



Confined Spaces

- ***29 CFR 1910.146***
- ***29 CFR 1926.21(b)(6)***

Objectives

1910.146 and 1926.21(b)(6)

- In this course, we will:
 - Identify confined spaces in general industry and the construction industry
 - Identify the difference between a confined space and permit-required confined space
 - Determine if a hazard exists within the confined space
 - Discuss responsibilities for the entrant, attendant and entry supervisor
 - Identify rescue options



Definition of Confined Space

1910.146(b)

- **General Industry**

- Is large enough and so configured that an employee can bodily enter and perform assigned work
- Has limited or restricted means for entry or exit; **and**
- Is not designed for continuous employee occupancy



Confined Spaces

1910.146 and 1926.21(b)(6)

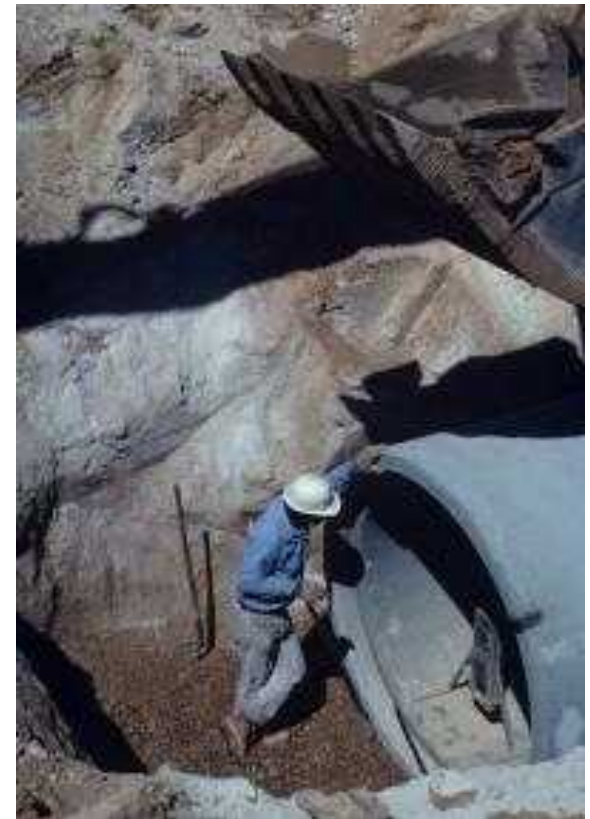
- Storage tanks
- Manholes and sewers
- Grain storage bins
- Boilers
- Ducts
- Tank cars



Confined Spaces

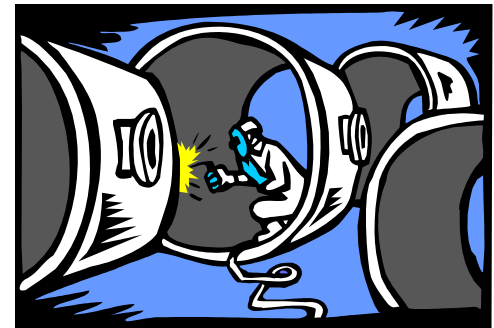
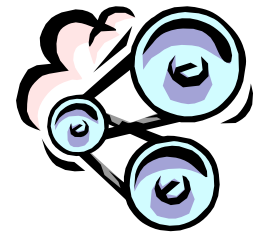
1910.146 and 1926.21(b)(6)

- Sewers
- Utility vaults
- Pipelines
- Equipment and machinery
- Tunnels
- Open top spaces (>4 feet)



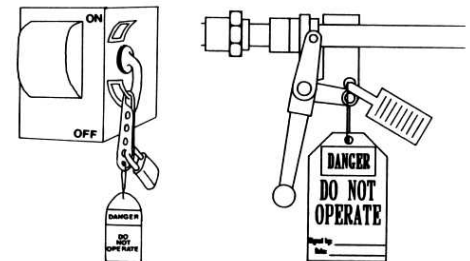
Confined Space Hazards

- Oxygen-deficient/enriched atmospheres
- Flammable atmospheres
- Toxic atmospheres
- General/physical (noise, entrapment, engulfment, temperature)
- Mechanical (moving parts)
- Electrical



Controlling Confined Space Hazards

- Locking out moving parts
- De-energizing electrical parts or wiring
- Blocking steam pipes and product in-feeding pipes
- Draining or pumping out liquid contents
- Air monitoring and ventilating



Confined Spaces in General Industry 1910.146(a)

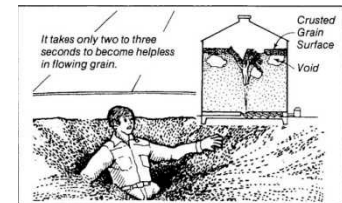
- **Confined Space Standard – 1910.146**
 - Contains requirements for practices and procedures to protect employees in general industry from the hazards of entry into permit-required confined spaces.
 - » Does not apply to agriculture, construction, or shipyard employment.



Permit-Required Confined Space

1910.146(b)

- Permit-required confined space (permit space) means a confined space that has one or more of the following characteristics:
 - Hazardous atmosphere
 - Engulfment hazard
 - Internal configuration (inwardly converging walls, sloping floors)
 - Recognized serious safety or health hazard



Permit Space Entry

1910.146(c)(2)

- If workplace contains permit spaces, employer shall inform exposed employees by posting signs or other equally effective means.



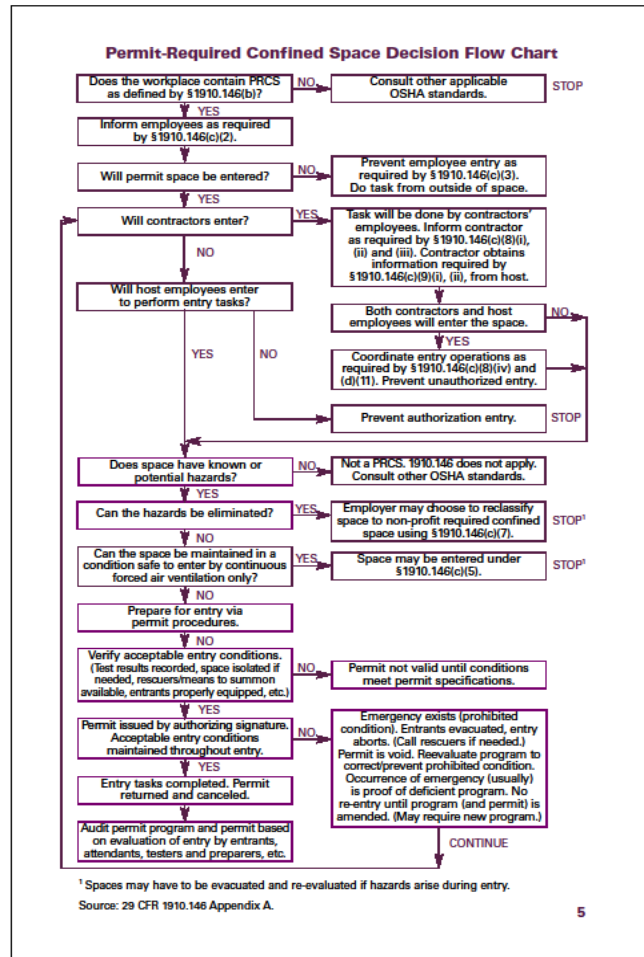
Permit Space Non-Entry

1910.146(c)(3)

- If employer decides its employees will not enter permit spaces, employer shall take effective measures to prevent employees from entering permit spaces.



Permit Space Decision Making Tool



Written Permit Space Program 1910.146(c)(4)

- If employees enter permit spaces, employer shall develop and implement a written permit space program.

(Company Name)

Permit Required Confined Space Sample Program

References:

North Carolina Occupational Safety and Health Standards for General Industry: 29 CFR 1910.146.

Purpose:

To provide a means by which employees can be protected from the hazards associated with entry into permit required confined spaces, and to develop procedures by which employees shall enter such spaces.

Policy:

I. All spaces owned or operated by the employer that meet the definition of permit required confined spaces shall be identified and appropriately marked, and access to such spaces shall be controlled.

II. Employees are prohibited from entering any space meeting the definition of permit required confined space, unless the following conditions are met:

A. The employer determines that employees must enter permit required confined spaces to perform the mission of the Unit and/or the duties of the employee.

B. The employees are trained in the duties under this policy which they are to perform.

C. The space is rendered safe for entry by:

1. Issuance and compliance with the conditions of a permit;
2. The space is reclassified as a non-permit space; or
3. Alternate Entry Procedures are performed.

III. Permits issued under the procedures in this policy shall be limited in duration to no longer than eight hours.

Definitions:

I. Confined Space Definitions

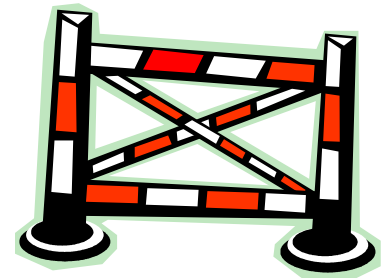
A. Confined Space - a space that meets all three of the following conditions:

CSB 06/24/05 Rev 1 2



Written Permit Space Program 1910.146(d)

- Provide measures and procedures:
 - Prevent unauthorized entry
 - Identify permit space hazards
 - Ensure implementation of safe entry
 - Maintain and ensure proper use of equipment
 - Evaluate permit space conditions
 - Provide for at least one attendant
 - Monitoring multiple spaces



Written Permit Space Program 1910.146(d)

- Method of designating the role(s) of each **active** person (attendants, entry supervisors, entrants)
 - For summoning rescue and other emergency operations
 - System for preparation, issuance, use, and cancellation entry permit
 - System for concluding entry after entry completion
 - Coordination with multiple employers
 - System to review entry operations and permit space program
-



Confined Space Entry Hierarchy

- No “permit” space
 - Entry permitted only if *all* hazards are eliminated
- Alternate entry procedures
 - Only in controlled atmospheric hazardous spaces
- Written **permit system**
 - Required for *any* high hazard space



Alternative Entry Requirements 1910.146 (c)(5)

- Employees must be trained
- Atmosphere tested before and during entry
- Continuous ventilation
- If a hazardous atmosphere is detected, or ventilation stops, the space must be promptly exited



Permit System

1910.146(e)

- Written procedure for preparing and issuing permits for entry and returning permit space to service.
- Requirements:
 - Document completion of required measures
 - Permit availability
 - Supervisor signature
 - Activity (job) duration
 - Permit termination/cancellation (1 year)

The image shows a sample confined space entry permit form. It includes sections for:

- 1. Job Description: Job No., Job Title, and Job Location.
- 2. Permit Information: Permit No., Issue Date, and Expiration Date.
- 3. Safety Measures: A table with columns for 'Hazard', 'Control Measure', and 'Responsible Person'.
- 4. Signatures: Fields for the Permit Issuer, Entry Supervisor, and the worker's name.
- 5. Additional Information: A section for 'Notes' and 'Remarks'.

The form is titled 'SAMPLE CONFINED SPACE ENTRY PERMIT' and is identified as 'CSB 3634(0) Rev 1'.

Entry Permit

1910.146(f)

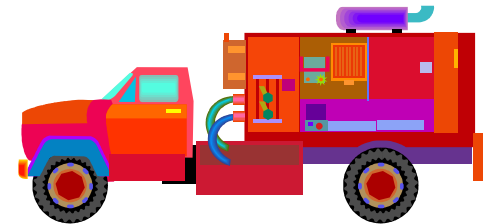
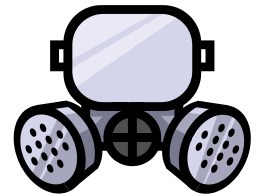
- Entry permit shall identify:
 - Space to be entered
 - Purpose of entry
 - Date and duration
 - Authorized entrants
 - Personnel (attendant and supervisor)
 - Hazards within the space
 - Isolation of space
 - Acceptable entry conditions



Entry Permit

1910.146(f)

- Additional requirements
 - Air monitoring testing results
 - Specifies safety equipment/PPE
 - Methods used to control the hazards
 - Communication procedures
 - Name and telephone of the rescue service
 - Rescue and emergency services



Air Monitoring and Ventilation

- Before and during entry

Methane 0.55

Ammonia 0.59

Carbon Monoxide 0.96

Nitrogen 0.97

AIR 1.0

Hydrogen Sulfide 1.2

Carbon Dioxide 1.5

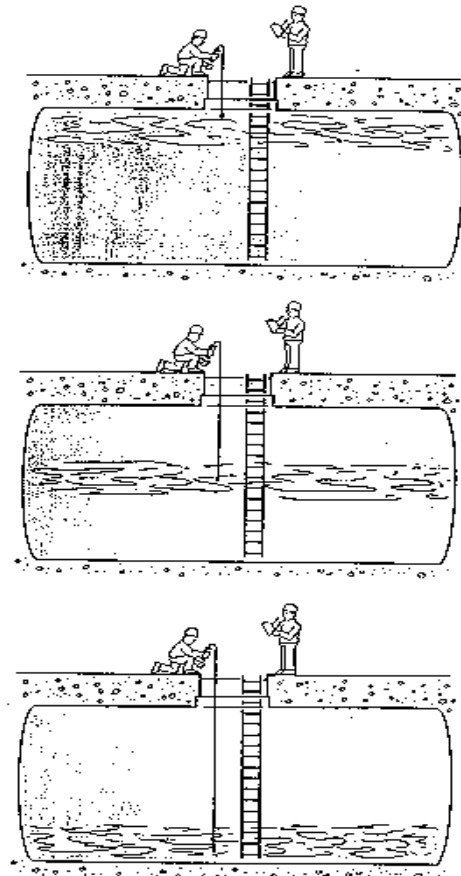
Gasoline 3-4

Jet Fuel 4.7

Lighter than
air gases



Heavier than
air gases



Air Monitoring and Ventilation



Duties Assigned

1910.146(h)-(j)

- **Authorized entrant:** Employee(s) who enter into the permit space
- **Attendant:** Individual stationed outside space who monitors entrant(s)
- **Entry supervisor:** Person responsible for planning, authorizing, and terminating entry



Authorized Entrant

1910.146(h)

- Knowledge of hazards in permit space
- Proper use of equipment
- Communication methods
- When to alert attendant
- When to exit



Attendants

1910.146(i)

- Knowledge of hazards in permit space
 - Aware of behavioral effects of exposure
 - Maintains an accurate count of entrants
 - Remains outside permit space during operations
 - Communicates with entrants
 - Monitors activities inside and outside space
 - Summons rescue and emergency services
-

Attendants

1910.146(i)

- Takes action when unauthorized persons approach permit space
- Performs non-entry rescues
- Performs no other duties that might interfere with primary duty – to monitor and protect entrants





Entry Supervisors

1910.146(j)

- Knowledge of hazards in permit space
 - Verifies completion of all tests, procedures and equipment in place as specified by permit
 - Terminates and cancels permit as required
 - Verifies rescue services and operable summons capability
 - Removes unauthorized individuals
 - Ensures entry operations remain intact
-



Training

1910.146(g)

- Training provided so all employees acquire the understanding, knowledge, and skills necessary for the safe performance of duties assigned.
 - Before first assigned to duties
 - Before change in assigned duties
 - When change in operations
 - Employee proficiency
 - Certificate of training



Rescue and Emergency Services 1910.146(k)

- Entry rescue
 - Use rescue and emergency services
 - Use own employees
- Non-entry rescue
 - Entrants use retrieval systems or methods





Rescue and Emergency Services 1910.146(k)(1)

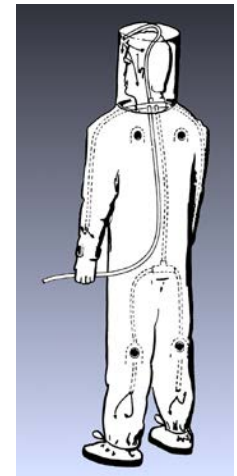
- Using rescue and emergency services
 - Evaluate prospective services ability to perform the summons in a timely and proficient manner
 - Identify the hazards in the space
 - Practice mock rescues





Rescue and Emergency Services 1910.146(k)(2)

- Rescue using in-house employees
 - Trained to perform assigned rescue duties
 - Trained in basic first aid and CPR
 - Practice rescue at least annually
- **Note:** If using air-supplying respirators, additional training is required per 1910.134



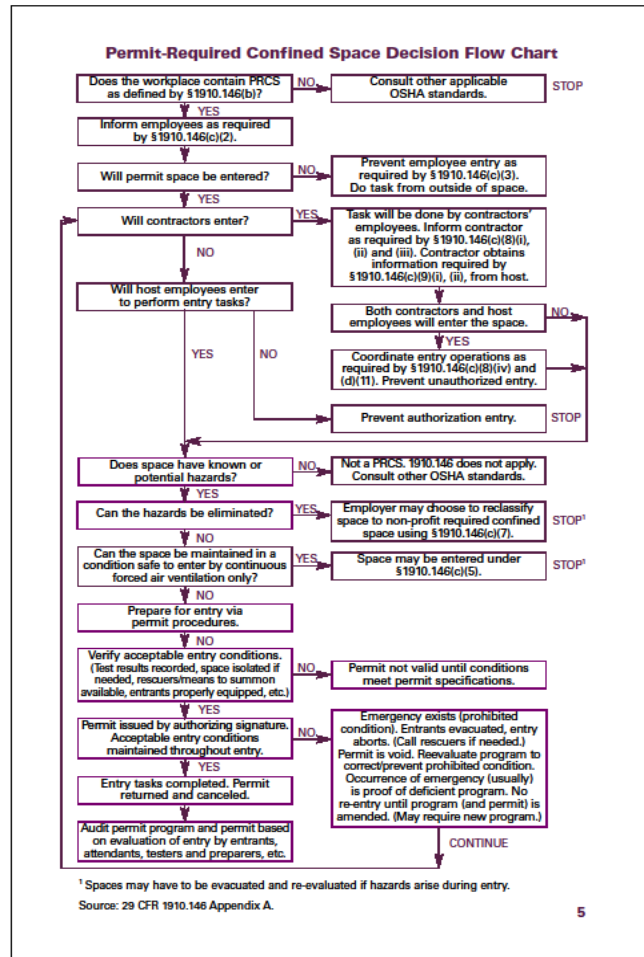
Rescue and Emergency Services 1910.146(k)(3)

- Non-entry rescue
 - Retrieving an entrant from a confined space without going into the space.
 - Entrants must wear a chest or full body harness with retrieval line attached.



- **A:** Permit-required Confined Space Decision Flow Chart
 - **B:** Procedures for Atmospheric Testing
 - **C:** Examples of Permit-required Confined Space Programs
 - **D:** Sample Permits
 - **E:** Sewer System Entry
 - **F:** Non-Mandatory — Rescue Team or Rescue Service Evaluation Criteria
-

Permit Space Decision Making Tool



Confined Spaces

1910.146 and 1926.21(b)(6)

- Storage tanks
 - Sewers
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 - Tank cars
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-

Definition of Confined Space

1926.21(b)(6)

- **Construction Industry**

- Having a limited means of egress, which is subject to the accumulation of toxic or flammable contaminants or has an oxygen deficient atmosphere.





Confined Spaces in Construction 1926.21(b)(6)

- Employees required to enter confined or enclosed spaces shall be instructed on hazards, precautions to be taken, and use of protective and emergency equipment.
- Employer shall comply with any specific regulations that apply to work in dangerous or potentially dangerous areas.





Is this a Confined Space?





Is this a Confined Space?





Is this a Confined Space?

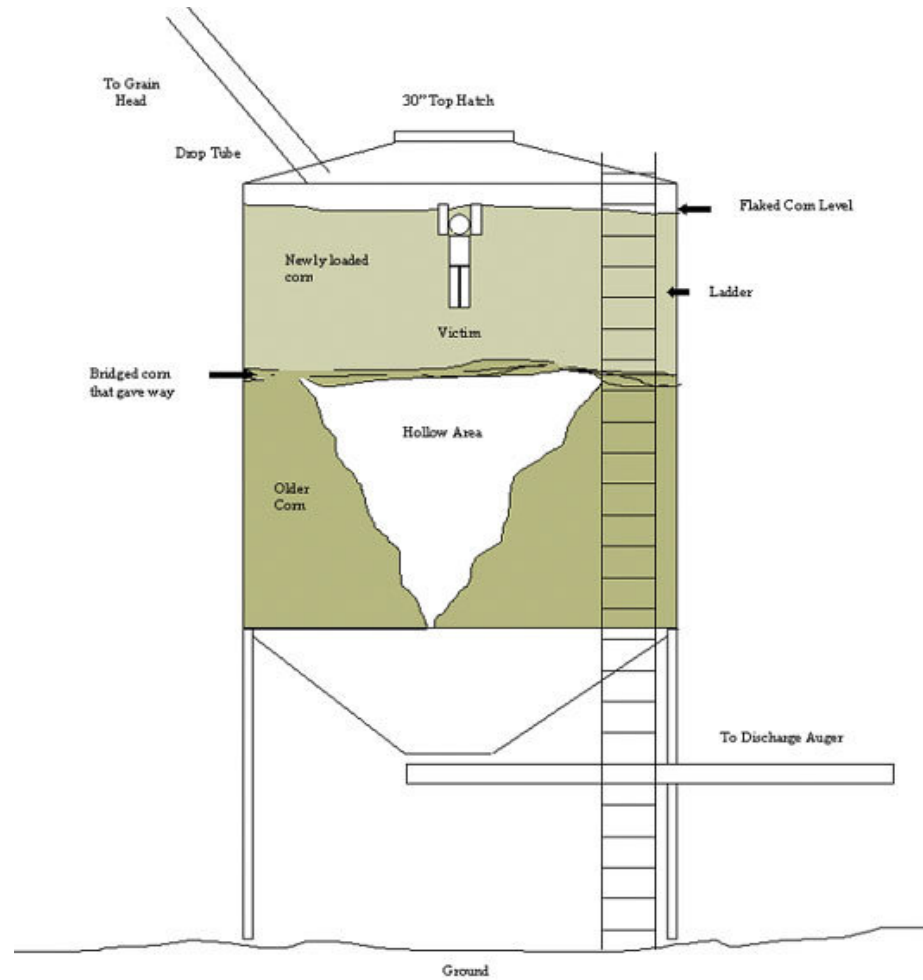




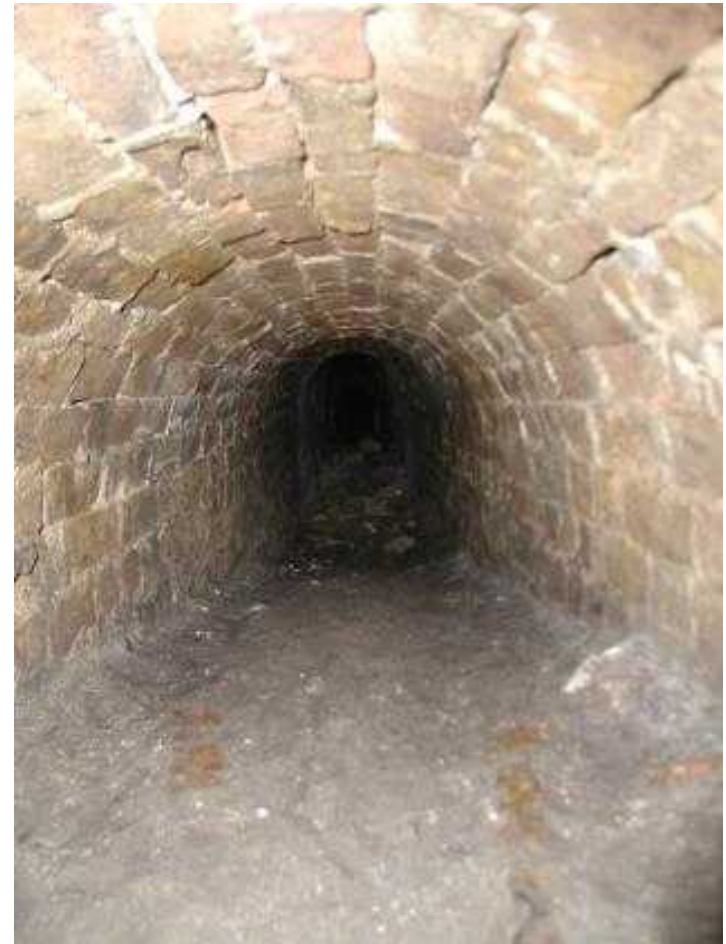
Is this a Confined Space?



Is this a Confined Space?



Are these Confined Spaces?





Are these Confined Spaces?



Are these Confined Spaces?





Is this a Confined Space?





Is this a Confined Space?





Is this a Confined Space?



Is this a Confined Space?





Is this a Confined Space?





Summary

1910.146 and 1926.21(b)(6)

- This presentation covered:
 - Identification of a confined space
 - How to recognize the difference between a confined space and permit-required confined space
 - Methods used to determine if/when hazards exists within the confined space
 - Responsibilities for entrant, attendant and entry supervisor
 - Rescue options
-

Thank You For Attending!

Final Questions?
