10-86 at a Bulk Fuel Yard

By Deputy Chief Fred Schaaf

Bulk fuel plants are found in every borough of New York City and used primarily to store products such as gasoline, oil, ethanol, LPG and CNG. Using ships, railway or pipeline, each fuel type and plant brings its own unique challenges regarding how the product is received, stored and dispersed. These plants may have multiple fire protection systems consisting of yard hydrants, standpipes, sprinklers, foam, dry chemical and other suppression agents specific to their fuel type. Units in Division 11 have conducted many drills at these plants and established Pre-Incident Guidelines concerning them. It is this kind of preparation that pays off when a high-hazard, low-frequency event takes place.

On January 28, 2017, while on a routine inspection at the Kinder Morgan Fuel Depot, located at 125 Apollo Street in Brooklyn, a plant operator smelled a heavy gasoline odor that revealed a leak coming from pump B in the pump pit. This pit is a concrete containment area that houses 10 pumps that receive fuel from the aboveground storage tanks and pumps it to the truck racks for loading onto fuel trucks.

Upon this discovery, the operator shut off the fuel source, which was coming from tank 4 (a 307,000-gallon tank) and reported the leak by calling 911, his manager and the Depot's spill cleanup contractor (Atlantic Response). At the time of the notification to FDNY dispatchers, he reported that approximately 200 gallons had accumulated in the pit and the Fire Department was needed "in case something does happen." At 2143 hours, Brooklyn Box 0078 was transmitted, dispatching Battalion 45, Engines 238 and 259, Ladders 106 and 146, Squad 288, Hazardous Materials 1 and the Hazardous Materials Battalion (Haz-Bat).

Battalion Chief James Maloney, Battalion 45, arrived at 2149 hours, with all other units arriving simultaneously or shortly thereafter. After assessing the situation, he had meter readings taken and a precautionary hose-line stretched. The flammable range of gasoline is 1.4 to 7.6 percent and readings taken five feet above the spill were zero. However, readings downwind at grade level fell between 1 to 4 percent of the lower explosive limit (LEL). Due to 15-mph winds that night, units were directed to stage upwind to stay out of the path of any flammable vapors. At 2214 hours, Chief Maloney transmitted a 10-86 (Foam Response). Though previously monitoring the incident via Borough frequency and cell phone, Deputy Chief Fred Schaaf, Division 11, responded on the 10-86 signal as the incident was expanding.

The signal 10-86 provided the following additional units because the hazardous-materials units that are part of the response matrix already were on-scene.

- Two Foam Tankers and Engines—Engine 260 (F-260)/Engine 247 (F-247)
- Two Foam Coordinators—Battalion 31/Battalion 32
- Two Purple K Units and Engines—Engine 33 (P-33)/Engine 228 (P-228)
- One Satellite Unit and Engine—Engine 207 (Satellite 6)
- One Foam Tender and Engine—Engine 325 (FT-01)

Chief Schaaf arrived at 2227 hours and immediately was updated on conditions by Chief Maloney. Electric power had been shut down to the pit and adjacent areas, but the leak was still active. This was due to head pressure pushing the residual fuel in the piping between the storage tank and pump B into the pump pit. It was estimated that the leak currently was upwards of 4,000 gallons and increasing at a rate of 10 gallons per minute with 1,600 gallons of residual fuel in the piping that still could come out. After consulting with Lieutenant John Berna, Haz-Mat 1, and Battalion Chief Timothy Rice, Haz-Mat Battalion, it was decided that F-260 would use their 500-gpm foam deck gun to disperse a three percent foam blanket, covering the spill with enough foam to suppress the vapors without overflowing the pump pit. Afterward, when evaluating this foam blanket, it was verified by meter readings to be suppressing the flammable vapors while simultaneously maintaining a strong thickness and consistency on the spill.

With ignition sources shut down and vapors suppressed under the foam blanket, members were starting to make headway in mitigating the incident. But with the leak still active, it was decided that members from Haz-Mat 1 would enter the pit area to shut down two valves to prevent any more fuel being added to the spill. The advantage to be gained with this entry was determined to be greater than the risk associated with letting the leak continue and possibly overflowing the pit, escalating the incident. This decision was made after consulting with Chief Rice, Battalion Chief Steven San Filippo, Foam Manager, and Lieutenant Berna.

Siamese connections on exterior of foam house. The color-coded caps, bands and signage denote use. Through inspections and drills, units will be assured of correctly augmenting these systems. Be aware that these systems may have been damaged during the incident to which members are responding.

In preparation for this entry, a Decon Area was established, while a foam hand-line was stretched to protect the entry team. This would supplement F-260, which stood ready to blanket the entire area with their deck gun if needed. The entire pit area was monitored for flammability levels while members of Squad 288 stood by as a backup team. With all resources in place, the members of Haz-Mat 1--outfitted in their Crash Rescue Gear--descended a fixed ladder into the main pit area. The fuel level was approximately one-foot deep, with several inches of foam covering it.

Pump B now is removed and out for repair. The fixed vertical ladder at left is how FDNY members gained entry. The two OS&Y valves closed to stop the leak are above and behind the missing pump.

After descending the ladder, members were able to traverse a few feet to the valves, shutting them down and stopping the leak.

With the leak now stopped, members entered the final phase of the operation, which was the cleanup. Atlantic Response personnel already were on-scene. Since the threat of the pit overflowing was removed by stopping the leak, F-260 was directed to operate their deck gun covering the entire pit area, which thickened the foam blanket on the spill. With meter readings measuring 0 LEL at the level of the foam blanket, Atlantic Response was given the approval to start their operations.

After the cleanup process was underway, Chief Schaaf made arrangements to have one Battalion Chief, one Foam Carrier with Engine and one Haz-Tech unit (for metering capabilities) remain on-scene until completion of the operation. At approximately 0400 hours, Battalion Chief John Feehan, working in Battalion 35, reported that all FDNY operations were concluded, a little more than six hours following receipt of the alarm. Atlantic Response reported that they had removed more than 6,000 gallons of product from the pit area. The only thing remaining in the pit was FDNY's foam blanket. Chief Schaaf was told by a plant operator that the foam blanket ultimately broke down in the sunlight and wind the following day.

Lessons Learned/Reinforced

- Vapor Suppression--For flammable liquid fires, FDNY does not start foam operations until there is enough product on-scene to extinguish the fire. But if the goal is vapor suppression, members may start foam operations while waiting for additionally called resources.
- Life Hazard--Many of these plants do not maintain large staffs. This particular plant has only two operators; a manager and security working during the day and one operator with security at night. They are required to have one FDNY Certificate of Fitness Holder on-duty at all times. Along with other responsibilities, they will be in charge of the maintenance and operation of the fire protection systems.
- Know Your Colors: Fire suppression systems are painted red and have colored bands indicating their product. This becomes relevant if members need to supply or operate off their systems. White = Water; Orange = Foam; Green Caps = Sprinkler System; Aluminum Caps = Non-Automatic Sprinkler
- Eliminate Ignition Sources--Power was removed from the pump pit and adjacent areas to prevent accidental ignition from an electrical spark. Consider low-lying ignition sources downwind if vapor density is an issue. Gasoline vapors are three to four times heavier than air and members picked up LEL readings of 1 to 4 percent downwind at grade level.
- Weather--On the night of January 28, it was 38 degrees with a 15-mph westerly wind. What if it was August with sunshine and the temperature was 95 and humid? This scenario would create more vapor generation, possibly causing a greater area of operation. It might become necessary to evacuate and shut down ignition sources in the surrounding areas.
- T Means Transport—Or, "transport backup (Special) unit," to be more precise. When an engine or ladder company assigned a special unit (or is a backup for one) is called with it to an incident, the response ticket will have a capital T after the unit, designating it as transporting a Special unit.
- Apparatus Access and Positioning—Initially, units should stage upwind, away from the incident area. Apparatus can be repositioned when a course of action is determined and the area is deemed to be safe.
- Be Cognizant of Your Unit's Metering Capabilities--Meter readings will be needed to monitor the atmosphere. At this inci-

The OS&Y valve used to control tank 4. It had been closed by the plant operator before FDNY's arrival, but there was an estimated 1,600 gallons of product still in the piping.

dent (gasoline leak), the Sensit TKX Combustible Gas Detector could alert only to the presence of gasoline vapors, not the percentage in the atmosphere. As of this writing, the MSA Altair, carried by FDNY engines and ladders, has been approved only to measure natural gas. Therefore, more advanced meters, carried by Haz-Mat units, Rescues, Squads and SOC Support Ladders would be needed.

- Action Levels–If members cannot reduce LEL levels by ventilation or shutting down sources after reaching FDNY action levels (10 percent of LEL for indoor operations and 20 percent for outdoor), then evacuation procedures should be initiated. Be aware that the meter readings are specific to their location and may be greater in other areas.
- Though not used at this incident, Purple K is a highly effective extinguishing agent. However, FDNY units are limited to a 200- to 300-foot operational distance with the product lasting just a little more than two minutes. Also, unlike foam, it does not cool ignition sources or suppress flammable vapors. Therefore, foam must be used in conjunction with it to prevent the fuel from reigniting.

Conclusion

With FDNY operations concluded, all that was left was enforcement action. Along with other stakeholders, FDNY's Bureau of Fire Prevention, Bulk Fuel Unit, personnel inspected the site and issued violations accordingly. Incidents such as this are not everyday occurrences. However, by conducting drills and familiarization visits, members can gain the knowledge necessary to operate safely and confidently at them.

Plant firefighting stations are found throughout the area. The fixed monitor with the hydrant is used for water streams. The outlet in the foreground has an orange cap, denoting it as supplying foam solution to be used with the hose and foam nozzle in the background.

Photo reveals the complete coverage and sturdy consistency of the foam blanket. Battalion Chief John Feehan remarked that it was similar to cupcake icing. Photo by Battalion Chief Steven San Filippo, Foam Manager

References

1. "Spotlight, Universal Gold Foam Concentrate 1%/3% AR-AFFF," by Battalion Chief Steven San Filippo, in this issue of *WNYF*.
2. "Introducing the MSA Altair Multigas Meter," by Captain Carlos Vazquez, in the 1st/2009 issue of *WNYF*.
3. "When a 'Routine' Call is Anything But Routine," by Battalion Chief James Kane, in the 3rd/2015 issue of *WNYF*. ■

About the Author

Deputy Chief Fred Schaaf has served the FDNY since 1993. He is assigned to Division 11. Previous assignments include Engine 26 and Ladder 18 as a Firefighter; Ladder 116 as a Lieutenant; Captain of Engine 315; and Battalion 38 as a Battalion Chief. He holds an Associate degree in Liberal Arts from Nassau Community College and a Bachelor's degree in Fire and Emergency Services from John Jay College. Additionally, he is a graduate of the West Point Counterterrorism course, FDNY Officers Management Institute (FOMI) and the Advanced Leadership course. This is his fourth article for *WNYF*.