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| **Carbon Monoxide Incidents** | Related Policies: Accountability Procedures; SCBA; Rapid Intervention Teams; ICS |
| *This policy is for internal use only and does not enlarge an employee’s civil liability in any way. The policy should not be construed as creating a higher duty of care, in an evidentiary sense, with respect to third party civil claims against employees. A violation of this policy, if proven, can only form the basis of a complaint by this department for non-judicial administrative action in accordance with the laws governing employee discipline.* |
| Applicable KY Statutes: |
| OSHA: 29 CFR Table Z-1 |
| NFPA Standard: NFPA 1500, NFPA 1561 |
| Date Implemented: | Review Date: |

1. **Purpose:** To establish a operation guideline for the safe and efficient response to incidents involving carbon monoxide.
2. **Scope:** This Standard Operating Procedure applies to all members responding to incidents involving, or potentially involving, carbon monoxide.
3. **Introduction**

Carbon monoxide (CO) is an odorless, colorless, and tasteless gas that is highly toxic when breathed in. It is the leading cause of accident poisoning deaths in the United States, and is responsible for hundreds of deaths each year.

Carbon monoxide is a byproduct of the incomplete combustion of hydrocarbons, and is a major concern to firefighters at fire incidents. Other types of incidents that produce high levels of CO include malfunctioning heating or cooking equipment, or incidents where exhaust or flue pipes are improperly vented.

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Carbon monoxide has a vapor density of .967, and is therefore slightly lighter than air. However, most commonly CO will follow the flow of air in a building, which may cause it to rise or sink depending upon conditions present.

CO levels as low as 1500 ppm are considered immediately dangerous to life and health, and concentrations above 50,000 ppm (5% in air) can be lethal in just a few breaths. Concentrations of CO at levels above 50 ppm for extended periods of time can produce symptoms.

Symptoms of CO poisoning are said to be "vague and varied". Headaches, dizziness, weakness, sleepiness, agitation, stupor, seizures and coma are the most common neurological symptoms. Other symptoms include nausea, vomiting, diarrhea, decreased cognitive ability, memory losses, disorientation, chest pain and shortness of breath. Patients may also experience impaired judgment, making it more difficult for them to recognize the danger and protect themselves.

According to OSHA the permissible exposure limit (PEL) to which employees may be exposed to CO over the course of an 8 hour work day is 50 ppm, while the NIOSH recommended exposure limit (REL) is 35 ppm. For Fire Department purposes, SCBA shall be worn whenever CO levels are determined to be in excess of 35 ppm, or when the atmosphere is suspected of containing CO, but the levels are unknown.

1. **Response**
2. The dispatch to any report of CO detectors activated or reports of the presence of CO in a building shall be the closest engine company and the closest unit with a functioning CO detector.

**Editor’s Note:** *Where staffing on engine companies is less than four, additional resources should be dispatched on the initial alarm so that the two-in two out requirement can be met.*

1. An EMS unit shall be dispatched in addition to the above companies in the event the caller reports that any person in the building or area is feeling ill.
2. **Operational Procedures**
3. All personnel entering a building or area suspected of containing elevated levels of CO shall wear SCBA until such time as the safety of the atmosphere can be established by testing and continuous monitoring, or if monitoring equipment is not available until the area has been thoroughly and completely ventilated with fresh air.
4. The two-in two out requirement explained in the SOP on self-contained breathing apparatus shall be followed.
5. Personnel shall at all times remain mindful and alert to the presence of other hazards that may be present, including gasses such as hydrogen cyanide, hydrogen sulfide, carbon dioxide, and low oxygen levels. Whenever possible a multi-gas meter should be used to monitor for CO.
6. All buildings or areas suspected of containing high levels of CO shall be evacuated of all civilians until the safety of the atmosphere can be established through air monitoring. Precautions shall be taken to establish an exclusion zone perimeter in order to exclude and deny entry to all civilians until such time as the emergency is mitigated. This may require posting firefighters at all entrances.

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1. Upon arriving on scene, a decision must be made whether to ventilate the building, or await the arrival of CO detection equipment. If all occupants have left the building and been accounted for, it is generally preferable to leave the building intact until the arrival of CO detectors in order to discover the source of the CO. However, the following situations dictate that the building or area should be thoroughly ventilated as early into the incident as possible:
	1. The presence of persons still in the building or area who cannot be immediately evacuated.
	2. Persons from the building who are unaccounted for
	3. The unavailability of CO detection equipment
2. If the decision is made to ventilate the area, consideration should also be given to shutting off any appliances that may be the source of the CO, including:
	1. Boilers
	2. Heating units
	3. Hot water heaters
	4. Liquid or gas fired space heaters
	5. Wood, coal, or pellet stoves or heaters
	6. Fireplace inserts
	7. Cooking appliances such as gas stoves
3. Upon the arrival of monitoring equipment, members wearing SCBA shall determine if elevated levels of CO exist, and if so the probable source of the CO. CO readings shall be recorded. The areas of highest CO concentration and the probable source of the CO shall be determined before ventilation is performed or any appliances shut off, except as otherwise provided.
4. Where a gas appliance is involved, the appropriate utility (gas company or propane supplier) shall be notified. The utility or supplier may also be requested to respond to assist in determining the source of high levels of CO.