

# NIOSH FOG Special Topic Report 2018

## Fatalities and hospitalizations related to the ignition, inhalation, or suspected inhalation of hazardous gases and vapors while handling fluids at oil and gas sites: 2015–2016

**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 extraction industry. Fatalities are identified through a variety of sources including OSHA, media reports, and professional contacts. Hospitalizations are identified through the Occupational Safety and Health Administration (OSHA) [severe injury data set](#). This special report provides an update on fatalities and hospitalizations associated with hydrocarbon gases and vapors (HGVs) and hydrogen sulfide (H<sub>2</sub>S) in the oil and gas extraction industry.

**Case Definition:** The following definition was developed to identify cases: During 2015–2016, fatalities or hospitalizations related to the ignition, inhalation, or suspected inhalation of HGVs and/or H<sub>2</sub>S while handling process fluids (e.g. fluid transfer) or working on tanks containing process fluids at oil and gas well sites or waste water disposal sites. Process fluids include waste water, flowback, petroleum condensate, or crude oil. Waste water is also sometimes referred to as produced water, brine, salt water, etc., but often still contain hydrocarbons.

### Summary Points

During 2015–2016, eight oil and gas worker fatalities were identified that met the case definition (see Table 1).

- **Event Type:** Three workers died of sudden cardiac death with potential exposures to hazardous gases and vapors, two workers died due to fire/explosions, two workers died due to hydrogen sulfide poisoning, and one worker died due to HGV exposures.
- **Activity Type:** Four workers died while transferring fluids from tanks to trucks, two workers were tank gauging or sampling, one worker was at an open tank hatch with unknown activity, and one worker was doing hotwork (grinding) on top of a tank.
- **Fluid Type:** Four workers were working with produced water, three workers were working with crude oil, and one with flowback.
- **Site Type:** Six workers died at well sites and two workers died at waste water disposal sites.

During 2015-2016, ten hospitalizations were identified that met the case definition (see Table 2).

- **Event Type:** Five workers were hospitalized due to fire/explosions, three workers hospitalized due to H<sub>2</sub>S exposure, and two workers hospitalized due to HGV exposures.
- **Activity Type:** Six workers were tank gauging or sampling, one worker was transferring fluids, one worker was using a vacuum truck to remove tank bottoms, one worker was draining condensate from a separator line (i.e. heater treater), and one was transporting waste water.
- **Fluid Type:** Three workers were working with produced water, one with flowback, one with tank bottoms (solids and waste), one with condensate, one with crude oil, and three were unknown.
- **Site Type:** Nine workers were injured/exposed at well sites and one worker was injured at a waste water disposal site.

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### Suggested Citation

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**Table 1. Worker Fatalities Related to Inhalation or Ignition of Hazardous Gases and Vapors, Oil and Gas Extraction Workers, 2015–2016**

	Year	Age	State	Event Type*	Activity*	Fluid	Site	Ruled Cause of Death
1	2015	59	ND	Exposure: harmful substance (H <sub>2</sub> S)	Undetermined (at open tank hatch)	Crude Oil	Well Site	Poisoning due to inhalation of H <sub>2</sub> S gas
2	2015	20	OK	Explosion (combustion) or fire	Hotwork and welding	Produced Water	Disposal Site	Asphyxia due to drowning in tank following explosion
3	2015	29	TX	Exposure: harmful substance (H <sub>2</sub> S)	Tank gauging or sampling	Crude Oil	Well Site	Poisoning due to inhalation of H <sub>2</sub> S gas
4	2015	20	WV	Exposure: harmful substance (HGVs)	Tank gauging or sampling	Flowback	Well Site	Asphyxia due to exposure to HGVs
5	2016	46	ND	Cardiac event: possible work exposure	Fluid transfer	Produced Water	Well Site	Arteriosclerotic heart disease
6	2016	66	OK	Cardiac event: possible work exposure	Fluid transfer	Crude Oil	Well Site	Hypertensive Heart Disease
7	2016	38	TX	Explosion (combustion) or fire	Fluid transfer	Produced Water	Disposal Site	Burns/smoke inhalation
8	2016	54	TX	Cardiac event: possible work exposure	Fluid transfer	Produced Water	Well Site	Arteriosclerotic and Hypertensive Heart Disease

\*FOG Variable

**Table 2. Worker Hospitalizations Related to Inhalation or Ignition of Hazardous Gases and Vapors, Oil and Gas Extraction Workers, 2015–2016\***

	Year	State	Event Type**	Activity**	Activity Details	Fluid	Site	Injuries Reported
1	2015	CO	Explosion (combustion) or fire	Fluid Transfer	Connecting truck line	Unknown	Well Site	Burns
2	2015	ND	Explosion (combustion) or fire	Separation equipment activities	Draining Condensate from treater line	Condensate	Well Site	Burns
3	2015	ND	Exposure: harmful substance (HGVs)	Tank gauging or sampling		Unknown	Well Site	Exposure resulting in hospitalization
4	2015	ND	Exposure: harmful substance (H <sub>2</sub> S)	Vacuum truck activities	Pulling tank bottoms	Tank bottoms, solids and waste	Well Site	Exposure resulting in hospitalization
5	2015	TX	Explosion (combustion) or fire	Tank gauging or sampling	Opening tank hatch	Produced water	Disposal Site	Burns
6	2015	TX	Explosion (combustion) or fire	Tank gauging or sampling	Flowback monitoring	Flowback	Well Site	Burns
7	2015	TX	Exposure: harmful substance (H <sub>2</sub> S)	Truck transport		Produced water	Well Site	Exposure resulting in hospitalization
8	2016	CO	Exposure: harmful substance (H <sub>2</sub> S)	Tank gauging or sampling		Produced water	Well Site	Exposure resulting in hospitalization
9	2016	CO	Exposure: harmful substance (HGVs)	Tank gauging or sampling		Crude Oil	Well Site	Exposure resulting in hospitalization
10	2016	TX	Explosion (combustion) or fire	Tank gauging or sampling		Unknown	Well Site	Burns/smoke inhalation

\*This table includes incidents that were reported to OSHA from states with federally run OSHA programs from 2015 through 2016.

\*\*FOG Variable