CASE STUDY: EXPLOSIVE GAS (PROPANE)

PROJECT DESCRIPTION: ODOR INVESTIGATION HISTORICAL RESIDENTIAL STRUCTURE

Scope of Services: AET was contracted to identify the source of an intermittent noxious odor in the finished basement level and subbasement atrium space at a historical residential structure (Circa 1845). This 9800SF architectural significant structure was being renovated/systems upgraded and a reported animal nesting/decayed odor was noted over the last several months. The subbasement is a 15'x15' square area with a 12' ceiling below the concrete porch/patio floor slab. Entry is made from an interior decorative window opening in the finished basement.

AET's Investigative Approach/Tools:

1. **Explosive Gases:** AET's CIH staff professional suspected the odor was due to a build-up of soil gases. A 4 gas meter (specific for hydrogen sulfide, oxygen, carbon monoxide and LEL) was used in the evaluation. Testing in the subbasement level found elevated concentrations of gases in excess of the lower explosive limit (LEL - 10%).

2. **Source Identification:** The subbasement is a humid environment with no active or passive ventilation. No exposed sewer lines or natural gas service lines were noted. The subbasement had an unfinished exposed soil floor and an adjacent crawl space area which could allow for the passage of trapped soil gases. Propane was used as the fuel for the exterior decorative lamps, assorted gas appliances and hot water heat at the residence

AET's Experience: Propane is a colorless, odorless, flamable gas which often contains ethanethiol (an added odorant) to enhance its poor odor detection properties. Propane's OSHA PEL is 1000 ppm; its odor threshold is 20 times the PEL and there are no reported noticeable irritant effects at concentrations 100 times the PEL. Propane is relatively non-toxic at concentrations below 1000 ppm and acts as a simple asphyxiant at high concentrations where oxygen is displaced causing asphyxiation. Propane is heavier than air and will accumulate in lower areas when a leak occurs in an enclosed space. The damp environment in the subbasement is such a space. The propane gas supply line traversing within the space was observed rusted and suspected of leaking.

Final Solution: The subbasement space was ventilated and the propane piping isolated and repaired. A subsequent engineering review was also performed to provide ventilation within the space to reduce humidity levels along with the continued evaluation of piping components.

When you need professional help or advice, email Roy Mosicant, CIH, at r.mosicant@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 we provide at our website www.aetinc.biz.

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