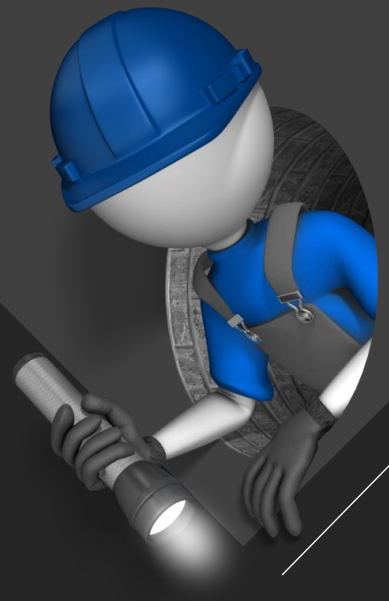


Confined Space
HazMat or Technical Rescue?

Monique@nwffenviro.com

- Graduate Crystal Coast Fire Academy
- Certified Safety Professional
- HazMat Technician (Instructor)
- Technical Rescue Qualified (General)
- Industrial Rescue (Instructor)
- EMT 1 (Basic)
- SAR Tech II

How Does Your Department Handle Confined Space Rescue Calls?

Back to Basics – What is a Confined Space?

1. Large enough for a human being to enter and perform work

2. Not designed for continuous human occupancy

3. Limited means of ingress/egress


WATTENFALL

What makes a confined space permit required?


Lock
Out
Power

Who Classifies the Space?

Does NFPA or ANSI Differentiate between CS and PRCS?

OSHA Requirements for Confined Space Operations – 29 CFR 1910.146

1. Written Plan
2. Appropriately trained personnel (Entrant, Attendant, Supervisor, Rescue)
3. Monitoring/Testing
4. Rescue Plan/Retrieval System

Are there exceptions for Emergency Services?

How do Emergency Services Meet Written Planning Requirements?

How Many People Are Required on A Rescue Team?

What is “Appropriate Training”?

OSHA Training Requirements

The employer shall provide training so that all employees whose work is regulated by this section acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this section.

The training shall establish employee proficiency in the duties required by this section and shall introduce new or revised procedures, as necessary, for compliance with this section.

Standards incorporated by reference

- 1910.120 (Training Curriculum)
- 1910.134 (IDLH Rescue)

RESCUE PERSONNEL MUST FIRST RECEIVE ENTRY TRAINING

NFPA Performance Requirements

- Initiate a search
- Incident Size Up
- Hazard Monitoring *
- Assess the Incident
- Control Hazards
- Apply SCBA to a victim
- Spinal Stabilization
- Horizontal and Vertical Entry
- Patient Packaging
- Anchor Point Selection and Set up
- Patient Removal
- Incident Termination

* Conduct monitoring of the environment given monitoring equipment reference material, PPE, a properly monitoring and detection equipment, and size up information, so that a representative sample of the space is obtained, accurate readings are made, readings are documented, and effects of ventilation in determining atmospheric conditions of the space have been determined for exposures to existing or potential environmental hazards

US Consensus Standards

US Consensus Standards for Confined Space

1. NFPA 350 Standard for Entry

2. NFPA 2500 (Previously 1670/1958/1983) Technical Rescue Program Standards

3. NFPA 1006 Technical Rescue Job Performance Requirements

4. ANSI/ASSP Z117.1 Industry Standard for Confined Space Entry

Distinctions

NFPA & ANSI

NFPA 350

Tiered Rescue Team Standards (Including Time Standard)

NFPA 2500

Awareness, Ops, Technician Professional Qualifications and Equipment Standards

NFPA 1006

Performance Requirements

ANSI 117Z

Atmospheric Tester

350 Rescue Standards

- Tier 1 – No Atmospheric Hazard
  - Onsite Time: 5 Minutes
  - Entry Time: 15 Minutes
- Tier 2 – No IDLH
  - Onsite (Standby)
  - Entry Time: 15 Minutes
- Tier 3 – IDLH
  - Onsite (Standby)
  - Entry Time: 2 Minutes

2500 Program Standards

Awareness – Non-Entry (Retrieval Rescue Only)

- Meet requirements of NFPA 470 Section 4

Operations – Entry (With Conditions)

- Meet requirements of 470 Section 4 and Rope Rescue (ops)
- Must be attached to retrieval system
- Victim must be visible
- Space must accommodate 2 rescuers + victim
- All hazards know, isolated, and controlled

Technician – Entry

- 470 Section 4, Rope Rescue (ops), Machinery Rescue (awareness)
- Retrieval system for rescuers not required
- Victim not visible
- Spaces too small for traditional wear of SCBA
- Hazards known and can be mitigated with SCBA

1006 Job Performance Requirements

- Task Based
- Tasks at operations and technician level include search, air monitoring, and use of entry and non-entry retrieval systems
- Awareness level tasks are restricted to non-entry

ANSI 117.Z Industry Standards

- Calibration Requirements for Instrumentation
- Atmospheric Tester Designation
- Otherwise No Appreciable Difference from 1910.146 (Don’t waste $125)

Regulatory Case Study

FEMA

BIRMINGHAM FIRE RESCUE

MICHIGAN DEPARTMENT OF LABOR & ECONOMIC OPPORTUNITY

Problem

- Birmingham, MI Public Services Department cited for violations of the confined space standard (Life Safety = 10 x Fine)
- Citation was specifically for the absence of standby rescue personnel in accordance with the standard
- City issued mandate for FD to provide services IAW the Standard
- Fire Department administration pushed back on OSHA standards as being unreasonable for life safety application
- Most available training is too generic to meet the requirements of the regulatory standard

Solutions

- Development (Funded through grants) of Fire Service Specific Confined Space Training (Did NOT adopt the 1670 standard)
- Developed specific policies prohibiting standby services outside of city departments
- Focused equipment purchases and annual training on spaces in the city in order to meet requirements

Moral: Generic Training Doesn't Work

What is your department policy on standby rescue?

Common Confined Space Hazards

H2S

Sewer gas also a byproduct of anaerobic decomposition

Low O2

Inadequate ventilation or use of interting gas

Engulfment

Grain Silos, trenches with class C soil

Fire

Escape difficult due to egress limitations, spread easy due to ventilation or reduce oxygen quickly due to poor ventilation


DANGER
CONFINED SPACE
DO NOT ENTER
WITHOUT PERMIT

What Air Monitor do You Use for CSR?


AIR
POWER MODE
GX-3R Pro
CO/H2S LEL O2 TOXIC


OXY
LEL
H2S
CO
CO2
MultiRAE LITE
MultiRAE
MultiRAE PRO
VOC
GAMMA


Honeywell BW MaxXT II


MSA


GLT

Case Studies

Colorado

5 Workers die from smoke inhalation (2007)

Oklahoma

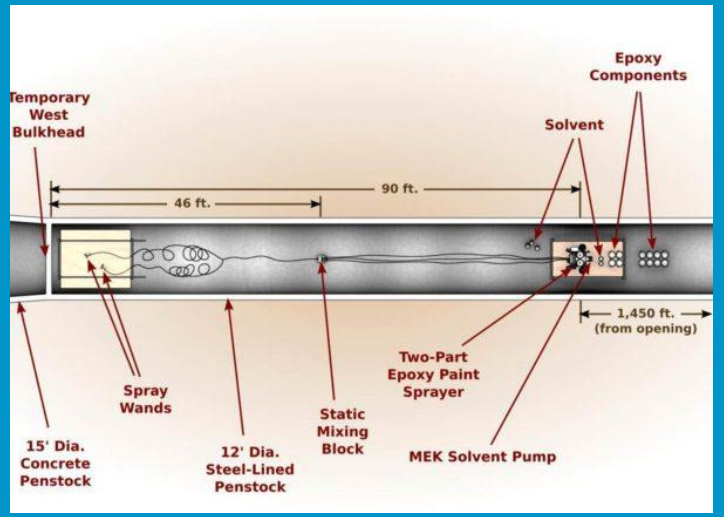
Two Workers Die from Low Oxygen
(2022)

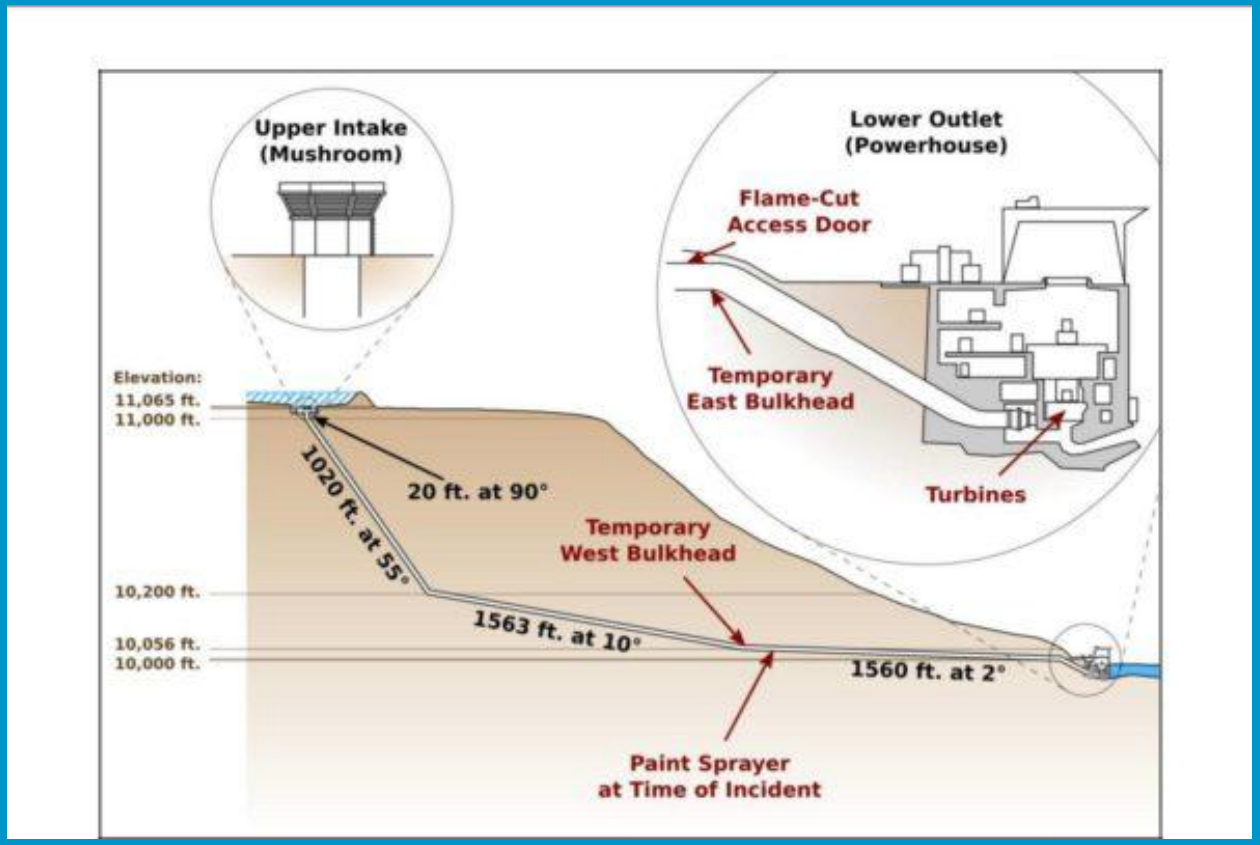
Texas

Worker dies from chemical exposure while cleaning tank
(2023)

Scenario Summary

- Painting Operation in Hydroelectric Penstock
- Workers using Methyl Ethyl Ketone for stripping paint and cleaning equipment between coats of new paint
- Operational problems, workers behind schedule
- No Air Monitoring inside the space (attendant monitoring at entrance)
- Fire breaks out, trapping workers
- Local rescue personnel don’t have necessary equipment for the rescue
- 5 workers die from smoke inhalation


Temporary West Bulkhead
Epoxy Components
Solvent
90 ft.
46 ft.
1,450 ft. (from opening)
Two-Part Epoxy Paint Sprayer
Spray Wands
Static Mixing Block
15' Dia. Concrete Penstock
12' Dia. Steel-Lined Penstock
MEK Solvent Pump


Upper Intake (Mushroom)
Lower Outlet (Powerhouse)
Flame-Cut Access Door
Temporary East Bulkhead
Turbines
Elevation:
11,065 ft.
11,000 ft.
20 ft. at 90°
1020 ft. at 55°
Temporary West Bulkhead
10,200 ft.
1563 ft. at 10°
10,056 ft.
10,000 ft.
1560 ft. at 2°
Paint Sprayer at Time of Incident

Let’s Talk About Preventable Errors

What Training, Equipment, and Personnel are Required for this Rescue?

- 2 Victims (1 Would Be Rescuer)
- 20 Foot Manhole
- No Communication with Victims
- No Visual Contact with Victims
- Air Monitoring Readings:
  - 02 – 12%
  - LEL – 0%
  - H2S – 75 ppm
  - CO – 0%

Let’s Plan This Rescue

- 2 Dead
- 1 Would-be rescuer
- Recovery performed by technical rescue
- No Air Monitoring by Contractor
- Low O2 reported by FD
- Company cited for failure to provide training and proper air monitoring

- Tank cleaner reported missing by his wife
- Co-worker finds unresponsive worker in tank
- No supervisor or attendant onsite
- No Permit
- No Engineering Controls in place

Let’s Plan This Rescue

- 1 Dead
- Found by Co-Worker
- CO Poisoning
- No Air Monitoring
- No Permit
- No Engineering Controls


DIESEL
DIESEL

Confined Space Entry Permit

Permit Number 234

Rescue # 911 Emergency Services # 911

Company Name: Acme Industrial	Date & Time Issued: 1/23/2020 0800
Job Site / Space ID: Tank N32	Date & Time Expires: 1/23/2020 2000
Purpose of Entry:	

HAZARDS IN THE CONFINED SPACE: (☑)		REQUIRED ENTRY EQUIPMENT: (☑)		COMMUNICATION
☐	Oxygen deficiency (<19.5%)	☐	Respirator	☐ Line of sight
☐	Toxic gasses or vapors > PEL	☐	Coveralls	☐ Radios
☐	Engulfment or Entrapment (circle selections)	✓	Hearing protection	☐ Other _____
☐	Electrical hazards	☐	Explosive proof lighting	**ADDITIONAL NOTES**
☐	Flammable hazards (gasses, vapors, high oxygen)	✓	Fire Extinguishers	
☐	Heat or Cold (circle one)	✓	Harnesses	
☐	Hazardous configuration	☐	Emergency Escape Equipment	
☐	Rotating or moving equipment	☐	Resuscitator - Inhalator	
☐	Chemical hazards	☐	Emergency Escape Respirator	
☐	Other _____	☐	Other: _____	

AUTHORIZED WORKERS		Written Rescue Plan Posted	
Entrants:	Bob Smith	☐	Employee Rescue
Attendants:	Jack Munro	☐	Employee Non Entry Rescue
Supervisors:	Jack Munro	☐	Outside Rescue – Contact #

Acceptable Entry Conditions: _____

ENTRY PREPARATIONS				ATMOSPHERIC TESTING
☐	Notify affected employees of work	☐	Review hazards and work procedure	Test will be done before entry
☐	Isolate hazardous energy	☐	Notify available emergency team	Continuous monitoring? Yes No
☐	Apply locks and tags	☐	Atmospheric test satisfactory	Test frequency: _____
☐	Verify isolation	☐	Additional permits obtained	Tester name: _____
☐	Secure area with posts and flags	☐	Required PPE worn	Tester ID #: _____
☐	Clean, drain and purge space	☐	Communication plan works	Tester name: _____
☐	Establish required ventilation	☐	Other _____	Tester ID:
		☐	Other	

TEST	PEL	☑	1	2	3	4	5	6	7	8
O_2 Min	19.5%	☐	OK							
O_2 Max	23.5%	☐	OK							
Flammability	10% LFL	☐	OK							
Carbon Monoxide	35 ppm	☐	OK							
H_2S	10 ppm	☐	OK							
Sulfur Dioxide	2 pm	☐								

Take Aways

Preventable Errors

Average of 140 Deaths per year in the past decade
12 LODD in that same time frame

Policy

If you don't have a policy, develop one

Training

Must be specific to area hazards

Equipment

Make sure the right equipment is being used by the right team

Questions?
More Information?

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V-Card