# Lockout Tagout

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**PDH:** 1

**Approved for:** AK, AL, AR, DE, FL, GA, IA, ID, IL, IN, KS, KY, LA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, SC, SD, TN, TX, UT, VA, VT, WI, WV, and WY

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# Module 1: Introduction

## Learning Objectives

By the end of this section, you will be able to:

- **Identify** the three primary conditions that lead to the unexpected release of hazardous energy.
- **Define** key technical terminology including "Kinetic," "Potential," "Electrical," and "Thermal" energy.
- **Evaluate** the distinction between "isolating/blocking" energy and "securing" points of control.

*Executive Summary:* Effective hazardous energy control requires a rigorous procedural approach and a deep commitment from management. Success depends on identifying all energy sources and understanding that danger arises only when energy is released in quantities exceeding human physiological tolerances.

## The Logic of Energy Control

The management of hazardous energy is not merely a physical task but a procedural solution. Maintenance and servicing involve inherent risks that can only be mitigated through structured logic.

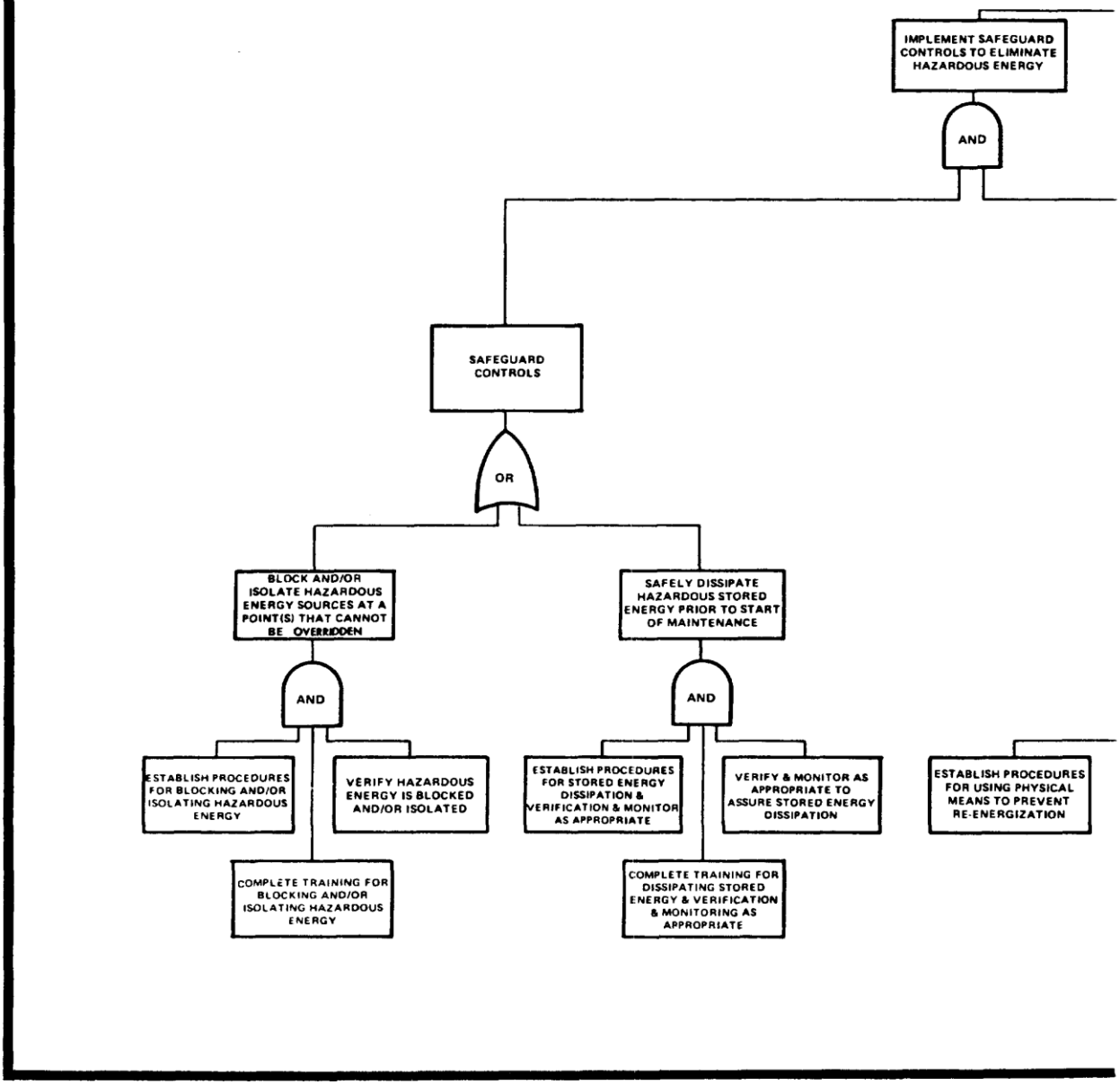
Unexpected energy release typically occurs due to:

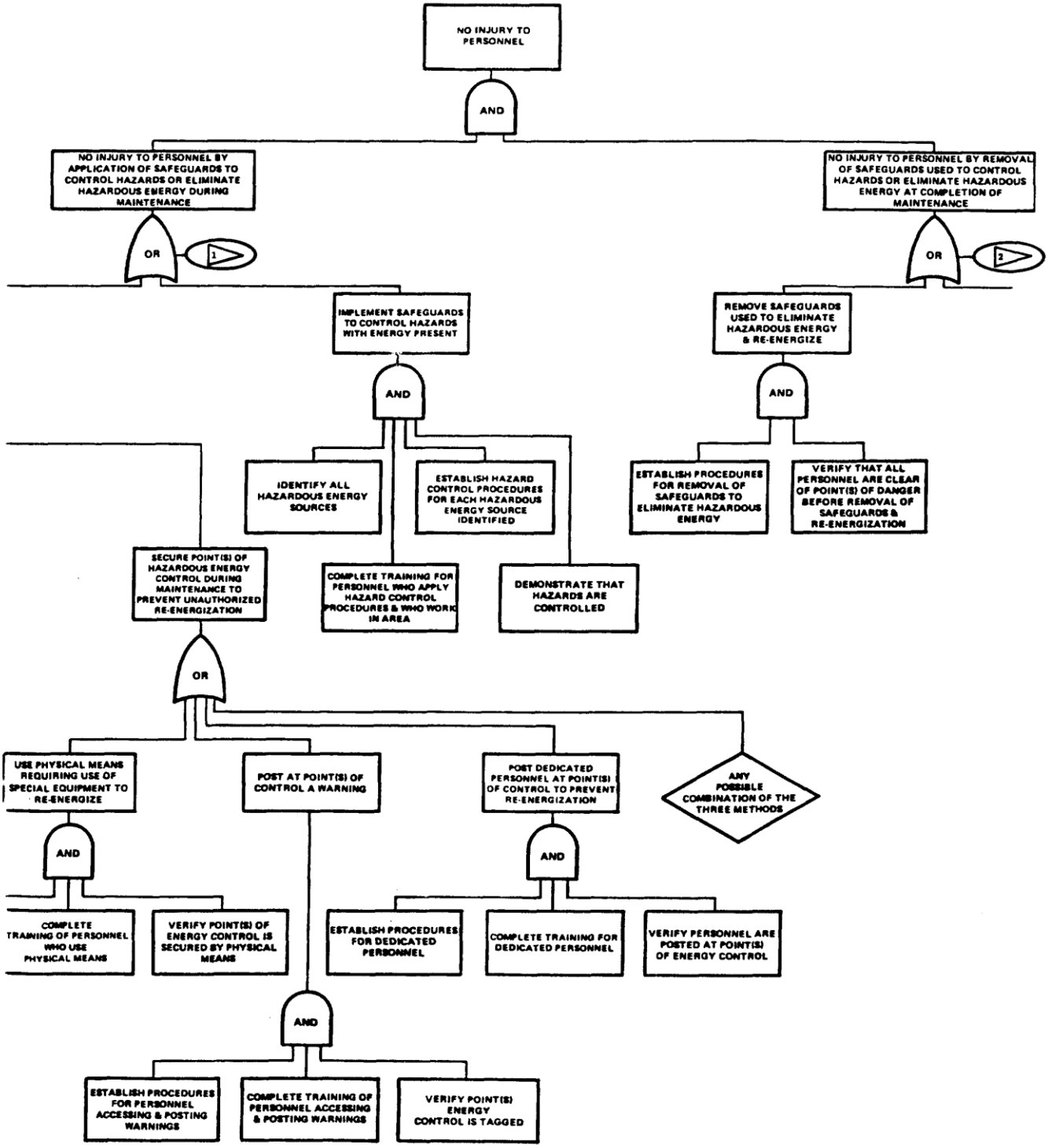
1. **Identification Failure:** All energy sources are not accounted for.
2. **Procedural Failure:** Safe work practices are not established for energized environments.
3. **Reactivation Failure:** Deactivated sources are accidentally or intentionally reactivated without the worker's knowledge.

# Management Commitment and Culture

A safety program's success is heavily influenced by the "intangible" factor of employee perception. If management does not demonstrate a firm commitment to safety rules, first-line supervisors and employees often become the "weak links" in the energy control chain.

Figure I. DIAGRAM FOR CONTROLLING HAZARDOUS ENERGY DURING MAINTENANCE AND SERVICING

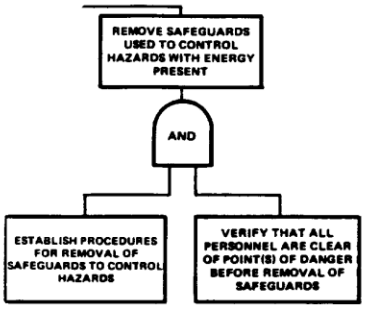




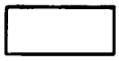
## Decision Criteria

1. IMPLEMENTATION OF SAFEGUARDS TO CONTROL HAZARDS WITH ENERGY PRESENT MAY BE CHOSEN INSTEAD OF HAZARDOUS ENERGY ELIMINATION BY DEVICES OR TECHNIQUES, WHEN IT CAN BE DEMONSTRATED THAT HAZARDS ARE CONTROLLED WITH ENERGY PRESENT BY:
   1. IDENTIFYING ALL HAZARDOUS ENERGY SOURCES AND HAZARDOUS RESIDUAL ENERGY, AND
   2. DOCUMENTING A PROCEDURE FOR AND DEMONSTRATING THAT THE PROCEDURE WILL CONTROL HAZARDS RESULTING FROM EACH HAZARDOUS ENERGY IDENTIFIED.

2. THE DECISION AT THIS POINT IS PREDETERMINED BY THE ORIGINAL OPTION CHOSEN IN 1.




## Legend



RECTANGLE SYMBOL – IDENTIFIES AN EVENT THAT RESULTS FROM THE COMBINATION OR EXCLUSION OF ACTIVITIES OR EVENTS.


AND GATE – DESCRIBES AN OPERATION WHEREBY CO-EXISTENCE OF ALL INPUTS ARE REQUIRED TO PRODUCE AN OUTPUT EVENTS.


OR GATE - DEFINES SITUATION WHEREBY AN OUTPUT EVENT WILL OCCUR IF ONE OF THE INPUTS EXIST.


DECISION GATE – EXCLUSIVE OR GATE WHICH FUNCTIONS AS AN OR GATE BUT PROVIDES A FOOTNOTED (▷ ) LIST OF DECISION CRITERIA ARE NOT SELF EVIDENT.

DIAMOND – DESCRIBES AN EVENT THAT IS CONSIDERED BASIC IN A GIVEN LOGIC SEQUENCE. EVENT IS NOT DEVELOPED FURTHER BECAUSE DEVELOPMENT IS OBVIOUS.

Technical Definitions & Classification

## Maintenance and Servicing

These tasks include inspection, repair, troubleshooting, and clearing jams. These activities do not officially commence on a new system until it becomes operational.

- **Inspection:** Testing against established standards to determine if an object is "complete" and functional.
- **Service:** Activities required to maintain efficiency, such as greasing, calibrating, and adjusting.

## Energy Classifications

For the purposes of this module, energy is categorized by its physical state:

1. **Kinetic Energy:** Energy of a body in motion.
2. **Potential Energy:** Energy due to position in a gravity field, pressure (pneumatic/hydraulic), or springs.
3. **Electrical Energy:** Generated power sources or static electricity.
4. **Thermal Energy:** Resulting from mechanical work, chemical reactions, or resistance.

## Control Concepts: Isolated vs. Blocked

While often used interchangeably, these terms have distinct engineering applications:

- **Isolate:** To "set apart." This is the correct term for **Electrical Energy**, which is disconnected.
- **Block:** To create an "obstruction." This is the correct term for **Gravitational Energy**, which requires a physical obstacle.

⚠️ **Safety Constraint: Securing** a point of control (using locks or tags) is a separate and distinct action from **isolating** or **blocking** the energy source itself. Both must occur for a system to be safe.

### The Dissipation of Energy

Dissipation is the process of reducing energy to levels tolerable by humans.

- **Mechanical:** Allowing inertia to bleed off (e.g., letting a flywheel come to rest).
- **Potential:** Reducing pressure to atmospheric levels or releasing spring tension.
- **Electrical:** Grounding a de-electrified circuit to prevent static buildup.
- **Thermal:** Allowing materials to cool/warm to between 4°C (39°F) and 45°C (113°F).

Purchase this course to see the remainder of the technical materials.