

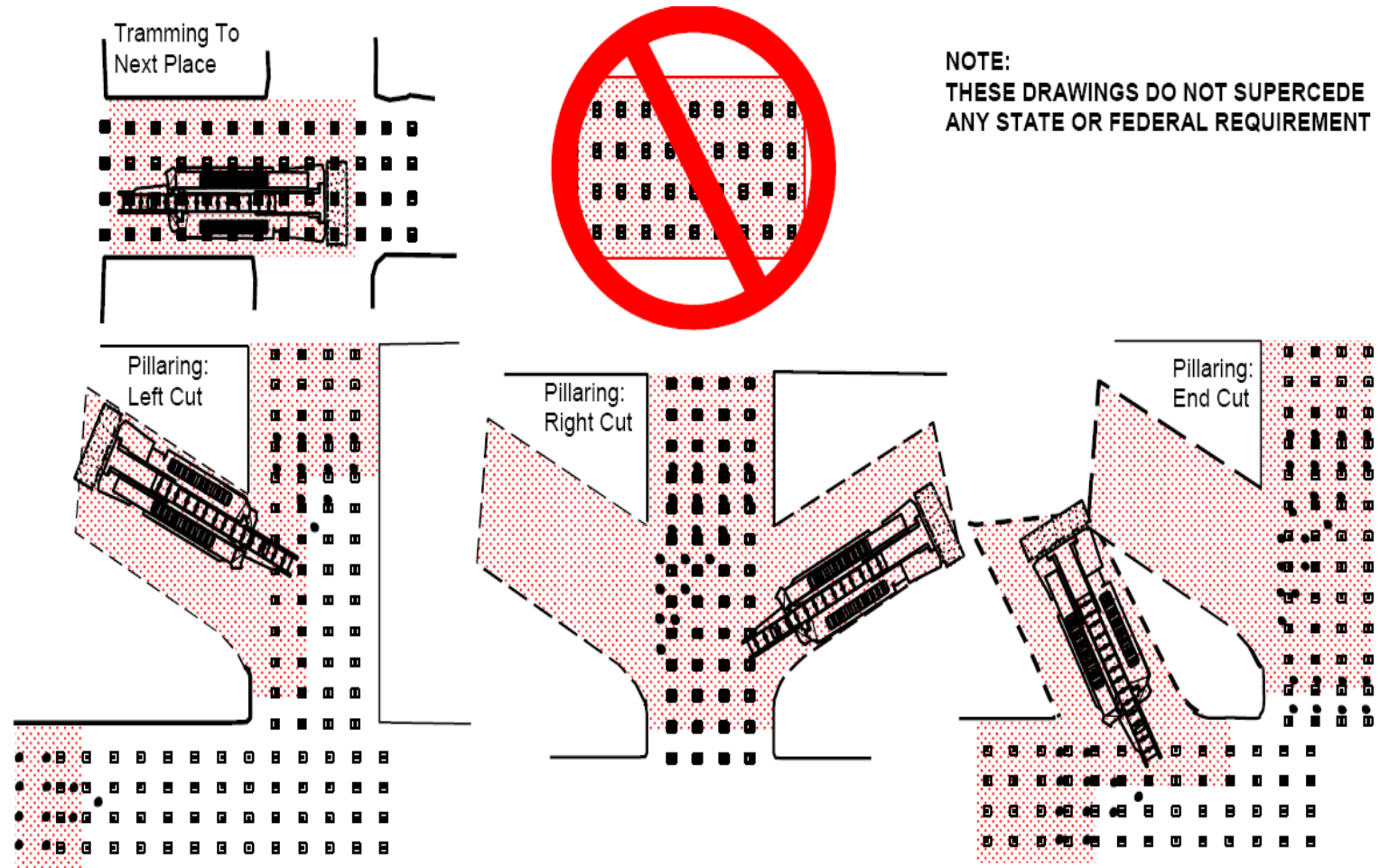
Red Zone Alert

Michael McMillion



- > Red Zone vs Proximity Detection Terms**
- > Basics**
- > Mobile Face Equipment Application**
- > Longwall Shield Application**

RED ZONES ARE NO ZONES FOR MINING WITH REMOTE CONTROL CONTINUOUS MINERS

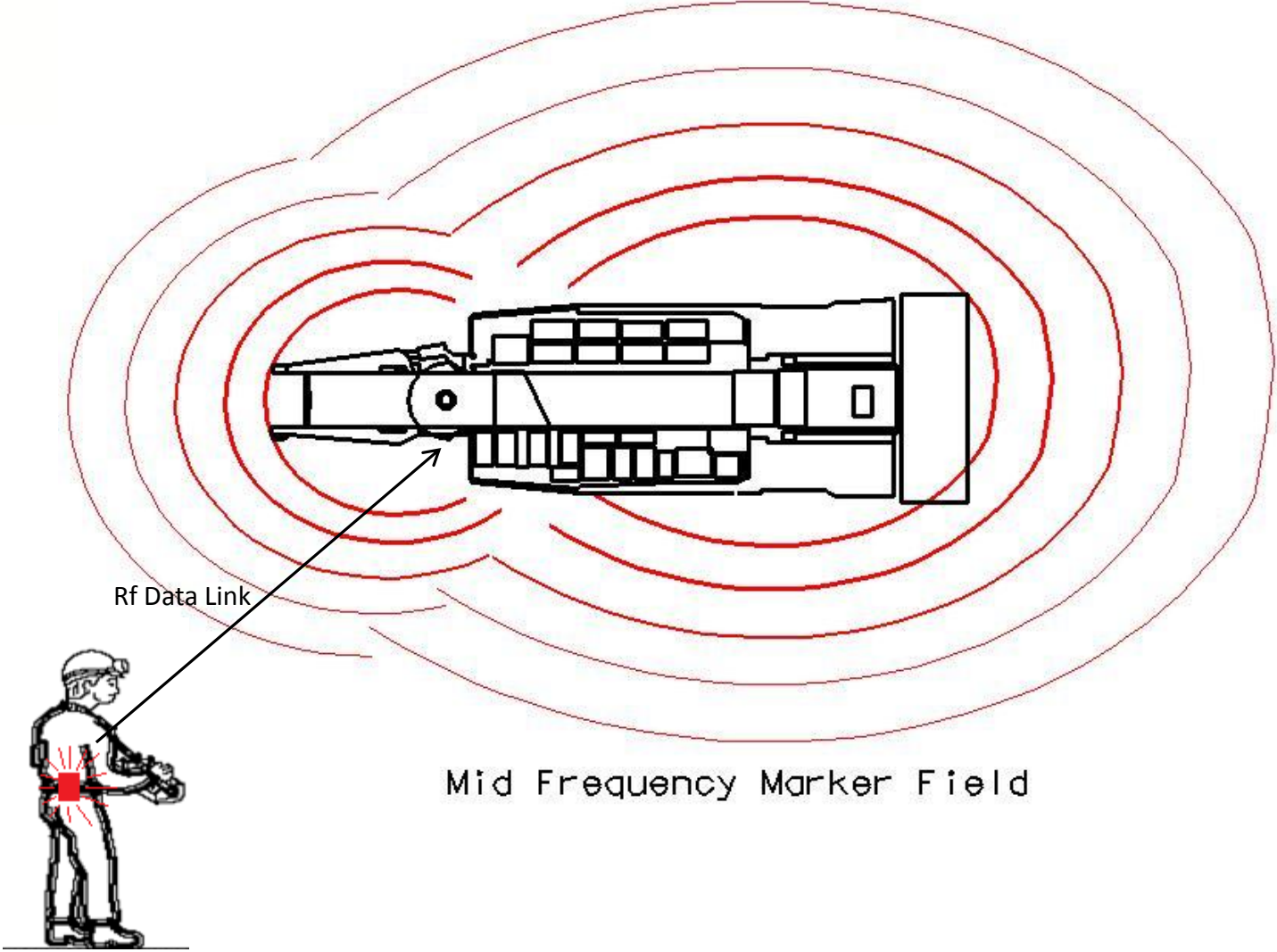


Can a Red Zone be enforced with technology?

- **Infrared**
- **Capacitive**
- **Ultrasonic**
- **RADAR**
- **Rf and RFID**
- **Visible Light**
- **Magnetic Field**

Needs for underground mining equipment:

- Accurate over short distances
- Stable for long time frames
- Not affected by dust and water
- Electromagnetic noise immunity
- Small foot print



Rf Data Link

Mid Frequency Marker Field

Consol Mobile Face Equipment Application

CM, Shuttle Car, Loader, Loader/Bolter, Scoop, Coal Hauler

Operation

Buchanan Mine

Cat CM - 2 years+

Joy CM - 3 months

Bailey Mine

Mains Section – 2 years (Loader, Scoop, 2 Shuttle Cars)

Alma Mine

Joy CM – 3 months

Early 2012 Plan – Company wide implementation

Installations

56 machines with complete Strata systems installed

70 machines “pre-wired” for Strata system

“Management of Change” Implementation Process

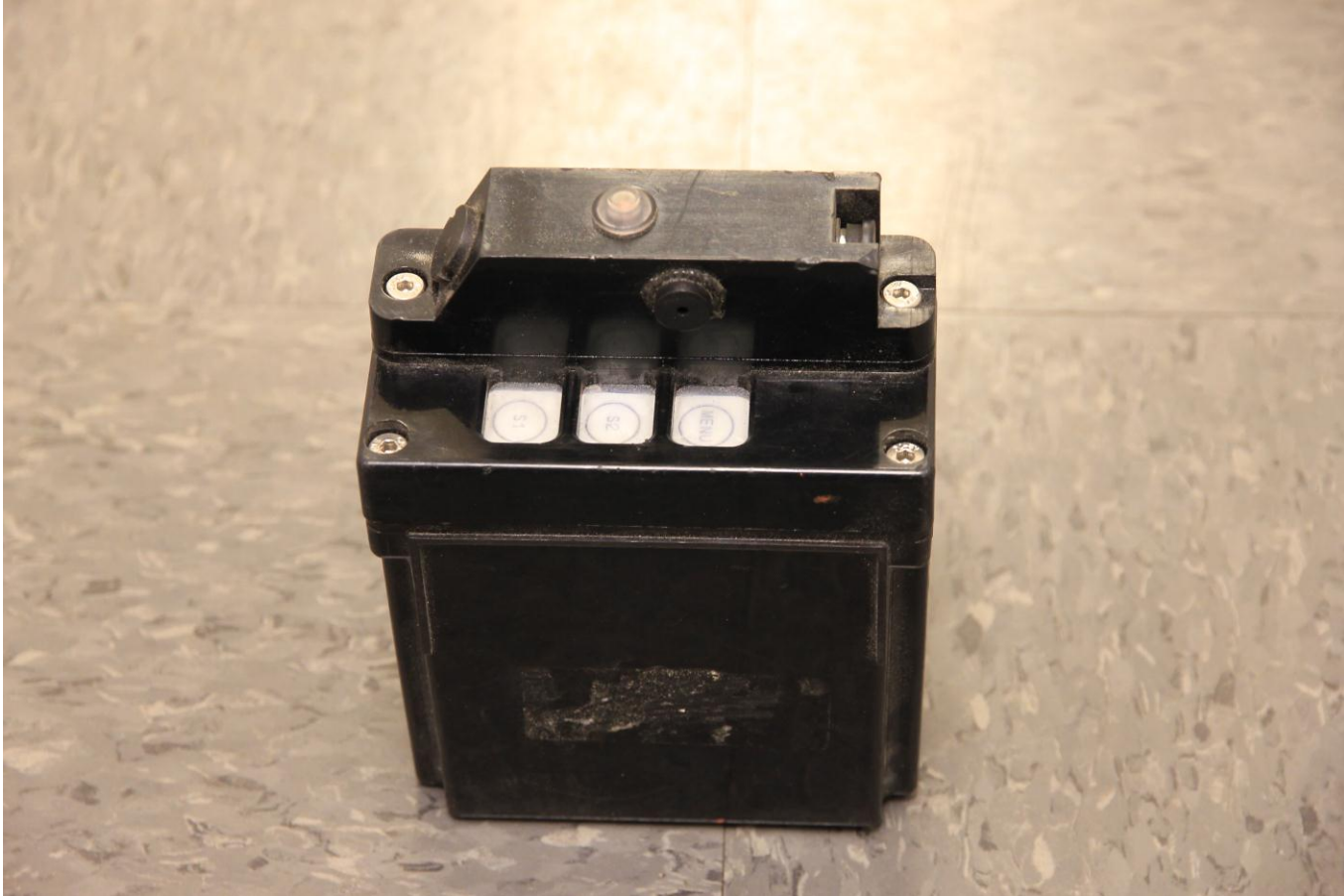
One Chain - Mine Management, Safety, Supervision,
Maintenance

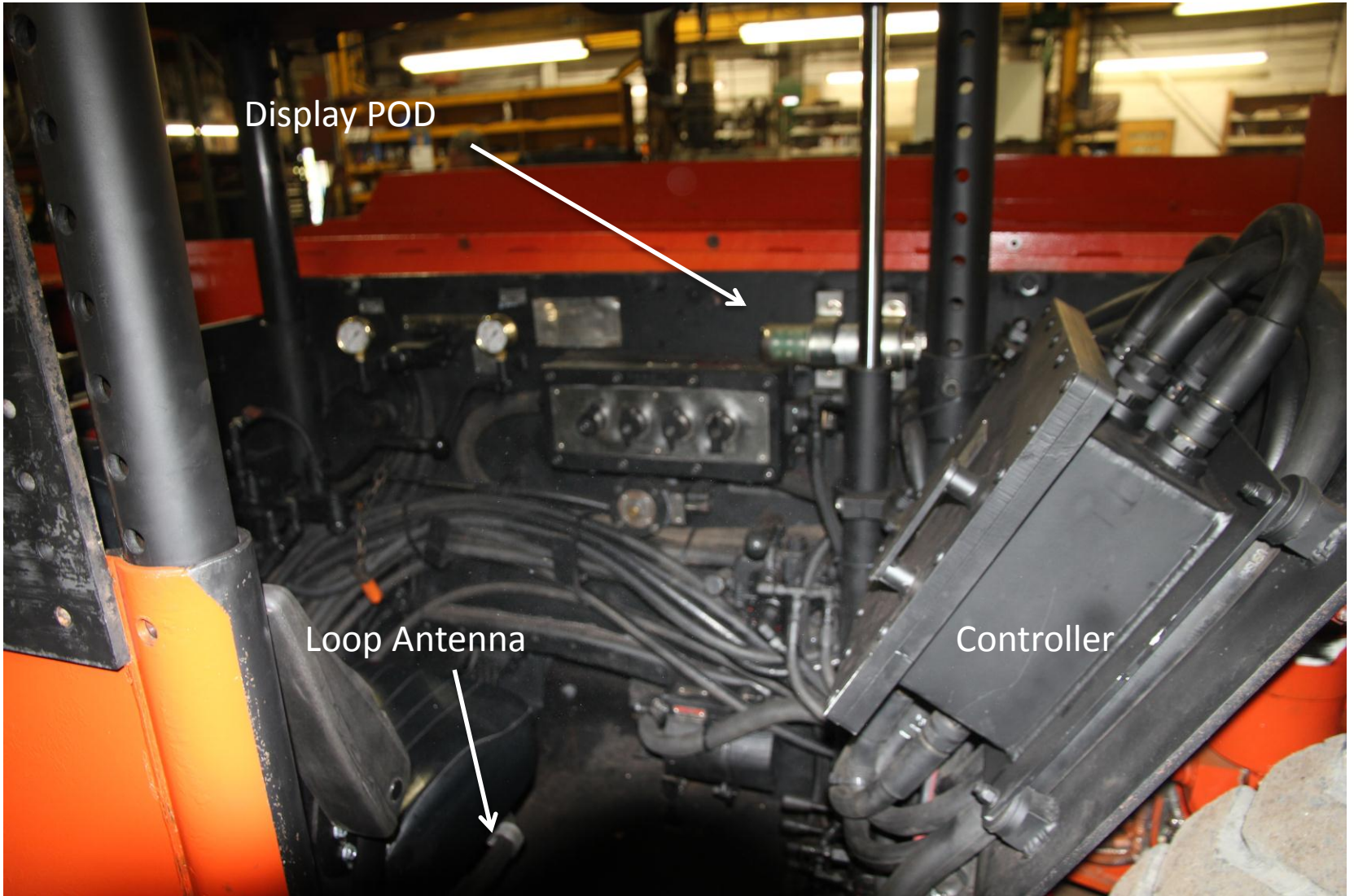
1. Classroom Operating and Maintenance Instruction
2. Cold Start
3. Hot Start
4. Follow-up, Feedback, Reinforce

Strata HazardAvert™

Joy Shuttle Car Installation

Strata HazardAvert™ PAD

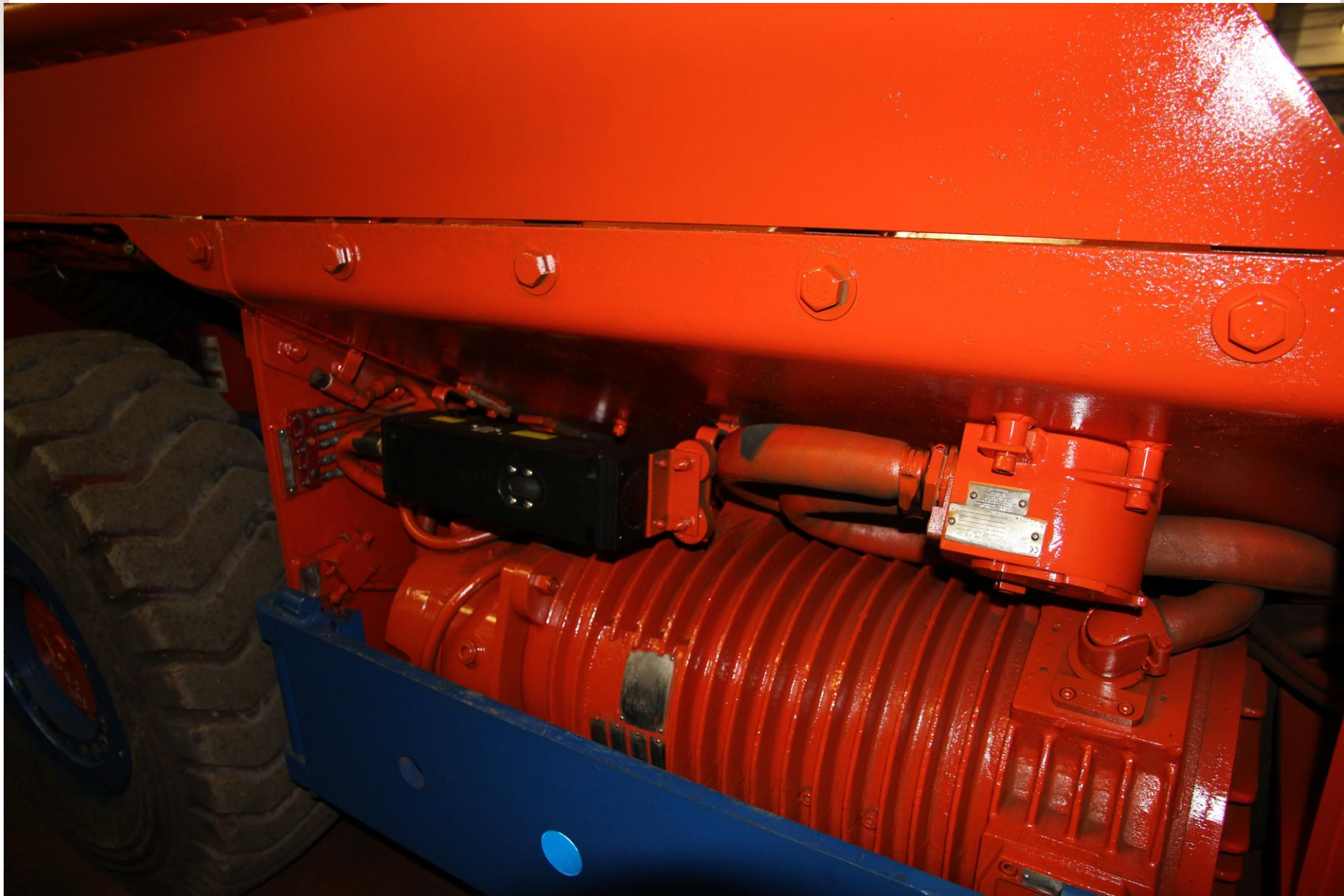


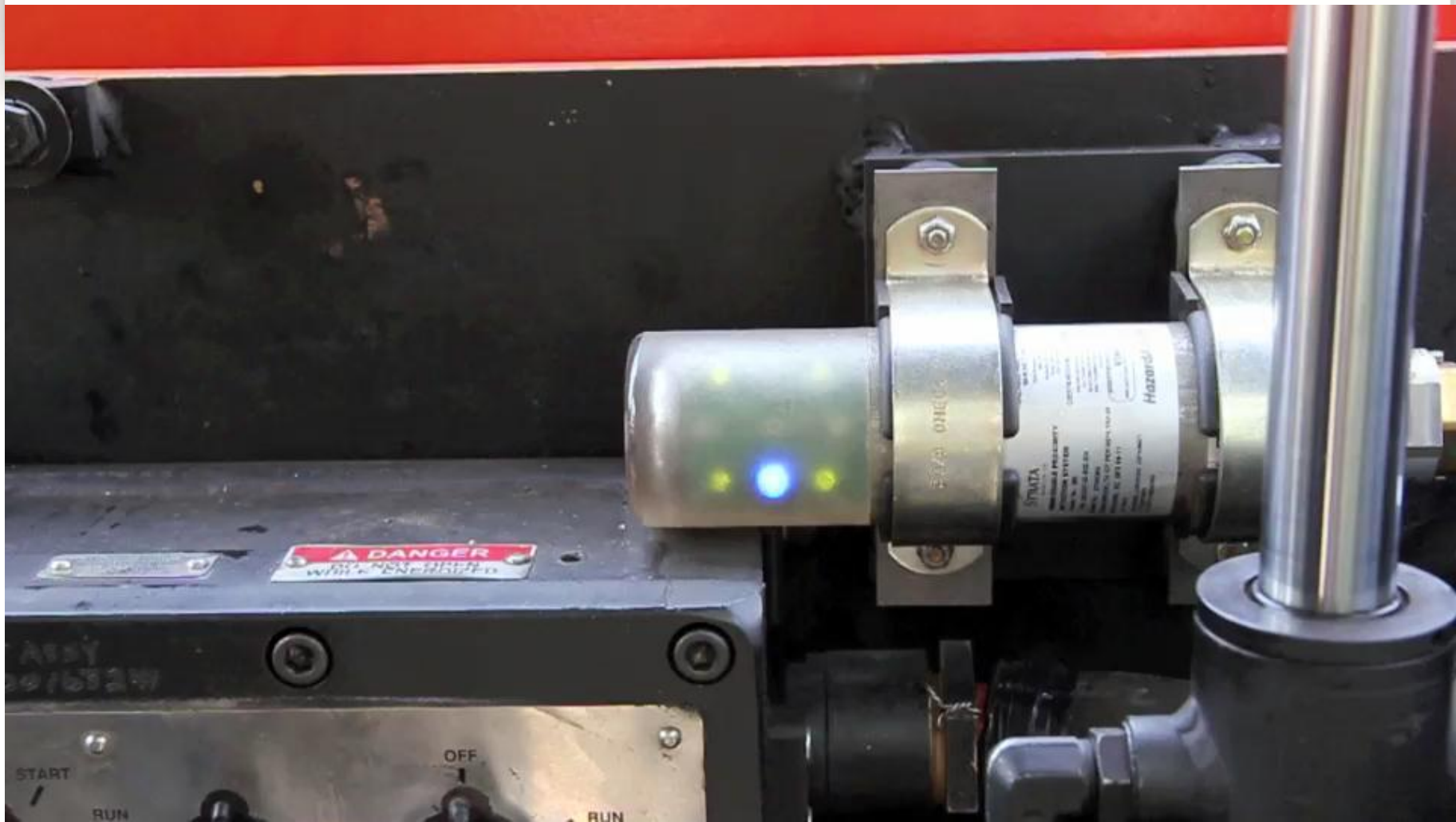


Display POD

Loop Antenna

Controller







Longwall Shield Application

Cat[®] Detect – PPD Red Zone Alert System

Planned start Q3 at Robinson Run Mine

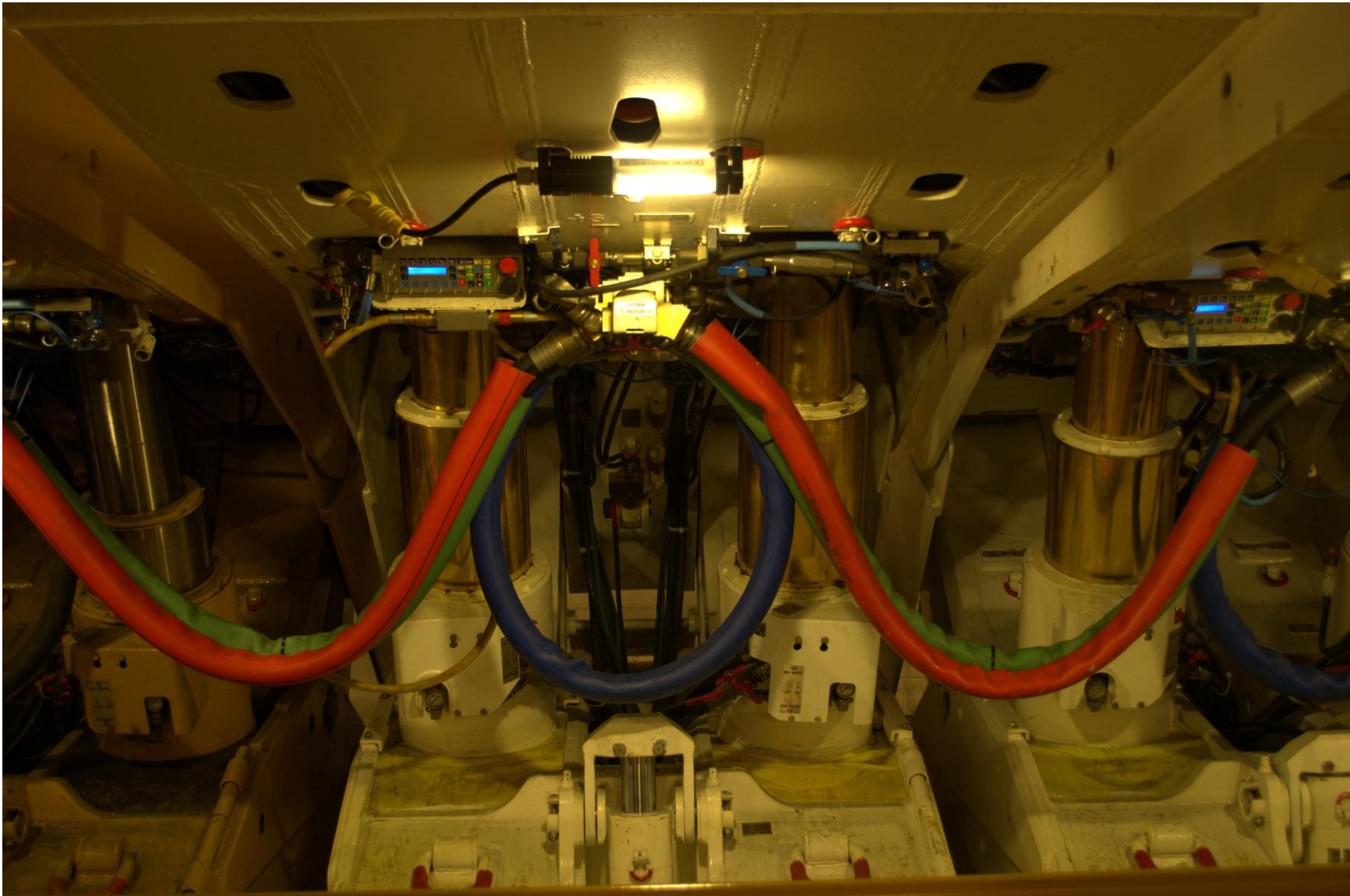


Cat[®] Detect



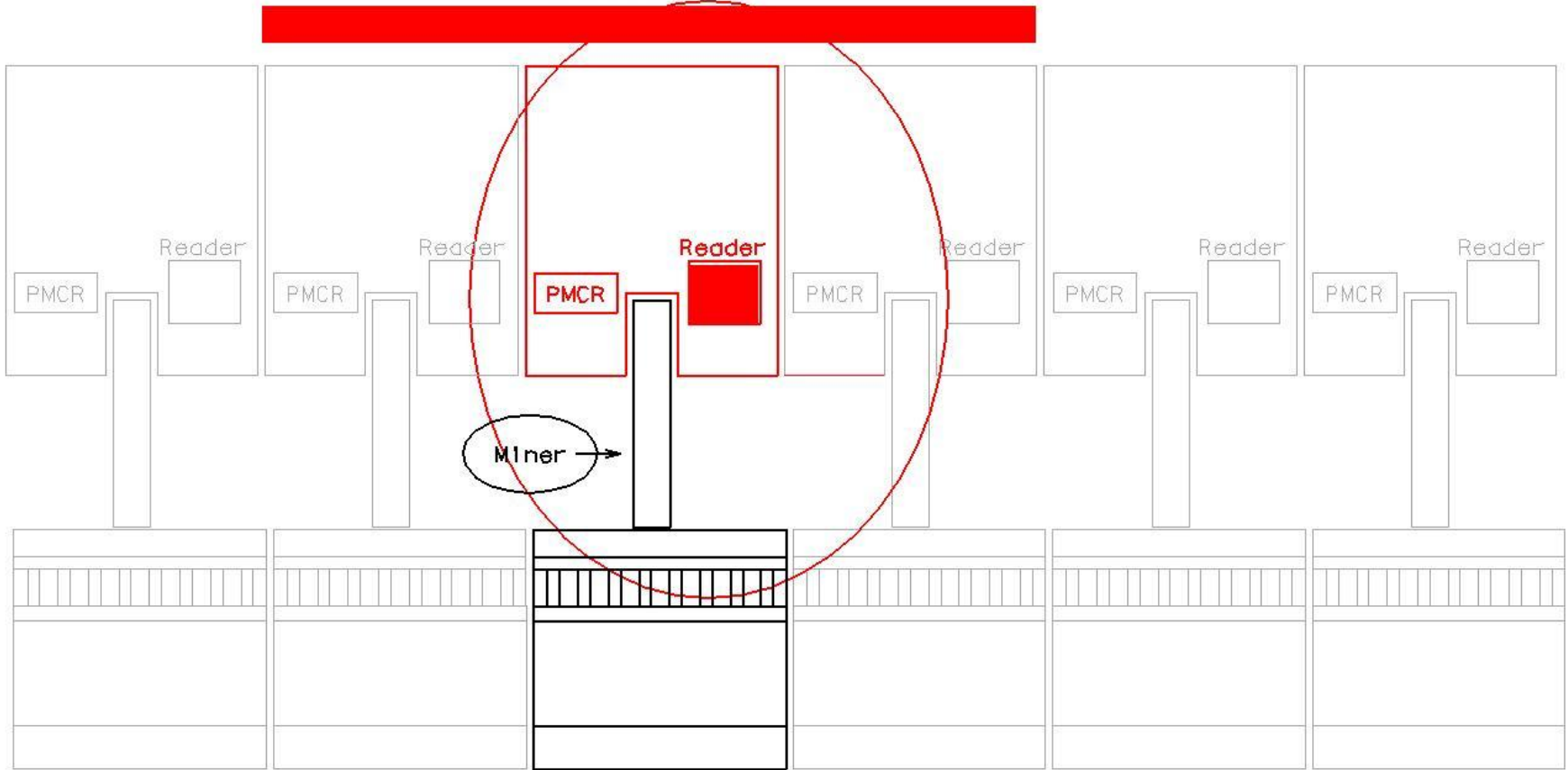
TAG Features

- Sealed unit with non-rechargeable internal battery
- Two classes of TAGs, Operator and Visitor
- Operator TAG is assignable to enable shield operation
- Visitor TAG will only allow safety functions
- All activity recorded

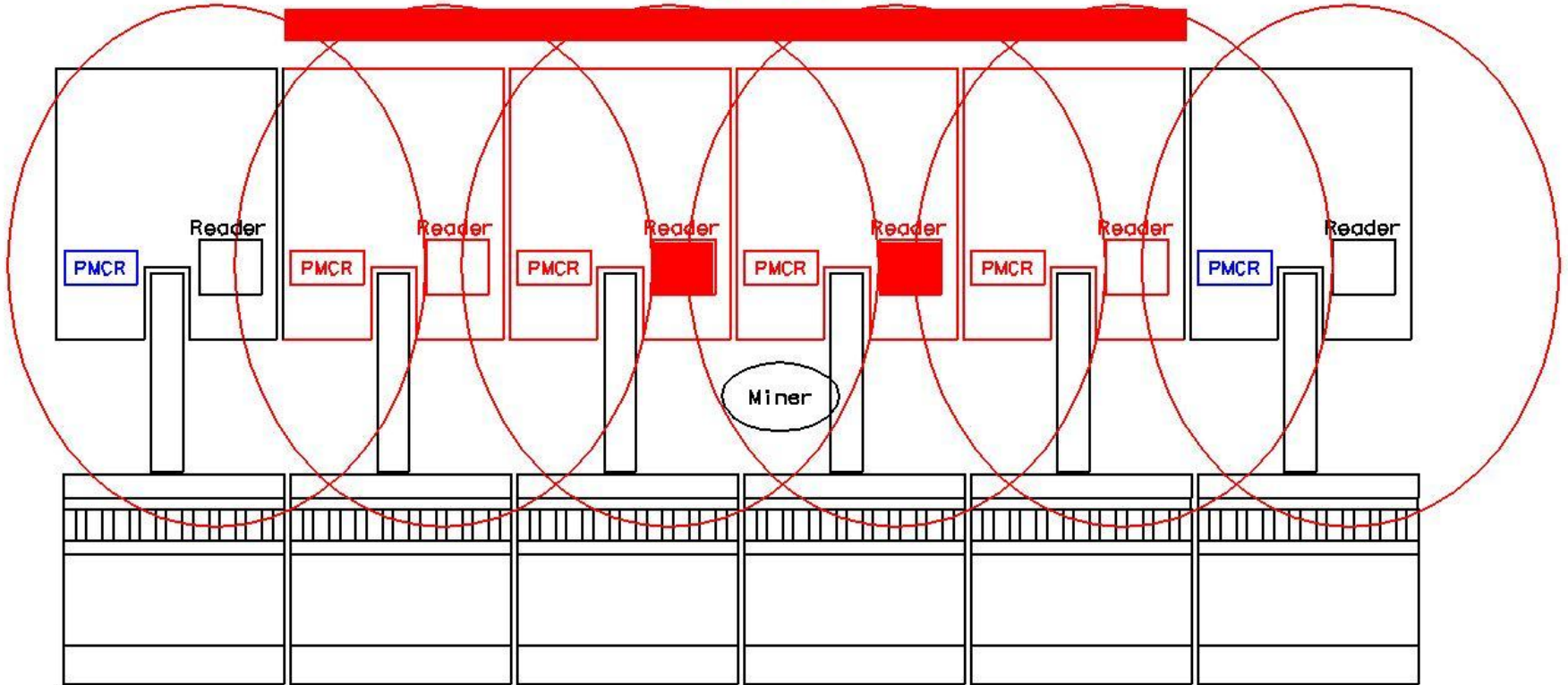


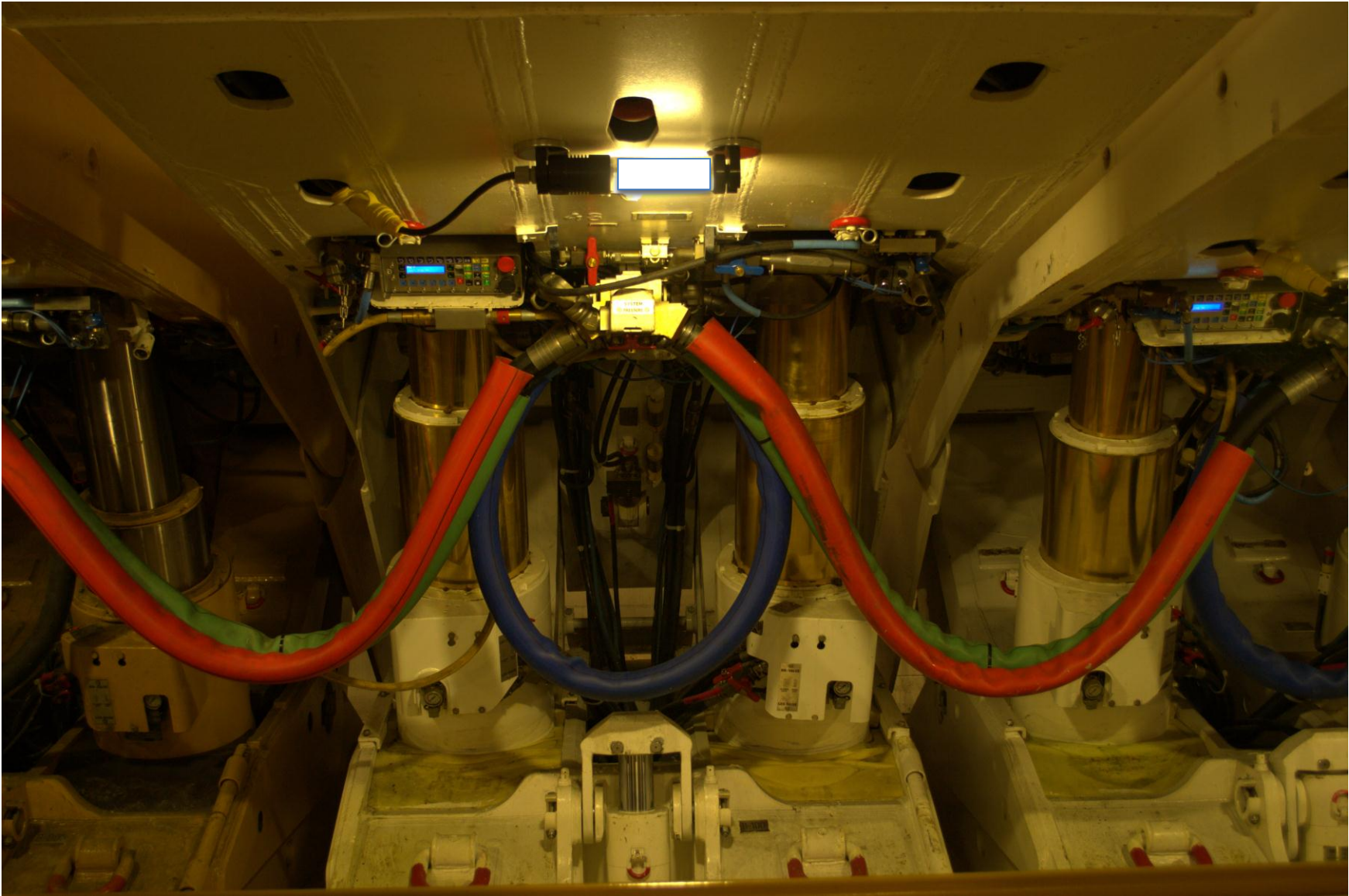


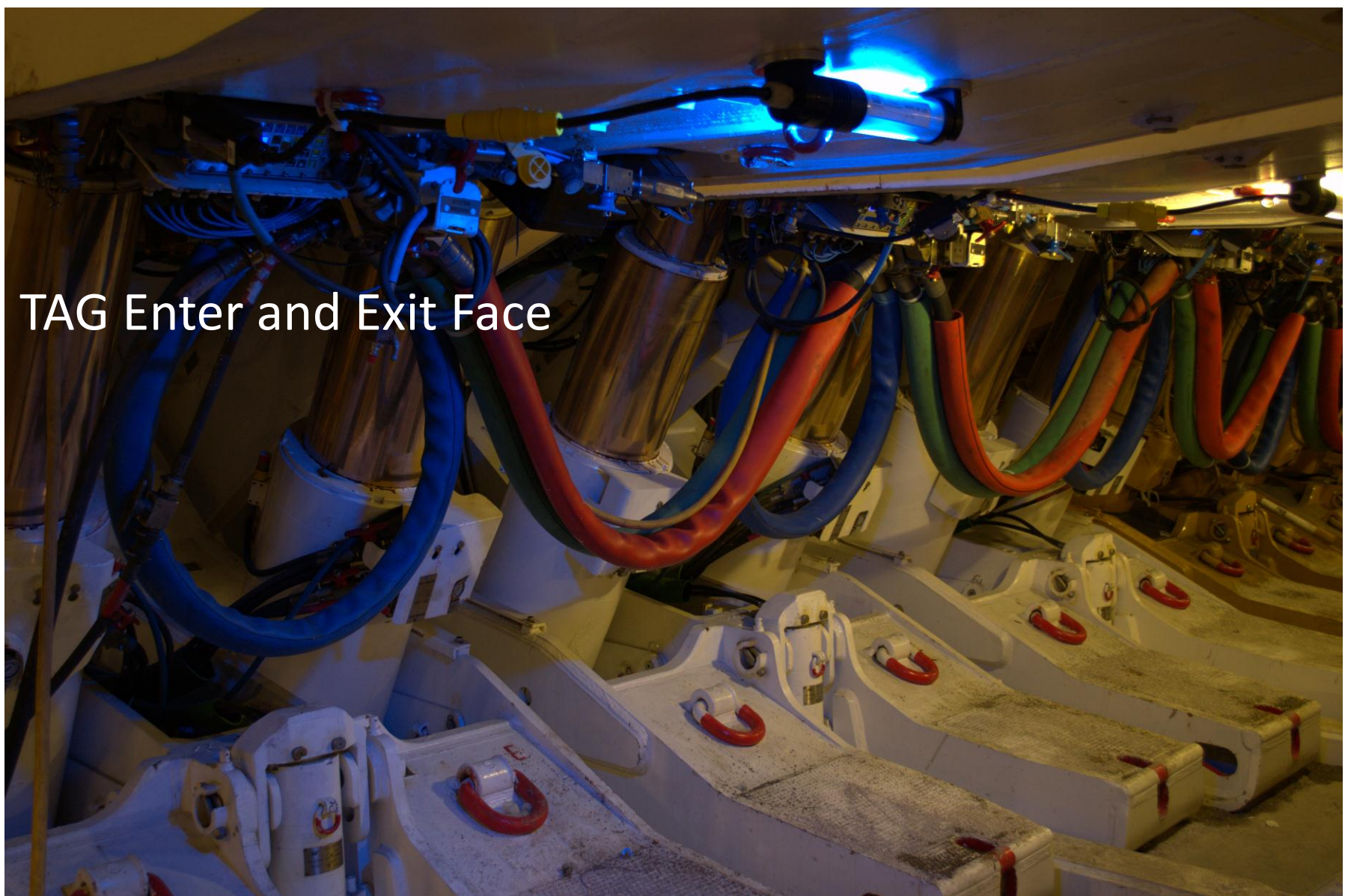
ALERT ZONE



ALERT ZONE







TAG Enter and Exit Face

Closing Comments

- ❑ Strata system has demonstrated good long term stability
- ❑ System installation at Rebuild or New assembly
- ❑ System Integration and space efficiency – Tag and PADs, IC Boards
- ❑ Customized marker field shape
- ❑ CM Operator complaint “can’t get close enough when changing place”



 **CONSOL ENERGY**®
AMERICA'S ENERGY STARTS HERE.