

Proper Testing of Odorant Levels in Natural Gas

IURC PIPELINE SAFETY SEMINAR

July 14 2010

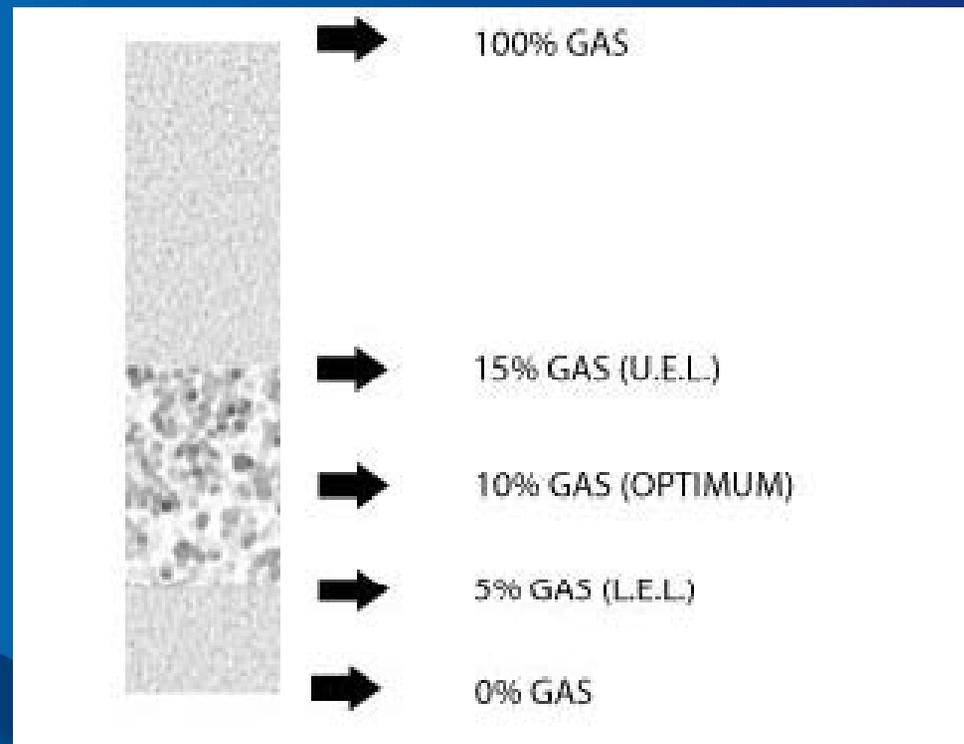
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GPTC / DOT 192.625 (a)

A combustible gas in a distribution line must contain a natural odorant or be odorized so that at 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.

FLAMMABLE RANGE – NATURAL GAS



DEFINITIONS

- **Readily** – adverb, in a ready manner as A: willingly, B: speedily, C: easily.*
- **Detect** or (adj.) **Detectable** – 1. To discover the true, hidden, or disguised character of. 2. To discover or determine the existence, presence or fact of.*

* Webster 7th Collegiate Dictionary

GPTC / DOT 192.625 (f) (revised 10/15/03)

To assure the proper concentration of odorant in accordance with this section, each operator must conduct periodic sampling of combustible gases using an instrument capable of determining the percentage of gas in air at which the odor becomes readily detectable.

DEFINITIONS

- **Periodic – (adj) Occurring at regular intervals.***
- **Sufficient – Enough to meet the needs of a situation or a proposed end.***
- **Frequent – Common, usual, happening at short intervals, habitual, persistent.***

GPTC / DOT 192.625 (f) – Periodic Sampling

- ASTM D 6273.98 Standard Test Method for Natural Gas Odor Intensity
 - These test methods cover the procedures for determining the ODOR intensity of natural gas through the use of instruments that dilute and mix sampled natural gas with air. The mixed gas stream is sniffed by the operator for the purpose of determining the threshold detection level or the readily detection level, or both, for Odorant in the natural gas stream.

DEFINITIONS

Readily Detectable Level:

The concentration of natural gas and odorant mixture in air which the operator is able to detect and identify natural gas odor.

Threshold Detection Level:

The concentration of natural gas and odorant mixture in air which the operator is barely able to detect an odor.

REMEMBER!

- **Odor is for the Customer's Use Only.**
- **Odorization is the Customer's Leak Detector.**
- **It is their Lifeline to Safety!**

HEATH ODORATOR



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BACHARACH ODOROMETER



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YZ SYSTEMS-DTEX



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FACTORS WHICH AFFECT ODOR QUANTITY

- Odorizer Shut-down
- Contaminants in Odorizer
- Natural Occurring Sulfurs
- Distillates in Pipeline
- Pipe wall Adsorption
- Oxidation in Pipeline

FACTORS WHICH AFFECT ODOR QUALITY

- **Physical Ailments**
- **Soil Adsorption**
- **Masking**
- **Distraction**

METHODS TO VERIFY ODOR QUALITY DOCUMENTATION OF ODORIZATION

- **Injection Rates**
- **Odorizer Inspections**
- **Customer Complaints Calls**
- **Serviceman Tests**
- **Odor Concentration Meter Tests**
- **Chromatographic Analysis**

CHROMATOGRAPH TECHNOLOGIES

- Lead Acetate
- Chemiluminescence's
- Flame Photometric
- Infrared
- Electrochemical

CHROMATOGRAPH



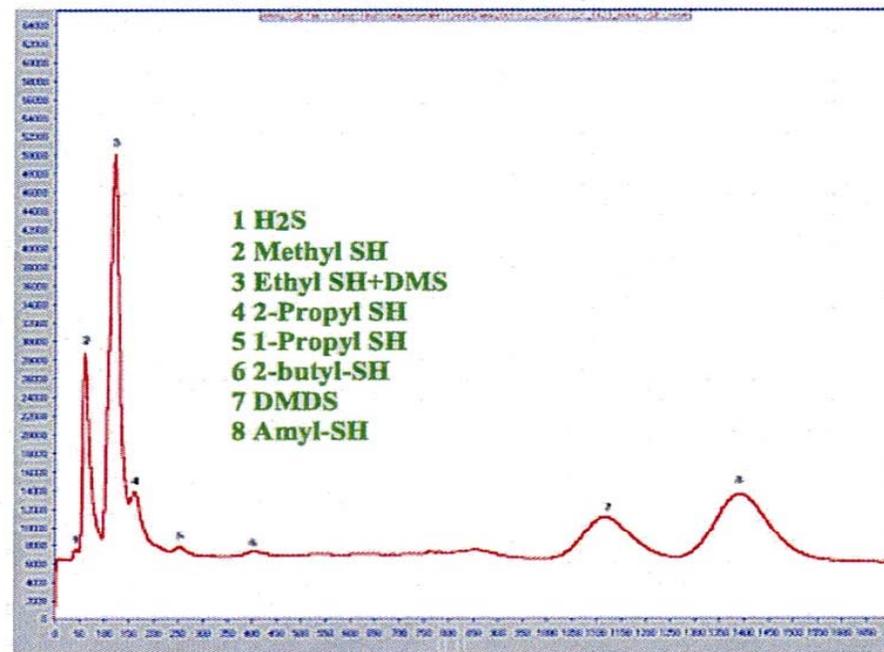
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MERCAPTAN / SULFIDE COMPONENTS

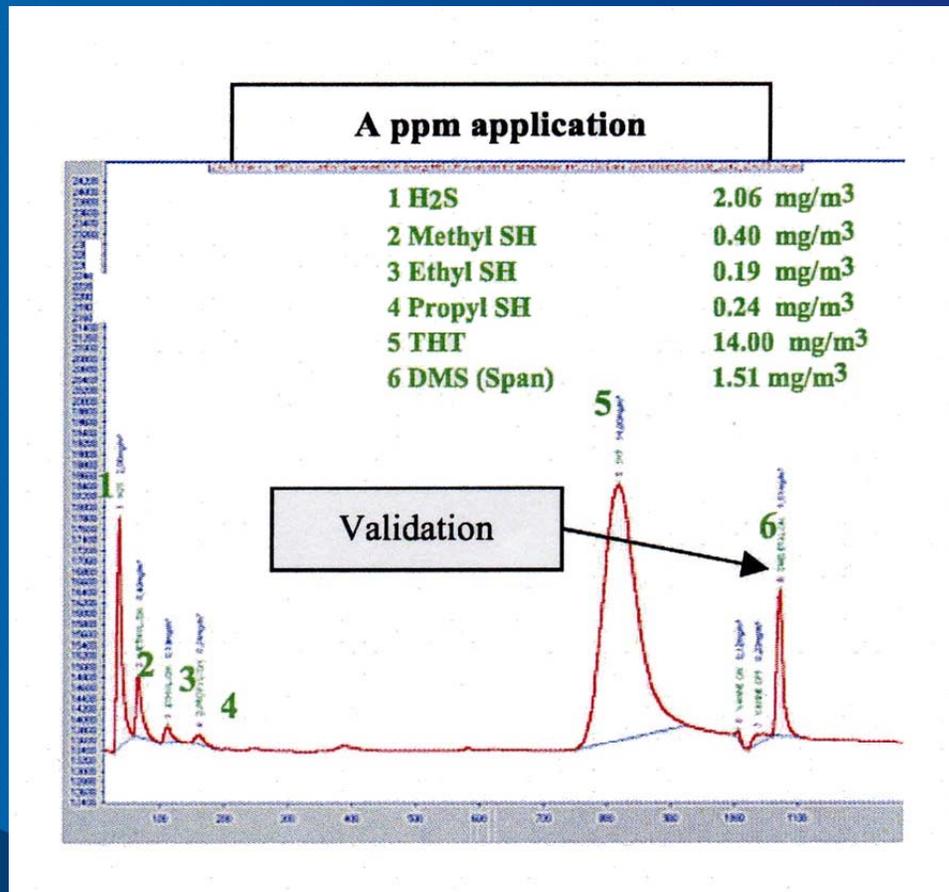
ABBR	NAME	W
●EM	Ethyl Mercaptan	1.08
●DMS	Dimethyl Sulfide	1.00
●IPM	ISO Propyl Mercaptan	0.88
●MES	Methyl Ethyl Sulfide	0.66
●NPM	Normal Propyl Mercaptan	0.85
●TBM	Tertiary Butyl Mercaptan	1.00 (REF)
●SBM	Secondary Butyl Mercaptan	1.99
●DES	Diethyl Sulfide	0.22
●THT	Thiophane	1.63
●EIS	Ethyl Isoprpyol Sulfide	0.07

CHROMATOGRAPHS

A ppb application



CHROMATOGRAPHS



CONCLUSION

- **Overall:**
 - **Make sure you understand your instrument**
 - Read the manual
 - Get training – manufacturers rep, gas company, personnel
 - Keep all records – calibration, test, etc. The PUC will check.
 - **Understand rules and regulations**
 - **Be aware of your surroundings**