

Case Study

Industrial Facilities

Archer Daniels Midland Soybean Extraction Refinery: Highly Flammable Liquid in Process Demands Highly Specialized Fire Suppression System

Soybeans provide a great source of alternative fuel called ethanol. But extracting the fuel from the beans proves to be a challenging process in which a volatile, colorless, highly flammable liquid hydrocarbon called Heptane is used. Heptane similarly demands a fire suppression system equal to its volatility.

When called on in 1996 to design a fire protection system for the Archer Daniels Midland (ADM) refinery in southern Minnesota, Futrell Fire was ready for the challenge. The firm had worked with highly flammable liquids before, specifically with flammable liquids that were stored, dispensed, mixed, and used at various 3M facilities throughout the United States. Since the ADM facility was three to four city blocks long, the fire protection system required a sophisticated detection system for fire and a multiple deluge system. The system also had to be equipped to disperse the most effective protection available against Heptane, a combination of water with a foam fire retardant additive.

Working with Arrow Tank and Engineering of Minneapolis, Futrell Fire came up with a fire program that applied Arrow's tank design proficiencies with its own fire design expertise. The project required:

- Design of suppression and control systems for the entire facility
- On-site water supply for all buildings, including a million-gallon water storage reservoir and multiple diesel fire pumps
- Water spray exposure protection for storage tanks
- Foam-water systems for the extraction operation

“We saw the need to create a large foam water and deluge system that would literally douse all areas of the refinery if a Heptane-based fire ever broke out,” notes Scott Futrell, President of Futrell Fire. “In this system, the fire detection process will open numerous deluge valves located throughout the plant and suppress a fire before it can level the facility.”

Companies that work with extremely flammable liquids and chemicals understand the potential fire risks to their workforce, to the refinery operations and plant, and to the product itself. “They also understand the need to protect themselves by using fire protections systems designed by fire protection engineers and professionals,” says Futrell. “In both the short and long term, such fire protection can save them significant dollars and help ensure that their exposure to legal liability is kept to a reasonable minimum.”