H2S Safety

CBEN 408 Safety Topic
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Why Avoid H2S?

- Health effects vary based on exposure time
  - Fatigue
  - Loss of smell
  - Headache, coughing, eye irritation
  - Eye damage
  - Slow death
  - Instant death
- Highly Flammable, explosive gas

<table>
<thead>
<tr>
<th>Concentration (ppm)</th>
<th>Symptoms/Effects</th>
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</thead>
<tbody>
<tr>
<td>0.00011-0.00033</td>
<td>Typical background concentrations</td>
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<tr>
<td>0.01-1.5</td>
<td>Odor threshold (when rotten egg smell is first noticeable to some). Odor becomes more offensive at 3-5 ppm. Above 30 ppm, odor described as sweet or sickeningly sweet.</td>
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<tr>
<td>2-5</td>
<td>Prolonged exposure may cause nausea, tearing of the eyes, headaches or loss of sleep. Airway problems (bronchial constriction) in some asthma patients.</td>
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<tr>
<td>20</td>
<td>Possible fatigue, loss of appetite, headache, irritability, poor memory, dizziness.</td>
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<tr>
<td>50-100</td>
<td>Slight conjunctivitis (“gas eye”) and respiratory tract irritation after 1 hour. May cause digestive upset and loss of appetite.</td>
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<tr>
<td>100</td>
<td>Coughing, eye irritation, loss of smell after 2-15 minutes (olfactory fatigue). Altered breathing, drowsiness after 15-30 minutes. Throat irritation after 1 hour. Gradual increase in severity of symptoms over several hours. Death may occur after 48 hours.</td>
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<tr>
<td>100-150</td>
<td>Loss of smell (olfactory fatigue or paralysis).</td>
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<td>200-300</td>
<td>Marked conjunctivitis and respiratory tract irritation after 1 hour. Pulmonary edema may occur from prolonged exposure.</td>
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<tr>
<td>500-700</td>
<td>Staggering, collapse in 5 minutes. Serious damage to the eyes in 30 minutes. Death after 30-60 minutes.</td>
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<tr>
<td>700-1000</td>
<td>Rapid unconsciousness, “knockdown” or immediate collapse within 1 to 2 breaths, breathing stops, death within minutes.</td>
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<tr>
<td>1000-2000</td>
<td>Nearly instant death</td>
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</tbody>
</table>

Source: https://www.osha.gov/SLTC/hydrogensulfide/hazards.html
How to Avoid H2S before plant entry?

• Before entering a plant, check in and sign in with the HO or SS
  • Let them know what and where you will be
• Make sure you have the right PPE
  • H2S monitor (no more than 6” away from face)
  • Four gas Monitor
  • Hard hat, gloves, NOMEX, boots, safety glasses (respirator)
• Leave Cell phone or any electronics that aren’t intrinsically safe

What to do if you encounter H2S in the plant?

• Note the direction of the windsock or wind
• Be aware of surroundings
• Smell rotten eggs?
• Immediately move UPWIND until you don’t smell it
• Hear and feel for your monitor
• After moving away, report to HO, SS, supervisor where and when you smelled H2S
Main take away

• You never know the concentration of H2S until it's too late.
• If you smell it, avoid it.
• Before walking into a plant, know what's happening and where to avoid.
• Make sure you have proper PPE.
• Personal story time!

Interaction Time

• Your supervisor asked you to get temperature readings from the main fractionator in ISOMAX.
• What are the steps do you need to BEFORE you enter the plant?
• You encounter H2S and the wind sock is blowing to the north? What do you do?