	COMMERCE FIRE DEPARTMENT Standard Operating Guidelines
	Subject: Carbon Monoxide Alarms
	Reference Number: 6.02
	Effective Date: 6/5/2014 **Last Date Revised:** 5/7/2015
	Approved By: Chief Kevin Dean

Purpose: This guideline is established to standardize responses to incidents involving activated carbon monoxide detectors.

Policy:

Scope: All responses to activated carbon monoxide detectors shall follow the procedures outlined in this guideline.

Responsibilities:

The Fire Chief is responsible for ensuring that all members of the agency are familiar with this guideline and the operation of the CO multi-gas monitor.

The Senior Officer on responses covered by this guideline will be responsible for filling out all appropriate response forms.

The Incident Commander is responsible for ensuring that air sampling for carbon monoxide is conducted at all activated carbon monoxide detector responses. The air sampling shall be done under worst-case situations. All doors and windows shall be closed prior to any air sampling taking place. All obvious sources will have an air sampling conducted.

The following guidelines apply to the air sampling. At 9 ppm above outside air a thorough investigation as to the source shall be conducted. At 35 ppm the building will evacuated and every effort made to determine the source of the emission. At readings above 70 ppm, all personnel will be in self-contained breathing apparatus. Readings above 70 ppm shall prevent the building from being re-occupied.

Commerce City Gas Department shall be called for assistance on all Carbon Monoxide responses at buildings supplied with natural gas. If the building is supplied with an oil furnace, or any other fossil fuel supplied furnace, recommend for the property owner to contact a heating and cooling company to check the system.

Any appliance that is giving off more than 9 ppm of carbon monoxide inside the building shall be shut off and information passed to owner and Cascade Gas.

Operational Guidelines:

Two separate areas of operational guidelines shall be outlined. First, a procedure that can be followed without the availability of metering devices. Secondly, a procedure that will outline a CO activation investigation when metering devices are available.

Non-Metering Device Investigation:

A. Note the presence of higher risk occupants.
(Those with a greater oxygen requirement)

1. Unborn babies
2. Infants
3. Children
4. Senior citizens
5. Coronary or respiratory patients

B. Note any flu type symptoms in all occupants:

1. Headaches
2. Fatigue
3. Nausea
4. Dizziness
5. Confusion
6. Irritability
7. Lowered conscious level
8. Reddening of the skin
9. Vomiting

C. Activate EMS as needed for occupants. Administer oxygen as per SOP 3.07.17.

D. Trust the CO monitor that has activated. Evacuate any remaining occupants.

E. Interview the occupants to determine:

1. The location of the monitor?
2. The approximate age of the monitor?
3. The approximate duration of the alarm feature?
4. Which combustion appliances were operating at the time of the activation?
5. How well sealed has the structure been at the time of the activation?
6. Which fuel supplier services the structure?
(Some of these suppliers have access to metering devices)

F. Self-Contained Breathing Apparatus (SCBA) are **REQUIRED** to enter the structure

1. 100 parts per million concentration over 90 minutes should activate these monitors
2. 200 parts per million concentration is a dangerous level

G. Retrieve the CO monitor and bring it to the outside and examine for:

1. The unit is a CO monitor and not a smoke detector.
2. The monitor's sensor is not out of date.
(These sensors should last only about 1-1/2 to 2 years)
3. Note the sensor area of the monitor. The darker the shading, the higher level of CO concentration has occurred.
4. CO exposure effects are measured in "half-life ". The monitor should not de-activate in a reasonable amount of time when exposed to fresh air.

H. Obtain permission (verbal) from the structure's occupant to:

1. Shut off the flow of fuel to the building from the exterior tank or meter.
2. Re-enter the structure (Donn S.C.B.A.) and open exterior windows and doors to purge the air supply.
3. Remove any air breathing pets that are found and turn over to the Occupants.

I. Make notes to include on Incident Report:

1. Structure address
2. Property Owner name, address, telephone number
3. Names of all occupants at the time of the alarm
4. Call back telephone number of the occupant
5. Willingness of the occupant to cooperate with investigation
6. Manufacturer, model, and power source of CO monitor
7. Fuel supplier
8. List all types of combustion appliances that may have caused CO
9. Note any appliances that may attribute to reverse stacking

J. Return the monitor to the occupant and inform them of:

1. Non availability of a metering devise
2. Fuel supplier may have metering devise
3. Dangers of CO
4. Possible sources of CO
5. The dangers of re- igniting combustion appliances before service is made

6. Possible services to assess improperly working appliances
    a. Fuel supplier
    b. Appliance repair services
    c. Plumbing contractors to assess venting pipes, water heaters
    d. HVAC contractors to assess heat exchangers, burners, venting
    * Do not recommend a specific service contractor.

K. Assess the need of the occupant for temporary housing until repairs are made:
1. Family
2. Friends
3. Neighbors
4. Third party organizations

Metering Device Investigations:

A. Same as A above.
B. Same as B above.
C. Same as C above.
D. Same as D above.
E. Same as E above.
F. Same as F above.

G. Activate metering device in a known fresh air environment
1. Check meter for power supply level
2. Check meter for proper initial readings
    a. Oxygen @ 20.9 %
    b. Combustible LEL @ 0 %
    c. CO level @ 0 ppm
    d. Proper fourth gas initial reading if monitor offers this option

H. Obtain permission (verbal) from the structure's occupant to enter the building.

I. Take a reading just inside of the entranceway.
Record the time and the reading to include in the narrative section of the incident's report.

J. Go to the area of the activated monitor or monitors for another reading.
Record the time and the reading to include in the narrative section of the incident's report.

K. Remove the sensor pack or cover from the activated CO monitor and note the shading, if any, of the sensor area. The darker the shading, the higher the level

of CO concentration that the monitor has been exposed to.
Record the time and the reading to include in the narrative section of the incident's report.

L. Reestablish the same conditions within the structure that were present at the time of the alarm activation.

M. Monitor the area around the combustion type appliances one at a time. monitor close to the ignition source. Record the time and the reading to include in the narrative section of the incident's report.

Keep investigating. Even if one possible source of CO has been found, do not rule out the potential for additional sources.

N. Note any appliances that are located close to one another. These could be a potential for reverse stacking. Record any findings that may indicate reverse stacking to include in the narrative section of the incident's report.

O. Check any non-vented heaters for discoloration that may indicate incomplete combustion. With these heaters operating, monitor the immediate area. Record the time and the reading to include in the narrative section of the incident's report.

P. Check for proper venting of appliances following these procedures...

1. The appliance must be operating at the time.
2. The flue pipe should be warm enough for the gases to draw through the flue.
3. The flue pipe must be unobstructed. Check for...
    a. All pipe joints are joined
    b. The flue exits the structure
    c. Monitor the area of the flue pipe outside of the structure Document the time and the readings.
    d. Determine as well as possible that the flue pipe is free of nests and animals

Before continuing to the next step. Monitor for the presence of combustible gases in the structure.

Record the time and the reading to include in the narrative section of the incident's report.

Q. At the area where the flue pipe begins over the appliance, check for venting convection using the match test as follows.

1. With a paper or stick match, strike the match and blow it out.
2. Place the smoking end of the match next to the entrance of the flue pipe and note the movement of the match's smoke.

3. An unobstructed flue pipe will draw the match's smoke up into the vent with the other gases.

R. Repeat these procedures for all combustion fueled appliances. Record the time and the reading to include in the narrative section of the incident's report.

S. At this point, the source of the CO should have been located. If so...

1. Shut off the appliance
2. Open the structure's exterior windows and doors to the fresh air.
3. Allow 'airing out' for a minimum of 15 minutes.

* It may be advisable to aid with 'airing out' to set up forced mechanical ventilation equipment.

4. Monitor for CO every 15 minutes until the concentration is below 20 ppm. Record the time and the reading to include in the narrative section of the incident's report.
5. Inform the occupant of your findings and advise them of repair needs.

T. At this point, if the source of the CO is not located...

1. Turn off all combustion appliances
2. Get permission (verbal) from the occupant to stop the flow of combustion fuel to the structure.

* If the occupant refuses to allow this, notify Senior Officer to have the appropriate fuel supplier come to the scene and stop the flow of fuel.

3. Open all exterior windows and doors so as to 'air out 'the structure for a minimum of 15 minutes.

* It may be advisable to set up forced mechanical ventilation equipment.

4. Monitor for CO every 15 minute until the concentration is below 20 ppm. Record the time and the reading to include in the narrative section of the incident's report.
5. Inform the occupants of your findings.

U. Assess the need of the occupant for temporary housing.

1. Family
2. Friends
3. Neighbors
4. Third party organizations

V. Inform occupant of the following...

1. Dangers of CO
2. Possible sources of CO
3. The dangers of re-igniting combustion appliances before service is made

4. Possible services to assess improperly working appliances
    a. Fuel supplier
    b. Appliance repair contractor
    c. Plumbing contractor to assess venting pipes and water heaters
    d. HVAC contractors to assess heat exchangers, burners, venting equipment
    * Do not recommend a specific service contractor

W. Inform the Senior Officer of the situation. He/she shall have the leeway to schedule another investigation of the structure at a later time, to re- evaluate the possible presence of CO. This must be done with the presence of the property owner or occupant.