THE NATION'S URANIUM PROCESSING FACILITY

Preparer:

Melia J. Sproul — 02/03/26
Melia J. Sproul — Date
UPF Startup Technical Writer

Concurrence:

Christian Wilmarth
Digitally signed by Christian Wilmarth
Date: 2026.02.17 10:44:45 -05'00'

Christian J. Wilmarth — Date
CNS Senior ES&H Director

Approval:

Austin Hancock — 02/04/26
Austin J. Hancock — Date
UPF Field Engineering Manager

Robert C. Drake — 02/03/26
Robert C. Drake — Date
UPF ES&H Manager

02/04/26
Phillip J. Tarbox D. Leshko for P. Tarbox — Date
UPF Startup Manager

Justin Swanson — 02/06/26
Justin G. Swanson — Date
UPF Site Manager

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Effective Date

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REVISION LOG

Revision 11

☒ Intent ☐ Non-Intent Implements PRMS Requirements: ☒ Yes ☐ No

- These changes are in response to Action 02 of Condition Report 25774-000-GCA-GAM-05307, *Energy Isolation Management Implementation Concerns (ORPS Report No. NA-UPO—CNS-UPFPROJ-2025-0012)*
  - Update to Section 2.13 Work Group Supervisor is responsible for:
    - Added bullet 5 to responsibilities - Ensuring hard copies of permits (e.g., EIP, SBMC, STT) are present with work crews
    - Under Note 2 in Section 2.13, added sub-bullet 4 under bullet 5 (Notification is distributed to the jobsite (e.g., Daily Information Sheet) for SBMCs going into STT condition
  - Update Section 3.3.3 Offsite Authorizations
    - Added NOTE under **Unavailable** Section to read – Unavailability includes if employment has been terminated and verified by WGS. Follow Section 3.3.5 for lock removal.
  - Update Section 3.6 Sanction to Test Instructions
    - Under NOTE updated bullet 4 **FROM**: All personnel signed on the EIP will sign off the EIP and remove their locks (if applied) **TO:** All personnel signed on the EIP will sign off the EIP (or CFN-1373 "Traveler" for an SBMC) and remove their locks (if applied)
    - Added bullet 5 - WGS ensures notification is distributed to the jobsite (e.g., Daily Information Sheet) for SBMCs going into STT condition
    - Updated last bullet **FROM:** WGS(s) and AE(s) who signed off the EIP during the STT period can sign-on the EIP again and work can continue. **TO:** WGS(s) and AE(s) who signed off the EIP during the STT period can sign-on the EIP or CFN-1373 (Traveler) again and work can continue
  - Update Section 3.7 Master Clearance **FROM:** A Master Clearance is a process that allows for either a Project-Wide Boundary Clearance (refer to Section 3.7.1), System Boundary Clearance (refer to Section 3.7.2), or a Master/Subordinate Permit Clearance process that allows group protection through use of a single Isolation Management permit. **TO:** A Master Clearance is a ~~process~~ type of EIP that allows for either a Project-Wide Boundary Clearance (refer to Section 3.7.1), System Boundary Clearance (refer to Section 3.7.2), or a Master/Subordinate Permit Clearance process that allows group protection through use of a single Isolation Management permit
- No forms have been edited as part of this revision
- Other changes include:
  - Updated acronyms
  - Editorial changes

Revision 10

☒ Intent ☐ Non-Intent Implements PRMS Requirements: ☒ Yes ☐ No

- These changes are in response to Condition Reports 25774-000-GCA-GAM-05326, *CNS/BNI Lockout/Tagout Program is Noncompliant with Governing Regulatory Requirements,* Compensatory

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Measure 1, and 25774-000-GCA-GAM-05301, *Annual EIM-LO/TO Audits Identified as Not Performed by the Required ECAHJ or Electrical DAR*

- Added Note to Section 2.3, *Authorized Employee*, for new form CFN-1373, *UPF System Boundary Master Clearance Work Group Sign ON/OFF Log,* (Traveler)
- Added information for use of CFN-1373 via the following:
  - Section 2.3, *Authorized Employee* – New paragraph at end of section
  - Section 2.11, *Tagging Authority* – Added bullet 11
  - Section 2.12, Updated Title from Startup Completions Lead to BNI Facilities Operations Manager and updated procedure reference from Y15-95-912 to Y15-95-926, *UPF Work Authorization*
  - Section 2.13, *Work Group Supervisor* – Added sub-bullet three under "WGS Responsible for:" and two additional Notes under bullet eight
  - Section 3.3.5, *Implementing an Emergency Closure* – Added bullet two
  - Section 3.7.2, *System Boundary Master Clearance* – Added Note 2
- Added to Section 3.7.2, *System Boundary Master Clearance*
  - Three bullets to clarify System Boundary Master Clearance process and to add CFN-1373
  - Added to process for releasing to have Authorized Employee(s) (AEs) sign off form CFN-1373 and also Work Group Supervisor (WGS) verification of all Authorized Employee(s) off form CFN-1373, then WGS signs off CFN-1373
- Updated flowchart in Appendix B, *EIP Work Process*
- Updated flowchart in Appendix C, *Change to Existing EIP Work Process*
- Updated flowchart in Appendix D, *Emergency Change to EIP Work Process*
- Updated flowchart in Appendix E, *Emergency Closure to EIP Work Process*
- Updated flowchart in Appendix F, *EIP Closure Work Process*

- This revision incorporates all previous PRCNs, Revisions, and supersedes Y17-95-64-801, Rev. 9
- The following form has been revised as a result of this document:
  - CFN-1373, *UPF System Boundary Master Clearance Work Group Sign ON/OFF Log*
- Other changes include:
  - Updated Section 2.8, *BNI Environmental Safety and Health Manager*
    - Bullet 6 updated to clarify responsibility
  - Updated references and acronyms
  - Editorial changes

Previous revisions on record

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CONTENTS

1.0 INTRODUCTION 6
1.1 Purpose 6
1.2 Scope 7
1.3 Applicability 7
1.4 Subcontractor Applicability 9
2.0 RESPONSIBILITIES 9
2.1 Affected Employee 9
2.2 Supervision 9
2.3 Authorized Employee 9
2.4 Authorized Operator 10
2.5 Independent Verifier 11
2.6 Startup Shift Supervisor 11
2.7 Permit Requestor 11
2.8 BNI Environmental Safety and Health Manager 12
2.9 Site Manager/Project Startup Manager 12
2.10 Responsible Field Engineer/Startup Test Engineer 13
2.11 Tagging Authority 13
2.12 BNI Facilities Operations Manager 14
2.13 Work Group Supervisor 15
3.0 REQUIREMENTS 16
3.1 General 16
3.2 Prerequisites to Isolation 17
3.3 Work Process for Isolation 17
3.4 Performing Isolations 24
3.5 Energy Isolation Permit Closure 24
3.6 Sanction to Test Instructions 25
3.7 Master Clearance 26
4.0 RECORDS 30
5.0 REFERENCES 31
5.1 Source References 31
5.2 Interfacing References 31
5.3 Forms 32

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6.0 SUPPLEMENTAL INFORMATION 32
APPENDIX A Acronyms and Definitions 33
APPENDIX B Energy Isolation Permit Work Process 40
APPENDIX C Change to Existing Energy Isolation Permit Work Process 41
APPENDIX D Emergency Change to Energy Isolation Permit Work Process 42
APPENDIX E Emergency Closure to Energy Isolation Permit Work Process 43
APPENDIX F Energy Isolation Permit Closure Work Process 44
APPENDIX G Sanction to Test Work Process 45
APPENDIX H Permitting Competency Tracking (Example) 46
APPENDIX I Energy Isolation Permit Entry Instructions (Q4 System) (Example) 49
APPENDIX J Danger – Do Not Operate/Do Not Remove Tag (Example) 50
APPENDIX K Caution – Restricted Operation Tag (Example) 51
APPENDIX L Energy Isolation Management Procedure Inspection Instructions 52
APPENDIX M Methods of Isolation 55
APPENDIX N Guidance on Application of Lockout/Tagout 56
APPENDIX O LO/TO Integration 60

FIGURES

Figure 1. Hierarchy of Permits 30
Figure 2. Danger – Do Not Operate/Do Not Remove Tag (Example) 50
Figure 3. CAUTION -- Restricted Operation Tag Example 51
Figure 4. EIM-LO/TO Procedure Inspection Form Sample 53
Figure 5. EIM-LO/TO Procedure Inspection Form Sample Continued 54
Figure 6. Breaker Lockout 55
Figure 7. Valve Lockout 55
Figure 8. Lockbox 55

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1.0 INTRODUCTION

1.1 Purpose

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 implements the Electrical Safety functional area of the Rule of 10 Code of Federal Regulations (CFR) 851, *Worker Safety and Health Program*. This Procedure meets or exceeds the applicable requirements of Occupational Safety and Health Administration (OSHA) 29 CFR 1926, Subpart K, *Electrical*; and 29 CFR 1910, Subpart S, *Electrical*. This Procedure follows all applicable CFR 1910 sections and covers all sources of energy (Electrical and Mechanical) through the roles and responsibilities of the Authorized Operator (AO) and Independent Verifier (IV).

Implementation of this Procedure will:

- Protect personnel and equipment from hazardous energy sources during the construction and startup phases of the Project
- Be used in parallel with UPF-MANUAL-CM-001, *Uranium Processing Facility Construction Electrical Safety Manual*
- 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-1312A, *Energy Isolation Permit*)
- Include all mandatory requirements by the U.S. Department of Labor in the following documents:
  - 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)*
  - 29 CFR 1910.333, *Selection and Use of Work Practices*
  - National Fire Protection Association (NFPA) 70E®-2015, *Standard for Electrical Safety in the Workplace®*, Article 120, *Establishing an Electrical Safe Work Condition*

NOTE: *Commentary (in blue text) in this Procedure provides 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 Authorized Employee (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

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- 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

29 CFR 1910.147(f)(3)(i), *The Control of Hazardous Energy (Lockout/Tagout), Group Lockout or 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.)

Commentary 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.

1.2 Scope

1.3 Applicability

This Procedure is applicable to all employees and contractors 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). The scope of this Procedure includes permanent plant systems and equipment, as well as 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 a software program used for electronic EIP and Lockout/Tagout (LO/TO) efforts in which LO/TOs are planned, approved, tracked, and closed using electronic forms. This is Bechtel's standard electronic EIP-LO/TO Program.

NOTE: *Engica Q4 Safety Software is controlled in accordance with Y60-95-015,* Uranium Processing Facility Software Quality Assurance.

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

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

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- 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 Y-12 National Security Complex 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 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 to 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 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 (i.e., Y-12, City of Oak Ridge) EIM system, the Site Manager/Project Startup Manager (PSUM) and Project ES&H Manager collectively ensure the requirements of this Procedure are met
- Single point isolations (i.e., an isolation performed by the individual doing the work where a LO/TO 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*.

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1.4 Subcontractor Applicability

Subcontractors will be trained as required to the requirements of this Procedure and shall comply with this Procedure. The requirements of this Procedure will be communicated to subcontractors, as appropriate, through subcontract language.

2.0 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 AO tasks; a WGS could perform AE/PR tasks).*

2.1 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 or 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 (refer to **Section 3.7.1, *Project-Wide Master Boundary Clearance***).

2.2 Supervision

Supervision is responsible for:

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

2.3 Authorized Employee

The AE will complete the following required training:

- UPF LO/TO Authorized Employee (Q51603876)
- UPF Lockout/Tagout Annual (Q51605072)

The AEs are responsible for:

- Verifying, prior to performing work, the Equipment being worked on has been Properly Isolated by a field walk-down and Isolation Points have been verified
- Verifying, prior to performing work, the equipment or system being worked on has been properly isolated in the field and verified on the EIP
- Verifying Zero-Energy Check has been completed on the EIP

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- Signing onto the EIP and implementing work in accordance with this Procedure and the conditions of the permit

NOTE: *For System Boundary Master Clearance, in lieu of personal lock or tag, CFN-1373 (Traveler),* UPF System Boundary Master Clearance Work Group Sign ON/OFF Log, *is used.*

- Placing their company-provided personal lock on the lockbox prior to performing work and removing their lock on completion of work, in cases where applicable
- Removing their company-provided personal lock before signing off the CFN-1312B, *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) (refer to **Section 3.6, *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 the permit upon notification the EIP will be released

An AE may work on equipment downstream of a System Boundary Master Clearance (refer to **Section 3.7.2**) after:

- Their WGS has verified isolation and signed onto the System Boundary Master Clearance for the System their Work Group is working on
- The AE signs onto the CFN-1373 (Traveler) acknowledging WGS protection for that System

2.4 Authorized Operator

The AO will complete the following required training:

- UPF Authorized Operator (Q51603920)
- UPF LO/TO Authorized Employee (Q51603876)
- UPF Lockout/Tagout Annual (Q51605072)
- UPF Authorized Operator Verification of Competency (Q51603950)

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

NOTE: *AO personnel to perform an Electrical LO/TO must be Qualified to Low-Voltage Qualified Electrical Person (LQEP) < 600 Volts, or Medium-Voltage Qualified*

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Electrical Person (MQEP) ≥ 600 Volts in accordance with UPF-MANUAL-CM-001 as well as complete CPR First Aid AED training (Q51307715).

- 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

2.5 Independent Verifier

The IV will complete the following required training:

- UPF Authorized Operator (Q51603920)
- UPF LO/TO Authorized Employee (Q51603876)
- UPF Lockout/Tagout Annual (Q51605072)
- UPF Authorized Operator Verification of Competency (Q51603950)

The 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 zero-energy conditions exist within the isolation boundary

NOTE: ***Section 2.5,* Independent Verifier***, requires verification by physical field walk down for the listed IV responsibilities.*

2.6 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

2.7 Permit Requestor

The Permit Requester (PR) will complete the following required training:

- UPF Permit Requestor (Q51603923)
- UPF LO/TO Authorized Employee (Q51603876)
- UPF Lockout/Tagout Annual (Q51605072)

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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
- Verifying the most recent revision of drawing against the scoped drawing
- 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

2.8 BNI Environmental Safety and Health 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
- Scheduling and performing annual audits of the LO/TO program.
- 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 (refer to **Section 3.1, *Affected Employee***) during site orientation

2.9 Site Manager/Project Startup Manager

Typically, the EIM-LO/TO 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

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- 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 evaluations of the implementation and adherence to this Procedure are completed

2.10 Responsible Field Engineer/Startup Test Engineer

NOTE: *For Subcontractor Structure, System, or Components (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
- Requesting LO/TO to support testing

2.11 Tagging Authority

The TA will complete the following required training:

- UPF LO/TO Tagging Authority (Q51604044)
- UPF Lockout/Tagout Annual (Q51605072)
- UPF Permit Requestor (Q51603923)
- UPF Authorized Operator (Q51603920)
- UPF Tagging Authority Verification of Competence (Q51604009)

The TA is responsible for:

- Issuing, modifying, to include adding isolation points as needed, and closing EIPs, System Boundaries, and Project-wide Clearance 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

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- Verifying the isolations, tags, and protective safety measures have been implemented and 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 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 (refer to **Section 3.7, *Master Clearance***)
- Maintaining CFN-1373 (Traveler) Logs for each Work Group by System
- 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 who 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 the control of lockboxes where there is a need to allow lockboxes and permits to be taken to the field

2.12 BNI Facilities Operations Manager

In accordance with Y15-95-926, *UPF Work Authorization*, the BNI Facilities Operations Manager, 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 jurisdictionally transferred to Startup
- Acting as the single point of contact for coordinating construction punchlist and completing efforts on systems transferred for testing

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- 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

2.13 Work Group Supervisor

The WGS will complete the following required training:

- UPF LO/TO Authorized Employee (Q51603876)
- UPF Lockout/Tagout Annual (Q51605072)
- UPF Authorized Operator (Q51603920)

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
- Ensuring hard copies of permits (e.g., EIP, SBMC, STT) are present with work crews
- 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

NOTE 1: *CFN-1373 (Traveler) is turned in to and maintained by System for each Work Group at the TA office*

NOTE 2: *The AE(s) are to sign ON the CFN-1373 (Traveler) once and do not sign OFF until the protection provided by the System Boundary Master Clearance is no longer needed*

- 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
- 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

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- Ensuring when AE(s) work on equipment downstream of a System Boundary Master Clearance (refer to **Section 3.7.2**) that:
  - As the WGS, they 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 for the Startup System on which their Work Group is working
  - Personnel, who are to be protected by the System Boundary Master Clearance and are under their Supervision, are **VERIFIED** to be AE Qualified
  - The AE(s), under supervision of the WGS, have signed onto the CFN-1373 (Traveler) for that System
  - Notification is distributed to the jobsite [e.g., Daily Information Sheet (DIS)] for SBMCs going into STT condition
- 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
- Showing each lock that has been placed to all AEs who will sign onto the LO/TO
- 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-LO/TO 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

3.0 REQUIREMENTS

3.1 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, *Energy Isolation Permit Work Process***, through **Appendix G, *Sanction to Test Work Process***.

Appendix H, *Permitting Competency Tracking (Example)*, is an example of the means by which VOC will be tracked for key positions within the EIM process.

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Appendix M, *Methods of Isolation*, and **Appendix N, *Guidance on Application of Lockout/Tagout***, give examples of energy isolation and guidance on application of LO/TO, respectively.

3.2 Prerequisites to Isolation

The following are prerequisites to isolation:

- Personnel shall not isolate a piece of plant 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 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 where workers who have signed on to permits and/or have placed LO/TO devices are not available for the close or change of those permits, OSHA allows the employer to remove their LO/TO devices.

In the above scenario and as discussed in **Section 3.3.5, *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.

3.3 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 this Procedure ensures a tag affords the user the same level of protection as a lock.

29 CFR 1910.147(c)(3)(ii), *The Control of Hazardous Energy (Lockout/Tagout), Full Employee Protection*; states that when a lock and tag is not used: "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 that would reduce the likelihood of inadvertent energization:

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- Removal of isolating circuit element
- Blocking of a control switch
- Opening of an extra disconnect switch
- Removal of a valve handle

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 (refer to **Section 3.6**)
- DANGER – DO NOT OPERATE tags (refer to **Appendix J,** ***Danger – Do Not Operate/Do Not Remove Tag [Example]***) and Caution – Restricted Operation tags (refer to **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

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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).*

3.3.1 EIP – Preparation, Issue, and Implementation (refer to Appendix B)

The intent of CFN-1312A and CFN-1312B 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.

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 WGS and/or AE for the working group have signed on the permit accepting the permit and zero-energy has been verified.*

Following are requirements for positions within the EIP process:

- The PR performs a walkdown of the equipment or system boundary and identifies the recommended protective measures and safety isolation management measures
- 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 that isolates the circuit should have a **Danger sign** attached stating a Temporary Ground has been installed
- The PR completes the applicable sections of the EIP (CFN-1312A and CFN-1312B) 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 (e.g., drawings, P&ID mark-ups) 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)

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- The TA consults with the RFE/STE/PR about the EIP request, if necessary, to verify the EIP is adequate for the scope of work to be performed
- The TA logs the new EIP on CFN-1311, *EIP/Lockout Permit Log*
- 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
- Before the zero-energy check to assess the hazard, complete CFN-1317, *UPF Electrical Hazard Risk Assessment and Testing Form* in accordance with Y17-95-64-880, *UPF Electrical Safety in the Workplace*. Once completed, attach the CFN-1317 to the isolation permit

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

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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 LO/TO devices (locks) to WGS and AEs and ensures the individual's name and entity are clearly identified
- 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 2: *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 3: *Formal zero-energy check requirements do not apply for a zero-energy follow-up (e.g., voltage PPE, M&TE).*

3.3.2 EIP Change/Modification (refer to Appendix C, *Change to Existing Energy Isolation Permit Work Process*)

Commentary Personnel preparing EIPs should consider the structuring of permits (refer to **Section 3.7.2**, 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 a Motor Control Center (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

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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 AE(s) remove their lock from lockbox then sign-off, then the WGS removes their lock from lockbox then signs-off the EIP
- The TA provides any new locks/tags required for the modification
- All isolation points and protective measures are validated then changed and verified (including zero-energy check) and permitting/work continues in accordance with the standard process
- If the change is an emergency change, refer to **Section 3.3.4, *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).*

3.3.3 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.

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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-1312A, CFN-1312B, and CFN-1373).

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.

NOTE: *Unavailability includes if employment has been terminated and verified by WGS. Follow Section 3.3.5 for lock removal*

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

3.3.4 Implementing an Emergency Change

Refer to **Appendix D, *Emergency Change to Energy Isolation Permit 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 removing their lock from lockbox then 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

3.3.5 Implementing an Emergency Closure

Refer to **Appendix E, *Emergency Closure of Energy Isolation Permit 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-1312A, CFN-1312B, and CFN-1373)

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- For System Boundary Master Clearance, the WGS or supervisor (with training equivalent to WGS) of the unavailable WGS shall ensure all AE(s) sign OFF the CFN-1373 (Traveler) and then the WGS shall sign to release the CFN-1373
- All available AE(s) working under the EIP shall remove locks from lockbox then sign-off and the available WGS shall remove their lock from lockbox then release the EIP by signing-off
- The supervisor (with training equivalent to a WGS) of the unavailable WGS and/or AE ensures the available WGS and AE working under the EIP are signed-off the EIP and/or CFN-1373 (Traveler) by the supervisor, and locks are removed from the lockbox by the TA, as applicable
- The TA ensures AOs remove all tags and locks
- The TA closes the permit after ensuring all LO/TO devices have been removed
- The TA closes out the EIP on CFN-1311
- 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).*

3.4 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).

3.5 Energy Isolation Permit Closure

Refer to **Appendix F, *Energy Isolation Permit Closure Work Process***, for the EIP Closure work process.

When the work is completed:

- The WGS verifies the work is complete

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- All AEs remove personal locks from lockbox 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 removes lock from lockbox and signs off the EIP and surrenders it to the TA
- The TA ensures all WGS/AE on the permit have signed-off

NOTE 1: *If one or more AEs or WGSs is not available, the TA may authorize an Emergency Closure in accordance with* ***Section 3.3.5****.*

NOTE 2: *If all AEs have not signed-off, the EIP shall remain active.*

- The RFE/STE/SSS (as applicable) confirms 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 3: *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 LO/TO devices have been returned and protective measures have been restored
- The TA closes the EIP on CFN-1311
- 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

3.6 Sanction to Test Instructions

Refer to **Appendix G**; CFN-1314, *Safety Tagging for STT*; CFN-1315, *Sanction to Test (STT) Cover Sheet*; and CFN-1316, *Sanction to Test (STT) 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 (or CFN-1373 “Traveler” for an SBMC) and remove their locks (if applied)

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- WGS ensures notification is distributed to the jobsite (e.g., DIS) for SBMCs going into STT condition
- All work on the EIP is stopped and only scope listed on the STT Cover Sheet (CFN-1315) may be executed
- If personnel listed on the EIP are unavailable, follow the Emergency Change rules in **Section 3.3.3, *Offsite Authorizations***
- TA confirms everyone is off the EIP
- The TA informs the AO to remove protective measures and document on CFN-1314
- TA confirms protective measures have been removed
- 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)
- All personnel involved in the test shall sign-on the STT Form (CFN-1315)
- The STT is considered in force until all signatures are in the Lift Release (sign) column and the WGS and TA have signed the STT cover sheet (CFN-1315)
- After testing is complete, the WGS ensures the STT is released and all AE(s) have signed the Lift Release column on CFN-1315 **PRIOR** to leaving the site
- The TA shall remove the STT Form from the front of the EIP, place 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
- The TA notifies the AO to use CFN-1314 to restore protective measures to the original state as designated in the EIP
- Restore isolations in accordance with the EIP and CFN-1314
  - Complete verifications on CFN-1314
  - Complete Zero Energy Check (WGS or witnessed by WGS) on CFN-1314
  - TA issues EIP on CFN-1314
- WGS(s) and AE(s) who signed off the EIP during the STT period can sign-on the EIP or CFN-1373 (Traveler) again and work can continue

3.7 Master Clearance

A Master Clearance is a type of EIP that allows for either a Project-Wide Boundary Clearance (refer to **Section 3.7.1**), System Boundary Clearance (refer to **Section 3.7.2**), or a Master/Subordinate Permit Clearance process that allows group protection through use of a single Isolation Management permit.

3.7.1 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 they are applied correctly.

Examples include:

- Main power feeds
- Gas supplies

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- 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 LO/TO 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 (Y15-95-915, *Notice of Energization*)
  - Meeting announcements
  - Signage
- Downstream EIP (if required) or System Boundary Master Clearance needs to be established prior to release of the Project-Wide Master Boundary Clearance
- The TA performs a physical walkdown and verifies 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 3.7.2** 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.

3.7.2 System Boundary Master Clearance

NOTE 1: *Refer to **Section 3.7.1** for notification requirements.*

System Boundary Master Clearances are to isolate systems prior to turnover to Startup, for the testing/commissioning activities from systems remaining under construction work scope. The WGS will function as the AE for System Boundaries and ensures 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

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- 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 startup 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
- The personnel who are to be protected by the System Boundary Master Clearance and are under the WGS supervision are VERIFIED to be AE qualified
- The AE(s) under supervision of the WGS have signed on to the CFN-1373 (Traveler) for that System for any work that is to be performed requiring protection

NOTE 2: *The AE(s) are to sign ON the CFN-1373 (Traveler) once and do not sign OFF until the protection provided by the System Boundary Master Clearance is no longer needed. An AE working on conductors protected by a System Boundary Master Clearance that are already terminated at a potential energy source will hang a personal lock when their work activities could reasonably result in direct exposure to uninsulated conductors (e.g., terminating end device conductors already terminated at potential energy source).*

WGS returns CFN-1373 (Traveler) in to the TA office.

- TA maintains CFN-1373 (Traveler) for each Work Group by System
- WGSs sign on/off and place their LO/TO device on the System Boundary Master Clearance isolation lockbox on behalf of their work group or as designated by the TA, 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 3: *System Boundary Master Clearances are planned by the Construction team, coordinating with the Startup team, to correspond with the Turnover of Systems to Startup and for the commissioning and startup evolutions required for systems during the Project life cycle. System Boundary Master Clearances will often extend.*

NOTE 4: *An AE may always elect to hang their own lock -and sign on to a System Boundary Master Clearance in lieu of signing onto CFN-1373 (Traveler) if they so choose.*

NOTE 5: *System Boundary Master Clearances should be scoped by systems downstream of the system being turned over to Startup. The PR may add isolation points to a System Boundary by adding new locks to an existing LO/TO without having to suspend the existing LO/TO during the addition. Several System Boundary Master Clearances may be required to isolate remaining Construction scope from a single system transferring to Startup.*

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Releasing a System Boundary Master Clearance

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

- Formal notification including, but not limited to, the following:
  - Published notice of Energization as required by Y15-95-915
  - Meeting announcements
  - Signage
  - WGS notifies their AE(s) that have signed ON CFN-1373 (Traveler) to sign OFF
  - The WGS signs CFN-1373 (Traveler) to release the System Boundary Master Clearance after verifying their AE(s) have signed OFF
- Verification that all AE(s) signed OFF of all CFN-1373 (Travelers) and WGS has signed to release the CFN-1373.
- Establishment of any required downstream EIPs or System Boundary Master Clearances prior to release of the System Boundary Master Clearance
- Physical walkdown and verification 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.*

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

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

An example of the hierarchy of such permits is shown in **Figure 1**.

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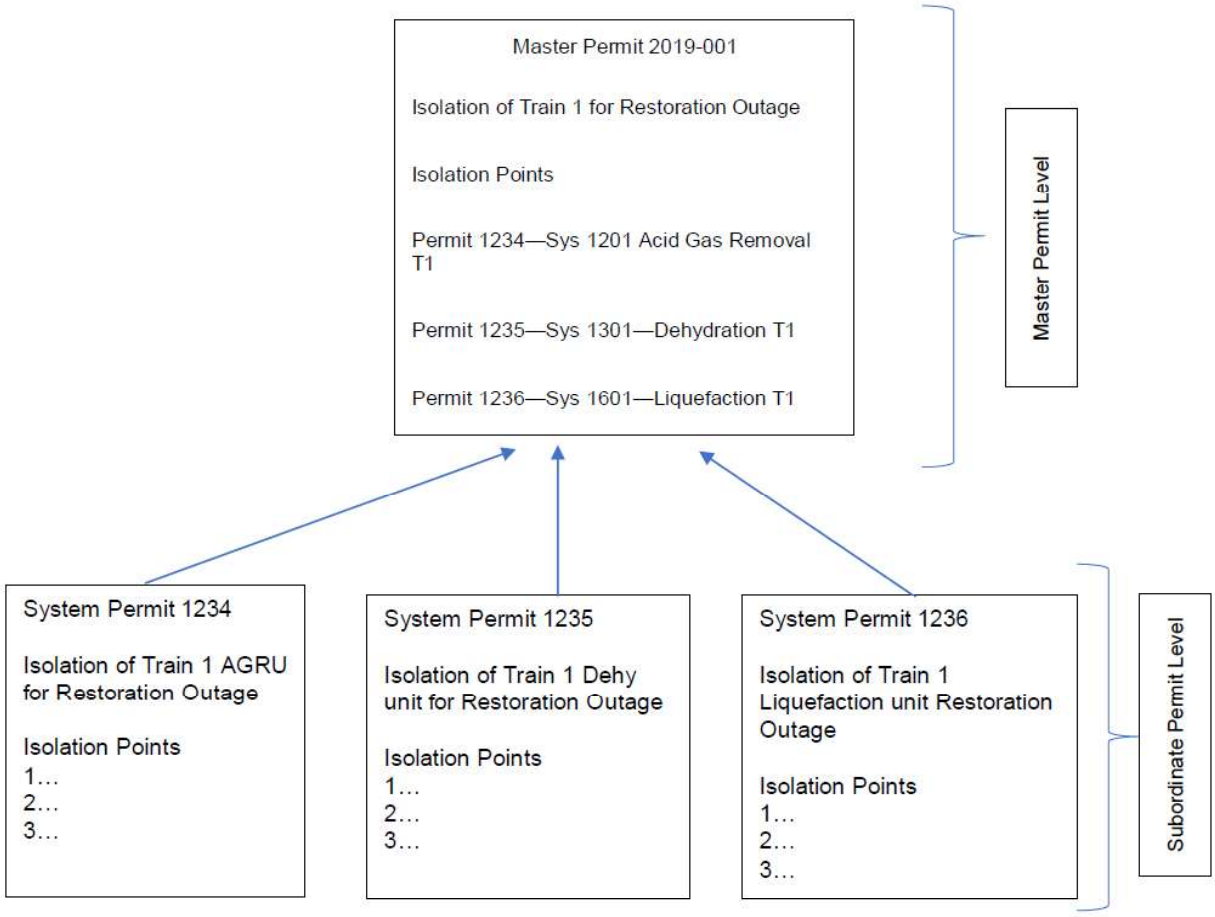


Figure 1. Hierarchy of Permits

- 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 that 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

4.0 RECORDS

Records generated by this Document shall be maintained in accordance with Y15-95-800, *UPF Document Management*.

The following records are generated:

Record or Form Number	Record Title	System/ Location	Document Type
Document Specific	*UPF Lockout/Tagout Permit (may include CFN-1311, CFN-1312A/B, CFN-1314, CFN-1315, CFN-1316)*	InfoWorks	LOTO
Document	*CFN-1373, UPF System Boundary Master Clearance Work Group Sign ON/OFF Log*	InfoWorks	LOTO

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5.0 REFERENCES

5.1 Source References

29 CFR 1910, *Subpart O, Machinery and Machine Guarding*

4MP-T11B-M105, *Work Process Procedures*

4MP-T81-01306, *Retention of Construction Records*

4MP-T81-01307, *Energy Isolation Management-LO/TO*

4MP-T81-02303, *Construction Equipment Maintenance*

4MP-T81N-01308, *Telecommunications System and Equipment Safety Tagging/Lockout*

TGUI-TR-801768-A003, *UPF Training Requirements Matrix (TRM)*

5.2 Interfacing References

10 CFR 851, *Worker Safety and Health Program*

29 CFR 1910, Subpart S, *Electrical*

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

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

29 CFR 1910.333, *Selection and Use of Work Practices*

29 CFR 1926, Subpart K, *Electrical*

ASME B31.3, *Process Piping*

NFPA 70E®-2015, *Standard for Electrical Safety in the Workplace®, Article 120, Establishing Electrical Safe Work Conditions*

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

UPF-MANUAL-CM-001, *Uranium Processing Facility Construction Electrical Safety Manual*

Y15-95-926, *UPF Work Authorization*

Y15-95-800, *UPF Document Management*

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

Y15-95-915, *Notice of Energization*

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

Y17-95-64-880, *UPF Electrical Safety in the Workplace*

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

Y60-95-015, *Uranium Processing Facility Software Quality Assurance*

Y73-107PD, *Lockout/Tagout for Personnel Protection Program*

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5.3 Forms

CFN-1311, *EIP/Lockout Permit Log*

CFN-1312A*, Energy Isolation Permit*

CFN-1312B, *Energy Isolation Permit Sign-on Sheet*

CFN-1314, *Safety Tagging for STT*

CFN-1315, *Sanction to Test (STT) Cover sheet*

CFN-1316, *Sanction to Test (STT) Log*

CFN-1317, *UPF Electrical Hazard Risk Assessment & Testing Form*

CFN-1373, *UPF System Boundary Master Clearance Work Group Sign ON/OFF Log*

6.0 SUPPLEMENTAL INFORMATION

Appendix A*, Acronyms and Definitions*

Appendix B, *Energy Isolation Permit Work Process*

Appendix C, *Change to Existing Energy Isolation Permit Work Process*

Appendix D, *Emergency Change to Energy Isolation Permit Work Process*

Appendix E, *Emergency Closure of Energy isolation Permit Work Process*

Appendix F, *Energy Isolation Permit Closure Work Process*

Appendix G, *Sanction to Test Work Process*

Appendix H, *Permitting Competency Tracking (Example)*

Appendix I, *Energy Isolation Permit 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, *Energy Isolation Management Procedure Inspection Instructions*

Appendix M, *Methods of Isolation*

Appendix N, *Guidance on Application of Lockout/Tagout*

Appendix O, *Lockout/Tagout Integration*

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APPENDIX A
Acronyms and Definitions

(Page 1 of 7)

Acronyms

AE - Authorized Employee 6
AFE - Affected Employee 9
AO - Authorized Operator 6
BNI - Bechtel National, Inc. 7
CFR - Code of Federal Regulations 6
DIS - Daily Information Sheet 16
DMC - Document Management Center 25
EIM - Energy Isolation Management 7
EIP - Energy Isolation Permit 6
ES&H - Environmental, Safety and Health 6
IV - Independent Verifier 6
JHA - Job Hazard Analysis 19
JIT - Just-in-Time Forms 7
LO/TO - Lockout/Tagout 7
LQEP - Low-Voltage Qualified Electrical Person 10
MCC - Motor Control Center 21
MQEP - Medium-Voltage Qualified Electrical Person 11
OSHA - Occupational Safety and Health Administration 6
P&ID - Piping and Instrument Diagram 8
PDWP - Power Distribution Work Permit 8
PR - Permit Requester 11
PR - Permit Requestor 9
PSUM - Project Startup Manager 8
RFE - Responsible Field Engineer 9
SME - Subject Matter Expert 19
SSC - Structure, System, or Component 13
SSS - Startup Shift Supervisor 11
STE - Startup Test Engineer 9
STT - Sanction to Test 10
TA - Tagging Authority 12
UPF - Uranium Processing Facility 7
VOC - Verification of Competency 9
WA - Work Authorization 14
WGS - Work Group Supervisor 7
Y-12 - Y-12 National Security Complex 8

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APPENDIX A
Acronyms and Definitions

(Page 2 of 7)

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 on to a permit unless they become an AE. An AFE may work on equipment downstream of a Project-Wide Master Boundary Clearance (refer to **Section 3.7.1**). ***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*
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 or CFN-1373 (Traveler) for System Boundary Master Clearance and who 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. AO personnel to perform an Electrical LO/TO must be Qualified to Low Voltage Qualified Electrical Person (LQEP) < 600 Volts, or Medium Voltage Qualified Electrical Person (MQEP) ≥ 600 Volts in accordance with UPF-MANUAL-CM-001.
BNI Facilities Operations Manager	On projects where Bechtel has an operations group within the Startup organization, the BNI Facilities Operations Manager/Designee is either an SSS or a dedicated individual reporting to the SSS tasked with the duties of a BNI Facilities Operations Manager/Designee. On other projects, the BNI Facilities Operations Manager/Designee is a TA designated by the PSUM. The UPF Startup Systems, BNI Facilities Operations Manager is responsible for the coordination of construction completion activities on systems that have been jurisdictionally transferred to Startup.
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.

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APPENDIX A
Acronyms and Definitions

(Page 3 of 7)

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/LO/TO 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 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 LO/TO 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 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, the instrument technician 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*

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APPENDIX A
Acronyms and Definitions

(Page 4 of 7)

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.
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.
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 29 CFR 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
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).
Engica Q4 Safety	The Bechtel Standard Application Program used for electronic implementation of EIM (LO/TO).
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.* Refer to **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.*

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APPENDIX A
Acronyms and Definitions

(Page 5 of 7)

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.
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 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.
Lockout/Tagout (LO/TO) 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 refer to “Isolation/Isolating.”)
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-LO/TO training. 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 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.

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APPENDIX A
Acronyms and Definitions

(Page 6 of 7)

Piping and Instrument Diagram (P&ID)	A visual representation of plant or equipment, indicating location of vessels, piping, valves, instruments, etc., in diagrammatic form.
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.
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 who 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.
Startup Shift Supervisor (SSS)	Typically, supervises operators who control systems and processes that run simultaneously with Project activities.
Supervision	Persons responsible for supervising Field Non-Manual (FNM) or Field Manual (FM) personnel on a project. Supervision has 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 BNI Facilities Operations Manager/Designee).
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 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

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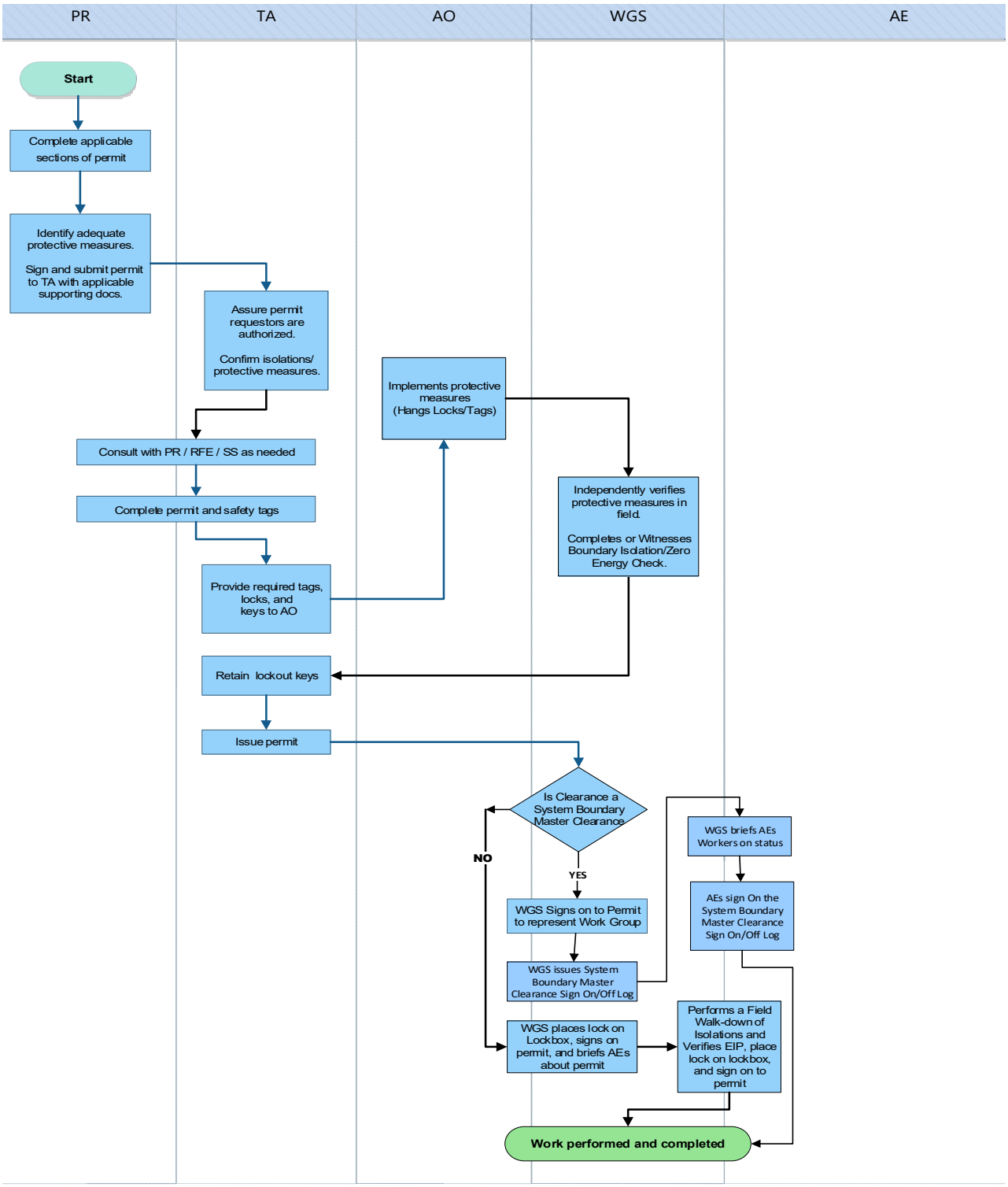
APPENDIX A
Acronyms and Definitions

(Page 7 of 7)

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.
Traveler	Form CFN-1373, *UPF System Boundary Master Clearance Work Group Sign ON/OFF Log*
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.*

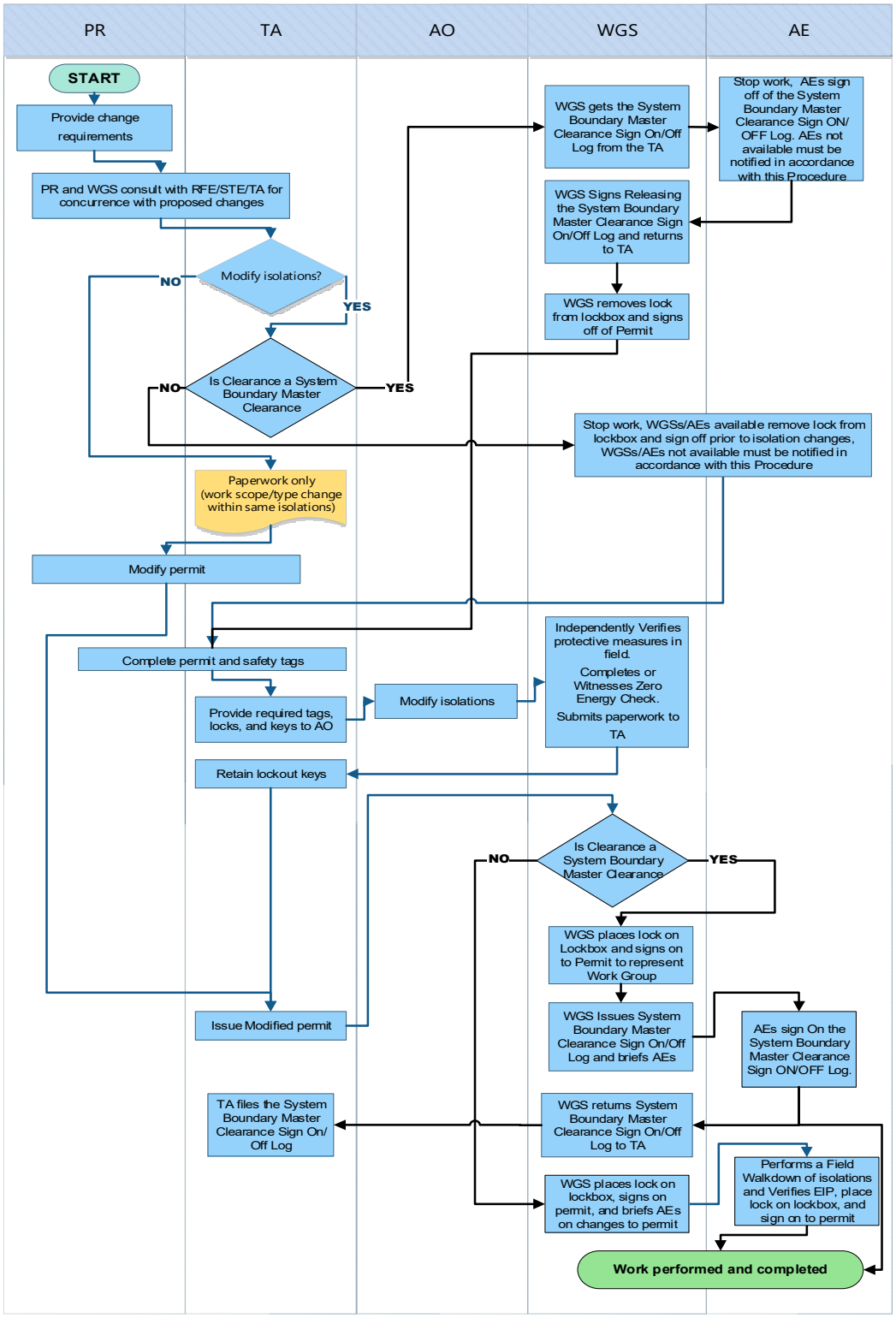
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APPENDIX B
Energy Isolation Permit Work Process



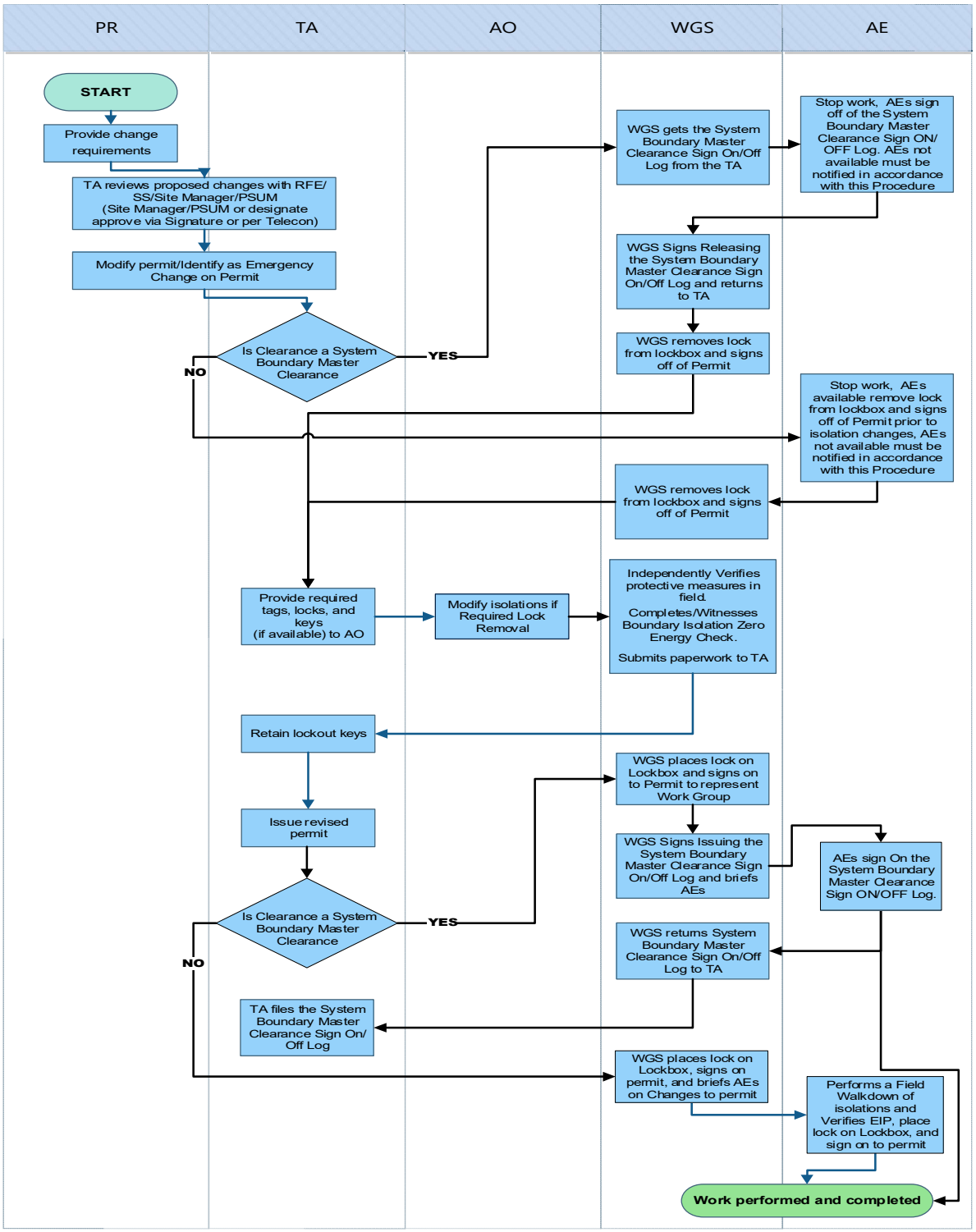
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APPENDIX C
Change to Existing Energy Isolation Permit Work Process



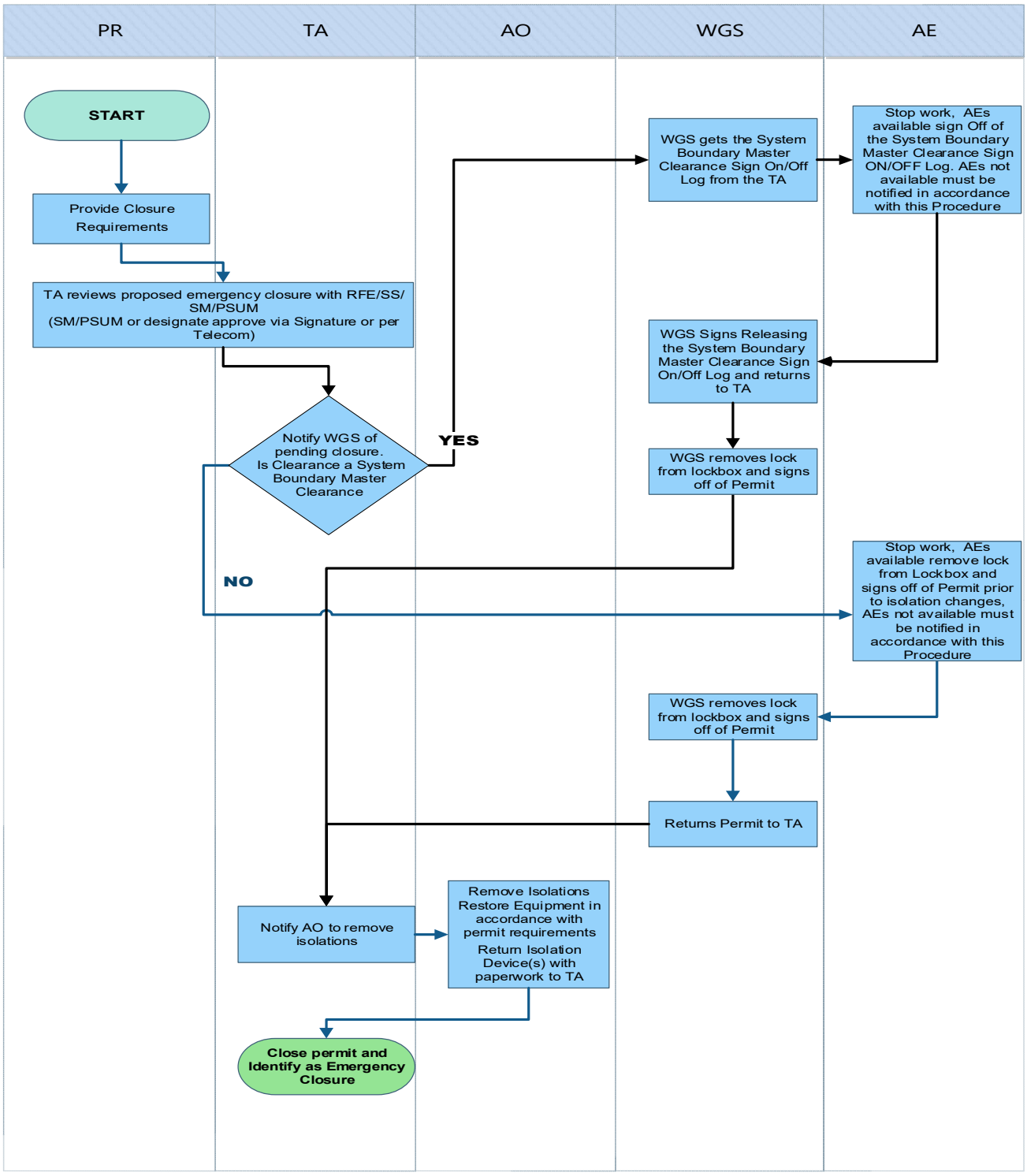
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APPENDIX D
Emergency Change to Energy Isolation Permit Work Process



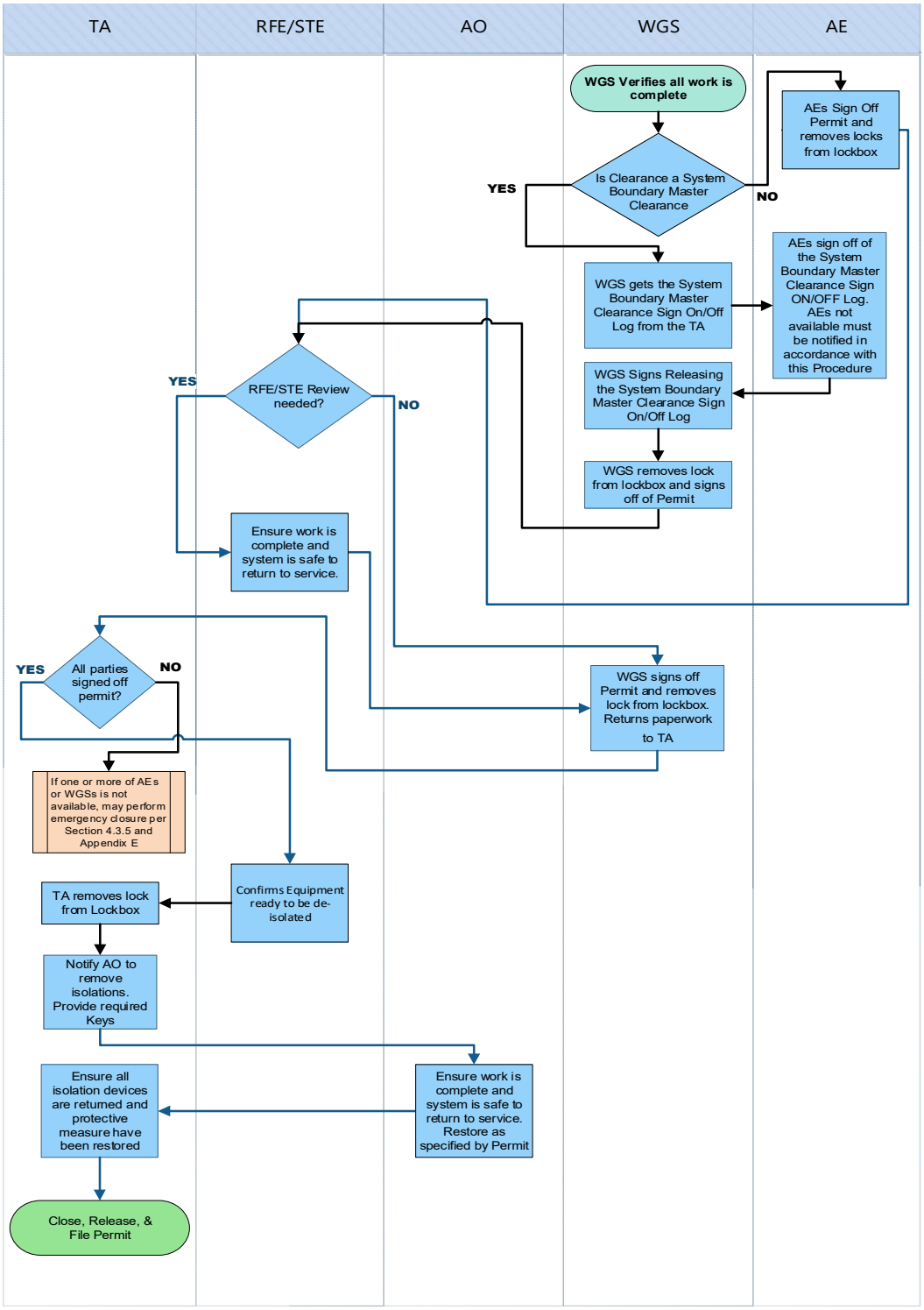
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APPENDIX E
Emergency Closure to Energy Isolation Permit Work Process



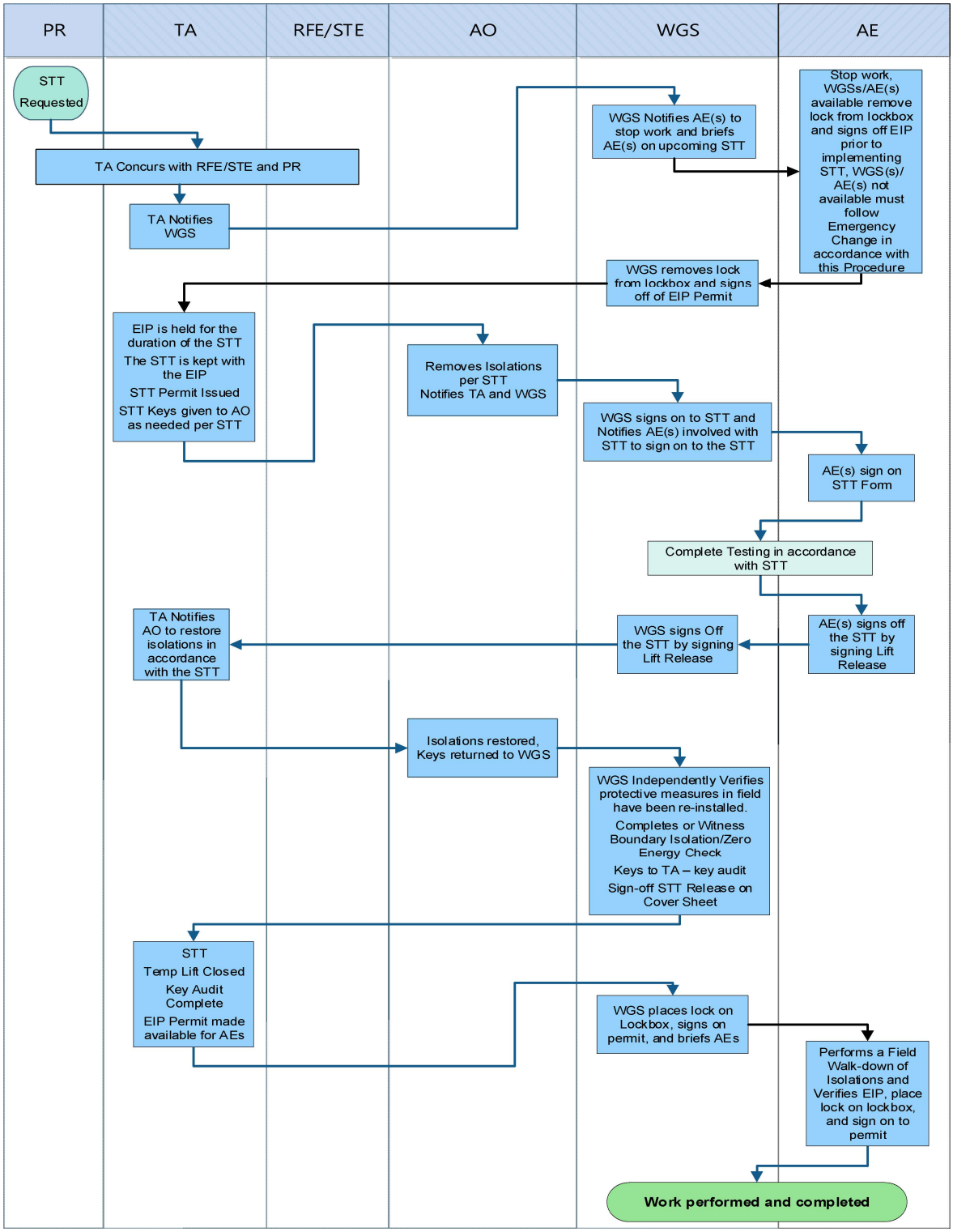
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APPENDIX F
Energy Isolation Permit Closure Work Process



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APPENDIX G
Sanction to Test Work Process



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APPENDIX H
Permitting Competency Tracking (Example)

(Page 1 of 3)

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.

EXAMPLE

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APPENDIX H
Permitting Competency Tracking (Example)

(Page 2 of 3)

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.

EXAMPLE

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APPENDIX H
Permitting Competency Tracking (Example)
(Page 3 of 3)

Work Group Supervisor- Verification of Competency

		Discipline	
Name	Selected By (Supervisor)	Electrical	Piping / Mech

EXAMPLE

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.

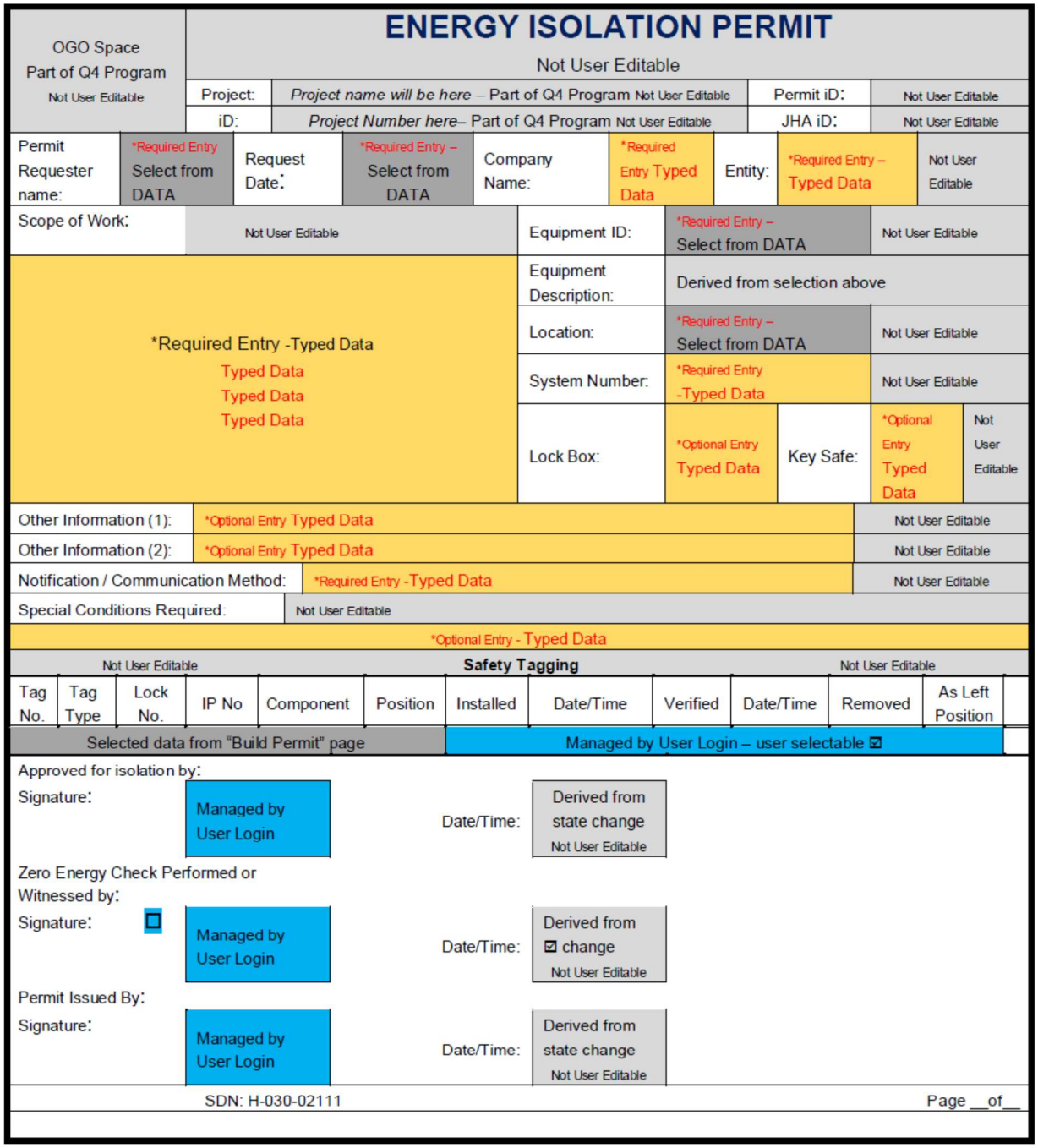
Supervisors must ensure other applicable training requirements, outside of LOTO training, are completed by personnel assigned to each specific LOTO task (e.g. confined space, Qualifed Electrical Personnel training).

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

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APPENDIX I
Energy Isolation Permit 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.



ENERGY ISOLATION PERMIT

OGO Space Part of Q4 Program Not User Editable		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__

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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, or consoles where normal size tags cannot be installed).

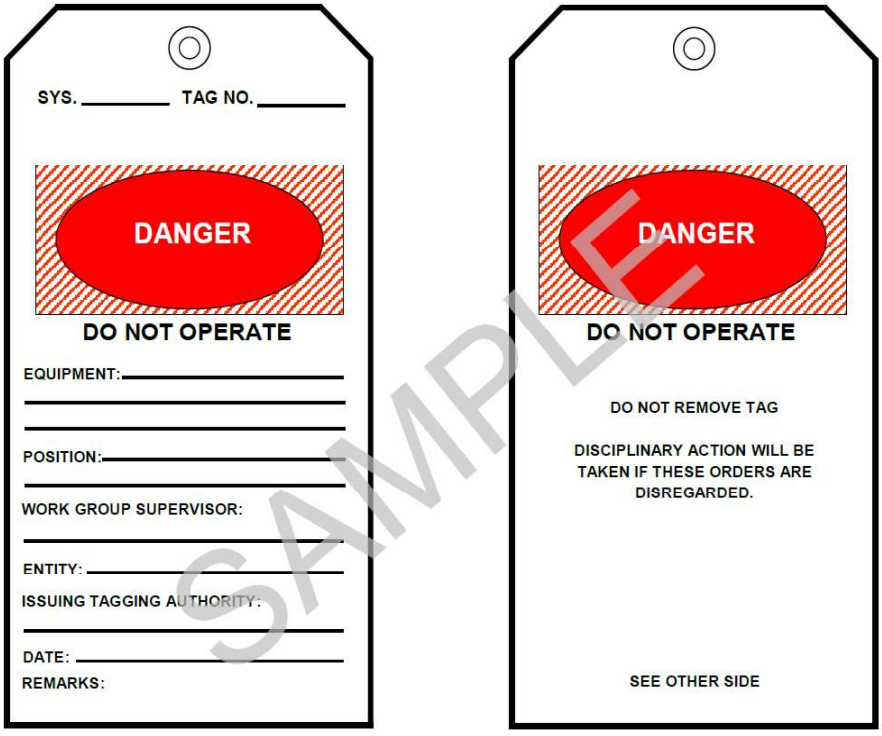


Figure 2. Danger – Do Not Operate/Do Not Remove Tag (Example)

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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. An example tag is shown in* ***Figure 3.***

- 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



(Tag sizes are approximate)

Figure 3. CAUTION -- Restricted Operation Tag Example

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APPENDIX L
Energy Isolation Management Procedure Inspection Instructions

(Page 1 of 3)

Inspections of EIM-LO/TO 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 29CFR 1910.147 (c)(6)(i), which states:

> "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 or be in accordance with the following (in accordance with OSHA 29 CFR 1910.147 (c)(6)(i)(A-D) and (ii)):

- Be conducted by an SME trained and competent in Isolation Management / LO/TO 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.*

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APPENDIX L
Energy Isolation Management 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?			

SAMPLE

Figure 4. EIM-LO/TO Procedure Inspection Form Sample

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APPENDIX L
Energy Isolation Management 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.

SAMPLE

Figure 5. EIM-LO/TO Procedure Inspection Form Sample Continued

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APPENDIX M
Methods of Isolation

Images show typical isolation devices and tags.



Figure 6. Breaker Lockout



Figure 7. Valve Lockout



Figure 8. Lockbox

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APPENDIX N
Guidance on Application of Lockout/Tagout

(Page 1 of 4)

NOTE 1: *Regardless of whether a LO/TO 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.*

NOTE 2: *Requirements of TPST-SU-801768-A004,* Line/Containment Break*, apply regardless of the whether the component/system is isolated by a LO/TO or under means of direct control.*

Hazardous Energy (energy levels are considered to be nominal values)	LO/TO Not Required if Direct Control Maintained	LO/TO 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, *Process Piping*, Category M fluids, (i.e., 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) < 50 V or < 10J (8 mF @ 50 V) 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 @ 50 V) 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)

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APPENDIX N
Guidance on Application of Lockout/Tagout

(Page 2 of 4)

Hazardous Energy (energy levels are considered to be nominal values)	LO/TO Not Required if Direct Control Maintained	LO/TO 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 (C2, C3, C4,…), 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

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APPENDIX N
Guidance on Application of Lockout/Tagout
(Page 3 of 4)

Hazardous Energy (energy levels are considered to be nominal values)	LO/TO Not Required if Direct Control Maintained	LO/TO 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

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APPENDIX N
Guidance on Application of Lockout/Tagout

(Page 4 of 4)

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

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APPENDIX O
LO/TO Integration

(Page 1 of 2)

UPF Personnel trained as Y-12 Service Supervisors

For the rare need for a Y-12 and UPF Project interface (i.e., over-lock, applicable need to follow both processes) between UPF Construction and Y-12 Management and Operations (i.e., PIDAS Excavation), the UPF Project will designate and train representatives as Y-12 Service Supervisors on Y18-107*, Lockout/Tagout for Personnel Protection*; and Y73-107PD, *Lockout/Tagout for Personnel Protection Program*.

UPF Employee (Y-12 Service Supervisor) Responsibility:

1. The UPF employee(s) trained as Y-12 Service Supervisors would sign on the applicable Y-12 LO/TO in accordance with the Y18-107 and Y73-107PD procedures providing applicable Hazardous Energy Control for downstream UPF authorized operators/affected employees
2. The UPF employee(s) would perform their work to the requirements of Y17-95-64-801, *UPF Energy Isolation Management (EIM)–Lockout/Tagout (LO/TO)*, for personal protection in addition to the Y-12 LO/TO procedure/process on applicable Hazardous Energy Control for this rare need
3. After UPF work is complete, the UPF employees as Y-12 Service Supervisors would then sign off the applicable Y-12 LO/TO in accordance with Y18-107 and Y73-107PD for Hazardous Energy Control removal

UPF and Y-12 M&O LO/TO Program Applicability

Y-12 employees, sub-contractors, and vendors working on Y-12 Management and Operations are to perform work to the requirements of Y18-107, Y73-107PD, and the Y-12 LO/TO Program (or an approved equivalent).

Y-12 employees, sub-contractors, and vendors working on the UPF Project are to perform work to the requirements of Y18-107, Y73-107PD, and the Y-12 LO/TO Program (or an approved equivalent).

Y-12 employees, sub-contractors, and vendors working on the UPF Project will require Double Isolation (Double Block & Bleed) to be installed to provide them with the same level of protection as their procedures and program.

UPF Construction employees, sub-contractors, and vendors working on the UPF Project will perform work to the requirements of Y17-95-64-801 and the UPF LO/TO Program (or an approved equivalent).

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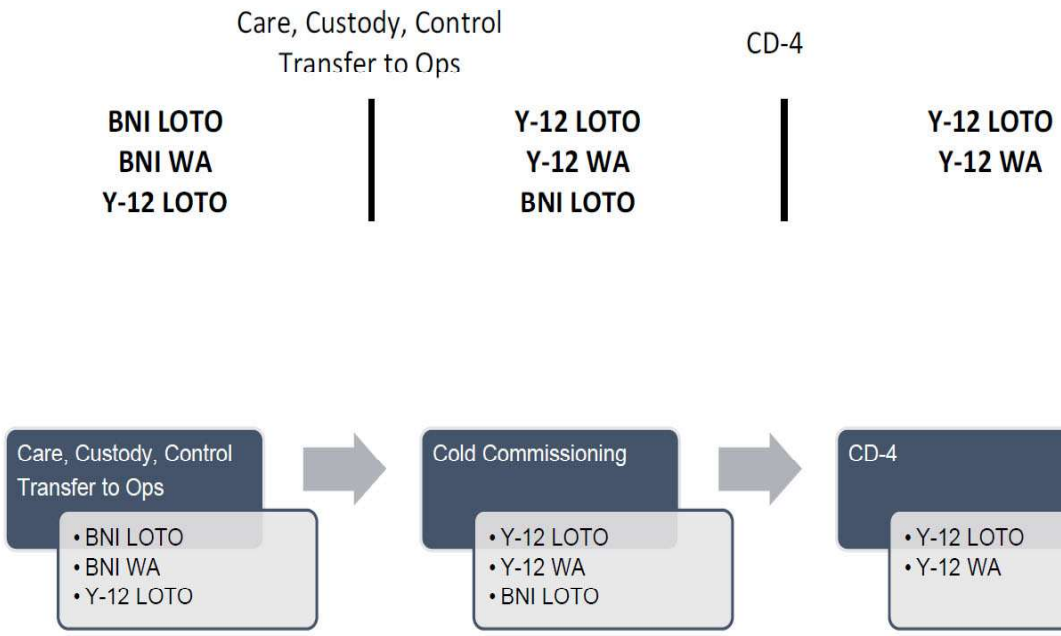
APPENDIX O
LO/TO Integration
(Page 2 of 2)

UPF Care, Custody, and Control for Turnover to Y-12 Management and Operations

Prior to transferring the Care, Custody, and Control of components/systems to Y12, BNI LO/TO and WA procedures will be followed by BNI Construction and BNI Startup. If a Y-12 employee requires access at this time, personnel will need to overlock on the BNI Construction or BNI Startup LO/TO in accordance with Y73-107PD.

After Care, Custody, and Control of the components/system is transferred to Y-12 employees will utilize the Y-12 LO/TO and WA procedures. If a BNI Construction or BNI Startup employee requires access at this time, personnel will need to overlock on the Y-12 LO/TO in accordance with Y17-95-64-801.

Post CD-4, only the Y-12 LO/TO and WA procedures shall be utilized on turned over equipment/systems.



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