Gas Odorants

Safe Handling, Health and Safety Concerns

Gas Odorants

Safe Handling, Health and Safety Concerns

Introduction

Five Questions

1. Why do we odorize?
2. What is odorant?
3. What are the health and safety concerns?
4. How do we safely handle odorant?
5. What do we do if there is an odorant spill?

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Why do we odorize?

1. New London Texas Gas Explosion in 1937

1. Because it is the law

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New London Gas Explosion in 1937

- New School
- Recently switched to natural gas directly from the field
- A natural gas leak caused gas to accumulate in the basement
- No one knew that there was a gas leak
- It was set off when an instructor turned on a sanding machine

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New London Gas Explosion in 1937

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New London Gas Explosion in 1937

Result

- Of the 500 students and teachers in the school, 298 died

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New London Gas Explosion in 1937

Recommendations

- Need for impregnation gas with a warning agent that will enable users to detect leakage
- Responsibility for the construction, maintenance and operation should be exclusively under the control of persons or organizations experienced in such work
- Schools should purchase their fuel supply from a public service company
- Gas companies may be of great service through their knowledge of and familiarity with the hazards involved in the use of gas

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New London Gas Explosion in 1937

Aftermath

- Texas legislates gas odorant within a four months
- Rest of the states quickly follow
- Canada and the rest of the world also adopt this standard

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The Law

Gas delivered to customers MUST be odorized

United States Federal Register

49 CFR 192.625(a)

"A combustible gas in a distribution line must contain a natural odorant or be odorized so that at a concentration in air of one-fifth of the lower explosive limit, the gas is readily detectable by a person with a normal sense of smell."

Canadian Standards Association

Z662-99 Section 4.17.1

"Fuel gas that is to be delivered to customers through distribution or service lines…and that does not naturally possess a distinctive odor to the extent that its presence in the atmosphere is readily detectable at all gas concentrations not less than one-fifth of the lower explosive limit shall have an odorant added to it to make it detectable."

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The Law - Important Considerations

- One fifth the lower explosive limit
- Detectable by a person with a normal sense of smell

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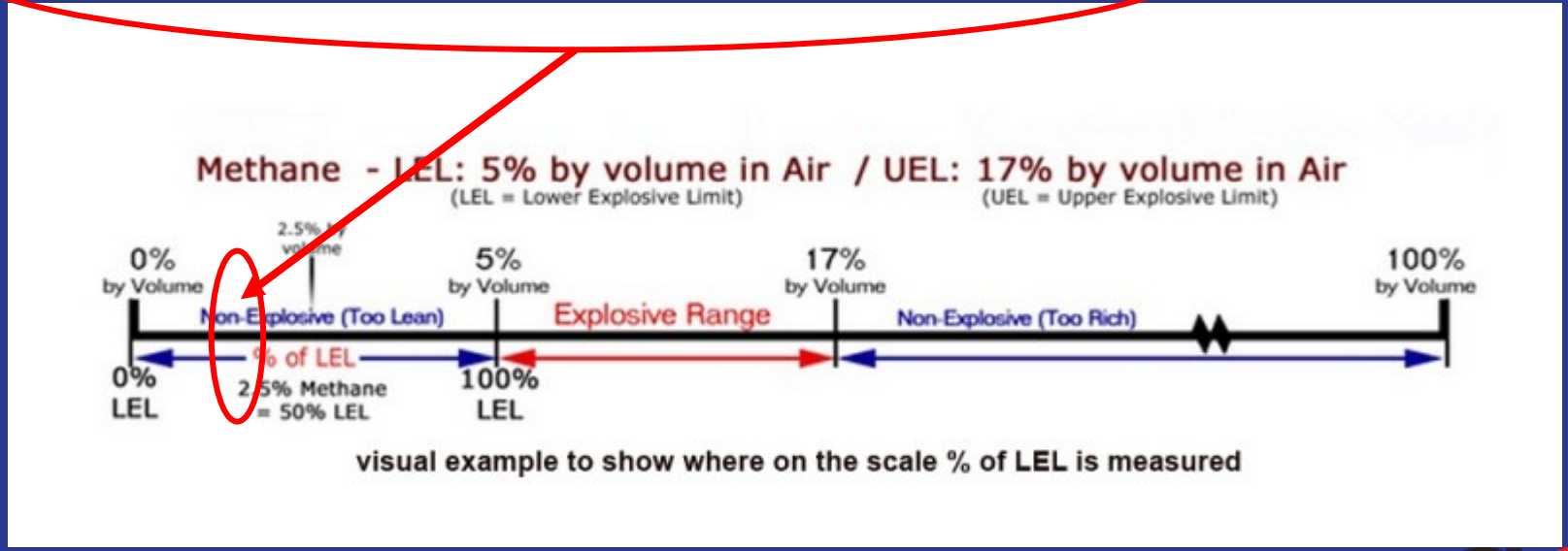
One fifth the lower explosive limit is 1%



visual example to show where on the scale % of LEL is measured

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"detectable by a person with a normal sense of smell"

- By a person
  - not a machine.
- "Normal Sense of Smell"
  - prove it.

United States Federal Register

49 CFR 192.625(a)

"A combustible gas in a distribution line must contain a natural odorant or be odorized so that at a concentration in air of one-fifth of the lower explosive limit, the gas is readily detectable by a person with a normal sense of smell."

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Odorant
is the #1 safety initiative
of any gas utility

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What is Odorant?

Odorant is a highly smelly compound that is added to natural gas and propane so that people can identify a leak by smell.

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Legal Requirements for Odorant

- The odorant may not be harmful to people, materials or pipe.
- The products of combustion from the odorant shall not be toxic when breathed, or corrosive or harmful to those materials to which the the products of combustion will be exposed.
- The odorant may not be soluble in water to and extent greater than 2.4 parts to 100 parts by weight

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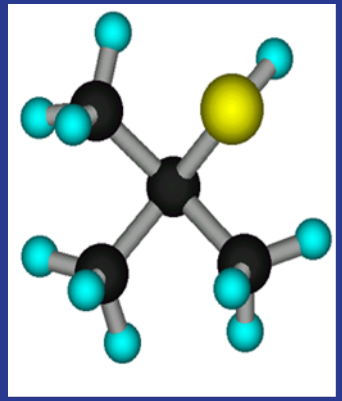
Odorants

- Generally made up of two parts:
  - Mercaptan (for smell)
  - Sulphide (for antifreeze)



***tert*-Butyl mercaptan (TBM)**

- Each area will have a specific blend that they use to match its temperature, humidity and soil conditions (acidity and moisture)

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Mercaptans

- In the Guinness Book of World Records and the stinkiest thing in the world
- The smell of dead and decaying plant and animal matter
  - People have a natural aversion to this smell
- Some people can smell at a threshold level of 1 part per billion
  - One blade of grass in 6 football fields

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COMMERCIALIZED ODORANT BLENDS

*** Not in the AGA 2017 Odorization Manual ***

AGA MANUAL	ARKEMA	Chevron Phillips	Mercaptans				Sulfides			Injection type		Cloud point
			TBM	IPM	NPM	SBM	DMS	MES	THT	Vapor	Liquid	
Blend 1	SPOTLEAK 1425	Scentinel N	75-80%	15-22%	2-7%	0-4%				X	X	≤-50°F (-46°C)
Blend 2	SPOTLEAK 1009	Scentinel E	75-80%	13-18%	2-8%					X	X	
Blend 3	SPOTLEAK 1001, 1410, 1420	Scentinel F20, F25, F50	48-82%				18-52%				X	
Blend 4	SPOTLEAK 1007	Scentinel S20	76-81%					18-24%		X	X	
Blend 5	SPOTLEAK 2323	Scentinel S50	50%					50%		X	X	
Blend 6	SPOTLEAK 1450	Scentinel O10	8-12%	68-72%	8-12%		8-12%				X	
Blend 7	SPOTLEAK 1005, 1039	Scentinel TB, T50	28-52%						48-71%		X	
Blend 8	SPOTLEAK 1013	Scentinel T							≥98%	X	X	
		Freezing point	1 °C / 34 °F	-130 °C / -202 °F	-113 °C / -171 °F	-140 °C / -220 °F	-98 °C / -144 °F	-106 °C / -159 °F	-96 °C / -141 °F			

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Safe Handling, Health and Safety Concerns

What are the Health and Safety Concerns?

Use the SDS

Remember that the legislation requires that
“The odorant may not be harmful to people, materials or pipe.”

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CP Chem S-20 SDS Sections

SECTION 1: Identification of the substance/mixture and of the company/undertaking
SECTION 2: Hazards identification
SECTION 3: Composition/information on ingredients
SECTION 4: First aid measures
SECTION 5: Firefighting measures
SECTION 6: Accidental release measures
SECTION 7: Handling and storage
SECTION 8: Exposure controls/personal protection
SECTION 9: Physical and chemical properties
SECTION 10: Stability and reactivity
SECTION 11: Toxicological information
SECTION 12: Ecological information
SECTION 13: Disposal considerations
SECTION 14: Transport information
SECTION 15: Regulatory information
SECTION 16: Other information

SAFETY DATA SHEET

Chevron Phillips CHEMICAL

SCENTINEL® S-20 Gas Odorant

Version 2.3 Revision Date 2023-10-17

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product information

Product Name : SCENTINEL® S-20 Gas Odorant
Material : 1096889, 1098465, 1024714, 1024715, 1024716, 1024722, 1024719, 1024718, 1024717, 1024713, 1024721, 1033064, 1024720

Use : Odorant

Company : Chevron Phillips Chemical Company LP
Specialty Chemicals
10001 Six Pines Drive
The Woodlands, TX 77380

Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)
Transport:
CHEMTREC 800.424.9300 or 703.527.3887(int'l)
Asia: CHEMWATCH (+612 9186 1132) China: 0532 8388 9090
Mexico CHEMTREC 01-800-681-9531 (24 hours)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600
Argentina: +(54)-1159839431
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Austria: VIZ +43 1 406 43 43 (24 hours/day, 7 days/week)
Belgium: 070 245 245 (24 hours/day, 7 days/week)
Bulgaria: +359 2 9154 233
Croatia: +3851 2348 342 (24 hours/day, 7 days/week)
Cyprus: 1401
Czech Republic: Toxicological Information Center +420 224 919 293, +420 224 915 402
Denmark: Danish Poison Center (Giftlinjen): +45 8212 1212
Estonia: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Finland: 0800 147 111 09 471 977 (24 hours/day)
France: ORFILA number (INRS): + 33 (0) 1 45 42 59 59 (24 hours/day, 7 days/week)
Germany: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Greece: (0030) 2107793777 (24 hours/day, 7 days/week)
Hungary: +36-80-201-199 (24 hours/day, 7 days/week)
Iceland: 543 2222 (24 hours/day, 7 days/week)
Ireland: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Italy: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

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ODOR-FADE WARNING A GAS LEAK CAN CAUSE A FIRE OR EXPLOSION RESULTING IN SERIOUS INJURY OR DEATH.

Be aware that the stenching chemical added to gas to make it detectable may not warn of a gas leak or the presence of propane or natural gas to all persons in every instance.

Instances where the odorant in an odorized gas may be undetectable include:
• Odor intensity may fade or be eliminated for a variety of chemical and physical causes, including the oxidation of rusting pipes, adsorption into or sticking onto the interior of pipes or appliances, or absorption into liquids.
• Contact with soil in underground leaks may de-odorize or remove odorant from the gas.
• Some people have a diminished ability, or inability to smell the stench. Factors that negatively affect a person's sense of smell include age, gender, medical conditions, and alcohol/tobacco usage.
• The stench of odorized gas may not awaken sleeping persons.
• Other odors may mask or hide the stench.
• Exposure to the odor for even a short period of time, may cause nasal fatigue, where a person can no longer smell the stench.

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SECTION 2: Hazards identification

Hazard Statements

- H225: Highly flammable liquid and vapor.
- H317: May cause an allergic skin reaction.
- H319: Causes serious eye irritation.

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Safe Handling, Health and Safety Concerns

SECTION 2: Hazards identification

Hazard Statements

- H225: Highly flammable liquid and vapor.
  - Natural Gas is EXTREMELY flammable
- H317: May cause an allergic skin reaction.
  - Repeated skin contact can result is a rash
- H319: Causes serious eye irritation.
  - Exposure of the substance to the eye can cause irritation but not damage.

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Prevention:

- P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
- P233 Keep container tightly closed.
- P240 Ground/bond container and receiving equipment.
- P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
- P242 Use only non-sparking tools.
- P243 Take precautionary measures against static discharge.
- P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
- P264 Wash skin thoroughly after handling.
- P272 Contaminated work clothing must not be allowed out of the workplace.
- P280 Wear protective gloves/ eye protection/ face protection.

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Safe Handling, Health and Safety Concerns

Response:

- P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
- P337 + P313 If eye irritation persists: Get medical advice/ attention.
- P363 Wash contaminated clothing before reuse.
- P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

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Storage:

- P403 + P235 Store in a well-ventilated place. Keep cool.

Disposal:

- P501 Dispose of contents/ container to an approved waste disposal plant.
    - Use an experienced contractor familiar with handing odorants

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Section 4: First Aid Measures

- General advice : Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Material may produce a serious, potentially fatal pneumonia if swallowed or vomited.
- If inhaled If unconscious, place in recovery position and seek medical advice. If symptoms persist, call a physician.
- In case of skin contact : If skin irritation persists, call a physician. If on skin, rinse well with water. If on clothes, remove clothes.
- In case of eye contact : Immediately flush eye(s) with plenty of water. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.
- If swallowed : Keep respiratory tract clear. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

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Safe Handling, Health and Safety Concerns

SECTION 8: Exposure controls/personal protectio

1. Use Engineering measures when possible

1. Use work practices to eliminate or reduce the chance of incidents

1. PPE
    a. Breathing apparatus as required
    b. Tight fitting goggles
    c. Gloves of suitable material

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How do we safely handle odorant?

1. Manage Odor
2. Manage Flammability
3. Manage Exposure
4. Manage Venting and Spills

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Managing Odor

1. Procedures
2. Eliminate Venting
    a. Closed loop systems
    b. Inspect and maintain odorant tanks, equipment and piping
    c. Do not allow tanks to vent or breathe
    d. Activated Carbon Filtration
    e. Flaring
3. Use a masking agent during operations
4. Properly Recycle odorant equipment and piping
    a. Use an experienced and qualified company

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Safe Handling, Health and Safety Concerns

Managing Flammability

1. Procedures
2. Eliminate Venting
3. Eliminate Spills
4. Eliminate Ignition Sources
    a. Grounding cable
    b. Cell phone use
    c. Air intake shut off valves for diesel engines
    d. Smoking
    e. Non-Sparking tools and fittings (eg. Brass)

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Managing Exposure

1. Engineering controls
2. Procedures
    a. Eliminate Venting
    b. Eliminate Spills
3. Use Proper PPE
    a. Goggles
    b. Gloves
    c. Respirator

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Safe Handling, Health and Safety Concerns

Managing Venting and Spills

1. Procedures
2. Eliminate Venting
   a. Closed loop systems
3. Eliminate Spills
   a. Drip trays
   b. Use rags soaked in masking agent
4. Use Proper Equipment and Proper Materials
   a. Hoses
   ~~b. Nitrile~~
   c. Stainless Steel

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How do we safely handle odorant?

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Safety Concerns

- **Driving**

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Safety Concerns

- **Driving**
- **Bottom Valves**

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Safety Concerns

- **Driving**
- **Bottom Valves**
- **Hoses**

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Safety Concerns

- Driving
- Bottom Valves
- Hoses
- Hose Connections

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Safety Concerns

- Driving
- Bottom Valves
- Hoses
- Hose Connections
- Operator

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What do we do if there is an Odorant Spill?

1. Assess the Risk
2. Stop the Spill (only if can be done safely)
3. Initiate the Spill Management Plan
4. Secure the Site
5. Contain the Spill
6. Minimize the Odor and Vapors
7. Absorb and Cover the Spill
8. Neutralize and Mask the Odor
9. Dispose of the Material

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What do we do if there is an Odorant Spill?

- Assess the Risk
  - What is the risk to me?
  - What is the risk to the public?
  - What can be done safely?
  - What PPE do I need?

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What do we do if there is an Odorant Spill?

- Stop the Spill (only if can be done safely)
  - Close the valve
  - Remove the pressure
  - Shut off the pump or the truck

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What do we do if there is an Odorant Spill?

- Initiate the Spill Management Plan
  - Assess the Risk
  - Notification
    - Management and Authorities
    - Third Parties
      - Chemtrec (US) 1-800-262-8200
      - Canutec (Canada) 1-888-226-8832 *666 (cell)
      - Spill Response Experts
  - Manage the Situation
  - Complete all Necessary Paperwork

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What do we do if there is an Odorant Spill?

- Secure the Site
  - Barriers
  - Close the gate
  - Limit the public

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What do we do if there is an Odorant Spill?

- Contain the Spill
  - Create a Berm
  - Have Odorant Collect in One Spot
  - Direct odorant away from buildings and footings
  - Direct odorant away from water bodies and sewers

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What do we do if there is an Odorant Spill?

- Minimize the Odor and Vapors
  - Cover spill with a tarp
  - Cover the spill with black dirt
  - DO NOT use a large about of bleach or other chemical as it might spread the odorant over a larger area.
  - Use masking agents as required
  - Use enzymes to neutralize

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What do we do if there is an Odorant Spill?

- Absorb and Cover the Spill
  - Use absorbent material to absorb odorant
  - If the spill is small
    - Place odorant impregnated dirt and absorbent material into airtight drums or containers for disposal.
  - If the spill is large remediate odorant on site
    - Cover (tarp) the area and remediate using, time, land farming and chemicals (if required)

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What do we do if there is an Odorant Spill?

- Neutralize and Mask the Odor
  - Use a masking agent
  - Cover with black dirt

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What do we do if there is an Odorant Spill?

- Dispose of the Material
  - Approved landfill
  - Approved land farming operator
  - Incineration

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Preparing for an Odorant Spill

- Engineer (design) the system to eliminate the possibility of a spill
- Prepare for a spill by having procedures and training personnel to minimize the chance of a spill
- Plan to react to a spill by having a spill response procedure in place
- Practice to respond to a spill by having training and spill drills

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Conclusion

Five Questions

1. Why do we odorize?
2. What is odorant?
3. What are the health and safety concerns?
4. How do we safely handle odorant?
5. What do we do if there is an odorant spill?

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Resources

Gas Odorant Service & Supply LLC - https://www.gasodorant.com/
American Gas Association - https://www.aga.org/
Canadian Gas Association - https://www.cga.ca/

National Response Centre (NRC) (US Spills) - https://www.epa.gov/emergency-response/national-response-center
Canutec (Canadian Spills) - https://www.epa.gov/emergency-response/national-response-center

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Your Questions?

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