Isolation of Hazardous Energy Standard

MSW Process – Contractor Communication

Thailand Profit Center
March, 2009
Purpose, Objectives and Scope

**Purpose**

The purpose of this standard is to ensure that isolation of hazardous energy and/or opening of equipment is performed in a safe and controlled manner.

**Objective**

This standard establishes requirements for performing isolation of machinery, equipment, vessels, piping and systems from sources of hazardous energy.

*NOTE: Each Global Upstream strategic business unit (SBU) or location may have additional regulatory requirements.*

**Scope**

This Isolation of Hazardous Energy Standard covers work performed by Chevron employees and their delegates and contractors within Chevron Global Upstream Exploration and Production (GU) operational control.

Included in the scope of this standard is the opening of process equipment as it relates to isolation of hazardous energy.
IHE SWP Requirements

1. Personnel performing isolation of hazardous energy must be trained and competent in the roles for which they are responsible.

2. Hazards associated with isolation of hazardous energy shall be identified and mitigated prior to beginning work.

3. Positive physical isolation is required for vessel entry and open flame hot work.

4. Isolation points shall be locked, tagged and documented.
5. Equipment involved in isolation of hazardous energy shall meet industry specification standards or applicable regulatory requirements.

6. Each personal lock/tag used for energy control will only identify and be used by a single individual. Group locks are discouraged but may be used if:

(a) an individual who is responsible and accountable for the group lock is identified on the permit, and

(b) a method is in place for the responsible person to account for all of the individuals covered by the group lock prior to placing or removing the group lock. The first lock to be installed and the last lock to be removed shall be fitted by operating personnel or their designee.
Requirements

7. For isolation of hazardous energy involving a change to an operational procedure or method, or in any other situation where an operational or equipment change is undertaken, the installation or change must comply with the requirements in the GU – Management of Change (MOC) process.

8. A suitable means of communication shall exist to advise different work crews that the equipment is out of service and to provide details of any safety or operational precautions to be undertaken.

9. Facility management shall conduct periodic audits and verifications to ensure compliance to this standard.
Definitions

**Authorized Employee:** A person who performs servicing or maintenance on machines and equipment. Lockout or tagout is used by these persons for their own protection.

**Affected person** – A person who performs the duties of his or her job in an area in which the energy control procedure is implemented and servicing or maintenance operations are performed.
Definitions

Facility Operating Personnel – company or contractor employees who have knowledge of and responsibility for the operations, equipment and processes at the facility. Examples of facility operating personnel may include OIM, terminal operators, designated contractors, and project managers.

Lock Box – A lockable metal box that is used when more than one person works on complex equipment. A single key or keys locking out the equipment is placed in the lock box, and then each person attaches their own lock to the box.
Definitions

**Group Lock:** When servicing and/or maintenance is performed by a group (crew, craft, department, etc.), they must utilize a procedure which affords the employees a level of protection equivalent to that provided by a personal lockout or tagout device.

Group lockout or tagout devices must be used in accordance with specific procedures and must include the following requirements, at a minimum:

- **Primary responsibility is vested in an authorized employee for a set number of employees** working under the protection of a group lockout or tagout device (e.g. an *operations lock*).

- Provision for the authorized employee to monitor the exposure status of individual workers with regard to the lockout or tagout of the machine or equipment.

- When more than one group is involved, assignment of overall job-associated lockout or tagout control responsibility to an authorized employee designated to coordinate all affected groups and ensure continuity of protection.

- **Each authorized employee** must affix a personal lockout or tagout device to the group lockout device (group lockbox or comparable mechanism) when he/she begins work, and must remove the device when he/she stops working on the machine or equipment being serviced or maintained.
Definitions

Difference!

“Lockout” is the placement of a *lockout device* on an energy isolating device, in accordance with an established procedure, *ensuring* that the energy isolating device and the equipment being controlled *cannot* be operated until the lockout device is removed.

“Tagout” is the placement of a *tagout device* on an energy isolating device, in accordance with an established procedure, *to indicate* that the energy isolating device and the equipment being controlled *may not* be operated until the tagout device is removed.
Definitions

Positive Physical Isolation – A state where the equipment is positively separated from the hazardous energy and toxic substance by use of one of the following methods (may also be referred to as “Daylighting” or “Air Gapping” in some locations):

- Removal of a section (spool) of piping
- Physical removal of a circuit breaker and grounding (earthing) the system
- Removal of mechanical couplings

Zero Energy State – The maximum protection against unexpected movement or activation of equipment or machinery, release of stored pressure, or flow of liquid or gas when maintenance or repair is performed.
Assessing and Managing Hazards

Prior to conducting any work that will require isolation of equipment and/or opening of process equipment, competent personnel must conduct a hazard analysis to identify the potential hazards associated with the isolation and to determine the controls necessary to ensure that isolation and/or opening of process equipment can be performed safely.

All isolation of hazardous energy must be permitted and managed in accordance with the GU - Permit to Work Standard.
Steps Required When Isolating Equipment

Employees must do the following before they begin service or maintenance work:

1. Inform all affected employees of equipment shutdown.
2. Shut down equipment.
3. Isolate or block hazardous energy.
4. Remove any potential (stored) energy.
5. Lock out or tag out the energy sources.
6. Verify the equipment is isolated from hazardous energy and de-energized.
Steps Required When Putting Equipment Back to Service

Employees must do the following before they remove lockout or tagout devices and re-energize equipment:

1. Remove tools and replace equipment components.
2. Inform co-workers about energy-control device removal.
3. Ensure all workers are clear of the work area.
4. Verify power controls are off or in a neutral position.
5. Remove the lockout or tagout device.
6. Re-energize equipment.
Steps Required When Troubleshooting Equipment:

1. Clear the machines or equipment of tools and materials.
2. Remove employees from the machine or equipment area.
3. Remove the lockout or tagout devices as specified.
4. Energize and proceed with testing or positioning.
5. De-energize all systems, isolate the machine or equipment from the energy source and reapply the lockout or tagout devices as specified prior to affecting further repairs, adjustments or maintenance.
Lock Fitting Order

Locks shall be fitted in the following order (as appropriate to the type of work being performed):

- First lock = Operator
- Second lock = Electricians
- Third lock = Other maintenance craft
Operations (Production) Lock

A operations lock may be used anytime to do the following:

- Protect machinery or equipment needing maintenance/repairs from operation
- Protect the environment from operation of such machinery or equipment
- First on and last off process for isolation points involving IHE.
- Personnel involved in maintenance or servicing of the equipment shall still perform the lockout/tagout process
What Leaders Can Do to Support the Isolation of Hazardous Energy SWP?

- Communicate the SWP requirements to your people
- **Train and coach your people and ensure they are competent before allowing them to work**
- Reinforce the use of individual (personal) lock
- All isolation points if failure to properly lock may cause harm to people must be **locked and tagged**
- Tagout alone may ONLY be done for equipment that is not capable of lock out
- **Develop isolation procedure for all equipment including marked up P&ID in case of complex isolation, e.g., platform shutdown**
- Purchase and use standard key, locks, tags and other isolation of hazardous energy devices
- Ensure proper communication and hand over (shift or personnel change)
What Leaders Can Do to Support the Isolation of Hazardous Energy SWP?

- All tags must be complete with name of the person who installed it, date and other necessary information.
- Develop isolation procedures are available for equipment with multiple isolation points (see example).
- Equipment to be worked on frequently (> twice/year) should have laminated isolation diagram available at site.
- Long-term isolation or isolation affecting operational procedure should be assessed under MOC.
- Locks and tags to be removed by person installing them.
- Prior to returning equipment to service, a final work site inspection shall be carried out.
- Conduct audit using checklist provided.
Lockout Box (Item #1)

13 LOCK GROUP LOCK BOX, RED COLOR, "BRADY" P/N: 65699
Ref. PR2282083, PO# 1021461
Unit Price: Est. Baht

<table>
<thead>
<tr>
<th>Portable Metal Lock Box</th>
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<tr>
<td>Size 9&quot; x 3-1/2&quot; x 6&quot;</td>
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</tbody>
</table>

<table>
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<th>Est. Price/Each</th>
<th>Delivery</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>65699</td>
<td>Red</td>
<td></td>
<td>2-4 weeks.</td>
<td></td>
</tr>
</tbody>
</table>
Example of Lock Box

LOCK BOXES

For group lockout situations involving a large number of workers and equipment, lock boxes can offer a number of advantages over hasps.

HOW LOCK BOXES WORK:
- Supervisor uses a single job lock on each energy control point to lock out equipment
- Keys for job locks are put in a lock box
- Each worker applies his own lock to the lock box. As long as any one worker’s lock remains on the lock box, the keys to the job locks cannot be accessed, and the energy isolating devices cannot be operated. Each employee retains exclusive control, as required by OSHA.

HOW GROUP LOCK BOXES CAN SAVE YOU LOTS OF MONEY:
- Example: Assume 5 workers need to lock out 10 energy control points
- Using hasps, 50 locks are required (all 5 workers must apply individual locks to each control point)
- Using a lock box, only 15 locks are required (10 job locks applied to the control points and 5 employee locks applied to the lock box). That’s 70% fewer locks!
- Less weight hanging from the energy point – 1 lock instead of 5!
- Finally, checking the locks on the lock box allows you track who is still working. With hasps, you need to walk around to each energy control point to see whose lock is still in place.
Lock Hasps (Item#2)
Color Code Key (Propose)

- Production – Yellow
- Electrician/Instrument – Red
- Mechanical – Blue
- Completion Operation Group (COG) – Orange
- FE Construction Group – Green
## Color Code Keys (Example) (Item#3)

### Electrical & Instrumentation (Red)

Brady Safety Padlocks, 1 - 1/2” Shackle Clearance, shackle diameter 1/4”
6 Padlocks/Package  (we probably need 2” Shackle – (Check with vendor)

<table>
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<tr>
<th>Catalog No.</th>
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<th>Est. Price/Pack</th>
<th>Delivery</th>
<th>Remarks</th>
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<tr>
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<td>I / E Dept.</td>
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<td>Mechanical Dept.</td>
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<tr>
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<tr>
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<td>COG</td>
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<tr>
<td>52345</td>
<td>Green</td>
<td>4,200 Baht</td>
<td>2-4 weeks.</td>
<td>FE (Construction)</td>
</tr>
</tbody>
</table>

### Production (Yellow)

### Mechanical (Blue)

### Completion Operation Group (COG) (Orange)

### Construction (FE Group) (Green)
Color Code Tag (Item#4)

- PRODUCTION DEPARTMENT (YELLOW)
Color Code Tag (Item#5)

- MECHANICAL DEPARTMENT (BLUE)

**DANGER**

DO NOT OPERATE

MECHANICAL DEPARTMENT

NAME: __________________
DATE: ____________
EQUIPMENT: ____________

SEE OTHER SIDE

**อันตราย**

THIS ENERGY SOURCE HAS BEEN ISOLATED BY:
MECHANICAL DEPARTMENT
UNAUTHORIZED REMOVAL OF THIS LOCK/TAG MAY RESULT IN DISCIPLINARY ACTIONS

REMORKS: __________________
______________________
______________________

SEE OTHER SIDE
Color Code Tag (Item #6)

- ELECTRICAL AND INSTRUMENTATION DEPARTMENT (RED)
Color Code Tag-out (Item#7)

- OTHER, e.g. COG, FE, etc.
Chain & Link (Item#8)

Chain & Links
Zinc plated or stainless steel ideal for use with above kits for attaching to padlock shackles. 3mm x 21 mm supplied in 10 metre lengths.
Lock Out Station (For Prod, I/E and Mech Shop) (Item#9_1)

Option#1

20-Lock Board
- Dimensions: 23½" H x 11½" W
- Includes 20 padlocks (99552 or 99500), two 1" hasps (65375), two 1½" hasps (65376) and 24 heavy duty tags (65520)

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>51189</td>
<td>20-Lock Board (Filled w/ Brady Safety Padlocks)</td>
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<tr>
<td>51194</td>
<td>20-Lock Board (Filled w/ Brady ¾&quot; Steel Padlocks)</td>
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<tr>
<td>50991</td>
<td>20-Lock Board (Board Only)</td>
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Lock Out Station (For Prod, I/E and Mech Shop) (Item#9_2)

Option#2

- Recommend for all shops
- May purchase only board

### 36-Lock Board
- Dimensions: 21½"H x 23½"W
- Includes 36 padlocks (99552 or 99500), three 1" hasps (65375), three 1½" hasps (65376) and 36 heavy duty tags (65520)

<table>
<thead>
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<td>36-Lock Board (Filled w/ Brady Safety Padlocks)</td>
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<td>51196</td>
<td>36-Lock Board (Filled w/ Brady ¾&quot; Steel Padlocks)</td>
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<tr>
<td>50992</td>
<td>36-Lock Board (Board Only)</td>
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</table>
Lock Out Station (For Prod, I/E and Mech Shop)
(Item#9_3)

OPTION#3 (Portable)

Station with 10 Padlocks
- Components:
  - 1 Ready Access Padlock Station (105932)
  - 10 Keyed-different safety padlocks (99552) or steel padlocks (99500)
  - 10 Heavy duty, re-usable lockout tags (65520) w/ nylon cable ties
  - 3 1” Group Lockout Hasps (65375)
  - 3 1.5” Group Lockout Hasps (65376)

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>105928</td>
<td>Padlock Station w/ 5 Safety Padlocks</td>
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<tr>
<td>105929</td>
<td>Padlock Station w/ 5 Steel Padlocks</td>
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<tr>
<td>105930</td>
<td>Padlock Station w/ 10 Safety Padlocks</td>
</tr>
<tr>
<td>105931</td>
<td>Padlock Station w/ 10 Steel Padlocks</td>
</tr>
<tr>
<td>105932</td>
<td>Ready Access Padlock Station (Unfilled)</td>
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</tbody>
</table>
Cable Lockout

Catalog #: 50943 (Item#10)

All Purpose Cable Lockout With 8' Sheathed Cable
Ergonomically designed for easier operation.
8' x 3/16" Diameter Cable, Red, Impact Modified Glass Filled Nylon.

Catalog #: 50944 (Item#11)

All Purpose Cable Lockout Without Cable
Ergonomically designed for easier operation.
Red, Impact Modified Glass Filled Nylon

Catalog #: 50950 (Item#12)

Sheathed Metal Cable - 12'
Cable for use with All Purpose Cable Lockout
12' x 3/16" Diameter Cable, Red, Sheathed Metal

Catalog #: 50948 (Item#13)

Nonconductive Nylon Cable - 12'
Cable for use with All Purpose Cable Lockout
12' x 1/8" Diameter Cable, Red, Nonconductive Nylon
Tag Station (Item#14) – (Optional)

10-Pocket Tag Safety Station
- Made of rugged polycarbonate
- Four pre-drilled holes for wall mounting
- Board dimensions: 22"H x 16½"W x 2¼"D
- Tags not included

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>81773</td>
<td>10-Pocket Tag Safety Station</td>
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</tbody>
</table>
Mini Cable Lockout (Item #15)

- Revolutionary new cable lockout perfect for use on disconnect switches, small gate valves, etc.
- Extremely compact and portable. Cable stored internally – works just like a tape measure!
- Push-button self-winding mechanism automatically cinches cable tight
- Body made of impact modified nylon
- Superior chemical, corrosion and temperature resistant properties.
- Comes with vinyl-coated steel cable or nonconductive nylon cable
- 6 lock holes accommodate most padlock shackles and hasps
- Body dimensions: 4" diameter x 1 3/4" deep
- Cable dimensions: 1/16" diameter x 8' length
- Patent Applied For
PadLock Labels Item#17)

Safety Padlock Labels

<table>
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<tr>
<th>Catalog No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>51379</td>
<td>English (6/Pkg)</td>
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<tr>
<td>51384</td>
<td>Spanish (6/Pkg)</td>
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<tr>
<td>51385</td>
<td>French (6/Pkg)</td>
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</table>
Lock Lubricant Spray (Item #16)

- PS88 Lock Lubricant Spray
  - Provides longer lasting lubrication than WD40
  - Protects against oxidation and corrosion
  - Does not attract dust

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>51278</td>
<td>PS88 Lock Lubricant Spray (1.7 oz. can)</td>
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