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Texas Innovative Practice – Arkema

SUMMARY

During Hurricane Harvey, flooding at the Arkema Chemical Plant caused trailers to leak dangerous chemicals. The Houston Police Department used a helicopter equipped with night vision video capabilities and data downlink software to reveal an unstable condition as chemicals began to react. This provided first responders real-time, detailed visual information that possibly saved the lives of sixteen responders who would have otherwise entered a dangerous situation.

DESCRIPTION

The Houston region's systematic improvements in communications capabilities are well-highlighted in its response to the Arkema Chemical Plant, a high-profile incident during the flooding in the aftermath of Hurricane Harvey. Located just east of Houston, in the town of Crosby, the Arkema Chemical Plant is a chemical processing facility that stores large quantities of volatile organic peroxides. These compounds require low-temperature refrigerated storage to keep them stable. If not kept stable, temperature-sensitive organic peroxides can rapidly decompose and combust. As Hurricane Harvey drenched the area with heavy rainfall and intense flooding, the rising water incapacitated the plant's power, including all backup generators and critical refrigeration infrastructure.ⁱ As a safety precaution, plant personnel moved the most volatile of the compounds into nine separate diesel-fueled refrigerated trailers located on higher ground inside the main facility. The trailers' refrigeration systems, which housed approximately 350,000 pounds of material, began running low on fuel and eventually stopped working. Rising high water further compromised the trailers, resulting in limited release and combustion of the compounds with the potential for a catastrophic release.ⁱⁱ The potential for a cascading event warranted a

complex, multi-jurisdictional response and management effort to protect the lives, property, and environmental well-being of the surrounding communities.



Responders used grant-funded HazMat suits and equipment at the Arkema Facility.

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Approximately 100 individuals from Federal, state, local, private, and academic partners assisted in incident operations. Specialty teams such as bomb squads, HazMat teams, and other special operation teams assisted in incident response. To coordinate operations, Unified Command relied on the joint Harris County-Houston radio network, funneled specifically through the Crosby tower site near the scene. This site, which was damaged by Hurricane Harvey and quickly repaired in the days preceding the chemical plant incident, was integral for communication during response operations. Network engineers and response officials stressed that without the capabilities that this communication network provided through the Crosby tower site, communication would have been nearly impossible for response operators. Additionally, responders used a Harris County response boat funded by \$48,750 in FY 2006 BZPP funds to remove the 11 ride-out personnel that remained inside the plant. Responders also used one Houston Police helicopter, which was purchased with local funds. Incident managers used this helicopter to monitor the trailers as response teams planned the response operation. The helicopter was equipped with grant-funded night vision and downlink software, funded with \$575,000 in UASI funds, allowed for real-time monitoring of ground conditions.

Officials developed and implemented an incident response plan and pulled together the necessary teams and resources within four hours. Because of ground contamination and flammability concerns, responders could not use robots or drones for entry. Rather, response officials had to send responders wearing grant-funded HazMat suits into the plant to deploy initiation devices for a controlled combustion of the chemicals inside the six remaining trailers that had not already burned. Due to imminent danger, officials had to move quickly to

stabilize the scene. Previous investments in preparedness, planning, teams, equipment, and training made this rapid process feasible. Without these vital investments, a quick response would not have been possible as local responders would have had to wait for outside resources to respond.

Just as the operation was to be executed, real-time video feeds from the helicopter revealed that chemicals in one trailer had begun to react, creating an unstable and life-threatening situation for the responders about to enter the site. Using the video capability, Unified Command decided to delay the operation until conditions were once again stabilized. This critical capability helped Unified Command conduct a rapid risk assessment, preventing the team from entering a deadly environment and potentially saving the lives of 16 responders.

Operations officials from this incident emphasized the parallels between this incident and terrorism-related incidents, both of which evolve and deteriorate rapidly, requiring continuous adaptation in high-risk, hazardous conditions. Access to the special response teams and technology that Houston and Harris County had already invested in, trained, and exercised permitted the development of a plan and its execution within four hours. Aerial resources increased situational awareness and allowed decision makers on the ground to adapt quickly and efficiently in a dynamic threat environment, ultimately saving lives. Without the prevention and protection capabilities—funded by SHSP, UASI, and local funds—the responders on this incident would not have been properly equipped, trained, or exercised to safely manage this incident.

UASI-funded resources at Arkema included: two HazMat teams, two bomb squads, a weather station, a Mobile Command Center, decontamination equipment, one law

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REFERENCES

FEMA, National Preparedness Assessment Division. Stakeholder Interviews with representatives from Texas. September 2018.

ⁱ <https://www.csb.gov/arkema-inc-chemical-plant-fire/>

ⁱⁱ <https://www.csb.gov/arkema-inc-chemical-plant-fire/>

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Last updated February 11, 2021

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