





# NORTHERN WAKE FIRE DEPARTMENT

## STANDARD OPERATING PROCEDURES

<b>TITLE:</b> Response to CO Alarms and Incidents	<b>SECTION/TOPIC:</b> OPERATIONS
<b>NUMBER:</b> 300-14	<b>ISSUE DATE:</b> 4/20/18
<b>REVISION DATES:</b>	<b>APPROVED BY:</b>  <hr/> <b>PRESIDENT – BOARD OF DIRECTORS</b>  <hr/> <b>FIRE CHIEF</b>

### I. PURPOSE

The purpose of this procedure is to provide guidance to Northern Wake Fire Department personnel responding to Carbon Monoxide (CO) alarm activations and Carbon Monoxide incidents.

### II. SCOPE

This Standard Operating Procedure applies to all Northern Wake Fire Department members.

### III. PROCEDURE

A. Any fuel-fired appliance or equipment will produce Carbon Monoxide (CO) in varying levels of concentration. In addition to vehicle and portable equipment engines, appliances such as: gas furnaces, gas cook stoves, wood stoves, fire places, gas water heaters, gas/kerosene portable heaters, gas logs, etc., can produce Carbon Monoxide.

#### B. Response

1. The normal response to this type of call shall be with one (1) apparatus that possesses a 4-gas monitor, unless otherwise advised by a fire department officer.
2. Apparatus responses to CO alarms will be non-emergency unless information provided by the Communications Center indicates an exposure emergency.

#### A. Investigation

1. Upon arrival, occupants should be evacuated and evaluated for exposure to Carbon Monoxide (CO) following the "Field Operations Guide" in Appendix B.
2. Carbon Monoxide basic exposure symptoms are:

- a) Mild Exposure - Slight headache, nausea, vomiting, fatigue (often described as "flu-like" symptoms)
- b) Medium Exposure - Severe throbbing headache, drowsiness, confusion, fast heart rate.
- c) Extreme Exposure - Unconsciousness, convulsions, heart and lung failure, brain damage, death.

- 3. If any occupants have symptoms of Medium or Extreme Exposure, a trained EMT or Medical Responder will initiate treatment and the appropriate EMS agency will immediately be contacted.
- 4. Fire department personnel will insure that the alarm is from a CO detector and not from a smoke detector; and will insure that the alarm is a CO alert and not a low battery alarm.

NOTE: The detector may take from one (1) to forty-eight (48) hours to clear and reset after the building has been ventilated.

- 5. The responding apparatus with a 4-gas monitor shall zero the monitor in fresh air and comply with all other start-up procedures per the manufacturer's recommendations.
- 6. A survey of the premises should be initiated to determine if the amounts of Carbon Monoxide present exceed 9 ppm.

NOTE: If Carbon Monoxide amounts exceed 9 ppm, refer to the "Carbon Monoxide Detector Activation Notice of Findings" in Appendix A.

- 7. All personnel shall utilize a complete SCBA in any atmosphere that exceeds 35 ppm of Carbon Monoxide.
- 8. If the structure/residence is found open and ventilated upon arrival, DO NOT "close" the structure to allow the hazardous atmosphere to re-develop.
- 9. Investigate all areas where Carbon Monoxide may be generated such as appliances, water heaters, and heating systems.
- 10. Higher levels of Carbon Monoxide will be detected close to or at the functioning appliance.
- 11. If it can be determined that an appliance is malfunctioning and possibly producing Carbon Monoxide, it shall be shut down and the premises ventilated.
- 12. If an appliance is found to be the source and possibly defective, the occupant(s) should be advised to contact the company that services the appliance.
- 13. Carbon Monoxide is slightly lighter than air with a vapor density of .97 (NIOSH) and this physical property will lead personnel to initially survey the upper areas of a structure for the presence of Carbon Monoxide.

CAUTION: Since the vapor density is very close to the weight of air, humid conditions may alter the characteristics of Carbon Monoxide making it neutrally buoyant or slightly heavier than air and personnel should survey the environment accordingly.

14. Upon completion of the Carbon Monoxide investigation, the "Carbon Monoxide Detector Activation Notice of Findings Form" (Appendix A) should be completed and a copy provided to the occupant. An explanation of the reading(s) received will be also explained to the occupant.

APPENDIX A

Incident #: \_\_\_\_\_

Dispatch Time: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

**Northern Wake Fire Department**

**CARBON MONOXIDE DETECTOR ACTIVATION**

**NOTICE OF FINDINGS**

Carbon monoxide is an odorless, tasteless, colorless gas that is DEADLY. It is a by-product of a fuel burning process. It can cause symptoms that can mimic flu, cause unconsciousness and even death. Many appliances around the home are capable of producing carbon monoxide when a faulty or unusual condition exists. **Since the source may be transient in nature, the source may not always be easily detectable.**

The **Northern Wake Fire Department** responded to investigate a possible carbon monoxide problem at:

\_\_\_\_\_  
Address (Number / Street) City Zip

\_\_\_\_\_  
Occupant Name Phone Number

CARBON MONOXIDE was ( ) was not ( ) found by our instruments. This does not mean that this was a false alarm. Our instruments found the highest interior level of CO to be \_\_\_\_\_ ppm. (parts per million).

**WHAT DOES THIS READING MEAN?**

**Less Than 9 ppm** Our instruments did not detect elevated levels at this time. However, this does not mean that higher levels did not exist prior to our arrival nor that higher levels will not accumulate after our departure. Check your carbon monoxide detector per manufacturer's recommendations. Replace or reset detector as directed by manufacturer's specifications.

**More than 9 ppm** Our instruments have detected potentially dangerous levels of carbon monoxide. We recommend that you leave this building immediately. We feel that it is unsafe to reoccupy this building until repairs are made and your detector is replaced or reset according to manufacturer's specifications. (NOTE - 9 ppm is the maximum recommended concentration for indoor air quality per the EPA)

**35 ppm** Maximum allowable concentration for continuous exposure in the workplace in any 8-hour period according to OSHA regulations without the use of breathing apparatus.

**100 ppm or More** We have detected a potentially lethal level of carbon monoxide in your home/business. Our recommendation is that you leave your home/building immediately! It is not safe until repairs are made and your detector is replaced or reset according to manufacturer's specifications.

(Note: ppm = parts per million)

Carbon monoxide affects individuals differently depending on the size, age and medical history of the occupant(s). Therefore, families with young children, or members with medical conditions, or aged individuals should take extra precautions in the event that carbon monoxide is detected.

**If you have any questions, please contact Northern Wake Fire Department Station #1 at 919-847-3858**

FD Incident Commander: \_\_\_\_\_ Date \_\_\_\_\_

Owner/Occupant: \_\_\_\_\_ Date \_\_\_\_\_

APPENDIX B

## Carbon Monoxide Field Guide

### First Responder Actions – CARBON MONOXIDE

Carbon Monoxide is a colorless and odorless toxic gas that is slightly lighter than air, with a vapor density of .97 (NIOSH) in dry air (air=1). However, it will have a tendency to remain at the level released or even sink if the air is moist. It may also be found at all areas of the atmospheric envelope due to air currents. CO will tend to concentrate in higher areas of the structure if the air is warm and dry.

CO is produced from the burning of any carbon containing fuel: including, but not limited to Natural Gas, Propane Gas, plastics / synthetic materials, and wood.

#### ASSUME A TOXIC ATMOSPHERE IS PRESENT UNTILL CONFIRMED – WEAR SCBA

- Safe Approach. Stop minimum of 100 feet away or further as needed
- Establish Command and Accountability
- Insure the structure is evacuated of all occupants and pets
- Gather information from the occupants or the complainant
- Request EMS if occupants are symptomatic to CO exposure.
- Treat any affected occupants until EMS arrives
- Zero the 4-gas monitor in fresh air and comply with the prescribed start-up procedures for the monitor
- Initial entry shall be in SCBA until monitoring confirms levels are BELOW 35ppm (OSHA)
- If occupancy is found "open", do not close to re-establish the CO atmosphere
- Locate the source of the CO emissions using the 4-gas monitor. Concentrations will be greater near the source
- Advise the occupant(s) of findings and encourage them to contact appropriate repair service(s)
- Advise the occupant of what the findings mean and the hazards of CO (see CO Action Levels)
- Complete the form "Carbon Monoxide Detector Activation – Notice of Findings"

### CARBON MONOXIDE - Action Levels

#### 9 ppm =

The maximum amount allowed averaged in eight (8) hours per the EPA's National Ambient Air Quality Standards (NAAQS). This level serves as the maximum for indoor air quality per the EPA.

- Occupants are advised NOT to remain in an environment that contains levels at or above 9 ppm.

#### 35 ppm =

Maximum allowable concentration for continuous exposure in the workplace in any 8-hour period according to OSHA regulation.

- 35 ppm also represents the maximum amount averaged in one (1) hour, per the EPA's National Ambient Air Quality Standards (NAAQS).
- SCBA MUST BE USED BY RESPONDERS AT LEVELS AT OR ABOVE THIS CONCENTRATION

#### Symptoms:

Carbon monoxide affects individuals differently depending on the size, age, and medical history of the occupant(s). Therefore young children, pregnant females, seniors, or existing medical conditions should be given extra consideration and take extra precautions in the event that carbon monoxide is detected.

The initial symptoms of low to moderate CO poisoning are similar to the flu (but without the fever):

- Headache
- Fatigue
- Shortness of breath
- Nausea Dizziness

High level CO poisoning results in progressively more severe symptoms, including:

- Mental confusion
- Vomiting
- Loss of muscular coordination
- Loss of consciousness
- Ultimately death

**50 ppm:** No adverse effects with 8 hours of exposure

**200 ppm:** Mild headache after 2-3 hours of exposure.

**400 ppm:** Headache and nausea after 1-2 hours of exposure.

**800 ppm:** Headache, nausea, and dizziness after 45 minutes; collapse and unconsciousness after 1 hour of exposure.

#### Detector Alarm Standards: (UL Standard 2034) "When the detector will alarm"

- 30 ppm for 30 days
- 70 ppm for 60-240 minutes
- 150 ppm for 10-50 minutes
- 400 ppm for 4-15 minutes

