SOP-GEN-005 Energy Isolation

1.0 Introduction

An energy isolation procedure is designed to prevent injuries and deaths caused by accidental start-up of machinery and equipment during maintenance or servicing. An energy isolation procedure requires that hazardous energy sources be isolated and rendered inoperative before maintenance or servicing work begins. These energy sources include electrical, pneumatic, hydraulic, mechanical, thermal, chemical and the force of gravity. Hazard tags and locks are used to identify and isolate equipment that may cause injury or damage if operated during installation or maintenance.

Anyone who operates or attempts to operate a valve, switch or device with an active lock or tag will be removed from the site immediately and is subject to disciplinary action up to termination.

All electrical, mechanical, hydraulic, and pneumatic systems including secondary power supplies need to be isolated prior to work commencing. All electrical lines must be locked and tagged. Machinery needs to be not only turned off, but disengaged or de-energized. There is still electrical energy at a switch and a short or someone inadvertently turning on the machine may start it running. It is imperative that the machinery/ equipment is tested to verify that it has been de-energized.

The Master has the overall responsibility to ensure that an energy isolation system is in place on TDI-Brooks vessels. The Chief Engineer is responsible for monitoring the energy isolation system.

2.0 References

- 29 CFR 1910.147

3.0 Scope

In order to isolate and render inoperative an energy source, it is important to survey the equipment first.

- An individual who is thoroughly familiar with its operation and associated hazards should conduct the survey.
- The initial survey should identify all energy sources impacted by work effort through physical inspections and examination of drawings or manuals.
- Locate and mark the places and means of disconnections (either lock or tag).
- Once identified, locks and/ or tags must be applied.
- During the survey an energy-isolating device must be locked in place or labeled with a tag warning against start-up of the equipment. Person(s) working on equipment shall apply a lock or tag to each energy-isolating device.
- For complex equipment with many energy sources a group lockout may be done. After locks/ tags are applied, an attempt to re-start the equipment without the possibility of injury must be made to verify that equipment cannot be restarted before servicing begins.
- Prior to beginning the work, the energy isolations must be evaluated by a supervisor or individual thoroughly familiar with operation.
- After servicing, each person who placed a lock or tag must remove it before the equipment is started.
- In the event that equipment is not repaired at when the crew signs off the vessel, the off signer will remove his locks and on signer will put his own locks on.
- The equipment/ machinery must be inspected by a second party prior to re-energizing.

A lockout involves the placement of a lockout device or tag on an energy-isolating device so that the energy isolating device and the equipment being controlled cannot be operated until the lockout device or tag is removed. A lockout device utilizes a key type lock to hold an energy-isolating device in the safe position and prevent the energizing of a machine or equipment inadvertently.

Tag-out involves the placement of a tag-out device on an energy-isolating device to indicate that the energy isolating device and the equipment being controlled may not be operated until the tag-out device is removed. A tag-out device is a prominent warning device, such as a tag with a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure to indicate that the energy isolating device and the equipment being controlled may not be operated until the tag-out device is removed. If an energy-isolating device is not capable of being locked out, then a tag-out procedure will be used. However, a lock is considered to be a safer mechanism for securing machinery/equipment.

Blocks may also be used as a safety device to prevent accidental re-starts of equipment. Blocks should be placed under any equipment that might inadvertently move by sliding, falling, or rolling. Another type of block is a blind or blank. A blind is a metal disk that is placed in a pipe to ensure that air, steam or other substance is not released so that the stored energy will not result in inadvertent movement.

4.0 Procedures

The Chief Engineer has the primary responsibility for the proper lockout of equipment and/or circuits. Anyone involved in a lockout/tag-out procedure will identify all energy isolating devices and switches that are in the pathway of what will be involved in a lockout/tag-out. More than one energy source may be involved. Prior to a lockout that individual must have permission from the Chief Engineer.

Prior to initiating an energy isolation using a lock the following steps must be completed:

- Notify all affected employees that a lockout is necessary.
- Fill out an energy isolation permit.
- Notify the bridge and engineering prior to initiating an energy isolation protocol.
- After obtaining approval from the Chief Engineer, shut down the equipment subject to energy isolation by following normal shut down procedures.
- Personnel are issued suitable locks/tags with suitable identification.
- Ensure that equipment is not in use prior to shutting it down.
- Shut or operate any switches, valves or other energy isolating devices so that all energy sources are disconnected or isolated from the equipment and/or circuits; stored energy such as in capacitors, springs, moving parts, air, gas, steam, or water pressure must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down etc.
- If the switches are in a metal box, the box must be locked out.
- If controls are in a metal-covered box, a common hasp can be welded or riveted to the door, along with a lock stable.
- Fuse boxes may also be locked in this manner.
- Electrical circuits must be checked by a qualified person with proper and calibrated electrical testing equipment.
- Lockout the energy devices.
- Verify that energy devices are disconnected by ensuring that the equipment does not operate when switched on or circuits are not carrying any voltage.
- Once the equipment is safely locked out then work may commence.
- When servicing is complete, check the equipment and/or circuits when there is no possibility of injury.
- When the equipment and/or circuits are clear, remove all locks and the equipment and/or circuit may be used.
- Locks are not removed by anyone other than the individual who placed the lock unless they are given the authority to do so.

Prior to initiating an energy isolation using a tag the following steps must be completed:

- Notify all affected employees that energy isolation is necessary.

- Fill out an energy isolation permit.
- Notify the bridge and engineering prior to initiating an energy isolation protocol.
- After obtaining approval from the Chief Engineer, shut down the equipment subject to energy isolation by following normal shut down procedures.
- Personnel are issued suitable tags and identified.
- The date and time of the tag was put into place shall be listed.
- Each tag shall have the name of the employee who locked/ tagged the device.
- After tags are in place, test the equipment by trying to turn it on. There may still be residual energy in the system that could injure a worker. Discharge it before work begins.
- Work may begin only after the equipment has been safely tagged out.
- When servicing is complete, check the equipment and/or circuits when there is no possibility of injury.
- When the equipment and/or circuits are clear, remove all tags.
- Tags are not removed by anyone other than the individual who placed the tag unless they are given the authority to do so.

Any individual performing servicing work on machine/equipment that may require an energy isolation procedure will be qualified in that type of work and lockout/tag-out procedures. All other employees whose work operations are or may be in an area where energy control procedure may be utilized will be instructed about the procedure and about the prohibition of attempting to restart or reenergize equipment that is locked out or tagged out.

5.0 Permit

All permits must be signed by the authorized person designated on the permit. **Authorized persons cannot write and sign their own permits. A second signature is required**.

Before work begins, an Energy Isolation permit must be filled out by the crewman doing the work and signed by the Chief Engineer.

A copy of the work permit must be posted at the site where the work is being done. Therefore, after the Chief Engineer signs the permit, make a copy to post at the work site and file the original on the bridge.

The Chief Engineer is responsible for entering the Energy Isolation permit as a work order in the preventative maintenance system, writing the work order number on the signed permit and filing the signed and completed permit on the bridge.

6.0 Long Term Energy Isolation

All permits expire in 12 hours EXCEPT the Energy Isolation permit. Often you will need to wait on parts or contractors to service equipment and it cannot be used until repaired. This can take weeks or months depending on circumstances.

Any Energy Isolation permit that remains open for more than 12 hours is considered a Long Term EI permit- but the process remains the same. The permit is filled out and signed by the Authorized Person. A copy is posted on the equipment near the activation controls. Locks and tags are applied by appropriate persons and the equipment is tested to discharge any remaining energy and ensure it will not come on accidentally. A task is created in the maintenance system describing the work to be done and is updated until it is complete.

- **All locks, tags and posted permits remain in place until the work has been completed AND**

- **The maintenance task and the permit remain OPEN and ACTIVE until the work has been completed.**