Effective Lockout of Hydraulic Systems

Introduction:

A lockout procedure is a sequence of safety precautions taken in advance of access to potentially dangerous machinery or equipment. It is used where there is a risk of the release of energy which could cause injury to persons carrying out the work, or indeed other individuals working in the neighbourhood of the equipment being maintained.

It involves isolating the energy sources and locking them such they can only be restored by the person carrying out the work, when the work is finished.

The procedure includes safety padlocks, safety tags/signs and also specialist lockout devices.

Stored (residual) energy:

In the case of hydraulically powered systems, the act of switching off the pump which generates the hydraulic power is insufficient to make the system safe. Hydraulic energy can stay in the system indefinitely after it has been switched off. A sudden and unexpected release of this energy can put the life of the worker in danger.

To that end, it is essential that the lockout procedure incorporates steps to dissipate this stored energy.

Preparation:

Whether preparing a formal procedural document that could be incorporated in the Permit to Work (PtW), or simply getting ready to shut down the machine, preparation should include the following:

1. Risk assessment (i.e. job safety analysis, isolation method, isolation list).
2. Notification (inform anyone affected by the planned shutdown of the machinery).
3. Identify and gather any equipment needed to perform the lockout.

Shutdown:

Switch off the machine following normal isolating procedure. In the case of hydraulic systems this is likely to include mains isolation switch, hydraulic supply valve, drain valve.

Dissipate any stored energy via drain valves.

Hydraulic supply valves can be locked in the closed position to prevent oil entering the system. Drain valves should be locked in the open position whereby hydraulic oil drains to the oil reservoir.
**Lockout:**

Apply locking devices to electrical isolators and hydraulic system drain valves. Secure these in place with safety isolation padlocks. Padlock keys should be retained by the person who applied them or retained in a Group Lock Box¹.

**Tagout:**

Apply signs or tags which provide the following information as a minimum.

1. Name of person carrying out the work.
2. Nature of work being undertaken.
3. Date tag applied.

Signs and tags should be compliant with the signs and signals standards relevant to your location of work.

**Blockout:**

As a final precaution, measures should be taken to prevent hydraulically powered components moving under their own weight. Locking pins may be provided as part of the machinery design. Where possible, these should be locked in place. In absence of this, blocks and chocks can be placed strategically to prevent parts from moving.

**Restoration of system:**

Restoring the equipment or machinery to its normal operating condition is usually the reverse of the isolation procedure. Reference to the equipment or machinery hand books will advise on the correct sequence.

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¹ Lockout procedures as part of a group of multiple workers is covered in a separate technical article.