

Region VI Transportation Tank Cleaning Operations Regional Emphasis Program (REP)

Workers employed in the transportation tank cleaning industry face many hazards that can lead to serious injury, illness, and death, including fire, explosions, hazardous atmosphere, and hazardous chemicals. During FY 2016 - 2021, Region VI initiated 165 inspection activities within the industry resulting in 318 violations. Thirty-six of the inspections were initiated as a result of a workplace fatality. Approximately 20 percent of the fatality investigations addressed worker entry into confined spaces and permit-required confined spaces. The REP will involve targeted inspections and will emphasize evaluation of transportation tank cleaning operations when they are observed during other OSHA inspections such as complaints, referrals, and other activities.



NAICS Codes associated with the transportation tank cleaning industry covered by the REP include:

- 484110 General Freight Trucking, Local
- 488210 Support Activities for Rail Transportation
- 488490 Other Support Activities for Road Transportation
- 488510 Freight Transportation Arrangement
- 562910 Remediation Services
- 562920 Materials Recovery Facilities
- 562998 All Other Miscellaneous Waste Management Services

Over the years there has been many cases in Region VI related to fatalities and serious injuries during transportation tank cleaning operations. Examples* of transportation tank cleaning incident investigations and proposed citations, grouped into section and major paragraph, included:

An employee was cleaning an inner lining of a railcar that had previously transporting latex. He lost consciousness while inside of the railcar with oxygen-deficient atmosphere. First responders attempted to rescue him but were unable to be revived/resuscitated. A second employee who entered the railcar and lost consciousness was rescued and transported to the local hospital for treatment. A third employee fell from the ladder inside of the railcar to the bottom of the car, lost consciousness, was able to conduct a self-rescue, and was transported to the local hospital for treatment.

- 1910.134(d) Selection of respirators
- 1910.134(e) Respirator medical evaluation
- 1910.134(f) Respirator fit testing
- 1910.146(c) Permit-required confined spaces general requirements
- 1910.146(d) Permit-required confined space program
- 1910.146(e) Permit system
- 1910.146(j) Duties of entry supervisors
- 1910.146(k) Rescue and emergency services



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An employee entered a tank car to perform chemical cleaning prior to completing an entry permit, ventilating the confined space, testing the atmosphere, and without a designated attendant. He became incapacitated during the entry. Another employee arrived to perform rescue, wearing a full face air purifying respirator, and entered the confined space and he also became incapacitated. Both employees were removed from the confined space and transported to a local hospital and died from asphyxiation from natural gasoline.

- 5(a)(1) General Duty Clause – Controlling ignition sources
- 1910.134(f) Respirator fit testing
- 1910.134(d) Selection of respirators
- 1910.134(g) Use of respirators
- 1910.146(d) Permit-required confined space program
- 1910.146(e) Permit system
- 1910.146(g) Permit-required confined space training
- 1910.146(h) Duties of authorized entrants
- 1910.146(i) Duties of attendants
- 1910.146(j) Duties of entry supervisors
- 1910.146(k) Rescue and emergency services



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Employee entered a tanker truck that last held Vinyl Acetate Polymer Residue and became unresponsive in the tanker. Two other employees entered the tank to rescue him and also became unresponsive. A fourth employee entered the tank and was able to rescue one of the employees but exhibited symptoms of chemical exposure. Emergency Services responded and pronounced two employees dead due to asphyxiation. Five other employees involved in rescue attempts were also hospitalized due to chemical exposure symptoms.

- 1910.134(d) Selection of respirators
- 1910.146(d) Permit-required confined space program
- 1910.146(g) Permit-required confined space training
- 1910.146(j) Duties of entry supervisors
- 1910.146(k) Rescue and emergency services
- 1910.1200(h) Employee information & training hazard communication



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Many fatality incidents with transportation tank cleaning involved hazards associated with the entry into the permit space and respiratory protection. However, those are not the only hazards associated with the work. Several years ago, several inspections were done in response to a fatality which provides a closer look at hazards that can be found in a transportation tank cleaning operation.

Employee and a coworker were preparing to water wash a tank trailer which had contained high alcohol wastewater. The profile for this material indicated a flashpoint of less than 80 degrees F. There was approximately 20 to 200 gallons of heel, sludge, in the bottom of the tank trailer. The coworker was at the base of the tanker, near the reserve valve. The employee was on a catwalk leading to the man way of the trailer. He lowered a damaged work light into the tanker, designed as safe for use in Class I Division I areas. It had a disconnected ground and was missing the explosion-proof cable grip bushing, which allowed flammable vapors to enter the bulb enclosure. There was ignition of the vapor cloud, with a flash fire and explosion. He was engulfed in flames, and either fell or was blown off the catwalk, approximately 11 ft. He suffered third degree burns over most of his body and a blunt force trauma to his head and was killed.

Example citations related to the fatality inspection included:

- 1910.146 Permit Required Confined Spaces
- 1910.303(b) Examination, installation, and use of electrical equipment
- 1910.304(g) Grounding systems, circuits, and equipment
- 1910.307(c) Electrical installations in hazardous (classified) locations
- 1910.307(d) Conduits in hazardous (classified) locations
- 19100334(a) Portable electric equipment



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Example citations related to the safety inspection included:

- 5(a)(1) General Duty Clause (Fall arrest systems)
- 5(a)(1) General Duty Clause (Boilers)
- 1910.22(a) Housekeeping
- 1910.23(c) Protection of open sided floors, platforms, runways
- 1910.23(e) Railing, toe boards, and covers specifications
- 1910.24(f) Stair treads
- 1910.036(d) Exit doors must be unlocked
- 1910.037(b) Exit routes lighting and marking adequate and appropriate
- 1910.120(p) Certain operations conducted under RCRA Act of 1976
- 19100132(a) Personal protective equipment - application
- 1910.147(c) The control of hazardous energy (lockout/tagout) general
- 1910.147(d) The control of hazardous energy application of controls
- 19100147(f) The control of hazardous energy additional requirements
- 19100157(c) Portable fire extinguishers general requirements
- 1910.176(b) Materials handling and storage secure storage
- 1910.178(a) Powered industrial trucks general requirements
- 1910.178(l) Powered industrial trucks operator training
- 1910.212(b) Anchoring fixed machinery
- 1910.219(c) Mechanical power-transmission apparatus shafting
- 1910.243(b) Pneumatic powered tools and hose
- 19100253(b) Oxygen-fuel gas welding and cutting
- 1910.303(g) General electrical equipment 600 Volts, nominal, or less.
- 1910.1200(f) Labels and other forms of warning hazard communication



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Example citations related to a health inspection included:

- 5(a)(1) General Duty Clause (Ventilation around toxic air contaminants)
- 1910.22(a) Housekeeping
- 1910.95(g) Audiometric testing program
- 1910.101(b) Compressed gases IAW CGA Pamphlet P-1-1965
- 1910.106(f) Flammable liquids Storage
- 1910.134(d) Selection of respirators
- 1910.134(f) Respirator fit testing
- 1910.134(g) Use of respirators
- 1910.134(h) Maintenance and care of respirators
- 1910.146(d) Permit-required confined space program
- 1910.146(k) Rescue and emergency services
- 1910.146(g) Permit-required confined space training
- 1910.146(i) Duties of attendants
- 1910.146(j) Duties of entry supervisors
- 1910.151(c) Facilities for quick drenching or flushing of the eyes and body
- 1910.215(a) Abrasive wheel machinery general requirements
- 1910.215(b) Guarding of abrasive wheel machinery
- 1910.215(d) Abrasive wheel machinery mounting
- 1910.305(j) Electrical wiring methods, components, and equipment
- 1910.146(d) Permit-required confined space program
- 1910.106(d) Flammable liquids container and portable tank storage
- 1910.176(c) Materials handling and storage housekeeping



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When looking at these transportation tank cleaning fatality inspections, and others in Region VI, we can see that several areas come up frequently in an incident such as:

- Permit Required Confined Space
- Respiratory Protection
- Electrical including installations in hazardous (classified) locations

Other hazards that can be found in transportation tank cleaning include, but are not limited to:

- Control of hazardous energy (Lockout/tagout)
- Flammable liquids
- Walking working surfaces and fall protection due to accessing work at heights and wet slippery floors
- Machine guarding and equipment
- Powered industrial trucks
- Hazardous chemicals covered under hazard communication
- Exposure to environmental heat
- Personal Protective Equipment
- Hearing conservation and noise
- Thermal
- Struck by hazards

A transportation tank cleaning operation can have hazards that are found in any typical industrial operation in addition to the hazards directly involved in the transportation tank cleaning.

The Region VI Transportation Tank Cleaning REP can be found at:

https://www.osha.gov/sites/default/files/enforcement/directives/CPL_2_02-00-032.pdf

Free Safety Assistance for Small Business from the OSHA Consultation Service

<https://www.osha.gov/consultation>

OSHA Publications on Topics Such as Permit Required Confined Spaces and Respiratory Programs

<https://www.osha.gov/publications>

*Incident examples and proposed citations were obtained from the OSHA website <https://www.osha.gov/data>. Not all citations may be listed. Standards listed were edited for space and group by section and major paragraph. Refer to the standard for exact wording. References to standards 1910.22-.24 correspond to the walking working standards in place at the time and not the current walking working surfaces standards.

This information has been developed by an OSHA Compliance Assistance Specialist and is intended to assist employers, workers, and others improve workplace health and safety. While we attempt to thoroughly address specific topics [or hazards], it is not possible to include discussion of everything necessary to ensure a healthy and safe working environment in this presentation. This information is a tool for addressing workplace hazards, and is not an exhaustive statement of an employer's legal obligations, which are defined by statute, regulations, and standards. This document does not have the force and effect of law and is not meant to bind the public in any way. This document is intended only to provide clarity to the public regarding existing requirements under the law or agency policies. It does not create (or diminish) legal obligations under the Occupational Safety and Health Act. Finally, OSHA may modify rules and related interpretations in light of new technology, information, or circumstances; to keep apprised of such developments, or to review information on a wide range of occupational safety and health topics, you can visit OSHA's website at www.osha.gov. For questions contact Jim Shelton at the Houston North OSHA Office at Shelton.james@dol.gov.