Asphalt H_2S Control

Recommended Practice and Lessons Learned

Athlon Solutions
The chemistry of results™

H_2S Must Be Controlled

Hydrogen sulfide (H_2S) is a deadly gas immediately dangerous to life and health at a concentration of 100 parts per million (ppm). OSHA limits exposure to 10 ppm for an eight-hour workday, but there is no universal guidelines for limiting H_2S concentrations.

To control, employers must understand the H_2S dangers present in their facilities. Employers must then establish safe limits. Athlon Solutions has seen limits set by facilities ranging between 0 ppm and 1,000 ppm.

There are many other good reasons to control H_2S in facilities. H_2S has a foul odor and can be a nuisance for the plant and surrounding neighborhoods. H_2S forms an explosive mixture at 4.3% (LEL) and 4.6% (UEL) by volume. While that seems high, H_2S can quickly concentrate above fluids in tankage. At higher temperatures and concentrations, H_2S is also directly corrosive to metals.

Mitigation Methods

- Vapor Recovery and Scrubbing. Remove H_2S vapors away from the working area, either by venting the gas or chemically scrubbing the vapors to a benign form. This process requires capital and chemicals. It is not 100% effective.
- Nitrogen Blanketing. It displaces the H_2S in the vapor space and can help keep it partitioned to the liquid phase. However, this process is costly and not permanent.
- Chemical Scavengers. Effective chemical scavengers react instantaneously and irreversibly with H_2S. The reaction product is benign to the asphalt, human health, and permanently remains in the liquid phase. Scavenger programs require little to no capital.

Key Benefits of Our Chemical Scavenger Program

- Athlon Solutions' asphalt scavengers meet the attributes of a successful program.
- This chemistry is highly reactive with H_2S and the solvent is oil-soluble, making the product ideal for high temperatures.
- Due to the low-dose requirement, Athlon Solutions' scavenger program is cost-effective.

Case History

A Gulf Coast asphalt terminal switched to Athlon Solutions' RPS-895 scavenger after struggling to efficiently scavenge H_2S from asphalt. While under the incumbent's program, personal H_2S monitors were frequently set off and resources were wasted retreating asphalt to achieve the target H_2S specifications. The customer has since reported cost savings. Additional benefits of the switch include no more safety alarms and retreats. Athlon Solutions has also provided analytic, technical, mechanical, and service support to the customer that was absent with the previous vendor.

Additional case histories and references are available upon request.

Lessons Learned Along the Way

- While H_2S may be low in the liquid phase, it is high in the vapor phase. As a rule of thumb, there is 400 ppm of H_2S in the vapor space above asphalt for every 1 ppm in the liquid phase.
- Testing consistency is very important. It was discovered that more H_2S will evolve from asphalt over time, at higher temperatures, and with more sample in the container.
- Asphalt contains sulfur compounds other than H_2S. Given time and an increase in temperature, these sulfur compounds can decompose to form additional H_2S.
- As with any H_2S treatment program, scavenger should be injected as far back into the process as possible to maximize residence time and mixing.

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