

CoHE: Integration of Control Measures on a Production Line

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Tekla A. Staley, CIH, CSP, CLSO



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How Do The Pieces Fit Together



Normal Production Operations

- **IF...** the activity is determined to be a minor tool change, minor servicing or an adjustment to the equipment, during normal production operations, while the equipment is powered,
- **AND...** these activities are routine, repetitive, and integral to the use of the equipment for normal production,
- **THEN...** the activity may be performed using alternative measures which provide effective protection from hazardous energy sources.

The activity is not subject to the requirements of 29 CFR 1910.147 (a)(2)(ii)

Maintenance

- Preventive, predictive or corrective maintenance and servicing are **NOT** normal production operations.
- Personnel may be exposed to unexpected startup or release of hazardous energy during the following activities:

Construction	Replacement	Modification
Installation	Major adjustment	Cleaning
Repair	Setup	Inspection
Lubrication	Unjamming	Tool Changes

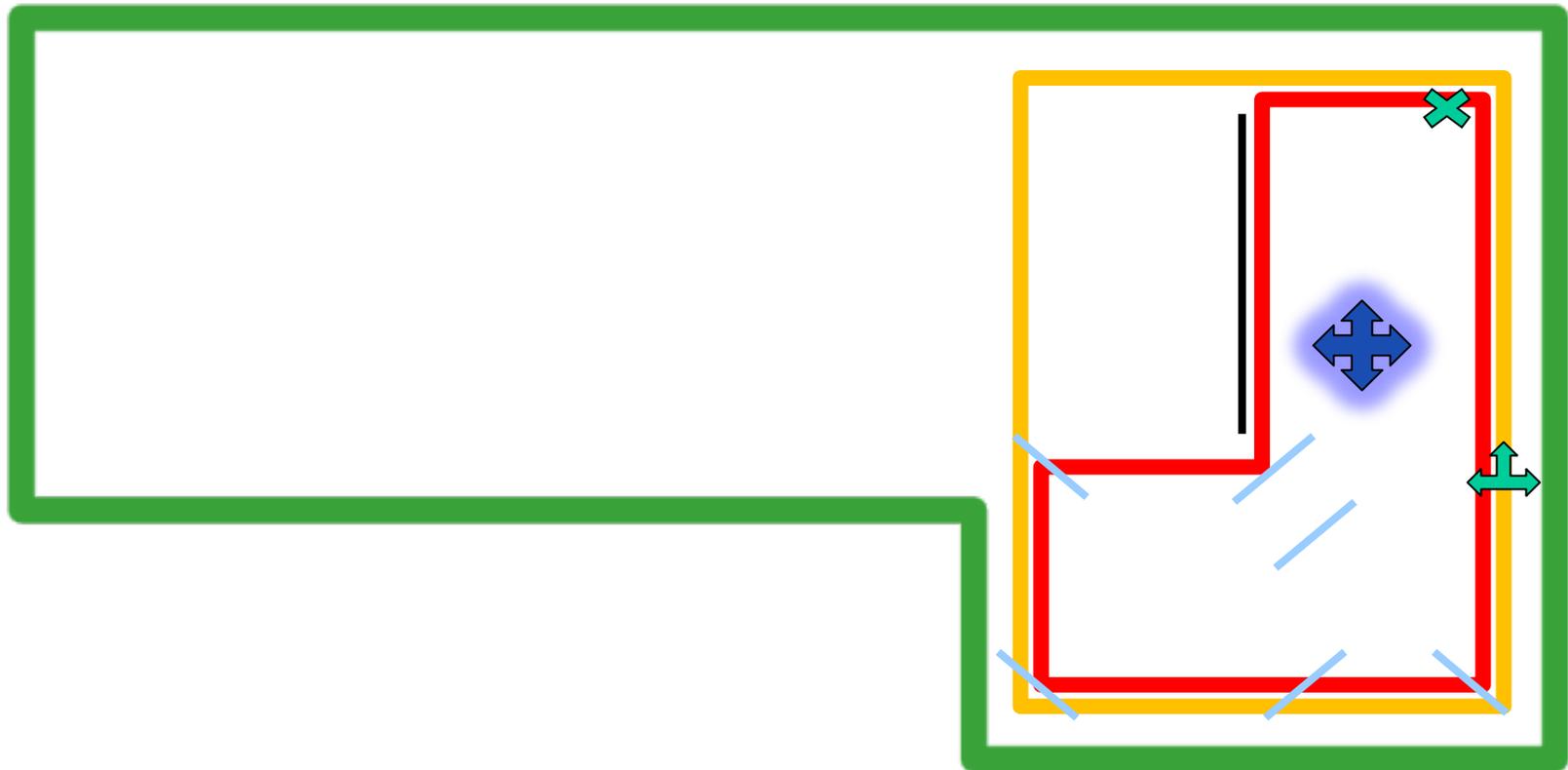
Don't Cross That Line



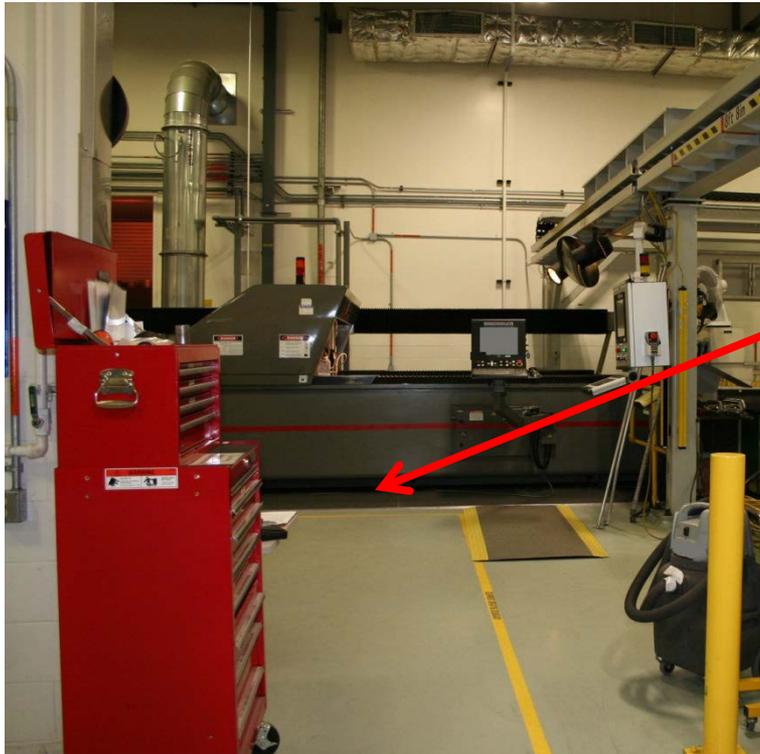
Equipment Operating Boundary



Features of a Watch Station



Design Safety Features



Pressure Sensitive Mats



Design Safety Features (cont.)

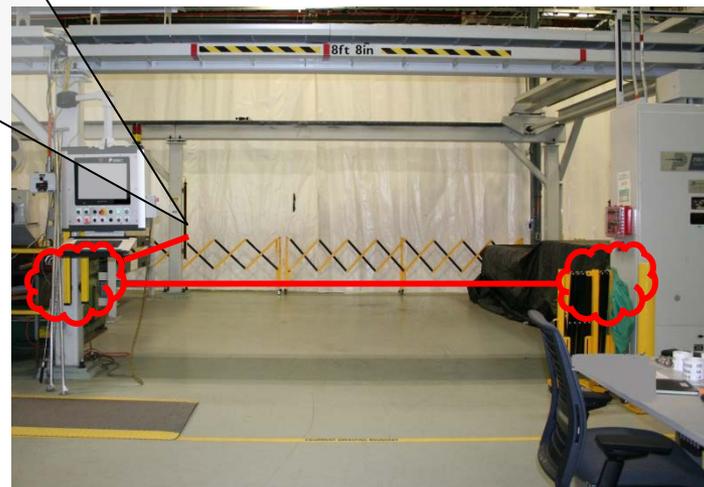
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Design Safety Features (cont.)

Light curtains are interlocked to equipment with mechanical motion.



Alternative Controls



Remote Pendant Control

Alternative Controls (cont.)



Moving the gantry as close to the resonator as possible so the only direction it can move is away from the technician.

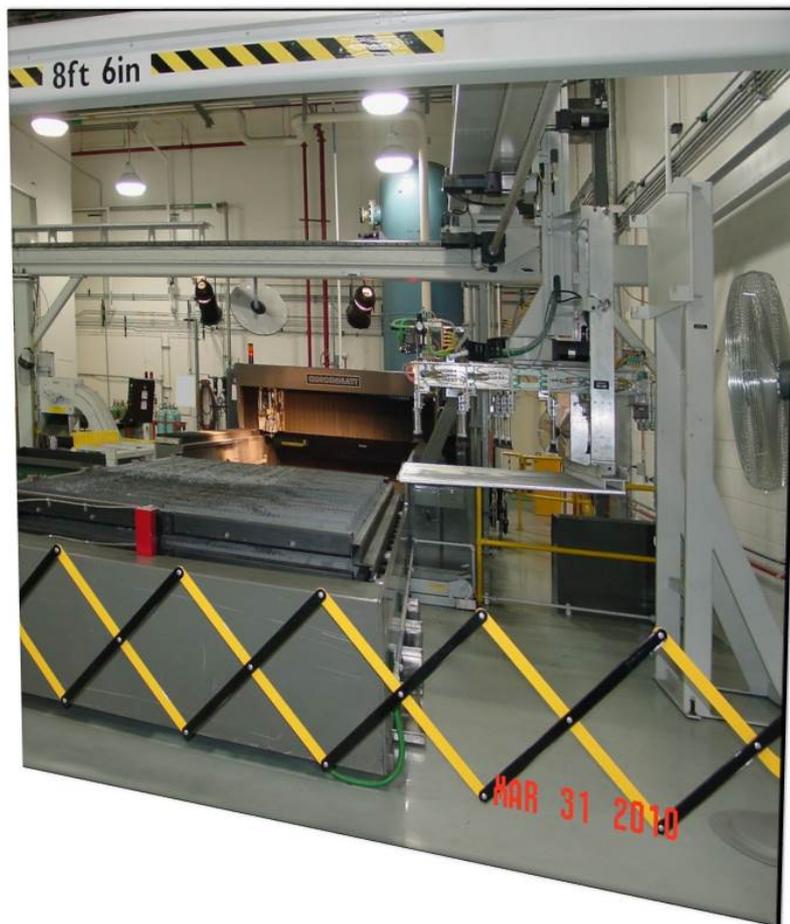
Alternative Controls (cont.)

A NOTE ON AIR GAPPING

- Does a hazard still exist if the production line is unmanned or shut down for an extended period? **YES**✓
- Why?
 - Hazardous energy sources still exist, they are not locked out, and the system is still available for use.
- Air gapping can be utilized to control those hazard during periods of extended non-use.
- What is air gapping?
 - This is an engineered break in the system for long term standby. It prevents operation of the system, isolating the hazards so that personnel can access the EOB/EOZ without controls.

Administrative Controls (cont.)

Portable,
expandable
fences.



Evaluate Your System

What to do when LOTO is not feasible . . .

Perform an ANSI Risk Assessment (ANSI B11.TR3.2000)

TASK	HAZARDS	CONSEQUENCE/ PROBABILITY	RISK LEVEL (unmitigated)	PROTECTIVE MEASURES (Alternate Methods)	RESIDUAL CONSEQUENCE/ PROBABILITY (after mitigation)	RESIDUAL RISK (mitigated)
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Consequence→ Probability of Occurrence↓	Catastrophic	Serious	Moderate	Minor
Very Likely	High	High	High	Medium
Likely	High	High	Medium	Low
Unlikely	Medium	Medium	Low	Low
Remote	Low	Low	Low	Low

Are you/is your management willing to accept the residual risk?

