

From: [Koepke, Cynthia L - DNR](#)
To: [Leopold, Michael](#); [Jeremy Williams](#)
Cc: [Peotter, Ben](#); [Jahnel, Haley](#); [Issac A - DNR Ross \(Issac.Ross@wisconsin.gov\)](#)
Subject: RE: BRRTS 02-33-582970 Darlington Historic Landfill Vent & Monitoring Letter
Date: Thursday, November 18, 2021 9:02:00 AM
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)

Appreciate that prompt reply, Michael.

I concur with the plan and the schedule in your email below.

I'm adding 2 requirements:

1. send me a quick email in about a month to let me know where things are at. If there are problems or delays, of course let me know as soon as you can. I know the weather and supply chain issues could slow things up.
2. monitor the gas probes and check the alarms monthly for 3 months, and then send me a summary of the results with a request for what you want the monitoring schedule to be after that.

Thanks everyone, appreciate the good communication on this. Don't hesitate to contact me if you have any questions now or in the future.

Cindy Koepke

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Cindy Koepke, P.G.

Phone: **608-219-2181**

Email: cynthia.koepke@wisconsin.gov

From: Leopold, Michael <LeopoldM@AyresAssociates.com>
Sent: Tuesday, November 16, 2021 4:01 PM
To: Koepke, Cynthia L - DNR <Cynthia.Koepke@wisconsin.gov>; Jeremy Williams <jeremy.williams@cityofdarlingtonwi.org>
Cc: Peotter, Ben <PeotterB@AyresAssociates.com>; Jahnel, Haley <JahnelH@AyresAssociates.com>
Subject: RE: BRRTS 02-33-582970 Darlington Historic Landfill Vent & Monitoring Letter

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Hey Cindy,

Provided are the clarifications you requested:

1. The timeframe for the start up of the system is approximately 2-4 weeks due to the lead time of the blower, the motor still works but will be replaced in the near future soon.
2. Once the active system is started, the monitoring plan will be monthly for 2-3 months during startup of the system and then would request resumption of semi-annual monitoring once the system is operational.

Thanks,
Michael

Michael G. Leopold

Environmental Engineering Staff

Ayres Associates Inc

Office: 715.834.3161 | Direct: 715.831.7534

LeopoldM@AyresAssociates.com

www.AyresAssociates.com

From: Koepke, Cynthia L - DNR <Cynthia.Koepke@wisconsin.gov>

Sent: Tuesday, November 16, 2021 11:12 AM

To: Leopold, Michael <LeopoldM@AyresAssociates.com>; Jeremy Williams <jeremy.williams@cityofdarlingtonwi.org>

Cc: Peotter, Ben <PeotterB@AyresAssociates.com>; Jahnel, Haley <JahnelH@AyresAssociates.com>

Subject: RE: BRRTS 02-33-582970 Darlington Historic Landfill Vent & Monitoring Letter

Jeremy, thank you for getting this going so promptly.

A few questions for your team at Ayres:

1. What is your approximate timeframe for the work to convert the system and start it up?
2. Some of the language in the Methane Monitoring Program section is unclear. How often are you planning to check the gas once the active system is started?

In the future, please submit reports and plans to the [RR Program Submittal Portal | Wisconsin DNR](#) instead of to my email. That helps make sure everything gets on BRRTS in a timely manner and should get you an automatic acknowledgment of your submittal.

We are committed to service excellence.

Visit our survey at <http://dnr.wi.gov/customersurvey> to evaluate how I did.

Cindy Koepke, P.G.

Phone: **608-219-2181**

Email: cynthia.koepke@wisconsin.gov

From: Leopold, Michael <LeopoldM@AyresAssociates.com>
Sent: Friday, November 12, 2021 12:55 PM
To: Koepke, Cynthia L - DNR <Cynthia.Koepke@wisconsin.gov>; Jeremy Williams <jeremy.williams@cityofdarlingtonwi.org>
Cc: Peotter, Ben <PeotterB@AyresAssociates.com>; Jahnel, Haley <JahnelH@AyresAssociates.com>
Subject: BRRTS 02-33-582970 Darlington Historic Landfill Vent & Monitoring Letter

**CAUTION: This email originated from outside the organization.
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Good Afternoon Cindy,

Provided on behalf of the City of Darlington is the requested Venting & Monitoring Plan for your review of the active vacuum system at the Darlington Historic Landfill located at 149 Wells Street, Darlington, WI 53530. The system is the same with a new blower install and we are designing minor mechanical modifications at the blower intake to reduce moisture content to extend the blower's life expectancy. The modifications are not expected to impact the system's design to vent the methane emissions till readings are lower than the lower explosive limits. The Blower capacity will be sized to meet blower calculations and modification adjustments needed for the pressure differential pathway. In the meantime, a conservative assumption of vacuum head loss was inserted in the blower calculations to account for these modifications but we can keep you informed on the modifications when the design is implemented. Please let us know if you have any questions or comments, please refer to the Owner for any fees for the review.

Thanks,
Michael



Michael G. Leopold | Environmental Engineering Staff

Office: 715.834.3161 | Direct: 715.831.7534

3433 Oakwood Hills Parkway | Eau Claire, WI 54701-7698

Ayres Associates Inc | www.AyresAssociates.com

Ingenuity, Integrity, and Intelligence.

November 12, 2021

Cynthia Koepke, P.G.
Wisconsin Department of Natural Resources
3911 Fish Hatchery Rd
Fitchburg, WI 53711-5367

Re: BRRTS 02-33-582970 Darlington Historic Landfill

Dear Cynthia:

As requested by the Department of Natural Resources (DNR), Ayres Associates evaluated the existing passive gas system, the results from landfill gas sampling, and proposes a methane venting and monitoring plan for the site at 149 Wells Street, Darlington, WI. This letter report summarizes our findings, conclusions, and recommendations to reduce the risk to health, safety, and the environment in the future.

Background

The site in question is a historic waste site that was operated by the City of Darlington and was listed in the Wisconsin Department of Natural Resources (WDNR) Bureau of Remediation and Redevelopment Tracking System (BRRTS) on May 20, 2003 (BRRTS #: 0233544202). It is now identified as BRRTS case number 02-33-582970. The primary site address, 149 Wells Street, which was previously called Dick's Supermarket, is currently operated as a Piggly Wiggly supermarket. Waste material was noted at varying depths and conditions throughout the project site based on borings that were conducted by Alpha Terra Science in 2003.

In July 2008, construction was completed on a passive gas venting system at this site. The passive venting system was installed with both vertical and horizontal wells with screened pipe lengths to allow for any potential landfill gas (i.e., methane) to passively vent to the atmosphere instead of being captured beneath hard surface features such as the parking lots. The landfill gas vented at two atmospheric locations. Each well has a sampling port installed to allow for data to be collected to evaluate the ongoing nature of the passive system and subsurface conditions.

On June 10, 2010, Linda Hanefeld from the South-Central Region at DNR sent a letter to the City requesting them to continue gas monitoring and to work with a consultant to evaluate and implement system operations and improvements. In July 2010, the City of Darlington contracted with Ayres Associates to perform these services. For the protection of health and safety, explosive gas alarms were installed in structures near the historic landfill property at the lowest level.

In December 2011 and January 2012, the City of Darlington installed work, noted in the November 2, 2011, letter, consisting of connecting together the existing gas monitoring probes to be an active venting system with a landfill gas blower mounted on the nearby city-owned utility building as documented in the January 27, 2012, Documentation Report from Cornerstone Environmental Group. Beginning in January 2013, the monitoring was reduced from monthly to quarterly.

The active ventilation process continued until August 9, 2014, when the DNR approved modifying and returning the operations to a passive system. Beginning in 2016, the monitoring was reduced from quarterly to semi-annually. As noted in DNR email correspondence on September 27, 2021, over the last 3 gas monitoring events (July 2020-July 2021) several gas probes had methane above the lower explosive limit of methane (5% by volume) one or more times. The main gas wells of concern are GW-22R, GW-14R, GW-106R, and GW-108 as methane was at or above the lower explosion limits (LEL.)

Venting Plan

The existing passive ventilation system, as shown in Figure 1, will be re-established as an active system with a vacuum to provide a pressure differential pathway to mitigate residual methane emissions. The location of the site is impacted by the adjacent Pecatonica River that contributes to a fluctuating but elevated groundwater table. Historically when the system was active, moisture entrained gas adversely impacted the blower operations, thus requiring additional maintenance and replacement of the blower unit. In returning to an active system, the furnished blower capacity will be similar to previous, but modifications will provide additional upstream features intended to separate the airborne water droplets from the vacuumed gas intake by mechanical means and provide drainage of the diverted water into the subsurface.

Engineering calculations were performed to appropriately size the flow rate and pressure that accounted for system friction losses and vacuum demand of the blower to incorporate this separation of moisture. Please refer to Appendix A. A blower will be selected to meet the criteria identified in Appendix A and will be serviced according to the manufacturer's recommendations.

Methane Monitoring Program

Landfill gas probes will be monitored semi-annually as it is currently, but with a brief inspection and one additional sampling event within 30 days after the activation of the system. The results will be reviewed with the DNR, and the frequency may be revisited, but at no point will the frequency be less than once per month during the first year.

The following standard monitoring procedures will continue to be followed when monitoring the gas extraction probes to ensure the safety of site monitoring personnel and also to ensure the accuracy of monitoring results.

Prior to proceeding to the landfill, the landfill gas instrument to be used will be calibrated to manufacturer's specifications.

Each gas probe will record the following data:

- Probe Number, and
- Date/Time

Each permanent gas probe will be monitored for the following:

- % Methane
- % Carbon Dioxide
- % Oxygen
- % Balance Gas (interpolated)

In addition to the above parameters that are specific to each gas probe, the following parameters will be determined each day monitoring is conducted:

- Barometric pressure and pressure trend,
- Relative humidity,
- Wind speed/direction,
- Ambient air temperature,
- Cloud cover, and
- Precipitation

The following equipment will be utilized at each gas probe.

Gas Indicator Meter - Landtec GEM 500, Landtec GEM 2000, or equivalent

No special equipment is necessary to measure the temperature, barometric pressure, relative humidity, and wind speed and direction. These parameters will be obtained from www.wunderground.com or other local weather source. Temperature will be measured with any of various types of thermometers. The

sampling technicians will estimate cloud cover. Precipitation in the preceding 24 hours will be determined by questioning landfill personnel, www.wunderground.com, or other local weather source. The sampling technicians while at the landfill will estimate precipitation, as applicable during the monitoring event. Equipment maintenance will be done per manufacturer's recommendations.

Monitoring Procedure:

1. Unlock lid/remove cover.
2. Attach Landtec GEM 2000, or equivalent to probe without the pump running. Read pressure/vacuum, record reading on the Explosive Gas Monitoring Report.
3. Turn on meter pump and record the highest reading and stabilized methane readings on the Monitoring Report.
4. Remove the meter's sample tube from the probe. Reattach gas probe lid/cover. When certain of being in a methane free atmosphere, operate the meter in accordance with the manufacturers procedures to cleanse the meter lines.
5. Proceed to the next permanent gas probe and repeat the above monitoring procedure at each gas probe.

Details on Safety Precautions for Sampling Personnel

1. Smoking or any activity, which may generate sparks or flames are strictly prohibited.
2. Entrance into utility manholes will not be conducted.
3. Sparks can occur from metal manhole covers and rings. Personnel will always test the air in a manhole or enclosed space with a detector before removing the cover.
4. Direct inhalation of landfill gases will be avoided. Such gases may contain volatile organic compounds or other substances, which may result in chronic or acute health problems, or could lead to accidents and/or death.
5. Workers will avoid contact with exposed refuse where possible irritants or other dangerous materials may be present.
6. Workers will not leave open wells or probes unattended. In no event should excavations or borings be left open or uncovered overnight.
7. As methane probe construction is completed, all pipes will be capped as soon as possible to stop the escape of any landfill gas.

Building/Structure Monitoring

The monitoring of structures can prevent a sensitive situation due to the possibility/proximity of human inhabitants. Continuous monitors are checked monthly during the routine explosive gas monitoring event. The sample technician verifies the unit is plugged in and functional. In addition, the monitor is checked in accordance with the manufacturer's recommendations. A copy of the manual for the explosive gas meter is located in Appendix B.

If the alarm is activated, the following procedures should be considered to ensure safety:

1. DO NOT turn on or off, unplug or operate electrical items (i.e., lights, fans, overhead doors, drills, etc.).
2. Open all available doors and windows to ventilate the structures. The monitor will continue to alarm until methane concentrations drop below 1% methane.
3. If the alarm continues, even after ventilating the area, evacuate all personnel from the structure.
NOTE: Personnel should be aware the monitors are calibrated to alarm at 1% methane and that the lower explosive limit is 5%. Therefore, a safety margin is provided.
4. Designated personnel using gas detection equipment will be called in to determine where the infiltration of methane gas is occurring (i.e., floor drains, foundation cracks, underground utility connections, etc.).

5. After the area of concern has been determined, it should be sealed to prevent another occurrence. Silicone caulks should not be used as they are poisonous to the gas detecting equipment and may cause inaccurate readings.

Care should be taken in the placement of the monitors, because they will be affected high concentrations of carbon monoxide, emissions of paint thinner, gasoline fumes, and other similar vapor emitting components, and aerosol sprays or cleaners. Situations such as these should be avoided because several occurrences may affect the calibration of the monitor.

Notification

Results of the gas monitoring program will be transmitted electronically to the WDNR at the email address Cynthia.Koepke@wisconsin.gov within ten working days of collection of the data. Corrective actions may be appropriate if off-site migration or building spaces have noted accumulation of methane and include properly ventilating confined spaces and may include aggressive procedures to draw the gases from the area. Authorization to abandon or modify monitoring of permanent probes may be granted in the future upon the findings of this investigation and the determination and WDNR's concurrence that there is no significant likelihood of future explosive gas formations and migration sufficient to require further action, or if probes no longer operational or have had a suitable length history of non-detection.

If you have any further comments on this approach, please don't hesitate to discuss this with me or the City. The City contact remains the Public Works Director, Jeremy Williams.

Sincerely,

Ayres Associates



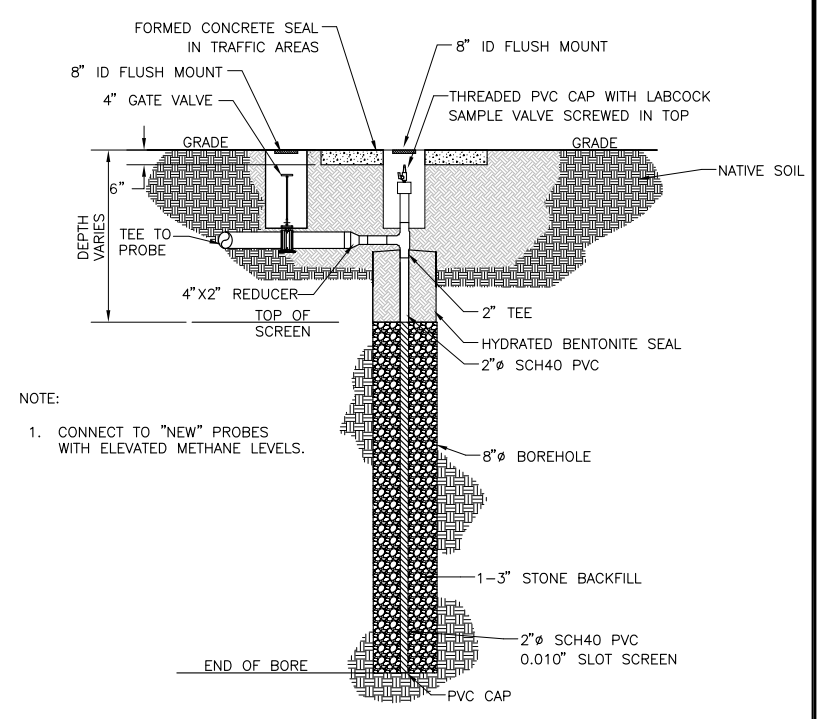
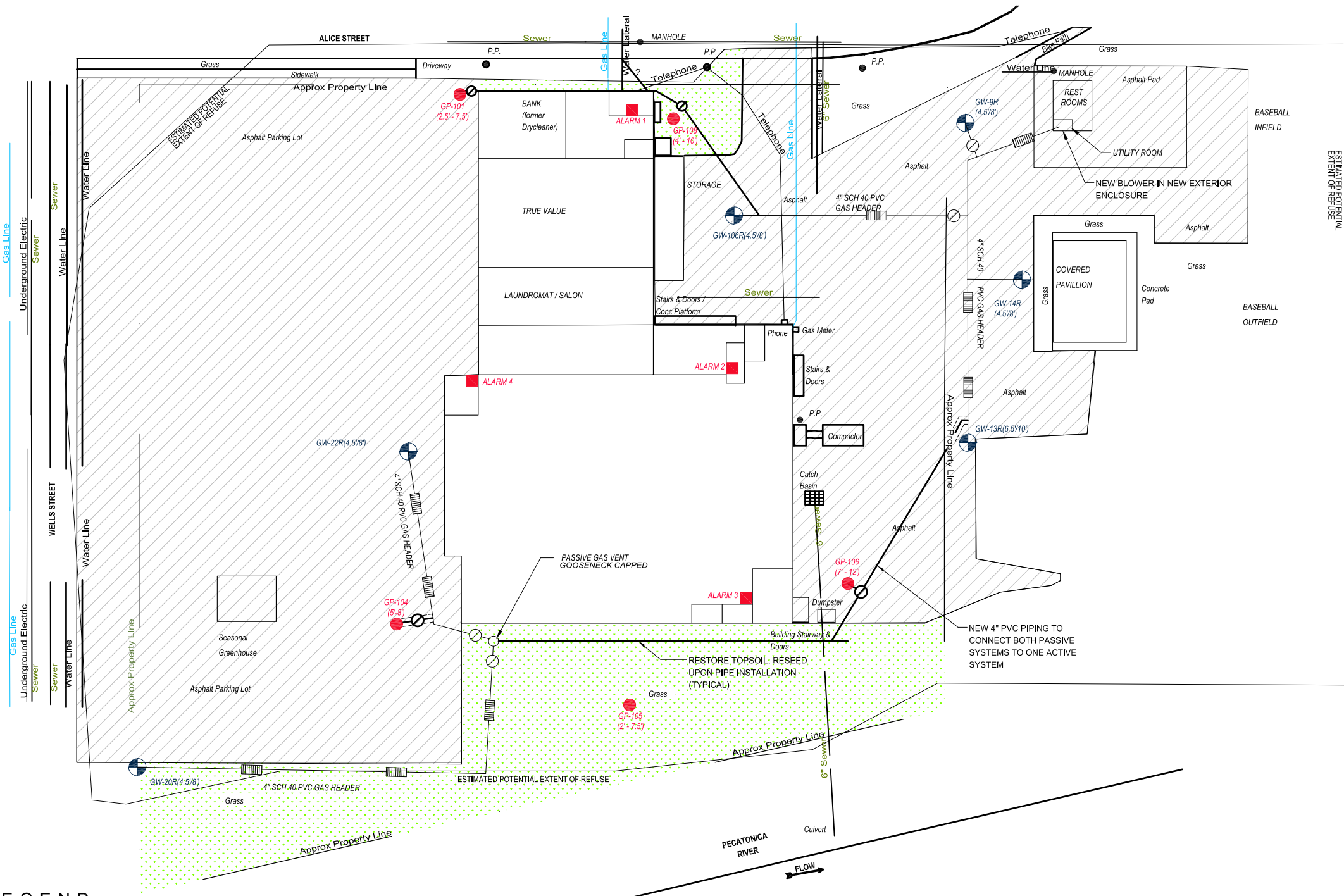
Ben Peotter, PE
Manager – Development Services Midwest / Project Engineer
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BP:ac

Enclosure

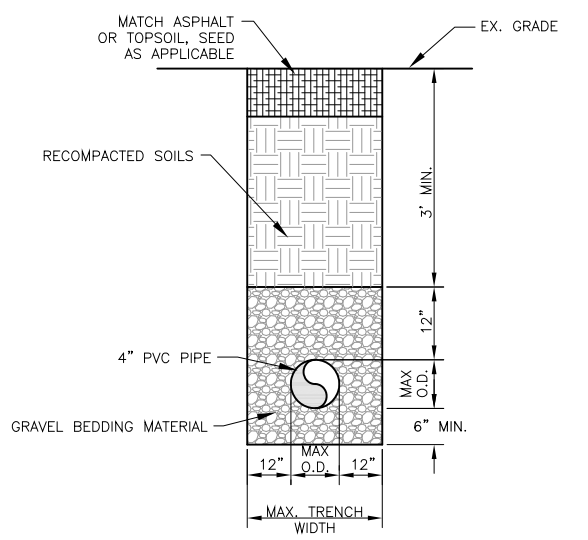
cc: City of Darlington - Jeremy Williams
Ayres Associates – Michael Leopold, Haley Jahnel

Figures



NOTE:
1. CONNECT TO "NEW" PROBES WITH ELEVATED METHANE LEVELS.

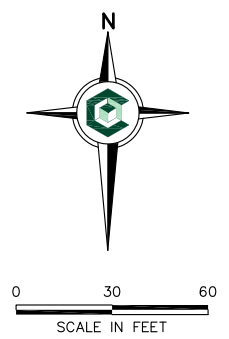
GAS PROBE
DETAIL 1
SCALE: NOT TO SCALE



TYPICAL TRENCH
DETAIL 2
SCALE: NOT TO SCALE

- LEGEND**
- GW-9R** REINSTALLED PASSIVE GAS EXTRACTION WELL WITH (SCREEN LENGTH/WELL DEPTH)
 - EXISTING VALVE
 - EXISTING ASPHALT
 - EXISTING GRASS
 - 4" PVC SLOTTED PIPE (10' LONG SECTIONS)
 - 4" PVC SOLID PIPE
 - EXPLOSIVE GAS ALARM LOCATION
 - NEW PROBE LOCATION (TOP OF SCREEN DEPTH - BOTTOM OF SCREEN / WELL BELOW GROUND SURFACE)
 - NEW VALVE
 - NEW 4" PVC SOLID PIPE

- NOTES**
1. EXISTING SYSTEM "A" INCLUDES GW-9R, 13R, 14R AND 106R.
 2. EXISTING SYSTEM "B" INCLUDES GW-20R, 22R.
 3. NEWLY INSTALLED PROBES ARE GP-101, 104, 105, 106 AND 108.



REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

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CITY OF DARLINGTON LANDFILL
DARLINGTON, WISCONSIN

AS-BUILT GAS PIPING MODIFICATIONS

SHEET NO.
1
PROJECT NO.
100207

Appendix A

Blower Calculations

**BIOWER SYSTEM CALCULATIONS
DARLINGTON HISTORIC LANDFILL
BRRTS 02-33-582970
CITY OF DARLINGTON**



HEADER PIPE SIZING CALCULATIONS

CALCULATIONS ASSUME THE FOLLOWING WELL PRODUCTION FACTOR:

0.50 = PRODUCTION RATE FACTOR FOR VERTICAL GAS WELLS (scfm/vf)

USER INPUTTED VALUES

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HEADER SECTION	WELL NO.	WELL DEPTH (FT)	PERF. WELL LENGTH (FT)	VACUUM @ WELL (IN.W.C.)	HEAD LOSS WELL AND FITTINGS (IN.W.C.)	HEADER LINE SIZE (IN)	LINE LENGTH (FT)
North Half Path							
	GP- 101	7.50	2.50	0.02	0.6		
A					0.1	4	178.00
	GW-106R	8.00	4.00	0.02	0.6		
B					0.1	4	115.33
South Half Path							
	GW-22R	8.00	4.50	0.02	0.6		
C					0.1	4	86.25
	GP-104	8.00	5.00	0.02	0.0		
D					0.1	4	224.00
	GP-106	12.00	7.00	0.02	0.6		
E					0.1	4	134.50
West Half Path							
	GW-20R	8.00	4.50	0.02	0.6		
F					0.1	4	237.67
Main Run							
	GW-13R	10.00	6.50	0.02	0.6		
G					0.1	4	84.00
	GW-14R	8.00	4.50	0.02	0.6		
H					0.1	4	85.50
	GW-9R	8.00	4.50	0.02	0.6		
I					20.0	4	66.00
TOTAL		77.50	43.00				

CALCULATED VALUES

(9)	(10)	(11)	(12)	(13)	(14)	(15)
WELL PROD. (SCFM)	LINE FLOW (SCFM)	HEAD LOSS/100' PIPE (IN.W.C.)	HEAD LOSS HEADER (IN.W.C.)	TOTAL HEAD LOSS (IN.W.C)	VELOCITY (FPS)	HEADER INSIDE DIA. (IN)
1.3	1.3					
	1.3	0.00	0.000	0.72	0.24	3.97
2.0	2.0					
	3.3	0.00	0.002	1.44	0.63	3.97
2.3	2.3					
	2.3	0.00	0.001	0.72	0.87	3.97
2.5	2.5					
	4.8	0.00	0.006	0.85	1.36	3.97
3.5	3.5					
	8.3	0.01	0.009	1.58	2.04	3.97
2.3	2.3					
	2.3	0.00	0.002	0.72	0.44	3.97
3.3	3.3					
	3.3	0.00	0.001	0.72	3.30	3.97
2.3	2.3					
	5.5	0.00	0.003	1.44	3.73	3.97
2.3	2.3					
	7.8	0.01	0.004	25.81	4.17	3.97
21.5	21.5			25.81	4.17	

Notes:

- Well production (Col. 9) = Perforated Well Depth (Col. 4) x Production Factor
- Line flow (Col. 10) = Sum of the well production as progress through header system.
- Head loss per 100 feet of pipe based on Darcy-Weisbach formula (Col. 11): $h_f = (flv^2)/(2Dg_c)$
- Head loss through section of header pipe (Col. 12) = (Line length (Col. 8)/100) x Head loss per 100 feet (Col. 11)
- Total head loss (Col. 13) = Vacuum @ well (Col. 5) + Head loss at wells, fittings (Col. 6) + Head loss through section of header pipe (Col. 12)
- Velocity = Line flow/Flow area = (Line flow (Col. 10) x 144 sq.in./sq.ft.) / [(3.14 x (Pipe inner diameter (Col. 15))^2/4) x (60 sec/min)]
- Head loss across the blower/flare station assumed to be 20 inches w.c.
- Main run is combined flow from gas wells to flare.

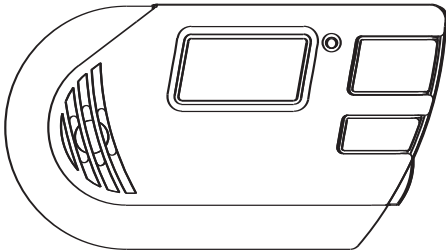
Design Guidelines

- § Velocity of 50 fps is maximum allowed during concurrent flow conditions
- § Velocity of 30 fps is max allowed during countercurrent conditions
- § 30 fps is max. in condensate management structures

Appendix B

Alarm Manual

PLUG-IN EXPLOSIVE GAS AND CARBON MONOXIDE ALARM WITH BATTERY BACK-UP AND SILENCE FEATURE



120VAC ~ 60Hz, 0.25 A

IMPORTANT! PLEASE READ CAREFULLY AND SAVE.

This unit was shipped with a user's manual that contains important information about its operation. If you are installing this unit for use by others, you must leave this manual—or a copy of it—with the end user.

Printed in Mexico
M08-0123-002 Q 01/08

LISTED TO
UL 1484
AND
UL 2034 Model GCO1

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Consumer Affairs: (800) 323-9005
www.brkelectronics.com • www.firstalert.com

BASIC SAFETY INFORMATION

IMPORTANT!

- Dangers, Warnings, and Cautions alert you to important operating instructions or to potentially hazardous situations. Pay special attention to these items.

CAUTION!

- This combination Explosive Gas/Carbon Monoxide Alarm has two separate alarms. The CO Alarm is not designed to detect fire or any other gas. It will only indicate the presence of carbon monoxide gas at the sensor. Carbon monoxide gas may be present in other areas. The Explosive Gas Alarm will only indicate the presence of explosive gas that reaches the sensor. The Explosive Gas Alarm is not designed to sense smoke, heat or flames.
- Do not stand too close to the unit when the alarm is sounding. It is loud to wake you in an emergency. Exposure to the horn at close range may harm your hearing.
- Do not paint over the unit. Paint may clog the openings to the sensing chambers and prevent the unit from operating properly.

WARNING!

- This unit must be powered by a 24-hour circuit. Be sure the circuit cannot be turned off by a switch, dimmer, or ground fault circuit interrupter. Failure to connect this unit to a 24-hour circuit may prevent it from providing constant protection.
- This Alarm must have AC or battery power to operate. If AC power fails and the battery is dead or missing, the alarm cannot operate.
- The Alarm will check for the presence of explosive gas at the sensor less frequently when powered by the back-up battery. Explosive gas could be present during the period between checks without going into alarm, especially during a condition that results in a rapid buildup of explosive gas.
- Test the Alarm once a week. If the Alarm ever fails to test correctly, have it replaced immediately! If the Alarm is not working properly, it cannot alert you to a problem.
- This combination Carbon Monoxide and Explosive Gas Alarm is intended for residential use and is not suitable for use in hazardous locations as defined in the National Electrical Code.
- This product is intended for use in ordinary indoor locations of family living units. It is not designed to measure CO levels in compliance with Occupational Safety and Health Administration (OSHA) commercial or industrial standards. Individuals with medical conditions that may make them more sensitive to carbon monoxide may consider using warning devices which provide audible and visual signals for carbon monoxide concentrations under 30 ppm. For additional information on carbon monoxide and your medical condition contact your physician.

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INSTALLATION

WHERE TO INSTALL THIS ALARM

For Gas Alarms, mounting depends on the type of explosive gas you intend to detect.

Natural Gas (methane) is typically supplied through a main utility line connected to your home. If you do not live in a rural area you are likely to be a user of natural gas. Natural gas is a fossil fuel consisting mainly of Methane. Methane is much lighter than air and will rise rapidly in air. If you are a user of natural gas, the Alarm should be mounted between 6 and 12 inches (152mm and 305 mm) away from the ceiling (using cord feature) to ensure the earliest opportunity to detect a leak.

Propane is typically supplied to homes by delivery truck in liquid form and stored near the home in propane tanks. Propane is used by homes in rural areas that do not have natural gas service. Since propane is the most commonly used Liquefied Petroleum Gas (LPG), **propane** and **LP-Gas** are often used synonymously. Unlike natural gas, propane is heavier than air and will collect at lower levels. If you are a user of propane, the Alarm should be mounted near the floor (using the direct plug-in feature) to ensure the earliest opportunity to detect a leak.

Both propane and natural gas are colorless and odorless. For safety reasons, an odorant (Mercaptan) is added so that any leak can be detected by smell. The common detection threshold for smelling the gases is around 20% of the **Lower Explosion Limit (LEL)**. This can vary greatly depending on the individuals sense of smell and how long they have been exposed to it. The LEL of each of these gases defines the bottom range of flammability for the gas. Your Alarm is calibrated to sound before 25% of the LEL of either gas detected.

Therefore, it is possible that you may smell gas before the Alarm is activated. If you are not sure which gas your home uses, contact your utility company.

For CO Alarms, the National Fire Protection Association (NFPA) recommends that a CO Alarm should be centrally located outside of each separate sleeping area in the immediate vicinity of the bedrooms. For added protection, install additional CO Alarms in each separate bedroom, and on every level of your home.

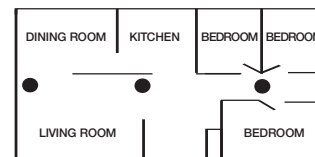
In general, install combination Explosive Gas and Carbon Monoxide Alarms:

- **WHERE YOU CAN HEAR THE ALARM FROM ALL SLEEPING AREAS**
- In or near bedrooms and living areas or wherever you suspect a gas or CO exposure is likely.
- On each level of a multi-level home.

IMPORTANT!

Improper location can affect the sensitive electronic components in this Alarm. Please see "Where this Alarm Should Not Be Installed".

Recommended Placement



Continued...

INSTALLATION, Continued

See "Avoiding Dead Air Spaces" for more information.

NOTE: For any location, make sure no door or other obstruction could keep carbon monoxide or gas from reaching the Alarm.

⚠ WARNING!

This unit should receive continuous electrical power. (The battery is meant for emergency back-up only). Choose an outlet where it can't be accidentally unplugged or switched off by children. Keep small children away from the unit. Teach them not to play with it or unplug it. Explain what the alarms mean.

WHERE THIS ALARM SHOULD NOT BE INSTALLED

To avoid causing damage to the unit, to provide optimum protection, and to prevent unnecessary alarms, Do NOT locate this Alarm:

- In garages, kitchens, crawl spaces and unfinished attics. Avoid extremely dusty, dirty or greasy areas. Installation in these areas could lead to nuisance alarms, may expose the sensor to substances that could damage or contaminate it, or the Alarm may not be heard by persons in other areas of the home, especially if they are sleeping.
- In the garage, vehicle exhaust can contain some carbon monoxide. These levels are higher when the engine is first started. Within hours of starting a vehicle and backing it out of the garage, the levels present over time can activate the Alarm and become a nuisance.
- In the kitchen, some gas appliances can emit a short burst of CO or gas upon start-up. This is normal. If your Explosive Gas/CO Alarm is installed too close to these appliances, it may alarm often and become a nuisance.
- Keep units at least 20 feet (6 meters) from the sources of combustion particles (stove, furnace, water heater, space heater) if possible. In areas where a 20-foot (6m) distance is not possible – in modular, mobile, or smaller homes, for example – it is recommended the Alarm be placed as far from these fuel-burning sources as possible. The placement recommendations are intended to keep these Alarms at a reasonable distance from a fuel-burning source, and thus reduce "unwanted" alarms. Unwanted alarms can occur if an Alarm is placed directly next to a fuel-burning source. Ventilate these areas as much as possible. **If you must install the Alarm near a cooking or heating appliance, install at least 5 feet (1.5 meters) from appliance.**
- In extremely humid areas. This Alarm should be at least 10 feet (3 meters) from a shower, sauna, humidifier, vaporizer, dishwasher, laundry room, utility room, or other source of high humidity.
- In direct sunlight.
- In turbulent air, like near ceiling fans or open windows. Blowing air may prevent CO or gas from reaching the sensors.
- In areas where temperature is colder than 40° F (4° C) or hotter than 100° F (38° C). These areas include non-airconditioned crawl spaces, unfinished attics, uninsulated or poorly insulated ceilings, porches, and garages.
- Less than 12 inches (305 mm) away from fluorescent lights. Electrical "noise" can interfere with the sensor.
- In "dead air" spaces. See "Avoiding Dead Air Spaces".

AVOIDING DEAD AIR SPACES

"Dead air" spaces may prevent gas from reaching the Alarm. To avoid dead air spaces, follow installation recommendations below.

On ceilings, install Alarms as close to the center of the ceiling as possible. If this is not possible, install the Alarm at least 4 inches (102 mm) from the wall or corner.

For wall mounting, the top edge of Alarms should be placed between 6 inches (152 mm) and 12 inches (305 mm) from the wall/ceiling line.

On a peaked, gabled, or cathedral ceiling, install Alarm within 3 feet (0.9 meters) of the peak of the ceiling, measured horizontally.

BEFORE YOU BEGIN INSTALLATION

Since CO generally mixes well with air, mounting the Alarm will depend on the type of explosive gas you intend to detect. If you are not certain which type of gas you are using in your home, please read about natural gas and propane in "Where to Install this Alarm".

⚠ WARNING!

- **Make sure the alarm is not receiving excessively noisy power.** Examples of noisy power could be major appliances on the same circuit, power from a generator or solar power, light dimmer on the same circuit or mounted near fluorescent lighting. Excessively noisy power may cause damage to your Alarm.

Find the pair of self-adhesive labels included with this Gas/CO Alarm.

- On each label write in the phone number of your emergency responder (like 911) and a qualified appliance technician.
- Place one label near the Gas/CO Alarm, and the other label in the "fresh air" location you plan to go if the alarm sounds.

HOW TO INSTALL THIS GAS/CO ALARM

IMPORTANT! Read all instructions before using this product.

Tools you will need: Screwdriver, drill.

1. Determine the best location for your Gas/CO Alarm.
2. Your Alarm is equipped to be mounted as a corded unit (recommended for natural gas detection), a direct plug unit (recommended for propane gas detection). The unit can be plugged directly into a wall outlet. If your outlets are mounted horizontally, refer to "If Outlet is Mounted Horizontally (Sideways)".

If the adapter is taken out of the unit, the Alarm can be installed high on the wall, while the adapter is plugged into a wall outlet. The explosive gas you use will determine if the Alarm should be installed high on the wall (AC cord option) or low on the wall (direct plug option).

ACTIVATING THE BATTERY BACK-UP

IMPORTANT!

Activate the battery back-up by installing the battery. **The battery is for back-up only and is not intended to power the Alarm for an extended period of time in the absence of AC.**

The Alarm will light-up the display briefly to indicate the unit is receiving power.

DIRECT PLUG ALARM INTO AN OUTLET (for Propane Detection)

IMPORTANT!

This Alarm can be plugged directly into a wall outlet located close to the floor. This is the recommended configuration for detecting propane.

1. Choose a standard UNSWITCHED 120V AC outlet.
2. Plug Alarm in.

IF OUTLET IS MOUNTED HORIZONTALLY (SIDEWAYS)

If you are going to use your Alarm as a direct plug into an outlet that is mounted horizontally (sideways), you may want to **rotate the adapter 90°**, as follows:

1. With back of unit facing you (AC blades on your left), place your left thumb on adapter release and grab AC blades with your right hand to release the left side.
2. Repeat for the other side adapter thumb release. This will allow adapter to slide out.
3. Remove adapter.
4. Rotate the adapter 90° and snap firmly back into place.
5. Plug Alarm into AC outlet.

WALL MOUNTED ALARM (for Natural Gas Detection)

IMPORTANT!

Installation tips for power cord models: The power cord option provides more flexibility in mounting locations and allows the Alarm to be easily installed at or above eye level.

NOTE: If you mount the Alarm high on a wall, make sure it is **between 6 to 12 inches (152-305 mm) down from the ceiling**. Any higher than this, it will be in "dead air" space and carbon monoxide or natural gas may not reach the sensors.

NOTE: Do not cover the Alarm with a curtain.

To install for a wall-mount, you will need to pull out the removable adapter and power cord, as follows:

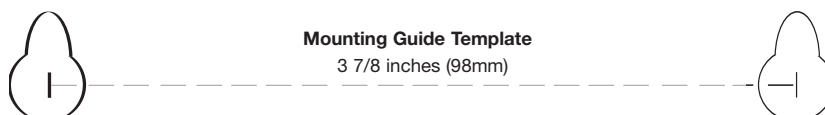
1. Repeat steps 1 to 3 as described above in "to rotate the adapter".
2. With adapter out, pull out power cord and unwrap it.
3. Insert the screws provided until head is approx. 1/8 inch (3 mm) from wall (if mounting in plaster board or drywall, drill 3/16 inch (5 mm) hole and use plastic anchor provided). Use mounting guide template to locate holes as shown in diagram below.
4. Hook the Alarm over the screw onto the keyhole in back of unit.
5. Plug power cord into AC outlet.

SECURING THE POWER CORD TO AN OUTLET

⚠ WARNING!

DISCONNECT POWER TO THE OUTLET TO AVOID ELECTRICAL SHOCK.

1. Remove the wallplate screw from the outlet and hold the wallplate in position.
2. Plug the power cord into the wall outlet so that the screw hole lines up with the wallplate screw hole.
3. Insert the screw through the power cord screw hole and into the wallplate screw hole.
4. Tighten screw in place and restore power to the outlet.



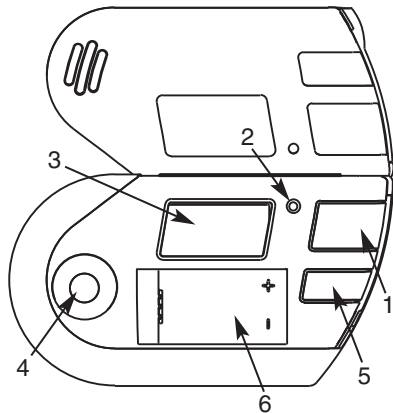
TEST THE ALARM

1. Make sure the Alarm is receiving AC power. Under normal operation, the Green indicator light will shine continuously. If the Green power indicator light does not light, recheck connections. If connections are correct and the Green power indicator still does not light, the unit should be replaced immediately.
2. Press and hold the test button until the alarm sounds. You will hear the signal that indicates the presence of explosive gas followed by the signal for carbon monoxide.

When testing the Alarm, have someone else check that the Alarm can be heard easily from the sleeping areas. The unit should be located where it can wake you if it alarms at night.

HOW YOUR ALARM WORKS

THE COVER OF YOUR ALARM



1. Test/Silence Button: Press and hold to activate test, or to silence the alarm.
2. POWER Light (GREEN)
3. Display
4. (Behind the Cover) Alarm Horn: 85dB audible alarm for test, alarm, and unit malfunction warning.
5. Display Button: Press to recall highest CO level recorded
6. Battery Compartment

IF YOUR GAS/CO ALARM SOUNDS

WHAT TO DO IF CARBON MONOXIDE IS DETECTED

⚠WARNING!

Actuation of your CO Alarm indicates the presence of carbon monoxide (CO) which can kill you. In other words, when your CO Alarm sounds, you must not ignore it!

IF THE CO ALARM SOUNDS:

1. Operate the Test/Silence button.
2. Call your emergency services, fire department or 911. Write down the number of your local emergency service here:

3. Immediately move to fresh air—outdoors or by an open door or window. Do a head count to check that all persons are accounted for. Do not re-enter the premises, or move away from the open door or window until the emergency services responder has arrived, the premises have been aired out, and your CO Alarm remains in its normal condition.
4. After following steps 1-3, if your CO Alarm reactivates within a 24-hour period, repeat steps 1-3 and call a qualified appliance technician to investigate for sources of CO from fuel-burning equipment and appliances, and inspect for proper operation of this equipment. If problems are identified during this inspection have the equipment serviced immediately. Note any combustion equipment not inspected by the technician, and consult the manufacturers' instructions, or contact the manufacturers directly, for more information about CO safety and this equipment. Make sure that motor vehicles are not, and have not, been operating in an attached garage or adjacent to the residence. Write down the number of a qualified appliance technician here:

WHAT TO DO IF EXPLOSIVE GAS IS DETECTED

If you hear the alarm horn sound one beep per second, gas has been detected. The word GAS will be displayed. Evacuate everyone from the building.

1. Leave the house immediately, opening doors and windows as you leave.
2. Do not use your telephone or appliances. Do not turn any light switches off or on. Any spark or flame could ignite the gas.
3. Call 911 and your gas company from a phone that is away from your home.
4. Do not re-enter the area until the source of the leak is found and corrected.

⚠WARNING!

- If the unit alarms and you are not testing the unit, it is warning you of a potentially dangerous situation that requires your immediate attention. NEVER ignore any alarm. Ignoring the alarm may result in injury or death.
- Never disconnect the power to quiet an unwanted alarm. Disconnecting the power disables the Alarm. This will remove your protection.

⚠WARNING!

Alarms have various limitations. See "General Limitations of Gas/CO Alarms" for details.

USING THE SILENCE FEATURE

⚠WARNING!

NEVER disconnect the power to your Alarm to silence the horn—use the Silence Feature. Disconnecting the Alarm removes your protection!

- The Silence Feature is intended to temporarily silence the horn while you identify and correct the problem.
- To use the Silence Feature, press the Test/Silence button until the horn is silent.
- If the Test/Silence button is pressed while the Alarm is in the silence mode, the alarm will start sounding again.

WHEN THE GAS ALARM IS SILENCED...

The Alarm will remain silent for approximately 2 minutes and then return to normal operation. If the gas has not cleared within the silence period, the unit will go back into alarm.

WHEN THE CO ALARM IS SILENCED...

The CO Alarm will remain silent for up to 4 minutes. While the Alarm is silenced, it will continue to monitor the air for CO. After 4 minutes, if CO levels remain potentially dangerous the horn will start sounding again.

IMPORTANT!

The Silence Feature is intended to temporarily silence the Alarm horn. It will not correct a CO or gas problem.

USING THE REMOTE CONTROL TEST/SILENCE FEATURE

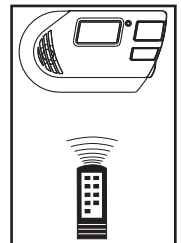
Using the VOLUME or CHANNEL buttons on most remote controls, you can test or silence this gas/CO Alarm from up to 12 feet (3.6 meters) away.

To Test or Silence the Alarm:

1. Make sure you have a clear path between you and the Alarm, free of any obstructions.
2. Point the remote at the front of the Alarm.
3. Press the VOLUME or CHANNEL button for at least 5 seconds.

If the Alarm does not respond to your remote control:

- You may be standing too far away.
- Your remote may not be compatible.
- You did not hold the button on your remote for at least 5 seconds.
- AC power must be present to Silence the low battery chirp.



SILENCING THE LOW BATTERY WARNING

This Silence Feature can temporarily quiet the low battery warning “chirp” for up to 8 hours if AC power is present. You can silence the low battery warning “chirp” two ways:

1. **Manually:** Press the Test/Silence button on the Alarm cover until you see the Green LED flicker, acknowledging the button-press.
2. **Using Your Remote Control:** Standing no further than 12 feet (3.6 meters) away from the Gas/CO Alarm, aim your IR remote at the Alarm and press the CHANNEL or VOLUME button for at least 3-5 seconds.

The display will flash “SILENCE” for 8 hours while the low battery warning “chirp” silence feature is activated. After 8 hours, the low battery “chirp” will resume. The Alarm will continue to operate as long as AC power is supplied. However, **replace the battery as soon as possible**, to maintain protection in event of a power outage.

USING THE PEAK CO MEMORY

The CO Memory Feature lets you check the highest level of CO recorded.

To check CO Memory:

1. Press the Display button until the peak CO level is displayed.







To clear CO Memory:

1. While checking CO memory, press or hold the Display button until “CLEAR” is displayed.
2. Press or hold the Display button until the CO Memory is cleared.



NOTE: The highest CO level will be saved, even after a power interruption, until you clear it. DO NOT clear the CO Memory reading if you plan to call someone to investigate a CO problem! Clear the CO Memory reading only after the investigator has checked your home.

UNDERSTANDING THE LIGHT, HORN, AND DISPLAY PATTERNS

Condition	LED	Horn	Display
NORMAL AC POWER	LED is Green.	Silent	All segments of display are turned on for a short time upon initial power. Then the battery level icon is displayed. 
BATTERY BACK-UP POWER	LED is Off, flashing Green once every 45 seconds	Silent	All segments of display are turned On for a short time upon initial power. Then the battery level icon is displayed flashing.
DURING TESTING	LED flashes Red in sync with the horn, simulating an Alarm condition: first gas then CO	First, the horn pattern for gas alarm (1 beep every second) is issued, and then the CO alarm horn pattern (4 beeps, pause, 4 beeps) is issued.	During the simulated gas alarm, “GAS” is displayed along with a full alarm level.  During the simulated CO alarm, “CO” is displayed along with a full alarm level.  Several ppm CO levels are also displayed and the alarm level is shown increasing. 
LOW OR MISSING BATTERY	Normal	A chirp is issued about every minute.	Battery icon will show an empty icon. 
GAS ALARM CONDITION	LED flashes Red in sync with horn	Repeating 1 beep every second	“GAS”, a full level, and “EVACUATE”.
CARBON MONOXIDE ALARM	LED flashes Red in sync with horn	Repeating 4 beeps, pause	“CO” alternating with the ppm number, a full level, and “EVACUATE”. 
PRE-ALARM CONDITION CO IS PRESENT	Normal	Normal	“CO” alternating with the ppm number. The level will indicate relative CO exposure level.
MALFUNCTION	LED flashing Green 3 times in sync with 3 rapid chirps	3 rapid chirps every minute	“ERROR” is displayed.
LOW BATTERY SILENCE	LED is Green.	Silent	“SILENCE” is displayed.

WEEKLY TESTING

⚠ WARNING!

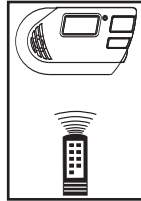
- **NEVER** use an open flame of any kind to test this unit. You might accidentally damage or set fire to the unit or to your home. The built-in test switch accurately tests the unit's operation as required by Underwriters Laboratories, Inc. (UL). **NEVER** use vehicle exhaust! Exhaust may cause permanent damage and voids your warranty.
- **DO NOT** stand close to the Alarm when the horn is sounding. Exposure at close range may be harmful to your hearing. When testing, step away when horn starts sounding.

⚠ CAUTION!

It is important to test this unit every week to make sure it is working properly. You can test this Gas/CO Alarm two ways:

1. **Manually:** Press the Test/Silence button on the Alarm cover until alarm sounds.
2. **Remote Control:** Aim your remote control at the Alarm and press the CHANNEL or VOLUME button.

During testing, you will hear a loud, repeating horn pattern: 1 beep every second, while the Red LED flashes and the display shows "GAS". Then you will hear a loud, repeating horn pattern: 4 beeps, pause, 4 beeps, pause, while the Red LED flashes and the display shows "CO" with an increasing CO ppm number.



If the Alarm does not test properly:

1. Make sure the AC power is applied and battery is fresh and installed correctly.
2. Test the unit again.

If the Alarm is still not working properly, replace it immediately. Refer to the "Limited Warranty" at the end of this manual.

⚠ WARNING!

If there is still a problem, do not try to fix the Alarm yourself. This will void your warranty!

REGULAR MAINTENANCE

⚠ WARNING!

Use only the replacement batteries listed below. The unit may not operate properly with other batteries. Never use rechargeable batteries since they may not provide a constant charge.

This unit has been designed to be as maintenance-free as possible, but there are a few simple things you must do to keep it working properly:

- Test it at least once a week.
- Clean the Alarm at least once a month; gently vacuum the outside of the Alarm using your household vacuum's soft brush attachment. Test the Alarm. Never use water, cleaners or solvents since they may damage the unit.
- Relocate the unit if it sounds frequent unwanted alarms. See "Where This Alarm Should Not Be Installed" for details.
- When the battery back-up becomes weak, the Alarm will "chirp" about once a minute (the low battery warning). You should replace the battery immediately to continue your protection. **This Alarm must have AC or battery power to operate. If AC power fails, and the battery is dead or missing, the Alarm cannot operate.**

⚠ WARNING!

DO NOT spray cleaning chemicals or insect sprays directly on or near the Alarm. **DO NOT** paint over the Alarm. Doing so may permanently damage the Alarm.

CHOOSING A REPLACEMENT BATTERY:

Your Alarm requires one standard 9V alkaline battery. The following batteries are acceptable as replacements: Duracell #MN1604, (Ultra) #MX1604; Eveready (Energizer) #522. **These batteries are available at many local retail stores.**

IMPORTANT!

Actual battery service life depends on the Alarm and the environment in which it is installed. All the batteries specified above are acceptable replacement batteries for this unit. Regardless of the manufacturer's suggested battery life, you **MUST** replace the battery immediately once the unit starts "chirping" (the "low battery warning").

WHAT YOU NEED TO KNOW ABOUT CO

WHAT IS CO?

CO is an invisible, odorless, tasteless gas produced when fossil fuels do not burn completely, or are exposed to heat (usually fire). Electrical appliances typically do not produce CO.

These fuels include: Wood, coal, charcoal, oil, natural gas, gasoline, kerosene, and propane.

Common appliances are often sources of CO. If they are not properly maintained, are improperly ventilated, or malfunction, CO levels can rise quickly. CO is a real danger now that homes are more energy efficient. "Air-tight" homes with added insulation, sealed windows, and other weatherproofing can "trap" CO inside.

SYMPTOMS OF CO POISONING

These symptoms are related to CO POISONING and should be discussed with ALL household members.

Mild Exposure: Slight headache, nausea, vomiting, fatigue ("flu-like" symptoms).

Medium Exposure: Throbbing headache, drowsiness, confusion, fast heart rate.

Extreme Exposure: Convulsions, unconsciousness, heart and lung failure. Exposure to Carbon Monoxide can cause brain damage, death.

⚠ WARNING!

Some individuals are more sensitive to CO than others, including people with cardiac or respiratory problems, infants, unborn babies, pregnant mothers, or elderly people can be more quickly and severely affected by CO. Members of sensitive populations should consult their doctors for advice on taking additional precautions.

FINDING THE SOURCE OF CO AFTER AN ALARM

Carbon monoxide is an odorless, invisible gas, which often makes it difficult to locate the source of CO after an alarm. These are a few of the factors that can make it difficult to locate sources of CO:

- House well ventilated before the investigator arrives.
- Problem caused by "backdrafting."
- Transient CO problem caused by special circumstances.

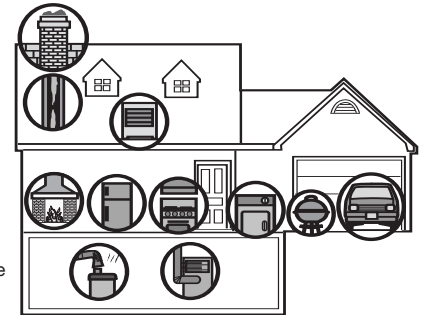
Because CO may dissipate by the time an investigator arrives, it may be difficult to locate the source of CO. **BRK Brands, Inc. shall not be obligated to pay for any carbon monoxide investigation or service call.**

POTENTIAL SOURCES OF CO IN THE HOME

Fuel-burning appliances like: portable heater, gas or wood burning fireplace, gas kitchen range or cooktop, gas clothes dryer.

Damaged or insufficient venting: corroded or disconnected water heater vent pipe, leaking chimney pipe or flue, or cracked heat exchanger, blocked or clogged chimney opening.

Improper use of appliance/device: operating a barbecue grill or vehicle in an enclosed area (like a garage or screened porch).



Transient CO Problems: "transient" or on-again-off-again CO problems can be caused by outdoor conditions and other special circumstances.

The following conditions can result in transient CO situations:

1. Excessive spillage or reverse venting of fuel appliances caused by outdoor conditions such as:
 - Wind direction and/or velocity, including high, gusty winds. Heavy air in the vent pipes (cold/humid air with extended periods between cycles).
 - Negative pressure differential resulting from the use of exhaust fans.
 - Several appliances running at the same time competing for limited fresh air.
 - Vent pipe connections vibrating loose from clothes dryers, furnaces, or water heaters.
 - Obstructions in or unconventional vent pipe designs which can amplify the above situations.
2. Extended operation of unvented fuel burning devices (range, oven, fireplace).
3. Temperature inversions, which can trap exhaust close to the ground.
4. Car idling in an open or closed attached garage, or near a home.

These conditions are dangerous because they can trap exhaust in your home. Since these conditions can come and go, they are also hard to recreate during a CO investigation.

HOW CAN I PROTECT MY FAMILY FROM CO POISONING?

A Gas/CO Alarm is an excellent means of protection. It monitors the air and sounds a loud alarm before Carbon Monoxide levels become threatening for average, healthy adults.

A Gas/CO Alarm is not a substitute for proper maintenance of home appliances.

To help prevent CO problems and reduce the risk of CO poisoning:

- Clean chimneys and flues yearly. Keep them free of debris, leaves, and nests for proper air flow. Also, have a professional check for rust and corrosion, cracks, or separations. These conditions can prevent proper air movement and cause backdrafting. Never “cap” or cover a chimney in any way that would block air flow.
- Test and maintain all fuel-burning equipment annually. Many local gas or oil companies and HVAC companies offer appliance inspections for a nominal fee.
- Make regular visual inspections of all fuel-burning appliances. Check appliances for excessive rust and scaling. Also check the flame on the burner and pilot lights. The flame should be blue. A yellow flame means fuel is not being burned completely and CO may be present. Keep the blower door on the furnace closed. Use vents or fans when they are available on all fuel-burning appliances. Make sure appliances are vented to the outside. Do not grill or barbecue indoors, or in garages or on screen porches.
- Check for exhaust backflow from CO sources. Check the draft hood on an operating furnace for a backdraft. Look for cracks on furnace heat exchangers.
- Check the house or garage on the other side of shared wall.
- Keep windows and doors open slightly. If you suspect that CO is escaping into your home, open a window or a door. Opening windows and doors can significantly decrease CO levels.

In addition, familiarize yourself with all enclosed materials. Read this manual in its entirety, and make sure you understand what to do if your Gas/CO Alarm sounds.

REGULATORY INFORMATION FOR EXPLOSIVE GAS/CO ALARMS

REGULATORY INFORMATION FOR CO ALARMS UNDERWRITERS LABORATORIES INC. UL2034

WHAT LEVELS OF CO CAUSE AN ALARM?

Underwriters Laboratories Inc. Standard UL2034 requires residential CO Alarms to sound when exposed to levels of CO and exposure times as described below. They are measured in parts per million (ppm) of CO over time (in minutes).

UL2034 Required Alarm Points*:

- If the alarm is exposed to 400 ppm of CO, IT MUST ALARM BETWEEN 4 and 15 MINUTES.
- If the alarm is exposed to 150 ppm of CO, IT MUST ALARM BETWEEN 10 and 50 MINUTES.
- If the alarm is exposed to 70 ppm of CO, IT MUST ALARM BETWEEN 60 and 240 MINUTES.

* Approximately 10% COHb exposure at levels of 10% to 95% Relative Humidity (RH).

The unit is designed not to alarm when exposed to a constant level of 30 ppm for 30 days.

IMPORTANT!

CO Alarms are designed to alarm before there is an immediate life threat. Since you cannot see or smell CO, never assume it's not present.

- An exposure to 100 ppm of CO for 20 minutes may not affect average, healthy adults, but after 4 hours the same level may cause headaches.
- An exposure to 400 ppm of CO may cause headaches in average, healthy adults after 35 minutes, but can cause death after 2 hours.

IMPORTANT!

This CO Alarm measures exposure to CO over time. It alarms if CO levels are extremely high in a short period of time, or if CO levels reach a certain minimum over a long period of time. The CO Alarm generally sounds an alarm before the onset of symptoms in average, healthy adults.

Why is this important? Because you need to be warned of a potential CO problem while you can still react in time. In many reported cases of CO exposure, victims may be aware that they are not feeling well, but become disoriented and can no longer react well enough to exit the building or get help. Also, young children and pets may be the first affected. The average healthy adult might not feel any symptoms when the CO Alarm sounds. However, people with cardiac or respiratory problems, infants, unborn babies, pregnant mothers, or elderly people can be more quickly and severely affected by CO. If you experience even mild symptoms of CO poisoning, consult your doctor immediately!

REGULATORY INFORMATION FOR CO ALARMS, Continued

Standards: Underwriters Laboratories Inc. Single and Multiple Station carbon monoxide alarms UL2034.

According to Underwriters Laboratories Inc. UL2034, Section 1-1.2: “Carbon monoxide alarms covered by these requirements are intended to respond to the presence of carbon monoxide from sources such as, but not limited to, exhaust from internal-combustion engines, abnormal operation of fuel-fired appliances, and fireplaces. CO Alarms are intended to alarm at carbon monoxide levels below those that could cause a loss of ability to react to the dangers of Carbon Monoxide exposure.” This CO Alarm monitors the air at the Alarm, and is designed to alarm before CO levels become life threatening. This allows you precious time to leave the house and correct the problem. This is only possible if Alarms are located, installed, and maintained as described in this manual.

Gas Detection at Typical Temperature and Humidity Ranges:

The CO Alarm is not formulated to detect CO levels below 30 ppm typically. UL tested for false alarm resistance to Methane (500 ppm), Butane (300 ppm), Heptane (500 ppm), Ethyl Acetate (200 ppm), Isopropyl Alcohol (200 ppm) and Carbon Dioxide (5000 ppm). Values measure gas and vapor concentrations in parts per million.

Audible Alarm: 85 dB minimum at 10 feet (3 meters).

REGULATORY INFORMATION FOR EXPLOSIVE GAS ALARMS

Standards: Underwriters Laboratories Inc. UL1484.

According to Underwriters Laboratories Inc. UL1484, this unit meets the alarm response time for gas as follows: This unit shall alarm before 25% of the LEL of either natural gas or propane is detected. In all cases, the unit will detect gas as a priority over carbon monoxide. If the device is detecting CO, then detects an amount of gas to cause an alarm, the device will stop alarming for CO and begin to alarm for gas.

GENERAL LIMITATIONS OF EXPLOSIVE GAS/CO ALARMS

This Gas/CO Alarm is intended for residential use. It is not intended for use in industrial applications where Occupational Safety and Health Administration (OSHA) requirements for Carbon Monoxide Alarms must be met. This device is not intended to alert hearing impaired residents.

Gas/CO Alarms may not waken all individuals. If children or others do not readily waken to the sound of the Gas/CO Alarm, or if there are infants or family members with mobility limitations, make sure that someone is assigned to assist them in the event of an emergency.

This Gas/CO Alarm will not sense gas or CO that does not reach the sensors. It will only sense gas or CO at the sensor. Gas or CO may be present in other areas. Doors or other obstructions may affect the rate at which CO or gas reaches the sensors.

Gas/CO Alarms may not be heard. The alarm horn loudness meets or exceeds current UL standards of 85 dB at 10 feet (3 meters). However, if the Gas/CO Alarm is installed outside the bedroom, it may not wake up a sound sleeper or one who has recently used drugs or has been drinking alcoholic beverages. This is especially true if the door is closed or only partly open. Even persons who are awake may not hear the alarm horn if the sound is blocked by distance or closed doors. Noise from traffic, stereo, radio, television, air conditioner, or other appliances may also prevent alert persons from hearing the alarm horn. This Gas/CO Alarm is not intended for people who are hearing impaired.

This Gas/CO Alarm is not a substitute for life insurance. Though this Gas/CO Alarm warns against increasing CO levels or the presence of gas, BRK Brands, Inc. does not warrant or imply in any way that they will protect lives. Homeowners and renters must still insure their lives.

This Gas/CO Alarm is not foolproof. Like all other electronic devices, this Gas/CO Alarm has limitations. It can only detect gas or CO that reaches the sensors. It may not give early warning of the source of gas or CO is in a remote part of the home, away from the alarm device.

This Gas/CO Alarm has a limited life. Although this Gas/CO Alarm and all of its parts have passed many stringent tests and are designed to be as reliable as possible, any of these parts could fail at any time. Therefore, you must test this device weekly. The unit should be replaced immediately if it is not operating properly.

Continued...

TROUBLESHOOTING GUIDE

If your Alarm does this...	It means...	You should...
Green light is OFF. Unit will not alarm when you press the Test/Silence button.	Unit may not be receiving any power.	Check the AC power supply. Make sure a fresh 9V battery is installed to power the battery back-up*.
Green light flashes ON, once a minute (horn is silent).	Alarm is not receiving AC power. Unit is operating on battery back-up.	Check the AC power supply.
The horn "chirps" once a minute.	Low battery warning. Battery is low or missing.	Replace the battery. Avoid interrupting AC power.
Once a minute, the alarm sounds 3 quick "chirps", and the green light flashes quickly three times.	Unit malfunction. Unit needs to be replaced. Based on self-diagnostic tests, the unit has detected a fault or the Alarm has reached its end-of-life, 5 years.	Units under warranty should be returned to manufacturer for replacement. See "Limited Warranty" for details.
The horn sounds constantly with no pattern and cannot be silenced.	Unit malfunction. Unit needs to be replaced.	Units under warranty should be returned to manufacturer for replacement. See "Limited Warranty" for details.
Alarm goes back into alarm after you pressed the Test/Silence button to silence an alarm.	Gas and/or CO levels are still potentially dangerous.	Refer to "If Your Gas/CO Alarm Sounds" for details on how to respond to an alarm. If anyone is feeling ill, EVACUATE your home immediately and call 911.
Alarm sounds frequently even though no high levels of gas or CO are revealed in an investigation.	The Alarm may be improperly located. Refer to "Where to Install This Alarm."	Relocate your alarm. If frequent alarms continue, have home rechecked for potential problems. You may be experiencing an intermittent gas or CO problem.

*For a list of acceptable replacement batteries, see "Regular Maintenance."

If you have any questions that cannot be answered by reading this manual, call Consumer Affairs: 1-800-323-9005.

LIMITED WARRANTY

BRK Brands, Inc., ("BRK") the maker of First Alert® brand products warrants that for a period of five years from the date of purchase, this product will be free from defects in material and workmanship. BRK, at its option, will repair or replace this product or any component of the product found to be defective during the warranty period. Replacement will be made with a new or remanufactured product or component. If the product is no longer available, replacement may be made with a similar product of equal or greater value. This is your exclusive warranty.

This warranty is valid for the original retail purchaser from the date of initial retail purchase and is not transferable. Keep the original sales receipt. Proof of purchase is required to obtain warranty performance. BRK dealers, service centers, or retail stores selling BRK products do not have the right to alter, modify or any way change the terms and conditions of this warranty.

This warranty does not cover normal wear of parts or damage resulting from any of the following: negligent use or misuse of the product, use on improper voltage or current, use contrary to the operating instructions, disassembly, repair or alteration by anyone other than BRK or an authorized service center. Further, the warranty does not cover Acts of God, such as fire, flood, hurricanes and tornadoes or any batteries that are included with this unit.

BRK shall not be liable for any incidental or consequential damages caused by the breach of any express or implied warranty. Except to the extent prohibited by applicable law, any implied warranty of merchantability or fitness for a particular purpose is limited in duration to the duration of the above warranty. Some states, provinces or jurisdictions do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above limitations or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state or province to province.

How to Obtain Warranty Service

Service: If service is required, do not return the product to your retailer. In order to obtain warranty service, contact the Consumer Affairs Division at 1-800-323-9005, 7:30 AM - 5:00 PM Central Standard Time, Monday through Friday. To assist us in serving you, please have the model number and date of purchase available when calling. 25 Spur Drive, El Paso TX 79906

Battery: BRK Brands, Inc. make no warranty, express or implied, written or oral, including that of merchantability or fitness for any particular purpose with respect to battery.

For your records, please record:

Date Purchased: _____

Where Purchased: _____

Date Installed: _____ / _____ **Month/Year**

Replacement date is five years after installation: _____ / _____
Month/Year

NOTE: End of Life Signal — Once the unit reaches the end of its lifecycle, the malfunction signal will sound once a minute to indicate the need to immediately replace the Alarm.

First Alert® is a registered trademark of the First Alert Trust.