletizers, automatic guided vehicles

APPENDIX N
Guidance on Application of LOTO

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Hazardous Energy (energy levels are considered to be nominal values)	LOTO Not Required if Direct Control Maintained	LOTO Required	Examples (application is not limited to those listed)
Mechanical	When energy isolation is under direct physical control of the worker	When energy isolation is NOT under direct physical control of the worker	Rotating equipment, reciprocating equipment, conveyors
Potential (Stored Energy)	Each situation must be evaluated based on the risk of the activity		Batteries, spring loaded equipment, hydraulics
Pressure (Compressed Gas)	• ≤ 4" (100mm) NPS and ≤ 130 psig (900 kPag) and ≤ 125°F (52°C) and • > -30 °F (-34°C) and when energy isolating means is under the direct physical control of the worker • Compressed gas cylinders, bottles, Dewar's flasks regardless of pressure or temperature • Instrumentation calibration ports/connections regardless of pressure/temperature when energy isolating means is under the direct physical control of the worker	> 4" (100mm) NPS and > 130 psig (900 kPag) and > 125 F (52°C) and < -30 F (-34°C)	Instrument air, nitrogen, service air, carbon dioxide, HVAC/chiller refrigerants, welding gases, vacuum
Pressure (Liquids)	• ≤ 4" (100mm) NPS and ≤ 150 psig (1030 kPag) and ≤ 125 F (52°C) and > -30°F (-34°C) and when energy isolation is under the direct physical control of the worker • Instrumentation calibration ports/connections regardless of pressure/temperature when energy isolation is under the direct physical control of the worker	> 4" (100mm) NPS and > 150 psig (1030 kPag) and > 125°F (52°C) and < -30°F (-34°C)	Demineralized water, potable water, fire water, cooling water, service/utility water, raw/filtered/UF/RO water, circulating water, glycol/water mixtures, steam condensate
Radio Frequency	Each situation must be evaluated based on the risk of the activity		RADAR, microwave transmitters, radio antennae
Sound	Each situation must be evaluated based on the risk of the activity		Ultrasonic level transmitters, sirens

APPENDIX N
Guidance on Application of LOTO

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Hazardous Energy (energy levels are considered to be nominal values)	LOTO Not Required if Direct Control Maintained	LOTO Required	Examples (application is not limited to those listed)
Thermal (Hot)	Liquids or gases < 125°F/52°C Surfaces < 140°F/60°C (surfaces are defined as having no leakage of liquid or gas outside of the pipe, containment, vessel, etc.)	Liquids or gases ≥ 125°F/52°C Surfaces ≥ 140°F/60°C	Processes using heat mediums (e.g., Steam, condensate, hot oil)
Thermal (Cold)	Liquids and surfaces ≥ -30°F/-34°C (surfaces should not leak liquid or gas outside of the pipe, containment, vessel, etc.)	Liquids and surfaces < -30°F/-34°C	Cryogenic processes (e.g., liquefied gas processes and sub-cooled liquid and gas processes)