CITIZEN'S ADVISORY COUNCIL TO LA PORTE INDUSTRY

Flaring 101

This meeting focused on understanding flares, including what they are, why they are necessary, and how they work. Attendees learned about the emissions produced by flares, how to determine when a flare is burning gas efficiently, and other types of environmental control technologies.

Chase Stewart, Health, Safety & Environmental (HSE) Specialist for Kuraray America Inc., presented "Flares in Industry." He covered the background of flare systems, flare designs, their operation, and relevant regulations. The primary function of flares is to serve as a safety device. They protect equipment from catastrophic failure by relieving pressure, significantly reduce exposure to pollutants for both employees and the community, and are designed with safety in mind—capable of handling both routine operations and the largest upset releases. Stewart compared this to a balloon ready to pop; instead of allowing it to burst, air is released in a safe, controlled manner.

Stewart explained how flare operations have evolved. Initially, flares were designed solely for emergencies. Over time, they transitioned into a means of disposing of waste gases and off-spec materials, serving as an alternative to venting equipment directly into the atmosphere. Today, flares function as an emission control system in both routine and upset conditions, with all emissions routed through them.

Stewart discussed different flare designs, which fall into three categories: routine flares that operate continuously, non-routine flares that are portable and used for flushing pipes, and dual-service flares that are used for both routine operations and turnarounds when shutting down and purging pipes. Flare designs are further categorized into non-assist, air-assist, or steam-assist flares, as well as elevated or ground flares. Structurally, flares can be self-supported structures, Guy-Wire supported structures, or Derrick design-style supported structures.

In operating a flare system, process gases are just one type of compound sent to the flare. Additional components include purge gases, typically natural gas, which are used to "sweep" oxygen, corrosive substances, reactive compounds, and inert gases through the flare header system. Assist gases, usually steam or air, improve the mixing of flare gases to enhance combustion efficiency, protect the flare tip from heat damage, and control visible emissions.

Stewart reviewed the regulations governing flare operation and design. These standards, derived from federal regulations, mandate that flares maintain a continuously lit pilot light, handle specific waste gas compositions, and prevent visible emissions beyond allowable limits. Flare designs must account for the heat radius of combustible materials and emission dispersion. Regulations require that flares meet a minimum heating value of 300 BTU and an exit velocity between 60 and 400 ft/sec to achieve maximum destruction removal efficiency (DRE). When operating within these standards, flares are assumed to have a 98% DRE, meaning only 2% of post-combustion materials are released, as permitted by regulations.

To illustrate flare operations, Stewart presented two example pictures of flares. The first example, "A Bad Day," showed black smoke and gas visibly escaping from the flare, indicating an upset condition. Regulations allow no more than five minutes of visible smoke per two hours. The second example, "A Good Day," displayed a large orange flame with only a trace amount of black smoke, representing a flare operating at peak DRE efficiency.

The CAC is a forum for candid and constructive dialogue between those who live or work in La Porte, Morgan’s Point, and Shoreacres and the managers of 41 chemical plants in La Porte. The CAC welcomes visitors. It meets again on Tuesday, March 4 at 6:00 p.m. to hear the Annual Report on Worker Safety. Contact info@laportecac.org if you wish to attend. The CAC shares information about its meetings and presentations at www.laportecac.org.