To: Senator Anderson, Chair

Committee on Jobs, Energy and Community Development

Senator Dibble,

Chair of the Subcommittee on Housing, to which was referred

S.F. No. 3216: A bill for an act relating to housing; regulating condominium conversions; amending Minnesota Statutes 2005 Supplement, section 515B.1-106.

Reports the same back with the recommendation that the bill do pass and be referred to the full committee.

.....
(Subcommittee Chair)

March 17, 2006 .....
(Date of Subcommittee recommendation)

COMMITTEE, SUBCOMMITTEE, DIVISION REPORT TRANSMITTAL

TO: Benjamin Brausa

Room: 111

FROM: CATHERINE MORRISON

____ Committee report(s) ready for signature and copying.

__✓__ Computerized subcommittee/division report(s)

____

To: Senator Anderson, Chair

Committee on Jobs, Energy and Community Development

Senator Dibble,

Chair of the Subcommittee on Housing, to which was referred

S.F. No. 2887: A bill for an act relating to manufactured homes; regulating manufactured home park conversions;amending Minnesota Statutes 2004, section 327C.095, subdivisions 1, 5.

Reports the same back with the recommendation that the bill be amended as follows:

Page 1, line 11, delete "commissioner of" and insert "commissioners of health and"

And when so amended that the bill be recommended to pass and be referred to the full committee.

.....
(Subcommittee Chair)

March 17, 2006 .....
(Date of Subcommittee action)

To: Senator Anderson, Chair

Committee on Jobs, Energy and Community Development

Senator Dibble,

Chair of the Subcommittee on Housing, to which was referred

S.F. No. 1003: A bill for an act relating to housing; requiring carbon monoxide alarms in all dwellings; providing criminal penalties; proposing coding for new law in Minnesota Statutes, chapter 299F.

Reports the same back with the recommendation that the bill be amended as follows:

Page 3, line 1, delete "Uniform" and insert "Minnesota"

And when so amended that the bill be recommended to pass and be referred to the full committee.

.....
(Subcommittee Chair)

March 17, 2006 .....
(Date of Subcommittee recommendation)

Senate Housing Subcommittee
Of
Jobs, Energy, and Community Development

Friday, March 17, 2006
10am-12pm
Room 107, State Capitol

Senator D. Scott Dibble, Chair

Agenda

I. S.F. 1003-Pariseau: Housing carbon monoxide alarms installation requirement.
   i. Sen. Pat Pariseau
   ii. Representative Denny McNamara
   iii. David Griggs, Citizen, Cannon Falls, MN
   iv. Jason Griggs – Oronoco, MN
   v. Cindy Jorgenson – Lakeville, MN
   vi. Marty Scheerer, Edina Fire Chief
   vii. O.J. Doyle, MN Ambulance Association
   viii. Jack Horner, Minnesota Multi-Housing Association

II. S.F. 2887-Dibble: Manufactured home park conversions regulations modifications.
   i. Dave Anderson, Executive director of APAC
   ii. Tim Thompson, Housing Preservation Project
   iii. Kevin Walker, North Country Cooperative Development Fund

III. S.F. 3216-Dibble: Common interest community local requirements application requirements modification.
   i. Chris Goepfert, Housing Preservation Project
   ii. Genevieve Gaboriault, Legal Aid Society of Minneapolis

SF. 3216

A bill for an act

relating to housing; regulating condominium conversions; amending Minnesota Statutes 2005 Supplement, section 515B.1-106.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:

Section 1. Minnesota Statutes 2005 Supplement, section 515B.1-106, is amended to read:

515B.1-106 APPLICABILITY OF LOCAL REQUIREMENTS.

(a) Except as provided in subsections (b) and (c), a zoning, subdivision, building code, or other real estate use law, ordinance, charter provision, or regulation may not directly or indirectly prohibit the common interest community form of ownership or impose any requirement upon a common interest community, upon the creation or disposition of a common interest community or upon any part of the common interest community conversion process which it would not impose upon a physically similar development under a different form of ownership. Otherwise, no provision of this chapter invalidates or modifies any provision of any zoning, subdivision, building code, or other real estate use law, ordinance, charter provision, or regulation.

(b) Subsection (a) shall not apply to any ordinance, rule, regulation, charter provision or contract provision relating to the financing of housing construction, rehabilitation, or purchases provided by or through a housing finance program established and operated pursuant to state or federal law by a state or local agency or local unit of government.

(c) A statutory or home rule charter city, pursuant to an ordinance or charter provision establishing standards to be applied uniformly within its jurisdiction, may prohibit or impose reasonable conditions upon the conversion of buildings occupied wholly or partially for residential use to the common interest community form of

ownership only if there exists within the city a significant shortage of suitable rental dwellings available to low and moderate income individuals or families or to establish or maintain the city's eligibility for any federal or state program providing direct or indirect financial assistance for housing to the city. Prior to the adoption of an ordinance pursuant to the authority granted in this subsection, the city shall conduct a public hearing. Any ordinance or charter provision adopted pursuant to this subsection shall not apply to any existing or proposed conversion common interest community (i) for which a bona fide loan commitment for a consideration has been issued by a lender and is in effect on the date of adoption of the ordinance or charter provision, or (ii) for which a notice of conversion or intent to convert required by section 515B.4-111, containing a termination of tenancy, has been given to at least 75 percent of the tenants and subtenants in possession prior to the date of adoption of the ordinance or charter provision.

(d) For purposes of providing marketable title, a statement in the declaration that the common interest community is not subject to an ordinance or that any conditions required under an ordinance have been complied with shall be prima facie evidence that the common interest community was not created in violation of the ordinance.

(e) A violation of an ordinance or charter provision adopted pursuant to the provisions of subsection (b) or (c) shall not affect the validity of a common interest community. This subsection shall not be construed to in any way limit the power of a city to enforce the provisions of an ordinance or charter provision adopted pursuant to subsection (b) or (c).

~~(f) Any ordinance or charter provision enacted hereunder shall not be effective for a period exceeding 18 months.~~

Senators Dibble and LeClair introduced–

S.F. No. 2887: Referred to the Committee on Jobs, Energy and Community Development.

A bill for an act

relating to manufactured homes; regulating manufactured home park conversions; amending Minnesota Statutes 2004, section 327C.095, subdivisions 1, 5.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:

Section 1. Minnesota Statutes 2004, section 327C.095, subdivision 1, is amended to read:

Subdivision 1. **Conversion of use; minimum notice.** At least nine months before the conversion of all or a portion of a manufactured home park to another use, or before closure of a manufactured home park or cessation of use of the land as a manufactured home park, the park owner must prepare a closure statement and provide a copy to the commissioner of the housing finance agency, the local planning agency, and ~~a copy to~~ a resident of each manufactured home where the residential use is being converted. A resident may not be required to vacate until 60 days after the conclusion of the public hearing required under subdivision 4. If a lot is available in another section of the park that will continue to be operated as a park, the park owner must allow the resident to relocate the home to that lot unless the home, because of its size or local ordinance, is not compatible with that lot.

Sec. 2. Minnesota Statutes 2004, section 327C.095, subdivision 5, is amended to read:

Subd. 5. **Park conversions.** If the planned cessation of operation is for the purpose of converting the part of the park occupied by the resident to a common interest community pursuant to chapter 515B, the provisions of section 515B.4-111, except subsection (a), shall apply. The nine-month notice required by this section shall state that the cessation is for the purpose of conversion and shall set forth the rights conferred by

this subdivision and section 515B.4-111, subsection (b). Not less than 120 days before the end of the nine months, the park owner shall serve upon the resident a form of purchase agreement setting forth the terms of sale contemplated by section 515B.4-111, subsection (d). Service of that form shall operate as the notice described by section 515B.4-111, subsection (a). This subdivision does not apply to a common interest community that is a cooperative incorporated under chapter 308A or 308B and that does not require persons who are residents at the time of conversion to become members of the cooperative.

Senator ..... moves to amend S.F. No. 2887 as follows:

Page 1, line 11, delete "commissioner of" and insert "commissioners of health and"

Senators Pariseau, Scheid, Ruud and Michel introduced--

S.F. No. 1003: Referred to the Committee on Jobs, Energy and Community Development.

A bill for an act

relating to housing; requiring carbon monoxide alarms in all dwellings; providing criminal penalties; proposing coding for new law in Minnesota Statutes, chapter 299F.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:

Section 1. [299F.50] [DEFINITIONS.]

Subdivision 1. [SCOPE.] As used in sections 299F.50 to 299F.52, the terms defined in this section have the meanings given them.

Subd. 2. [INSTALLED.] "Installed" means that an approved carbon monoxide alarm is hardwired into the electrical wiring, directly plugged into an electrical outlet without a switch, or, if the alarm is battery-powered, attached to the wall of the dwelling.

Subd. 3. [SINGLE AND MULTIFAMILY DWELLING.] "Single and multifamily dwelling" means any building or structure which is wholly or partly used or intended to be used for living or sleeping by human occupants.

Subd. 4. [DWELLING UNIT.] "Dwelling unit" means an area meant for living or sleeping by human occupants.

Subd. 5. [APPROVED CARBON MONOXIDE ALARM.] "Approved carbon monoxide alarm" means a device meant for the purpose of detecting carbon monoxide that is certified by a nationally recognized testing laboratory to conform to the latest

Underwriters Laboratories Standards (known as UL2034 standards).

Subd. 6. [OPERATIONAL.] "Operational" means working and in service according to manufacturer's directions.

Sec. 2. [299F.51] [REQUIREMENTS FOR CARBON MONOXIDE ALARMS.]

Subdivision 1. [GENERALLY.] Every single family dwelling and every dwelling unit in a multifamily dwelling must have an approved and operational carbon monoxide alarm installed on each level of the residence and within ten feet of each room lawfully used for sleeping purposes.

Subd. 2. [OWNER'S DUTIES.] The owner of a multifamily dwelling which is required to be equipped with one or more approved carbon monoxide alarms must:

(1) provide and install one approved and operational carbon monoxide alarm on each level of the dwelling and within ten feet of each room lawfully used for sleeping; and

(2) replace any approved carbon monoxide alarm that has been stolen, removed, found missing, or rendered inoperable during a prior occupancy of the dwelling unit and which has not been replaced by the prior occupant prior to the commencement of a new occupancy of a dwelling unit.

Subd. 3. [OCCUPANT'S DUTIES.] The occupant of each dwelling unit in a multifamily dwelling in which an approved and operational carbon monoxide alarm has been provided and installed by the owner must:

(1) keep and maintain the device in good repair according to manufacturer's directions; and

(2) replace any device that is stolen, removed, missing, or rendered inoperable during the occupancy of the dwelling unit.

Subd. 4. [BATTERY REMOVAL PROHIBITED.] No person shall remove batteries from, or in any way render inoperable, a required carbon monoxide alarm.

Sec. 3. [299F.52] [ENFORCEMENT.]

A violation of section 299F.50 or 299F.51 subjects the owner of the single family dwelling, multifamily dwelling, or dwelling unit to the same penalty and enforcement mechanism

provided for violations of the Uniform Fire Code provided in section 299F.011, subdivision 6.

Sec. 4. [EFFECTIVE DATE.]

Sections 1 to 3 are effective January 1, 2007, for all newly constructed single family and multifamily dwelling units and August 1, 2008, for all existing and newly constructed single family and multifamily dwelling units.

BUILDERS
ASSOCIATION OF MINNESOTA
SERVING THE HOME BUILDING AND REMODELING INDUSTRY

March 17, 2006

To: Jobs, Energy and Community Development, Housing Subcommittee Members
From: Pam Perri Weaver, Executive Vice President

Re: SF 1003, Carbon Monoxide Alarm Mandate

On behalf of the Builders Association of Minnesota (BAM) members I am writing to comment on SF 1003. This proposal would require carbon monoxide alarms in all dwellings and dwelling units that are built or sold in Minnesota.

BAM supports the inclusion of CO alarm installation in the state building code, provided the code provision is targeted at homes with the highest likelihood of CO poisoning. As a standing policy, BAM does not believe that building code issues should be written at the legislature. This is why BAM supported the inclusion of the following language when the Minnesota-specific amendments for the adopted 2000 International Mechanical Code was being considered:

> **"501.4.1.1 Carbon monoxide detector.** When any atmospherically vented appliance is installed in a new dwelling, a carbon monoxide detector complying with UL Standard 2034 shall be installed in accordance with the manufacturer's installation instructions."

The language was not adopted during the 2000 IMC code adoption process. Based on our research we believe that CO alarms should be required only in new dwellings or townhomes with atmospherically vented appliances. CO alarms are not necessary in homes that use other types of space and water heating equipment.

While BAM supports the inclusion of CO alarm requirements in the Minnesota State Building Code in concept, the bill in its current form places the mandate broadly over all newly constructed homes regardless of their potential for CO problems. Unique water and space heating equipment has been used in new single-family homes in Minnesota

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Carbon Monoxide

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CARBON MONOXIDE POISONING

You could be at risk.

Carbon monoxide is an odorless, colorless, and non-irritating gas that is a product of incomplete burning of carbon-containing materials such as natural gas, propane, gasoline, wood, and charcoal. The Journal of the American Medical Association (JAMA), reports an estimated 1,500 people die annually due to accidental carbon monoxide poisoning. In addition, about 10,000 people lose a day of work or seek medical attention each year because of carbon monoxide poisoning. As people attempt to conserve heat by making their homes "airtight," the incidence of poisoning increases.

Carbon monoxide impairs the ability of blood to carry oxygen. The brain and heart are very sensitive to lack of oxygen. People with heart and lung disease are at higher risk of developing problems from carbon monoxide, as are children and old people. The unborn child is also very sensitive to carbon monoxide poisoning.

Symptoms of carbon monoxide poisoning:

- Drowsiness
- Nausea
- Vomiting
- Headache
- Dizziness
- Irritability
- Difficulty thinking
- Blurred vision
- Coma

Note: Flu-like symptoms can be due to carbon monoxide poisoning. Beware of several family members complaining of flu symptoms the same day.

Sources of carbon monoxide:

- Furnaces
- Gas water heaters
- Kerosene or propane space heaters
- Gasoline-powered engines
- Fires
- Charcoal grills

People at risk for carbon monoxide poisoning:

- People in homes with malfunctioning heating appliances
- Drivers and passengers in automobiles with leaky exhaust systems
- People in fish houses
- Firefighters
- Auto mechanics
- Workers at loading facilities
- Warehouse storage workers
- Steel and other industrial workers

What to do:

Act quickly to remove person from environment.

Call the Poison Center 1-800-222-1222 for further information.

Call 911 if someone is seriously ill.

How to prevent carbon monoxide poisoning:

INSTALL A CARBON MONOXIDE DETECTOR in your home. Choose a detector that has an audible alarm and a digital readout of the carbon monoxide concentration. Place the detector near the bedroom. Detectors are available at hardware, discount, and building supply stores.

PROVIDE ADEQUATE VENTILATION when using wood stoves, space heaters, and fireplaces. Make sure all flame-burning appliances are properly installed and operated and have routine maintenance.

MAKE SURE your furnace has adequate intake of outside air.

DO NOT USE ovens and gas ranges for heating purposes.

DO NOT OPERATE gasoline-powered engines in confined areas, such as garages or basements.

DO NOT BURN charcoal inside a home, cabin, recreational vehicle, or tent.

HAVE ONLY A QUALIFIED TECHNICIAN install or convert fuel-burning equipment from one type of fuel to another.

Carbon Monoxide

What Is It?

Carbon monoxide (CO) is an odorless, colorless gas that interferes with the delivery of oxygen in the blood to the rest of the body. It is produced by the incomplete combustion of fuels.

What Are the Major Sources of CO?

Carbon monoxide is produced as a result of incomplete burning of carbon-containing fuels including coal, wood, charcoal, natural gas, and fuel oil. It can be emitted by combustion sources such as unvented kerosene and gas space heaters, furnaces, woodstoves, gas stoves, fireplaces and water heaters, automobile exhaust from attached garages, and tobacco smoke. Problems can arise as a result of improper installation, maintenance, or inadequate ventilation.

What Are the Health Effects?

Carbon monoxide interferes with the distribution of oxygen in the blood to the rest of the body. Depending on the amount inhaled, this gas can impede coordination, worsen cardiovascular conditions, and produce fatigue, headache, weakness, confusion, disorientation, nausea, and dizziness. Very high levels can cause death.

The symptoms are sometimes confused with the flu or food poisoning. Fetuses, infants, elderly, and people with heart and respiratory illnesses are particularly at high risk for the adverse health effects of carbon monoxide.

An estimated 300 people die each year as a result of carbon monoxide poisoning and thousands of others end up in hospital emergency rooms.

What Can Be Done to Prevent CO Poisoning?

- Ensure that appliances are properly adjusted and working to manufacturers' instructions and local building codes.
- Obtain annual inspections for heating system, chimneys, and flues and have them cleaned by a qualified technician.
- Open flues when fireplaces are in use.
- Use proper fuel in kerosene space heaters.
- Do not use ovens and gas ranges to heat your home.
- Do not burn charcoal inside a home, cabin, recreational vehicle, or camper.
- Make sure stoves and heaters are vented to the outside and that exhaust systems do not leak.
- Do not use unvented gas or kerosene space heaters in enclosed spaces.
- Never leave a car or lawn mower engine running in a shed or garage, or in any enclosed space.
- Make sure your furnace has adequate intake of outside air.

What If I Have Carbon Monoxide Poisoning?

Don't ignore symptoms, especially if more than one person is feeling them. If you think you are suffering from carbon monoxide (CO) poisoning, you should

- Get fresh air immediately. Open doors and windows. Turn off combustion appliances and leave the house.
- Go to an emergency room. Be sure to tell the physician that you suspect CO poisoning.
- Be prepared to answer the following questions: Is anyone else in your household complaining of similar symptoms? Did everyone's symptoms appear about the same time? Are you using any fuel-burning appliances in the home? Has anyone inspected your appliances lately? Are you

Related Links

- NSC Environmenta Center Indoor Air (Program
- EPA Carbon Monc
- Wayne State Univ

certain they are working properly?

What About Carbon Monoxide Detectors?

Carbon monoxide (CO) detectors can be used as a backup *but not as a replacement* for proper use and maintenance of your fuel-burning appliances. CO detector technology is still being developed and the detectors are not generally considered to be as reliable as the smoke detectors found in homes today. You should not choose a CO detector solely on the basis of cost; do some research on the different features available.

Carbon monoxide detectors should meet Underwriters Laboratories Inc. standards, have a long-term warranty, and be easily self-tested and reset to ensure proper functioning. For maximum effectiveness during sleeping hours, carbon monoxide detectors should be placed close to sleeping areas.

If your CO detector goes off, you should:

- Make sure it is the CO detector and not the smoke alarm.
- Check to see if any member of your household is experiencing symptoms.
- If they are, get them out of the house immediately and seek medical attention.
- If no one is feeling symptoms, ventilate the home with fresh air and turn off all potential sources of CO.
- Have a qualified technician inspect your fuel-burning appliances and chimneys to make sure they are operating correctly.

April 5, 2004

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Indoor Air Quality

Carbon monoxide (CO)

Carbon monoxide (CO) is a colorless, odorless, poisonous gas. Deaths are usually caused by carbon monoxide poisoning from combustion in poorly ventilated enclosures. The symptoms of carbon monoxide poisoning are: headache, nausea, shortness of breath, dizziness and confusion. The severity of symptoms depends on the concentration of gas. Low level exposure produces chronic, flu-like symptoms and is usually not recognized.

Carbon monoxide gas is produced when fossil fuel burns incompletely because of insufficient oxygen. During incomplete combustion, the carbon and hydrogen combine to form carbon dioxide, water, heat, and deadly carbon monoxide. In properly installed and maintained appliances gas burns clean and produces only small amounts of carbon monoxide. Anything which disrupts the burning process or results in a shortage of oxygen can increase carbon monoxide production. Wood, coal, and charcoal fires always produce carbon monoxide, as do gasoline engines.

Exposures in parts per million (PPM)

30 PPM Permissible	Average over 8 hours
200 PPM	Maximum for acute exposure
800 PPM Lethal	2 hour exposure

Sources: Combustion - furnaces, boilers, space-heaters, stove tops, hot water heaters (gas), clothes dryers (gas), wood stoves, fireplaces, BBQ's, tobacco smoking, combustion engines, candles, incense, kerosene lanterns, propane appliances. Official recommendation: concentration levels should be below 30 PPM average exposure.

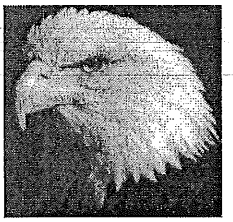
Our recommendation: safe concentration levels are 0 (zero), the hazard increases dramatically above 30 PPM. Average occupational exposures above 10PPM (sustained through the work day) are unacceptable if your goal is normal function and good health long term. Smokers provide their own personal supply of carbon monoxide and may have exposure levels above safe limits when their personal CO exposure is added to ambient air exposure.

Measurement

Research Inc.

Environmed Research Inc., Sechelt, British Columbia, Canada. In business since 1984. Online since 1995.

Environmed Research Inc.



From the Land of the Eagle,

1. Stain indicator tubes - only useful for screening industrial environments.
2. electronic devices - use transducers for continuous monitoring
3. electrochemical devices - accuracy +/- 5%

Physiology

When Carbon Monoxide is inhaled, the CO combines with the hemoglobin to form carboxyhemoglobin or COHb. The CO displaces the oxygen on hemoglobin. The COHb bond is over 200 times stronger than oxygen's bond with hemoglobin. The strong COHb bond also makes it difficult for the body to eliminate CO from the blood. Carbon Monoxide can poison slowly over a period of several hours, even in low concentrations.. Sensitive organs such as the brain, heart, and lungs suffer the most from a lack of oxygen. Unfortunately, the symptoms of CO poisoning are easily mistaken for other common illnesses and CO poisonings are often misdiagnosed.

Symptoms such as headaches, dizziness and fatigue are common to a number of illnesses such as the flu or the common cold. These symptoms can occur with a COHb blood saturation levels of 10-30%. At 30-50% COHb symptoms are nausea, severe headaches, dizziness, and increased pulse and respiration. COHb levels over 50% cause progressive symptoms proceeding to loss of consciousness, collapse, convulsions, coma, and finally death.

How much is dangerous?

High concentrations of carbon monoxide kill in less than five minutes. At low concentrations it will require a longer period of time to affect the body. Exceeding the EPA concentration of 9 ppm for more than 8 hours will have adverse health affects. The U.S. Occupational Health and Safety limit for healthy workers is 50 ppm.

Carbon monoxide detectors, which are designed to protect against high concentration of carbon monoxide are required to sound an alarm when concentrations are greater than 100 ppm. Continued exposure to carbon monoxide can cause permanent brain, nerve, or heart damage. Some people require years to recover while others might never fully recover.

The time of exposure, the concentration of CO, the activity level of the person breathing the CO, and the person's age, sex, and general health all affect the danger level. Exposure to Co at a concentration of 400 ppm will cause headaches in 1 to 2 hours; in 3 to 5 hours the same concentration can lead to unconsciousness and death. Physical exertion, with an accompanying increase in respiration rate, shortens the time to critical levels by 2 or 3 fold. Respiratory

capacity decreases and the risk of heart attack increases at levels well below 50 ppm.

CO poisoning should be suspected when:

- Entire family is sick at the same time.
- Flu-like symptoms decrease while away from the house.
- Illness is present when gas appliances are in use.
- Excess moisture on the interior of windows.

Urgent treatment- CO poisoning

Move immediately into fresh air; administer oxygen if available. go to hospital for treatment. In severe cases, patients are treated in a hyperbaric chamber which forces carbon monoxide from the body.

The half-life of carboxyhemoglobin in fresh air is approximately 4 hours - complete flushing takes 12 to 24 hours. Oxygen and hyperbaric chambers, can reduce CO damage, speed recovery, and reduce medical problems.

Loss of consciousness suggests high levels of carbon monoxide poisoning, and patients tend to have symptoms for several weeks. They will suffer from headache, fatigue, loss of memory, difficulty in thinking clearly, irrational behavior, and irritability. Recover can be slow and frustrating. Some individuals suffer permanent brain and organ damage. Victims may be highly sensitive to CO for the rest of their lives.

A breath test can determine carbon monoxide levels. Medical laboratories can measure carboxyhemoglobin levels in the blood. Carboxyhemoglogin levels in the blood drop after the victim is removed from the carbon monoxide source Because the effects of carbon monoxide poisoning may last for months, normal carboxyhemoglobin levels in the blood 24 or more hours after exposure are not relevant.

Protection from the dangers of carbon monoxide poisoning
Purchase a carbon monoxide detector(s).

Check heating appliances by a qualified heating contractor.

Replace open heating units - space heaters, wood stoves and fireplaces with direct-vent, sealed combustion units.

Auto Emissions of CO

US EPA Source

In cities, about two-thirds of the carbon monoxide emissions come from transportation sources, with the largest contribution coming from highway motor vehicles. In urban areas, the motor vehicle contribution to carbon monoxide pollution can exceed 90 percent. In 1992, carbon monoxide levels exceeded the Federal air quality standard in 20 U.S. cities, home to more than 14 million people.

Carbon monoxide results from incomplete combustion of fuel and is emitted directly from vehicle tailpipes. Incomplete combustion is most likely to occur at low air-to-fuel ratios in the engine. These conditions are common during vehicle starting when air supply is restricted ("choked"), when cars are not tuned properly, and at altitude, where "thin" air effectively reduces the amount of oxygen available for combustion (except in cars that are designed or adjusted to compensate for altitude).

The Clean Air Act gives state and local governments primary responsibility for regulating pollution from power plants, factories, and other "stationary sources." The U.S. Environmental Protection Agency (EPA) has primary responsibility for "mobile source" pollution control. The EPA motor vehicle program has achieved considerable success in reducing carbon monoxide emissions. EPA standards in the early 1970's prompted automakers to improve basic engine design. By 1975, most new cars were equipped with catalytic converters that convert carbon monoxide to carbon dioxide. Catalysts typically reduce carbon monoxide emissions as much as 80 percent. In the early 1980's, automakers introduced more sophisticated converters, plus on-board computers and oxygen sensors to optimize the efficiency of the catalytic converter. Today's passenger cars are capable of emitting 90 percent less carbon monoxide over their lifetimes than their uncontrolled counterparts of the 1960's. As a result, ambient carbon monoxide levels have dropped, despite large increases in the number of vehicles on the road and the number of miles they travel. With continued increases in vehicle travel projected, however, carbon monoxide levels will begin to climb again unless even more effective emission controls are employed.

Carbon monoxide emissions from automobiles increase in cold weather. This is because cars need more fuel to start at cold temperatures, and because some emission control devices (such as oxygen sensors and catalytic converters) operate less efficiently when they are cold. Until 1994, vehicles were tested for carbon monoxide emissions only at 75? F. But recognizing the effect of cold weather, the 1990 Clean Air Act calls for 1994, and later, cars and light trucks to meet a carbon monoxide standard at 20? F as well.

The 1990 Clean Air Act also stipulates expanded requirements for Inspection and Maintenance programs. These routine emission system checks should help identify malfunctioning vehicles that emit excessive levels of carbon monoxide and other pollutants. The inspections will be complemented by requirements for on-board warning devices to alert drivers when their emission control systems are not working properly. Another strategy to reduce carbon monoxide emissions from motor vehicles is to add oxygen-containing compounds to gasoline. This has the effect of "leaning out" the air-to-fuel ratio, thereby promoting complete fuel combustion. The most common oxygen additives are alcohols or their derivatives.

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Product Safety Tips:

CO Alarms

What is carbon monoxide?

Carbon monoxide, known by the chemical formula "CO", is a poisonous gas that kills approximately 534 people in the United States alone every year. Of that number, about 207 people were killed by carbon monoxide emitted from a consumer product, like a stove or water heater. You can't hear, taste, see or smell it. It's nicknamed the "silent killer' because it sneaks up on its victims and can take lives without warning.

What are the sources of CO?

CO is a by-product of incomplete combustion. CO sources can include malfunctioning appliances -- including furnaces, stoves, ovens and water heaters -- that operate by burning fossil fuels such as natural or liquefied petroleum (LP). When malfunctioning appliances aren't adequately ventilated, the amount of CO in the air may rise to a level that can cause illness or even death.

Other CO sources include vehicle exhaust, blocked chimney flues, fuel-burning cooking appliances used for heating purposes, and charcoal grills used in the home, tent, camper, garage or other unventilated areas.

How does CO affect the human body?

When victims inhale CO, the toxic gas enters the bloodstream and replaces the oxygen molecules found on the critical blood component, hemoglobin, depriving the heart and brain of the oxygen necessary to function.

The following symptoms are related to carbon monoxide poisoning and should be discussed with all members of the household:

Mild exposure: Often described as flu-like symptoms, including slight headache, nausea, vomiting, fatigue.

Medium exposure: Severe throbbing headache, drowsiness, confusion, fast heart rate.

Extreme exposure: Unconsciousness, convulsions, cardiorespiratory failure, death.

Many cases of reported carbon monoxide poisoning indicate that while victims are aware they are not well, they become so disoriented, that they are unable to save themselves by either exiting the building or calling for assistance. Young children and household pets are typically the first affected.

Carbon monoxide alarms are intended to alarm at carbon monoxide levels below those that cause a loss of ability to react to the danger of carbon monoxide exposures.

What are the symptoms of CO poisoning?

CO poisoning victims may initially suffer flu-like symptoms including nausea, fatigue, headaches, dizziness, confusion and breathing difficulty. Because CO poisoning often causes a victim's blood pressure to rise, the victim's skin may take on a pink or red cast.

How can I tell if there is a risk of CO poisoning in my home?

Have your fuel-burning appliances inspected by a qualified technician at least once a year. A qualified technician should have practical

knowledge of the operation, installation and proper ventilation of fossil-fuel-burning devices; carry the applicable insurance; be bonded; and be licensed to perform heating, ventilation and air conditioning (HVAC) work in your area.

Be alert to these danger signs that signal a potential CO problem:

- streaks of carbon or soot around the service door of your fuel-burning appliances;
- the absence of a draft in your chimney (indicating blockage);
- excessive rusting on flue pipes or appliance jackets;
- moisture collecting on windows and walls of furnace rooms;
- fallen soot from the fireplace;
- small amounts of water leaking from the base of the chimney, vent or flue pipe;
- damaged or discolored bricks at the top of your chimney; and
- rust on the portion of the vent pipe visible from outside your home.

Also, recognize that CO poisoning may be the cause when family members suffer from flu-like symptoms that don't disappear but improve when they leave home for extended periods of time.

How can I avoid CO poisoning?

The most important steps are preventive ones. Have a qualified service professional inspect your fuel-burning appliances at least once a year. Install UL Listed CO alarms outside of sleeping areas and near all fuel-burning appliances.

Other precautions include:

- avoid using charcoal grills inside the home, tent or camper, or in an unventilated garage;
- don't allow vehicle exhaust fumes to enter the home; and
- make sure all fuel-burning appliances are properly ventilated.

What should I look for when I buy a CO alarm?

Rather than looking for specific features, look for the UL Mark with the adjacent phrase "Single Station Carbon Monoxide Alarm."

UL Listed CO alarms are designed to detect elevated levels of CO and sound an alarm to alert you and your family of a potential poisoning risk. Although CO indicator cards and other devices on the market are also intended to detect elevated levels of CO, most aren't designed with an audible alarm. The presence of an audible alarm may be significant -- especially while you and your loved ones sleep.

UL Listed CO alarms are required to have manually operated alarm reset/silence button that will allow you to silence the alarm signal. If elevated levels of CO continue to exist, the alarm will sound again in six minutes.

How can I protect my family when we're traveling? When we're working in the garage?

UL evaluates and Lists CO alarms intended for use in recreational vehicles (RVs) and areas such as garages or attics where dampness, humidity and temperatures aren't as controlled as in the living space of the home. CO alarms used in these areas comply with additional requirements designed to address the special conditions often present in these environments.

UL also evaluates CO travel alarms. These devices are equipped with a mounting bracket for temporary mounting only.

UL Listed CO alarms intended for use in these environments are marked accordingly near the UL Listing Mark.

Do CO alarms operate differently than smoke alarms?

Although they may look and sound similar, CO alarms and smoke alarms are designed and intended to detect two separate, distinct hazards. Therefore, to help protect your family from both hazards, it's important to install both UL Listed CO alarms and smoke detectors.

How do I install my CO alarm?

Follow the installation instructions found in the manufacturer's use and care booklet that accompanies the product. Proper installation is an important factor in receiving optimum performance. It's important to follow these instructions exactly.

How do I take care of my CO alarm?

Like smoke detectors, CO alarms need to be tested regularly and cleaned as indicated in the manufacturer's use and care booklet. If the unit operates off a battery, test the detector weekly and replace the battery at least once a year.

Should I follow any safety tips for using and maintaining my CO alarms?

As with any product, read the manufacturer's use and care booklet for installation and maintenance guidelines. Keep these instructions on file for future reference.

If your unit operates off the battery, never allow anyone to "borrow" the battery. Like any appliance or power tool, a CO alarm can't work unless it has a functioning power source.

Will exposure to other household gases or vapors cause the CO alarm to sound a false alarm?

When UL evaluates samples of residential CO alarms, consideration is made that your home may contain moderate levels of cleaning chemicals and other substances. UL 2034, the Standard UL engineers and technicians use to test residential carbon monoxide alarms, includes exposure tests to normal concentrations of methane, butane, heptane, ethyl acetate (nail polish remover), isopropyl alcohol (rubbing alcohol), carbon dioxide and propane -- all gases that would typically be found in a home.

You should, however, keep these chemicals away from your CO alarms. Low exposure over an extended period of time could damage the sensing device and cause your alarm to sound a false alarm.

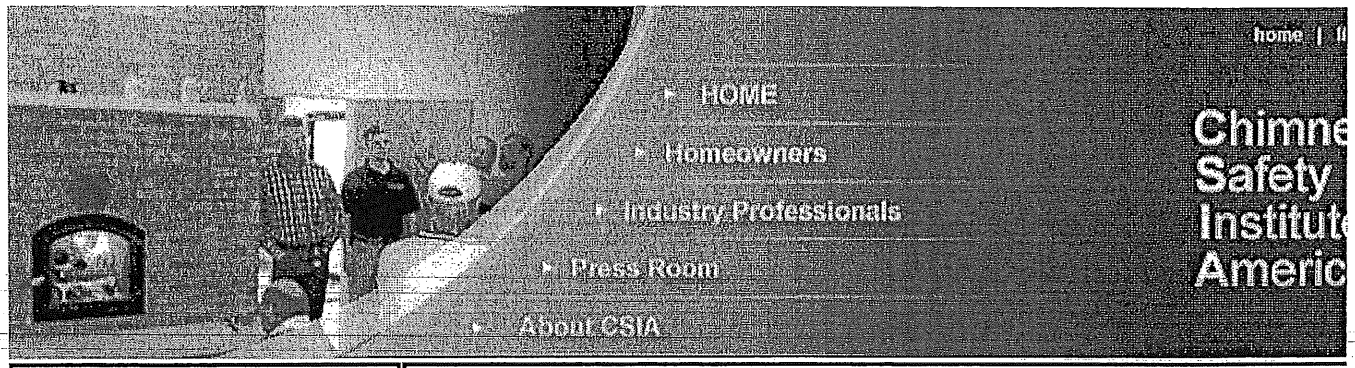
What do I do if my CO alarm sounds?

Immediately operate the reset/silence button and call your emergency services (fire department or 911).

Move to fresh air - either go outside or move to an open door or window. Check to make sure that everyone in your household is accounted for. Do not re-enter the premises nor move away from the open door or window until the emergency services have arrived, the premises have been sufficiently aired out, and your CO alarm remains in its normal condition.

If your CO alarm reactivates within a 24-hour period, operate the reset button, call you emergency services and move to fresh air. Call a qualified technician to examine and/or turn off your fuel-burning appliances or other sources of combustion. If your RV, car or truck is idling in an attached garage, turn off the engine. Although your problem may appear to be temporarily solved, it's crucial that the source of the CO is determined and appropriate repairs are made.

Remember that an alarm indicates elevated levels of CO in your home. CO is called the "silent killer" because it cannot be seen or smelled. Some people can be exposed to dangerous levels of CO and not feel any symptoms. Regardless of whether you feel symptoms, never ignore the alarm.



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- Today's Safety Tip

Do you have a smelly fireplace? Chimney Breath is most often cause by moisture and rain - or high humidity. Have your chimney cleaned early in the spring to make the humid summer days less odiforous.

- Request More Information
- Related Links

Thursd

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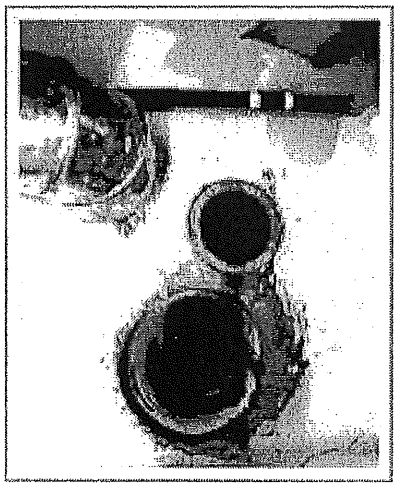
Carbon Monoxide

Consumer confidence in the convenience and safety of today's home heating usually well-placed. The oil and gas heating industries have achieved impres records. Nonetheless, according to the U.S. Consumer Product Safety Comm 200 people across the nation are known to die each year from carbon monoxi caused by problems in the venting - out of their homes - of toxic gases produc heating systems. Other estimates for total accidental CO poisioning are much Journal of the American Medical Association, (JAMA Volume 261, No.8, Febr estimates 1,600 deaths occur yearly.

In addition, around 10,000 cases of carbon monoxide-related injuries are diag year. Because the symptoms of prolonged, low-level carbon monoxide poisor symptoms of common winter ailments (headaches, nausea, dizziness, fatigue seasonal depression), many cases are not detected until permanent, subtle d brain, heart and other organs and tissues has occurred. The difficulty of diagr means the numbers of people affected may be even higher.

WHAT IS CARBON MONOXIDE?



By now we all know that carbon monoxide i dangerous, colorless, odorless gas, genera with your home heating system, but for a lit understanding, let's take a quick trip back t chemistry class. The gas or oil you burn for are compounds known as hydrocarbons (h carbon). In your furnace these hydrocarbor with oxygen from the air in your home, and produce heat.. When your furnace and chir working properly, the gas or oil is burned m completely, and the resulting fumes are ma dioxide(carbon + 2 oxygen atoms) and wat furnace doesn't get enough oxygen, either house is too tight or the chimney isn't functi carbon monoxide (carbon +1 oxygen atom) instead. It's the lack of that one little oxyger causes all the trouble.

WHAT CARBON MONOXIDE DOES TO YOU

Too much carbon monoxide in your blood will kill you. Most of us know to try t
Less well known is the fact that low-level exposure to this gas also endangers

One of the imperfections of our human bodies is that, given a choice between
monoxide and oxygen, the protein hemoglobin in our blood will always latch c
monoxide and ignore the life-giving oxygen. Because of this natural chemical
bodies - in effect - replace oxygen with carbon monoxide in our bloodstream,
or lesser levels of cell suffocation depending on the intensity and duration of e

The side-effects that can result from this low-level exposure include permane
brain damage. Infants and the elderly are more susceptible than healthy adult
with anemia or heart disease.

The symptoms of low-level carbon monoxide poisoning are so easily mistake
the common cold, flu or exhaustion that proper diagnosis can be delayed. Be
be sure to see your physician about persistent, flu-like symptoms, chronic fati
generalized depression.

CARBON MONOXIDE LEVELS AND SYMPTOMS

SYMPTOM	CARBON MONOXIDE CONCENTRATION *Percentage of Hemoglobin Carrying Carbon Monoxide*
Usually no sign	0 to 10
Headache, angina in heart patients	10 to 20
Throbbing headache, nausea, irritability, difficulty concentrating	20 to 30
Severe headache, dizziness, fatigue, confusion	30 to 40
Rapid breathing and heartbeat, fainting	40 to 50
Respiratory failure (collapse), seizures (collapse)	50 to 60
Severe respiratory failure, low blood pressure, fatal coma	60 to 70
Rapidly fatal coma	Above 70

Source: The Building Official and Code Administrator, March/April 1993; BOCA International, publish

IF YOU SUSPECT A PROBLEM

If you ever suspect a carbon monoxide problem, immediately open doors or w
ventilate the house and get everyone outside for fresh air. Most utility compar
respond to emergency calls and check your house and heating system for the
carbon monoxide. Do NOT reinhabit the house until you are certain there is n
problem. If necessary seek medical attention, treatment is very important. Ha
system and the chimney checked and serviced by reputable professionals as
possible.

WHY IS POISONING FROM CARBON MONOXIDE ON THE RISE?

1) A Todays houses are more air tight due to energy conserving measures. C
there is less fresh air coming into a home and not as many pathways for stale
to leave it. When furnaces and boilers are starved of the oxygen needed to bu
completely, carbon monoxide is produced. Many newer houses are so airtight
exhaust fans in the kitchen and bathroom can overcome the draft in the furna
and literally pull the toxic gases into the living space.

2) A The new high-efficiency gas and oil furnaces,when hooked up to existing not perform at an optimum level. The differences in performance create condi combustion byproducts to more easily enter home living spaces.

3) A The above conditions join a number of older, on-going problems includin deteriorating flue liners, soot build-up, debris clogging the passageway, and a nests obstructing chimney flues.

WHY CHIMNEY MAINTENANCE IS IMPORTANT

When gas and oil burn in vented heating systems, the dangerous fumes that products of combustion - including carbon monoxide - are released into the cl a connector pipe. Funneling these fumes out of the living area is the primary chimney. In addition to carrying off toxic gases, chimneys also create the draf that provides the proper air and fuel mixture for efficient operation of the heati Unfortunately, many chimneys in daily use in homes throughout the country e improperly sized or have conditions that make them unable to perform their in function.

GAS.

Natural gas is a clean-burning fuel, but todays high-efficiency gas furnaces pc problems. (see the pages on GAS for a more complete discussion) The fume: are cooler and contain high levels of water vapor, which cause more condens older models. Since these vapors also contain chlorides picked up from hous combustion air, the flues are subjected to more corrosive conditions than befc quickly deteriorate or plug up completely.

OIL

Oil flues need to be cleaned and inspected annually because deposits of soot on the interior walls of the chimney. The amount of soot depends on how well furnace is and whether the house provides sufficient air for combustion. Exce causes problems ranging from inefficient furnace operation to completely bloc

To the extent that problems with either of these heating systems interfere with toxic gases and particles out of the house, they may also force carbon monox home. They may cause a one-time, high-level exposure situation or release s more regularly over a longer period. These problems should never be ignorec

PREVENTING PROBLEMS

In the United States, numerous agencies and organizations now recognize th annual heating system inspection and maintenance in preventing carbon mor poisoning. The U.S. Consumer Product Safety Commission, the U.S. Environ Protection Agency, the National Fire Protection Association, the American Lu - are some of the organizations that now encourage the regular maintenance heating systems and their chimneys in order to keep "the silent killer" at bay.

A well tuned furnace or boiler, connected to a venting system or flue that is cc structurally sound, clean and free of blockages, will operate efficiently and prc

and comfortable home. Carbon monoxide detectors are now readily available
should be without at least two, one near the furnace and one near the sleepin
home. Detectors are NOT a substitute for routine maintenance, but can be a l
problems occur.

Considering the risks involved when gas or oil systems are neglected, and the
accrue when they are properly maintained, we suggest you have your furnace
yearly by a qualified technician and your chimneys checked annually by a CS
Chimney Sweep and cleaned or repaired as needed.

HOME

DRAFT

Carbon Monoxide Analyst Protocol

INTRODUCTION

The Carbon Monoxide standards and best practices outlined in this document are designed to provide a protocol for those building technicians and investigators attempting to determine whether potential exists for CO to enter a house. This may be in preventative cases, where a homeowner is concerned about the dangers of CO, or in reactive situations where CO detectors have alarmed or occupants have become ill from exposure. Many institutions and organizations, such as the medical community, utility and fire fighting groups, have CO standards for their use under specific situations. Often these standards deal only with one portion of the home, or certain pieces of equipment.

In order to enable accurate diagnosis of carbon monoxide threats, the analysts must expand their view of a house and its individual components. All of the systems of a building - HVAC, building shell, occupant behavior - as well as outdoor conditions, act in an interrelated fashion. CO Analysts must learn to look beyond specific sources of CO to determine why a problem may begin, where one never existed before. Often, it takes a number of circumstances happening concurrently in order for a hazard to occur. The CO Analyst must learn how these systems interact, what sets of circumstances may lead to CO entering a home, and a logical process for investigating all of these factors when analyzing a building for CO.

The goal of this protocol is to provide a standardized set of practices for HVAC contractors, utility personnel, fire departments, home inspectors, and the building performance industry that will, when implemented, lead to accurate diagnoses of potential or actual sources of carbon monoxide within residences. These practices will be comprehensive in nature, examining the interactions of all building systems within the home, both with each other and with external conditions. This protocol will facilitate implementing the proper treatment to alleviate potential and actual exposure to CO by occupants of buildings through accurate, thorough, initial inspections.

The Standards and Best Practices listed in this document are non-fuel specific except where noted. They form the basis of the CO Analyst Protocol. This protocol has been designed by the Carbon Monoxide Safety Awareness Advisory Council and serves as a means of defining minimum standards for the response industry. It must be realized that any government agency or business entity may choose to uphold higher standards than the protocol defines. Consistent with the Building Performance Institute's other certifications, the protocol has been arranged into a format of standards and best practices. These standards are intended to be reflective of a field-based approach to doing work. BPI defines standard in this context as - to the extent practical, the measurable goal of a set of best practices or procedures. Best practice is defined as - by common agreement an action, activity, protocol or technique that is the state of the practice. In other words, standards are what a worker needs to do and best practices are how to do it.

Job Title:

Carbon Monoxide Analyst - This individual may be self-employed or be employed by a utility, heating contractor, building department, fire department, public health department, home inspection company, equipment manufacturer/supplier or weatherization organization. Duties will include: operation and maintenance of test equipment; conducting thorough visual inspection of the building and combustion sources; ability to perform comprehensive ambient CO analyses and perform CO tests on equipment found in a typical building (vented heating appliance, domestic hot water, kitchen range/oven, unvented heating appliances). Once tests are completed, the analyst will interpret results, determine follow-up steps and perform occupant education. This job designation is designed to serve as a mean competency for responders from all sectors. It is not intended to serve as a mitigation certification. This is a first step, front line certification for those personnel who are first in the door answering a CO complaint or are responsible for inspections ascertaining CO safety.

Carbon Monoxide Analyst Test Equipment

Analysts shall have a digital CO analyzer and a draft gauge to assist CO investigations. Differential pressure manometers, blower doors and duct blasters are also useful in conducting these investigations but are not required for personnel working at the CO Analyst level.

Standard - CO Testing Instruments

- Carbon Monoxide test instruments must meet the following minimum requirements.
- Digital display capable of measuring 1 - 2 ppm increments @ 5 - 10% accuracy (COMMENT)
- Scale to read at least up to 500 ppm.
- Reach 90% of final reading within one minute.
- Have a probe/hose assembly for flue gas sampling capable of withstanding high temperatures and the ability to remove water vapor from the combustion by-products.
- Ability for continuous sampling

Best Practices - CO Test Instruments

- CO test equipment can be affected by heat, cold, humidity, battery strength and mishandling.
- Always warm up and operate the instrument per manufacturer instructions.

Best Practices -Calibration of CO Testing Equipment

- Instruments must be calibrated per manufacturer instructions or when accuracy is in doubt.
- Field zeroing of the instrument should only be done with test gases as described in the owner's manual.
- Factory or other certified calibration must be performed at recommended intervals. Do not re-zero instruments for individual houses.
- Re-zeroing an instrument without test gases may result in readings that are not absolute or accurate.
- Zeroing of instruments should never be attempted on a job. Temperature, battery level, truck exhaust and other factors can affect zeroing.
- A constant need to zero indicates an instrument or operator error.
- Zeroing an instrument in the field eliminates reading the true ambient level.

Carbon Monoxide Action Levels

Standard for Action Levels
The following action levels have been defined as minimums for BPI certified Carbon Monoxide Analysts. Analysts may work for a government agency or business entity that has adopted more stringent standards than the ones defined in this document. As such, CO Analysts may enforce those higher standards. Under no circumstances shall a BPI certified CO Analyst recognize less stringent standards or ignore conditions in excess of the defined action levels. The action levels are considered net indoor ambient readings - i.e. - indoor ambient minus outdoor ambient readings.

0 to 9 parts per million (ppm)
Normal - No Action: Typical from: outdoor sources, fumes from attached garages, heavy smoking, fireplace spillage and operation of unvented combustion appliances. With ambient conditions in this range, analysts may continue testing sequences.

10 to 35 parts per million (ppm)
Marginal: This level could become problematic in some situations. Actions: Occupants should be advised of a potential health hazard to small children, elderly people and persons suffering from respiratory or heart problems. If the home has an attached garage, document CO levels in garage. Accept this level as normal for unvented appliances but not for vented appliances. If unvented appliances are in operation, recommend additional ventilation in the areas of operation. With ambient conditions in this range, analysts may continue testing to locate the CO source.

36 to 99 parts per million (ppm)
Excessive: Medical Alert. Conditions must be mitigated. Actions: Ask occupants to step outside and query about health symptoms. Advise occupants to seek medical attention. If occupants exhibit any symptoms of CO poisoning, have someone drive them to a medical facility. Enter the building, open doors and windows to ventilate the structure. Turn off all combustion appliances until the CO level has been reduced to safe levels. If forced air equipment is available, continuos operation of the air handler is recommended at this time. If the home has an attached garage, document CO levels in garage. Test combustion appliances one at a time to determine the source of CO production. If an appliance is determined to be the source of CO production, it should be shut off and not used until a qualified technician with proper test equipment can service it.

100 - 200 parts per million (ppm)
Dangerous: Medical Alert. Emergency conditions exist. Actions: Evacuate the building immediately and check occupants for health symptoms. Advise all occupants to seek medical attention. Occupants should have someone else drive them to a medical facility. If occupants exhibit symptoms of CO poisoning, emergency service personnel must be called. Evacuation is important, but Analysts must not subject themselves to excessive conditions. Maximum exposure time is 15 minutes. Open all doors and windows that can be done quickly. If the home has an attached garage, document CO levels in garage. Disable combustion appliance operation. Continually monitor indoor ambient levels while moving through the building. Once the atmosphere within the structure has returned to safe levels and the appliances have been turned back on, locate the source of CO production for corrective measures.

Greater than 200 parts per million (ppm)
Dangerous: Medical Alert. Emergency conditions exist. Actions: Evacuate the building immediately and check occupants for health symptoms. Advise all occupants to seek medical

attention. Occupants should have someone else drive them to medical facility. If occupants exhibit symptoms of CO poisoning, emergency service personnel must be called. Evacuation is important, but analysts must not subject themselves to these conditions. Do not stay inside or re-enter the building until conditions have dropped below 100 ppm. Open all doors and windows that can be done quickly without entering the structure. Call the local utility to shut off gas supply (if applicable and necessary). If the home has an attached garage, document CO levels in garage if possible to do so without being subjected to high levels of CO. Once the atmosphere within the structure has returned to safe levels, restore fuel supply to appliances. Operate and test the appliances one at a time to determine the source of CO production.

Classification of CO Analyses

Standard - Classification of CO Analyses
Inspections conducted by BPI certified CO Analysts must be classified either routine or priority. This will be determined by conditions prompting the request for a CO inspection. For CO Analyses conducted as a part of heating system maintenance, these analyses shall be considered routine unless the customer exhibits or complains of CO symptoms. Classification of CO inspections resulting from a customer request will be determined by information provided by the customer at the time of initial contact, preferably over the phone. This is done to ensure an adequate response in situations where a customer's health may be endangered. Conduct a short interview to adequately determine the prioritization of the CO inspection request.

Best Practices - CO Inspection Classification

- All customers reporting they or someone in the home may have symptoms of CO poisoning will be treated as a priority.
- Customers requesting a routine safety inspection shall be queried for manifestations of CO poisoning symptoms. The call must be treated as a priority if the caller reports symptoms, otherwise it may be classified as a routine inspection.
- Customers requesting an inspection due to a CO detector alarm will be classified as a priority.
- Anytime a customer reports evidence of potential CO poisoning symptoms, advise them to vacate the premises and wait outside or next door for the inspector.
- Any requests receiving priority status must be immediately responded to. If immediate response is not possible, notify another certified analyst or contact utility/emergency response personnel.
- Requests classified as routine may be scheduled accordingly.

CO Inspection Protocol

Standard CO Inspection
A comprehensive protocol will be adhered to by BPI certified CO Analysts. This protocol includes: Ambient CO Level Testing, Client Interview, Building Inspection, Equipment Testing, Detector Utilization and Customer Education.

Standard - CO Testing, Ambient Levels
Accepted CO protocol should be followed, upon request of testing, whenever CO contamination is suspected, and when combustion appliances are serviced. Ambient levels will be tested before and after any work is done. All readings will be recorded. Ambient tests must be performed prior to conducting the client interview and/or inspections of the dwelling.

Best Practices - Measuring Ambient CO Levels

- Ensure your instrument has been "warmed up" per manufacturer instructions.
- Measure actual outdoor ambient CO away from any potential source; auto, sidewall vented appliances, etc.
- Record outdoor reading as a baseline reference point.
- Proceed into the building entrance for an initial indoor CO ambient reading.
- Subtract outdoor reading from any indoor reading to determine the magnitude of any CO problem found within the home.
- Record the results found at the entrance, just inside the building.
- Determine if atmosphere is safe for continued testing. See action levels.
- If action levels dictate a response follow Standard for Action Levels. If conditions are deemed safe, proceed with customer interview.

Standard - Occupant Interview

An interview with the building occupant(s) is an essential component of all CO testing. The occupants may describe when they have problems and/or what they think might be causing it. A history of health symptoms and possible CO occurrences may help to pinpoint any potential problems. CO Analysts shall conduct an occupant interview as a part of every inspection.

Best Practices - Client Interview

- Perform interview in an area safe from CO exposure.
- Inquire about health problems.
- Question occupants to see if they have experienced any specific CO poisoning symptoms including: headaches, dizziness, nausea, confusion, rapid breathing, fatigue, unconsciousness, disorientation, or flue like symptoms.
- Ask if anyone else in the home has shown signs of experiencing these symptoms.
- If anyone appears to be experiencing symptoms, refer them to medical evaluation (see action levels).
- Ask about unusual moisture problems.
- Ask about recent mechanical problems.
- Ask if a vehicle has been in or out of the garage recently (if applicable).
- Ask if oven or range was in use. Ask if the fireplace was in use (if applicable).
- Ask if occupants were doing laundry or vent fans were in use.
- Repeat customer health inquiries if a serious CO problem is found and the occupants have not acknowledged any symptoms previously.
- Reference action levels.

Standard - Building Inspection

A walk through inspection of the structure is necessary to ensure no potential source of CO production is missed. Utilize a standardized recording form to ensure no potential source is missed and document all findings for future reference.

Best Practices - CO Recording Form

Use a standardized CO recording form when performing a CO inspection. Include:

- Company, technician, date and time of testing.
- Client and physical location.
- Interview information including health symptoms.
- Smokers in the structure.
- Is this an emergency situation or routine procedure - inspection classification.
- Listing of normal CO sources to be inspected and results from testing those sources.
- Location of all Combustion Appliance Zones.

- Mechanical and passive ventilation within the structure.
- Type of fuels in use.
- Location and numbers of smoke and CO detectors.
- Make, model numbers and type of detectors.
- Attached or detached garage.
- Potential exterior sources of CO production.
- Type, model and serial numbers of combustion appliances.
- Vent system condition for each appliance (if vented).
- Weather conditions of the day.
- Action taken.
- Follow-up

Best Practices - Building Walk Through Inspection

- Record all testing information.
- Continually test for ambient CO levels while inspecting each zone.
- Note any CO readings in attached garages.
- Inspect for and record any CO sources near exterior of house (busy street, grills, go-carts, shop with gasoline, power equipment, etc.)
- Identify and inspect each Combustion Appliance Zone (CAZ) within the building recording number and type of combustion appliances.
- Inspect for and record in each CAZ: the number, type and location of exhaust appliances (bathroom vent fans, kitchen range hoods, dryers, exhausting cook tops).

Best Practices - Combustion Appliance Zone (CAZ)

- Specific attention must be paid to CAZ's as these are likely sources of CO production.
- Identify and record location of all CAZ's. Include vented appliances and unvented appliances.
- Inspect venting systems. Note corrosion and flue gas spillage. Inspect flue pipe and where it joins chimney for leakage.
- Questions concerning venting can be checked against manufacturer literature or the following codes: NFPA 211 (solid fuel); NFPA 31 (oil); or NFPA 54 (gas).

Standard - Appliance Testing

All combustion appliances will be tested individually for CO production. If operation of any appliance raises ambient CO concentrations in the dwelling above 35 ppm, the appliance must not be operated by the homeowner until the cause is corrected.

Best Practices - House Preparation

Prior to testing combustion appliances, the house must be set to winter mode.

- Windows closed.
- Exterior doors closed.
- Close equipment room doors.
- Turn off all combustion appliances.

Best Practices - General Procedure for Appliance Testing

- Test vented combustion appliances first.
- Test unvented appliances only after completing vented appliance tests.
- Test common vented appliances individually beginning with the smaller appliance.
- If both appliances pass then test while both are firing.
- Test ambient air in the combustion appliance zone before testing combustion gases.
- Always monitor ambient CO levels to ensure health and safety.

- When ambient levels (space levels) within the CAZ are:
  - ***0 - 9 ppm*** Okay to test.
  - ***10 - 35 ppm*** Proceed with testing but carefully monitor ambient.
  - ***36 - 99 ppm*** Turn appliance off and ventilate area. When ambient CO levels are reduced to safe levels, operate one appliance at a time until source is located. Disable the defective appliance until it can be repaired.
  - ***Greater than 100 ppm*** Stop testing, shut down the appliance(s), ventilate the area and exit the building. When ambient CO levels are reduced to safe levels, operate one appliance at a time until source is located. Disable the defective appliance until it can be repaired.
- Perform draft tests for all vented combustion appliances creating worst case conditions.
- Once each combustion appliance has been tested individually for CO, retest the appliances while all are in operation.

Best Practices - Furnace CO Testing

- Test oil fired furnaces in the vent connector before the barometric damper.
- Test low efficiency propane and natural gas furnaces (<80%) at the outlet of each heat exchanger section before the draft diverter or collector box, and before any dilution air. Treat drum type heat exchangers as one cell.
- Test mid (80%) and high (90%) efficiency propane and natural gas furnaces in the vent connector after the draft inducer. Drill a hole in the vent pipe 12" to 18" above the outlet thimble. This hole must be sealed after testing is complete.
- CO readings should peak, drop, then stabilize within 5 minutes. If CO readings continue to climb for more than five minutes the condition must be considered unsafe and corrected - even if CO levels are still below 100 ppm.
- If highest single CO readings are:
  - ***0 - 99 ppm*** conditions are acceptable.
  - ***100 - 200 ppm*** at any location, the condition must be considered unsafe and the problem corrected. The unit may be operated minimally if no spillage of flue gas is detected.
  - ***200 - 400 ppm*** at any location, the condition must be considered unsafe and the problem corrected immediately. The unit may be operated minimally if no spillage of flue gas is detected.
  - ***Greater than 400 ppm*** Conditions are considered unsafe. The appliance must be disabled and not run (even if no CO is detected in the ambient space) until the condition is corrected.
- Readings in all cells of the heat exchanger should be taken several times over a five minute period to verify stability.
- After the initial CO test on the furnace, any additional appliances venting air from the structure should be turned on one at a time to see if they affect operation. Continuous readings on the furnace should show no change in CO readings. Do not perform this stress test on units producing CO greater than 200 ppm, however conduct draft test.
- During this test , perform a draft test on the furnace. Draft gauge probe should be inserted above the draft hood or diverter. Normal draft is between .01" and .02" W.C.
- Any draft below .01"WC is a potential draft problem.
- Additional doors should be opened or closed at this time to see if their position has any affect on draft.
- Any reduction in draft when other appliances are turned on indicates a problem even if no carbon monoxide is measured. Undersized flue pipe, restricted chimney or negative pressure in the CAZ is indicated.
- Any vented appliance spilling CO should be not be operated until the problem is corrected.

- Visual signs of rust and black or white soot on the appliance cabinet or inside the vestibule may indicate unsafe operation even if no elevated CO readings are found in the CO testing sequence.

Best Practices - Furnace Burner Light-off and Peak Test (Propane and Natural Gas only)

- A light-off test should be taken after one cycle at the farthest burner from the pilot.
- CO readings that peak above 400 ppm at this point can indicate pilot, igniter, or burner problems.
- Fire the unit, observe for peak CO.
- When the appliance shuts off from the light off test, testing should continue in one heat exchanger cell for a period of 60 seconds.
- Increase of CO readings following shut down may indicate a leaky fuel valve or pump.

Best Practices - Boiler CO Testing

- Test oil fired boilers in the vent connector before the barometric damper.
- Test low efficiency propane and natural gas boilers (<80%) at the outlet of each heat exchanger section before the draft diverter or collector box, and before any dilution air.
- Test mid (80%) and high (90%) efficiency propane and natural gas boilers in the vent connector after the draft inducer. Drill a hole in the vent pipe 12" to 18" above the outlet thimble. This hole must be sealed after testing is complete.
- CO readings should peak, drop, then stabilize within 5 minutes. If CO readings continue to climb for more than five minutes the condition must be considered unsafe and corrected - even if CO levels are still below 100 ppm.
- If highest single CO readings are:
  - ***0 - 99 ppm*** conditions are acceptable
  - ***100 - 200 ppm*** at any location, the condition must be considered unsafe and the problem corrected. The unit may be operated minimally if no spillage of flue gas is detected.
  - ***200 - 400 ppm*** at any location, the condition must be considered unsafe and the problem corrected immediately. The unit may be operated minimally if no spillage of flue gas is detected.
  - ***Greater than 400 ppm*** Conditions are considered unsafe. The appliance must be disabled and not run (even if no CO is detected in the ambient space) until the condition is corrected.
- Readings in all cells of the heat exchanger should be taken several times over a five minute period to verify stability.
- After the initial CO test on the furnace, any additional appliances venting air from the structure should be turned on one at a time to see if they affect operation. Continuous readings on the furnace should show no change in CO readings. Do not perform this stress test on units producing CO greater than 200 ppm, however conduct draft test.
- During this test , perform a draft test on the furnace. Draft gauge probe should be inserted above the draft hood or diverter. Normal draft is between .01" and .02" W.C.
- Any draft below .01"WC is a potential draft problem.
- Additional doors should be opened or closed at this time to see if their position has any affect on draft.
- Any reduction in draft when other appliances are turned on indicates a problem even if no carbon monoxide is measured. Undersized flue pipe, restricted chimney or negative pressure in the CAZ is indicated.
- Any vented appliance spilling CO should be not be operated until the problem is corrected.
- Visual signs of rust and black or white soot on the appliance cabinet or inside the vestibule may indicate unsafe operation even if no elevated CO readings are found in the CO testing

sequence.

Best Practices - Boiler Burner Light-off and Peak Test (Propane and Natural Gas only)

- A light-off test should be taken after one cycle at the farthest burner from the pilot.
- CO readings that peak above 400 ppm at this point can indicate pilot, igniter, or burner problems.
- Fire the unit, observe for peak CO.
- When the appliance shuts off from the light off test, testing should continue in one heat exchanger cell for a period of 60 seconds.
- Increase of CO readings following shut down may indicate a leaky fuel valve or pump.

Best Practices - Domestic Hot Water Tank CO Testing

- Initially test DHW tank with no other appliances or exhaust operating.
- Test Oil fired DHW tanks in the flue before the barometric damper.
- Test Propane or Gas fired tanks in the fire tube on both sides of the baffle.
- CO readings should peak, drop, then stabilize within 5 minutes. If CO readings continue to climb for more than five minutes the condition must be considered unsafe and corrected - even if CO levels are still below 100 ppm.
- If highest single CO readings are:
  - ***0 - 99 ppm*** conditions are acceptable
  - ***100 - 200 ppm*** at any location, the condition must be considered unsafe and the problem corrected. The unit may be operated minimally if no spillage of flue gas is detected.
  - ***200 - 400 ppm*** at any location, the condition must be considered unsafe and the problem corrected immediately. The unit may be operated minimally if no spillage of flue gas is detected.
  - ***Greater than 400 ppm*** Conditions are considered unsafe. The appliance must be disabled and not run (even if no CO is detected in the ambient space) until the condition is corrected.
- Readings in all cells of the heat exchanger should be taken several times over a five minute period to verify stability.
- After the initial CO test, any additional appliances venting air from the structure should be turned on one at a time to see if they affect operation. Continuous readings should show no change in CO readings. Do not perform this stress test on units producing CO greater than 200 ppm, however conduct draft test.
- During this test , perform a draft test. Draft gauge probe should be inserted above the draft hood or diverter. Normal draft is between .01" and .02" W.C.
- Any draft below .01"WC is a potential draft problem.
- Additional doors should be opened or closed at this time to see if their position has any affect on draft.
- Any reduction in draft when other appliances are turned on indicates a problem even if no carbon monoxide is measured. Undersized flue pipe, restricted chimney or negative pressure in the CAZ is indicated.
- Any vented appliance spilling CO should be not be operated until the problem is corrected.
- Visual signs of rust and black or white soot on the appliance cabinet or inside the vestibule may indicate unsafe operation even if no elevated CO readings are found in the CO testing sequence.

Best Practices - Other Vented Appliances

- Types of appliances such as Space Heaters, Gas Dryers, Gas Fireplaces, Vented Ovens/Ranges.

- These units must be properly vented in accordance with applicable codes.
- Repeat steps from Furnace CO Test Best Practices.

Best Practices - Unvented Appliances - Space Heaters, Gas Fireplaces +

- Should be tested after vented appliance testing is completed.
- Do not leave the CAZ while testing is in progress.
- Test unvented appliances 6 inches above the flame, or insert the instrument probe into the vent sleeve before dilution air has an opportunity to be mixed in with flue gases.
- ***Less than 50 ppm*** after 2 - 3 minutes of operation - OK
- ***50 - 99 ppm*** after 2 - 3 minutes of operation - Marginal. Have the appliance serviced
- ***Greater than 100 ppm*** after 2 - 3 minutes - Unsafe. The appliance should not be used until repaired.

Best Practices - Ranges and Ovens

Ovens

- Should be tested after vented appliance testing is completed.
- Do not leave the CAZ while testing is in progress.
- For oven tests, remove any items stored in the oven before proceeding.
- Remove foil coverings from broil areas.
- Make sure that self-cleaning features are not activated. This may produce excessive levels of CO.
- Test ovens by inserting the instrument probe into the vent sleeve before dilution air mixes with combustion by-products.
- Continually test ovens during warm up and record peak. (10 minutes)
- CO levels greater than 400 ppm during warm up or levels that stay high for several minutes before decreasing indicate potential problems and should be serviced or replaced.
- For units with separate broiler burner, repeat test.
- Continually monitor ambient space around oven during testing.
- Note: Electric ovens with excessive buildup or in self cleaning mode may produce carbon monoxide.

Range Top

- Test after vented appliance testing is completed.
- Do not leave the CAZ while testing is in progress.
- Remove all pots and foil from the burner area.
- Turn all range top burners on high and allow to warm.
- Test 6" above the flame without pots or test fixtures.
- When an unvented stove/range is found in a building, stress the need for a strategy to vent pollutants to the outdoor atmosphere.
- ***Less than 50 ppm*** after 2 - 3 minutes of operation - OK
- ***50 - 99 ppm*** after 2 - 3 minutes of operation - Marginal. Have the appliance serviced
- ***Greater than 100 ppm*** after 2 - 3 minutes - Unsafe. The appliance should not be used until repaired.

Best Practices - Wood Burning Appliances

- Wood appliances always produce high levels of CO during operation. No flue gas spillage must occur.
- Continually test ambient CO levels with normal household appliances operating; exhaust vents, air handler blower on, heating appliance operating, clothes dryer, etc.
- Perform a draft test on the wood flue for vented appliances if they are in operation.
- Ensure no spillage occurs from fireplaces through the operation furnace blowers, range

vents dryers and exhaust fans.
- Note proximity of furnace cold air returns to fireplace.
- Test fireplaces for CO above hearth near the wall. This is an ideal spot for CO detector.

Standard - Retest Ambient
After completion of appliance CO testing, ambient CO tests in all zones should be re-tested to ensure no change in CO from initial tests.

Standard - CO Detectors
Upon completion of a CO analysis, check all CO detectors in the home to ensure proper maintenance and operation. Analysts should recommend CO detector installation near bedrooms and in all CAZ's. Detectors that provide warnings between 35 - 99 ppm are recommended - especially if small children, elderly or persons with health problems occupy the building. Detectors that maintain operation during power outages (battery powered or battery back-up) provide additional safety. Detectors should have the capability of being mounted at eye level or higher. Digital detectors can provide the earliest warning, but only when visually observed. Detectors should meet current standards, UL2034 or IAS 6-96 (subject to change). Installing one battery detector near sleeping areas and one digital detector in living areas where it can be easily observed is an excellent protection strategy.

Best Practices - CO Detectors
- Follow detector manufacturer's recommendations for installation and maintenance.
- If only one detector is installed, it should be located near the bedrooms, mounted high in an area of good airflow.
- Install CO detectors in all combustion appliance zones (CAZs)
- Areas containing unvented combustion appliances and those with wood burning stoves or fireplaces should have a digital CO detector.

Standard - Client Education
CO Analysts shall work with the occupants requesting the analysis to inform them about: the test results on their house, potential sources of CO in homes, causes of CO production, how to minimize risk of CO poisoning, proper maintenance of HVAC equipment and detector placement/maintenance.

Best Practices - Client Education
- Thoroughly review the results of the CO analysis with the customer. Explain to them you are going to discuss sources of CO, causes for its production and then develop a protection strategy for their home.
- Discuss with the customer all potential sources of CO production. Include the following: outside sources such as roads; automobiles in attached garages; other gasoline powered equipment such as generators; indoor combustion appliances such as heating systems, DHW heaters, kitchen ranges; gas or wood fired fireplaces; self cleaning ovens; and unvented space heaters.
- Inform the occupants about the causes of CO production. Include: normal by-product from internal combustion engines, incomplete combustion, insufficient air, lack of maintenance, improper equipment set-up and impingement restricting the combustion process.
- Discuss strategies to minimize risk of CO build-up in the home. Include: never warming up car in garage, providing ventilation where fireplaces/unvented space heaters are in use, vent use for kitchen range and annual servicing of combustion appliances by trained professionals knowledgeable in the use of CO testing equipment.
- Develop in conjunction with the customer a protection strategy for their home which shall

include: maintenance schedules for appliances including occupant performed tasks such as filter changing, adequate CO detector coverage and maintenance of detectors, operation of ventilation systems, and use/operation of fireplaces/unvented space heaters.

DRAFT

HOME

Carbon Monoxide Mandates

by Sherry Munyon, Capitol Hill Associates, Inc.

2005

STATE INITATIVES

STATE *(and authors)*	**Status** *(passed, failed, pending)*	**Introduction & Bill No.**	**Supporters**	**Opponents**	**Other** (Information attached)
Alaska *Rep. Gatto* *Rep. Gruenberg*	**Passed**	**HB 351** 1/12/04			See complete Bill in the 23rd Legislative session of Alaska
Georgia *Sen. Butler et al.*	Pending (Introduced in Senate and referred to Regulated Industries)	**SB 21** 1/24/05			Did not pass out of committee this session, but still open to pass next year. Bill to provide that after July 1, 2005, each new dwelling or dwelling unit shall be equipped with a carbon monoxide detector or alarm; to provide for standards; to provide for enforcement; to provide a penalty; to provide for other related matters; to repeal conflicting laws; and for other purposes.
Illinois *Rep. Borror*	Pending (first reading and referred) Passed in Senate 3/1/05	**SB 142**			The bill is still waiting to be heard in Commerce, Economic Development and Small Business. Requires the installation and maintenance of a carbon monoxide detection device in certain dwellings after December 31, 2005. Makes it a Class D infraction to: (1) fail to install, repair, or replace a device; or (2) remove or tamper with a device or its battery. Provides that a person other than a manufacturer who installs a device is immune from civil liability for claims that the device is defective

Iowa *King (c)* *Lamberti* *Kibbie*	Died 3/18/01 (no bills introduced in 2005)	**SSB1191** 3/11/01			Iowa Department of Public Health (IDPH) has drafted CO alarm legislation Introduced. Iowa Department of Public Health pre-file that would require installation of CO detectors in rental properties. Other provisions.
Massachusetts *Rep Hynes* *Rep. Falzone* *Rep Falzone*		**HF 1952** 1/26/05 **HF 1893** 1/26/05 **HF 1892** 1/26/05			Required the installation of carbon monoxide detectors in certain multi-family residential buildings. Requires carbon monoxide detectors in certain residential buildings. Requires carbon monoxide detectors in residential buildings upon sale or transfer.
Michigan	Died				Declaration of CO safety and awareness week
Minnesota *Rep. McNamara; Lillie* *Sen. Pariseau; Scheid; Ruud; Michel* *Sen. Limmer, Metzen, Kleis, Krammer, Solon*	Pending Pending Died	**HF 1337** **SF 1003** *2/24/05* **SF245** **Introduced in 1996**			Requiring carbon monoxide alarms in all dwellings; effective January 1, 2007, for all newly constructed single family and multifamily dwelling units and August 1, 2008, for all existing and newly constructed single family and multifamily dwelling units. Required CO detectors in all new houses, apartments and lodging buildings and hotels; or significant remodeling of existing buildings after August 1, 1996

New Jersey *Rep. Munoz* *Sen. Bucco* *Sen. Girgenti*	**Passed** Pending (read and sent to first committee) Pending (read and sent to first committee)	**N.J.S. 27D-133.3** and 133.4 2/8/1999 **A2861** 5/17/04 In committee **S399** 1/13/04		Former Governor Whitman	Current law requires the installation of carbon monoxide detectors in all newly constructed and existing multi-family structures, hotels, and boarding homes **A2861** Requires contract for sale of real property to include requirement for inspection of smoke and carbon monoxide detectors located on property. **S399** Exempts from sales and use tax sales of carbon monoxide detectors and any device or equipment sold for residential use to detect, warn of, abate, or extinguish fires.
New York *Morelle* *Mclaughlin* *Morahan* *Lavalle*	**Passed**	**SB 475/ AB 2424** 7/30/02 **A02123 / S03704** 1/24/05 / 3/29/05 **A02947 / S03059** 1/31/05 / 3/4/05 **A03403 / S00983** 2/2/05 / 1/21/05 **S00243** 1/11/05 **S02659** 2/24/05	SB 475/AD 2424 National Electrical Manufacturers Assoc. (NEMA),U.S. Consumer Product Safety Commission (CPSC) and the National Fire Protection Association (NFPA)		SB 475/AD 2424 legislation requiring the installation and maintenance of carbon monoxide detectors in all new residential construction in the state and in those offered for sale. **A02123 / S03704** Requires the installation of carbon monoxide detectors in certain dwellings **A02947 / S03059** Requires the installation of carbon monoxide detectors in certain multiple dwellings **A03403 / S00983** Requires the installation of carbon monoxide detectors in school buildings **S00243** Exempts the sale of fire extinguishers, smoke detectors and carbon monoxide detectors from sales and use taxes **S02659** Requires public housing authorities to install a functioning carbon monoxide detector in each of its tenant dwelling units

North Carolina		**NCGS Stat 143.138(a)**			Legal opinion of Attorney General stated application would be limited to retrofit existing building, but could not legally apply to new construction.
Ohio	Died	**SB269**			Applied to schools
Rhode Island *Sen. Celona*	**Passed**	**S-2078** Mandated 1/1/02 (SB2135 died)			Require that carbon monoxide detectors be installed in all buildings hereinafter constructed or converted for residential occupancy as well as existing residential dwellings prior to the transfer or sale of such property
Tennessee	Dead	**HF2282** **SB2639**			
West Virginia *Sen. Ball*	**Passed**	Tyler's Bill			requires carbon monoxide detectors in any new building with a fuel-burning source
Vermont *Rep. Pugh*	Pending	**HB.0243 / S.0101** 2/24/05			Requiring the installation of carbon monoxide detectors in housing

LOCAL GOVERNMENT INITIATIVES

	Status *(passed, failed, pending)*	**Date Introduced and Bill Number**	**Supporters**	**Opponents**	**Other**
Baltimore, **Maryland**	Passed				
Bel Air, **Texas**	Passed				

Berkeley, **California**	Passed	12-8-1999			City Council poised to make CO detectors mandatory in newly constructed apartment buildings
Binghamton, **New Jersey**	Passed before State Mandated	Ordinance # **1225.2**			
Chicago, **Illinois**	Passed	Effective 10/1/94			
Des Moines, **Iowa**	Passed				
Frankfurt, **Illinois**	Passed				
Greensburg, **New York**	Passed before State Mandate				
Lakewood, **Ohio**	Passed	**Chapter 1331** Effective Sept.,1997			
Lincolnwood, **Illinois**	Passed				
Olympia, **Washington** *Anjela Foster*	Failed				Decided efforts on education rather than legislation
Pontiac, **Michigan**	Passed Feb/Mar 2004			Detroit Metro Apartment Association concerned	Retrofit all rental units with hardwired co and smoke detector
St. Louis, **Missouri**	Passed				
Village of South Orange, **New Jersey**	Passed before State Mandated				
Woodbury, **New Jersey**	Passed before State Mandate	**Ordinance #1957-03**			Carbon Monoxide ordinance

Brown Deer, **Wisconsin**	Passed	Effective 1/1/02			All one and two family residences must comply
New York City **New York**	Passed	10/20/05			The new law (Local Law 7 of 2004) requires at least one carbon monoxide detecting device within 15 feet of sleeping rooms. Owners will be responsible for installing approved devices, while occupants would keep and maintain the devices in good repair. Owners would also be entitled to a reimbursement of $25 per device from tenants.
Wilmington, **Delaware**	Passed	11/15/02			Requires carbon monoxide detectors in every home, provides for fines
Orangeville	Passed	1/8/96			Requires the installation and maintenance of detectors, provides penalties.
Rockland County **New York**	Passed	1/1/04			Requires all dwellings contain carbon monoxide detectors.
Westerly, **Rhode Island**	Passed	1/1/02			Requires the installation and maintenance of detectors, provides penalties.

.NATIONAL AND INTERNATIONAL INITIATIVES

	Status *(passed, failed, pending)*	**Date Introduced and Bill Number**	**Supporters**	**Opponents**	**Other**
Congress	2002 three proposals were introduced	H.R. 3303, H.R. 3377, H.R. 3385			

	And all failed				
Toronto, Canada	**Passed**	Effective 11/1/98			$2,000-$10,000 fine

SUMMARY

Several States have mandated use of carbon monoxide detectors

Alaska
New Jersey
New York
North Carolina
Rhode Island
West Virginia

Some States introduced Legislation mandating carbon monoxide detectors that have not become law.

Minnesota (1996)	*Tennessee*	*Massachusetts*
Iowa	*Ohio*	*Illinois*
Georgia	*Michigan*	

Several local units of Government have mandated use of carbon monoxide detectors, including:

Albany, NY	Kingston, NY
Baltimore, MD	Lakewood, OH
Bel Air, TX	Lincolnwood, IL
Brown Deer, WI	St. Louis, MO
Des Moines, IA	Village of South Orange, NJ
Frankfurt, IL	Woodbury, NJ
Greenburg, NY	

ROCHESTER

Minnesota

August 9, 2004

Senator Patricia Pariseau
117 State Office Building
St Paul MN 55155

Dear Senator Pariseau:

The Mayor and City Council of Rochester, Minnesota are supportive of your efforts to amend the Minnesota State Building Code to require carbon monoxide alarms in newly constructed dwelling units and in dwelling units offered for sale.

It is estimated that 2000 people die each year in the U.S. from carbon monoxide poisoning. Minnesota has a long heating season and has a significant potential for carbon monoxide poisoning.

Sincerely,

Ardell F. Brede, Mayor
City of Rochester

John Hunziker
Council President

Dennis Hanson
Council Member

Marcia Marcoux
Council Member

Jean McConnell
Council Member

Walter Stobaugh
Council Member
Absent

Robert Nowicki
Council Member

Sandra Means
Council Member

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Questions and Answers about Carbon Monoxide (CO) and CO Alarms

Underwriters Laboratories Inc.®

Carbon Monoxide alarms

Working for a safer world

Portrait of a Killer

What is carbon monoxide?

Carbon monoxide, known by the chemical formula, "CO" is a poisonous gas that kills more than 250 people in the United States alone every year. You can't hear, taste, see or smell it. It's nicknamed the "silent killer" because it sneaks up on its victims and can take lives without warning.

What are the sources of CO?

CO is a by-product of incomplete combustion. CO sources can include malfunctioning appliances – including furnaces, stoves, ovens and water heaters – that operate by burning fossil fuels such as natural or liquefied petroleum (LP) gas, oil, wood or coal. When malfunctioning appliances aren't adequately ventilated, the amount of CO in the air may rise to a level that can cause illness or even death.

Other CO sources include vehicle exhaust, blocked chimney flues, fuel-burning cooking appliances used for heating purposes, and charcoal grills used in the home, tent, camper, garage or other unventilated areas.

What are the symptoms of CO poisoning?

CO poisoning victims may initially suffer flu-like symptoms including nausea, fatigue, headaches, dizziness, confusion and breathing difficulty. Because CO poisoning often causes a victim's blood pressure to rise, the victim's skin may take on a pink or red cast.

If a person continues to inhale CO, he or she faces the risk of breathing difficulty, cardiac trauma, brain damage, coma and even death.

Avoiding CO

How can I tell if there is a risk of CO poisoning in my home?

Have your fuel-burning appliances inspected by a qualified technician at least once a year. A qualified technician should have practical knowledge of the operation, installation and proper ventilation of fossil-burning devices; carry the applicable insurance, be bonded; and be licensed to perform heating, ventilation and air conditioning (HVAC) work in your area.

Be alert to these danger signs that signal a potential CO problem:

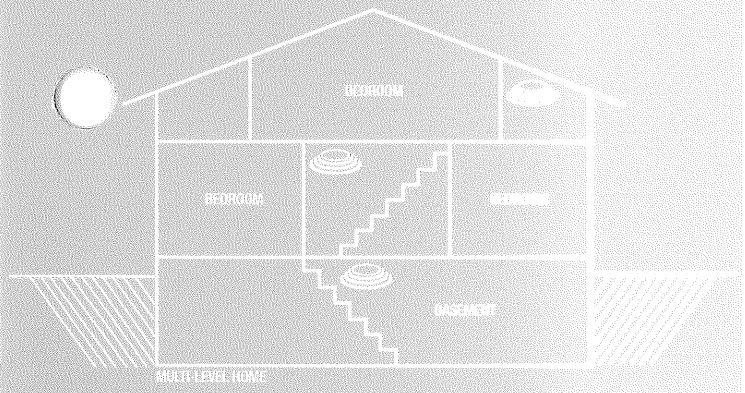
- Streaks of carbon or soot around the service door of your fuel-burning appliances;
- The absence of a draft in your chimney (indicating blockage);
- Excessive rusting on flue pipes or appliance jack
- Moisture collecting on the windows and walls of furnace rooms;
- Fallen soot from the fireplace;
- Small amounts of water leaking from the base of the chimney, and
- Rust on the portion of the vent pipe visible from outside your home.

Also, recognize that CO poisoning may be the cause when family members suffer from flu-like symptoms that don't disappear but improve when they leave home for extended periods of time.

How can I avoid CO poisoning?

The most important steps are preventive ones. Have a qualified service professional inspect your fuel-burning appliances at least once a year. Install UL Listed CO alarms outside of sleeping areas and near all fuel-burning appliances. Other precautions include:

- Avoid using charcoal grills inside the home, tent or camper, or in an unventilated garage;
- Don't allow vehicle exhaust fumes to enter the home; and
- Make sure all fuel-burning appliances are properly ventilated.



Install UL Listed CO alarms outside of sleeping areas and near all fuel-burning appliances.

CO Alarms—

Tools to alert your family

What should I look for when I buy a CO alarm?

Rather than looking for specific features, look for the UL Mark with the adjacent phrase "Single Station Carbon Monoxide Alarm."

UL Listed CO alarms are designed to detect elevated levels of CO and sound an alarm to alert you and your family of a potential poisoning risk. Although CO indicator cards and other devices on the market are also intended to detect elevated levels of CO, most aren't designed with an audible alarm. The presence of an audible alarm may be significant – especially while you and your loved ones sleep.

UL Listed CO alarms are required to have a manually operated alarm reset/silence button that will allow you to silence the alarm signal. If elevated levels of CO continue to exist, the alarm will sound again in six minutes.

How can I protect my family when we're traveling? When we're working in the garage?

UL evaluates and Lists CO alarms intended for use in recreational vehicles (RVs) and areas such as garages or attics where dampness, humidity and temperatures aren't as controlled as in the living space of the home. CO alarms used in these areas comply with the additional requirements designed to address the special conditions often present in these environments.

UL also evaluates CO travel alarms. These devices are equipped with a mounting bracket for temporary mounting only.

UL Listed CO alarms intended for use in these environments are marked accordingly near the UL Listing Mark.

Do CO alarms operate differently than smoke alarms?

Although they may look and sound similar, CO alarms and smoke alarms are designed and intended to detect two separate, distinct hazards. Therefore, to help protect your family from both hazards, it's important to install both UL Listed CO and smoke alarms.

CO Alarms–

Tools to alert your family

How do I install my CO alarm?

Follow the installation instructions found in the manufacturer's use and care booklet that accompanies the product. Proper installation is an important factor in receiving optimum performance. It's important to follow these instructions exactly.

How do I take care of my CO alarm?

Like smoke alarms, CO alarms need to be tested regularly and cleaned as indicated in the manufacturer's use and care booklet. If the unit is wired directly into your home's electrical system, you should test it monthly. If your unit operates off a battery, test the alarm weekly and replace the battery at least once a y

Should I follow any safety tips for using and maintaining my CO alarm?

As with any product, read the manufacturer's use and care booklet for installation and maintenance guidelines. Keep these instructions on file for future reference.

Read and follow the manufacturer's instructions regarding installation, use and maintenance of your CO alarms.

If your unit operates off a battery, never allow anyone to "borrow" the battery. Like any appliance or power tool, a CO alarm can't work unless it has a functioning power source.

Will exposure to other household gases or vapors cause the CO alarm to sound a false alarm?

When UL evaluates samples of residential CO alarms, consideration is made that your home may contain moderate levels of cleaning chemicals and other substances. UL 2034, the Standard UL engineers and technicians use to test residential carbon monoxide alarms, includes exposure tests to normal concentrations of methane, butane, heptane, ethyl acetate (nail polish remover), isopropyl alcohol (rubbing alcohol), carbon dioxide and propane – all gases that would typically be found in a home.

Keep chemicals away from your CO alarm.

You should, however, keep these chemicals away from your CO alarms. Low exposure over an extended period of time could damage the sensing device and cause your alarm to sound a false alarm.

CO Alarms–

Tools to Alert Your Family

What do I do if my CO alarm sounds?

Immediately operate the reset/silence button and call your emergency services (fire department or 9-1-1).

Move to fresh air – either go outside or move to an open door or window. Check to make sure that everyone in your household is accounted for. Do no re-enter the premises nor move away from the open door or window until emergency services have arrived, the premises have been sufficiently aired out, and your CO alarm remains in its normal condition.

If your CO alarms reactivates within a 24-hour period, operate the reset button, call your emergency services and move to fresh air. Call a qualified technician to examine and/or turn off your fuel-burning appliances or other sources of combustion. If your RV, car or truck is idling in an attached garage, turn off the engine. Although your problem may appear to be temporarily solved, it's crucial that the source of the CO is determined and appropriate repairs are made.

Remember, an alarm indicates elevated levels of CO in your home. CO is called the "silent killer" because it cannot be seen or smelled. Some people can be exposed to dangerous levels of CO and not feel any symptoms. Regardless of whether you feel symptoms, never ignore the alarm.