



Juraj Strmen – Author
Nick Wiewiorowski – Presenter

Transfer systems for safe odorant deliveries
WGMSC

Content

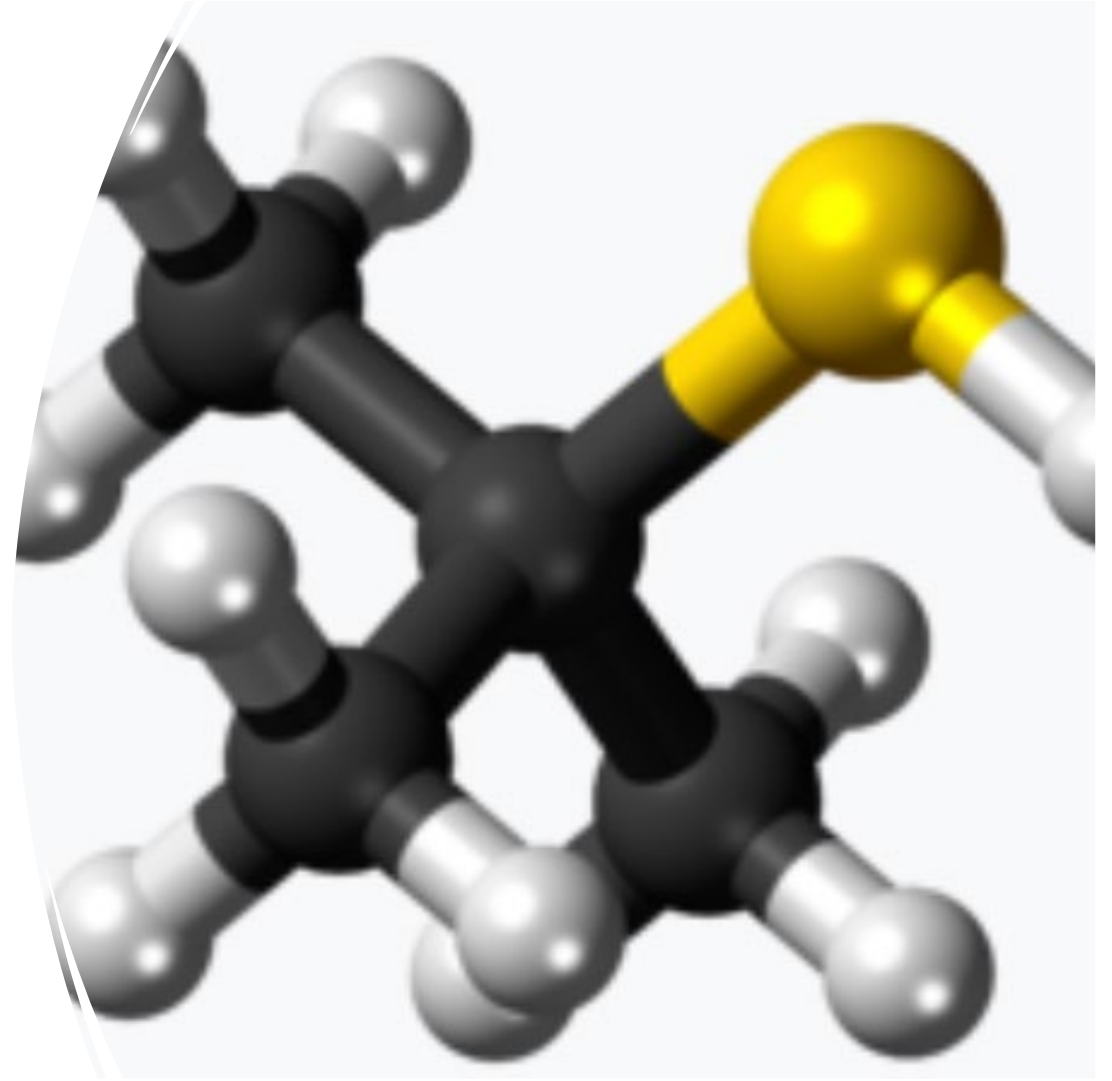
DOT Regulations

Odorant Transportation Equipment

Odor Free Deliveries

Spill Consequences

Emergency Spill Response Plan



Background

Natural gas odorant liquids are transported and stored using various technologies and systems.

This presentation discusses equipment and procedures for completing safe odorant transfers.

Natural gas odorant ("mercaptan odorant") is a liquid added to otherwise odorless natural gas to impart a distinct sulfur smell.

Approximately a dozen different odorant blends are used in the US – a combination of mercaptans and sulfides.

The various raw materials are manufactured by two main companies. Distribution is performed by these manufacturers directly, or through distributors in certain geographies.



"Nothing left to chance — safe transfers protect operators, communities, and the environment."

DOT regulatory information

Classification

Natural gas odorant is classified under DOT 49 CFR Part 172 as a flammable liquid — transported as a hazardous product.

Documentation Requirements (49 CFR 172.500)

UN 3336, Flammable Liquid 3
Safety Data Sheet
Bill of lading
Product certificate of analysis
(Optional) DOT Emergency response guidebook

Driver/Technician Qualifications

DOT Hazmat training · CDL hazmat license ·
(Optional) Hazard communication · Emergency response training

Transport Exceptions

Materials of Trade (49 CFR 173.6)

Max 8 gallons — proper shipping name, not full placarding

Non-Bulk Packaging (49 CFR 171.8)

Under 119 gallons



Odorant transport equipment



Odorant Transport Equipment



Bulk or Tanker Trucks

6,000 gal

- Semi Truck with Trailer
- 250 psig rated DOT tanks on truck chassis
- Fill large odorant tanks
- Equipped with: overpressure protection, liquid & vapor return manifolds, liquid metering, vapor compressor
- Filled at manufacturer, tested, driven to client site



Minibulk, Microbulk, Bobtail

1,000–2,500 gal

- Semi Truck chassis with fixed tank
- Used for client tanks 20–1,000 gal
- Ideal when site space restricts large truck access
- Same safety equipment as tanker trucks
- Greater flexibility for tight-access sites



Microbulk, Odorant Truck

250–500 gal

- F550 dually or similar chassis with fixed tank
- Serves small utilities and tight sites where larger trucks can't access
- Same safety equipment as larger bulk trucks

Odorant Transport Equipment

DOT Cylinders

5, 57, 120, 250 Gal

DOT Cylinders: 250 psig rated returnable vessels (often property of manufacturer/distributor);

Transported by third-party hazmat carrier;

Offloaded into bulk storage at client site;

DOT drums occasionally used for hazardous waste odorant destined for incineration, over-packed for transport;

Cylinder expiry must be verified before use.



ISO Containers

6000 gal

Used for large-volume or international transport;
Require site infrastructure for footprint and weight;

Same closed-loop transfer principles as bulk tanker delivery;

Less common in US domestic distribution;
Typically unloaded to bulk storage, not used as permanent site storage.

Odor Free Delivery

1

Vapor Compressor Starts

Draws vapor from receiving
tank

2

Pressure Differential Created

10–30 psig drives liquid flow

3

Liquid Odorant Transfers

Metered by turbine or mass
flowmeter

4

Displaced Vapor Returned

Back to source truck — zero
release

Safe Out Injection System

Utility Responsibility

Utility responsibility to put system into standby for filling

Bypass odorizer

- Isolate from the pipeline

- Basically close valves

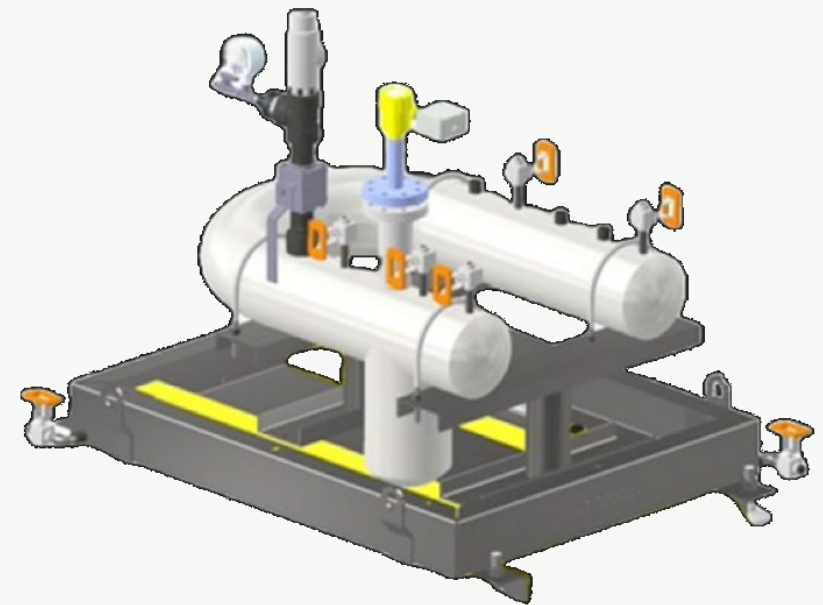
- Hook up truck then start with pressure movement

Injection odorizers

- Put pump into standby

- Isolate blanket gas

- Hook up truck to start pressure movement



Equipment for Odor-Free Delivery



Vapor Compressor

Creates 10–30 psig differential between vessels to drive liquid flow. Closed-loop recovery returns displaced vapor to source tanker — eliminating need to flare or scrub mercaptan vapors.

Carbon Filters

15, 30, or 55-gal activated carbon beds for odor-free transfer. Used with XP-rated fans (active) or passive pressure differential. Portable and recyclable to 96% wt. Monitor for thermal excursion.



Equipment for Odor-Free Delivery

Flow Metering



Every transfer is metered for accurate billing and inventory reconciliation.

Coriolis (mass) flow meters are preferred for accuracy and are standard on newer trucks.

Turbine meters are still found on older equipment.

Grounding Ability

Prevent static buildup.

Bond and ground the truck and receiving tank before opening any valves. A simple grounding strap prevents static discharge during liquid transfer.



Equipment for Odor-Free Delivery



Flare

Depressurizes receiving tank for smaller DOT cylinder transfers or high-pressure tank fills. Combustion produces sulfur oxides — operator must be upwind; avoid weather inversions.

Spill Kit

Full-face respirator, gloves, Tyvek suit, odor-kill liquid, odor-masking agent, absorbent pads & granules, odor-control carbon filter, recovery drum. Have them on-site before transfer begins.



Flare Hazards

Combustion products of mercaptan are hazardous (SO₂) – OSHA PEL (TWA) is 5 ppm

Combustion products are heavier than air and tend to linger at ground level during weather inversion.

Must be at least 50' away from tank and down wind.

50' away from ignition sources

Should not be operated during inversions (foggy conditions “heavy air”) or high winds (could cause leak calls if flare goes out).

Cylinder Transfer Equipment

Cylinder Specific Equipment

Vapor and liquid manifolds

Flex hoses

Leak soap – to pressure test prior to opening valve

Liquid level gauge on tank

Nitrogen cylinder or a 30-50 psig source of natural gas.

Flare or carbon filter

Odor control products (odor kill sprays, masking agent)

Spill response kit



Guidelines for Safe Odorant Delivery

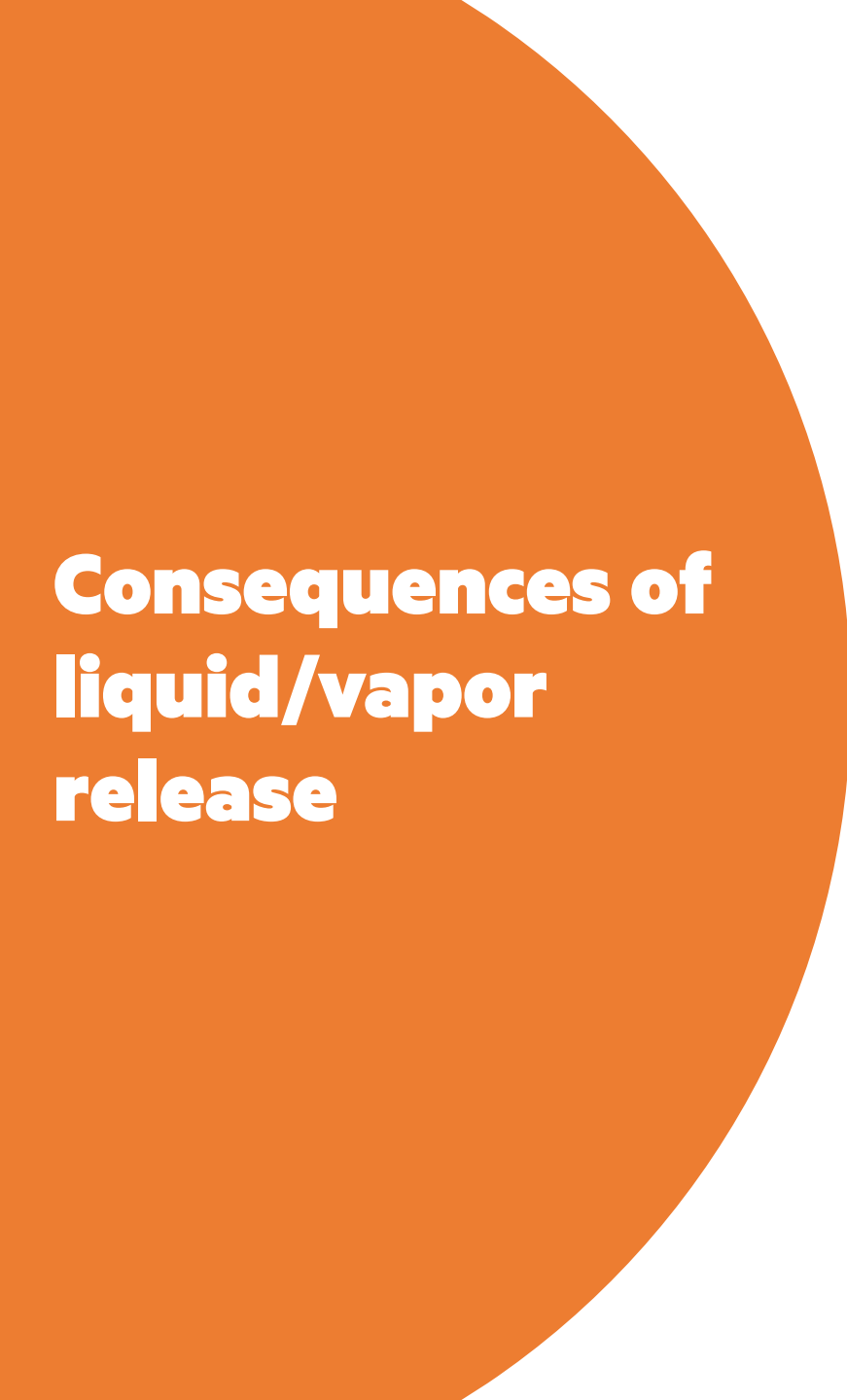
Driver/Technician Responsibility

- Ground truck; use non-sparking tools
- Verify all equipment prior to operation (compressor, gauges, filters, flare)
- Inspect valve and receiving tank integrity before filling
- Never transfer if liquid level gauge is non-functional — stop and fix first
- Fill to max 80% by volume
- Inspect firefighting equipment; wear FR clothing, chemical gloves, safety shoes, safety glasses etc.
- Avoid extreme weather (high winds, hail, lightning)
- Prefer closed-loop systems; never vent odorant vapors to atmosphere
- Clean all tools with odor-kill liquid after transfer
- Address any fugitive vapors

Utility Responsibilities

- Know which blend is being used
- Maintain odorant tank, valves, PRV, and liquid level gauge in working order
- Properly labeled liquid and vapor valves
- Ensure odorant tank is in secondary containment (double walled)
- Tank must be properly grounded
- Keep access clear of obstructions, snow and ice



A large orange circle is positioned on the left side of the slide, partially cut off by the edge.

Consequences of liquid/vapor release

Effects on environment (water source and soil)

Business disruption

- Mobilization of operations to address leak calls

- Station shut down

Public relations

High cost of remediation and disposal

Potential disruption of natural gas to public

A series of four yellow curved dashes are located in the bottom right corner of the slide.

Day After an Odorant Spill

Impact Areas

- Health and Safety
- Community Impact
- Fire Risk
- Environmental Impact
- Business Disruption



Odorant Spill Response

Stop the source of leakage, if possible.

Notify Gas Company, Police, Fire Marshall as required. Follow Utility Protocol.

Assess the magnitude of the spill. Don PPE as needed.

Shut off all ignition sources

Start carbon ventilation system

Assign employees to monitor the odor on the property perimeter

Contain the spill (e.g. prevent spread in ground water), if manageable

Absorb spilled odorant, if manageable

Neutralize the odorant (mask/kill the smell), if manageable

Dispose of the treated material

Prepare information for Hazmat team

Call Environmental cleanup company

Reduce Risk

Risk analysis

Emergency response plan

Odorization training

PM of odorization equipment

Tools for spill response

Modernization of installation



Thank you

Juraj Strmen

Paper Author

Juraj@mrrus.com

514.513.1490

Nick Wiewiorowski

Presenter

Nick@mrrus.com

304.904.8748

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