NIOSH FOG Special Topic Report 2015

Suspected Inhalation Fatalities Involving Workers during Manual Tank Gauging, Sampling, and Fluid Transfer Operations on Oil and Gas Well Sites: 2010—2014

Data Sources: The NIOSH Oil and Gas Sector Program maintains a database, Fatalities in Oil and Gas Extraction (FOG), that collects data on fatal events in the oil and gas exploration and production industry. Fatalities were identified through a variety of sources including OSHA, media reports, and professional contacts. This report provides a summary of the data contained in FOG related to suspected inhalation deaths to workers involved in tank gauging, sampling, and fluid transfer activities at oil and gas well sites. NIOSH will continue to work closely with OSHA to collect additional details on each case.

Case Definition: Included in this report are fatalities associated with tank gauging, sampling, and fluid transfer activities at oil and gas well sites where the inhalation of volatile petroleum hydrocarbons is a possible contributing factor during 2010—2014[1]. Many of the 2014 OSHA cases are still "open" making it difficult to obtain further information on the cause of death. The following types of fatalities were excluded: confined space, fires/explosions, and documented hydrogen sulfide (H_2S).

Summary Points

- During 2010—2014, nine fatalities were identified that met the above case definition.
- Of the nine worker fatalities, six occurred in 2014, one in 2013, one in 2012, and one in 2010.
- Three fatalities occurred in North Dakota, three in Colorado, one in Texas, one in Oklahoma, and one in Montana.
- All of the fatalities occurred at crude oil (production) tanks.
- Four of the fatalities occurred during tank gauging. Five additional fatalities occurred during sampling by pumpers/truckers.
- All nine of the fatalities occurred among employees who were working alone or not being observed.
- In at least one case, the victim had sought medical evaluation for health effects (dizziness, disorientation, etc.) experienced during prior gauging activities.

Case Descriptions:

Note: Information reported for each case description is publicly available and is a summary of the event from multiple sources.

2014

Case #9 A 20-year-old male flow tester was found unresponsive on a well pad site and later determined to have died at this well site. The victim was expected to gauge a crude oil tank. The victim was discovered in the early morning face down in the upper hatch of a crude oil storage tank. The well pad was not known to have risks for exposures to H_2S in the area nor had H_2S been detected in the past at this site. This death was ruled work-related by OSHA. The medical examiner reported the cause of death included cardiac arrhythmia with cardiac hypertrophy, coronary artery hypogenesis, obesity and exposure to petroleum hydrocarbons vapors.

Case #8 An employee was assigned to an oil (production tank) battery to gauge and monitor oil production. The employee would routinely (on the hour) gauge each of the 3 water and 3 oil tanks on site. The victim was required to climb the stairs to the catwalk above and drop a gauger into the tank and measure the amount of liquid in each tank. The employee was found by a delivery driver, at the bottom of the stairs next to the tank battery. Victim was coming down the catwalk stairs when he collapsed at the base of the stairs. Victim was found at approximately 4:14 a.m. by the delivery driver.

Case #7 A 59 year old oil tanker truck driver died while collecting crude oil samples from an open thief hatch. The employee was wearing a 4-gas monitor, which reported an oxygen deficient atmosphere and the presence of hydrocarbons exceeding 100% of the lower explosive limit at the approximate time of his death. He was working alone. The employee had been involved in a similar incident on the catwalk a few weeks prior where he was found disoriented and dizzy by another driver and was taken to the clinic for a checkup. His work activity included traveling to oil fields to transfer crude oil located in large on-site production (storage) tanks into a tanker truck. Prior to pumping crude oil from the storage tanks to the tanker truck, the employee's tasks

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2014 (cont.)

included climbing onto a catwalk between the oil tanks to gauge and sample their contents. Coroner reports state worker died of atherosclerotic cardiovascular disease and sudden cardiac death, and states that toxic gas inhalation and oxygen displacement by volatile hydrocarbons may have been contributory. Other personal factors such as diabetes and tobacco use may also have contributed.

Case #6 Employee (57 years old) working for a transport company was found collapsed on a catwalk adjacent to crude oil tank, non-responsive, unable to resuscitate, and was declared dead by the coroner. Emergency responders did not detect the presence of significant hydrocarbons or H_2S when they arrived. Time of death was 11:00 a.m.

Case #5 The employee (52 years old) lost consciousness while pulling an oil sample out of a thief hatch on a tank. The employee fell backwards on the 90 degree corner of the catwalk guardrail. The employee's clothing became hooked to the guardrail. The employee was hanged by his sweatshirt hood. From the toxicology report, autopsy, and extensive air monitoring conducted by the employer and emergency personnel it was determined this individual died from natural causes. The cause of death was sudden cardiac death due to ischemic heart disease. Contributing factors include atherosclerosis and cardiomegaly.

Case #4 A truck driver pumping and hauling crude oil from a tank battery was found on the catwalk next to a tank slumped over and non-responsive. It appears he was measuring the volume of liquid from the top of the tank battery. There were no signs of physical trauma and both the employee and a second driver who found the employee were wearing H_2S monitors that did not alarm. The medical examiner's determination of cause of death has yet to be determined as of 2/24/15.

2013

Case #3 Decedent (39 years old) was a truck driver and was transferring crude oil from a tank battery for downstream transportation. A "pumper" showed up to the well site and noticed the decedent slumped over a railing on top of the tank battery. The pumper reported that the decedent was cold to the touch. County sheriff and county coroner responded. It was reported that the decedent was wearing a hydrogen sulfide monitor and FRC. Death was ruled work related by OSHA. Coroner's report stated atherosclerosis of the major arteries 75-93%. H2S/hydrocarbons were not detected in the bloodstream.

2012

Case #2 Victim (21 years old) had just finished gauging a crude oil tank in a tank battery at a well site. Employee was found on the tank battery of the well site. The medical examiner ruled the cause of death to be hydrocarbon exposure due to inhalation of petroleum vapors, including propane, butane and ethane. Death was ruled work related by worker's compensation.

2010

Case #1 At approximately 3:00 a.m., the victim (30 years old), employee 1, was found slumped over on the catwalk by the #1 oil storage tank at the oil well servicing site. The victim was found by a second crew member and with the help of a third crew member was removed from the catwalk to the level ground below. Crew members 2 and 3 administered CPR until the Ambulance and EMTs arrived. CPR was continued in route to the hospital where employee 1 was pronounced deceased at 4:35 a.m. Autopsy revealed hypertensive and atherosclerotic cardiovascular disease.

[1]Sudden Deaths Among Oil and Gas Extraction Workers Resulting from Oxygen Deficiency and Inhalation of Hydrocarbon Gases and Vapors — United States, January 2010–March 2015 | MMWR (cdc.gov)

Suggested Citation

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