BARANTAS
Safe & Healthy Workplaces

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Lockout/Tagout Course

LOT_D04 & LOT_004.2

Participants Workbook

Name: _____

Company:_____

Date: _____

Trainer: _____

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PROGRAM GOAL

PROTECTION OF WORKERS

Hazardous Energy Control
Participants in this program will be taught the fundamentals of lockout/tagout, the different types of lockout, understanding differences between individual, group, and complex lockouts, choosing when a permit might be required, and the understanding and use of the supplied forms to manage lockout.

This lockout/tagout course is based on CSA standard Z460-20.

Electrical Safety - Arc and Shock Protection
It is recommended this course be taught and in conjunction with electrical safe work practices which includes training and procedures in arc and shock protection methods and programs.

Part 1 - Theory and Methods

1. What is Lockout / Tagout (LOTO)
2. Definitions & Z460/Z462
3. Duties & Responsibilities
4. Examples of potential energy sources
5. Equipment design and equipment of LOTO
6. Tasks and Hazard Identification
7. Energy control and types of LOTO
a) Individual
b) Group
c) Complex Group
8. References and more information

PROGRAM NOTICE

Completion of this lockout/tag-out (LOTO) course will allow the participant to be considered an Authorized Individual for the purposes of performing common lockout scenarios. Specific company and workplace familiarization and training are still required.

This course will cover the basic concepts, methods, and equipment that can be used to manage common lockouts, but should not be considered the only training required to properly perform LOTO in complex lockout, or when specific procedures are required.

01.1 About Barantas

BARANTAS
Safe & Healthy Workplaces

Founded in 2002,
Barantas is a full-service health and safety firm.
We build relationships based on mutual trust by providing our clients with comprehensive, long-term protection and a personalized partnership, anchored by our commitment to service excellence.
Our **infrastructure** allows us to provide each and every client with the same exceptional level of service, regardless of where they are located.

BARANTAS (from Manx Gaelic): authority, surety, safe place or safe haven

01.2 Incident Investigations & Field Inspections

Barantas has field experience in incident and accident investigations, along with case law review. Here are a few examples below:

Fatality – Refrigeration
Worker fails to verify zero energy state at a refrigeration plant before being in the vicinity and working on equipment. Energy release results in 3 fatalities.

Critically Injured - Electrical Arc Flash
Supervisor verifies zero energy state, but does not have control of supply side of electrical gear. Worker begins to work on measuring for wire length with metal fish tape at the source bus bars when they became energized. Worker suffered extreme burns and skin loss, but lived with 65 skin grafts later and 3 years in hospital. Worker was 25 and is permanently disabled.

Critically Injured – Shock
Electrical worker was working on 347 lighting, turned off switch, but did not verify zero energy state. Upon uncoupling wires was shocked with single phase of 347 which was still live. Heart condition persisted and worker has reduced physical capabilities as a result.

Fatality – Physical
Customer shopping in big box store was walking down isle when a heavy large item fell from racking above crushing customer. Person later died from injuries in hospital. Store workers failed to isolate and prevent material from falling from potential energy release resulting in the above incident.

02.1 – Protection of Workers

There is often confusion with lockout of equipment. Specifically when it comes to Lockout programs and the equipment used in those programs.

Example of poor isolation of a valve - DON'T DO THIS

Lockout and Tag out (LOTO) primary purpose (and only purpose) is for the protection of WORKERS.

LOTO locks have nothing to do with protecting equipment from damage or failure. Facilities and workers can use 'maintenance' locks for that purpose. Turning off and locking out equipment that is failing to protect it from further damage is most likely a maintenance lock.

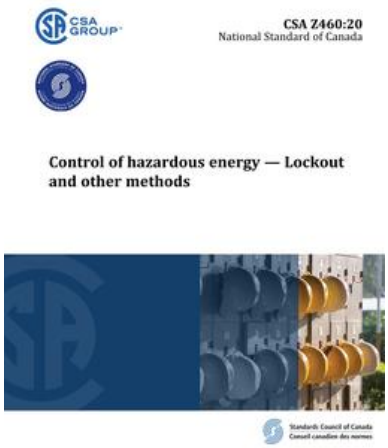
However, once a worker or repair person comes along to repair the equipment and will be working on it, LOTO lock(s) must now be used indicating a worker is on the system and has isolated the energy source(s).

02.2 – Hazardous Energy Controls

Participants in this program will be taught the fundamentals of lockout/tagout, the different types of lockout, understanding differences between individual, group, and complex lockouts, choosing when a permit might be required, and the understanding and use of the supplied forms to manage lockout.

This lockout/tagout course is based on CSA standard Z460-20.

This standard renews itself approximately every 5 years.



02.3 – Electrical Safety

Shock and Arc Flash Protection

It is recommended this course be taught and in conjunction with electrical safe work practices which includes training and procedures in arc and shock protection methods and programs.

This course will not cover shock and arc flash protection.

Barantas offers a subsequent 'Workplace Electrical Safety' course to complete a company's electrical safe work program requirements, based on the requirements of CSA Z462-24.

03.1 – Solid and Stable Standard

The CSA Z460 Control of Hazardous Energy Standard has been around for a long time and is considered by many to be a solid and stable standard. In recent years it has changed very little with only enhancements being added to it, as well its field practicality or applicability has proven strong.

It may not cover every situation, but its principles and standards are adaptable, allowing workers and supervisors to develop effective means of energy control for the protection of workers.

03.2 – Z460-20 Updates & Additions

Let's review the most recent changes and enhancements to the Z460 Standard: General wording and clarification updates

1. Equipment nomenclature wording improved and emphasized
2. Clarification of **'remote locations'** - when isolation is far from working site - procedures required
3. Addition of Annex I - **Application to Construction Sites**
4. Other enhancements to annexes with more examples

04.1 – What is Lock Out & Tag Out – and why?

Lockout is:

Equipment, machine, or process made inoperable by **placement of a lockout device on an energy-isolating device in accordance with an established procedure,** thereby indicating that the energy-isolating device is not to be operated until removal of the lock or in accordance with an established procedure.

It's Purpose:

To ensure a safe work condition: a state in which an energy source has been disconnected, locked, and tagged out, in accordance with established standards and **tested to ensure the isolation of energy.**

04.2 – What is Lock Out & Tag Out – and why?

The Core of Z460 has several Primary Principles (components) that must be in any LOTO program or procedure.

- **EVERY individual** working downstream of energy or lockout **must be protected**
- **EVERY individual MUST have control** over his or her personal safety
- **EVERY individual** is ***responsible for ensuring safe working conditions***
- **EVERY** individual **shall**:
  - ensure **ALL energy sources** are isolated
  - **VERIFY** isolation and de-energization has been accomplished
  - work in a safe manner (follow procedures)
  - ***ensure work area is left in a safe state***
- **Supervisor/Foreman** shall: ensure all individuals are informed and participate

05 – DEFINITIONS

05.1 Lock Out
Lockout is - placement of a lockout device on an energy-isolating device in accordance with an established procedure.

05.2 Lock Out Device

A mechanical means of locking that uses an individually keyed lock to secure an energy-isolating device in a position that prevents the energization of a machine, equipment, or process.

05.2.1 – Requirements for Lockout Devices

What's wrong with this kit?

All lockout devices (including all tags used with lockout devices) shall

1. be uniquely identified; (usually serial number)
2. be the only devices used for controlling hazardous energy;
3. not be used for other purposes;
4. be capable of withstanding the environment to which they are exposed;
5. be standardized within the facility (or company) in at least one of the following criteria:
   A. colour;
   B. shape;
   C. size; or
   D. specific markings; and
6. be substantial enough to prevent the operation of the energy-isolating device without excessive force, unusual measures, or destructive techniques, e.g., bolt cutters or other metal-cutting tools.

An information tag shall be used with each lockout device unless the lockout device itself has the required information attached.

Each lockout device, and tag if used, shall identify the authorized individual who applied the device and may include the date and reason for lockout - and remain legible for the duration of use.

05.3 – Information Tags

All LOTO devices **are required to be tagged** with identifying information in accordance with the standard.

Your company may also have additional requirements (like phone number).

A warning label (tag) as a means of attachment used in conjunction with the application of a lockout device to an energy-isolating device. It usually indicates the nature, purpose, and time of application of the lockout, as well as the identity of the authorized individual who performed the lockout.

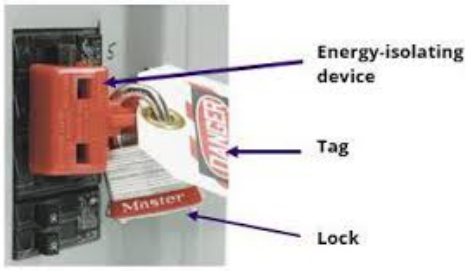
05.3.1 – Requirements for Information Tags
In addition, your personal lock, that must have only **ONE key**,

it also **MUST have a tag** which is:

- made of **non-conducting material and will withstand the environment to which it will be subjected**
- placed in a **conspicuous location**
- **secured** to the lock to prevent inadvertent removal
- **Z460 Minimum Requirements want you to Indicate:**
  - **the name of the person** who applied the lock (usually the person disconnecting the equipment or installation)
  - the person's **employer**
  - **why the equipment/installation is disconnected**
  - the **date** the equipment/installation **was disconnected**

Some employers also want you to put **your contact number** on the tag as well!

05.4 – Energy Isolating Device



An energy isolating device is 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; a line valve; a block; and other devices used to block or isolate energy.

Note: Push-button selector switches and other control-type devices are not energy-isolating devices.

All lockout devices (including all tags used with lockout devices) shall

1. be uniquely identified;
2. be the only devices used for controlling hazardous energy;
3. not be used for other purposes;
4. be capable of withstanding the environment to which they are exposed;
5. be standardized within the facility (or company) in at least one of the following criteria:
   1. colour; *(know your company colour scheme)*
   2. shape;
   3. size; or
   4. iv) specific markings; and

6. be substantial enough to prevent operation of the energy-isolating device without excessive force, unusual measures, or destructive techniques, e.g., bolt cutters or other metal-cutting tools.

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Each lockout device, and tag if used, shall identify the authorized individual who applied the device and may include the date and reason for lockout - and remain legible for the duration of use.

05.5 – Hazardous Energy

Hazardous energy is any electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal, gravitational, or other energy that can harm personnel.

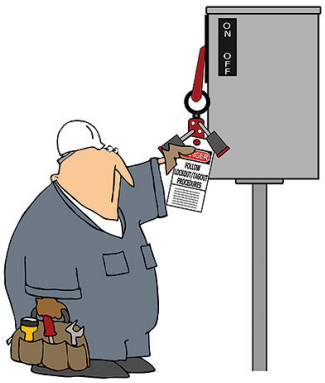
06 – DUTIES & RESPONSIBILITIES

06.1 Primary Authorized Individual (PAI)

A Primary Authorized Individual (PAI)...

(which is sometimes referred to as a Person In Charge (PIC) - a more US term)

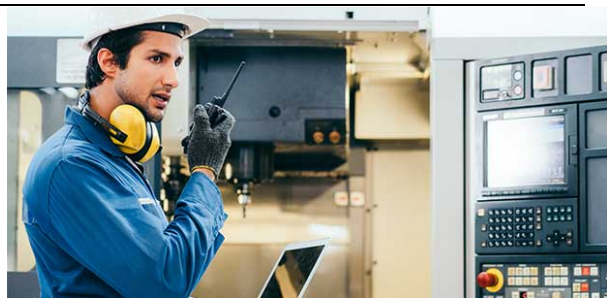
is a person assigned as the lead authorized individual, under the group lockout process, to apply and coordinate the removal of the lockout of a machine, piece of equipment, or process, on which work will be performed.



06.2 Authorized Individual (AI)
An AUTHORIZED Individual is **(Worker / Employee)**
A person who is qualified to engage in hazardous energy control because of knowledge, training, and experience and has been assigned to engage in such control.

Authorized individuals shall be responsible for performing hazardous energy control in compliance with the program, procedures, and training provided for them by the employer.

06.3 – Affected Individual



An AFFECTED Individual is an individual who is **not directly involved in the work** requiring hazardous energy control, but who is (or may be) **located in the work area.**

Examples can include but not limited to: owners observing progress on a walk-through, other workers/employees coming to discuss something with you, an engineer taking measures to verify installation or configuration (but is not modifying or working on the equipment directly), surveyors, etc.

06.4 – Employers

Employers Shall:

- determine through regular supervision or through inspections conducted **on at least an annual basis** that each worker is complying with the safety-related work practices required by this Standard.

Have the following responsibilities:

- establish, document, and implement the safety-related work practices and procedures required by this Standard

Your employer, depending on size, may have tiered inspection strategies ranging from field inspections, branch audits, and regional reviews to a national or corporate full review process.

06.4.1 – Training by Employer

Employers are responsible for TRAINING

- ensure a worker shall receive **initial** and **periodic retraining** in safety-related work practices and applicable changes in this Standard, at intervals **not to exceed 3 years**, to maintain an appropriate level of awareness…

07.0 – EXAMPLES OF ENERGY SOURCES

07.1 Examples

When there is a potential for harm to an individual, before work begins, all sources of hazardous energy shall be isolated, locked out, verified and de-energized *(brought to a zero energy state)*.

- Electrical
- Hydraulic
- Mechanical
- Pneumatic
- Thermal
- Potential
- Kinetic
- Radiation
- Chemical

08.0 – EQUIPMENT DESIGN AND PROGRAM REQUIREMENTS

08.1 Mechanical Examples

In this section lets look at some examples of mechanical lockout devices and their applications. Note the red highlighted examples showing cautions and dangers to consider when applying lockout devices.

Valves on a pipe run (nipples) can often be involved in a lockout as an 'open to atmosphere point. In this case if they MUST be open for the lockout, they may likely be LOCKED OPEN.

Valve covers (in this case a GATE VALVE DEVICE) are used to prevent the turning of the handle once the valve is in the 'state' desired for the lockout.

CAUTION!

One thing that cannot happen as part of performing a lockout, is to create hazards for other worker(s). In this example, if ONLY the valve on the left was to be locked out, the applier of the cable and lock created a danger or risk in the facility by capturing the other valve in the process. If this same left-only lockout is required, put the cable around the stem of the other lock or the pipe to prevent introducing other hazards.

Hasps are useful in any application when potentially more than one lock may need to be applied.

This example is a solenoid control of a PVC ball valve.

NOTE: software control is NOT lockout, all solenoids still need a physical disconnect device applied.

This type of lockout device is very flexible in its applications. There are pros and cons to this device

Pros:

• It fits many different sizes of valves easily
• It is a ball valve lockout device that can allow partial open or closed states or even ranges of states depending on where you put the 'peg' stops

Cons:

• does not cover the nut on the handle or provide extra security
• is possible for the 'pegs' to bend or move position
• does not have a built-in hasp

This type of ball valve cover is very strong but has some limitations.

Pros:

• Is very strong and completely covers the valve handle and body
• Has a hasp built in
• Prevents tampering with lock itself and will not shift from it's position

Cons:

• is limited in the size of valves it can handle - you may need several different sizes of these depending on your applications
• Can only lock valve in two positions - full open or full closed

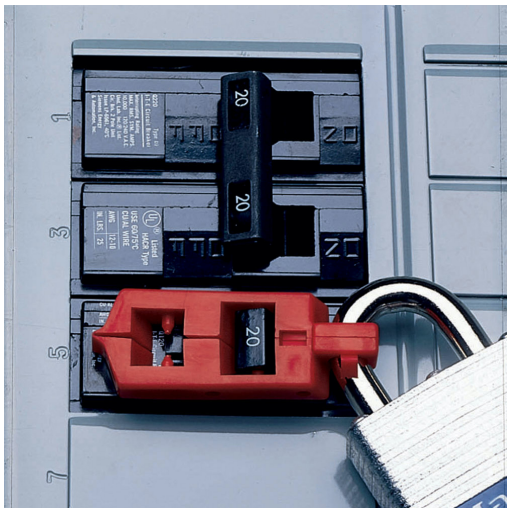
08.2 – Electrical Examples

Lets review some of the common electrical lockout devices and their applications. Take note of the comments about concerns and risks in their use and how to best deploy them.

Electrical breaker disconnects are very common and come in many different shapes, sizes, and types of applications (breakers that they will fit).
The pinned breaker isolation device (requires breakers with tab holes for pins)
The Leviton breaker isolation device.

Here is a compression-style device. You must be careful not to over or under-tighten in order for it to be properly secure without damaging equipment.

Application of Single Pole & Multi-Pole Breaker Lockouts



NOTE: all tags MUST have the shackle of the lock go through the tag - zip tying to the lock is not acceptable.

In a case where many branch circuits need to be locked out, you may need to use many individual breaker isolation devices, as well as a cable lock. It is not practical or even possible to put a lock on each one.

CAUTION: lockouts, particularly group lockouts, should be designed with the consideration of when locks will need to be removed. For example, if half of this lockout will be removed in 1 week because work is finished, but the others will remain another 2 weeks for the rest to finish, this should have been setup as two different cables and lockouts.

Some multipole units like this one, have their own custom devices meant to be used with them. You may need to purchase or have provided for you (usually by owners of equipment) specific devices.

08.3 – When no connection point

Today there are so many different devices available, regardless of what you need to lockout, there is probably a device somewhere for that challenge.

Here is a cylinder head lockout for example.

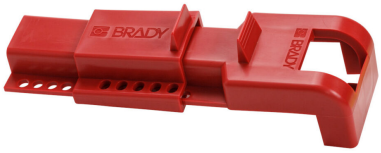
In some cases, usually with legacy equipment, there isn't an easy or apparent way to securely lock it out.

Since clients or owners do not want their equipment damaged or altered, applying devices to ensure lockout can be a challenge. 3M make a product below to help with this.

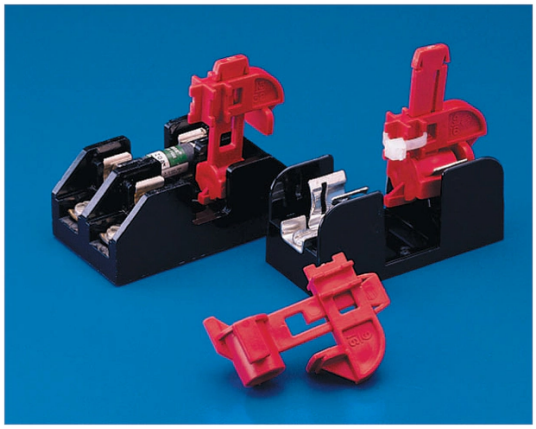
This device from 3M, has a glue-on anchor point (The black block) which has a very strong hold, allowing a cable lock to be used to go through a switch that otherwise did not have a point to secure to for lockout. This device can be removed without any visible damage to a unit and is strong enough to not be taken off easily.

08.4 – Other Connection Devices

As mentioned earlier, there are so many devices available depending on what you need to do. Check down below for just a few other examples of types of devices that are commercially available through common channels.



Appliance plug box



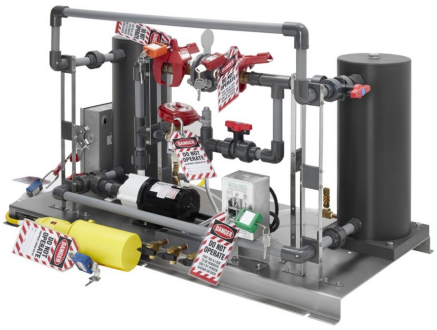
08.5 – LOTO Program Requirements

Lockout Program Requirements based on CSA Z460:20 §7.3.1

Lockout is a systematic program and is the primary method of hazardous energy control. A lockout program shall consist of the following elements to effectively protect personnel:

a) identification of the **hazardous energy** covered by the program;
b) identification of the **types of energy-isolating devices**;
c) identification of the **types of de-energizing devices** (permanently installed or portable);
d) **selection and procurement** of protective materials and hardware;
e) assignment of **duties and responsibilities**;
f) determination of shutdown, de-energization, energization, and start-up sequences;
g) **documented lockout procedures** for machines, equipment, and processes;
h) **training** of personnel; and
i) **auditing** of program elements.

08.6 – Requirements of Manufacturers & Integrators



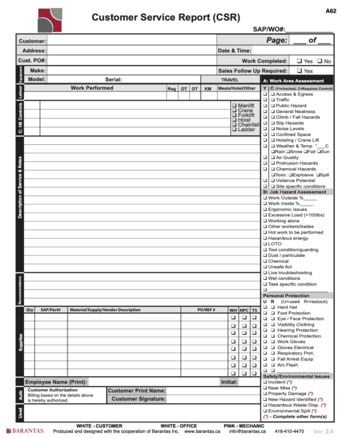
Today, in accordance with the CSA standard, anything manufactured which may need servicing, MUST have built into it, the ability for a worker to isolate energy sources to be able to repair, service, or perform work on the equipment or device.

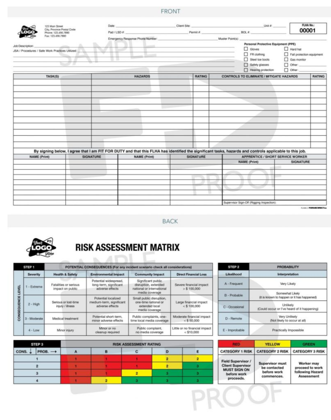
Manufacturers, integrators, modifiers, and remanufacturers shall be responsible for designing, integrating, installing, and building machines, equipment, or processes so that the user can effectively control hazardous energy during activities such as, but not limited to, erecting, installing, constructing, repairing, adjusting, inspecting, unjamming, setting up, troubleshooting, testing, cleaning, dismantling, servicing, and maintaining machines, equipment, or processes.

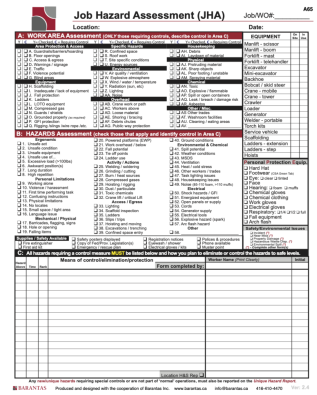
09.0 – HAZARD IDENTIFICATION AND TASKS

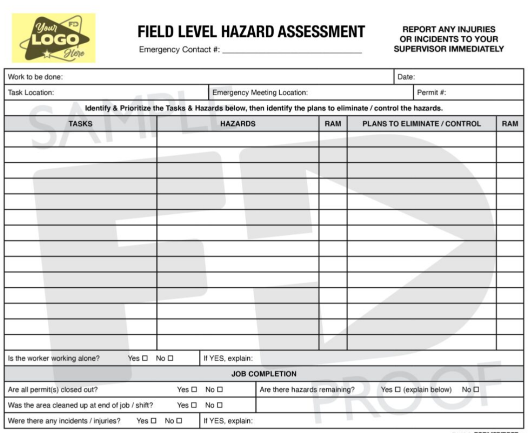
09.1 – JHA, FLHA, PSI, POD, CSR to name a few

As part of performing any high-risk activity or task, a hazard assessment must always be performed and controls developed to mitigate risk as much as possible.









Your company may have a form for this, they might be called a Job Hazard Assessment, a Field Level Hazard Assessment, a Plan of the Day, or even a Customer Service Report for integrated safety and billing forms. Regardless, the purpose is the same.

- **Stop**
- **Assess** (think)
- **Control** (devise how to proceed safely)
- **Implement** (perform actions to control)
- **Verify** (ensure you have controlled what you think you have)

Similar to the Plan-DO-Check-Act concept.

However, there are well-done assessments (written down), and not-so-well-done assessments. It is very important you have a good record of your controls and actions in regards to your energy isolation.

So what IS a BAD Entry?

Always identifying your controls on your forms is very important and part of a good due diligence defense. But don't just write 'performed lockout' as that is not overly helpful to show you knew what you were doing.

What is a GOOD Entry?

Write as your control: Isolated MCC #2, Suction valve A20, and outlet valve CD4, then verified zero energy state.

09.2 – Verification Testing

The Critical Importance of Verification of Zero Energy State

Placing systems in a safe working condition might seem simple, but there are several factors to consider.

- Proper planning and preparation will make any type of testing simpler and safer.
- Having to gather (fetch) other tools or testers interrupts focus and can contribute to an accident.
- Will you be troubleshooting or testing for the absence of voltage?
- What test instrument will be used to determine the absence of voltage?
- Is a detailed warning label present for arc flash and shock?

Not verifying is gambling with yours and others lives - this fella lost the bet.

So what must be considered when testing for zero or absence of energy?

You MUST always treat it as if energy is there until you prove there is not.

ALWAYS.

Ask yourself some primary questions:

- What PPE will be required?
- What is the voltage of the circuit?
- What is the Arc Flash Boundary?
- Is your lockout/tagout complete?
- Is your test tool functioning properly?

09.3 – Determining Safe State

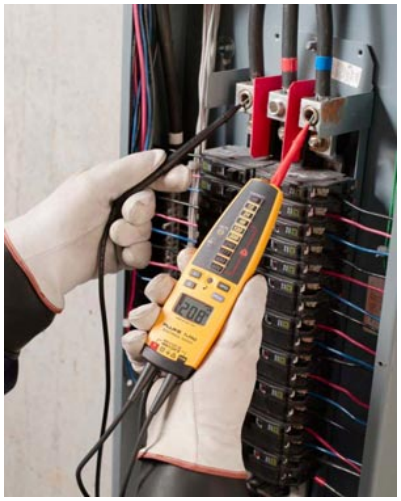
For some situations, determining a safe state (absence of energy) can be very difficult, especially if the situation is not set up to be able to do this.

Take a piping system that has been isolated. It has no gauge, no nipple (open to the atmosphere point), and no other extension from it. How would you verify there is no pressure in the pipe - extremely challenging.

Ensure when building or preparing systems, you build into the system a way or method for verifying the zero energy state. This is most important for service technicians in various trades who have to leave systems for a period of time in an isolated state (for service).

Eg. When larger cast pipe is being used, put a valve on the blind.

In long pipe runs fully installed, make sure there are nipples or open to atmosphere points at key places where a worker can both relieve pressure and ensure an open to atmosphere point.



When electrically verifying treat as voltage is present - this means what PPE do you need to have on to protect yourself from potential hazards of live energy at the voltage level you're testing for?

Shock and Arc Flash protection are likely required.

10.0 – TYPES OF ENERGY CONTROL (LOTO)

10.1 – Individual LOTO

Individual Lockout is as it sounds - you as an individual are locking out equipment so you have complete control while working on it for energy isolation.

It may be one or several isolation points, but you will be the KEY HOLDER for all the locks involved and have complete control over any future activation of the equipment.

You may be assigned an individual lock (commonly red) that has ONLY ONE KEY and the serial number is recorded as assigned to you. The lock must have only one key.

The lock must also have a tag on it when applied in a LOTO.

10.2 – Group LOTO

Group Lockout using locks referred to as "Group" or "Company" locks as primary isolation point locks. These locks go on the equipment, their corresponding keys are placed in a "lock box" which as the picture to the left shows a wall-mounted unit, or can be portable (tabletop). Workers then 'lock off' with their personal locks on the LockBox directly controlling access to the equipment keys (their personal control).

Group lockout is for groups of workers, and it does require more time to setup and requires additional hardware from strictly individual lockout.

The next section will get into the requirements of group lockout equipment.

10.3 – Lock Purpose & Colours

Your company may have a specific colour code with meanings for different types of locks.
For the purpose of this course, we'll define the following key persons and their corresponding lock colours as follows:

RED = Your Personal Lock
BLUE = Group or Company Lock
GREEN = Supervisor Lock (or security lock)
YELLOW = Complex Lockout Control Lock
PURPLE = Subtrades lock colour.

It is not common for subtrades that might be working for your company to come with the correct colour of lock. It is also NOT possible to get locks which come in multi-colours, but sometimes a lock needs to identify several different things.

For example, a lock may need to identify a subtrade supervisor, yet they may have come with a red lock for this purpose. Having a collection of multi-colour electrical tape is an inexpensive and fast way to correct the issue.

If the subtrade supervisor had a RED lock with them, you can band the lock with GREEN and PURPLE electrical tape to signify this is the supervisor of the subtrade.

Or if this is a worker for a subtrade signing in your lockout, and they already have a red lock indicating their PERSONAL lock, you simply need to add a PURPLE band to the already red lock.

10.1 – Individual LOTO Details

Every Authorized Individual (worker/employee) is to be issued a PERSONAL lock.

The personal lock is like your ID, it goes wherever you go. If you're not there working on the system, neither is your personal lock. But if you're there, working on the system, your personal lock is your ID that you, as identified on your tag, is there and working on the system and no one can activate unless you say it's safe by removing your lock yourself.

Personal locks must have only **ONE key**, and have a tag which is:

TAGS MUST:

- made of **non-conducting material and will withstand the environment to which it will be subjected**
- placed in a **conspicuous location**
- **secured** to the lock to prevent inadvertent removal
- **Indicate (4 things required by CSA 460):**
  - the name of the person who applied the lock (usually the person disconnecting the equipment or installation)
  - the person's employer

- why the equipment/installation is disconnected
- the date the equipment/installation was disconnected

But your employer may want you to put extra information on the tag beyond the CSA 460 requirement:

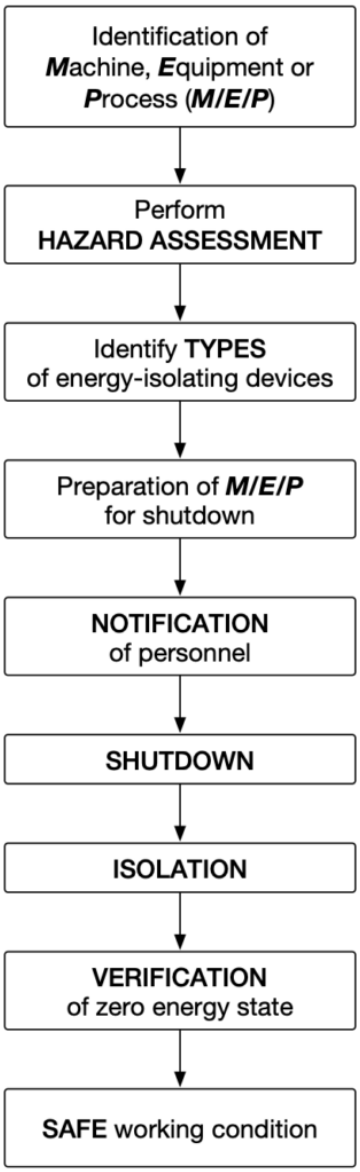
This can include but is not limited to your phone number, employee ID, your photograph, your title or position, etc.

Each Individual is to receive appropriate training.

For many company programs, there is a simple Work Hack that can be done to keep writing time efficient and accurate

"The standard does not limit the number of tags that can be attached to a lock, only that it must have at least one. Since often 3 of the most common things on the tag in individual LOTO are static, there's not need to write them over and over again. Take one tag and write your name, employer and your contact phone number. Laminate it, or put clear packing tape over the writing to prevent if from being rubbed off. Then using a second tag attached to the same lock, with a dry erase marker, write the date and why you are performing the isolation. You can repeat this process over and over again, due to the dry erase marker - only writing very little and using very few tags."

10.1.2 – Individual Process



Identification: is recognizing LOTO is going to be required

Perform hazard Assessment: Using your company methods, assess for hazards and develop controls

Types of Devices: Identify all the different types of devices you'll require. If you don't have them, you can't start this until you obtain them.

Prepare: This means getting everything all located and ready to apply, tags completed, etc.

Notification: Very important in many situations. It is unprofessional as well as can be unsafe to not let people know services or energy supply will be turned off. Notify those that need to know.

Shutdown: Perform the shutdown, turning off, closing of valves etc.

Isolation: Apply your personal lock(s) - you may need more than one.

Verification (Critical Step): After energy has been isolated and released, verify you have obtained zero energy state.

Safe working condition: if the verification proves true, you can proceed to work in a safe state maintaining control over your locks and keys.

Personal Locks must be in the control of the authorized individual.

You can NEVER give your key to your personal lock to anyone!

- If your company uses JHA/FLHA/PSI etc., record on your personal/individual form
- BE SURE to identify ALL hazardous energy sources
- BE SURE to verify

Safety Lockout
XYZ Manufacturing
Portable Chiller No. 1
Only Trained and Authorized Employees Shall Conduct Lockout Procedures

Secondary Lockout device required for ball valve

YOU ARE HERE

Always Perform Machine Stop Before Locking Out Disconnects

Other Machinery Which Could Present a Hazard? None
Other Associated Energy Sources? None

ENERGY TYPE AND SOURCE	I.D. TAG	PROCEDURES FOR LOCKING OUT AND/OR RELEASING ENERGIES	VERIFICATION PROCEDURES
600 Volt Main Electrical Disconnect Switch. Located on front of Chiller. Fed from disconnect switch on wall behind Chiller	E1	Place Disconnect Switch in the off position. Apply lock and tag. Disconnect electrical power for Chiller No. 1	Attempt to start the equipment powered by this disconnect switch. The equipment must not start and no action shall occur. For electrical work, verify the absence of voltage with an approved test instrument
120 PSI Main Pneumatic Safety Shutoff Valve. Located on front of Chiller	P1	Place valve in the off position. Apply lockout device, lock and tag. Disconnects air for Chiller No. 1	Visually confirm shutoff valve is in the off position and locked. Verify zero air pressure at gauge. Ensure no residual air pressure remains in any lines. May require manual bleed off

For Replacement Call: Lenco Training & Technical Services (905) 681- 8886, len@arcflash.ca DATE: 04-22-2019

IF SYSTEM CANNOT BE LOCKED OUT OR IF SYSTEM FAILS VERIFICATION CONTACT YOUR SUPERVISOR

It will become more common to have some clients (owners) develop standardized safety procedures for their equipment. Here is an example of a simple chiller and the owner's procedure they want contractors to follow when working on it.

Note it has two isolation points, which MAY require the use of two locks (but you accomplish it with one lock and a cable lock device), and they've told you everything you need to know: Voltage, pressure, how to verify, etc.

What happens when 2 or 3 people want to work on this at the same time? How can we handle that?

Hasps can be used, and each person remains in their OWN personal lockout - applied their own personal locks.

OR

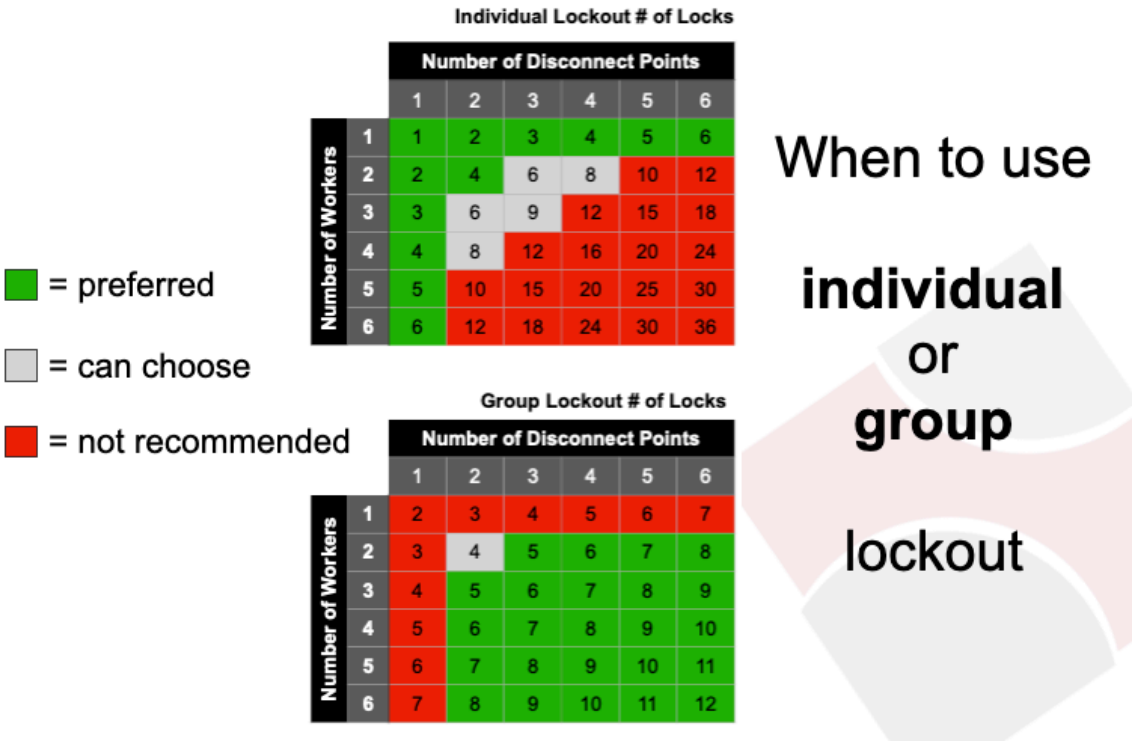
It can become a **GROUP** lockout, with group locks applied to the isolation points, and personal locks applied to the LOCK BOX used in group lockout. More on this coming up...

10.1.3 – When can't a worker use individual LOTO anymore?

Individual lockout is fast, simple and has very little 'paperwork'. You simply need to complete your company hazard assessment, tag your lock(s) appropriately and you're ready to perform the Lockout.

But how far can we stretch this... is there a limit?

Yes there is and let's look at the practicality of the switch to group lockout.



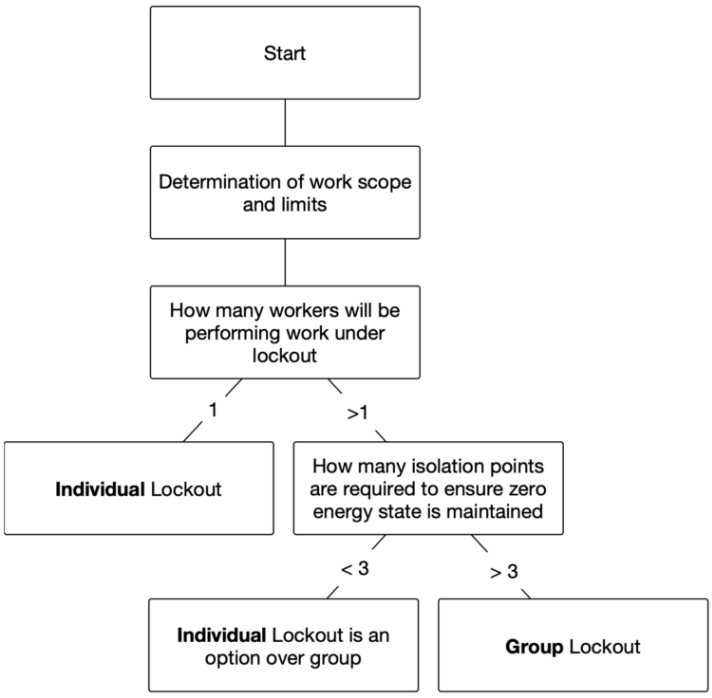
The tables indicate the ideal number of locks and hardware used.

For Individual LOTO, note as the number of people and isolation points really starts to increase, it becomes impractical to stay in the individual lockout process.

Group, on the other hand, doesn't handle the smaller situations of only a few people and isolation points very well.

Some companies will leave it up to the field workers to decide when they will shift from individual lockout to group lockout. Check with your company program for this information.

In general, many situations where there is more than one worker and more than one isolation point, often transition to group lockout around 3 isolation points. Not always, but it's a common number in many programs.



Using the previous table, there is small set of options which can allow for either individual or group lockout to be performed with similar lock requirements.

When choosing, be mindful of the weight of the locks on the lockout device and damage to equipment or machine.

Whether individual or group LOTO - EVERY WORKER MUST BE PROTECTED

10.1.4 – Review of Individual LOTO

Review of Individual Lockout

- performed by individual worker
- requires locks to have personal tag completed with requirements of CSA Z460 and potentially some company-specific requirements
- Name
    - Employer
    - Date of disconnection
    - Reason for disconnection

    and if the company requires

    - any company-specific information required (phone, ID, Photo, etc)
- has little paperwork beyond tag and hazard assessments
- can require workers to use more than one lock within limits

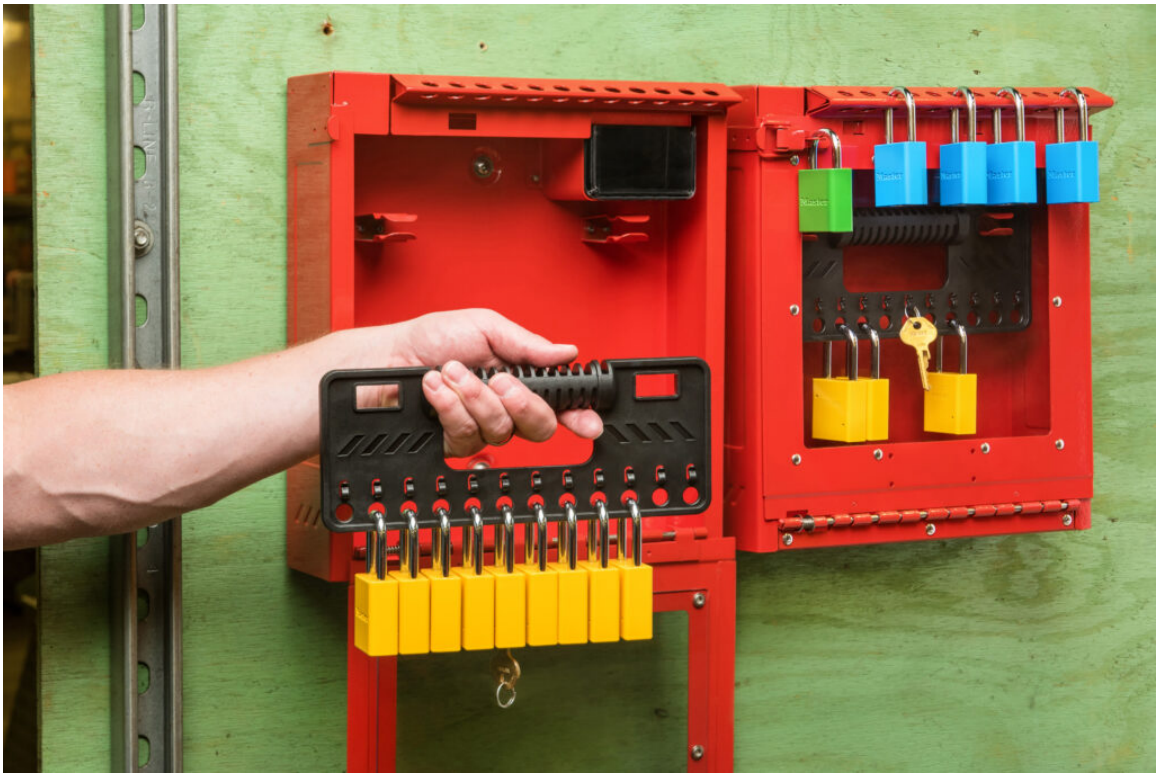
- each lock can only have ONE key
- YOU remain in control of each lock's key at all times
- your individual lock CAN NOT be left behind if you are not there working on the system
- several 'individual' workers can work together with each worker remaining independently in individual lockout

10.2 – GROUP LOTO

10.2.1 – Group LOTO Equipment

Group LOTO commonly uses the following extra equipment:

• Lock box (either wall mount or portable)
• Group or Company locks with tags
• Permit (paper document with details of locked out equipment
• for multi-shift work may include a worker sign on/off form



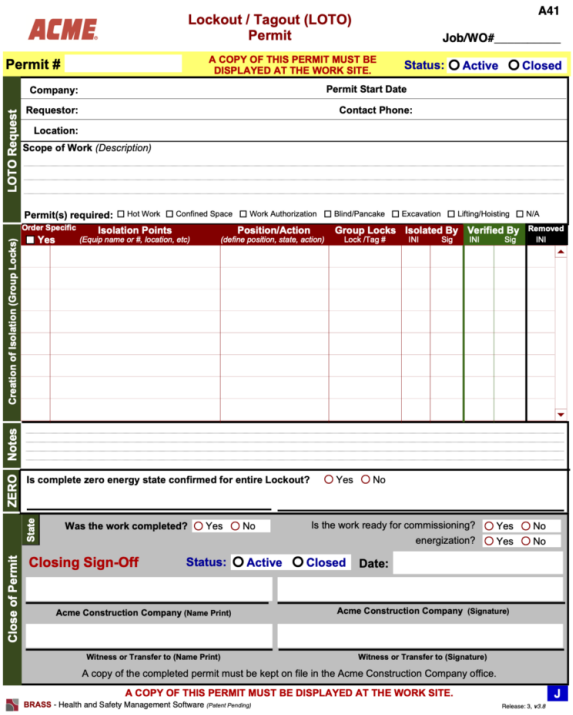
In this image, the 'group' locks are yellow. NOTE that they have only a single key. Keyed-alike locks can be allowed in a LOTO program, but ONLY under the condition, there is still ONLY ONE key for all of them.

Note there is a green Supervisor lock, and blue Individual locks on the second box shown.

A portable lock box - common in construction or mobile service groups.

Example **permit** which may be used to identify and record actions to set up and administer group lockout.

Worker Sign on and off form for multi-shift group lockouts where worker presence on the lockout is monitored. This sheet also clearly identifies associated permit and lock box numbers to tie them together.


A41

ACME

Lockout / Tagout (LOTO) Permit

Job/WO#_____

Permit # | A COPY OF THIS PERMIT MUST BE DISPLAYED AT THE WORK SITE. | Status: O Active O Closed

LOTO Request

Company: | Permit Start Date

Requestor: | Contact Phone:

Location:

Scope of Work (Description)

Permit(s) required: ☐ Hot Work ☐ Confined Space ☐ Work Authorization ☐ Blind/Pancake ☐ Excavation ☐ Lifting/Hoisting ☐ N/A

Creation of Isolation (Group Locks)

Order Specific ■ Yes	Isolation Points (Equip name or #, location, etc)	Position/Action (define position, state, action)	Group Locks Lock /Tag #	Isolated By INI	Sig	Verified By INI	Sig	Removed INI

Notes

ZERO

Is complete zero energy state confirmed for entire Lockout? O Yes O No

Close of Permit

State

Was the work completed? O Yes O No | Is the work ready for commissioning? O Yes O No | energization? O Yes O No

Closing Sign-Off | Status: O Active O Closed | Date:

Acme Construction Company (Name Print) | Acme Construction Company (Signature)

Witness or Transfer to (Name Print) | Witness or Transfer to (Signature)

A copy of the completed permit must be kept on file in the Acme Construction Company office.

A COPY OF THIS PERMIT MUST BE DISPLAYED AT THE WORK SITE.

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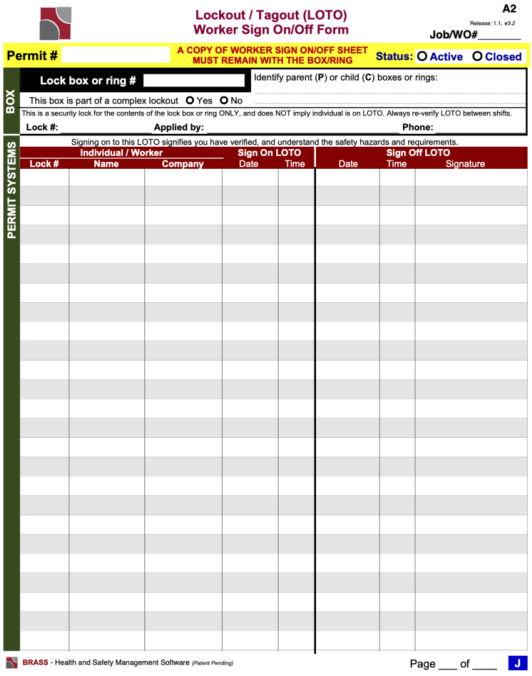
A2

Lockout / Tagout (LOTO) Worker Sign On/Off Form

Job/WO#_____

Permit # | A COPY OF WORKER SIGN ON/OFF SHEET MUST REMAIN WITH THE BOX/RING | Status: O Active O Closed

BOX

Lock box or ring # | Identify parent (P) or child (C) boxes or rings:

This box is part of a complex lockout O Yes O No

This is a security lock for the contents of the lock box or ring ONLY, and does NOT imply individual is on LOTO. Always re-verify LOTO between shifts.

Lock #: | Applied by: | Phone:

PERMIT SYSTEMS

Signing on to this LOTO signifies you have verified, and understand the safety hazards and requirements.

Individual / Worker Lock #	Name	Company	Sign On LOTO Date	Time	Sign Off LOTO Date	Time	Signature

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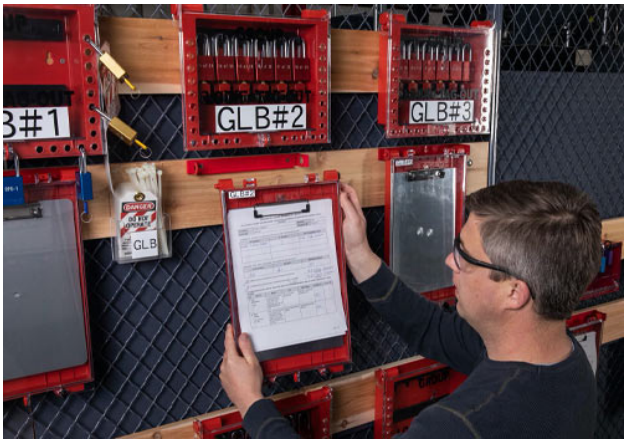
10.2.2 – Group LOTO Tags

All locks involved in a lockout require a tag. Group locks also require a tag but their requirements are simple but vary between companies.



Most companies require the following in their **GROUP TAGS** using a permit system:

- **Company Name**
- **Permit Number**
- **Phone number** usually for either the main corporate office or a specific number for the job or project (so that someone can be reached in the event of questions or emergencies)

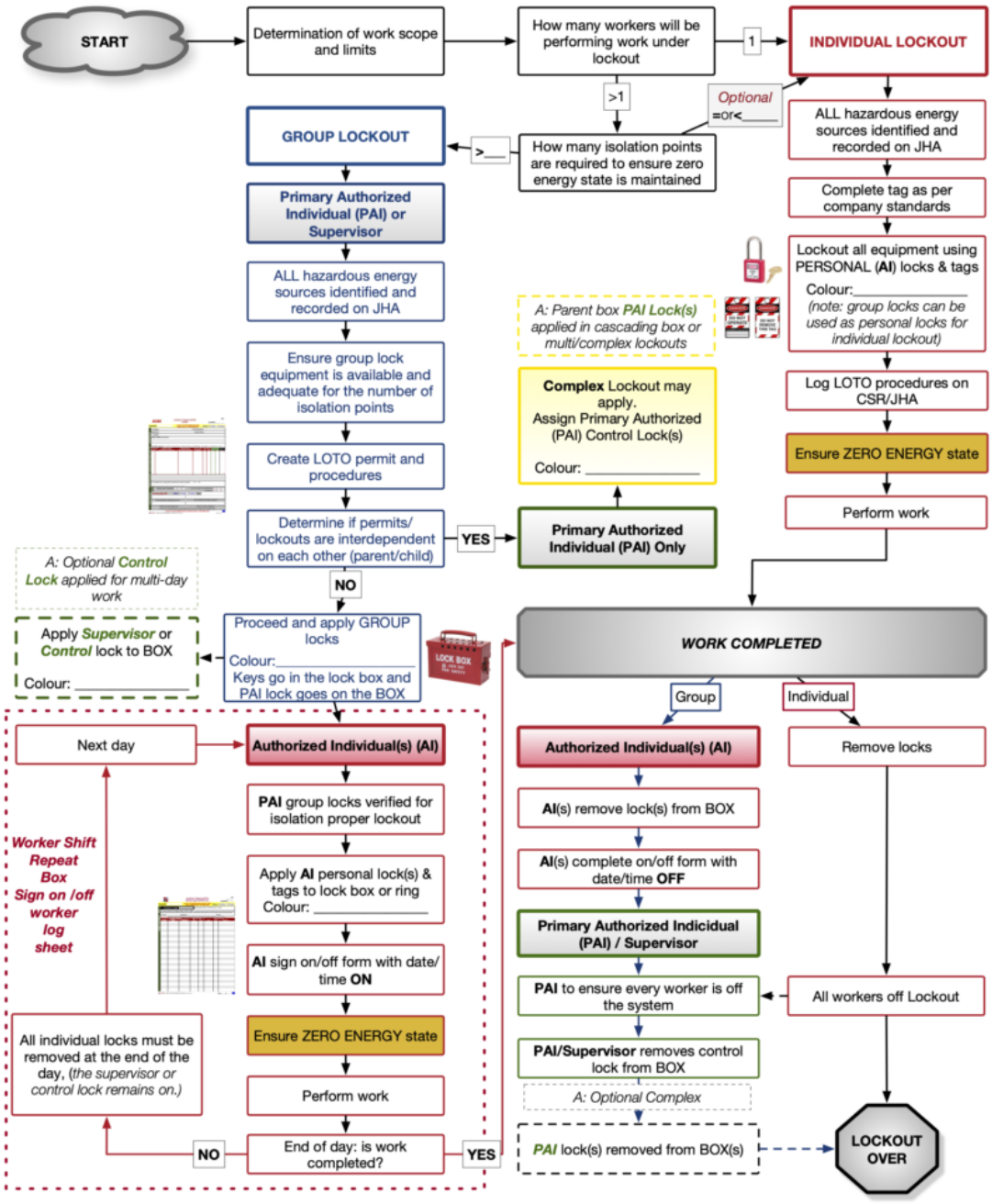
10.2.3 – Group LOTO Process

The flowchart below combines the overall LOTO process and the decision plan for individual vs group LOTO. This chart is based on the following colour scheme for a companies program:

RED = Individual
BLUE = Group or Company
GREEN = Supervisor
YELLOW = Complex Lockout

In a GROUP lockout, the Primary Authorized Individual (PAI) usually develops and creates the LOTO permit and schema, oversees the application of group locks (and may participate), puts all group lock keys in the lock box, creates a worker sign-on/off sheet if needed, and may apply a supervisor lock to the lockbox if a multi-shift task.

When work is completed, all workers must come off the system and it is verified safe to energize, PAI takes the supervisory lock off the lock box and allows access to group keys to remove all equipment locks and the lockout is over.


START
Determination of work scope and limits
How many workers will be performing work under lockout
1
INDIVIDUAL LOCKOUT
>1
Optional =or<____
GROUP LOCKOUT
>___
How many isolation points are required to ensure zero energy state is maintained
ALL hazardous energy sources identified and recorded on JHA
Complete tag as per company standards
Primary Authorized Individual (PAI) or Supervisor
Lockout all equipment using PERSONAL (AI) locks & tags
Colour:____
(note: group locks can be used as personal locks for individual lockout)
ALL hazardous energy sources identified and recorded on JHA
A: Parent box PAI Lock(s) applied in cascading box or multi/complex lockouts
Ensure group lock equipment is available and adequate for the number of isolation points
Complex Lockout may apply.
Assign Primary Authorized (PAI) Control Lock(s)
Colour: _____
Log LOTO procedures on CSR/JHA
Create LOTO permit and procedures
Ensure ZERO ENERGY state
Determine if permits/ lockouts are interdependent on each other (parent/child)
YES
Primary Authorized Individual (PAI) Only
Perform work
A: Optional Control Lock applied for multi-day work
NO
Apply Supervisor or Control lock to BOX
Colour: _____
Proceed and apply GROUP locks
Colour:_____
Keys go in the lock box and PAI lock goes on the BOX
WORK COMPLETED
Group
Individual
Next day
Authorized Individual(s) (AI)
Authorized Individual(s) (AI)
Remove locks
PAI group locks verified for isolation proper lockout
AI(s) remove lock(s) from BOX
Worker Shift Repeat Box Sign on /off worker log sheet
Apply AI personal lock(s) & tags to lock box or ring
Colour: _____
AI(s) complete on/off form with date/time OFF
Primary Authorized Indicidual (PAI) / Supervisor
AI sign on/off form with date/ time ON
PAI to ensure every worker is off the system
All workers off Lockout
Ensure ZERO ENERGY state
PAI/Supervisor removes control lock from BOX
All individual locks must be removed at the end of the day, (the supervisor or control lock remains on.)
Perform work
A: Optional Complex
NO
End of day: is work completed?
YES
PAI lock(s) removed from BOX(s)
LOCKOUT OVER

10.2.5 – Group LOTO Forms

Group LOTO often has a permit system with a defined life cycle:

- **1. Request (need identified)**
  - identifies the work scope that is to be accomplished
- **2. Create (determine and build isolation scheme)**
  - identify ALL potential hazards and risks to determine isolation points
- **3. Isolate (perform isolation)**
  - executes instructions on an isolation list (sometimes order-specific)
- **4. Verify (confirm isolation and zero energy state)**
  - cannot be performed by the ***original isolator***, confirm LOTO
- **5. Issue (permit is created and active)**
  - both isolator and verifier confirm LOTO following which PAI issues permit
- **6. Close (close of issued permit - work ended/stopped)**
  - after verifying safe to do so, permit is closed, locks are removed

There can be two forms in group lockout.
The primary form or permit, is the main document that includes all the details of what, where, and how isolation points are locked out.

The permit is often referenced by workers to ensure they understand exactly what has been isolation to ensure they are working on the equipment in a safe state. This can include but is not limited to:
• Address of facility
• Primary Authorized Individual name and contact number
• Information about interconnected requirements (permits)
• Details about the isolation points and states
• Comments if applicable
• Primary Authorized Individual verification of **OVERALL** zero energy state.

Below are some examples of the forms. In the next section, there is an example of how they could be completed.

10.2.5.1 – The Permit

Below is a sample completed permit. Some items have been colour-coded to help you appreciate what goes where.

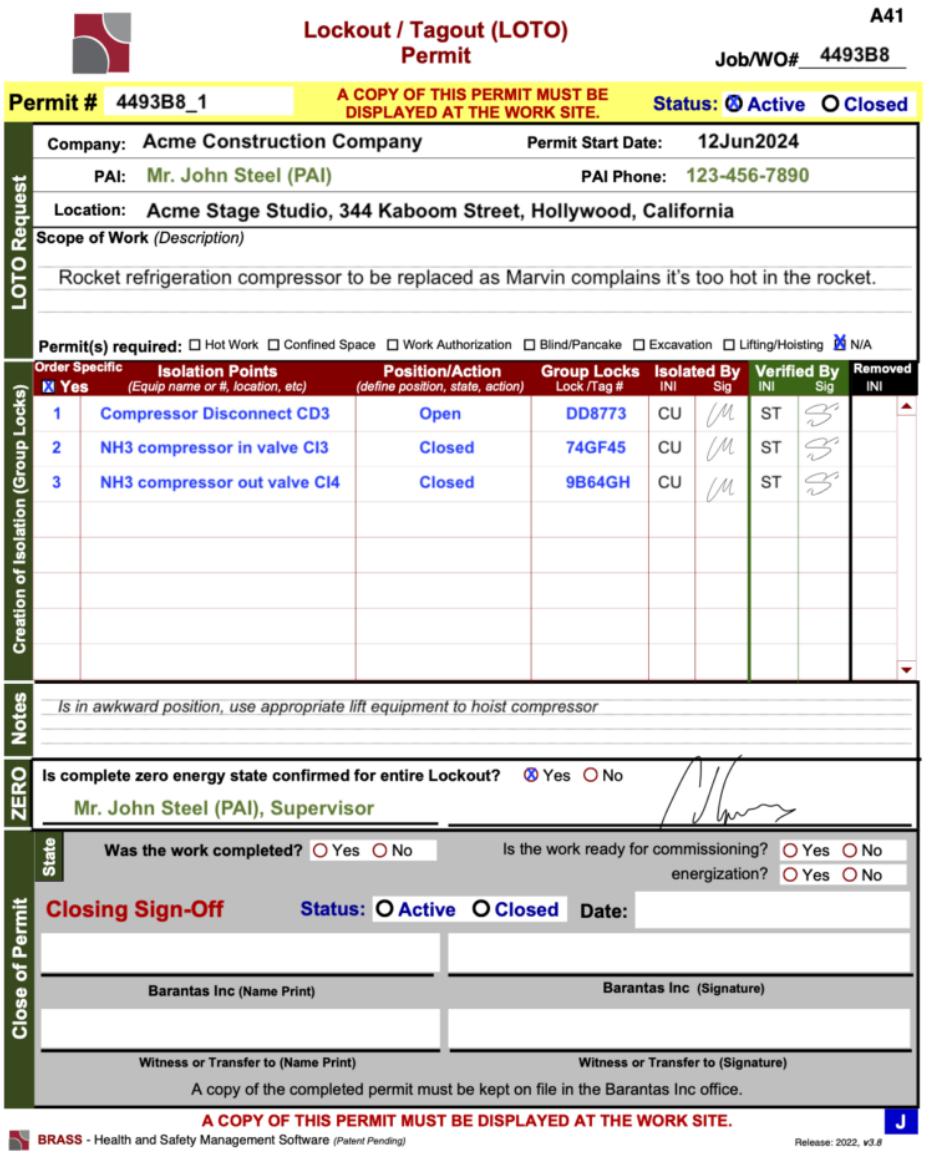
• Primary Authorized Individuals and their associated hardware are colour coded GREEN

• Group locks are colour coded BLUE

Note this permit has three isolation points. An electrical feed to the compressor, and the in and out of the compressor refrigerant (NH3).

Two different workers applied the locks to the isolation points and verified the correct point and the state of the isolation before printing their initials and initializing.

N/A is checked for other permits as no other permits are connected to this one.



A41

Lockout / Tagout (LOTO) Permit

Job/WO# 4493B8

Permit # 4493B8_1 — A COPY OF THIS PERMIT MUST BE DISPLAYED AT THE WORK SITE. — **Status:** (X) Active ( ) Closed

LOTO Request

Company: Acme Construction Company — Permit Start Date: 12Jun2024

PAI: Mr. John Steel (PAI) — PAI Phone: 123-456-7890

Location: Acme Stage Studio, 344 Kaboom Street, Hollywood, California

Scope of Work *(Description)*

Rocket refrigeration compressor to be replaced as Marvin complains it's too hot in the rocket.

Permit(s) required: ☐ Hot Work ☐ Confined Space ☐ Work Authorization ☐ Blind/Pancake ☐ Excavation ☐ Lifting/Hoisting ☒ N/A

Creation of Isolation (Group Locks)

Order Specific (X) Yes	Isolation Points (Equip name or #, location, etc)	Position/Action (define position, state, action)	Group Locks Lock /Tag #	Isolated By INI	Isolated By Sig	Verified By INI	Verified By Sig	Removed INI
1	Compressor Disconnect CD3	Open	DD8773	CU		ST		
2	NH3 compressor in valve CI3	Closed	74GF45	CU		ST		
3	NH3 compressor out valve CI4	Closed	9B64GH	CU		ST		

Notes

Is in awkward position, use appropriate lift equipment to hoist compressor

ZERO

Is complete zero energy state confirmed for entire Lockout? (X) Yes ( ) No

Mr. John Steel (PAI), Supervisor

Close of Permit

State

Was the work completed? ( ) Yes ( ) No — Is the work ready for commissioning? ( ) Yes ( ) No — energization? ( ) Yes ( ) No

Closing Sign-Off — Status: ( ) Active ( ) Closed — Date:

Barantas Inc (Name Print) — Barantas Inc (Signature)

Witness or Transfer to (Name Print) — Witness or Transfer to (Signature)

A copy of the completed permit must be kept on file in the Barantas Inc office.

A COPY OF THIS PERMIT MUST BE DISPLAYED AT THE WORK SITE. J

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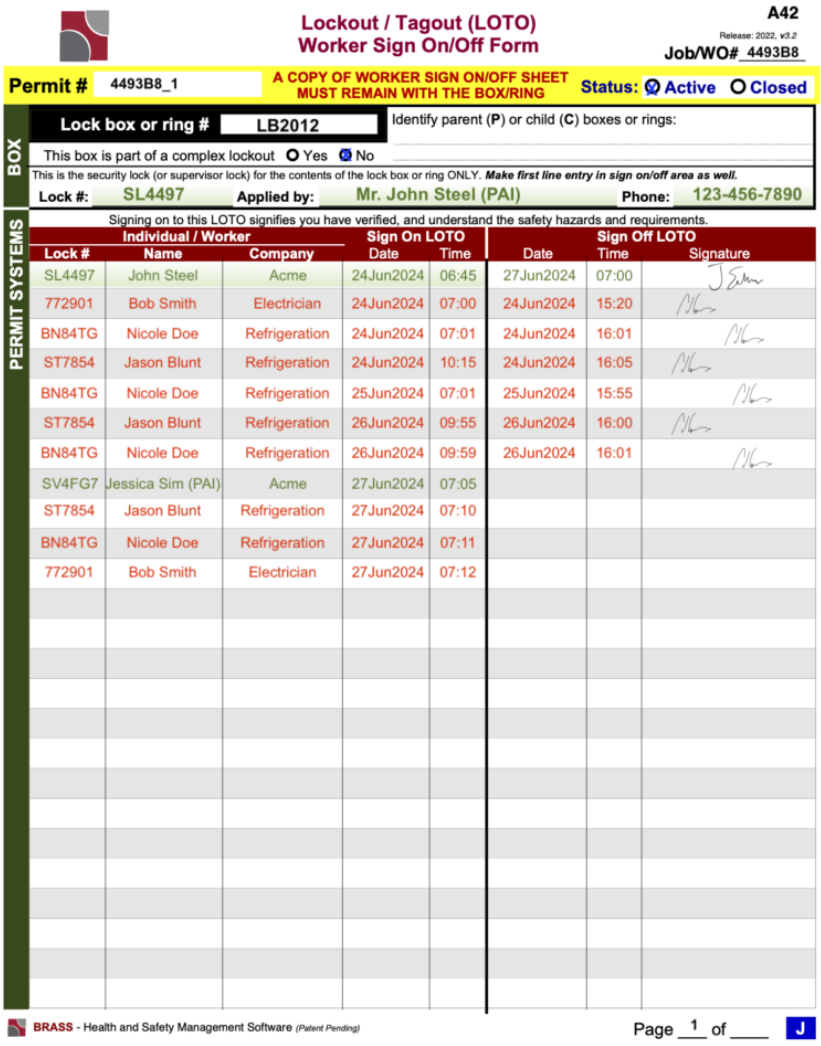
10.2.5.2 – The Work Log Sheet

A worker sign-on and off form is also part of this permit shown below.

There are several key things being demonstrated in this example.

- Note that the PAI supervisor lock (green) is added at the start of the lockout to both the initial field, as well as the first line entry on the sign-on/off below.
- Workers are coloured RED
- On day 4 (27th), we have a change of PAI (supervisor).
- Note the time the locks are exchanged. The NEW lock goes on BEFORE the OLD lock comes OFF.
- Currently on day 4 all workers are working on the system at the time we are looking at the sheet.



Lockout / Tagout (LOTO)
Worker Sign On/Off Form

A42
Release: 2022, v3.2
Job/WO# 4493B8

Permit # 4493B8_1 — A COPY OF WORKER SIGN ON/OFF SHEET MUST REMAIN WITH THE BOX/RING — Status: (•) Active ( ) Closed

BOX

Lock box or ring # LB2012 — Identify parent (P) or child (C) boxes or rings:

This box is part of a complex lockout ( ) Yes (•) No

This is the security lock (or supervisor lock) for the contents of the lock box or ring ONLY. *Make first line entry in sign on/off area as well.*

Lock #: SL4497 Applied by: Mr. John Steel (PAI) Phone: 123-456-7890

PERMIT SYSTEMS

Signing on to this LOTO signifies you have verified, and understand the safety hazards and requirements.

Individual / Worker			Sign On LOTO		Sign Off LOTO		
Lock #	Name	Company	Date	Time	Date	Time	Signature
SL4497	John Steel	Acme	24Jun2024	06:45	27Jun2024	07:00	
772901	Bob Smith	Electrician	24Jun2024	07:00	24Jun2024	15:20	
BN84TG	Nicole Doe	Refrigeration	24Jun2024	07:01	24Jun2024	16:01	
ST7854	Jason Blunt	Refrigeration	24Jun2024	10:15	24Jun2024	16:05	
BN84TG	Nicole Doe	Refrigeration	25Jun2024	07:01	25Jun2024	15:55	
ST7854	Jason Blunt	Refrigeration	26Jun2024	09:55	26Jun2024	16:00	
BN84TG	Nicole Doe	Refrigeration	26Jun2024	09:59	26Jun2024	16:01	
SV4FG7	Jessica Sim (PAI)	Acme	27Jun2024	07:05			
ST7854	Jason Blunt	Refrigeration	27Jun2024	07:10			
BN84TG	Nicole Doe	Refrigeration	27Jun2024	07:11			
772901	Bob Smith	Electrician	27Jun2024	07:12			

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Page 1 of ____ J

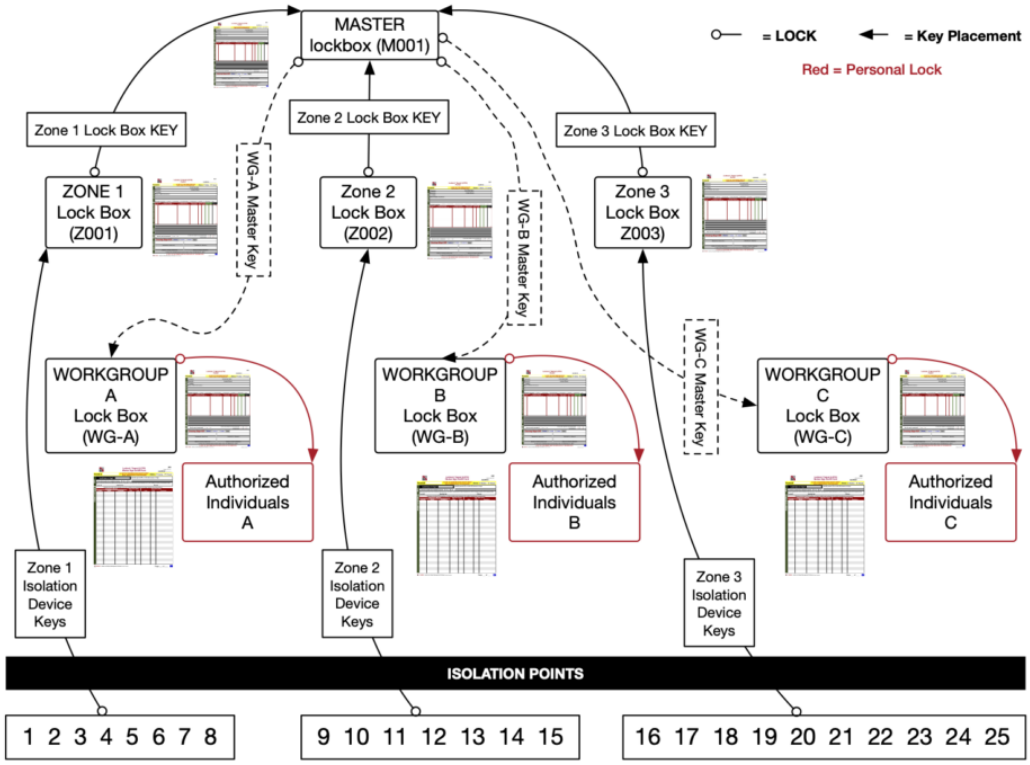
10.3 – COMPLEX LOTO

10.3.1 – Complex LOTO Overview

Complex LOTO is not detailed in this course.

Most of the time, companies that require complex lockouts hire specific persons or assign people trained and competent in complex lockouts to manage and oversee the entire Complex Schema. As a result, it is not covered in this course but we'll show you a basic overview of a simple one.

There are no test questions on complex lockout.



11.0 – ABNORMAL SITUATIONS

11.1 – What causes abnormal lock removal conditions

Sometimes a situation arises where the lock is required to come off but the key is not present. There are two primary cases when this happens:

1. **The key has been lost.**
2. **An error is made and a lock is left behind (worker or trade)**

When this happens the process has to start to 'cut the lock'.

This process is designed to take some time on purpose, companies don't want to cut locks.

The process is:

- **1. Most commonly performed when**
  - Worker/Trade leaves lock behind and is not present
  - Key is lost
- **2. Designed to require two persons to verify safe for removal**
  - identify ALL potential hazards and risks to determine isolation points
- **3. Isolate (perform isolation)**
  - executes instructions on isolation list (sometimes order specific)
- **4. Verify (confirm isolation and zero energy state)**
  - cannot be performed by ***original isolator***, confirm LOTO
- **5. Issue (permit is created and active)**
  - both isolator and verifier confirm LOTO following which PAI issues permit
- **6. Close (close of issued permit - work ended/stopped)**
  - after verifying safe to do so, permit is closed, locks are removed

11.2 – The Lost Key Procedure

Sometimes a situation arises where the lock is required to come off but the key is not present. There are two primary cases when this happens:

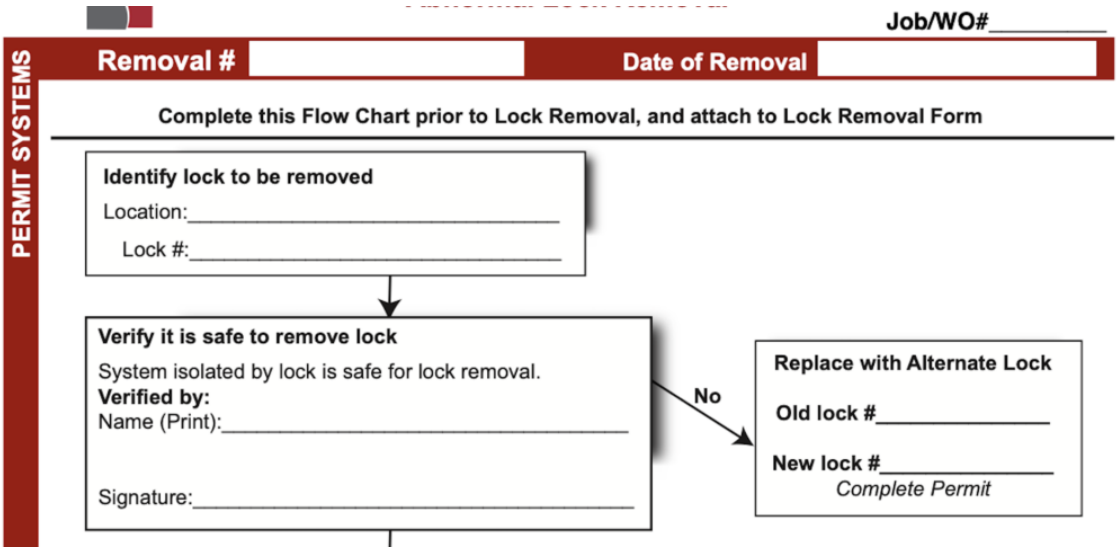
1. **The key has been lost.**
2. **An error is made and a lock is left behind (worker or trade)**

When this happens the process has to start to 'cut the lock'.

This process is designed to take some time on purpose, companies don't want to cut locks.

The process is:

- **1. Most commonly performed when**
  - Worker/Trade leaves lock behind and is not present
  - Key is lost
- **2. Designed to require two persons to verify safe for removal**
  - identify ALL potential hazards and risks to determine isolation points
- **3. Isolate (perform isolation)**
  - executes instructions on isolation list (sometimes order specific)
- **4. Verify (confirm isolation and zero energy state)**
  - cannot be performed by ***original isolator***, confirm LOTO
- **5. Issue (permit is created and active)**
  - both isolator and verifier confirm LOTO following which PAI issues permit
- **6. Close (close of issued permit - work ended/stopped)**
  - after verifying safe to do so, permit is closed, locks are removed



11.3 – Worker/Trade Forgotten Lock Procedure

FORGOTTEN LOCK (ERROR): Follow the flowchart all the way through allowing for at least a minimum of 60 minutes to respond to attempts to reach them (text, voicemail, emails, etc.) before proceeding down the flowchart to obtain alternate authorizations to cut the lock.

When cutting a worker/trade lock Supervisors SHALL:

• Obtain second authorization at or above their administrative level in the company from a person of authority for the task being performed

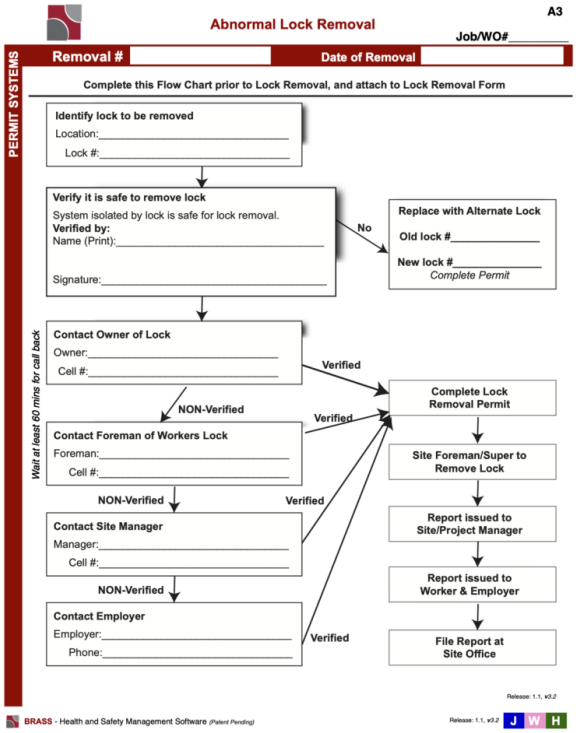
• Make every reasonable effort to contact the owner of the Lock. If it is a sub-trade or alternate company lock, please refer to the next section.
• If a trade lock, be sure to involve management in the process as it's a very political event to bridge the control boundary of another company's Lockout system.
• Complete permit after flowchart has been completed.

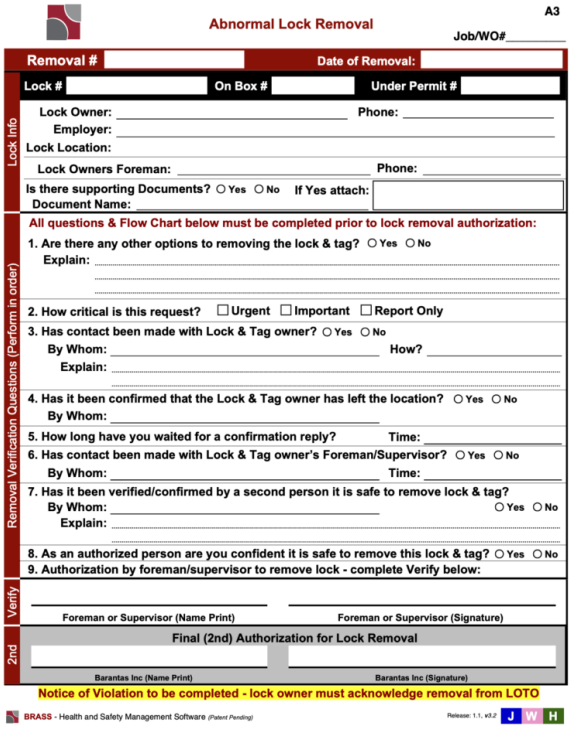
NOTE: on the form below the simple lock replacement section (lost key) has been blocked out as it cannot be used in this case.

11.4 – Forms and Requirements

The Two forms in their entirety are the procedure flowchart side, followed by the permit side. The permit includes much of the previous flowchart information, however has the formal sign off and authorization fields.

When cutting locks in either case:
• Save the lock and permits, they are legal documents and hardware and will be returned to the office
• If receiving phone authorization and the person is not present to sign, indicate the phone number calling from and to with the date and time in the signature field instead.





12.0 – EXAMPLES AND LEGAL IMPLICATIONS

12.1 – Challenges of Travelling Service Professionals

One of the challenges of a mobile service or repair person is what do you do when you cannot finish the job this visit or shift?

A very common problem, as parts might need to be ordered, or motors sent out to be rebuilt. In the meantime, you have a responsibility to leave the client's facility in a safe state, and this goes beyond simply telling them you're not finished.

Let's take the example of removing an electric 600v motor to be rebuilt. This will take 2 weeks before it is returned.

• Any fluid the pump might have been responsible for moving is likely isolated (in and out valves closed)
• The electrical feed to the motor (now just pigtails on the floor) is open with the Motor Control Centre (MCC) in the off position.

Before leaving you MUST:

- ensure any other person will not hurt or injury themselves
- have informed the client of the situation
- put written notifications in place indicating it's not operational
- put a physical barrier in place to prevent accidental operation or energization.

12.2 – The Requirement of ‘Leaving Equipment in safe state” Challenge

There are three primary components in showing you've done your due diligence in leaving it in a safe state:

- Tell the owner/manager it is not completed and unsafe to operate
- Place signs indicating that it is not safe to operate on all critical or key areas
- Put a physical barrier in place to prevent 'accidental' operation of equipment or re-energization.

Perform a risk assessment as to what would happen if a) a valve was opened, or b) the MCC was turned 'on'.

To protect from the electrical hazard, the CEC requires installations to be 'finger safe'. You could accomplish this in different ways:

1. Lock out the MCC preventing operation with either a facility lock (from facility) or by leaving a lock behind (less preferred); or
2. Remove the wires from inside the MCC on the load side such that any operation of the MCC will not transmit power to anything; or
3. At the pigtail end, secure wire ends in a junction box which is further secured in place. Wire nut and tape ends inside the box, and securely place cover on box (screwed down).

Options 2 and 3 do not require leaving any LOTO hardware behind and are often preferred for this reason.

12.3 – Due Diligence Explained

As repair or service professionals who frequent client facilities and must leave behind unfinished tasks, you're often challenged with keeping as much of your own LOTO hardware with you to go to the next client as possible. This means taking locks off, and leaving the 'situation' in a safe state.

Primary considerations when doing this:

- You have to prove you told them not to operate it
- You have to prove you put a sign saying do not operate it
- **AND you have to place some physical in a way that requires a tool, or another piece** of hardware, to enable the victim to be able to access or operate when you don't want them to and DEFEAT the item you have in place (eg. removing a fuse is not sufficient).

13.0 – REFERENCES

13.1 – Canadian & International References

- Occupational Health & Safety Act R.S.O. 1990, c.O.1 *(as amended)*
- Regulations for Construction Projects O. Reg 213/91 *(as amended)*
- Regulations for Industrial Establishments O. Reg 851 /90 *(as amended)*
- CSA - Z462 - Workplace Electrical Safety *(as amended)*
- CSA - Z460 - Control of hazardous energy - Lockout and other methods *(as amended)*
- CSA - Canadian Electrical Code (CEC), C22.1-09 *(as amended)*
- IEC 61010-1 (Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements). (International) *(as amended)*
- OSHA 29 CFR-1910, Subpart S (US) *(as amended)*
- NFPA 70,“The National Electrical Code” (NEC) (US) *(as amended)*

- NFPA 70E, Standard for Electrical Safety in the Workplace (US) *(as amended)*

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"Tell me and I forget, teach me and I may remember, involve me and I learn."

Benjamin Franklin

Barantas Inc. (Barantas) offers many of the essential programs that companies require to ensure their workers are working proactively to the best of their abilities and in a safe and healthy manner.

In many cases, Barantas will tailor programs to suit the clients' needs. Barantas has custom courses not listed in this catalogue, please call and inquire if a specialized course is required.

Several key components in our course offerings help differentiate us from other training providers. When looking for high quality training, and education programs, ask about the following:

- ✓ A full **employer certificate** complete with all the training information and identical to the training card for the worker
- ✓ **Security-enhanced** Records-of-Training (ROT) - make sure the top quality you have paid for is not fraudulently copied
- ✓ Legislation **compliant** certificates by course
- ✓ **Light, thin, wash-proof, and tear-proof cards**
- ✓ Easy call-in authentication of training cards issued
- ✓ Many NATIONALLY Standardized, adult-designed training programs

Barantas is striving to ensure your employees receive the highest quality training and education available in the country today.

Lockout / Tagout (LOTO) FLOWCHART

START

Determination of work scope and limits

How many workers will be performing work under lockout

1 → **INDIVIDUAL LOCKOUT**

>1

Optional =or<____

How many isolation points are required to ensure zero energy state is maintained

>____ → **GROUP LOCKOUT**

Primary Authorized Individual (PAI) or Supervisor

ALL hazardous energy sources identified and recorded on JHA

Ensure group lock equipment is available and adequate for the number of isolation points

Create LOTO permit and procedures

Determine if permits/ lockouts are interdependent on each other (parent/child)

YES → **Primary Authorized Individual (PAI) Only**

NO

*A: Optional **Control Lock** applied for multi-day work*

Apply ***Supervisor*** or ***Control*** lock to BOX

Colour: **YELLOW**

Proceed and apply GROUP locks

Colour:_____ **RED**

Keys go in the lock box and PAI lock goes on the BOX

Complex Lockout may apply.
Assign Primary Authorized (PAI) Control Lock(s)

Colour: _____

*A: Parent box **PAI Lock(s)** applied in cascading box or multi/complex lockouts*

ALL hazardous energy sources identified and recorded on JHA

Complete tag as per company standards

Lockout all equipment using PERSONAL (**AI**) locks & tags

Colour:_____

(note: group locks can be used as personal locks for individual lockout)

Log LOTO procedures on CSR/JHA

Ensure ZERO ENERGY state

Perform work

WORK COMPLETED

Group → **Authorized Individual(s) (AI)**

AI(s) remove lock(s) from BOX

AI(s) complete on/off form with date/time **OFF**

Primary Authorized Indicidual (PAI) / Supervisor

PAI to ensure every worker is off the system

PAI/Supervisor removes control lock from BOX

A: Optional Complex

PAI lock(s) removed from BOX(s) → **LOCKOUT OVER**

Individual → Remove locks → All workers off Lockout → **LOCKOUT OVER**

Next day → **Authorized Individual(s) (AI)**

PAI group locks verified for isolation proper lockout

Apply **AI** personal lock(s) & tags to lock box or ring

Colour: _____

AI sign on/off form with date/ time **ON**

Ensure ZERO ENERGY state

Perform work

End of day: is work completed?

NO

YES

All individual locks must be removed at the end of the day, (*the supervisor or control lock remains on.*)

Worker Shift Repeat Box Sign on /off worker log sheet

Lockout / Tagout (LOTO) GUIDELINES

= preferred

= can choose

= not recommended

Individual Lockout # of Locks

Number of Workers	Number of Disconnect Points					
	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	4	6	8	10	12
3	3	6	9	12	15	18
4	4	8	12	16	20	24
5	5	10	15	20	25	30
6	6	12	18	24	30	36

Group Lockout # of Locks

Number of Workers	Number of Disconnect Points					
	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

When to use

individual

or

group

lockout

ACME

Lockout / Tagout (LOTO) Permit

Job/WO#_____

Permit # | **A COPY OF THIS PERMIT MUST BE DISPLAYED AT THE WORK SITE.** | **Status:** ○ Active ○ Closed

LOTO Request

Company: | **Permit Start Date:**

PAI: | **PAI Phone:**

Location:

Scope of Work *(Description)*

Permit(s) required: ☐ Hot Work ☐ Confined Space ☐ Work Authorization ☐ Blind/Pancake ☐ Excavation ☐ Lifting/Hoisting ☐ N/A

Creation of Isolation (Group Locks)

Order Specific ☐ Yes	Isolation Points *(Equip name or #, location, etc)*	Position/Action *(define position, state, action)*	Group Locks Lock /Tag #	Isolated By INI	Isolated By Sig	Verified By INI	Verified By Sig	Removed INI

Notes

ZERO

Is complete zero energy state confirmed for entire Lockout? ○ Yes ○ No

Close of Permit

State

Was the work completed? ○ Yes ○ No

Is the work ready for commissioning? ○ Yes ○ No

energization? ○ Yes ○ No

Closing Sign-Off **Status:** ○ Active ○ Closed **Date:**

Acme Construction Company (Name Print) | **Acme Construction Company** (Signature)

Witness or Transfer to (Name Print) | **Witness or Transfer to** (Signature)

A copy of the completed permit must be kept on file in the Acme Construction Company office.

A COPY OF THIS PERMIT MUST BE DISPLAYED AT THE WORK SITE.

ACME

Lockout / Tagout (LOTO) Extra Isolation Points (Paper Records)

Release: 3, *v3.5*

Job/WO#_____

PERMIT SYSTEMS - LOTO ISOLATION POINT LISTING

Permit # _____ **THIS COPY OF ISOLATION POINTS MUST REMAIN WITH THE PERMIT** **Status:** ○ Active ○ Closed

Order #	Isolation Points *(Equip name or #, location, etc)*	Position/Action *(define position, state, action)*	Group Locks Lock /Tag #	Isolated By INI	Isolated By Sig	Verified By INI	Verified By Sig	Removed INI

ACME

Lockout / Tagout (LOTO) Worker Sign On/Off Form

Release: 3, *v3.2*

Job/WO#_____

Permit # _____ **A COPY OF WORKER SIGN ON/OFF SHEET MUST REMAIN WITH THE BOX/RING** **Status:** ○ Active ○ Closed

BOX

Lock box or ring # _____

Identify parent (**P**) or child (**C**) boxes or rings: _____

This box is part of a complex lockout ○ Yes ○ No

This is the security lock (or supervisor lock) for the contents of the lock box or ring ONLY. ***Make first line entry in sign on/off area as well.***

Lock #: _____ **Applied by:** _____ **Phone:** _____

PERMIT SYSTEMS

Signing on to this LOTO signifies you have verified, and understand the safety hazards and requirements.

Individual / Worker			Sign On LOTO		Sign Off LOTO		
Lock #	Name	Company	Date	Time	Date	Time	Signature

ACME

Lockout / Tagout (LOTO) Permit

Job/WO#_____

Permit # _____ **A COPY OF THIS PERMIT MUST BE DISPLAYED AT THE WORK SITE.** **Status:** ○ Active ○ Closed

LOTO Request

Company: **Permit Start Date:**

PAI: **PAI Phone:**

Location:

Scope of Work *(Description)*

Permit(s) required: ☐ Hot Work ☐ Confined Space ☐ Work Authorization ☐ Blind/Pancake ☐ Excavation ☐ Lifting/Hoisting ☐ N/A

Definitions

Lock Colour Definitions: if defined this site uses specific lock colour codes defined below: ○ Not Used ○ Defined Colours

Authorized Individual: person who is qualified to engage in LOTO because of knowledge, training, and experience and has been assigned to engage in such control.
Primary authorized individual: a person assigned as the lead authorized individual under the group lockout process, to apply and coordinate removal of the lockout of a machine, piece of equipment, or process on which work will be performed.

Primary Authorized Individual: _____

Supervisor: _____ **Individual / Worker:** _____

Group / Company: _____ **Sub-contractor:** _____

Utility

Isolation Guarantee: if service isolation from a utility is required, the utility authority will issue an isolation guarantee number. The Authorized Person on this LOTO becomes the "HOLDER" of that Guarantee.

Company: _____ **Guarantee #** _____

Provided by: _____ **Contact Phone:** _____

Creation of Isolation (Group Locks)

Order Specific ☐ Yes	Isolation Points *(Equip name or #, location, etc)*	Position/Action *(define position, state, action)*	Group Locks Lock /Tag #	Isolated By INI	Isolated By Sig	Verified By INI	Verified By Sig	Removed INI

ZERO

Verification of Isolation: a level that is not harmful to any individual must be confirmed and verified. This must be done by an authorized person.

Zero Energy State Confirmed: ☐ Yes

Verified by: _____ **Signature:** _____

Box

Keys in box or ring # _____

Identify parent (**P**) or child (**C**) boxes or rings:

This box is part of a complex lockout ○ Yes ○ No

ACME

Lockout / Tagout (LOTO) Permit

Permit # _____

Release: 3, *v3.2* Job/WO#_____

Documents

Name of Document 1	Name of Document 2	Name of Document 3
Add Doc1 / Export Doc1	Add Doc2 / Export Doc2	Add Doc3 / Export Doc3

Issue

A hazard analysis has been performed, reviewed and is complete? ☐ Yes *(LOTO cannot be issued until completed.)*

Permit issued by Primary Authorized Individual: _____ **Phone:** _____

Primary Authorized Individual Signature: _____

Notes/Comments

State

WORK COMPLETION:

Was the work completed? ○ Yes ○ No

Is the work ready for commissioning? ○ Yes ○ No

Is the work ready for energization? ○ Yes ○ No

Close of Permit

Surrender of Isolation Guarantee: _____ **Holder Surrendered Date:** _____

Surrender Code *(if any):* _____ **Holder Surrendered Time:** _____

Surrendered by (Holder): _____

Closing Sign-Off

Status: ○ **Active** ○ **Closed** **Date:** _____

(Name Print)	(Signature)
Witness or Transfer to (Name Print)	**Witness or Transfer to (Signature)**

A copy of the completed permit must be kept on file in the Acme Construction Company office.

A COPY OF THIS PERMIT MUST BE DISPLAYED AT THE WORK SITE.

ACME

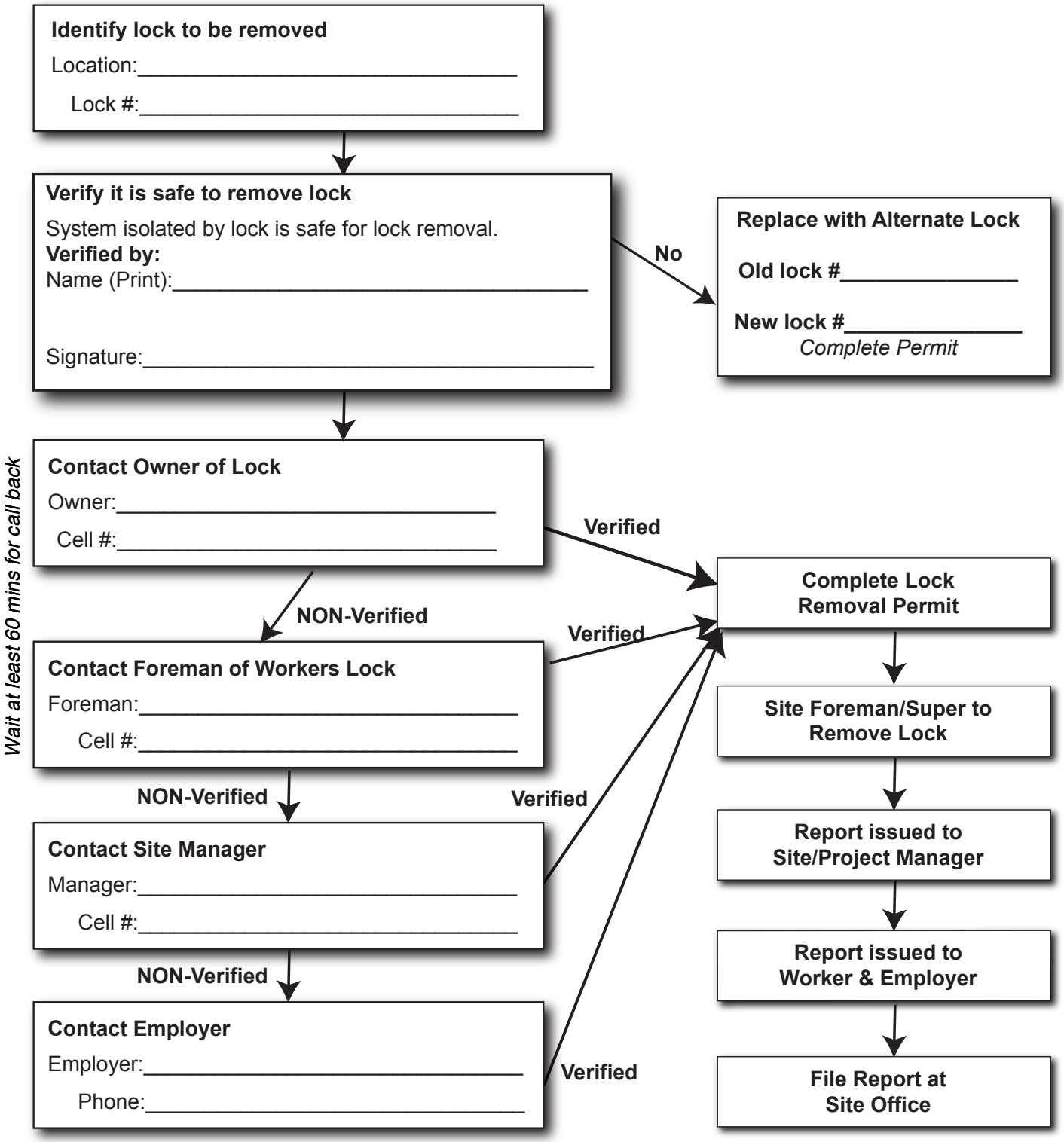
Abnormal Lock Removal

Job/WO#_____

PERMIT SYSTEMS

Removal # _____ **Date of Removal** _____

Complete this Flow Chart prior to Lock Removal, and attach to Lock Removal Form



Release: 3, *v3.2*

ACME

Abnormal Lock Removal

A43

Job/WO#_____

Removal # | **Date of Removal:**

Lock Info

Lock # | **On Box #** | **Under Permit #**

Lock Owner: _____ **Phone:** _____

Employer: _____

Lock Location:

Lock Owners Foreman: _____ **Phone:** _____

Is there supporting Documents? ○ Yes ○ No **If Yes attach:**

Document Name: _____

Removal Verification Questions (Perform in order)

All questions & Flow Chart below must be completed prior to lock removal authorization:

1. **Are there any other options to removing the lock & tag?** ○ Yes ○ No
   Explain: .....
2. **How critical is this request?** ☐ Urgent ☐ Important ☐ Report Only
3. **Has contact been made with Lock & Tag owner?** ○ Yes ○ No
   By Whom: _____ **How?** _____
   Explain: .....
4. **Has it been confirmed that the Lock & Tag owner has left the location?** ○ Yes ○ No
   By Whom: _____
5. **How long have you waited for a confirmation reply?** **Time:** _____
6. **Has contact been made with Lock & Tag owner's Foreman/Supervisor?** ○ Yes ○ No
   By Whom: _____ **Time:** _____
7. **Has it been verified/confirmed by a second person it is safe to remove lock & tag?**
   By Whom: _____ ○ Yes ○ No
   Explain: .....
8. **As an authorized person are you confident it is safe to remove this lock & tag?** ○ Yes ○ No
9. **Authorization by foreman/supervisor to remove lock - complete Verify below:**

Verify

_____ _____

Foreman or Supervisor (Name Print) **Foreman or Supervisor (Signature)**

2nd

Final (2nd) Authorization for Lock Removal

_____ _____

Acme Construction Company (Name Print) **Acme Construction Company (Signature)**

Notice of Violation to be completed - lock owner must acknowledge removal from LOTO