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UNITED STATES

Epidemiology Perspective
Williston, ND
Hydraulic Fracturing BAKKEN SAFETY TOUR 2016

Kyla Retzer, MPH
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National Institute for Occupational Safety & Health (NIOSH)

- Part of the Centers for Disease Control & Prevention (CDC)
- Research-focused
- Created an Oil and Gas Sector Program in 2007 (Epi/Surveillance, Exposure Assessment, Engineering Controls, Communications)

Outline

Fatality Trends

Motor Vehicle Safety

FOG

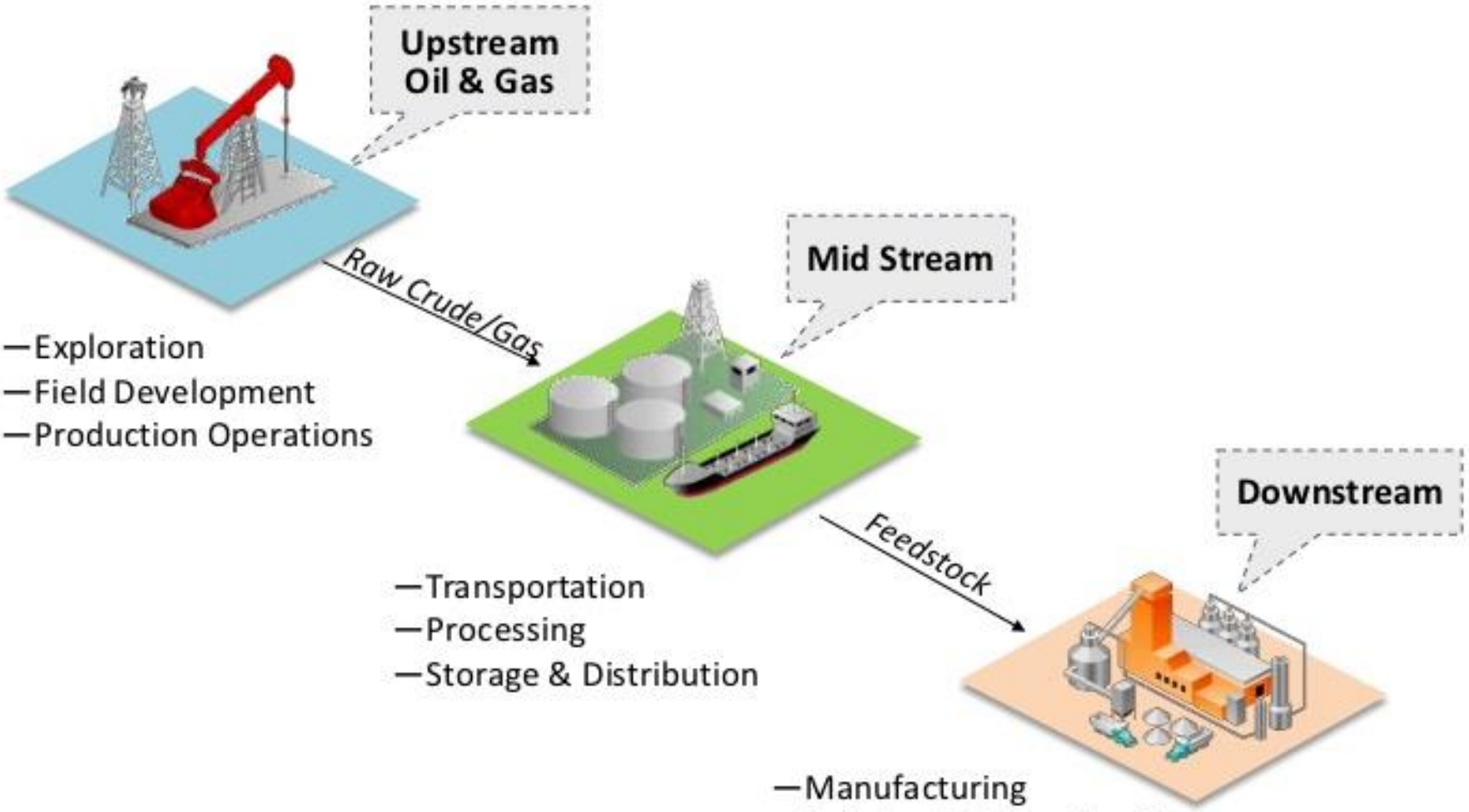
Targeted Surveillance-
Fatalities in Oil and Gas Database (FOG)

Conclusion: Working Together

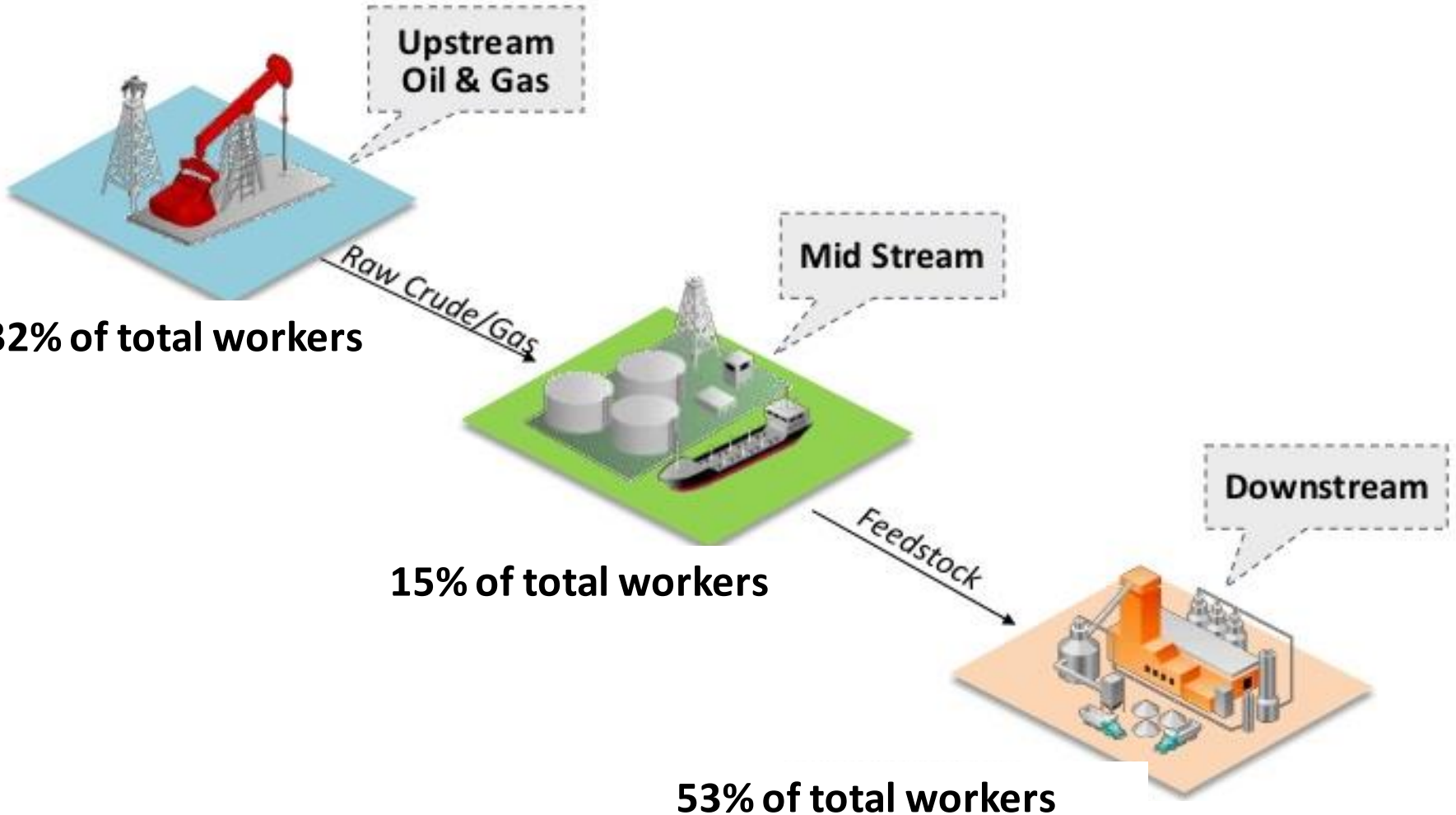
Outline

Fatality Trends

The Oil and Gas Industry



The Oil and Gas Industry



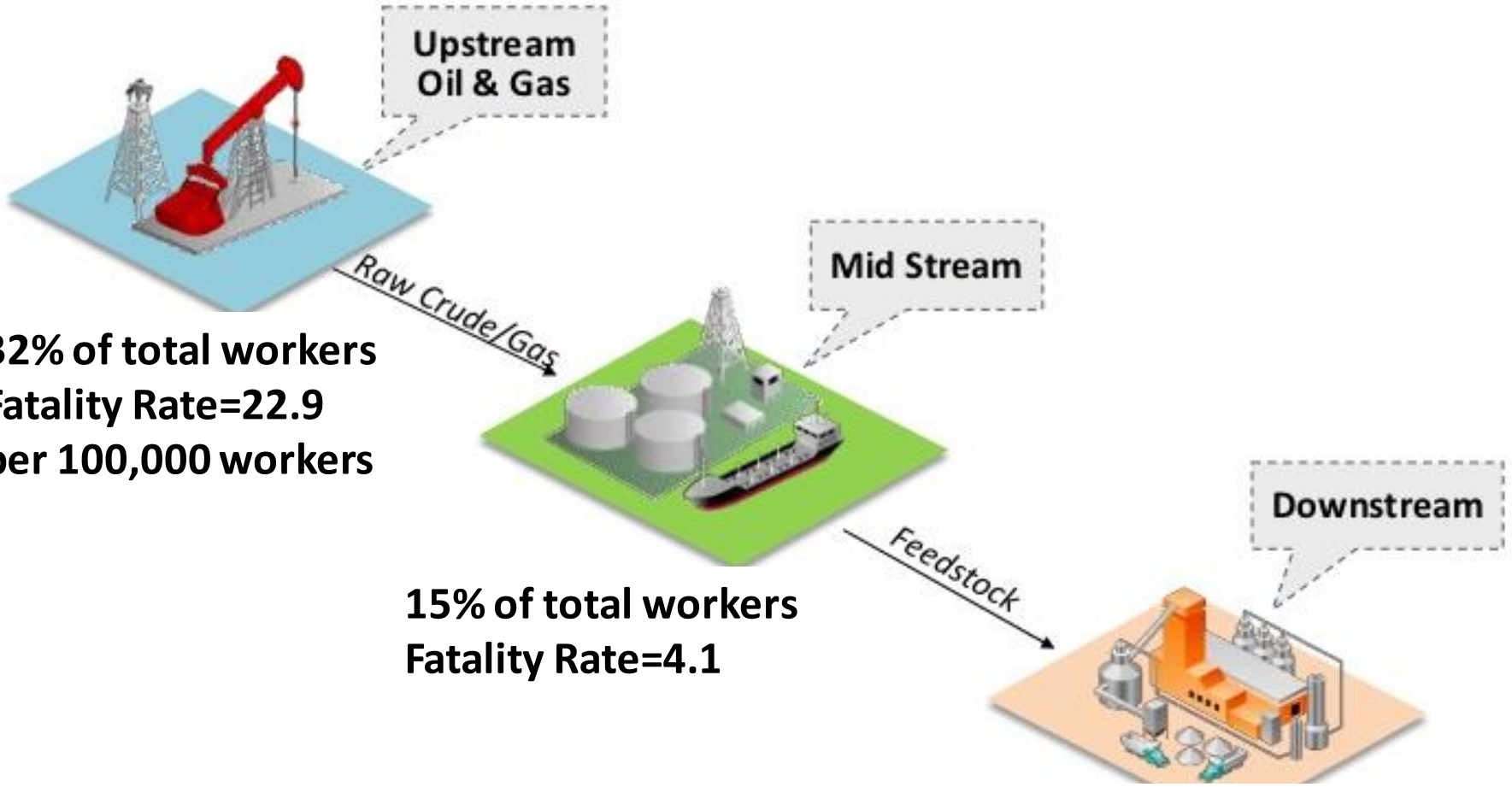
32% of total workers

15% of total workers

53% of total workers

Source: BLS/CFOI and BLS/QCEW. All rates calculated per 100,000 workers.

The Oil and Gas Industry



32% of total workers
Fatality Rate=22.9
per 100,000 workers

15% of total workers
Fatality Rate=4.1

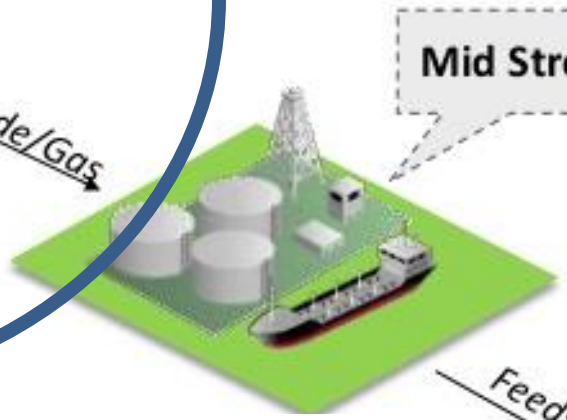
53% of total workers
Fatality Rate=4.2

Source: BLS/CFOI and BLS/QCEW. All rates calculated per 100,000 workers.

The Oil and Gas Industry

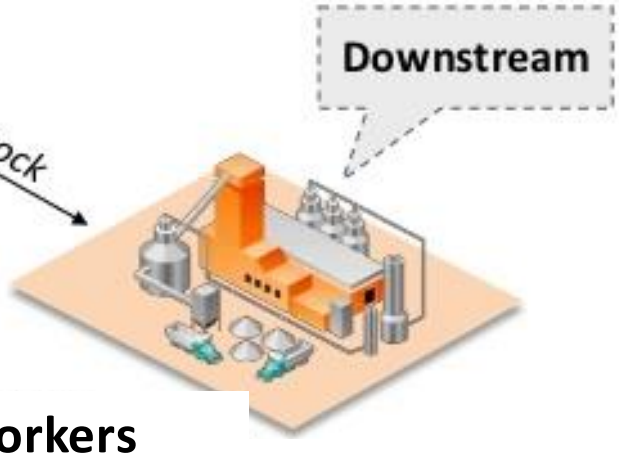
Raw Crude/Gas

32% of total workers
Fatality Rate=22.9
Per 100,000 workers



Feedstock

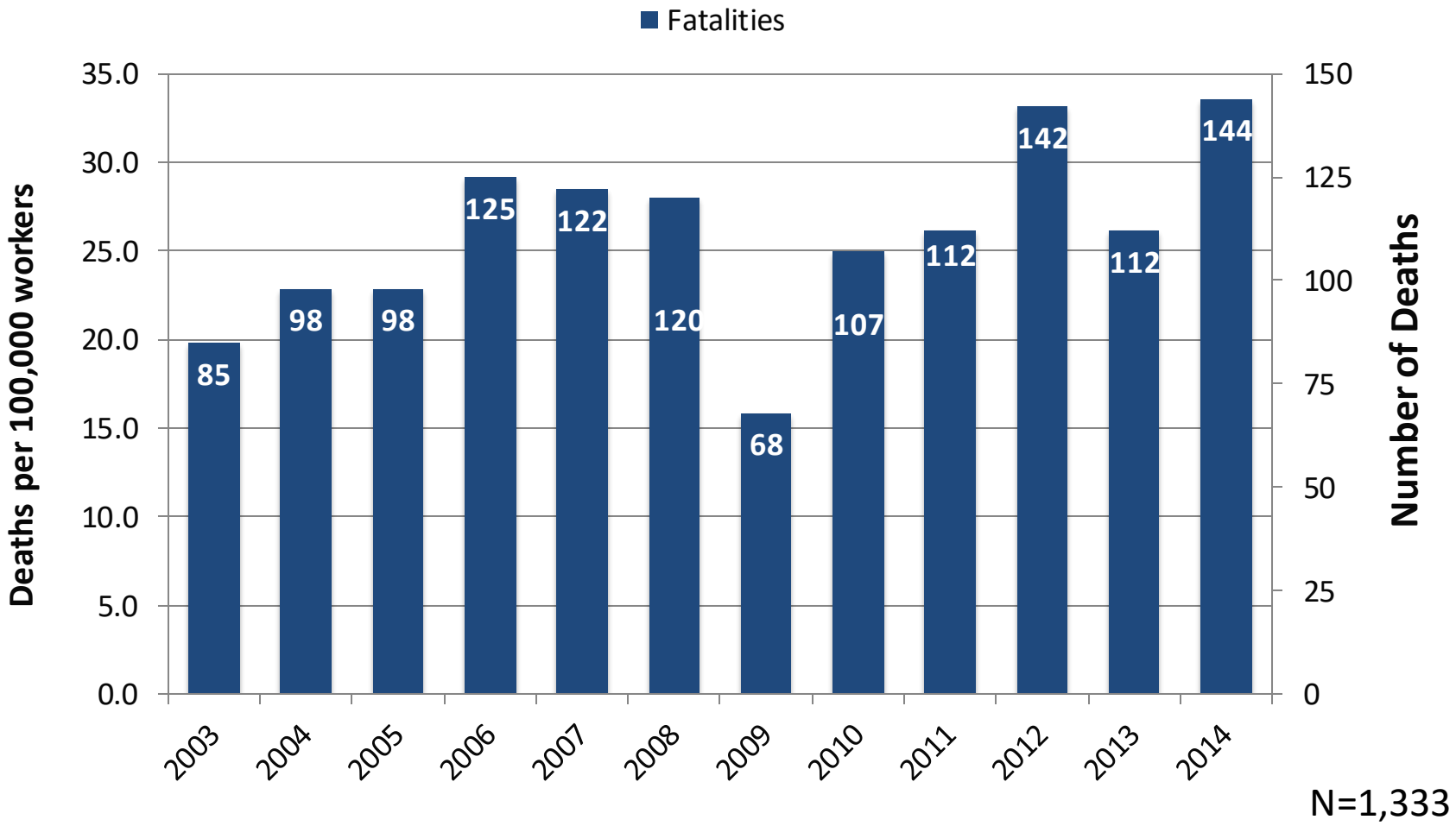
15% of total workers
Fatality Rate=4.1



53% of total workers
Fatality Rate=4.2

Source: BLS/CFOI and BLS/QCEW. All rates calculated per 100,000 workers.

Number and Rate of Fatal Work Injuries
U.S. Oil & Gas Extraction Industry, 2003–2014



Note: Fatality counts from BLS Census of Fatal Occupational Injuries. Worker Estimates from BLS Quarterly Census of Employment and Wages (2013). Rate per 100,000 workers per year. Includes NAICS 211, 213111, 213112. *Data for 2014 are preliminary.

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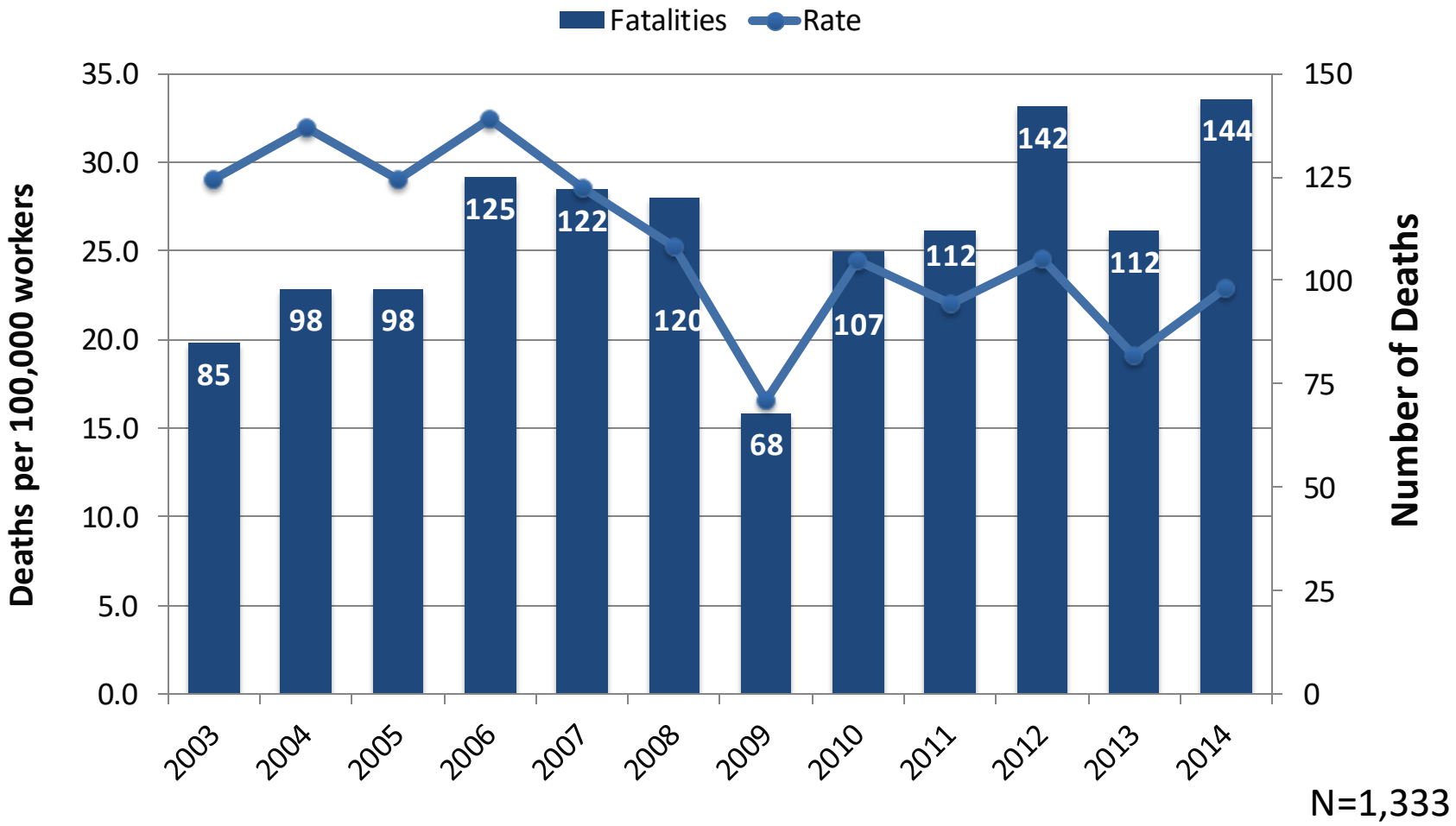

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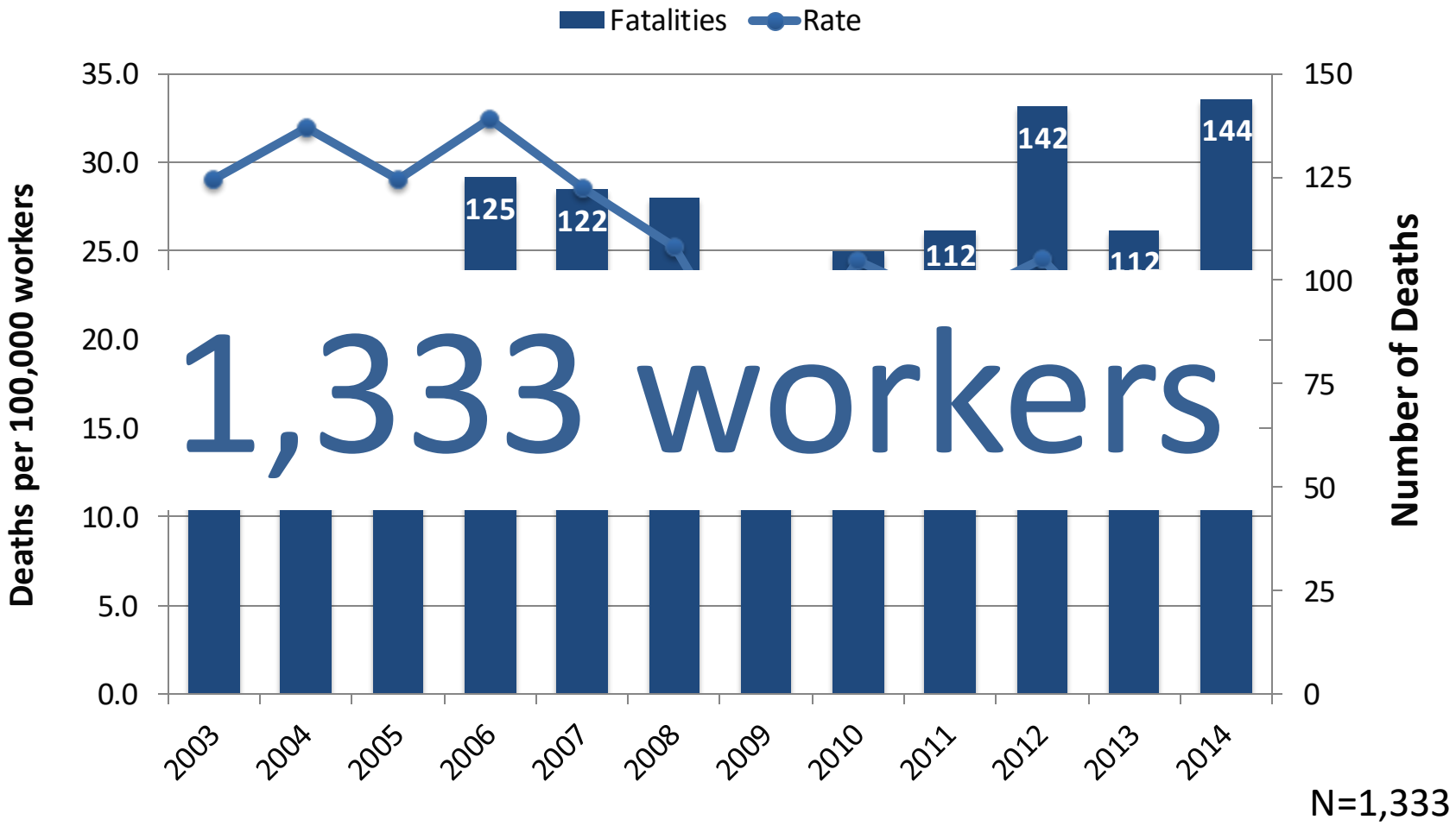

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Trends in Fatality Rate by Company Type

Oil and Gas Operators

Fatalities

58%

Statistically Significant

Well Servicing Companies

Fatalities

33%

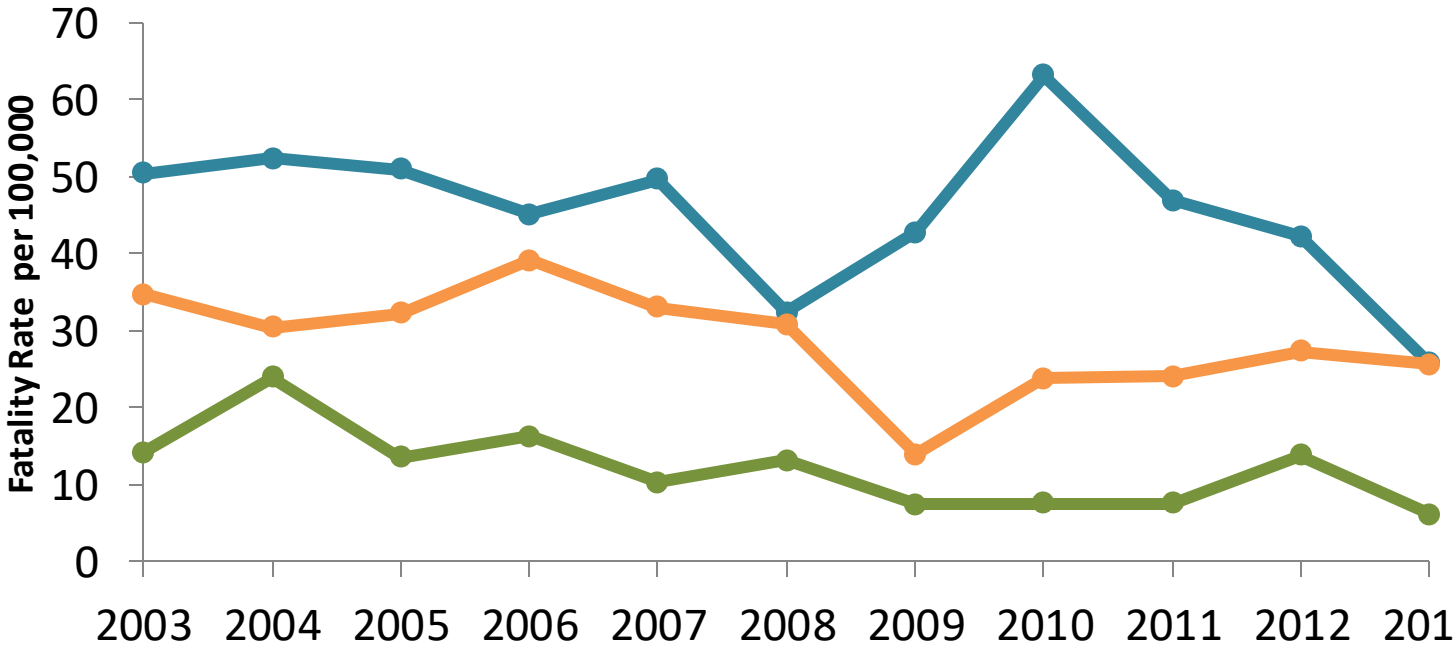
Statistically Significant

Drilling Contractors

Fatalities

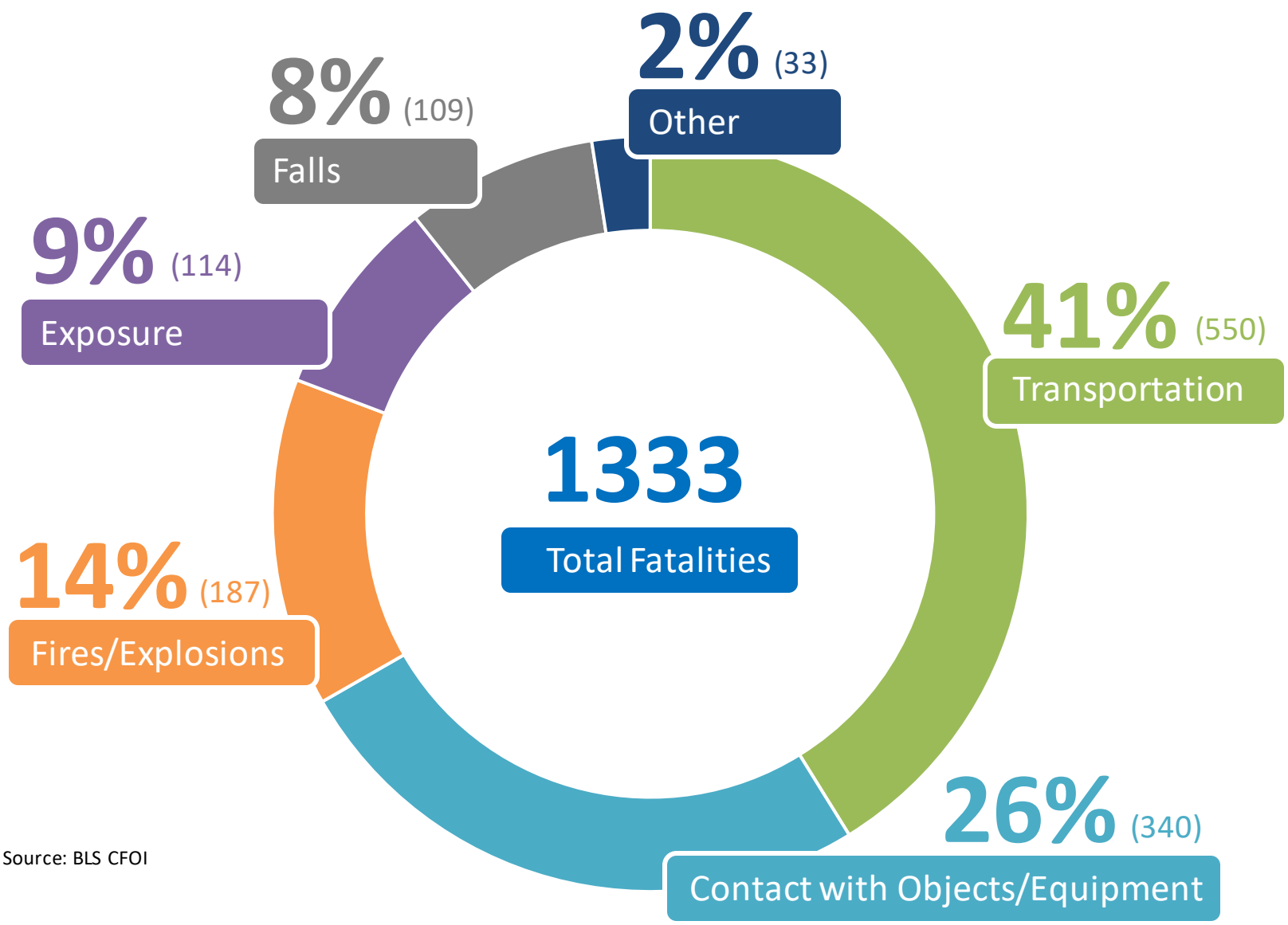
27%

Not Statistically Significant



June 8, 2015

Most Frequent Fatal Events
U.S. Oil & Gas Extraction Industry, 2003–2014



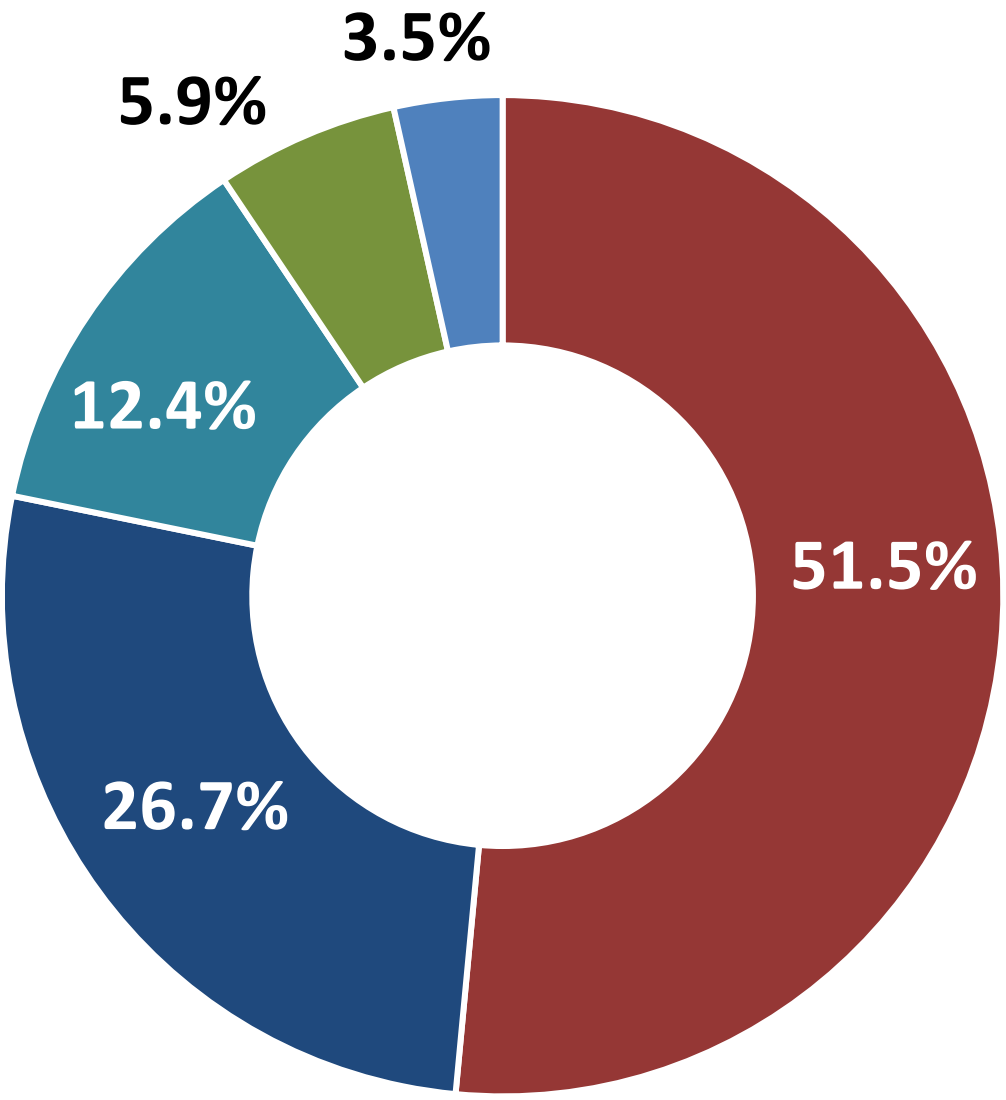
Data Source: BLS CFOI

Outline

Motor Vehicle Safety

Motor Vehicle Fatalities by Vehicle Type

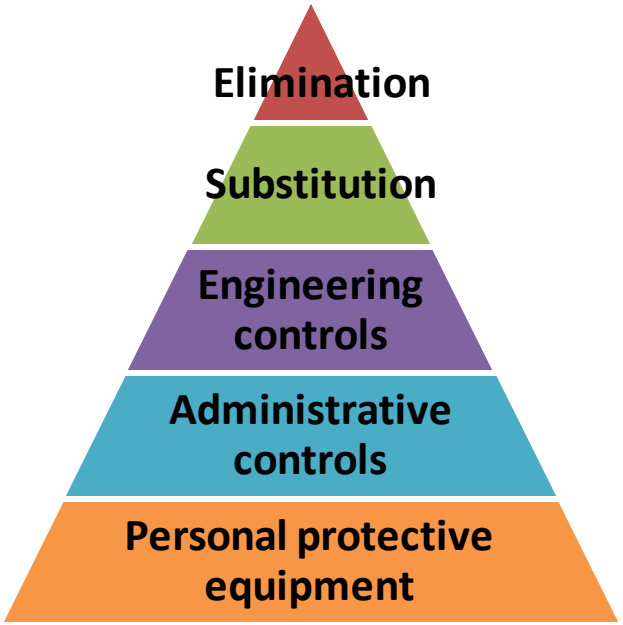
U.S. Oil & Gas Extraction Industry, 2003-2009



- Pickup Truck
- Semitrailer, tractor trailer, trailer truck
- Unknown or other types of truck
- Automobile
- Other Types of Vehicles

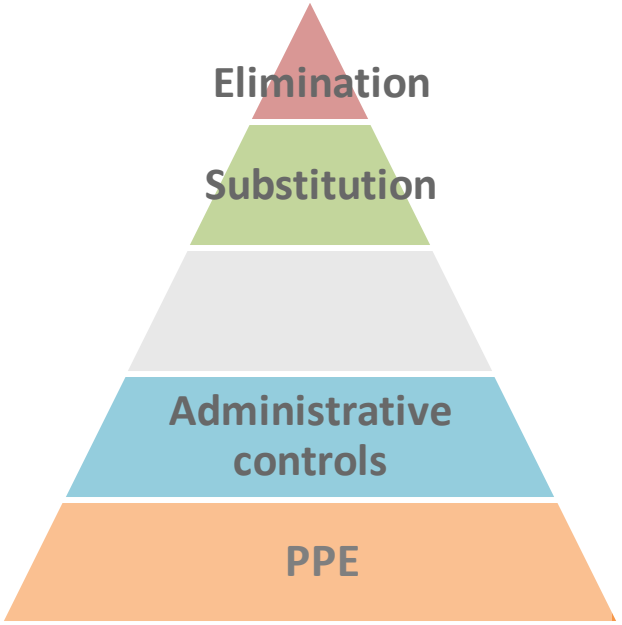
Source: CDC-NIOSH with restricted access to BLS CFOI microdata

Motor Vehicle Safety Program



1. Develop a Motor Vehicle Safety Program

- Require and enforce seatbelt use
- Prohibit cell phone use
- Set limits on maximum driving distances per day/week
- Limit commute time before shift
- Include Journey Management Procedure



More information: OGP Land Transport Safety Recommended Practice, Journey Management: www.ogp.org.uk/pubs/365-2.pdf; SPE 168566.

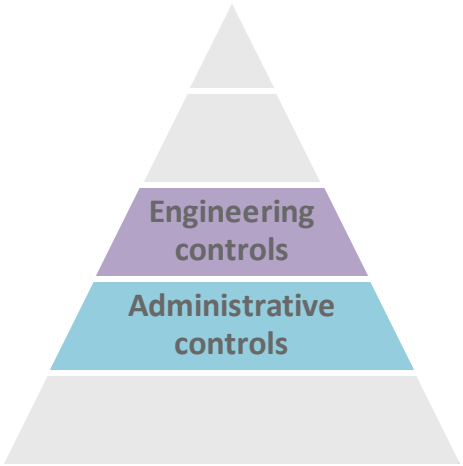
2. Consider Use of In-Vehicle Monitoring Systems

Records Data	Measures Performance	Changes Behavior
✓ Date and Time ✓ Speed ✓ Acceleration/Deceleration ✓ Seat Belt Use	Measures driver performance against a predetermined set of parameters	Has shown to be effective in realizing immediate and positive effect on driver behavior.

Motor Vehicle Crash Rates[1] 50–90%

Speeding[2] 60%

Miles Driven[3] 8-20%



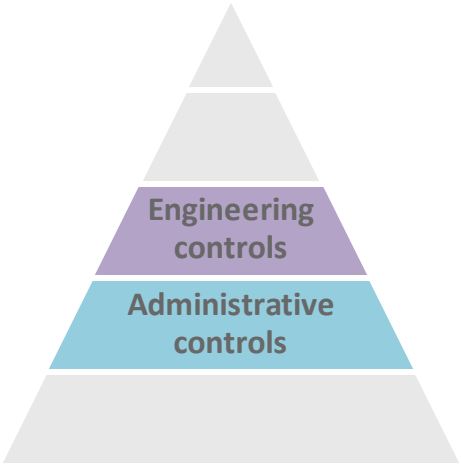
[1] Gale et. al, 2012, Mora et. al, 2010, Velasquez, et. al, 2010, Matusalen, et. al, 2006, Ballard et. al, 2004, Jutten et. al, 2002, Cocianni & Taviansky, 1998); [2] Twilhaar, 2000; [3] Lopez, 2006, Twiilar, 2000.

Fatigue-Related Crash

- **3 workers killed, 4 hospitalized**
- **No skid marks at scene**
- **None of the workers were wearing their seatbelt**

3. Consider Use of Fatigue Detection Technologies

- Fatigue and distraction detection systems (eye-movement)
- Smart phone sleep apps/fitness bands
- Fatigue Management Systems



http://www.sixsafetysystems.com/page/fatigue-management

Outline

Targeted Surveillance-
Fatalities in Oil and Gas Database (FOG)

Different risks for different basins?

Is distraction or fatigue a factor?

Struck by what?

Do they work where they live?

Are some vehicles more dangerous?

What are the most common ignition sources?

What are the most dangerous operations?

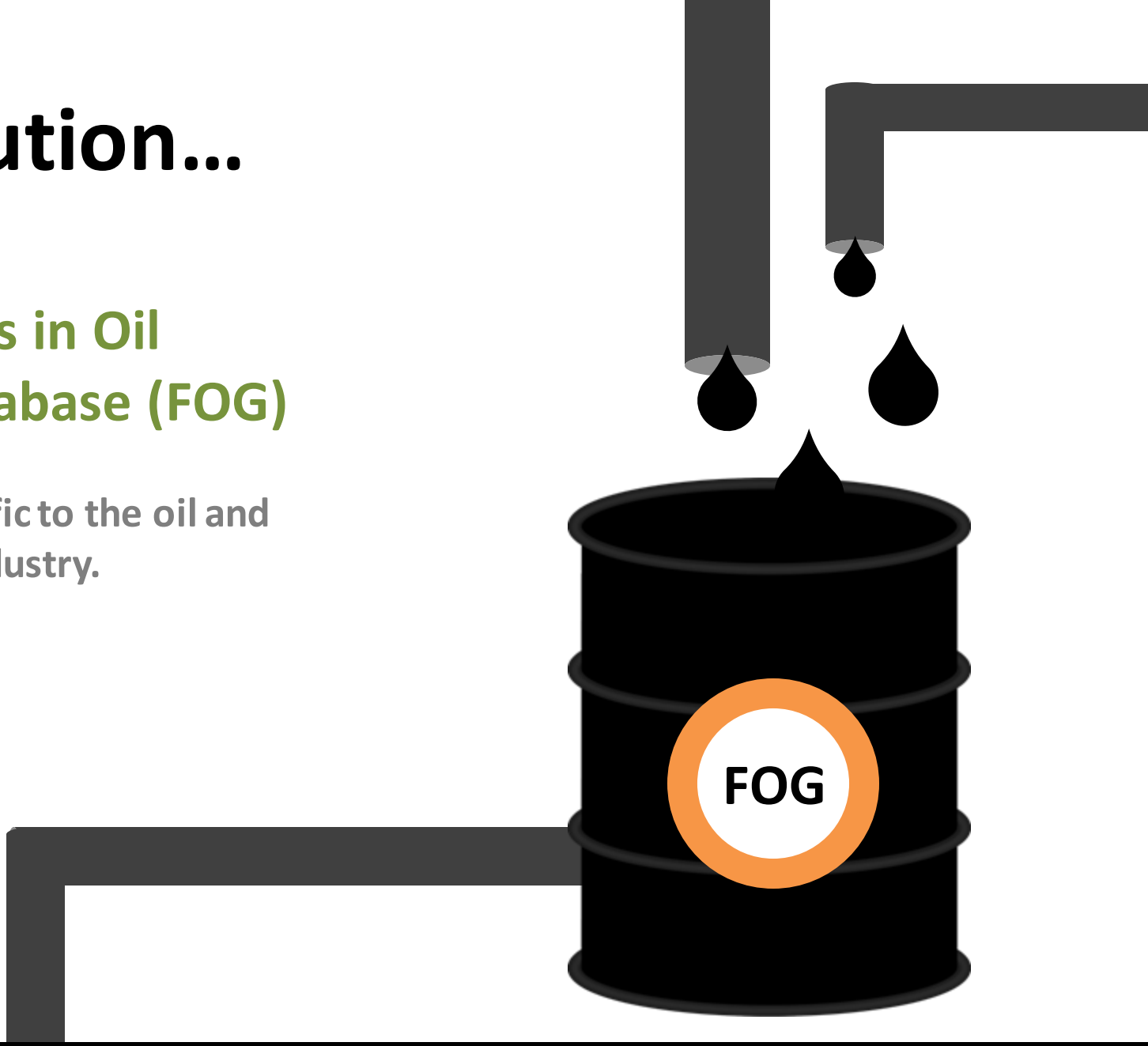
The details needed to answer these questions are not in available current data sources

(e.g. Bureau of Labor Statistics, Census of Fatal Occupational Injuries, CFOI)

The solution…

The Fatalities in Oil and Gas Database (FOG)

A database specific to the oil and gas extraction industry.



Fatalities in Oil and Gas (FOG) Database

Internal database collecting detailed information about oil and gas worker fatalities in the U.S.

Est. 2014 (going back to 2005)

Includes

Fatal events to U.S. oil and gas extraction workers

- Land-based
- Offshore
- Traditional O&G industries
- Contracted into O&G
- Motor vehicle incidents
- Non-traditional commutes
- Cardiac events

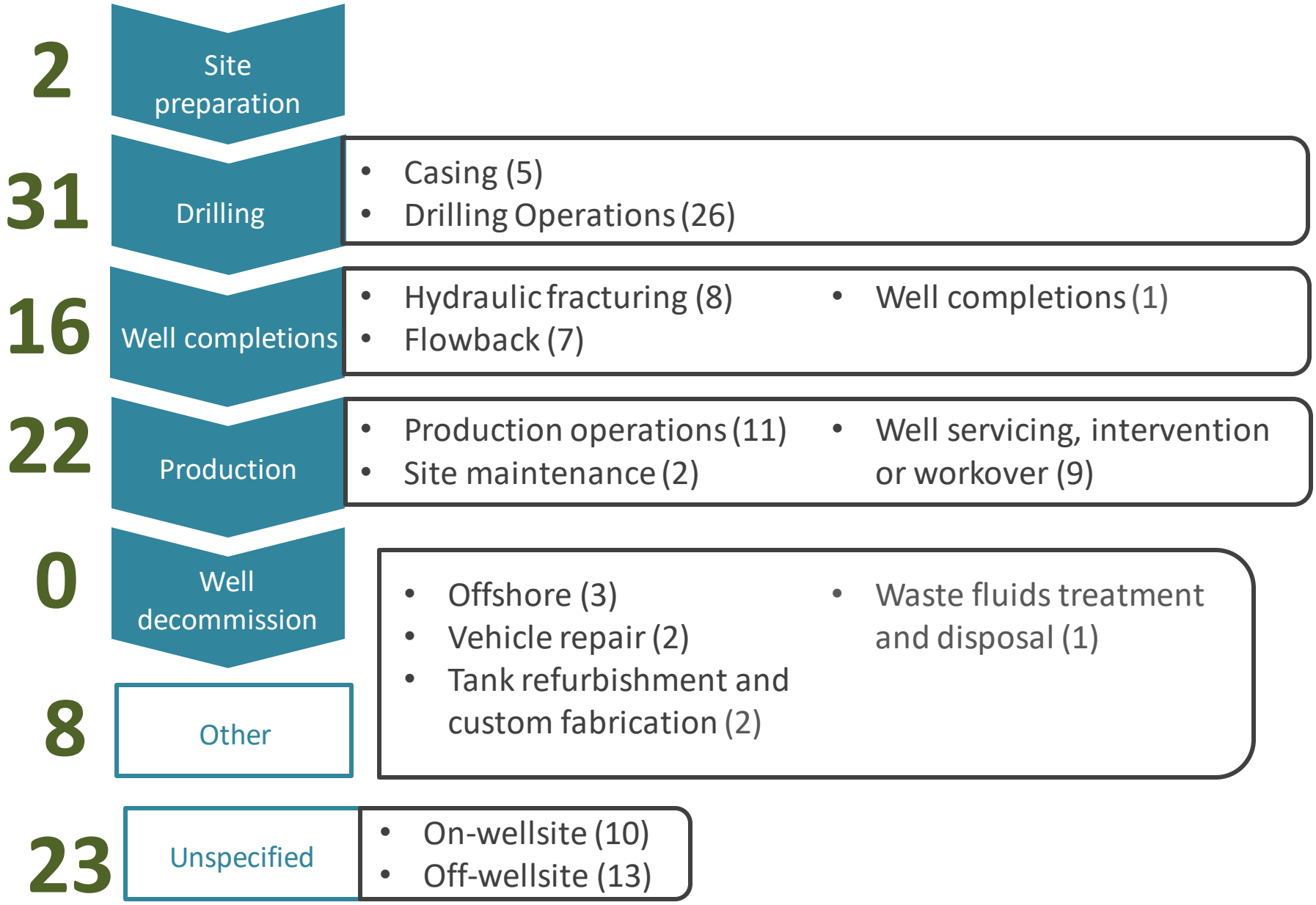
Excludes

Midstream, downstream, non-fatal injuries

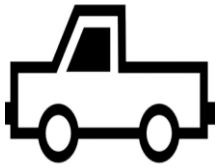
Data Sources

OSHA case files, media, crash reports, autopsy reports, industry partners, etc.

2014 Fatalities by Operation



2014 Fatalities by Activity



Motor Vehicle Travel
18 fatalities

Material Handling: Crane, forklift, winch truck
13 fatalities

Rig or equipment repair or Maintenance
10 fatalities

Rigging up or down
8 fatalities

Make up and break out
8 fatalities

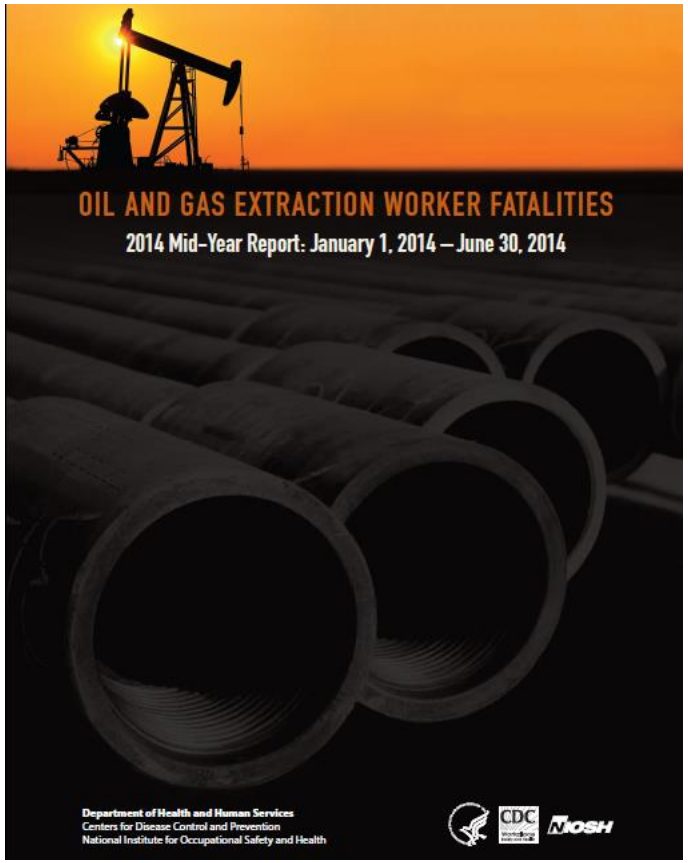
CDC Workplace Safety and Health

NIOSH

Emerging Issue Identified with help of FOG

Ten cardiac related fatalities working around open tank hatches.

First FOG NIOSH Numbered Publication
2014 Mid-Year Fatality Report



Maps

Fatalities by Operation

Descriptive Statistics

Narratives

http://www.cdc.gov/niosh/topics/fog/

Future Plans for FOG

- Add Non-Fatal Injury and Illness Events
- Enhance data collection
- Query FOG data online

Outline

Conclusion: Working Together

A Journey of Working Together

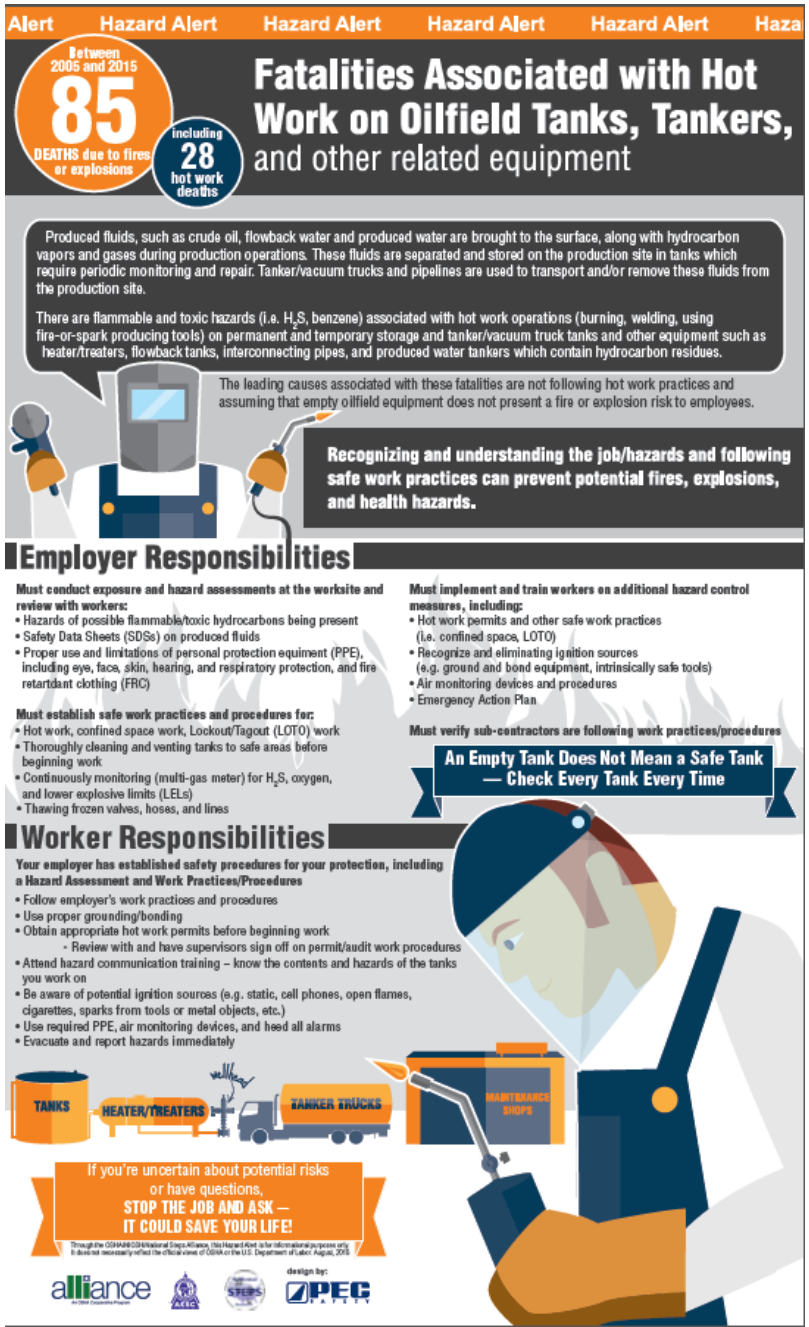
- Ongoing in-person meetings of industry, academia, government
- Allowed us to overcome distrust
- Increased understanding about safety and health hazards
- Allowed for development of FOG and response to emerging issues (through Alliance with OSHA and National STEPS network)

Hazard Alert #1

http://www.nationalstepsnetwork.org/docs_tank_gauging/TankHazardInfographicFinal04_22_15.pdf

Hazard Alert #2

FINAL DRAFT



Contact Info and Acknowledgements

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JOINT US/EU
CONFERENCE ON HEALTH
AND SAFETY AT WORK
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BAKKEN SAFETY TOUR
AUGUST 31 - SEPTEMBER 2
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