



# Response Guide

In the presence  
of natural gas  
from the network



## Table of Contents

Aim	3
Natural Gas	4
Properties of Natural Gas	4
Risks	5
Signs of leakage	6
Emergency response structure	7
Responder Roles and Responsibilities	8
<b>Distribution</b>	<b>11</b>
Gas distribution network	11
Response Tactics	12
<b>Transmission</b>	<b>16</b>
Gas transmission network	16
Emergency Planning Zone (EPZ)	16
Response Tactics	17
<b>Énergir technical response</b>	<b>18</b>
Distribution Network	18
Transmission Network	19
Champion gas network	20
<b>Complementary Information</b>	<b>22</b>

## Aim

This document is intended to provide information on natural gas in order to support emergency response services should an incident occur in the gas distribution, supply or transmission network.

# Natural Gas

Natural gas is comprised of 95% methane (CH<sub>4</sub>).

- It is lighter than air and disperses into the atmosphere when released.
- It is naturally odourless. An odorous substance, mercaptan, which has a rotten-egg smell, is added to it to make it possible to detect its presence in very low concentrations in the air (less than 1%).
- It is neither toxic nor soluble in water.
- It contains 4% ethane, distinguishing it from swamp gas.

It appears mainly in one of two forms: gaseous or liquified. In the gas network, it is found in the gaseous state. (Refer to the LNG Response Guide for more detail on liquefied natural gas.)

## Properties of Natural Gas

Appearance

(physical state, colour, etc.)

**Colourless and odourless gas**

Vapour density (air = 1)

**0.578 (lighter than air)**

Initial boiling point

**-161°C**

Flash point

**-188°C**

Lower flammability  
or explosive limit  
(LFL / LEL)

**4.9% (at 25°C)**

Odour

**Odorant (mercaptan) for  
leak detection – smells like  
rotten eggs**

Olfactory threshold

**Less than 1% in the air**

Relative density of LNG  
(water = 1)

**0.44 to -162°C**

Auto-ignition temperature

**538°C**

Upper flammable or explosive  
limit (UFL / UEL)

**14.9% (at 25°C)**

# Risks

Natural gas is a safe, non-toxic energy source. Yet as with any source of energy, it must be treated and handled with care. The following risks must be taken into account, particularly with respect to the establishment of safety perimeters.

## Noise and projection of objects



When there is a leak from a pipeline or an appliance in the gas network, the whistling noise produced by the natural gas as it escapes can damage a person's hearing. Furthermore, in the case of a large leak, nearby objects may be projected as a result of the pressure of the escaping gas.

## Air displacement and asphyxia



Natural gas breathed in accidentally, in a small quantity, has no effect. However, and as with any substance able to displace air, a high concentration of natural gas may deprive a living organism of oxygen and thereby cause asphyxia.

## Fire fuelled by natural gas



A fire fuelled by natural gas releases an intense heat that may inflict burns on a person who is near the flame and not wearing protective equipment. These burns may be caused by a burning leak or a fireball.

## Deflagration



If natural gas builds up within an enclosed space, a risk arises when it reaches the flammability range. Should ignition occur in such an environment, all the fuel will be immediately consumed through a deflagration.



## Signs of leakage

### Olfactory indicator

Natural gas is odorized and has a characteristic rotten-egg smell (mercaptan). Inside transmission lines, it is not always odorized, in which case it can be distinguished by a slight odour of hydrocarbons.

### Aural indicator

Depending on the pressure inside the pipeline and the extent of the damage to it, it may be possible to hear a whistling or rumbling sound.

### Visual indicator

The line's loss of containment may be detected by the presence of:

- Stained or melted snow or ice above a section of pipe;
- Dust projected into the air;
- Bubbles at the surface of a stream, river or pond;
- Discoloration of vegetation near a pipeline.

### Confirmation measurement

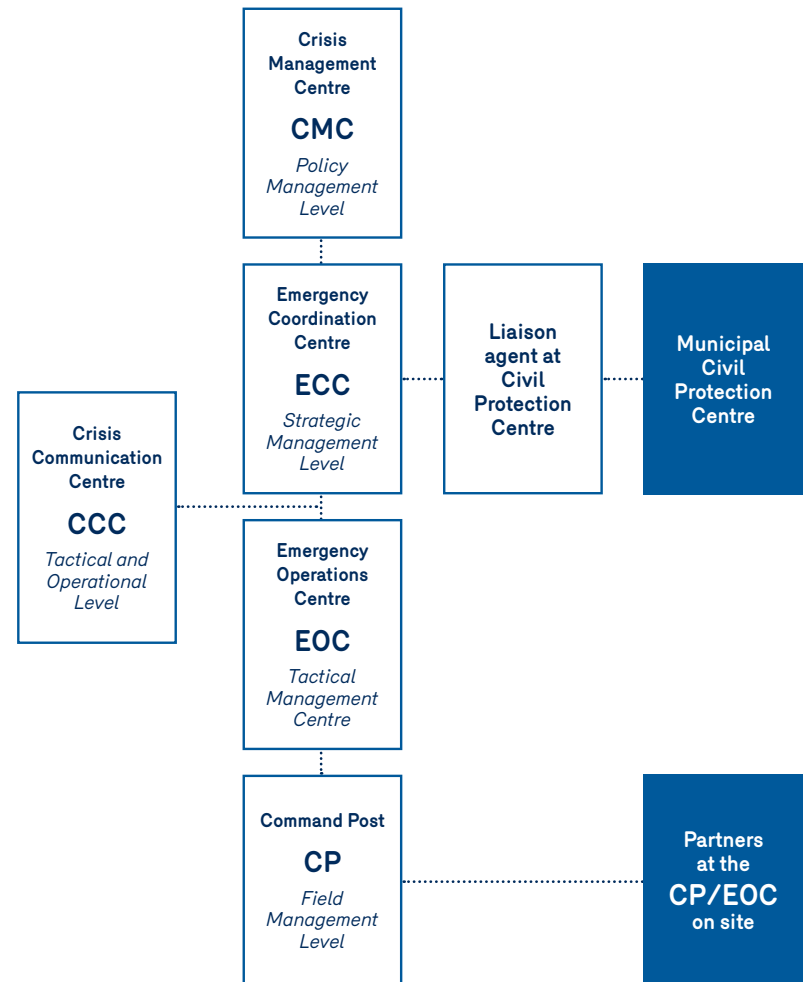
It will be possible to confirm the presence of natural gas by taking gas readings using detection equipment.



## Emergency response structure

When an incident involving natural gas occurs, a gradual mobilization of Énergir's human and material resources is deployed based on preestablished alert levels.

Énergir has developed an alert procedure, based on the principle of response escalation, whose aim is to notify its emergency responders of the scale and nature of the event to which they are summoned to respond. This procedure has the following sequence:





# Responder Roles and Responsibilities

## Responders are in the unified CP

### Roles and Responsibilities – Énergir CP

When an incident involving natural gas occurs, the Énergir CP:

- Collaborates in the response headed by the Commanding Officer of the FD (Fire Department);
- Participates in securing the premises in support of the FD (gas readings, site layout);
- Takes action on the network (e.g., leak repair, ventilation);
- Puts the network back into service following such action;
- Coordinates with the internal and emergency responders.

### Roles and Responsibilities – FD CP

The actions to be undertaken depend on the scale of the situation.

Responsibility	Actions
Site management / Unified CP / EOS	<p>Ensure the <b>taking of command</b>.</p> <p>Establish the necessary perimeters.</p> <p><b>Secure the premises</b>, in particular through the following actions:</p> <ul style="list-style-type: none"> <li>• Taking gas readings</li> <li>• Establishing the necessary perimeters</li> <li>• Installing protective water jets (avoid flooding the trench or clogging it with sludge or debris)</li> <li>• Positioning the firefighting units according to the perimeters</li> </ul> <p>Assess and analyze the situation in collaboration with Énergir.</p> <p><b>Coordinate the actions</b> of the responders at the unified CP (firefighters, police officers, ambulance drivers, Énergir, Hydro One, MTQ, etc.).</p>
Response	<p>Don the requisite protective gear.</p> <p>Eliminate all sources of ignition and heat (e.g., validate shutdown of electrical current with Hydro One) and anticipate the associated issues (e.g., generator, loss of electric power).</p>

Response (cont'd)	<p>If there is ignition, protect any vulnerable environment located near the flame or secondary sources of fire.</p> <p>Proceed with search and rescue operations and administer first aid to the injured.</p> <p>Set up a temporary housing installation and provide assistance to evacuated and injured people.</p>
Site access	<p>Allow Énergir employees safe access to the response site.</p> <p>Decide on an <b>evacuation strategy</b> (e.g., according to wind direction, access paths and traffic flow).</p> <p>Evacuate persons finding themselves <b>within the perimeter</b> and <b>refuse access</b> to all unauthorized persons.</p>
Coordination	<p><b>Notify</b> those in charge of the facilities located <b>in the risk zone</b> so they can adopt prevention and response measures.</p> <p>Get informed on the duration of the response in order to plan ahead for team shift changes or make a request for backup assistance.</p>
Reintegration	<p>Before authorizing the return of evacuees, ensure the area's safety.</p> <p>Énergir personnel may proceed with concentration readings using a gas detector.</p>
Investigation	<p>Preserve the scene of the incident or disaster for investigative purposes.</p> <p>Collaborate in the evaluation of property and environmental damages.</p>

#### Avoid:

- Attempting to extinguish a flame fuelled by natural gas.
- Moving or handling the equipment of Champion's network, with the exception, as necessary, of shutting off service line valves (generally indicated in red).
- Entering our fenced facilities (e.g., station).



## Roles and Responsibilities – Police Department CP

When an incident involving natural gas occurs, the Police CP:

- Establishes the safety perimeter;
- Directs traffic outside the perimeter, in collaboration with the partners concerned;
- Manages the crowds that might form nearby;
- Collaborates in the investigation or spearheads it, as necessary (e.g., incident resulting from criminal activity).

## Distribution

### Gas distribution network

On its way to the end user, natural gas goes through the distribution network. It runs through various pipelines buried underground, chiefly in public rights-of-way, to connect with houses, businesses and industries.

Natural gas makes its way to the client via so-called supply lines (moderate pressure) and distribution lines (low pressure).

This portion of the network, for the most part located in proximity to urban activity, experiences the lion's share of breaks caused by third parties (excavation, shovelling or unclogging of sewers at spots where there is a natural gas line present, etc.). Leaks most often occur on the street (external leak) or inside a building (internal leak).

Network	Diameter	Pressure	Line	Location
Supply	220 mm (8 in.)	1 200 kPa (175 psi)	Steel	Chiefly public rights-of-way



## Response Tactics

### External leak – Distribution / Supply

- Evacuate nearby buildings, if required.
- Establish the response perimeters.

#### Leak or odour without ignition

- Carry out gas detection at all times.
- Approach any leak or rupture with the wind at your back.
- Eliminate all sources of ignition (e.g., traffic lights, motor, etc.).
- Consider the possible underground migration of gas (e.g., sewers).
- Check and evacuate buildings next to the perimeter, if necessary.
- Ask the occupants of neighbouring buildings to prevent natural gas from penetrating the buildings.
- Ensure, as necessary, that appropriate ventilation practices are in place.
- Request that all ventilation systems (intake of outdoor air) of neighbouring buildings be shut off.
- Allow Énergir employees to access the site and to repair the rupture.
- Do not flood the natural gas outlet (trench).

- The initial operations perimeter should extend 100 m from the location of the leak. It may be adjusted according to the situation. The group leader can advise you in decision making.
- Allow Énergir's technicians to resolve the situation.
- Never undertake to reopen a natural gas valve. It is essential to contact Énergir when a valve has been shut. Only an Énergir technician can reopen a natural gas valve.

### External leak – Distribution / Supply

- Evacuate nearby buildings, if required.
- Establish the response perimeters.

#### With ignition / fire

- Avoid extinguishing the burning natural gas.
- Protect the neighbouring structures.
- Avoid flooding the gas outlet, in order to not have water in the pipes.
- Allow Énergir technicians safe access to the area (to plug up the leak, among other things).

- The initial operations perimeter should extend 100 m from the location of the burning leak. It may be adjusted according to the situation (heat). The group leader can advise you in decision making.
- Allow Énergir's technicians to resolve the situation.
- Never undertake to reopen a natural gas valve. It is essential to contact Énergir when a valve has been shut. Only an Énergir technician can reopen a natural gas valve.



# Transmission

## Gas transmission network

This network spans considerable distances. It is comprised of steel pipelines, often quite substantial in diameter, and carries natural gas at high pressure. This type of piping, though it may cross through municipalities, is usually found in less dense areas, installed in easements legally granted to Champion Pipeline.

Work cannot be conducted within these easements without prior authorization and without the presence of Énergir. Incidents involving this type of piping, while infrequent, must be considered a potential risk.

Network	Diameter	Pressure	Line	Location
Transmission	220 mm (8 in.)	7 000 kPa	Steel	Mostly easements

## Emergency Planning Zone (EPZ)

A scenario for emergency measures planning for transmission pipelines is provided by Énergir. The EPZ is an emergency measures planning corridor based on a highly unlikely leak scenario having the most significant consequences.

All uses and structures present within this corridor should be located by the municipality. The municipalities and their emergency departments should integrate this element into their emergency measures plan and their civil protection plan:

- Response perimeter;
- Evacuation plan;
- Response tactics.

## Response Tactics

### External Leak – Transmission

- Establish the response perimeters (according to noise, heat and the EPZ).
- Evacuate the perimeter.
- Allow Énergir personnel to isolate the portion of the network affected, by shutting off the block valves.

Leak or odour without ignition	With ignition / fire
<ul style="list-style-type: none"><li>• Make sure the natural gas escapes to the open air.</li><li>• Eliminate all sources of ignition (e.g., traffic lights, motor).</li><li>• Prevent the migration of the natural gas via an underground pathway.</li><li>• Approach any leak or rupture with the wind at your back.</li></ul>	<ul style="list-style-type: none"><li>• Protect any vulnerable and/or combustible environment (e.g., houses, cars, trees).</li><li>• Do not flood the natural gas outlet (trench), in order to not have water in the pipelines.</li><li>• Avoid extinguishing the burning natural gas.</li></ul>

- The initial operations perimeter should be based on the emergency planning zone. It may be adjusted according to the situation. The group leader can advise you in decision making.
- Allow Énergir’s technicians to resolve the situation.
- Never undertake to shut off or reopen a natural gas valve (e.g., in a station). Only an Énergir technician is qualified to do so.






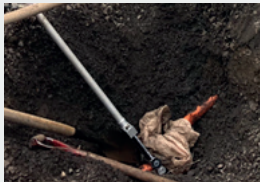
## Énergir technical response




Énergir's teams respond within 35 minutes on average, for situations involving a fire, an explosion, a fire inside a building with natural gas or a leak with odour to the atmosphere, including cases of third-party ruptures (on the service line or on the mains line), intoxication, asphyxia or other call related to CO, delayed ignition, flooding or water damage, and pressure problems (high pressure).

When in doubt, contact us and wait for us in order to provide the information related to the event.


Énergir's response tactics will vary according to the situation. Here are the main situations to know. These procedures are subject to numerous conditions aimed at ensuring the safety of responders. Refer to the group leader at the CP (yellow vest) to confirm the applicable response plan.

### Distribution Network

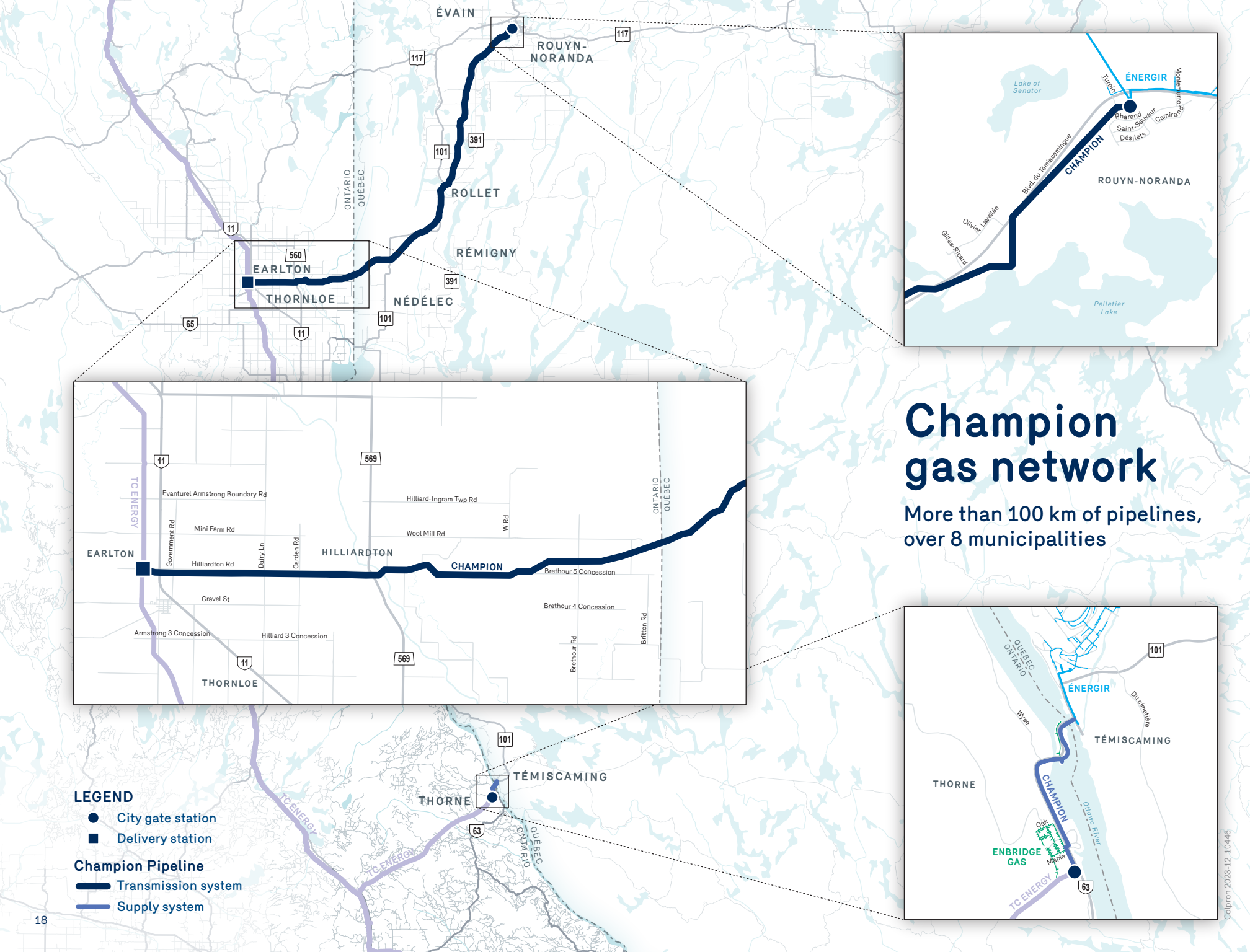
Situation	Examples of leak repair methods	
Rupture with presence of a flow limiter	<ul style="list-style-type: none"> <li>Confirm engagement of the limiter.</li> </ul>	
Leak after the BSE valve (red valve)	<ul style="list-style-type: none"> <li>Shut off the red valve.</li> </ul>	
Above-ground rupture on a riser	<ul style="list-style-type: none"> <li>Valve changer on a riser.</li> <li>Squeeze-off tool on a riser.</li> </ul>	
Underground rupture on a service line	<ul style="list-style-type: none"> <li>Remote squeeze-off tool for excavation.</li> </ul>	

Underground rupture on mains line (ML)	<ul style="list-style-type: none"> <li>Out of the gas.</li> <li>Squeeze-off tool if large open trench.</li> <li>Remote squeeze-off tool for excavation if excavation more restrained.</li> </ul>	
Rupture situation not meeting safety standards	<ul style="list-style-type: none"> <li>Excavation beyond the exclusion perimeter to enable sealing.</li> </ul>	
Underground leak	<ul style="list-style-type: none"> <li>Search for the leak.</li> <li>Excavation above the leak point.</li> <li>To the extent the situation is under control, the presence of the FDs is not required.</li> </ul>	

### Transmission Network

Situation	Examples of leak repair methods	
Leak or major rupture on transmission pipeline	<ul style="list-style-type: none"> <li>Leak repair by shut-off of block valves upstream/downstream.</li> </ul>	





# Champion gas network

More than 100 km of pipelines,  
over 8 municipalities

## LEGEND

- City gate station
- Delivery station

## Champion Pipeline

- Transmission system
- Supply system



# Complementary Information

**championpipeline.com**

## Emergency management

**mesures.urgence@energir.com**

**communications@championpipeline.com**

---

## To report an emergency

In Montréal: **514 598-3111**

Outside Montréal: **1 800 361-8003**

---

## Training

For information on available training on natural gas for fire departments and public safety players:

**etg.energir.com**

**etg@energir.com**

**450 449-6960**

---

## Limits

It is understood that all legal and regulatory provisions as well as all applicable standards and good practices generally recognized and observed during emergency responses take precedence over the contents of this document. It remains the responsibility of the emergency response departments concerned to comply and ensure compliance with all these laws, regulations and applicable standards as well as with these generally recognized and observed good practices.

## References

Cadre de référence Intervention pipeline - (CRIP) – Québec Ministry of Public Safety (MSPQ)  
Guide relatif aux opérations d'incendie et d'autres secours (MSPQ)

01-2024, 10446 Colpron, 150 FR



Logo FSC