



Case Study: **Chemical Plant**

High Velocity Aspirations



Project:

Chemical Plant
MCC Room



Aspiration Smoke Detection

FAAST overcomes **installation** and **logistical** difficulties at a mission-critical industrial chemical plant.

A large industrial chemical plant needed to install smoke detection in its motor control center (MCC) room, but shutting down the 800-acre stand-alone chemical plant to install the system could cost the plant \$10 million a day in lost productivity. Downtime was not an option, so the system needed to be installed while the plant was still up and running. The question was, "How?"

S & S Sprinkler Systems was engaged to find a solution. When John Waldrop, Senior Project Manager, and designer, Zack Normandin, tuned into a System Sensor FAAST Fire Alarm

Aspiration Sensing Technology® webinar, they realized FAAST could be a "winning solution" for this chemical plant.

S & S had considered other methods, such as water-based or clean agent fire protection for the chemical plant, "...but the use of water or inert chemical agents would have meant a long time for restoration and clean up in an emergency, not to mention the high cost for the volume of clean agent necessary," Waldrop says. Instead, he recommended and chose FAAST because it was user-friendly, especially in the design and cost.



An industrial plant may have many motors and components for motor control that are allocated to a special area or room. An MCC is usually a modular cabinet system for powering and controlling motors. An MCC room may have a 20-foot ceiling with air supply and returns mounted at a lower level. Rows of electrical cabinets are typically 8-feet tall and cable tray tiers are mounted at 12 to 18 feet high.

Standard spot detectors have difficulty sensing fires in MCC rooms because of their air flow patterns, which can heavily dilute smoke and cause it to not reach ceiling-mounted detectors in detectable levels. And because electrical cabinets generally have gaskets on their doors with no vents, fire can potentially develop for a long time inside the cabinet before enough heat and smoke escape to trigger an alarm in a standard detector. Heat buildup in these high-ceilinged rooms could

requirement for protecting the chemical plant's MCC room. Even with its ability to discriminate against nuisance particulate, FFAST has a listed sensitivity rating of 0.00046%/ft (0.0015%/m) obscuration. This level of sensitivity can detect very small quantities of smoke, mitigating the effects of dilution and enabling a response before costly damage or loss can occur. FFAST also offers five fully programmable alarm levels, so strategic responses can be customized to specific smoke thresholds for the facility.

"There was a tremendous amount of surface-mounted, rigid conduit, all types of cable trays, raceways, high voltage and sensitive equipment," Waldrop continues. "Because of FFAST, we were able to install it while the equipment was running. FFAST is especially important because it is easy to angle around and not disturb the raceways."

"The FFAST air sampling system worked the first time, and everything flowed really well."

— **John Waldrop**, Senior Project Manager S & S Sprinkler Systems

also stop the cooler smoke from rising to the ceiling and triggering an alarm.

In the case of the specific MCC room S & S was tasked to protect, huge high-velocity air handlers are used to chill the 7,000-square-foot room's motors and generators. This constant blowing tends to stir up dust, raising the potential for costly nuisance alarms that could shut down production.

"It is a relatively clean environment but has a high velocity of air movement necessary to cool the giant transformers and switchgear. Photo and spot detection would not fit the bill because of the amount of detectors we would need, in addition to servicing them on a 15- to 20-foot ceiling. Spot detectors could also get clouded; the high velocity of air could blow particles right into the photo chambers," Waldrop says.

FFAST's patented Dual Vision sensing technology and advanced particle separation combine to provide high-sensitivity to actual fire with superior nuisance rejection – a critical

Because of a crowded wall, it was difficult to get the hard pipe from the detector up the wall and into the existing installation. Rather than bend the hard pipe around the obstacles, installers threaded the capillaries through without shutting down the plant or putting people at risk.

"The capillaries were the key part to put the detection where we needed it and were a breeze to put in," Waldrop says.

The fire suppression control module to the annunciator is located in the utilities control room a block away. S & S used fiber rather than copper wire to connect the FFAST device to the module because it is easier to use and install. The main control panel was reformatted to RJ45 fiber-optic cable. FFAST easily met the fire marshal's inspection and approval.

"The FFAST air sampling system worked the first time, and everything flowed really well," says Waldrop.

Using Capillary Tubes

Capillary tube sampling locates sampling points remote from the main sampling pipe when the main sampling pipe cannot be routed through the protected area for technical or aesthetic reasons. Capillary tubes can sample equipment cabinets or enclosures within the protected area.

Lacking other guidance, it is recommended to put a minimum of two capillary sampling points in a room to provide redundancy should any one hole become obstructed. Local codes and standards differ on the minimum distance detection points can be positioned from walls and ceilings. It is important to observe local regulatory requirements.

Guidelines for capillary tube use include:

1. Try to keep the length of capillaries the same.
2. Tube length should not exceed 26 ft. (8 m).
3. When sampling enclosures, the sampling point is typically placed at or close to the top of the enclosure's interior.



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