CASE STUDY: HVAC ODOR PATHWAY FROM SEWER GAS

Project Description: Odor Investigation Bank Branch Vestibule

Scope of Services: AET was contracted by the customer service center of a commercial bank to provide emergency response to complaints from customers and employees of a mildew-like odor in the vestibule of the bank branch. The vestibule is a 10x10 area with 2x2 lay-in ceiling tiles, glass/sheetrock walls and a fast drying carpeted floor. There is also a supply air grill inside the vestibule which results in the vestibule being under positive pressure compared to outdoors. The bank is not on a public sewer system but utilizes a temporary sanitary holding tank which is evacuated on a monthly basis.

AET's Investigative Approach/Tools:

1. ***Rule out mold/water damage...*** No significant areas of excess residual moisture were noted on the walls, floors and ceilings in the vestibule via infrared thermography and moisture measurement testing. Similar findings were found in the remainder of the bank branch except for carpeting around the water cooler in the break room. Air-O-Cell mold spore sampling also did not identify any significant amplification of airborne mold spores.

2. ***Find the real odor source...*** The vestibule of a building which contains a supply air discharge is an excellent location to evaluate odor problems related to an HVAC pathway. Vestibules are confined areas restricting air mixing and also the first point of entry for odor notice compared to outdoor fresh air.

3. ***Visual inspection (Mechanical Room)...*** The coil and filters in the HVAC unit were cleaned and showed no mold growth. However, a sanitary odor was noted emanating from the floor drain next to the HVAC unit. Smoke testing observations confirmed an odor pathway as the HVAC unit was not completely sealed.

AET's Experience: Odor Threshold is the lowest concentration that a compound or chemical is perceived by the human sense of smell. Odor perception/detection varies significantly from individual to individual. Odor threshold values reported in scientific literature represent concentrations where 50% of the individuals exposed can detect an odor. Odors can also vary by occupants description of the odor. The customers/employees in this case study reported a mildew-like odor; AET's CIH reported a sanitary-like odor. Further, odors are frequently intermittent or transient and difficult to evaluate.

Sewer gas is a complex mixture of gases including hydrogen sulfide, ammonia, methane, carbon dioxide, sulfur dioxide and nitrous oxide. Methane and hydrogen sulfide are flammable and highly explosive. Hydrogen sulfide gas smells like rotten eggs even at extremely low concentrations.

CONCLUSION: The source of the odor in the vestibule of the bank branch was a dry floor drain trap and re-entrainment of the sewer odors into the HVAC unit. The odor pathway was via the HVAC unit to the supply diffuser in the small vestibule. Specific recommendations were made to seal/repair the openings associated with the HVAC unit and to charge/maintain water in the dry floor drain trap. Maintenance was also made aware on a monthly basis to recharge the drain trap to eliminate future problems.

When you need professional industrial hygiene advice email Alan Sutherland, CIH, CHMM at a.sutherland@aetinc.biz or call 610-891-0114. We provide nationwide services; phone consultations are free. Check out the full range of environmental contracting/consulting services on our website www.aetinc.biz.

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