Properties of Natural Gas and Propane

PHYSICAL CHARACTERISTICS OF WHICH OPERATORS SHOULD BE AWARE

October 17, 2012
What is Natural Gas?

- Natural Gas is a combination of:
  - **Methane**
  - Ethane
  - Propane
  - Butane
  - Carbon Dioxide
  - Other Minor Constituents
## Various Natural Gas Compositions

<table>
<thead>
<tr>
<th>State</th>
<th>Methane</th>
<th>Ethane</th>
<th>Propane</th>
<th>Butane</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michigan</td>
<td>75.80</td>
<td>17.5</td>
<td>0</td>
<td>0</td>
<td>6.7</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>96.80</td>
<td>2.5</td>
<td>.2</td>
<td>0</td>
<td>.5</td>
</tr>
<tr>
<td>Texas</td>
<td>79.00</td>
<td>6.31</td>
<td>2.2</td>
<td>.07</td>
<td>12.42</td>
</tr>
<tr>
<td>PG&amp;E</td>
<td>95.10</td>
<td>2.69</td>
<td>0.22</td>
<td>0.025</td>
<td>0.726</td>
</tr>
</tbody>
</table>
Basic Properties of Natural Gas

- Flammable
- Lighter than Air
- Colorless
- Non-Toxic
- Odorless
- Tasteless
- Ignition Temperature
  Range 1000 -1200 °F
Gas ignited in a confined location can be EXPLOSIVE!!
Specific Gravity

- Air is a standard at 1
- Number less than 1 is lighter than air, Natural gas 0.65<1
- Number greater than 1 is heavier than air, Propane 1.65>1
FLAMMABLE LIMITS

- LEL = Lower Explosive Limit
- UEL = Upper Explosive Limit
- FLAMMABLE RANGE
Flammability of Natural Gas

Limits of Flammability

Lower Explosive Limit - (LEL)

Upper Explosive Limit - (UEL)

1% 5% 10% 15%

NATURAL GAS-IN-AIR MIXTURE
Basic Properties of Propane Gas

- Flammable
- Heavier than Air
- Colorless
- Non-Toxic
- Odorless
- Tasteless
- Ignition Temperature range: 957-1090°F
Flammability of Propane

Limit of Flammability

Lower Explosive Limit (LEL)

Upper Explosive Limit (UEL)

1%  5%  10%

PROPANE IN AIR MIXTURE
EFFECTS OF GAS ON PLANT LIFE

Gas does not poison the soil, but it can ...

- Dry the soil out (drought effects)
- Reduce the oxygen content of the soil
- Change the pH (acidity) of the soil
- Change the color of the soil
- Reduce the soil’s ability to support plant growth
POTENTIAL SOURCES OF GAS LEAK IGNITION?

- Any Open Flame
- Any Spark
- Electrical Switches
- Electrical Motors
- Automobiles
- Static Electricity
- Telephone
- Doorbell
Properties of Natural Gas and Propane of Natural Gas and Propane

What is the main point of all this?

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Be aware of gas properties and flammability ranges when in operations and when providing emergency response, especially where gas is in a confined place.
Properties of Natural Gas and Propane

Questions?