CASE STUDY: CARBON MONOXIDE
SILENT KILLER... IAQ HEADACHE

Each year in the US, Carbon Monoxide (CO) poisoning claims approximately 480 lives and sends another 15,000 people to hospital emergency rooms for treatment. CO is an odorless, colorless, toxic gas which is impossible to see, taste or smell. CO is produced whenever any fuel (gas, oil, kerosene, wood or charcoal) is burned. CO is a product of combustion and increases in concentration under low or insufficient oxygen conditions.

Exposure to CO impedes the red blood cells ability to carry oxygen to body tissue. When CO is inhaled, it readily combines with the hemoglobin in the red blood cells producing Carboxyhemoglobin (COHb). Hemoglobin's binding efficiencies for CO is 300 times greater than it's infinity for oxygen. As a result, small amounts of CO can dramatically reduce hemoglobin's ability to transport oxygen within the body.

IAQ Headaches: CO testing is a standard practice in AET's IAQ investigative protocols where a combustion source is identified. Occupant reports of headaches, dizziness, chest tightness and nausea are key symptoms of exposure. CO levels are evaluated utilizing direct reading instrumentation which also instantaneously records temperature, relative humidity and carbon dioxide levels within the work spaces. CO testing is performed near a combustion source and traced back from various pathways to occupied spaces.

AET's Experience: CO levels in homes as well as commercial and industrial work areas should be 0-1 ppm (similar to outdoor background conditions). Levels above background should trigger a comprehensive source evaluation, review of existing controls as well as any immediate repairs. The National Ambient Air Quality Standard (NAAQS) for CO is 9 ppm over an 8 hour period and 35 ppm over a 1 hour period, not-to-exceed more than once per year.

Representative AET projects involving CO include:

1. Propane forklift use in warehouses (including adjacent occupied tenant space due to shared walls and positive pressure within the warehouse).
2. Re-entrainment of CO gas from truck traffic in loading dock areas or near the building fresh air intakes.
3. Evaluation of CO gas within air supply respirator systems due to improper compressor location, overheating or leakage.
4. CO leaks in heating and ventilation systems.
5. Evaluation of CO levels in confined spaces prior to entry.

CONCLUSION: Prevention of CO illness requires regularly scheduled maintenance of combustion sources, testing of controls and periodic monitoring to verify performance. AET recommends combustion sources within commercial facility be screened at least annually for CO. Once problems are identified, repairs are often easy; failure to identify can result in severe physiological symptoms including death.

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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