WGMSC

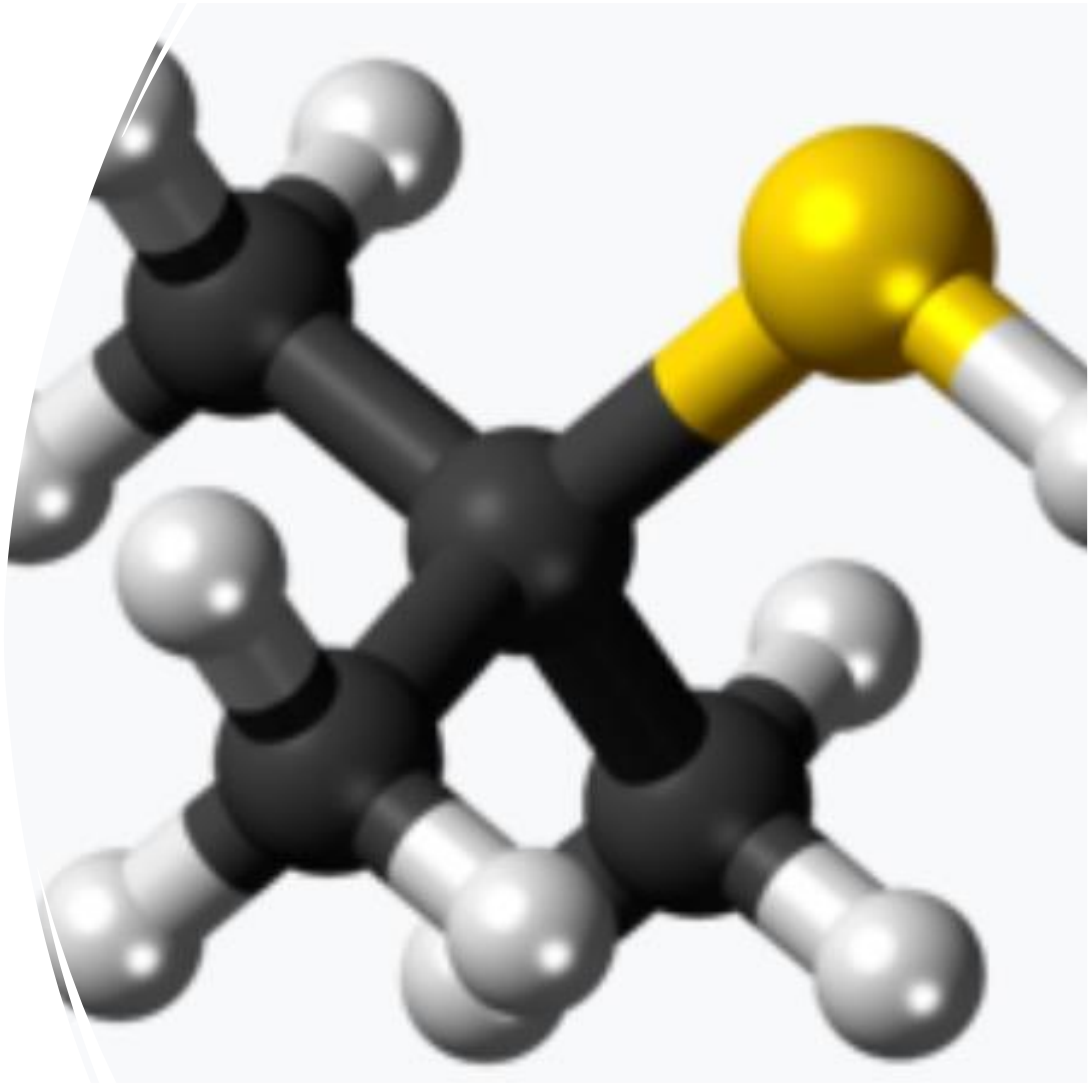
western gas measurement short course

SALT LAKE CITY

Juraj Strmen - Technical Director, MRR

Transfer systems for safe odorant deliveries – April 29th – May 2nd 2024, WGMSC – Salt Lake City, UT.

Content



1. Odorant transport equipment

A) Turn-key odorant delivery service: transfer of liquids into client storage tank

- Bulk
  - 5000- 6500-gal tanker truck
- Microbulk
  - 1000- to 3000-gal tanker trucks
- DOT approved cylinder
  - less than a 1000 lbs. or ~120 gallon capacity cylinder

B) Delivery of product only. Client completes odorant transfer.

- Bulk
  - 6000-gal ISO container
- Exchange of empty cylinders
  - 5, 57, 100, 250 gal

Bulk Delivery
6000-gallon tanker truck

Microbulk Delivery

2400-gallon tanker truck

Microbulk Delivery
2 x 1000-gallon tanker truck

- Delivery of odorant from pickup truck using DOT cylinders

- Bulk Delivery
- 6000-gallon ISO tank

Cylinder Delivery

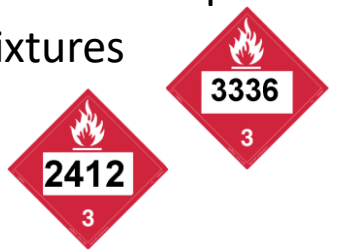
57 gallon DOT cylinder

Cylinder Delivery

5 gallon DOT cylinder

2. DOT regulatory information

- Odorants are Class 3 flammable hazardous materials
- Never ship by air!!!
- Road/rail transport governed by DOT 49 CFR parts:
  - 107 – hazardous program procedures
  - 171-180 – regulation on packaging and shipment
  - 390-397 – federal motor carrier regulation
- Requires HAZMAT driver and placarding
  - Mercaptan mixtures
  - Thiophane
  - Bill of lading
  - Drug testing
  - Training, certifying drivers and employees in hazardous materials handling
  - Hazard communication, emergency response training.



- Odorants can be transported without placards under the Materials of Trade exception (see 49 CFR 174.600, max of 8 gallons of odorant) or as stated in the non-bulk packaging rule 49 CFR 171.8 (max of 119 gallons of odorant).

3. Equipment required for odorant transfers

For tanker truck deliveries:

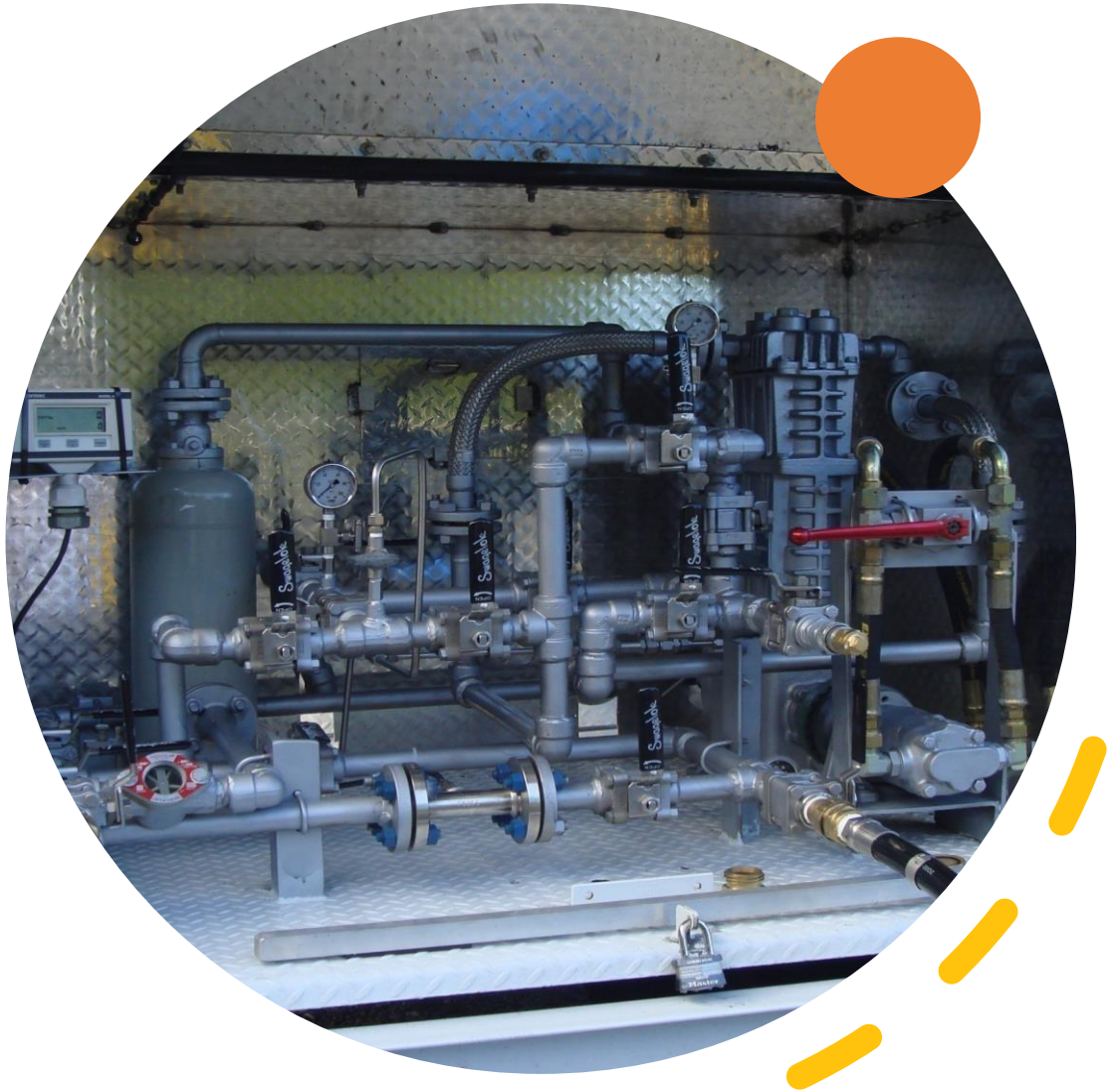
- Receiving tank with level gauge
- Liquid flowmeter and flex hoses
- Closed loop vapor compressor

For cylinder deliveries:

- Vapor and liquid manifolds
- Flex hoses
- 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

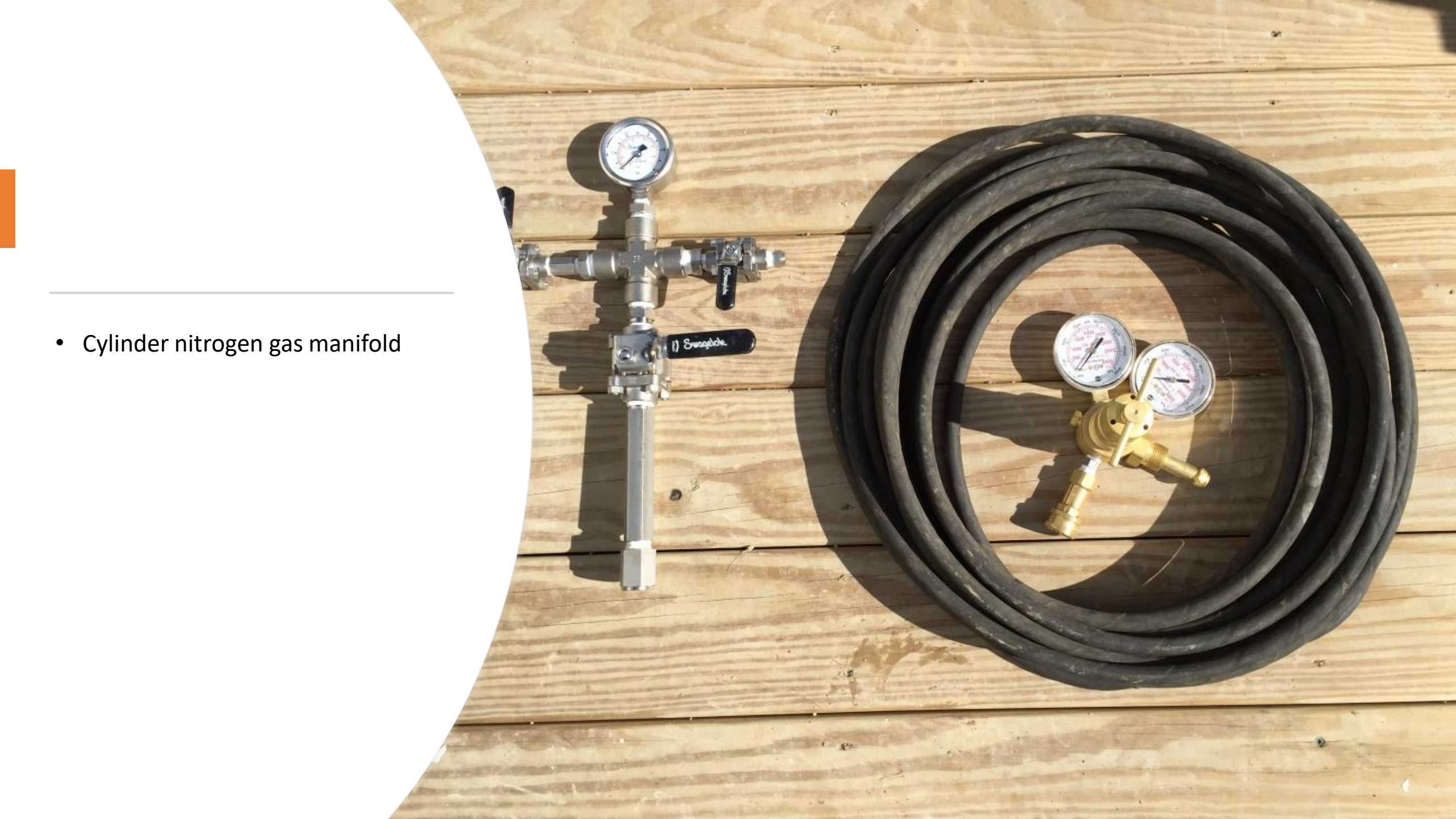

MRR
MIDLAND RESOURCE
RECOVERY
YOUR PARTNER IN ODORIZATION
2363
VAPOR LINE
FILL LINE

- Truck closed-loop vapor compressor transfer manifold

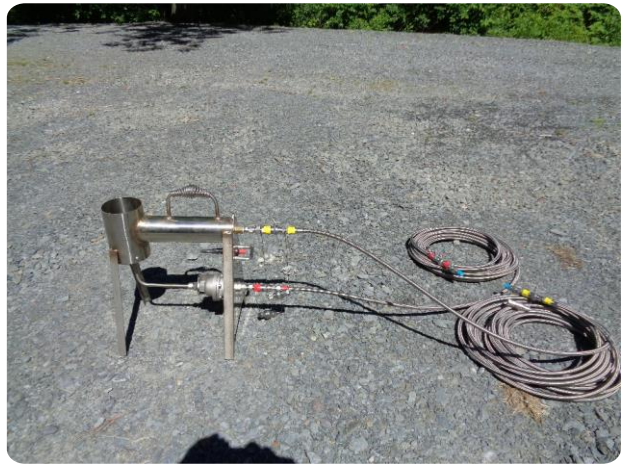


- Cylinder liquid transfer manifolds

- Cylinder nitrogen gas manifold



- Flares



Hazards with using flares to depressurize odorant tanks

- Combustion products of mercaptan are hazardous (S02) – 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 or high winds. (could cause leak calls if flare goes out)

- Use of carbon filters to capture fugitive emissions.

- Mercaptan-specific odorant spill kit

4. Guidelines for safe odorant delivery

- Safety is a high priority during odorant transfers. Flammable liquid, handled with caution.
- Operators should be OQ-qualified for abnormal conditions, hose connection/disconnection pressure test, NPT/compression fittings. Further training would include specific equipment training, labeling, placarding, bill-of-lading and safety data sheet information knowledge, as well as physical and chemical properties of odorants, odorant spill response and odor control, knowledge of various odorization systems, DOT and CDL rules and regulations.
- Grounding and use of non-sparking tools
- Type and quantity of odorant requested (CoA and SDS of product)
- All equipment must be verified prior to operation (compressor, filter, flare, pressure gauges, liquid level gauges on receiving tank and tanker truck tank)
- Validation of functionality of level gauge during fill. Fill to no more than 80% typically.
- Firefighting equipment must be inspected and ready for use during each odorant delivery.

4. continued…

- Personal protective equipment (FR clothing, chemical protection gloves, glasses, safety shoes) must be worn. SDS sheets must be consulted prior to work for odorant specific PPE. A spill kit would contain additional PPE for use in an odorant spill clean-up.
- Avoid odorant transfers in extreme weather
- Closed-loop systems (e.g. compressor) are preferred to non-closed-loop systems (e.g. flaring, carbon scrubbing).
- Odorant vapors should never be vented to the atmosphere.
- Clean all tools after transfer to avoid leak calls.
- Olfactory fatigue is possible if fugitive vapors are present for more than 5-10 minutes.
- 4 gas monitors should be worn to protect technician from a natural gas leaks at gate station
- Understanding of odorization system.
- Odor control during disconnection

5. Utility responsibility for safe odorant transfer

- Safe staging/design of odorization equipment and ground location
- Identification of liquid, vapor tank entries
- Functioning level indication
- Functioning pressure gauges on tank
- Secondary containment free of water
- Odor-free gate station for low odorant exposure to delivery technician. OSHA PEL (TWA) is 0.5 ppm.

6.Consequences of odorant spills

- False leak calls puts the public at risk (desensitization to risk, mobilization of nat. gas crews)
- Possible adverse effect on human health
- Effects on environment (water source and soil)
- Business disruption
- Public relations problem
- High cost of remediation and disposal
- Reliability of gas delivery system in question

The day after a large odorant spill…

1. Station shutdown - business disruption
2. Public at risk – negative perception
3. High environmental cleanup costs

7. Odorant Spill Response

1. Stop the source of leakage, if possible.
2. Assess the magnitude of the spill. Don PPE as needed.
3. Shut off all ignition sources
4. Notify Gas Company, Police, Fire Marshall as required
5. Start carbon ventilation system
6. Assign employees to monitor the odor on the property perimeter.
7. Contain the spill (e.g. prevent spread in ground water), if manageable
8. Absorb spilled odorant, if manageable
9. Neutralize the odorant (mask/kill the smell), if manageable
10. Dispose of the treated material in sealed containers
11. Prepare information for Hazmat team.
12. Call Environmental cleanup company.

Steps that will lower risk of odorant spills:

1. Risk analysis – very low cost
2. Emergency response plan – very low cost
3. Odorization training – low cost
4. PM of odorization equipment – low cost
5. Tools for spill response – low cost
6. Modernization of installation - moderate

Use only appropriate equipment for odorant transport

Spill response training for employees handling odorant

Odor Control Training

Thank you!