Importance of Hydrogen Sulfide Safety

Over the past ten years, as swine rations include more DDGS, sulfur content in manure has increased from 3 pounds per 1000 gallons to 9 pounds per 1000 gallons. This has led to an increase in hydrogen sulfide concerns when agitating and pumping manure.

Exposure to hydrogen sulfide, even at low concentrations, can have serious health impacts. At high concentrations, exposure to the gas can cause nearly instant death. Symptoms of hydrogen sulfide exposure can be found in Table 1.

Table 1. H2S Exposure Impacts (Humans)

<table>
<thead>
<tr>
<th>Concentration</th>
<th>Symptoms/Effects</th>
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<tbody>
<tr>
<td>0.01-1.5 ppm</td>
<td>Odor threshold; can first smell it</td>
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<tr>
<td>2-5 ppm</td>
<td>Prolonged exposure may cause nausea, tearing, or headaches</td>
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<tr>
<td>20 ppm</td>
<td>Fatigue, loss of appetite, headache, dizziness</td>
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<td>100 ppm</td>
<td>Coughing, eye irritation, loss of smell, death after 48 hours</td>
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<tr>
<td>500-700 ppm</td>
<td>Staggering, collapse, damage to eyes, death after 30-60 minutes</td>
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<tr>
<td>700-1000 ppm</td>
<td>Rapid unconsciousness, collapse within 1-2 breaths, death within minutes</td>
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<tr>
<td>1000-2000 ppm</td>
<td>Nearly instant death</td>
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Hydrogen Sulfide Monitors

One way to keep you and your employees safe is by using a hydrogen sulfide monitor. Monitors, which range in price from $99 - $800, will alert you a certain hydrogen sulfide threshold is reached. The monitors are small enough to wear and can be purchased at on-line retailers. Examples include:

- Honeywell GasAlertMax XT II
- BW Honeywell GasAlert Clip Extreme GA24XT-H
- BW Honeywell GasAlert Micro Clip XL 4-Gas Monitor
- Draeger Pac 3500 H2S Monitor
- RAE Systems ToxiRAE II

Neither endorsement of companies is intended, nor is criticism implied of similar companies not mentioned.

2016 Usage of Monitors

During the 2016 Manure Applicators Certification program, participants were asked about hydrogen sulfide monitor usage. At the time, 5 percent of commercial applicators and 1 percent of confinement applicators had monitors. Additionally, applicators were asked about the likelihood of purchasing a monitor in the future, with 25 percent of commercial applicators and 31 percent of confinement applicators saying it was likely they would purchase a monitor. A summary of responses can be found in Figures 1 a. and 1 b.

Figure 1 a. Summary of Commercial Applicators responses currently having monitoring equipment

Figure 1 b. Summary of confinement applicator responses to how likely is it that you will purchase a H2S meter

In addition to purchasing a monitor, other practices to follow when agitating or pumping manure include:

- Verify all fans are working and air inlets are open
- Place a tarp over pump-out to help protect applicator
- Communicate with farmer and crew
- Listen for pig distress
- Be aware and alert as dangerous conditions can develop quickly