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MONTHLY SAFETY BRIEF: GAS HAZARDS

Stepan, one of our clients that uses ISNetworld to manage their subcontractor's safety reviews, requires training on gas hazard awareness. This safety brief will address this requirement.

The gasses of concern in this case are those that are detected by the standard 4-gas meter: Oxygen %, explosive gases, carbon monoxide and hydrogen sulfide. As you know, we have a safety policy that deals with the proper storage, maintenance, calibration and use of Hygieneering owned and rented direct reading instrumentation (4-gas meters, photoionization detectors, IAQ monitors, etc.):

HYGIENEERING SAFETY POLICY - 7.30 - DIRECT READING INSTRUMENTATION

This safety policy reiterates some of the points in the direct reading instrument policy but provides additional information specific to gas hazards.

Some Basics:

1. Prior to any assignment where this applies, you will receive site specific get Gas Hazard Awareness training initially and annually thereafter.
2. The site-specific hazard training will include:
    a. The locations of alarm stations at the site
    b. The fixed gas monitoring equipment located at the site (where and what gases are monitored).
    c. If your duties will require the use of portable gas detection, you will receive a separate comprehensive training session on the meter used. Your ability to use a 4-gas meter will be verified by a hands-on review and quiz.
    d. For site work, you will be provided information on the Gas Alarm settings and the associated response actions. This may be different for different clients, so site specific review is required.
    e. For site work, we will work with our host client to ensure you get information regarding personnel rescue procedures and evacuation procedures.
        i. Employees will be aware of the client's contingency plan provisions including evacuation routes and alarms.
        ii. Employees should participate in emergency evacuation drills and practice rescue procedures.
    f. If applicable, you will receive use and care training for Self-Contained Breathing Apparatus (SCBA) - including donning and emergency procedures (Use of SCBA is not anticipated for our standard work).
    g. Any training provided will be documented and available for review.
    h. We will use portable gas detectors in any locations required by the client (i.e.: high gas hazard areas).
3. Consistent with our Direct Reading Instrument Policy:
    a. The gas monitor must be calibrated per manufacturer's recommendations and contain a current calibration sticker on the monitor providing the date of calibration.
    b. Bump tests are required to be completed at the beginning of each day the monitor is in use, per the requesting client and manufacturer's guidelines, to ensure the monitor is functioning correctly.

Gas Hazard information for use of the standard 4-gas meter:

Oxygen

- Air is 20.9% or 209,000 ppm oxygen
- Oxygen Deficient Atmosphere according to OSHA is an atmosphere containing less then 19.5% oxygen by volume; an atmosphere containing more then 23.5% oxygen by volume is considered oxygen enriched atmosphere.
- Symptoms of low oxygen exposure include confusion, rapid heart rate and rapid breathing, headache and shortness of breath.
- Lack of oxygen can be more fatal than some toxic gases and vapors and caused by many different mechanisms:
    - Displacement, Microbial action, Oxidation, Combustion, Absorption

LEL%

- Definition = The lowest concentration (percentage) of a gas or a vapor in air capable of producing a flash of fire in presence of an ignition source.

Carbon Monoxide

- Carbon monoxide is an odorless, colorless and toxic gas
- Carbon monoxide (CO) is produced whenever any fuel such as gas, oil, kerosene, wood, or charcoal is burned.
- Exposure Limit - The OSHA PEL is TWA 50 ppm (55 mg/m3)
- CO exposure can be fatal. Common overexposure symptoms can be a dull headache, weakness, nausea, and confusion.

Hydrogen Sulfide

- Highly toxic and flammable gas.
- Colorless gas with a strong odor of rotten eggs. The smell may go away, but you are still being exposed as your body may just be adapting to the smell.
- Symptoms of exposure include irritation to eyes and respiratory tract, conjunctivitis, pain, pain in eyes and sensitivity to light, coughing, pain in breathing, and pain in nose and throat.
- Repeated exposure causes headaches dizziness and digestive disturbances
- Exposure Limit – The OSHA PEL is 20 ppm as a Ceiling and 50 ppm [10-minute maximum peak]

GAS HAZARD AWARENESS QUIZ

1) Which of the following best describes the hazard concern of gases?
   a. Toxic
   b. Corrosive/Irritating
   c. Flammable/Explosive
   d. Can be any or all of the above, depending on the gasses involved.

2) Which of the following is a health affect associated with oxygen deprivation?
   a. Skin Irritation
   b. Confusion
   c. Pain in the nose and throat
   d. None of the Above

3) At client site locations with potential hazardous gas exposure, you can expect additional safety training concerning emergency procedures and gas monitoring systems in place?
   ☐ True
   ☐ False

4) All of the following are mechanisms that can cause an oxygen deficient atmosphere: displacement by other gasses, microbial action and oxidation.
   ☐ True
   ☐ False

5) You will always smell hydrogen sulfide because it smells so bad like rotten eggs?
   ☐ True
   ☐ False

Instructor – John Feller, CIH, CSP

SCORE: PASS / FAIL

_____	_____	_____
Employee Signature	Supervisor Signature	Date