Arkema Facility Response
Hurricane Harvey Incident
Crosby, TX

October 3, 2017

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Background

Landfall of Hurricane Harvey on August 25, 2017, and subsequent stalling of the system over south Texas, caused unprecedented flooding in the Houston Region, including a small town located northeast of the Greater Houston area, Crosby, TX. The Arkema Inc. organic peroxide facility is located in Crosby, TX. Flooding at the Arkema facility caused a loss of power and ultimate failure of refrigeration needed for product stabilization. Without refrigeration, organic peroxides degrade and spontaneously combust, creating a fire hazard. While the facility operators maintained monitoring of the internal temperature of some of the 9 organic peroxide containers, due to the conditions at the site, there was no way to prevent the critical temperature from being reached.

Coordinated Incident Response

In a coordinated effort between State, Federal, and local agencies, the Interagency Modeling and Atmospheric Assessment Center (IMAAC) modeled potential release scenarios at the facility, based on the rupture of the sulfur dioxide (SO_2) tank and the effects of an organic peroxide fire. Based on that assessment, a 1.5 mile evacuation zone radius was established, which would also include potential hazards from release of other substances on-site. Throughout the incident, contractors hired by Arkema and the United States Environmental Protection Agency (USEPA) conducted emergency response air monitoring for Lower Explosive Limit, oxygen, SO_2, hydrogen sulfide, carbon monoxide, and total volatile organic compounds (VOCs) at strategic locations around the 1.5 mile perimeter. No concerning levels were detected.

In addition to the IMAAC modeling, the USEPA deployed the Airborne Spectral Photometric Environment Collection Technology (ASPECT) aircraft to monitor the situation at the facility from the air. ASPECT serves as an initial screening tool to aid the emergency response coordinators in making informed decisions based on remote sensing tools and imagery.

At about 2 am on August 31, 2017, the first container caught fire. At approximately 5 pm on September 1, 2017, two more containers caught fire. Since this fire happened during daylight hours, the full scope of the smoke plume was observed. At the beginning of the fire, the smoke plume was dark, but as the fire continued to burn the plume turned white. A white smoke plume is an indication that there is more complete combustion of the source material. On September 2, 2017, ASPECT provided imagery showing a yellow liquid had begun to leak from some of the remaining 6 containers. On September 3, 2017, at approximately 4 pm, in an effort to destroy the material, the emergency responders initiated a controlled burn. This was conducted during favorable meteorological conditions (i.e., calm winds), which allowed the smoke plume to go straight up so as to not impact the surrounding areas. After the fire burned itself out, the USEPA and facility contractors used hand-held emergency response monitoring equipment to survey the area. They began at the 1.5 mile evacuation perimeter, and slowly

moved inward toward the facility. They measured 6 parameters, with total VOCs being some of the only detects.

The all-clear was agreed upon by all agencies and emergency responders (State, Federal, and local) based on the following:

1. The fire burned out completely, consuming the source material.

2. There were little-to-no odors detected. Compounds on-site would be expected to be odorous and odors that were detected were not necessarily ones associated with compounds on-site.

3. Lack of detects using hand-held emergency response equipment during the last round of monitoring.

After the all-clear, USEPA collected a floodwater sample from near the facility and analyzed for a wide-range of VOCs and semi-volatile organic compounds (SVOCs). There were no detects in the floodwater sample. Monitoring will continue for a time with the hand-held emergency response equipment to ensure the area remains safe.