



## **HVAC Exhaust Fire Protection**

The fire risk related to exhaust systems has been a topic of interest to ANI's Engineering Department because several fires have recently occurred in systems in use at nuclear support and research facilities. The fires occurred in unprotected exhaust systems. They were fueled by combustible residue accumulating on the filters or by combustible system components.

Exhaust systems are used at nuclear support and research facilities to transfer vapor, fumes and dust from the production source to some other location, usually the environment. Before the effluent can be released, it is filtered and monitored for radioactive contamination. A fire hazard can exist when (1) exhaust system components are combustible or (2) when the exhaust gas contains combustible vapors or particles that can accumulate as a combustible residue in the system. When the fire hazard is significant, steps should be taken to control the fire risk. Two risk control techniques are fire prevention and fire protection.

An acceptable insurance risk is obtained through fire prevention if (1) the exhaust gas stream does not contain material that can develop a combustible residue and (2) all system components (including the duct and filters) are either noncombustible or approved as low fire hazard, not requiring automatic sprinkler protection. Independent laboratories, such as Underwriters Laboratories and Factory Mutual, provide a list of tested and approved products that are low fire hazard.

Fire protection is also an acceptable risk control technique. It is used when system components or residue are combustible enough to create a significant fire hazard. A water-based extinguishing system is the preferred method. The extinguishing system can be designed as an automatic sprinkler, water-spray or open head deluge system. Important design factors to consider include shutting down the exhaust fans when a fire is detected, prompt operation of the extinguishing system, water application rates and control of the water released. ANI's fire protection engineers are available to answer questions regarding fire prevention and fire protection for exhaust systems.