



CSE Training – Trainer Handbook

Confined Space Entry Training for Decentralized Wastewater Workers

Safety and Health Investment Project (SHIP)

Written by The Washington On-Site
Sewage Association, Funding and Support
Provided by the Washington State
Department of Labor and Industries





Acknowledgements

Acknowledgement

This document was written and prepared by the Washington On-Site Sewage Association. Funding and support for this project has been provided by the State of Washington, Department of Labor & Industries, Safety & Health Investment Projects (SHIP), a Division of Occupational Safety and Health (DOSH).

WOSSA would like to thank all who were involved in the research, writing and review of this report.

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For more information about this grant, or the WA. Department of Labor & Industries Safety & Health Investment Projects (SHIP) visit their website at: SafetyProjects.LNI.wa.gov



Introduction

Instructor's Guideline

This pre-amble will provide guidance to the instructional use of this training resource for the Onsite Wastewater Industry.

Introduction

Washington State Labor and Industry requires employers to provide a safe and health workplace for their workers. Washington requirements for confined space entry are well defined under Chapter 296-809 WAC and have their basis in the OSHA Confined Space Entry rules.

Risk identification and management is the employer's responsibility, but it also requires awareness, recognition and compliance to company policy and procedures by employees in the identified risk based work activities. Understanding the requirements of the CSE rule for employers starts raising awareness to the administrative requirements of the rule. Principally, this calls for a *written plan*. The best way to approach this in the learning environment for employers is to use the course materials as a gap analysis as they develop the company specific CSE program. Another critical element of the rule requirement is *demonstrated* skills. This curriculum allows for a practical skills based approach to demonstrate confined space identification, air quality monitoring, non-entry rescue equipment and use, and the respective roles of both entrant and attendant.

This training resource is designed to be used and presented to employers and employee's working in confined space exposures in the decentralized wastewater industry. These work environments would include, but are not limited to:

- On-Site Wastewater Systems (small flows less than 3,500 gpd)
 - Light commercial applications (strip malls, combined wastewater/grease)
 - Side sewer and jetting operations connected to sewer infrastructure
-

How to use these Training Materials

Suggested Instructor qualifications:

The instructor should have a minimum of 3-5 years' experience in the On-Site industry working with OSS Pumpers, Inspectors, Installers or Regulatory infrastructure and have at least 1 year presentation/education experience to the OSS industry for qualified CEU approved training.

Have direct experience with confined space entry procedures and be familiar with O&M, tank repairs and maintenance exposures specific to the industry and have a working knowledge of OSHA and State Labor Industrial Health and Safety Regulations and how they are applied.

Practical experience in Safety Management applications and program implementation for small business and risk management.

Using the Resource

Presenters of the training resource should anticipate approximately 8-10 hours of preparation time to familiarize themselves to the learning objectives and content of this program before presenting it. The material and content is designed to be interactive and encourage a learning environment for discussion and Q/A on the subject matter. The companion documents are structured so the presentation will build the framework of developing the knowledge and skills for effective individual company programs.

1. Power Point presentation:
 - a. This should be printed in the format included, 3 slides to a page with "note" lines for participants. Speaker's notes are inclusive for each slide and should be reviewed for content and intent to learning objectives.
2. Companion documents:
 - a. CSE Training Handbook: Chapter 296-809 WAC - Complete code
 - b. CSE Training Resource: Provides examples of CSE programs and tools to create company specific programs oriented to the on-site wastewater industry.
 - i. Related rules in other chapters of code
 - ii. Example CSE Programs
 - iii. Sample CSE Permits
 - iv. Sewer system entry
 - v. Evaluating Rescue Teams or Services
 - vi. Atmospheric Testing of Permit-required confined spaces

Note: With minor modifications, this resource could be used in other similar industry needing confined space program development and training for CSE.

Washington On-Site Sewage Association NWOTC

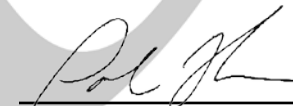
This is to certify that

First & Last Name

*Completed: LNI SHIP Grant – “Confined Space Entry Training for
Decentralized Wastewater Workers”*

*Sponsored by the Washington On-Site Sewage Association
Month Day, Year*

This is a full day Course: 8.0 Contact hours awarded
City, State



John Thomas
Executive Director





**Washington On-Site
Sewage Association**

Confined Space Training

Has attended **8** hours of
Confined Space Training

Date:

Instructor:



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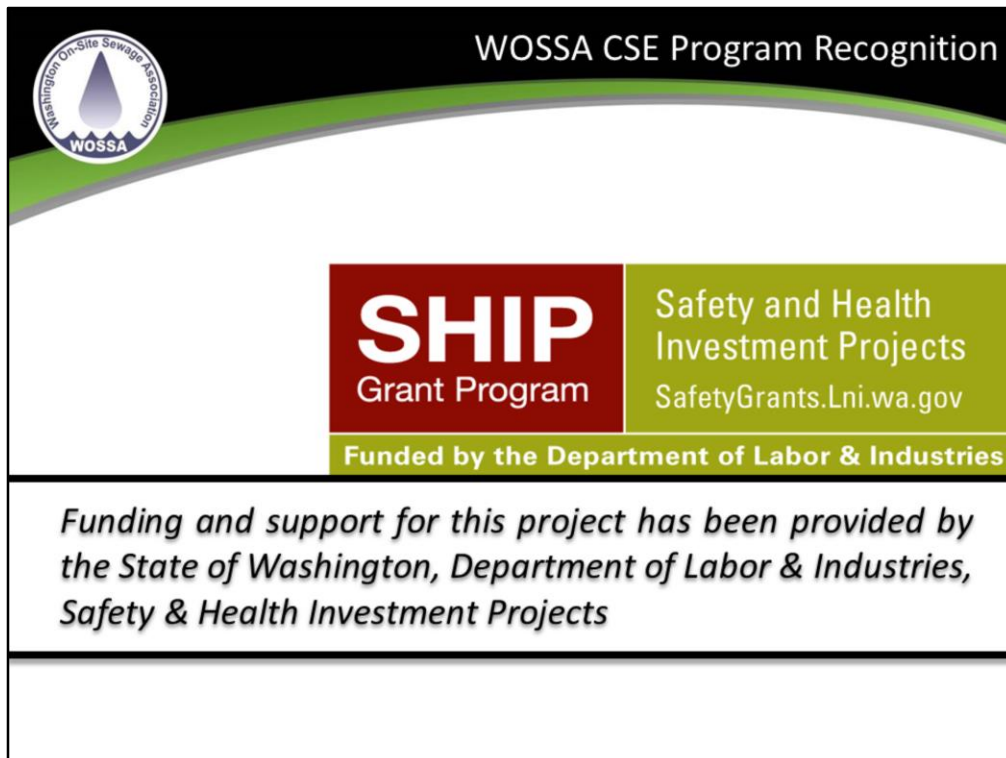
Instructor:



Introduction of topic to class;

Depending on class size, the presenter should have participants introduce themselves and the industry segment they work in.

The ideal class size for interactive participation and practical skills learning, should not exceed 20.



Presenter should recognize the SHIP program as the funding source to develop this program, and the Washington Onsite Sewage Association for the deliverables of the grant milestones that included:

- A regulatory review
- Field practice and observations
- PPE evaluations/procedures
- Hazard assessments and field sampling in various workplaces for verification of biologic exposures in contaminated CS using traditional mitigation (forced air supply – blowers)
- Delivery of a CSE training program with key elements to the OSS industry defined and practical application of field skills and equipment use in training.

(These will also be discussed in more detail in upcoming slides).



Washington On-Site Sewage Association
"Voice of the Industry"

Develop and Deliver an
industry specific Confined
Space Entry training
program for the On-Site
industry and workers that
enter confined spaces.



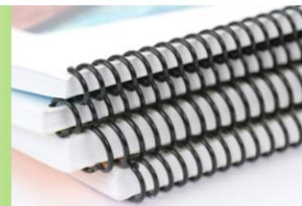
The primary deliverable of the grant has been to produce an industry specific CSE program that is unique to the OSS industry. The program will address the regulatory overlaps of excavations and trench safety into other work scenarios that industry service providers are or may be active in. Each class will have a different make up of participants from the main industry segments: Installer, Pumper/O&M and Inspector and the presenter should be prepared to go with the flow and discussions of the group and to encourage interactive discussion with work tasks, not specifically reviewed in the presentation but that can be related.



Confined Space Entry Program Resources

Handout's for the class include:

- PowerPoint presentation
- CSE Training Handbook
 - Contains the WAC 296-809-100
 - Outlines what you must do
- CSE Training Resource
 - Tools for setting up your CSE program



Class resource documents should be identified to ensure that everyone in the class has a copy of each. It is important to spend a couple of minutes describing the purpose of each and how they will be used in the class and as takeaways for companies to use as they develop or modify their company specific CSE written program.



How are the rules for Confined Space Entry set up?

Four Major Sections: WAC 296-809 – Confined Spaces

- Identify and Control permit-required confined spaces and inform employees
 - 5 sub-sections
- Develop a written permit-required confined space program
 - 3 sub-sections
- Provide employee training and certify their proficiency
 - 2 sub-sections
- Implement and use confined space entry permit procedures 19 sub-sections

This slide introduces the WAC 296-809 – Confined Spaces as an overview of the rule in Washington, breaking it down into manageable sections. The presentation continues to present and discuss each section and its applicability to the user setting up or expanding their CSE program.



Class Agenda

- Discuss the rule requirements as they apply to CSE in the OSS industry in our state
- Discuss the roles of:
 - Entrant
 - Attendant
 - Supervisor



Understanding the scope and application of the rule is fundamental to the development of an appropriate CSE program for employers. The discussion will include creating and management of the administrative requirements of the rule and the functional requirements of the rule applied. The field work tasks of the entrant, attendant and supervisor are outlined in the class discussion and demonstrated in the field practice.



- Review Examples of OSS Confined Spaces
 - Septic and Pump Tanks
 - Pump Trucks
 - Sewer lines
- Application of Confined Space rules to Excavations and Trenches
 - Tank Excavations
 - Trenches
 - Soil Log Test Pits



The presenter will introduce the most common confined spaces identified in the OSS industry and work spaces/equipment. Over time Q&A with class participants may also offer additional work tasks that have not been included in the current program. The presenter should be able to communicate the application of general CSE regulatory requirements to provide guidance based on the elements discussed in the overall application of CSE principles and safety in these new situations.



- Review Personal Protective Equipment (PPE)
 - Selection
 - Fit for use
 - Maintenance
- Practice and demonstrate proficiency doing a confined space entry and using equipment.
 - Septic and Pump Tanks
 - Pump Trucks/Storage Tanks



A broader, task specific review of PPE by task, with a focus on “fit for use” will occur later in the presentation.

The presenter will also set expectations for participants on the field practice and rolls that they will demonstrate later in the course.



Left to their own
devices, employee's
will make decisions
on their own



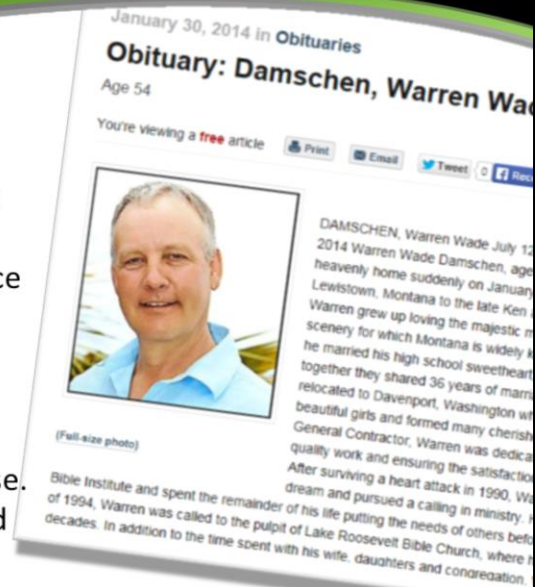
With direction or leadership from management or small business owners, their employee's will make decisions based on their own experience, expediency. Not always the ones that an owner might wish.



Transition slide to importance of understanding and application of the CSE requirements that define the need in real ways for small business owners in the OSS industry. These stories offer counterpoint to the perceptions that persist in the industry that do not recognize the hazards specific to our industry for CSE and excavations and the need for individual assessment and a written program for CSE exposures.



January 23 - Davenport, WA
54 year old Warren Damschen died of toxic exposure while working inside a confined space septic tank. He and other workers were cleaning out a septic tank when Damschen descended into the space to shovel excess waste to the hose. After calling for a ladder he did not appear and other workers used a hose to pull him out.



Relational slide that shares an actual fatality of an industry service provider in Washington.



Video testimonial that strengthens the perception of need by a Service Provider who tells a very powerful story.



Confined Space Hazards PRCS Fatalities

- 47% Air (Oxygen, Gases, Vapors)
- 21% Drowning (Engulfment)
- 19% Toxic (Liquids, Vapors, etc above PEL)
- 10% Blunt Force Trauma
- 2% Electrocution (Mostly due to objects the victim took in with them)
- 1% Burns

Some statistics to share with the class



Washington On-Site Sewage Association
"Voice of the Industry"

Confined Space Entry

Discuss the rule requirements
as they apply to CSE in the OSS
industry in our state

SHIP Grant Program
Safety and Health
Investment Projects
SafetyGrants.Lni.wa.gov
Funded by the Department of Labor & Industries

This is a transition slide in the presentation and shifts the discussion over to best practice in the field and a discussion of observations of a variety of work tasks.

The Presenter can facilitate feedback from the group on:

- What is it that we do?
- While there are commonalities, each job is different.
- What is best practice?



Confined Space

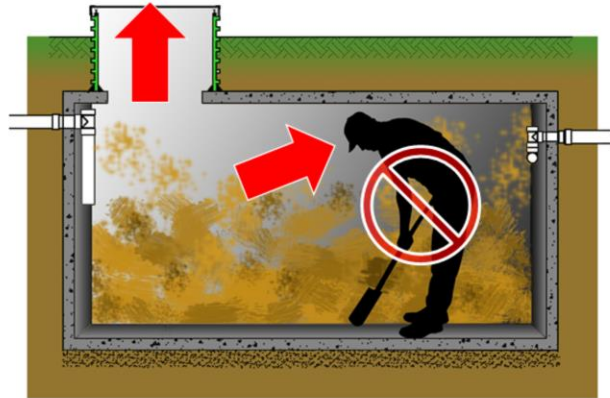
- A **Confined Space** is a space that has all of the following:
 - Large enough and arranged so an employee could fully enter the space and work.
 - Has limited or restricted entry or exit
 - Not primarily designed for human occupancy

Industry examples include septic tanks, pump tanks, storage/transfer tanks, pump trucks are all confined spaces. Presenter should highlight that all confined spaces are “permit only” until determined to be alternative or non-permitted confined spaces. It is important to begin to discuss differentiation in similar work tasks: ie: tanks that are contaminated with sewage are automatically “permit only” for CSE due to the inability to “eliminate” the risks associated with pathogen exposures in contaminated tanks.

Tanks that are buried at excessive depths prior to engineered tank construction standards are at risk when ground water tables are high. It is a fluid work environment that constantly changes the need for individual assessment of each space.



- Large enough and arranged so an employee could fully enter the space and work.
- Not primarily designed for human occupancy
- Has limited or restricted entry or exit



Typical, one compartment tank

Note that the size of these tanks can vary from 450 gallon to several thousand gallons.

Discussion elements to review:

- Is the configuration of the tank such that gasses or other exposures can accumulate or concentrate in different sections of the tank.
- How many access points are there?
- Are they all exposed to maximize venting?
- Where would you put the venting?
- What are appropriate ventilation methods?
- How much ventilation is needed? (calculation of air volume turnover rate and capacity of ventilating equipment used).
- Ask, “What variations on this configuration have you seen?”
- What work tasks are you performing?
- Would it make a difference in your pre-entry assessment of the space?



Ask the group if they think this is a “confined space entry”. Generally, this activity is a common task and most of the time the answer will be “no”....discussion to follow on the definition in the next slide...Presenter may offer commentary on potential of immersion (head first), due to loss of consciousness from methane gas, a known OSS contaminant that is lighter than air.

Discuss what the CSE requirements are and the options to do this differently...



Confined Space “Entry”

- The action by which a person passes through an opening into a permit-required confined space and includes work activities in that space.
 - **Entry** is considered to have occurred as soon as **any part** of the entrant's body **breaks the plane** of an opening into the space.

Focus on the definition from a regulatory/legal standpoint, not common practice.

The presenter should note the language in the definition when permits are “not” required. In septic system components and tanks, the main tank lids present an opening that IS large enough for entry.

The presenter should introduce several other elements: the airborne contaminant rules as it regards to high pressure water use from a hose in the tanks during the cleaning operation and LO/TO rules in particular to working in tanks that usually have several inches of water in them with pumps and floats that pose an electrical hazard.



Confined Space “Entry” (Con’t)

- If the opening is large enough for the worker to fully enter the space, **a permit is required even for partial body entry.** Other rules such as chapter 296-803 WAC, lockout-tag-out, and chapter 296-841 WAC, Airborne contaminants, may apply
- Permits are not required for partial body entry where the opening is not large enough for full entry

This slide will present a number of discussion opportunities for O&M Service providers, Pumpers and Inspectors. When a service provider is doing a normal inspection and reaches into a tank to pull the sock filter out through the main lid, it is a confined space entry. If they use a hook to reach in and pull the filter out without breaking the plane with a body part then they are not making a CSE. If they are doing a baffle repair and reach inside the tank through the main lid, they are making a CSE, but many companies do this repair from the outside of the tank altogether.



Types of Confined Space

- Permitted Confined Space Entry
- Alternate Entry Procedures
- Non-Permit Confined Space



Presenter should focus on the definition from a plain reading of the reference in the CSE rule. Also note the language in the definition when permits are “not” required...in these tanks, the opening IS large enough for entry. Each of these entries will be discussed in greater detail later in the presentation.



Permitted Confined Space (a space with any ONE of the following)

- Contains or has a potential to contain a hazardous atmosphere
- Contains a material with engulfment potential
- Internal configuration that could cause one to be trapped or asphyxiated by inwardly converging walls or by a floor, which slopes downward and tapers to a smaller cross section.

Discuss speaking points from slide: Key points for discussion is the language “potential”. As an entrant or supervisor, you must look at each situation as a stand alone entry and associated work tasks. This is particularly true of larger OSS systems (commercial/schools/communities) that may have multiple tanks that are connected and evaluation may include blanking crossover pipes or a different approach to air supply.



Permitted Confined Space (a space with any ONE of the following)

- Contains any physical hazard, including health or safety hazards, engulfment in solid or liquids, electrical shock or moving parts.
- Any other recognized safety or health hazard that could either: impair self rescue or result in a situation that presents an immediate danger to life or health

Discuss speaking points from slide: Key points for examples are contaminated tanks under repair. Tanks with cracks in side walls can very well have an engulfment potential in high winter water conditions or after they have been pumped out due to the structural integrity of the tank being compromised. This is especially true in older tanks before tank construction standards were adopted.



Hazardous Atmosphere

- Before a permit space that may have a hazardous atmosphere can be entered, the atmosphere must be tested
 - Oxygen: Enriched or Deficient
 - Combustible Gasses (LEL): Methane; Hydrogen Sulfide
 - Toxic Gasses and Vapors (PEL): Hydrogen Sulfide
 - Pathogen Exposures

This slide will introduce the participants to the basic consideration of air quality monitoring but also a new exposure that has generally been unrecognized in CSE evaluation and mitigation. Understanding how this impacts the standard CSE protocols and mitigation is critical to management of the CSE tasks, in particular of grossly contaminated tanks (systems in use).



Atmosphere

- **Breathing Zone:** Space around the entrants nose and mouth, forming a hemisphere with a 6-9" radius
- **Exposed or Exposure:** The contact an entrant has with a toxic substance, harmful physical agent or oxygen deficient condition, whether or not PPE provides protection. Exposure can occur through various routes of entry such as inhalation, ingestions, skin contact or skin absorption
- **Gas:** A normally formless fluid which can be changed to a liquid or solid state by the effect of increased pressure or decreased temperature or both
- **General Exhaust Ventilation:** The general movement of air out of an area or permit-required confined space by mechanical or natural means

This and the next series of slides puts into context the definitions and “lingo” with workers in our industry to common use in the workplace.



- **Immediately dangerous to life or health (IDLH):**
 - An atmospheric condition that would cause:
 - An immediate threat to life
 - Cause permanent or delayed adverse health effects
 - Or, interfere with an employee's ability to escape
- **Mist:** Liquid droplets suspended in air, generated by condensation from the gaseous to the liquid state or by breaking up a liquid into a dispersed state, such as splashing, foaming, spraying or atomizing
- **Vapor:** The gaseous form of a substance that is normally in a solid or liquid state

The presenter can highlight the frequency of common work tasks that create aerosols. It is of particular concern to the selection of proper PPE in contaminated tanks and know pathogen exposures.



Atmosphere

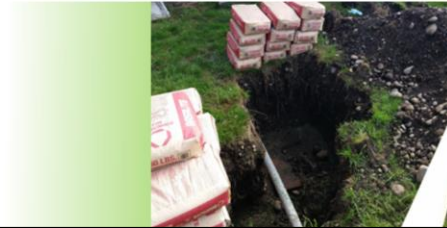
- **Oxygen deficient:** An atmosphere with an oxygen content below 19.5% by volume
- **Permissible exposure limits (PEL):**
 - The amount of an airborne chemical, toxic substance, or other harmful agent that must not be exceeded during any part of the workday
 - An airborne chemical or toxic substance can have 3 PEL values:
 - TWA8: This is an 8 hour, time weighted average limit
 - Short-term exposure limit (STEL). This is typically a 15 minute, time weighted average limit.
 - Ceiling limit © - This is an instantaneous limit

Most participants may be familiar with the 19.5% limits and alarm level function of their air quality monitor, but it is important to review and help them understand how the PEL structure is used to identify and mitigate cumulative exposures in some work activities like tank repair.



Engulfment

- Contains a material with the potential for engulfing someone who enters the space
 - Rock / Dirt from Above
 - Structural Failure
 - Drowning

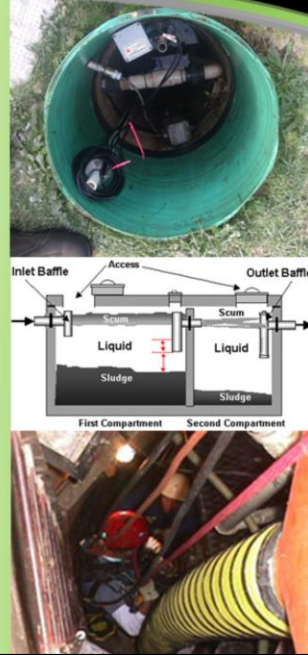


A specific work activity identified in the field study done by WOSSA was existing septic tank repair. The picture is from an actual field observation done with a service provider in Washington. In excavations, the requirement is to have spoils a minimum of two feet back from the edge of the excavation. The presenter should point out the obvious hazard of the weight of the concrete on the immediate edge and highlight the cobbled soil structure that is being weighted. You can see in the picture the entry hole in the tank that the worker will enter to prep the inside of the tank, he will then exit and dump the concrete in and re-enter.



Internal Configurations

- Has a configuration that could allow someone entering to be trapped or asphyxiated by inwardly converging wall or floor, which slopes downward and tapers to a smaller cross-section



Tank configurations come in many shapes and sizes. While most OSS tanks bottoms don't meet this standard, internal barriers and inserted components like pumps, piping and electrical cords are all common and impair egress or non-entry rescue.



Physical Hazards

- This includes any recognized health or safety hazards including engulfment in solid or liquid material, electrical shock or moving parts



Excavations, electricity, LO/TO, water (sewage)....Engulfment in the excavation is obvious but the presenter can point out the middle and bottom pictures for hazards of combination of water and electricity in the bottom and the fellow in the middle picture is actually standing chest deep in water....although he is wearing his safety glasses!



Other Hazards

- Any other safety or health hazard that could impair the ability to self rescue or is an immediate danger to life or health
 - Environmental (heat/cold)
 - Chemicals, Paints
 - Sealants, Adhesives, .22 Power Actuated Hammer
 - Spiders / Snakes / Rats
 - Getting In or Out
 - Impairment of Self Rescue
 - Health (pathogens)

Presenter can discuss additional elements of a CSE. Not all tanks are the same and not all weather conditions are the same. A septic tank buried 8 feet down that you enter to repair in late July on a sunny day has different exposure when you do it in late November (worst rain month) when it is empty and ground water tables have risen to 3 feet of surface.

Another important discussion item is to be aware of the materials that you take into the confined space with you that may cause issues. A story emerged of an air quality monitor alarming after three shots fired from a .22 power actuated hammer in a standard 1,000 gallon septic tank that was 5' deep and had the main lid open for an extended period for ventilation.



One of the key differences in OSS work that has had a previously unrecognized impact to PPE selection, procedures and equipment used to manage the workspace is the consideration of biologic pathogens. It has been demonstrated that the grossly contaminated work space with residual raw human waste (after a tank has been pumped out or emptied), is not adequately addressed in the confined space entry rule. The reference to the requirement is obscure in the code, but are found here:

296-809-100 Scope.

WAC 296-800-11045

Protect employees from biological agents



Chapter 296-841 WAC – Airborne Contaminants

Toxic Substance (Any chemical *or* biological agent, such as:)

- Bacteria
- Virus'
- and Fungus, which is any of the following:
 - 1.) Listed in the latest edition of the NIOSH Registry of Toxic Effects of Chemical Substances (RTECS)
 - 2.) Shows positive evidence of an acute or chronic health hazard in testing conducted by, or known to the employer
 - 3.) The subject of a safety data sheet kept by or know to the employer showing the material may pose a hazard to human health.

This elevates CSE atmospheric controls in contaminated tanks with raw human waste:

Reference:

Chapter 296-841 WAC - AIRBORNE CONTAMINANTS

Last Update: 3/18/14



Fluid samples were taken to represent common work or wastewater handling procedures/exposures including:

- Repairs
- Storage/transfer
- Standard maintenance and pumping
- Typical residential and commercial sewage



Sampling Results found in Washington

Laboratory Results Completed by WOSSA

- Mixed Bacterial flora
- Bacillus
- Gram negative Rods
- **Gram positive Cocci**
- Aeronmonas Hydrophila
- Aeromona Caviae
- **Streptococcus**
- Fungus
- Yeasts
- Enteric type gram negative rods
- **Staphylococcus, Coagulase Negative**
- Gram positive Coryneform rods
- Aeromonas Sobria
- **Escherichia Coli O157:H7**
- Fecal Flora
- Spore forming gram positive rods
- Propionibacterium gram positive rods
- **MRSA**
- Diptheroieds
- **Molds and Rare Molds**

This list provides a level of detail of many specific pathogens and information previously identified in our industry. It also adds these following “new” players to the list that were not known.

- MRSA
- Molds and rare molds
- Fungus/Yeasts
- Specifics on E.Coli O157-H7I

In the field studies, samples tested positive for a bacterium family at the dump site directly related to Chlamydia that were captured on a plate test from aerosolized wastewater during the truck unloading sequence.



Real life On-Site examples from Washington

- Sewage in eyes – Both with “pink eye” needing to go to the Emergency Room
- 2 LNI Claims for “Pink Eye” over \$4,000 in paid claims – follow on infections with Sty's
- MRSA infection in nose from Aerosols working in OSS with a one week hospital stay
- Cases of E-Coli & Hepatitis
- Giardia
- Employees' less than 6 months on the job...sick

These examples of real life work related illness' support the application of the Blood Borne Pathogen rules to the industry when biologic exposures are included in the Job Safety Analysis, and selection of appropriate PPE. These unique exposures will be introduced later in the program in co-ordination to the practical skills activities associated with the training and actual implication to OSS confined space entry in contaminated work spaces.



Examples of “Permit Confined Space”

- New Septic Tanks (until they are evaluated)
- “In-Use” or “Contaminated” Septic Tanks
- Pump Truck Tanks
- Tank Excavations (with a cross over to trenches)...

Different CSE call for different procedures and hazard assessment, but the approach is basically the same



Tank Configurations

- Not all Tanks are Equal
- Different Tank Construction Materials
- Old Tank vs. New Tank Styles and Design Standards



Different CSE call for different procedures and hazard assessment, but the approach is basically the same



WAC 296-809-600

Alternative Entry Procedures

- To Choose Alternate Entry Procedures for spaces where the only hazard is hazardous atmosphere
 - Established only after using the permit entry process
 - To qualify, there are ONLY Atmospheric Hazards which can be controlled/eliminated by mechanical ventilation.

An example of this for the OSS industry would most commonly be a “new” tank installation that has no piping connected to it from any other sources. It is important to highlight that all spaces are “permit only” until demonstrated to be something else through testing and review.



WAC 296-809-600

- Make sure, when using alternate entry procedures, instead of permit entry procedures, that you have monitoring and inspection data that supports the following:
 - That the only hazard of the permit-required confined space is an actual or potentially hazardous atmosphere.
 - That continuous forced air ventilation alone is all that is needed to maintain the permit-required confined space for safe entry.

Discussion here should focus on actually testing and recording the results of the determination.

It is worth while to note that the rule may allow for alternative methods such as the use of a Pump Truck and its hose on “vacuum” but there are specific requirements, documentation and written procedures that the service provider must do to validate the effectiveness its use.



WAC 296-809-600

- Make sure an entry to obtain monitoring and inspection data or to eliminate hazards is performed according to WAC 296-809-500, Permit entry procedures.
- Make sure all documentation produced is available to each affected employee and their authorized representative.

Discussion of the requirements of rule. It was common when WOSSA was observing in the field that we would see a tripod set up, harness used and air quality monitor attached to a pants pocket or waist belt and down into the hole, they would go! Paper work for one company was filled out post entry. The presenter should highlight that paperwork and actual environment assessment and testing is done and documented prior to entry.



- Use continuous forced air ventilation as follows:
 - Wait until the forced air ventilation has removed any hazardous atmosphere before entry
 - Direct forced air ventilation toward the immediate areas where entrants are or will be, and continue until they exit the space
 - Provide the air supply from a clean source *and* make sure it does not increase the hazards in the space

Language on specific requirements of use for forced air ventilation.



WAC 296-809-700

Nonpermit Confined Spaces

- Make sure any space you classify as nonpermit, does not have the potential to contain serious health or safety hazards
 - Follow the following requirements when classifying a confined space as a nonpermit confined space
 - Reevaluate nonpermit confined spaces if hazards develop.

Two elements for discussion are the actual testing and determination of the confined space atmosphere, document, document, document!

Pay attention to the work in progress (in any CSE), for changes. Reevaluation could also be triggered by observation of the entrant by the attendant...confusion, not immediately responsive, complaining of headache, vision, heat/cold etc. would be cause to immediately bring the entrant out and reevaluate the space.



WAC 296-809-700

Nonpermit Confined Spaces

- **Important:** A confined space may be classified as a nonpermit confined space for as long as the hazards remain eliminated. Once a hazard is present, you must follow all requirements of this chapter that apply



This discussion can be on field practice, but also is more likely oriented to fixed facility spaces and tankage. The signage provides a discussion point that even if a space has been determined to be non-permit required, you should always check the air quality prior to entry.



- Follow these requirements when classifying a confined space as a nonpermit confined space
 - The confined space cannot contain an actual or potential hazardous atmosphere
 - The confined space cannot contain hazards capable of causing death or serious physical harm. This includes any recognized health or safety hazards including engulfment in solid or liquid material, electrical shock, or moving parts
 - If you must enter to remove hazards, the space must be treated as a permit-required confined space until hazards have been eliminated

Discuss speaking points from slide: Key points for discussion are that the first two items in the list can initially be determined and evaluated from outside the tank. The last element in the list has the space treated as a conventional permitted CSE and needs the full permit procedure followed.



Note:

- Controlling atmospheric hazards through forced air ventilation does not eliminate the hazards.
- You should evaluate the use of lockout-tagout, as covered in chapter 296-803 WAC, to determine if using it fully eliminates the hazard
- You are allowed to use alternate entry procedures covered in WAC 296-809-600 if you can demonstrate that forced air ventilation alone will control all hazards in the space.

Discuss speaking points from slide:

Ventilation alone does not eliminate the hazard it only mitigates as long as it is operating. Industry uses different approaches to ventilation and not all are approved. Calculation of atmosphere turnover prior and during entry that is matched to equipment is rarely observed and should be part of this discussion.

If you can demonstrate that forced air ventilation alone will control ALL the hazards in the space, then alternate entry procedures are allowed.

The performance standard on this is more than running an air quality monitor while forced air ventilation is supplied and documenting the results. It is also not “transferable” to any other confined space. The employer can’t say “I’ve demonstrated that forced air controls all the hazards in a single 1,000 gallon tank”, and claim that all 1,000 gallon tanks are alternate entry.



You must:

- Document how you determined the confined space contained no permit-required confined space hazards. Certify this documentation with the following:
 - Date
 - Location of the space
 - Signature of the person making the determination
- Make the certification available to each entrant, or their authorized representative.

A continuation of the previous slides discussion and requirements.

Of note is the “signature of the person making the determination”. When you sign this, you are “certifying” your determination. Have you been trained? Are you current? Is your equipment calibrated? By who? When? Are you identified as a “competent person” for you employer?



Washington On-Site Sewage Association
"Voice of the Industry"

Confined Space Entry

Roles in a Confined Space Entry
Supervisor, Attendant, Entrant

SHIP
Grant Program
Safety and Health
Investment Projects
SafetyGrants.Lni.wa.gov
Funded by the Department of Labor & Industries

This is a transition slide in the presentation and shifts the discussion over to best practice in the field and a discussion of observations of a variety of work tasks.



Entry Supervisor (WAC 296-809-50018)

- Supervisor Tasks
 - Authorizes the entry into a permit-required confined space by signing the entry Permit
 - Oversees entry operations
 - Knows about the hazards that may be faced during entry, including the mode, signs or symptoms, and consequences of the exposure.

Discuss speaking points from slide: Details Supervisor tasks and responsibilities



Roles of Confined Space Entry

- Verifies and checks all of the following:
 - The appropriate entries have been made on the permit
 - All tests specified by the permit have been conducted
 - All procedures and equipment specified by the permit are in place
 - before approving the permit and allowing entry to the space

Discuss speaking points from slide: Details Supervisor tasks and responsibilities



Roles of Confined Space Entry

- Terminates the entry and cancels the permit when:
 - The assigned task or job has been completed
 - A condition in the space that is not covered by the entry permit is discovered
- Verifies that rescue services are available and that there is a way to contact them
- Removes unauthorized individuals who enter or attempt to enter the permit-required confined space during entry operations

Discuss speaking points from slide: Details Supervisor tasks and responsibilities



Roles of Confined Space Entry

- Determines that entry operations remain consistent with the terms of the entry permit and acceptable entry conditions are maintained:
 - Whenever responsibility for a permit-required space entry operation is transferred; and
 - At regular intervals dictated by the hazards and operations performed within the space.

Discuss speaking points from slide: Details Supervisor tasks and responsibilities. Final comments to the scope of the Supervisor's role. Especially since the Attendant in our industry is commonly going to function in a dual roll as Supervisor.



Roles of Confined Space Entry

- **SET UP:** Is to have a Safety Tail Gate and/or a JSA (Job Safety Analyst) and fill out the paper work and have all technicians sign the JSA/Safety Tail Gate as well. You need to go over all the hazardous and emergency plan with the crew before the job starts. To inspect all the equipment to make sure it has been set up properly and that paper work is filled out. That the site is secured.
- **DURING:** To maintain control over the job and assist in the safety and productivity of the crew and equipment.
- **AFTER:** Cancel and sign the permit, make sure entrant has disposed of or clean any contaminated clothing, PPE, safety equipment. Supervisor is to clean and maintain vehicle equipment. To ensure all appropriate paper work reaches dispatch and the safety coordinator. Job site has been cleaned and put back in working order. All equipment is accounted for and brought back in working condition.

Summary



Attendant (WAC 296-809-50020)

- **Attendant Tasks:** Provide at least one attendant outside the permit-required confined space during entry operations
 - Understands the hazards that may be faced during entry, including the mode, signs or symptoms, and results of exposure to the hazards
 - Is aware of the behavioral effects of exposure to the hazard

Discuss speaking points from slide: Details Attendant tasks and responsibilities



Roles of Confined Space Entry

- Continuously maintains an accurate count of entrants in the space
- Maintains an accurate record of who is in the permit-required confined space
- Communicates with entrants as necessary to monitor their status or alert them of the need to evacuate the space
- Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space

Discuss speaking points from slide: Details Attendant tasks and responsibilities



Roles of Confined Space Entry

- Orders entrants to evacuate the space immediately if any of the following conditions occur:
 - A prohibited condition.
 - The behavioral effects of hazardous exposure in an entrant.
 - A situation outside the space that could endanger entrants.
 - The attendant cannot effectively and safely perform all the duties required in this chapter.

Discuss speaking points from slide: Details Attendant tasks and responsibilities



Roles of Confined Space Entry

- Takes the following actions when unauthorized persons approach or enter a space:
 - Warn unauthorized persons to stay away from the space
 - Tells the unauthorized persons to exit immediately if they have entered the space
 - Informs entrants and the entry supervisor if unauthorized persons have entered the space
- Performs non-entry rescues as specified by your rescue procedure

Discuss speaking points from slide: Details Attendant tasks and responsibilities



Roles of Confined Space Entry

- Has the means to respond to an emergency affecting one or more of the permit spaces being monitored without preventing performance of the attendant's duties to the other spaces being monitored
- Carries out no duties that might interfere with their primary duty to monitor and protect the entrants
- Calls for rescue and other emergency services as soon as entrants may need assistance
- Monitors entry operations until relieved by another attendant or all entrants are out of the space

Discuss speaking points from slide: Details Attendant tasks and responsibilities.

It would be noteworthy to highlight element number two in the slide that speaks to the attendant responsibilities to not “carry out duties that might interfere with their primary duty to monitor and protect the entrants”.

This is especially important when the scope of the job changes. Based on the size of the space, more than one entrant, exposure level, level of control needed: ie- LO/TO, multiple tanks, multiple pumps etc. It may not be appropriate to function as both an Attendant and a Supervisor. Employee’s need to understand that if they find themselves in a situation (any) that they are uncomfortable with, they need to not only speak up, but stop work until they figure out what additional resources they need to accomplish the work.



Roles of Confined Space Entry

- **SET UP:** Is responsible for monitoring the entrants, keeps unauthorized entrants away from the space, has consent communication with the entrants, monitors their status, tells them when to evacuate, remains outside the space during entry operations until relieved by another certified attendant or until all entrants have exited the confined space. Use all equipment properly, determines that acceptable entry conditions are maintained, know the hazards, including the mode, symptoms and consequences of exposure and performs non-entry or entry rescue.
- **DURING:** Is to be monitoring and keeping in communication with the entrant at all times. **You are to record the gasses every 15 minutes and communicating with entrant at least every 15 minutes.** It is your responsibility to insure the safety of the entrant at all times.
- **AFTER:** Is responsible for making sure all safety equipment is cleaned, stored and check back in properly. That the job site has been cleaned and put back in working order or has been cautioned off and made safe until the next working day. **All equipment is accounted for and brought back.**

Summary



Roles of Confined Space Entry

Entrants (WAC 296-809-50022)

- Entrant Tasks:
 - Know the hazards they may face during entry, including the mode, signs or symptoms, and results of exposure to the hazards
 - Use equipment properly
 - Communicate with the attendant as necessary so the attendant can monitor entrant status and alert entrants of the need to evacuate

Discuss speaking points from slide: Details Entrant tasks and responsibilities.

While the attendants role is to have the entrants back, the primary person responsible for the entrants personal safety is the entrant himself.

That means that the entrant understands the hazards and has either personally evaluated and mitigated them or has reviewed the document record if it was accomplished by someone else.

Typically, for the majority of CSE in the OSS industry, this would normally be done by the entrant and his work partner (attendant).

Highlight the importance of personal responsibility and the ability to speak up if something changes or it is a situation that the entrant has never seen or done before...slow down, back up a step if you're not sure. In construction they say, "measure twice, cut once".



Roles of Confined Space Entry

- Alert the attendant whenever either of these situations exist:
 - A warning sign or symptom of exposure to a dangerous situation such as, behavioral changes, euphoria, giddiness potentially from lack of oxygen or exposure to solvents
 - A prohibited condition

Discuss speaking points from slide: Details Entrant tasks and responsibilities.

Can they recognize a prohibited (or hazard) condition?

There are three levels of exposure: 8 hour, 15 minute and immediate.

Discuss options and best practice for the attendant monitoring role. \

The attendant should be in line of site, in constant communication and in control of the non-entry rescue equipment.

If the CSE configuration doesn't allow that, then the entrant will have to work out with the attendant, how to communicate differently.



Roles of Confined Space Entry

- Exit from the permit-required confined space as quickly as possible when one of the following occurs:
 - The attendant or entry supervisor gives an order to evacuate
 - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation
 - The entrant detects a prohibited condition
 - An evacuation alarm is activated

Discuss speaking points from slide: Details Entrant tasks and responsibilities and handling emergencies. Keep in mind that as an entrant, you are monitoring your immediate space for air quality and any other hazards and have to respond to the best of your ability in what could be a deteriorating situation. The attendant/supervisor has a bigger picture and there may be something happening outside of your personal space that he/she needs you to react to, and get out.



Roles of Confined Space Entry

- **SET UP:** Is to communicate with the attendant, use all equipment properly, inspect the equipment before using it, exit from the permit space immediately upon an order to evacuate, an alarm warning or signs of a hazardous condition. Entrant must know the hazards, symptoms and consequence of exposure. Notify the attendant of any signs or symptoms of exposure to a hazardous condition.
- **DURNING:** Is to be doing their work in a professional, productive and safe manner at all times, it is your responsibility to know the signs of exposures in a confined space and to be communicating with the attendant and supervisor at all times.
- **AFTER:** Are responsible for making sure all safety equipment is cleaned, inspected, stored and checked back in properly. That the job site has been cleaned and put back in working order or has been cautioned off and made safe until the next working day. That all equipment has been accounted for and brought back.

Summary



Transition slide and testimonial



Excavations and Trenches

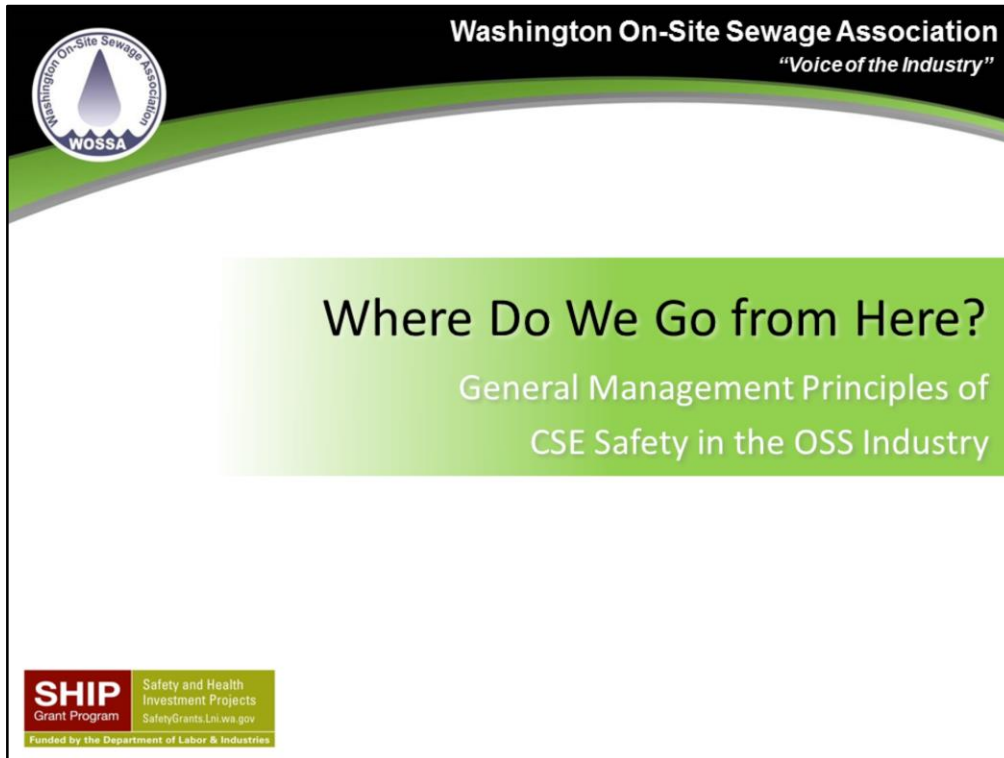
- Soil logs
- Tank Excavations
- Trenches

The presenter should also raise awareness of CSE issues and overlap with these three common work areas/tasks.

It is important to get participants to think differently about these spaces that they are in.

It is typical that these spaces are evaluated in context to the 7 soil categories listed in the Onsite WAC 246-272-A for OSS design.

Excavations (soil logs and tanks) along with trench safety looks at soil classification, setback requirements and slope/entry egress issues under a completely different set of criteria and the soils classification scheme is very different.



Safety begins as process management. While we don't always fall under a specific set of rules and guidelines, it appears that for this issue there is much that can be gleaned from Blood Borne Pathogen rules and methods that will be overlaid onto the CSE rules and assessment.

Small businesses are obligated to ensure a safe workplace under the "General duty" clause of both WISHA and OSHA.

Having an APP (accident prevention plan), PPE evaluation and use and a commitment from management to protect workers health is a minimum.



Where are we at now as an industry?

We found three levels of program

- Companies with no program or awareness of CSE requirements
- Companies with an understanding of the requirements but are non-compliant
- Companies with an understanding of the requirements but have gaps in their CSE Program



Discussion with the group to identify the current state of CSE program levels and where service providers in our industry are at as a indication of compliance system wide with the OSS

- Lack of knowledge that a CSE rule exists
- Lack of availability or access to the needed equipment to make a CSE appropriately and /or inability to use them (lack of training)



What are other factors?

The “Resistance” Barrier....

What reasons do you think the use of Confined Space Programs are so low in our industry?

- Resources
- Knowledge
- Time



Discussion with the group to identify the current state of CSE program levels and why service providers in our industry resist or simply do not consider CSE issues when entering confined space.

Several reasons are listed below, but encourage and recognize others offered by participants.

- Inability to identify confined space by employee's (lack of training)
- Lack of recognition of the hazards ("I've been doing this for 20 years and haven't died yet!")
- Overscheduling workload that leads to rushing or hurrying. ("I'll just be down there for a minute!")
- Peer pressure (fellow employee's or business owner)



Everyone is different, But

- Behaviors are learned
 - Perception of risk
 - Acceptance of risk
 - Past Experience
 - Current need



Discuss the obvious exposures as a start, because it is individual decisions that will ensure compliance on a personal level. The discussion should start here based on what we see in the field. Ask the participants to identify some common exposure elements to the work activity and put it in context to the CSE rules. This concept can be addressed from both an owner's perspective that can have a huge impact on employee's and the employee's that make decisions in the field.

- Access/Egress suitability
- Point out the cable and use of harness for non-entry recovery
- Identify the forced air supply

ASK – What else?

- Hot work considered (fumes)
- Electrical equipment used (grinder and electrical extension cord trailing the air tube)
- Does it matter that the entrant is standing in 6" of water/sewage?
- What additional PPE would/should be considered?



Safety is the individuals personal responsibility, co-workers and employers support a safety culture in the workplace, but it is the individual that makes the final decision to do something unsafe or not...invite the participants to share their personal experiences in CSE's, current programs and others along with any examples of how they work and when they don't.



How Do I Know if I need a CSE Program?

- The rule applies to your company if any of the following exist
 - There are confined spaces in the workplace
 - Your employees will enter another employer's Confined Spaces
 - A contractor will enter your CSE's
 - You provide confined space rescue services

An introduction to the WA WAC that applies to industry and the requirements of individual CSE programs and requirements will be outlined.

The order of the introduction of the administrative rule is to work through the individual sections of the WAC and then follow with a practical application of rule and introduction of a generic tool that can be used or modified for individual company needs.



- **Summary Requirement:**
 - Identifying and control of permit-required confined spaces
- **Your responsibility:**
 - To identify your permit-required confined spaces and control employee entry
- **You must:**
 - Identify permit-required confined spaces



Discuss speaking points from slide: Details Employers tasks and responsibilities



Administrative Requirements

- **WAC 296-809-20002 : Identifying and Controlling Permit Required Confined Spaces**
 - Identify permit-required spaces
 - Posting signs?



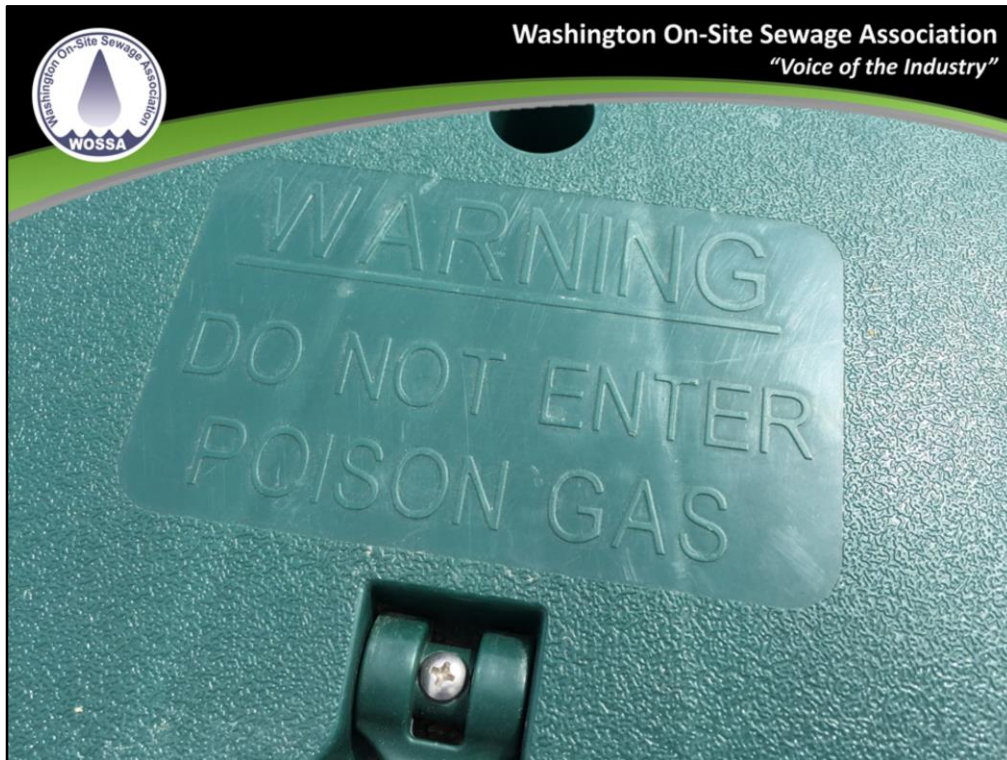
Minimum labeling



Better??

Discuss speaking points from slide: Details Employers tasks and responsibilities

While you can't post signage on every septic tank your on, spaces like truck tanks, transfer storage tanks (that have openings large enough for entry) can be labeled and demonstrate workplace evaluation and controls.



Industry manufacturer's are putting this kind of labeling on their products, but it is generally inconsistent. It is important (especially with new hire training) to orient your workers. They may see lids that have this and go to another worksite and look at a lid on an identical tank that doesn't have this notice and ASSUME that it must not be dangerous. Who knows how they come to these conclusions, but they do!



Labeling from the manufacturer is convenient and becoming more common place.



Same comment, different label on a pump truck.



- **Your Responsibility (cont.):**
 - Inform employees and control entry to permit-required confined spaces.
 - WAC 296-809-20004
 - Follow these requirements when you contract with another employer to enter your confined space.
 - WAC 296-809-20006

Discuss speaking points from slide: Details Employers tasks and responsibilities

Although not common, raise awareness to employer's that subcontract work out. Follow these requirements to address your evaluation of "their" CSE written plan.

As an owner, that's the first question you should ask a subcontractor that your going to allow to do work.

Don't ask "do you have a confined space program?" Your question should be "please give me a copy of your *written* confined space entry program, for review before you start work on the project".

If they don't have a written plan, you should look for another contractor.



- **WAC 296-809-300 Summary**
- Your responsibility:
 - To develop your permit-required confined space program and practices
- **IMPORTANT:**
 - This section applies if employees will enter a permit-required confined space

Presenter should highlight the importance of the requirement of a “written” plan with full documentation.



- **You must: WAC 296-809-30002**
 - Develop a written permit-required confined space program before employees enter, that describes the means, procedures and practices you use for the safe entry of permit-required confined spaces as required by this chapter. Including the following:
 - Documentation of permit entry procedures
 - Documentation used for alternate entry procedures
 - How to reclassify permit –required to non-permit Confined Spaces
 - Designation of employee roles: entrant, attendant, entry supervisors, rescuer, and those that test or monitor the atmosphere
 - Identification of designated employee duties
 - Training employees on their designated roles

Without a written plan, that covers these elements, you don't have a CSE program. The presenter can ask the group to define the barriers that small business owners have to putting the time or investment into meeting the administrative requirements.

Emphasis on how the administrative effort at the front end of the program can also save time and expense by establishing the scope of individual company needs. This may also eliminate elements of the rule that do not apply to an individual business model. It is important to state that the tools in this program will allow them to efficiently create their written plan, and translate that into a prioritized action plan for program implementation.



- **You must:** WAC 296-809-30002 – Cont.
 - Provide training to employees
 - On how to identify and evaluate hazards
 - Use and maintenance of the equipment
 - How to prevent unauthorized entry
 - How to coordinate with another employer
 - How to rescue entrants
 - Note: For alternate entry, your written program only needs to meet requirements of WAC 296-809-400, employee training and WAC 296-809-600: alternate entry procedures

Presenter should speak to the key notes on the slide. Remind folks that this is language taken directly from code. It is not an “interpretation” or the presenters “opinion” on the application and scope of the code to the OSS industry.



- **You must:** WAC 296-809-30004 – another employers space
 - Obtain any available information about permit-required confined space
 - Coordinate entry operations with any other employers whose employees will be working in or near the confined space
 - Inform the host employer, either through a de-briefing or during operations about:
 - The entry program that you will follow: and
 - Any hazards you confronted or created in the space during entry operations

The presenter should ask the group they are instructing if anyone does work under any of the elements described.

Generally, it will be uncommon, but situations change and it is important to have participants understand the requirements when working on a larger site with multiple companies and under a general contractor.



- Summary:
 - Your Responsibility
 - To make sure employees are trained to perform their designated roles safely.
 - You Must
 - Provide employee training per WAC 296-809-40002
 - Certify employee proficiency per WAC 296-809-40004

Presenter should refer participants to the codes referenced in the slide and get them to find and review them in their handout resources. This will introduce the detail of the requirements but also orient them to the resource when “post-class” they need to know where to look something up for review or clarification.

Further discussion and Q&A opportunity to engage participants follows in the next several slides



- Provide Employee Training:
 - You Must
 - Provide training to each employee involved in permit required confined space activities so that they acquire the necessary understanding, knowledge and skills to safely perform assigned duties.
 - Note: Employers can determine proficiency by:
 - Observing employee performance during simulated exercises
 - A comprehensive written examination; or
 - Any other method that is effective for the employer

The presenter can reference this program as meeting the needs for this requirement and also remind the participants of the availability to engage the use of the class for new hires in a regular training program.

It may be worthwhile to encourage participation to ask how these requirements are currently being met. Many of the CSE training that is generally available meets the first element on the slide, but being able to practice and demonstrate proficiency through simulation is often the most frequent and absent part of training. If the employer is unable to accomplish this in the workplace post class, it is best done with the practical assessment done in live but safe situations.



- Provide Employee Training:
 - You must provide training at the following times:
 - Before an employee is first assigned to duties under the chapter
 - Before there is a change in assigned duties
 - When there is a new confined space hazard for which the employee has not already been trained
 - If you have reason to believe there are either deviations from your procedures or employee knowledge *or* use of your procedures are inadequate.

The presenter will speak to each element. It basically outlines different moments of opportunity that the employer can take advantage of but recognizes that the workplace (and especially that in the OSS industry) is a pretty fluid environment. Each jobsite is different and each CSE is a new situation to evaluate.



- Provide Employee Training:
 - You Must:
 - Certify employee proficiency in their assigned duties
 - Make sure the certification contains:
 - Each employee's name, the trainer's written or electronic signature or initials and the date of the training and is available for inspection by employee's and their authorized representatives

Participation in this class will certify CSE knowledge to the rule and experience in evaluating and understanding the three principle roles in a CSE. The employer has responsibility to certify proficiency to assigned duties that are not only task specific, but also match services offered. It's why they have their written plan that is company specific.



- Summary:
 - Your responsibility
 - Establish procedures for permit required CSE
 - Implement those procedures
 - Use and entry permit that contains all required information
 - Keep and review your entry permits
 - Prevent unauthorized entry
 - Provide, maintain and use proper equipment
 - WAC 296-809-50002,50004, 50006,50008,500010,

Introduction slide of the next section/topic of the CSE rule and it's application



- Summary:
 - Your responsibility
 - Evaluate and control hazards for safe entry
 - Assure availability of rescue and emergency services
 - Use non-entry rescue systems whenever possible
 - Ensure entry supervisors perform duties and responsibilities
 - Provide an attendant outside the permitted confined space
 - Ensure entrants know the hazardous conditions and their duties
 - Have and implement procedures for ending entry

Continuation of previous slide



Example Procedure For Permit

When a confined space work activity is identified, it is a requirement to use and complete a CSE permit to evaluate the space.

You must test the atmosphere before entering .

You must monitor the atmosphere the entire time the entrant is in the space.

You will note this in the area of the permit where it says Atmospheric Monitoring.

If the entrant leaves the space and then enters at a later time you will need to test the atmosphere before the entrant enters the confined space and do constant monitoring awhile entrant is in the confined space.

All areas of the permit will be completed and supervisor signs off on the time permit canceled.

Presenter should focus on the sequencing of these tasks. Use your permit and evaluation procedures on the job prior to entry, do air quality monitoring while completing the permit and do it again just prior to entering the confined space.

When the job is done, complete the permit and close out the entry. Make any comments on the permit to anything that was different, a challenge, unanticipated during the entry. Permits can (and should) be reviewed at a later date as a QA issue to the program and to highlight any previous unknown exposures or new tasks that the existing program didn't or can't address. Corrections or expansion of the CSE program will occur if needed.



Example Procedure For Permit

The permit will be used if self entry, non-entry or entry rescue is performed. All information will be completed. The permit will be signed of at the completion of the job when the CSE has ended.

If you have not identified and evaluated a third party rescue service, you must use non-entry rescue equipment on permitted CSE's. Indicate where the Permit forms are located and available.

Key point to this discussion slide is the issue around non-entry rescue equipment and the challenges of working alone...

Presenter should ask the group "how do you address these issues now?" and then offer references to the rule or study resource.



Transition video and testimonial



Equipment Review

Equipment (Inspect all equipment before and after entry):

- Tripod
- Winch
- Harness
- Blower
- Gas monitor
- Lock Out/Tag Out Equipment
- Communication Methods
- Permit Paperwork



Introduction slide to PPE equipment. Presenter should note that this is typical but for specialty jobs, you may need more or different PPE.



Equipment Review



Presenter should point out several options here:

- 1.) Gas operated, note the intake hose is far from the exhaust. Pay attention to wind direction when setting these up, and placement of nozzle end: Ask the participants if it should go into the top, center or bottom air space and why.
- 2.) Reduction nozzle on air supply hose provides for better access and egress
- 3.) Note the anchoring system tab under the steel lid.



Different configuration...Electric



Equipment Review



Presenter should discuss the variety of options in this and next slides. Ask participants what they use.

What do they like and not like about them?

What if it's a horizontal entry that you are connecting into...what changes in your entry protocol?



Equipment Review

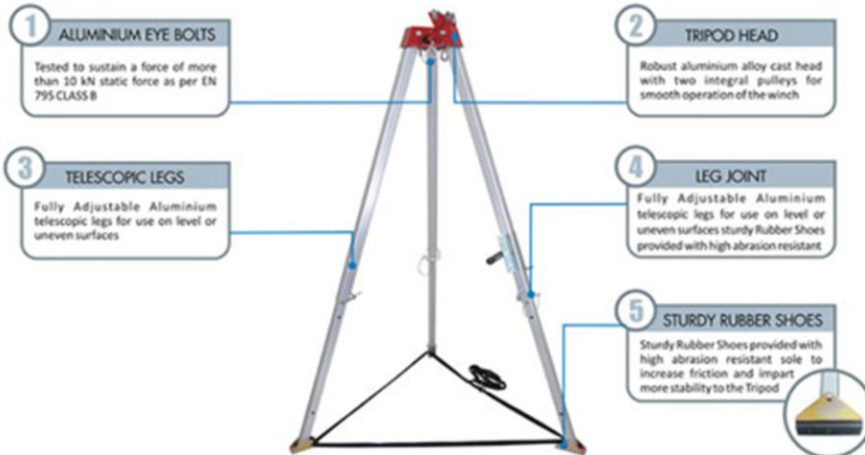


Presenter should explain anchoring this system, how it works to extract and ask the group to explain what can go wrong or right in an extraction. Not looking for right and wrong answers as much as getting them to think through and imagine the scenario and what they would or would not do. Advantages? Disadvantages?

A real life application would be a “swim job” under a house in a crawl space. Have them talk through the process of a set-up and extraction under those circumstances.



Equipment Review



Most common vertical entry tri pod. Presenter should highlight the 5 critical elements and stability issues of setting these up. It is important to ensure they are on a stable platform/lid top or the ground. You don't need this to fail and tip over with 4 more cranks to go to get you co-worker (now a victim) out of the confined space.



Equipment Review



Right ways and wrong ways to do initial checks of air quality.

Presenter should show slide and ask if this is “ok” and lead the discussion to let participants describe why this is wrong and what some of the consequences may be (headlong into the tank from inhaling gasses that are venting).

Note the liquid level in the space with the reflection of the worker.



Right way to conduct an air quality test in a confined space, using a probe.



Equipment Review



Slide begins discussion of appropriate PPE of filters and masks. It's about choices and making good decisions. If all a worker needed in his or her toolbox was a crescent wrench they could cover all nuts including metric. But, real live doesn't happen that way and neither does selection for PPE.

Presenter should survey the room for participants with facial hair. Although not covered in detail in this program, it is noteworthy to point out that if an employer has an exposure mitigation program that includes a facemask requirement, the it will also require a face fit procedure to be followed. Facial hair generally doesn't pass muster in these issues.

It ultimately goes to the "fit for use" issue and selection of PPE.



Equipment Review

PPE (Personal Protective Equipment):

- Hard Hat
- Gloves
- Safety Glasses
- Respirators (Must be certified) / filters
- Face Shields (When possibility of flying fragments, objects, large chips and particles.
- Steel Toed Boots
- Tyvek Suits
- Ear Protection
- Lighting



Presenter will review various PPE for barrier protection: head, eyes, hearing, torso, hands and arms, legs and feet. Also issues for external environment can be integrated into the discussion: heat, cold, rain, wind, poor lighting.



Readings on Sniffer

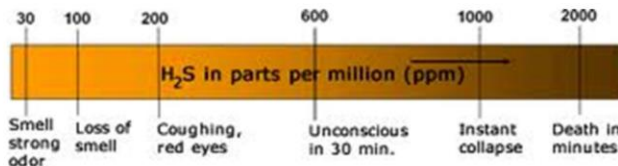
- **Oxygen:** (Chemical Form O₂) Needs to read between 19.5% and 23.5%: Too much oxygen: things burn very, very easily in oxygen enriched atmospheres, so that's a bad thing; too little can cause a Carbon Monoxide.
- Physical signs of not enough oxygen would be uncoordinated, judgment becomes impaired, and people become unconscious and or die.
- READING SHOULD BE = 20.0

You have to be able to breath. To get the work done and to be able to get out. The presenter should review the key points and engage the participants in some Q&A or shared experiences that are work related or not.



Readings on Sniffer

- **Hydrogen Sulfide** (Chemical Form H_2S): Colorless, smells like rotten eggs; heavier than air; very poisonous, corrosive & explosive. (Physical signs of hydrogen sulfide poisoning irritates the eyes, nose, throat and respiratory system; burning tearing of eyes, cough or shortness of breath, headache, dizziness, nausea, vomiting, excitability and or staggering. READING SHOULD BE = 0)
- **IDLH**: immediately dangerous to life and health (level that interferes with the ability to escape) (NIOSH)
- **PEL**: permissible exposure limit (enforceable) (OSHA)



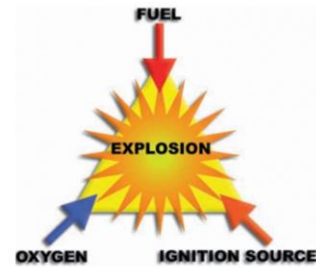
H_2S Gas can be produced by sewage. Point out exposures in context to physical characteristics of the gas.

- How does it affect your location of ventilation
- When you put your vacuum hose in the inlet, but only 18 inches down or your mechanical air supply, what do you suppose happens to the air movement and turnover rates in the bottom of the tank?
- What if you're on your hands and knees spreading concrete around the bottom for a tank repair?
- What is different if you are doing all of this in a pump tank? (electrical/energy) if not LO/TO
- Will your N-95 mask protect you?



Readings on Sniffer

Methane (Chemical Form CH₄) – Colorless, odorless flammable gas that is the main constituent of natural gas. Methane is found in the ground; it displaces oxygen and is a combustible gas. (Physical signs of inhaling methane: headaches, tiredness or fatigue, dizziness, nausea and may become confused, irritable, difficulties with physical coordination or death.) READING SHOULD BE =0



It why we ventilate, and check prior to going in.

It is important to point out that methane gas *may* get trapped in sludge in the bottom of the tank if not pumped out and with disastrous results.



Readings on Sniffer

Carbon Monoxide (Chemical Form CO) - Colorless, tasteless, odorless; lighter than air; takes the oxygen out of the air. Carbon monoxide is in car exhaust fumes, cigarette smoke, fires, electrical generators, propane fueled equipment. (Physical signs of carbon monoxide poisoning is headache, dizziness, nausea, convulsions, death.) READING SHOULD BE = 0



One of our shared stories was a service provider that was inside a tank replacing a sheet baffle that had fallen off with a pneumatic hammer. There were four connection points. When he had pulled the trigger on three of them (.22 rounds), his air quality monitor went off.

Presenter can also reference other equipment noted in slide that is common in the OSS industry.



Ventilation –

Natural: Depending on the configuration of the confined space, natural ventilation, together with eliminating and introduction of new contaminated, may be enough to control or mitigate atmospheric hazards.

Mechanical: Pushing fresh air into a space under positive pressure, or exhaust ventilation where you are removing the contaminated air. Use with new tanks

Exhaust Ventilation or Negative Pressure: Pulls contaminated air out of the space. Take care not to contaminate the area outside the space with materials pulled from inside of the space. Exhaust ventilation is considered to be the better way to ventilate flammable or toxic atmospheres. Use with contaminated tanks in use.

This slide sets up the discussion on ventilation methods under the rule and what is common in practice for our industry.

Code calls for mechanical ventilation, and the exhaust ventilation is under discussion as an acceptable practice, but hose placement and volumetric turnover rate is critical.



Air Turnover/Ventilation

CFM (pump size)	Gallons (tank size)
20-40	80-200
50-90	150-500
100-120	400-800
130-150	700-1,200
160-200	1,000-1,800
210-240	1,700-2,500
250-280	2,400-3,000
290-340	3,100-3,600
350-400	3,500-4,200

Discussion:

Different size tanks need different volumes of air to adequately ventilate them.

Do you push air in? or should you pull air out?

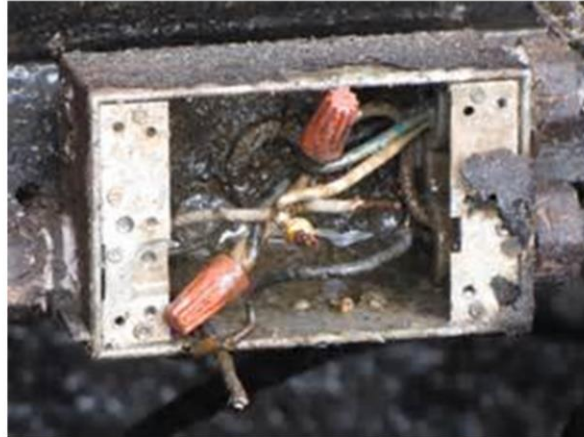
Answer: it depends on the situation.

First question: Is the space clean (new) or contaminated with sewage?

- If air is “clean”, best practice is to calculate the air turnover rate (see chart) and always blow into the space and monitor
- If “contaminated”, and you blow air into the space (see chart), you will need to wear additional PPE (N-95 fitted face mask’s, goggle’s for contaminated aerosols created by the blower) and monitor wearing a personal air quality monitor.
- If “contaminated”, and you are sucking air (see chart) via a pump truck or blower, ensure that the hose or blower hose, is well inside the tank and unblocked. It is still recommended to wear a minimum of an N-95 face fitted mask along with goggles or eyewear with side shield protection.



Common find in a Pump Tank



Electrical connections at installation of OSS pump tanks and components like this are all too common. LO/TO procedures, especially in CSE situations are critical.



Hazard Control

Lock Out / Tag Out

Six Steps:

Preparation for shutdown – Know the types and magnitude of energy involved, the hazards of the energy and the methods of controlling the energy.

Shutdown - This may be as simple as throwing a switch or it may require a more orderly, methodical shutdown sequence,.

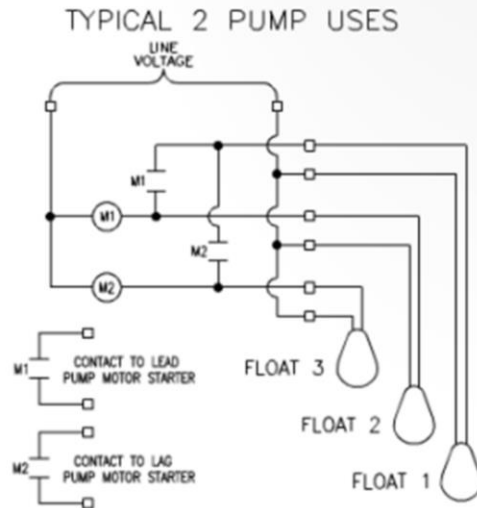
Isolation – Locate ALL energy isolation points that control the particular equipment involved.



LO/TO procedures are well documented



LO/TO – you need to be able to read these





Hazard Control

Lock Out / Tag Out

Six Steps:

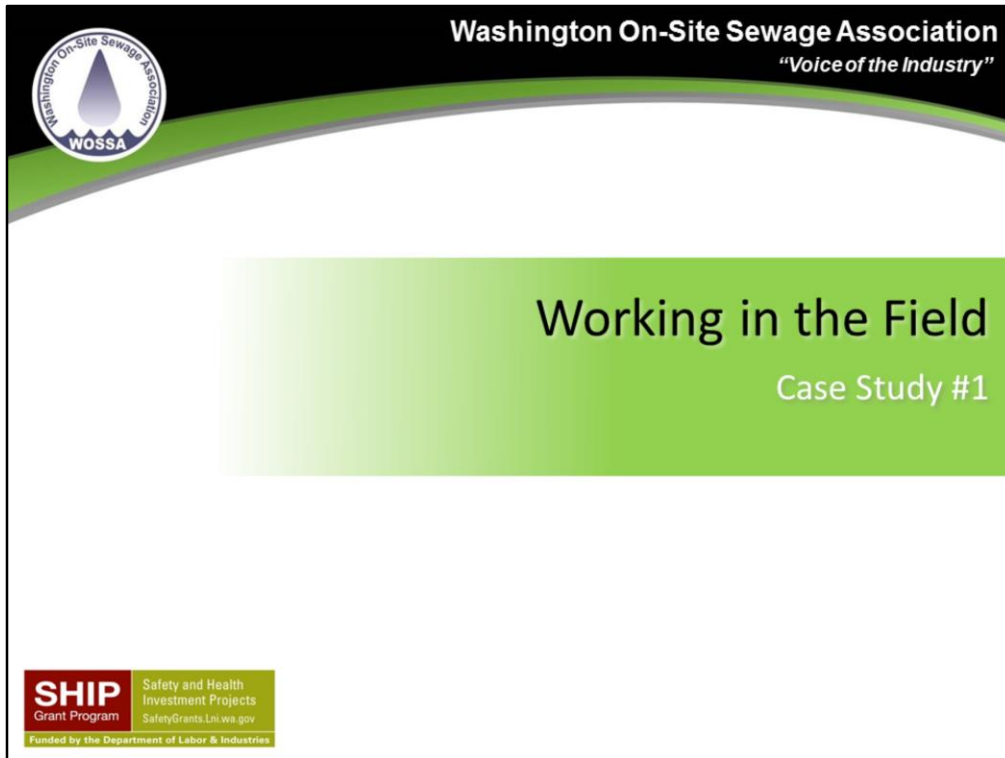
Application of lock out/ tag out devices: lock out / tag out devices shall be installed by and authorized employee to hold the energy isolation points in a safe position.

Control stored energy – Assure all potentially hazardous stored energy is controlled and /or alleviated.

Verification of isolation – An authorized employee shall verify, prior to entering the space or performing work on equipment, that it has been locked and/or tagged.



LO/TO procedures are well documented



This is a transition slide in the presentation and shifts the discussion over to best practice in the field and a discussion of observations of a variety of work tasks.



This is the beginning of a project in the field. The existing tank was decommissioned and a new tank (and drainfield) was being installed.

This field case study focuses on exposures in a tank excavation and multiple employers on the site.



Tank excavation and preparations for new tank installation



A non employee (agency inspector), on the site, jumped into the hole to inspect a pipe in the ground that was exposed just above her head and to the right (follow the shadow line to the dark spot).

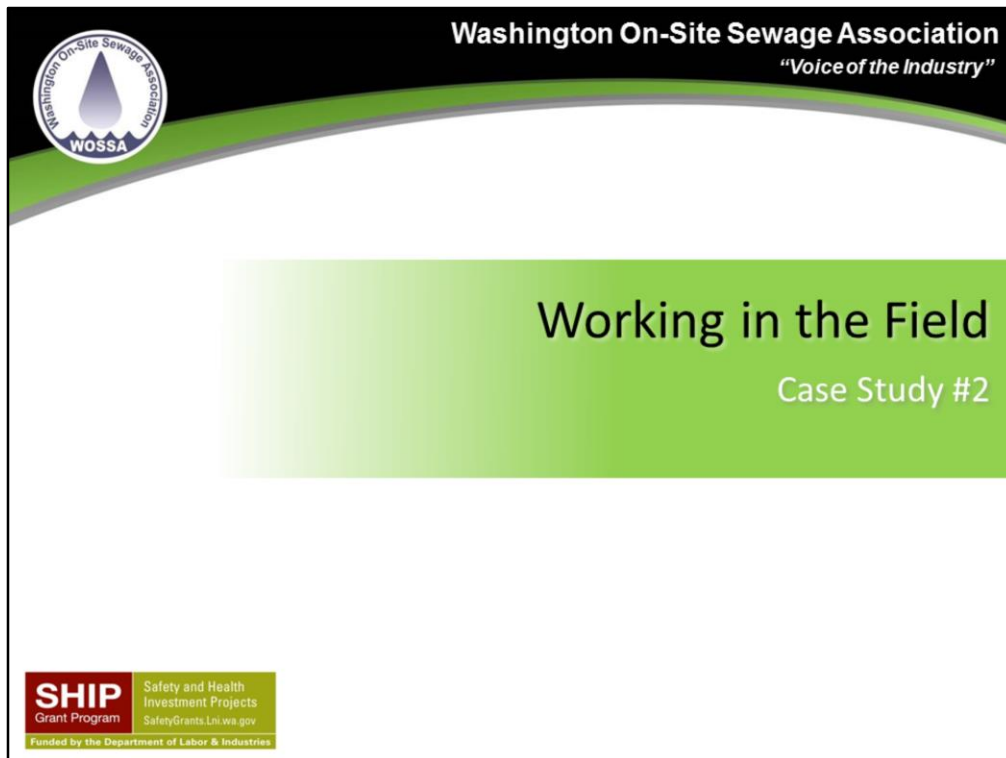
- Ask the group how many rules were violated here under the code?
- What were they?



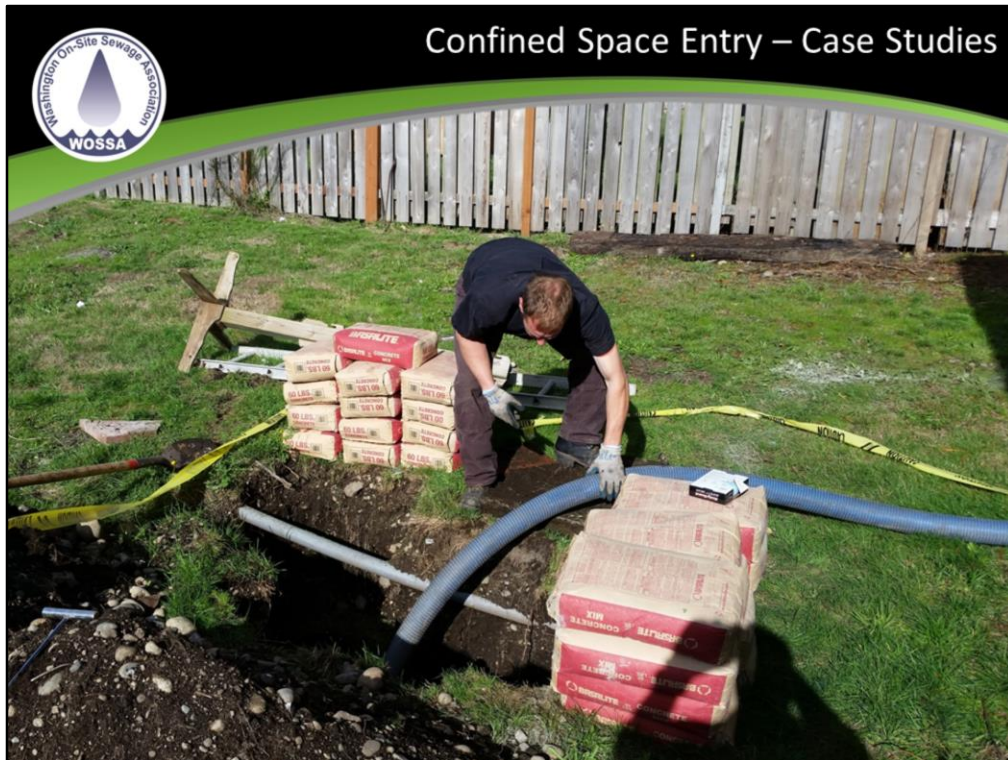
Typical industry practice of an employee being in the hole over 5 feet deep, leveling out gravel prior to tank placement (violation of excavation rule).



New tank installed, employee making an uncontrolled CSE to place a baffle and connect the house sewer pipe to the tank.



This is a transition slide in the presentation and shifts the discussion over to best practice in the field and a discussion of observations of a variety of work tasks.



Exposure:

Material not a minimum of 2' back from excavation edge in an uncontrolled CSE.

Engulfment and struck-by potential of the employee (unseen) that is inside the tank.



Presenter engage the class on the right and wrong activities/violations in this work task in perspective of being an “entrant”

- Non rated ladder
- limited egress
- danger from falling items above with no hard hat.
- Unseen in the picture the employee is wearing an air quality monitor, but on his hip and not near his face (best practice).
- CSE form not used prior to entry
- Air quality not tested prior to entry



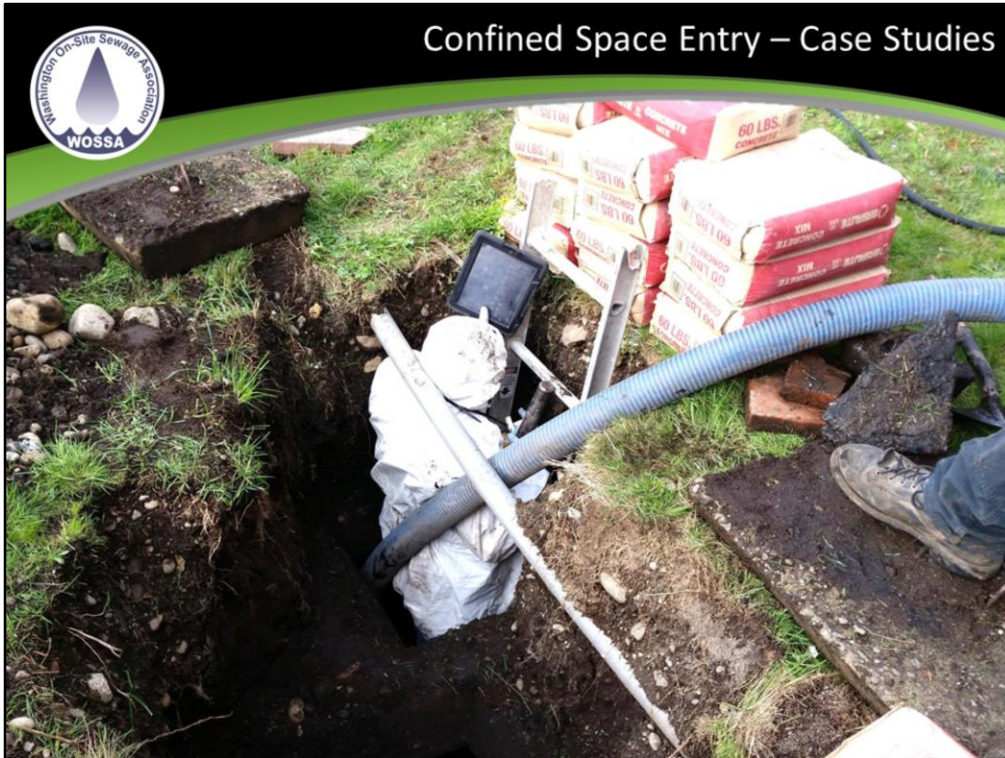
Presenter engage the class on the right and wrong activities/violations in this work task.

- Tank repair (contaminated), so permit entry required
- Entrant just lost his method of egress/self rescue
- No non-entry rescue available or used



Presenter engage the class on the right and wrong activities/violations in this work task.

Exposures to both heavy sacks of concrete and soil collapse on entrant



Presenter engage the class on the right and wrong activities/violations in this work task.

What are the unique exposures here?

Entrants and attendant/supervisor allowed entry without knowing what the white pipe was in the picture. It is not a part of the OSS system. Is it electrical?, is it water under pressure?

The point is that it is not known and workers didn't make any attempt to determine if it presented a hazard or not, principally because they did not have available or use the CSE form from their employer.



Presenter engage the class on the right and wrong activities/violations in this work task.

These are the feet of the attendant, standing on a narrow ledge above the hole and the entrant.

- He could fall in
- He could fall in and injure his entrant who is below him
- He is generally unable to provide much aid standing in the hole below the ground surface



Presenter engage the class on the right and wrong activities/violations in this work task.

Does the condition of the equipment affect its functionality if the “sniffer” is covered in dirt, mud and fecal material?

Inspection of the device (not shown in the picture) showed that it was beyond its calibration date.



Presenter engage the class on the right and wrong activities/violations in this work task.

Maybe none at this point, but a review of the MSDS sheet on the concrete was pretty significant to the dust exposure.

This employee is going back down into the hole with unknown dust levels of an inhalation exposure significant.



Section V - Health Hazard Data

Acute Effects: Wet cement on unprotected skin, whether direct or through saturated clothing, can cause severe, third degree caustic burns. **NOTE: Portland cement burns skin with little warning; discomfort or pain cannot be relied upon to alert a person to a hazardous skin exposure. The severity of the burn may not be detected until several hours after the damage begins.** Dry portland cement can produce mild irritation to severe burns of the eye; it can irritate the upper respiratory system.

Reference previous slide



Confined Space Entry – Case Studies

Chronic Effects: Dry Portland cement can cause inflammation of the lining of the nose and the cornea. Repeated exposure to Portland cement may result in drying of the skin and may lead to thickening, cracking, or fissuring of the skin. Hypersensitive individuals may develop an allergic dermatitis (possibly due to trace amounts of hexavalent chromium at less than 0.005%). This reaction may appear in several forms including a mild rash to severe skin ulcers. Persons already sensitized may react to their first contact with the product. Other persons may experience this effect after years of exposure to Portland cement products.

Reference previous slide



Confined Space Entry – Case Studies

Signs and Symptoms of Exposure: Burning sensation around moist tissue areas (i.e., eyes, nose, upper respiratory system); painful burning on exposed skin that can develop with little warning.

Exposure of sufficient duration to wet Portland cement can cause serious, potentially irreversible tissue (skin or eye) destruction in the form of chemical (caustic) burns, including third degree burns. The same kind of destruction can occur if wet or moist areas of the body are exposed for sufficient duration to dry Portland cement. **DO NOT ALLOW WET PORTLAND CEMENT TO GET INSIDE BOOTS, SHOES, OR GLOVES AND DO NOT ALLOW WET, SATURATED CLOTHING TO REMAIN AGAINST THE SKIN.**

See next slide



Normal procedure is for the employee doing the tank repair is to shovel the concrete around the floor until it is more or less the same depth and then to add water via a hose (20-40psi) and then be on his hands and knee's spreading it around until uniform.



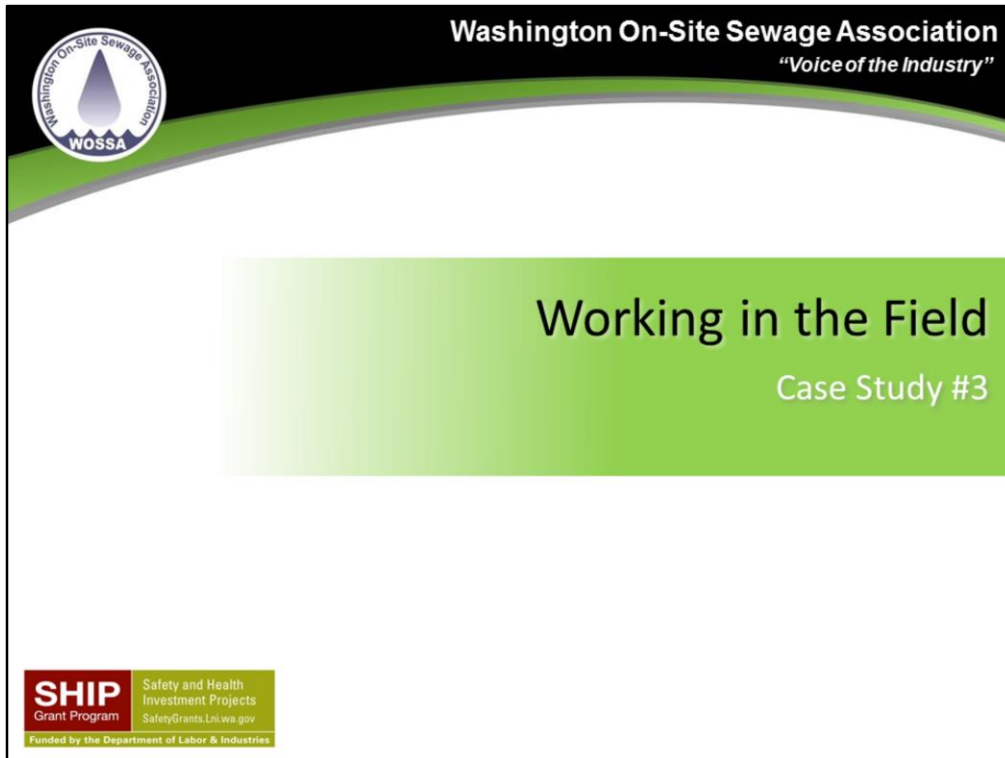
Confined Space Entry – Case Studies



CSE Program:

- No CSE Paperwork at Entry
- No Pre-Entry Air Quality Testing / Yes - Active Air Monitoring
- Air Vacuum w/ Truck Hose
- No Mechanical Rescue Equipment
- Second Person On-Site

Presenter to highlight list on right.



This is a transition slide in the presentation and shifts the discussion over to best practice in the field and a discussion of observations of a variety of work tasks.



Confined Space Entry – Case Studies



Key Points:

This is an excavation (done by the homeowner) in anticipation of a property sale and required tank repair in place. On the high side, there was approximately 6 feet of dirt on the tank and unknown engineering standards for tank construction.

Frost on the ground, temperature changes from 28 degree's in the AM to 48 degree's later in the day.

The service provider had workers out the previous day who prepped the site and pumped the tank out.

Presenter should engage the participants to identify any issues that they see.

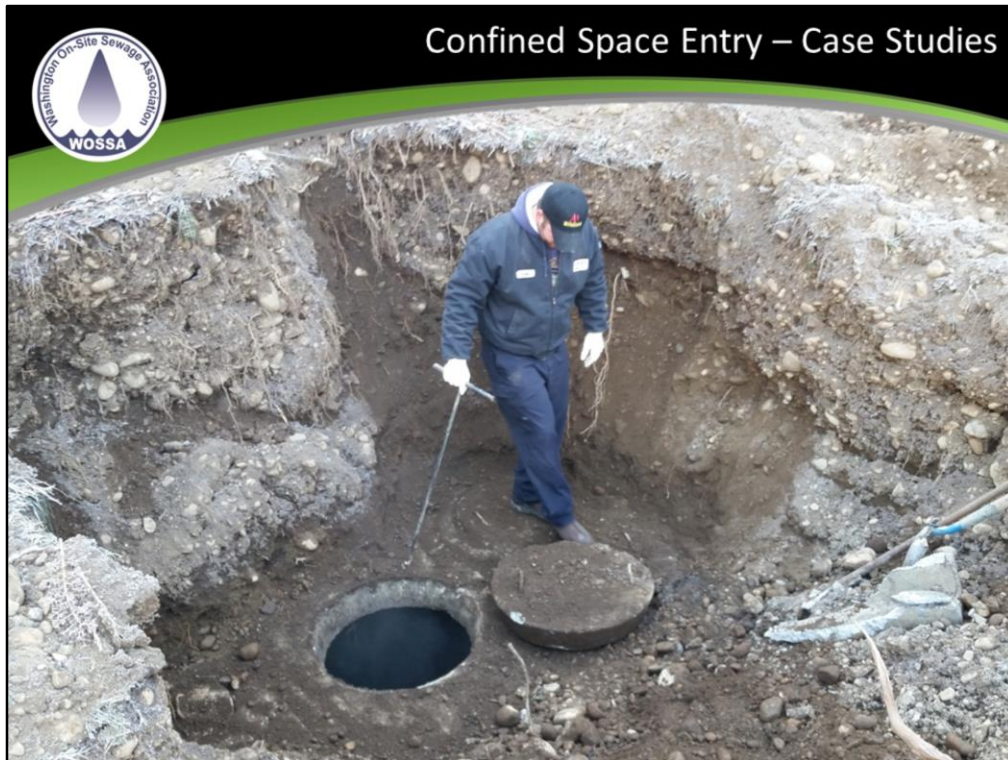
Note sluffing of material onto top of tank. The previous day, employee's shoveled and swept of the top of the tank until it was clean.



Key points:

Day two, different workers from the same company are here to repair the tank inside and it will require a CSE.

Although the excavation is on a slope and appears to be deeper than the 5' limit, there is egress out of the excavation to the right.



Key Points:

The top of the tank is being inspected on day two by the company employee's after having been shoveled off and cleaned up.



Key Point:

The workers were uncomfortable with the set up for making a CSE.



Key Point:

As the morning continued to warm up, more material sloughed off onto the tank, and the employee made the call that they were not going in until the excavation had been stabilized.

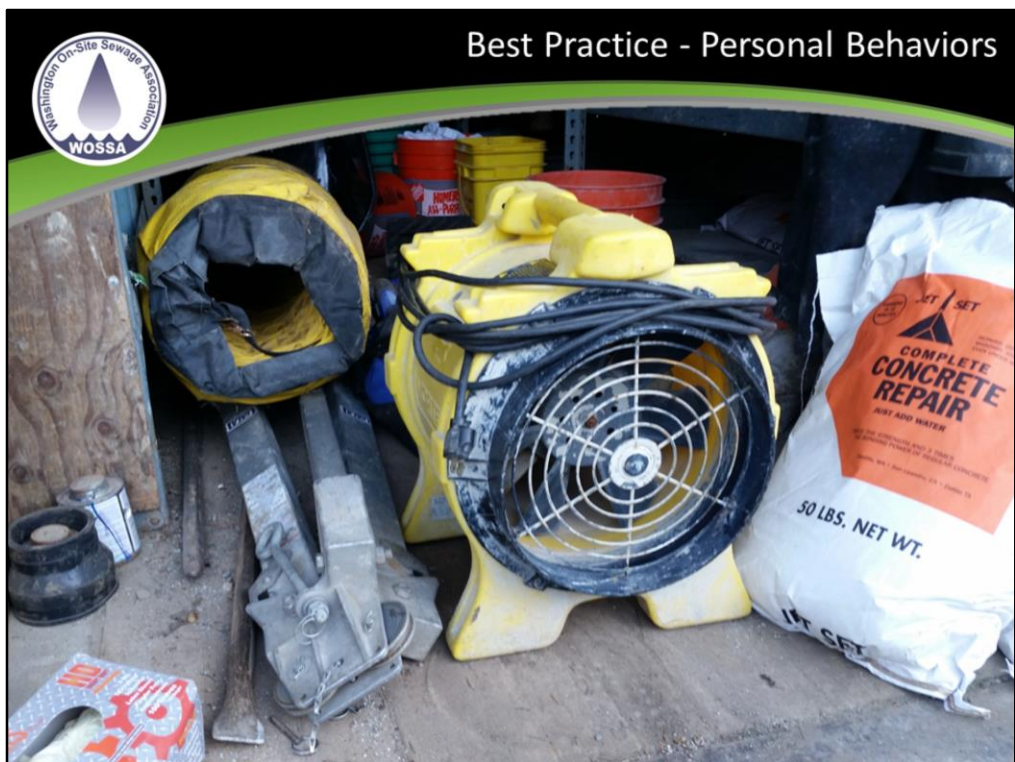


Confined Space Entry – Case Studies



Key Point:

Third day: The homeowner who had access to an excavator opened up the excavation to reduce the potential of exposure and they company workers prepared to continue the project.



The company provides the necessary equipment for employee's to do tank repairs as it is a specialty of the service provider.



Confined Space Entry – Case Studies



Key Point:

Set up for the job, and having the equipment available does not take an extraordinary amount of time and is a billable.



Key Point:

Almost set up to make the CSE, but the employee's are about to make some changes to the procedure.



Key Point:

The entry looks like it will proceed as planned.

The Entrant instructed the Attendant to set up the air supply on reverse (pulling air from the tank), because he didn't want "cold" air blowing on his neck while he was inside doing the work (it was about 35 degrees).

The air supply was simply laid on top of the inspection port. You can see the gap in the hose orientation. This has the potential to limit its effectiveness and intended use.

First, heavier gasses that may be in the bottom of a tank will not likely be ventilated properly and second, the effectiveness of the blower operating in reverse with the poor match up of the hose being a round tool in a square (and smaller) hole will mean that it is pulling *some* percentage of atmospheric air while it runs. The net effectiveness of the turnover rate of the tankage volume will be diminished and the actual exposure may not be satisfactorily mitigated.

Presenter may make the point that even with a CSE program in place, employee's will often make independent decisions that will compromise the protocol with or without consequences.



Getting ready to go to work, attendant in place

No CSE permit was used prior to entry.

No Air quality monitor was used prior to entry.



Broader view of the worksite



Where's the attendant??

Presenter can ask the class about the role of the attendant:

Was he:

- Immediately available
- Actively monitoring the entrant
- Line of site or active communication
- Actively monitoring the external workspace for changes



Key Point:

Work is going on, but this is essentially a similar condition to the video. Deeply buried tank, side wall failure, winter conditions, unknown high winter water table level.

With no permit used, these questions remain unanswered.

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WOSSA

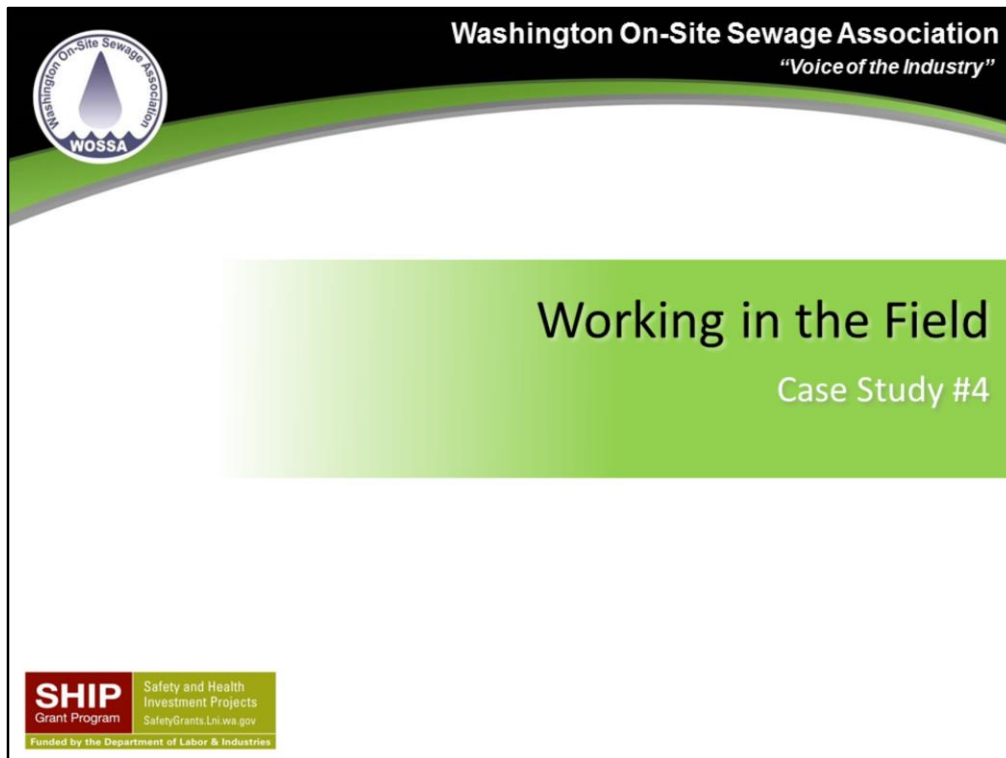
Confined Space Entry – Case Studies

CSE Program:

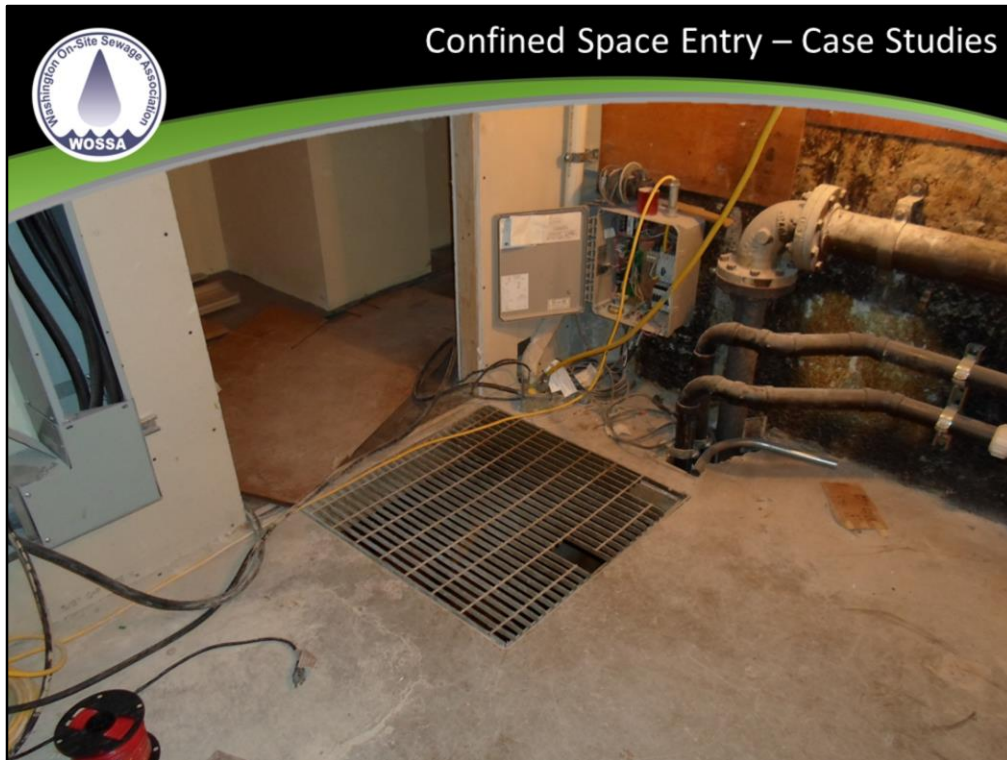
- No CSE Paperwork
- No Active Air Monitoring
- No Forced Air Ventilation /
Used Vacuum Air with
Ventilator
- Used Mechanical Rescue
Equipment
- Used Second Person



Summary of case study and deficiencies noted in slide.



This is a transition slide in the presentation and shifts the discussion over to best practice in the field and a discussion of observations of a variety of work tasks.



Key Points

Alternative work, this is an electrical pump inspection to verify pump function in a pump tank under the grate in the floor.

The pump controls are exposed and the door is open. Parts of the building are under construction and you can see a number of extension cords running out the door and down hallways.



Another view of the same project.



Key Points

Presenter should engage the participants participation:

- “Is this a confined space?”
- “Why?” (entrance large enough for full body entry)

Note: Point out the scuff marks on the pipe in the left of the entrance and footprint on the tank in the middle. It is where the employee is standing in one of the forward slides.



Confined Space Entry – Case Studies



Key Points

Presenter to engage participants:

- What are the potential hazards here?
- What process would you expect to be used? (LO/TO)
- Multiple employers/workers on site.

(note the open plug box)



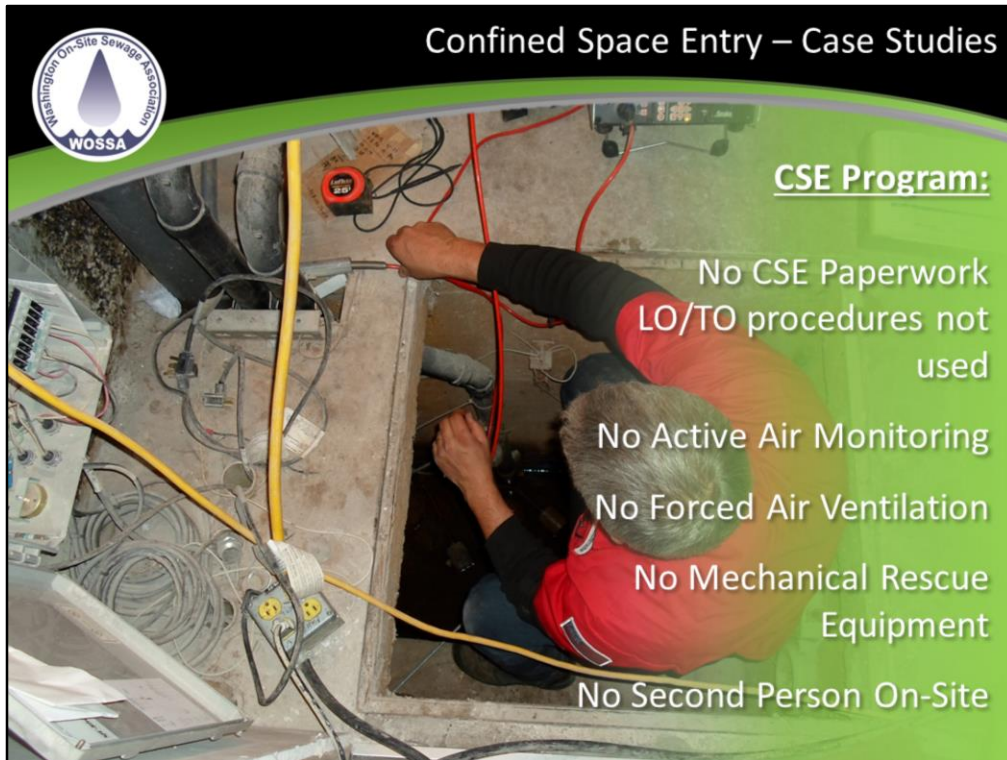
Confined Space Entry – Case Studies



Key Points:

(from previous slide)

- Unstable work platform
- Working on live electrical with open water below
- Also point out the depth of the tank (if slipped) and that the worker ends up in standing water with live electrical components from previous slide.



Final review of inconsistencies



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"Voice of the Industry"

Questions?



SHIP
Grant Program

Safety and Health
Investment Projects
SafetyGrants.Lni.wa.gov

Funded by the Department of Labor & Industries



Washington On-Site Sewage Association
"Voice of the Industry"

CSE Practical Field Activities

Setting up and operating the Tri-Pod
Using an Air Monitoring Meter
Harness up and entry
Non-entry Rescue



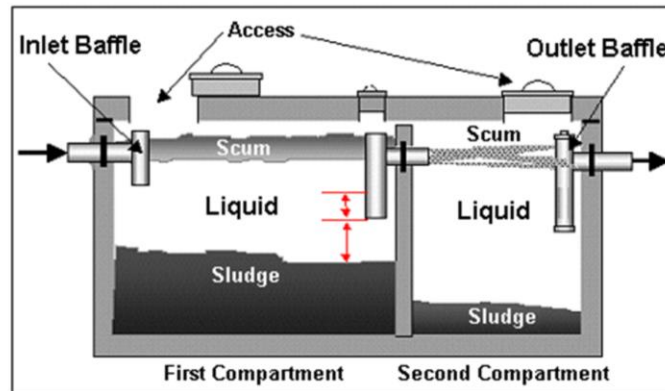
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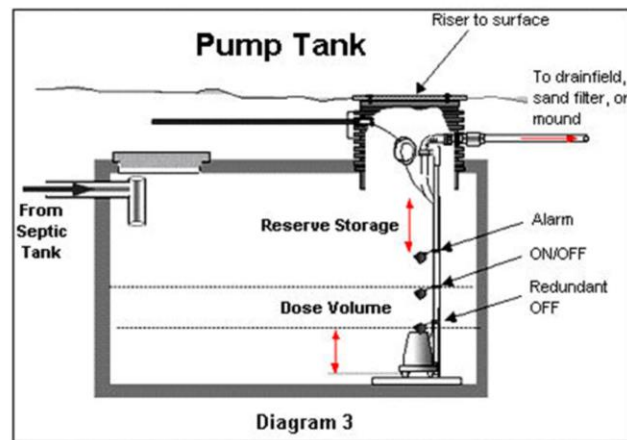


Consideration to venting as well as potential for cross over from second compartment to first compartment if not plugged at the crossover or some other means. EACH tank is going to be different





Consideration to venting as well as potential the need to isolate electrical energy will be critical. EACH tank is going to be different



In preparation for the practical skills assessment, the presenter should reinforce the variety of configurations that entrants will be exposed to.