Question 84: What is the typical flash point for your slurry oil product? Can a flash point of 200 F or higher be achieved with steam stripping the main fractionator bottoms? What are your storage temperature guidelines? What lower explosion limit (LEL) and H2S levels are found in the tank vapor space?

Dwight Agnello-Dean (BP)

This topic of slurry oil flash point and control has been a recent discussion topic at our FCC units. Collective inputs indicate the range of flash points temperatures are from 140degF to 220degF. We have demonstrated that greater than 200 deg F flashpoints can be achieved with main column bottom steam stripping. These represent units with both internal fractionator steam stripping and external slurry oil strippers. This question is similar to one addressed in the 2008 Q&A. In the responses Sexton reported substantial gains in flashpoint resulting from moderate amounts of stripping steam. Stripping steam tests conducted at BP units confirm the reported higher flashpoints at higher steam rates although with varying degrees of success. One unit only realized 10 deg F of increased flashpoint for every 1000lb/hr of steam. Storage temperature guidelines specify storage temperatures are not to exceed the slurry flashpoint temperature. Storage temperatures range from 100 -200 deg F.

Matthew Meyers (Western Refining)

The typical slurry oil flash point can be maintained well over 200 F on average if the quench is well distributed. If the quench stream(s) are not well distributed, stripping steam may have little effect on the subcooled regions of the bottoms. For a 100 lb/hr increase in steam, the flash can increase by as much as 20 F in a well distributed bottom. However, if there is not a quench distributor and the quench flow is too high relative to the feed rate, the increase may not be noticeable. Also, too much steam can adversely affect tower operation, especially bottoms level indication. The increased steam flow is likely to form large bubbles that may break around the cool, denser quench streams to cause fluctuating and false level indication. The problem may be exacerbated at reduced feed rates. One alternative to assist the stripping efficiency is to route some of the quench directly to the bottoms pumps, allowing for the bottoms liquid to be more uniform and closer to its bubble point. Care should be taken to make this change gradually to ensure the bottoms temperature remains well below 700 F.

The asphalt and chemical cleaning industry have documented the observation that oily residue and asphalt blending components release VOC’s after processing. This cannot be predicted from the flash point of the material and is most likely due to thermal cracking. According to the article, “Better understanding needed for asphalt tank-explosion hazards,” Oil and Gas Journal Sept 1989: The amount of cracking that may produce combustibles increases with tank storage temperature and decreases with time.

One tank at a storage temperature between 160F and 180F had a vapor space LEL above range and H2S of 210ppm. Another tank at a much lower storage temperature, between 120F and 140 F, and had much lower levels of combustibles and H2S.

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