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Natural gas hazards safety guide

For emergency services workers

Creating a safer state
with electricity and gas

This guide has been endorsed by the Victorian Energy Safety Commission.

Authorised and published by the Victorian Government, Melbourne
November 2021

ISBN: 978-1-925838-51-0 (Print)
ISBN: 978-1-925838-50-3 (Online)

This document is also available online at esv.vic.gov.au

Natural gas hazards safety guide

Foreward

Energy Safe Victoria (ESV) has developed the Natural Gas Hazards Safety Guide to provide guidance for all Victorian emergency services personnel when dealing with potential natural gas hazards, and managing safety where the natural gas supply system may be involved in fire, rescue and other emergency situations.

It is intended for use by Victoria's emergency services personnel in the course of emergency services duties, and should not be used by other persons for any other purpose.

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The energy industry safety regulator

Energy Safe Victoria

ESV is the independent safety regulator responsible for electricity, gas and pipeline safety in Victoria. ESV is established under the *Energy Safe Victoria Act 2005*.

Our principal role is to ensure the safe and efficient supply and use of energy to all Victorians.

The nature and scope of our activities are defined by the objectives, functions and responsibilities as described in the *Energy Safe Victoria Act 2005*, the *Electricity Safety Act 1998*, the *Gas Safety Act 1997* and the *Pipelines Act 2005* (the Acts), and the corresponding regulations.

We achieve our objectives through:

- minimising safety risks arising from exposure to energy supply and use
- ensuring that pipeline safety hazards are mitigated
- promoting energy safety and efficiency.

Our mission

ESV aspires to lead the Victorian community and industry in responding to the risks arising from the unprecedented transformation of energy devices, systems, networks and customer market behaviour; to ensure compliance with energy and pipeline legislative safety obligations by energy network and system operators, the gas and electrical trades, and the manufacturers and suppliers of energy products, and; to lead the state in demonstrating Victoria's commitment to safe and efficient energy supply and use, and pipeline safety.

Our vision

ESV is recognised as the leading technical and safety regulator, making a real and substantial difference to energy safety in Victoria through continuous improvement, risk-informed safety monitoring, and capability for anticipating and responding to safety issues.

Our safety objective

To minimise injury, loss of life and damage to property due to electrical or gas causes or the construction and operation of pipelines.

Who is this guideline for?

This guideline provides general information about gas safety considerations for emergency service personnel when attending gas-related emergencies.

It is not intended for use by the general public. It is also not intended to replace official emergency services guidelines and procedures.

The properties of natural gas

Natural gas is a naturally occurring, hydrocarbon gas mixture consisting primarily of methane. It may also contain small percentages of other hydrocarbons, carbon dioxide, nitrogen, oxygen, and hydrogen sulphide.

Natural gas is:

Highly flammable

- Take extreme care to prevent ignition hazards in the vicinity of any natural gas leak.
- Will explode at a gas-to-air ratio of between 5% and 15%.
- Highly volatile and has the potential to cause serious injury or death.
- Severe explosion hazard if exposed to heat or flame under the right conditions.

Lighter than air

- Approx. 60% density of air – gas will rise.
- Naturally tends to rise and dissipate rapidly in the air.
- Will follow the path of least resistance and travel upward through any available space (e.g. ducts, cracks in the road, etc.).
- Gas cloud may travel a considerable distance from the source of gas leaks.
- Will move laterally and migrate along utility lines or trenches until finding a way to travel upward.

Colourless and odourless in its natural state

- Odorant (a sulphur-based mercaptan blend) is artificially added.

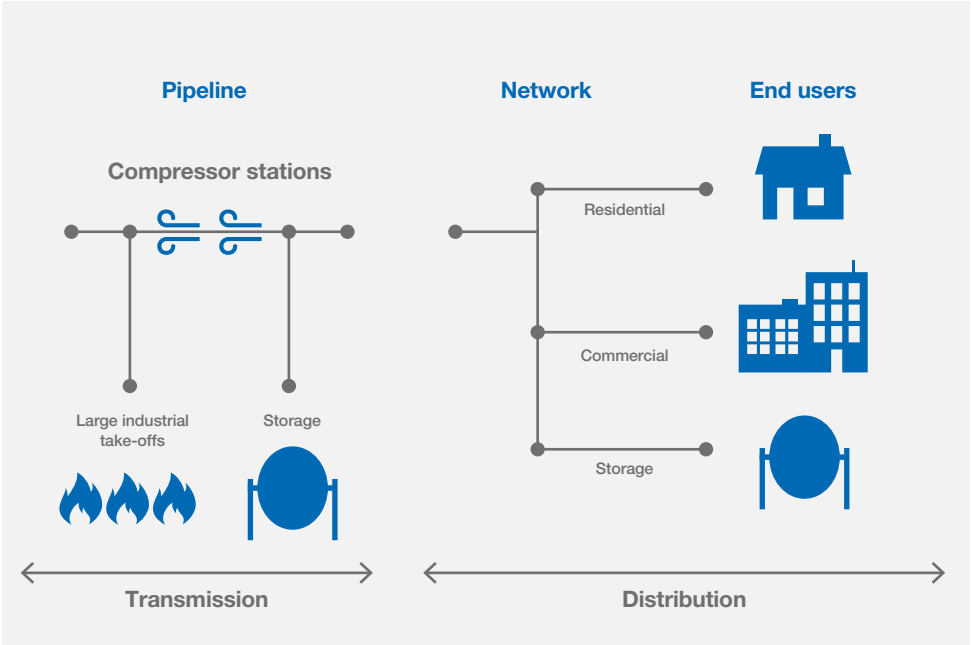
Non toxic

- Natural gas on its own is not toxic but can cause asphyxiation if it displaces air in an enclosed space.

The basics of natural gas supply

Natural gas is transported from gas production plants to consumers via the natural gas system, which comprises high pressure transmission pipelines and the distribution network, with its lower pressure services (gas mains and service lines).

Natural gas industry



Transmission

- Transmission gas pipelines move large volumes of natural gas from gas production facilities to major commercial and industrial customers or to city gates (pressure reduction facilities) before it enters the distribution network.
- Operate at a transmission pressure greater than 1,050 kilopascals.
- Transmission pipeline markers, which can be found along the right of way (or pipeline easement) or sometimes offset from the pipeline's centre line, include information about the pipeline operator, the pipeline's product, and emergency contact details.
- Pipelines are generally buried from 750 millimetres to 1500 millimetres deep.
- Pipeline diameters vary in areas and can range from between 50 millimetres (2 inches) through to 1006 millimetres (42 inches).
- Gas pipelines are made of steel and are designed to contain compressed gas and not for protection against impacts. Wall thickness ranges are variable between 5–20 millimetres.
- Pipelines and facilities may traverse private property and be in close proximately to new and older developments.
- Always take extreme care when working or responding to incidents in the vicinity of high pressure gas transmission pipelines and always contact the pipeline licensee.

Distribution

- Conveys natural gas from the outlet of the transmission system to consumer gas meters.
- Operate at a distribution pressure up to 1,050 kilopascals (which includes mains and services).
- Pipelines can be manufactured from a wide range of material including polymer and composite construction.

Gas supplies other than natural gas

Victoria has the highest rate of access to natural gas in Australia, and reticulated natural gas is available in most Victorian cities and large towns. Where natural gas is unavailable, liquefied petroleum gas (LPG) is often used as an alternative and is supplied via reticulated networks (for example, in Victoria's alpine areas and at Phillip Island) or in cylinders.

Responding to natural gas-related emergencies

The Australasian Inter-Service Incident Management System (AIIMS)

The Australasian Inter-Service Incident Management System (AIIMS) is the nationally recognised incident management system for fire and emergency service agencies.

The AIIMS system provides common terminology and procedures to facilitate coordination of information and resources among all responders, and is endorsed by the Australasian Fire and Emergency Service Authorities (AFAC) Council as the Incident Control System used by all Australian fire, emergency service and land management agencies.

Gas-related emergency response short list

Gas-related emergencies need a rapid and disciplined response, which can vary depending on the circumstances.

The following is a general sequence of events during an emergency.

- Notify the gas company.
- Establish an evacuation and exclusion zone.
- Identify hazards and assess site risks.
- Identify the gas leak.
- Organise to have the gas isolated.

(For more event-specific response sequences, see Responding to Gas Leaks/ Escape and Responding to Fires/Explosions later in this guidance.)

Notify the gas company

Notify the relevant gas company immediately (or seek confirmation this has been done) and request a response time.

In any situation where gas is involved, it is extremely important to communicate with the relevant gas company as soon as possible.

See page 28 for gas company emergency contact numbers.

Transmission

The transmission system in Victoria is predominately owned, maintained, and operated by APA VTS (Operation) Pty Ltd. Other parts of Victoria's transmission system are owned, maintained, and operated by independent transmission pipeline companies. Their contact details can be found on the pipeline markers located in the vicinity of the pipeline easement.

Transmission pipeline markers

Pipeline marker signs carry important contact information about a pipeline's owner and operator.

A warning that excavation near the pipeline is dangerous

The pipeline product

24 hour emergency phone number

A direction to contact the pipeline operator before excavating near the pipeline

The pipeline operator

Pipeline markers do not show the exact location of a pipeline but will typically be located on both sides of public roads, railways, rivers, vehicle tracks, or property boundaries, and are generally installed along the route of a transmission pipeline's right-of-way or easement, which can range from 6 to 25 metres wide.

The location of Victoria's gas transmission pipelines can be found via the Emergency Management Common Operating Picture (EM-COP)[1] (Data layer -> Infrastructure -> Services -> Gas Pipelines).

Distribution

Victoria's distribution networks are owned, maintained, and operated by three distribution businesses. Each distribution business is responsible for a separate geographic region, including the natural gas meter assembly at the premises.

Distribution network markers

Above ground markers and markings are used to identify and warn of the presence of gas distribution networks in certain locations. Network markers are used to show the location of mains and services where they may not be expected, when they represent a critical supply, where they are located in a high-density community-use location, or where they could not be laid in accordance with the means of conformance.

Installed at appropriate intervals and locations, and providing the network operator's name and contact telephone number, distribution network markers/markings can be found in various forms including:

- plates embedded in pavements above the infrastructure
- paddock markers
- signs next to the infrastructure.

1 Victoria's web-based communication, planning and collaboration tool enabling emergency personnel to quickly share information and make strategic decisions.

Establish an evacuation and exclusion zone

Do not approach the scene with vehicles or other mechanised equipment until the evacuation/exclusion zone has been established.

To effectively establish an evacuation and exclusion zone:

1. Isolate the general area. Do not allow members of the public, unauthorised persons, media, and other responders to enter. Consider establishing an evacuation area in a safe location upwind of the site.
2. For gas leaks in the street, establish an exclusion zone around the location of any fires and any other location where a vapour cloud may form and disperse into the air or travel underground. Always be aware that a damaged or leaking pipeline has the potential to rupture.

   Consult the pipeline licensee about establishing an exclusion zone. The pipeline licensee will have calculated the appropriate exclusion zone using a formula called the 'pipeline measurement length'. For more information, refer to *The possible consequences of a fire or explosion* on page 15.

   Do not attempt any excavation to identify the pressure or diameter of the piping material. Contact the gas company for advice about the asset and the required exclusion zone.

   The following table provides a general guide about the minimum distance the public should be kept from a leak, depending on the diameter and operating pressure of the affected pipeline.

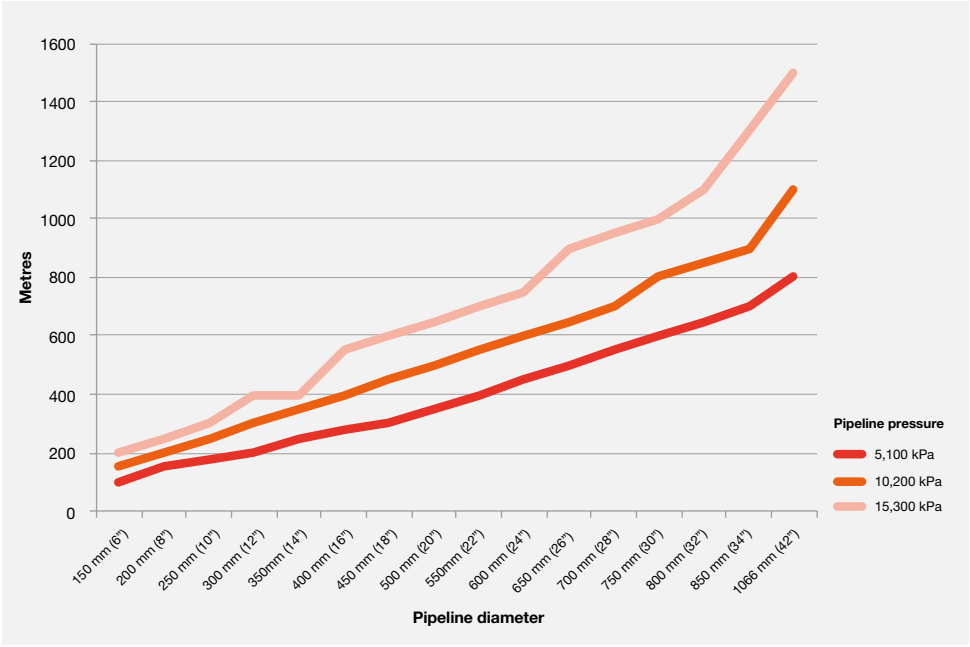
   In the case of low pressure leaks (distribution network mains and services), an exclusion and evacuation zone can also be established using gas detection equipment. A reading of 1% or more of Gas-In-Air Ratio or 20% Lower Explosive Limit (LEL) Of Natural Gas will be inside the exclusion zone.
3. Eliminate all potential ignition sources within the exclusion zone by:
   - restricting vehicle, tram, or rail access
   - contacting electricity distribution business to request isolation/ de-energisation of electrical infrastructure
   - prohibiting the use of any non-intrinsically safe electrical equipment (which means it cannot produce a spark) and especially mobile phones.
4. Follow the General precautions outlined on page 17.

Pipeline diameter	Recommended exclusion zone distance based on pipeline pressure and diameter This is the minimum distance people should be kept from the leak		
	5,100 kPa	10,200 kPa	15,300 kPa
150 mm (6”)	100 metres	150 metres	200 metres
200 mm (8”)	150 metres	200 metres	250 metres
250 mm (10”)	180 metres	250 metres	300 metres
300 mm (12”)	200 metres	300 metres	400 metres
350mm (14”)	250 metres	350 metres	400 metres
400 mm (16”)	280 metres	400 metres	550 metres
450 mm (18”)	300 metres	450 metres	600 metres
500 mm (20”)	350 metres	500 metres	650 metres
550mm (22”)	400 metres	550 metres	700 metres
600 mm (24”)	450 metres	600 metres	750 metres
650 mm (26”)	500 metres	650 metres	900 metres
700 mm (28”)	550 metres	700 metres	950 metres
750 mm (30”)	600 metres	800 metres	1000 metres
800 mm (32”)	650 metres	850 metres	1100 metres
850 mm (34”)	700 metres	900 metres	1300 metres
1066 mm (42”)	800 metres	1100 metres	1500 metres

Source: AS/NZS 2885.6:2018 Appendix B Radiation contour.

Recommended exclusion zone distance – based on pipeline pressure and diameter

The chart below shows the minimum distance people should be kept from a gas leak.



Source: AS/NZS 2885.6:2018 Appendix B Radiation contour.

The possible consequences of a fire or explosion

Establishing an exclusion zone to reduce the risk of a fire or explosion is extremely important.

This is because heat radiation from a fire or explosion can have serious consequences depending on its intensity.

The distance within which death or serious injury can be expected (the consequence distance) will vary depending on a number of factors including the pipeline's specifications (size, length, and thickness), the operating pressure, and the gas specifications.

The gas company uses a 4.7kW/m^2 radiation contour (the pipeline measurement length) to establish the exclusion (or evacuation) zone for a transmission pipeline leak.

Heat intensity (kW/m^2)	Effect
4.7	Will cause pain in 15-20 seconds and injury after 30 seconds of exposure (at least second degree burns will occur).
12.6	High chance of injury. Significant chance of fatality after extended exposure. Causes the temperature of wood to rise to a point where it can be ignited by a naked flame after extended exposure. Thin steel with insulation on the surface away from the fire may reach a thermal stress level high enough to cause structural failure.

Beware of explosive reignition

Extinguishing a primary, gas-fuelled fire can result in explosive reignition. Unless lives are at risk, do not attempt to extinguish a pipeline-fuelled gas fire unless the:

» gas has been isolated, and

» pipeline licensee has given consent for the action.

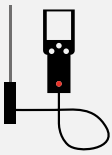
If a gas pipeline has not been isolated and the fire has been extinguished, leaking gas can migrate until it finds another ignition source.

Identify hazards and assess site risks

Always undertake a risk assessment to determine potential hazards and be aware of:

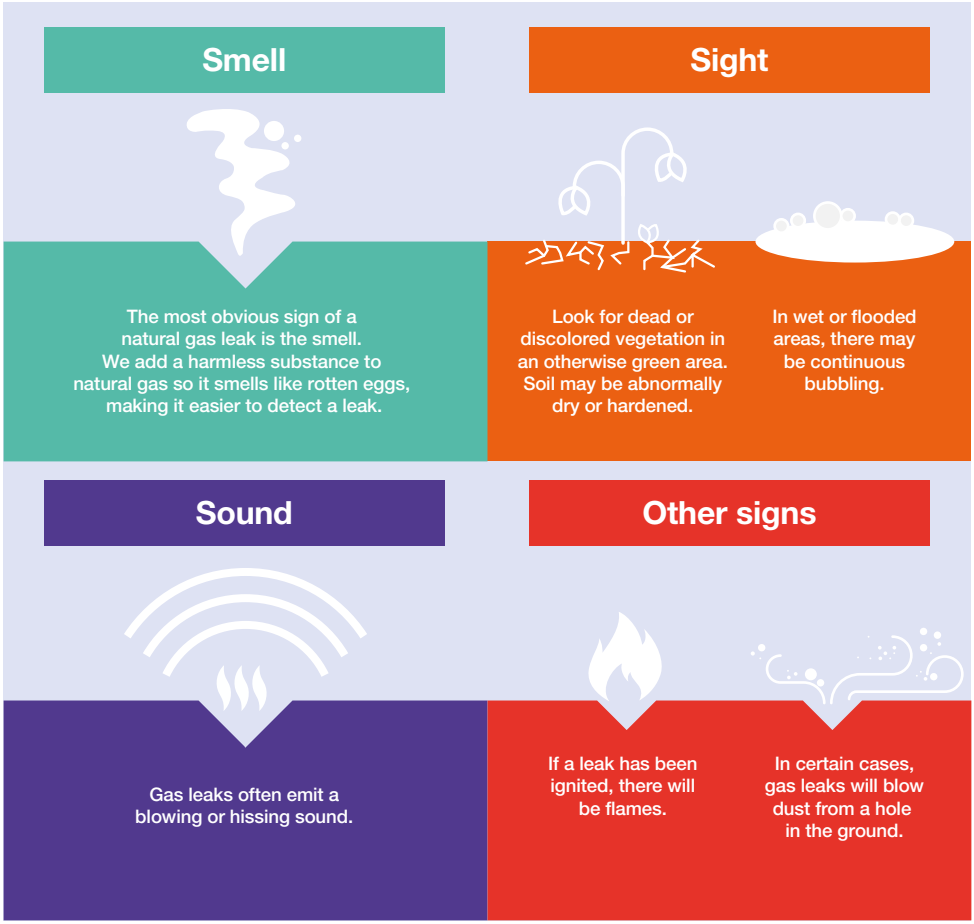
- gas accumulation in underground spaces or buildings—stay clear of manholes, pits, sewers, drains, and conduits
- ignition sources (even the smallest flame or spark can ignite leaking natural gas) including:
  - electrical assets (for example, overhead power lines and sub-stations)—contact the relevant electricity supply company to have any electrical assets in the vicinity of the gas leak isolated
  - vehicles/trams/trains—do not park emergency vehicles near places where natural gas can accumulate, such as manholes, pits, sewers, drains, and conduits, and control traffic to prohibit vehicles, trams, or trains moving into the vicinity of the gas leak
  - equipment/machinery—when safe to do so, switch off all running equipment and machinery, and prohibit the use of any equipment or machinery that is not intrinsically safe (unable to produce a spark) in the vicinity of the gas leak (this includes hand tools, radios, mobile phones, flashlights etc.).
- signs of the gas leak's location.

General precautions

	Establish an evacuation and exclusion zone.
	Isolate or eliminate potential ignition sources (anything that can produce sparks). This includes power lines, electrical motors, firearms, vehicles, mobile phones, torches, emergency radios, cigarettes, construction equipment, static electricity and open flames.
	Approach cautiously and stay in an upwind or a crosswind location (ensuring the wind is not blowing gas towards you) and if possible approach from downhill (as natural gas is lighter than air). Stay out of the path of the leak at a safe distance.
	Stay out of manholes, pits, sewers, drains, or any type of underground vault. Do not park over stormwater drains or manholes. Do not move or drive into a vapour cloud or puddle of liquid.
	Monitor the atmosphere for the gas-in-air ratio as well as to measure how far the gas has travelled. Atmospheric conditions may impact the information from the air monitoring equipment, which can help to establish the evacuation area. Retreat to a safe area if the gas detector alarms. Continuous gas monitoring is required while personal are inside the evacuation area.
	If possible, equip with full self-contained breathing apparatus (SCBA) and personal protective equipment (PPE).

Identify the gas leak

A gas leak can generate a number of detectable signs. These can include sounds, visible disturbances and smells.



Source: newlook.dteenergy.com/

Transmission pipeline leaks

The most common cause of damage to a transmission pipeline is unauthorised excavation and construction activities. The worst case scenario for a transmission pipeline incident is a full bore rupture of the pipeline, which can result in fire or explosion.

Outdoor gas leaks/escapes rarely involve transmission pipelines but are extremely serious when they do.

Do not enter a transmission pipeline facility without consulting the pipeline operator.

Due to the severity of the possible consequences of a transmission pipeline gas leak, further consideration may be required when establishing the exclusion and evacuation zone.

See Establish an evacuation and exclusion zone on page 12 for more information.

Distribution network leaks

The most common cause of damage to distribution networks is also unauthorised excavation and construction activities. Pipe failure can also occur due to cracking from extreme weather as surrounding soil contracts, or from pinholes due to corrosion.

Outdoor gas leaks/escapes most commonly involve the distribution network, and signs of a gas leak may include:

- browning or discoloured vegetation on an easement
- a mist, shimmer, or vapour cloud
- dirt being blown into the air or bubbles from a water course
- the smell of gas.

Organise to have the gas isolated

Gas transmission pipelines and distribution networks (gas mains and services) must be isolated by the pipeline operator or relevant distribution company.

Isolating gas transmission pipelines

Contact the gas company or pipeline operator (as per the pipeline marker signs) to alert them about the incident so they can isolate the supply. Infrastructure asset gas isolation valves should only be operated by the relevant gas company or pipeline operator.

A delay (possibly up to several hours) can occur because isolating a gas transmission pipeline can adversely affect the community. Commercial, industrial, domestic consumers and essential services may be impacted. Unless there is an immediate safety risk, gas isolation must be coordinated between pipeline operators and regulatory authorities.

The distance between gas isolation valves can also affect how quickly the gas supply stops once the supply has been isolated:

- In urban areas, isolation valves are located closer together, so gas can be isolated quite quickly.
- In country areas, isolation valves can be much further apart, sometimes more than 100 kilometres, which means it can take several hours to isolate and depressurise the gas supply.

Isolating gas distribution networks (gas mains and services)

Contact the gas distribution business that owns and operates the network. While the gas distribution network can be isolated using isolation valves, this should only be done by the relevant distribution business.

Never attempt to 'squash off' any of the gas mains and service lines to isolate the leak. This may cause a static spark and ignite the leaking gas. It may also disconnect supply to potentially vulnerable or gas critical customers within the network.

Isolating commercial buildings and industrial premises

Individual structures will have a dedicated isolation valve, which is required at the entry point of piping to each building. This does not apply to single occupancy residential premises, where the isolation valve is located on the outlet of the gas meter.

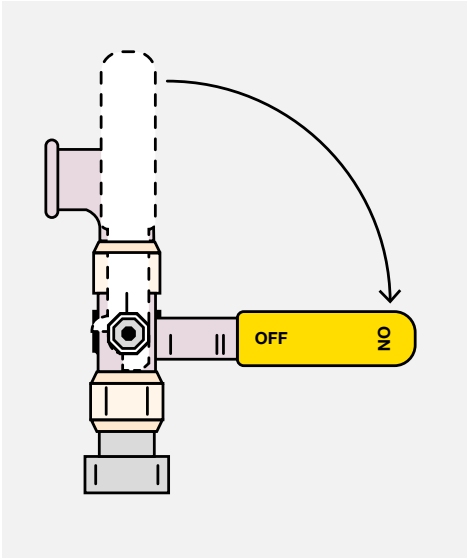
Multi-storey buildings will typically have isolation valves for each level. Buildings built since 2014 will have isolation valves for each tenancy (or occupancy). These valves are required to be accessible and identified by the tenancy being supplied.

In commercial, industrial or residential apartment buildings, every gas appliance requires an accessible isolation valve.

In single residential buildings (with the exception of cooking appliances, space heaters, and gas lights), all gas appliances are required to have an accessible isolation valve.

Isolating domestic residential premises

Domestic gas isolation valves are normally found at the boundary meter or the tenancy isolation valve. Locate the isolation valve and turn it to the 'off' position (which is horizontal to the pipe or ninety degrees to the direction of flow) as shown below.



Other considerations

When gas leaks occur and dissipate in air, the smell of gas may be noticeable even outside the exclusion/evacuation zone. Consideration should be given for managing odour complaints from the community downwind of the location of the incident.

When conducting any plume modelling during the incident, contact the gas company for information about the design and operational parameters of the affected transmission pipelines/distribution networks.

Responding to gas leaks/escape (outdoors)

Outdoor gas leak/escape response checklist:

1. Notify the gas company immediately. This will be a pipeline licensee/operator (transmission pipelines) or distribution business (gas mains and service lines).
2. Establish an exclusion zone around the leak's location. Leaking gas will create a vapour cloud and disperse into the air due to its density.

Establish the exclusion zone's area by using:

» the pipeline licensee's 'pipeline measurement length' as the exclusion area (for a transmission pipeline), or

» gas detection equipment to take air quality readings. A reading of 1% or more of Gas-In-Air Ratio or 20% Lower Explosive Limit (LEL) Of Natural Gas will be inside the exclusion zone.

» Also check for any manholes, sewers, or vaults in the nearby area and test (without entering) to identify for any additional gas travel, as this may extend the exclusion zone area.

3. Eliminate all potential ignition sources within the exclusion zone by:
   - restricting vehicle, tram or rail access
   - contacting the electricity distribution business to request isolation/de-energisation of electrical infrastructures
   - prohibiting the use of any non-intrinsically safe electrical equipment (especially mobile phones).
4. Use dispersal lines where required to disperse vapour clouds. If a gas main is leaking, do not allow water into pits and trenches. A fully charged hose line should also be deployed.
   Only use water in exceptional circumstances to dissipate gas.

» Do not attempt to close or operate any mainline valves as this may change system pressures.

» Do not attempt to 'squash off' a pipeline to isolate the leak (irrespective of the material of the pipeline) as this may result in a static spark and ignite the leaking gas. It may also disconnect supply to potentially vulnerable and gas critical customers within the network.

Responding to gas leaks/escape (indoors)

Indoor gas leak/escape response checklist:

1. Notify the gas company immediately. This will be a distribution business.
2. Evacuate the building and establish an exclusion zone:
   - Use gas detection equipment to take air quality readings. A reading of 1% or more of Gas-In-Air Ratio or 20% Lower Explosive Limit (LEL) Of Natural Gas will be inside the exclusion zone.
   - Depending on the severity of the leak, also consider evacuating nearby houses and buildings (especially in densely populated areas).
3. Eliminate all potential ignition sources:
   - In high rise buildings, consider contacting the relevant electricity distribution company to isolate the building's electricity supply. Give special consideration to shutting down any possible backup generation that may be activated when the electricity supply is removed.
   - Only use intrinsically safe equipment (e.g. radios, flashlights, etc).
4. Establish natural ventilation as soon as possible (by opening windows and doors) to prevent natural gas from accumulating above the lower explosive limit.
   - If the building has already reached the upper explosive limit, take special consideration/care when ventilating through the explosive range.
5. If it is safe to do so, isolate the gas supply to the premises by turning off the main isolation valve at the gas meter.
   - Before closing the valve, note the sound of gas flowing through the meter and look for movement of the numbers on the face of the meter.
   - Turn the valve tap/lever to the horizontal 'off' position (at a right angle to the pipe). When supply has been isolated, the sound and number movement at the meter should cease.

- Avoid potential ignition sources:
  - Do not use doorbells, light switches, and garage door openers.
  - Avoid stepping on doormats as friction from boots may create a spark of static electricity.
  - Do not use mechanical methods for ventilation (for example, fans).
- Do not attempt to close or operate any mainline valves (on the street or underground, etc.) as this may change system pressures.
- Do not attempt to re-open gas valves closed during the incident investigation, even if it has been determined the gas leak has been fixed. A proper integrity testing and relighting process will need to be performed by qualified personnel before the re-commissioning of gas to the premises.

Responding to fires/explosions (outdoors)

Outdoor fire/explosion response checklist:

1. Notify the gas company immediately. This will be a pipeline licensee/operator (for transmission pipelines) or distribution business (for gas mains and services).
2. Control surrounding combustible material and extinguish any smouldering embers in the surrounding area. Use dispersal lines where required to disperse vapour clouds. If a gas main is leaking, do not allow water into pits and trenches, and deploy a fully charged hose line. Water should only be used in exceptional circumstances to dissipate the gas.
3. Establish an exclusion zone around the location of the fire and any other location where a vapour cloud may form and disperse into the air or travel underground. Establish the exclusion zone's area by:
   - applying the pipeline licensee's 'pipeline measurement length' as the exclusion area (for a transmission pipeline), or
   - using gas detection equipment to take air quality readings; a reading of 1% or more of Gas-In-Air Ratio or 20% Lower Explosive Limit (LEL) Of Natural Gas will be inside the exclusion zone
   - checking to see if there are buildings, manholes, sewers or vaults nearby and testing (without entering) to identify any additional paths for the gas to travel, as this may extend the exclusion zone area.
4. Eliminate all potential ignition sources:
   - Restrict vehicle, tram or rail access.
   - Isolate/de-energise electrical infrastructure.
   - Prohibit the use of any non-intrinsically safe electrical equipment (especially mobile phones).

- » Do not attempt to extinguish burning gas. Let it burn until the gas supply can be isolated.
- » When controlling surrounding combustible materials, avoid using water in directing solid streams at the escaping gas or at the excavated area (in the case of a pipeline strike) as water will enter the excavated hole or the gas pipeline and may create an additional hazard that will impact the repair process.
- » Do not attempt to close or operate any mainline valves as this may change system pressures.
- » Do not attempt to 'squash off' a pipeline to isolate the leak (irrespective of the material of the pipeline) as this may result in a static spark and ignite the leaking gas. It may also disconnect supply to potentially vulnerable and gas critical customers within the network.

Responding to fires/explosions (structures)

Structural fire/explosion response checklist:

1. Notify the gas company immediately. This will be a distribution business.
2. If it is safe to do so, isolate the gas supply by turning off the main isolation valve at the gas meter.
   - Before closing the valve, note the sound of gas flowing through the meter and look for movement of the numbers on the face of the meter.
   - Turn the valve tap/lever to the horizontal 'off' position (at a right angle to the pipe). When supply has been isolated, the sound and number movement at the meter should cease.
   - For industrial or commercial buildings, isolating the gas supply may interrupt important and costly processes or create further hazards. Where possible, always consult with the relevant facility management or the gas company prior to gas isolation.

     If the gas supply cannot be isolated, suppress the surrounding fire and control nearby combustibles to prevent the fire from spreading.
3. Establish an exclusion zone around the location of the fire and any other location where a vapour cloud may form and disperse into the air or travel underground.

   Establish the exclusion zone's area by:
   - using gas detection equipment to take air quality readings; a reading of 1% or more of Gas-In-Air Ratio or 20% Lower Explosive Limit (LEL) Of Natural Gas will be inside the exclusion zone.
   - checking to see if there are buildings, manholes, sewers or vaults nearby and testing (without entering) to identify any additional paths for the gas to travel, as this may extend the exclusion zone area.
4. Contact the relevant electricity distribution business to request isolation/de-energisation of the electricity supply.

- » Do not attempt to close or operate any mainline valves as this may affect system pressure.
- » Do not attempt to 'squash off' any pipeline to isolate the gas supply as this may result in a static spark that may ignite leaking gas.

Carbon monoxide exposure

Carbon monoxide is:

Colourless, odourless and tasteless

Not easily detectable by people.

Extremely poisonous

- Particularly when inhaled in an enclosed/poorly ventilated space.
- Carbon monoxide can rapidly build up in red blood cells, eventually replacing the oxygen in the blood, blocking oxygen from getting into the body, damaging tissues and potentially resulting in death.
- Carbon monoxide poisoning may cause symptoms including tiredness, shortness of breath, headaches, dizziness, nausea, weakness, confusion or chest pain.
- Extended exposure can cause seizures, loss of consciousness, coma, permanent brain injury and death.

Slightly lighter than air

Will tend to rise and dissipate in the air.

Comes from incomplete combustion

The incomplete combustion of fuels like natural gas, LP gas, coal, petrol, and wood can create excess carbon monoxide gas.

Appliances that produce carbon monoxide gas include:

- Gas heaters (space heaters, wall furnaces, and ducted central heaters).
- Gas water heaters.
- Stove tops and ovens.
- Gas powered refrigerators.
- Decorative log fires.
- Barbeques.

Carbon monoxide response checklist:

- Constantly monitor carbon monoxide levels using a carbon monoxide detector and, if safe to do so, identify the potential source (commonly from a gas heater).
- Ventilate the premises by opening all windows and doors.
- Turn off all gas appliance(s).
- Advise the occupant/owner not to turn on the suspect gas appliance until it is inspected and tested by a qualified gasfitter.

Gas company emergency numbers

The distribution networks

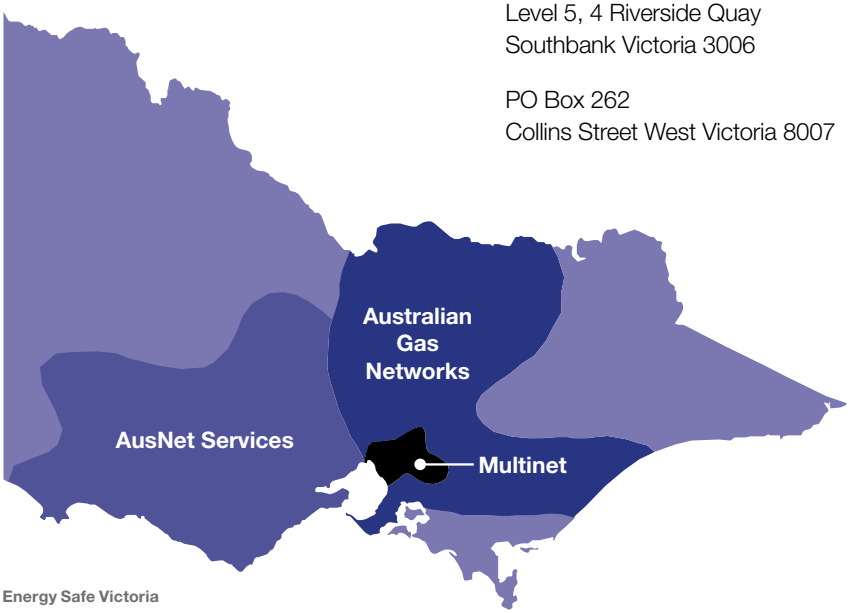
Each distribution business is responsible for a separate region.

AusNet Services: 136 707
Western Region

Australian Gas Networks: 1800 898 220
Northern and Eastern Region

Multinet Gas: 132 691
Central & Metro Region

The distribution network businesses are responsible for the entire distribution network, including the natural gas meter at the premises.



Energy Safe Victoria

The transmission system

APA VTS (Operation) Pty Ltd
1800 017 000

Energy Safe Victoria

Call 1800 671 337
to report any gas related incident

General enquiries 03 9203 9700
or 1800 800 158

info@energysafe.vic.gov.au
esv.vic.gov.au
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