



SAFETY HANDBOOK

Working around

natural gas pipelines

ATCO Gas

This safety handbook is for any person who undertakes ground disturbance work.

How to use this safety handbook

This handbook is divided into two major sections:

Locating and **Ground Disturbance**.

Important information on what to do should you contact a natural gas pipeline is at the back of the handbook under

Hit and Blowing/Leaking Natural Gas Pipelines and **Natural Gas Fires**.

Ground disturbance work includes but is not limited to:

- > digging
- > augering
- > driving materials into the ground and/or
- > professional excavation

WHY IS SAFE GROUND DISTURBANCE SO IMPORTANT?

Contact with buried natural gas pipelines can lead to serious injury or death.

Contacts also result in property damage that can cause interruptions in natural gas delivery to others and be costly to repair.

Safety should always be your first priority when working around natural gas pipelines.

The two most important steps to remember:

1) You must contact Alberta One-Call prior to beginning ground disturbance work.

Alberta One-Call will arrange to have an ATCO Gas representative come to your worksite and identify all natural gas facilities in your work area.

Contact: 1.800.242.3447 or www.alberta1call.com



2) Hand expose the natural gas facility.

You must carefully hand expose the natural gas facility if you are disturbing the ground **within one metre (39 inches)** of the outside locate markings.

NOTE: Hydrovacing is an acceptable method of hand exposing.

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Locating underground facilities

CALLING ALBERTA ONE-CALL

The Alberta Occupational Health and Safety Code states you **must contact Alberta One-Call to have underground natural gas facilities located in your work area** (1-800-242-3447 or www.alberta1call.com).

This is a **free service**. *(There may be a fee for unscheduled requests)*

Alberta One-Call requires **at least two full working days notice** to do locates. Long weekends and other holiday periods tend to be active times, therefore, more notice is required to meet scheduling requirements.

Alberta One-Call will arrange to have an ATCO Gas representative come to your worksite and identify all natural gas facilities in your work area.

Remember that a main cause of hitting pipeline facilities is failure to obtain an Alberta One-Call locate request.

NOTE: Some owners of buried utilities do not belong to Alberta One-Call. They must be contacted directly by excavators requiring locates.

You must use an ATCO Gas approved utility locator agent.

TYPICAL LOCATE METHODS

1) The locator will spray **temporary paint markings** on the ground and/or place **flagging** in the ground to indicate where natural gas facilities are buried. Natural gas markings are required to be yellow.

The paint markings indicate:

- > the **direction** the pipeline runs
- > the **approximate location** of the pipeline and/or other facilities (*The depth of the facility will not be provided*)

Please note that locates have expiry dates.

The **markings** used in locating are a pair of dashed lines connected with a "V." The "hand expose zone" (see Ground Disturbance) extends one metre outward from the marks. Figure 1 describes typical locate marks. Figure 2 explains temporary marking definitions and the international colour code for marking buried facilities.

FIG 1 [Temporary locate markings]

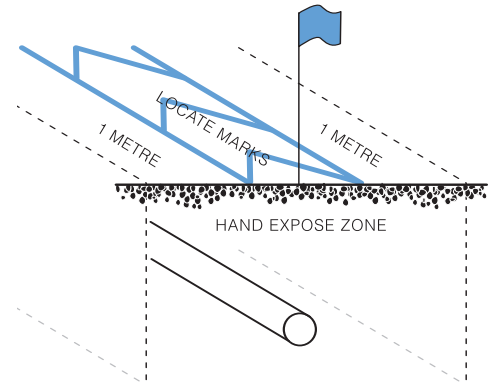


FIG 2 [International colour code for marking buried facilities]

WHITE	Proposed excavation
PINK	Temporary survey markings
RED	Electric power lines, cable conduit, lighting cables
YELLOW	Gas, oil, petroleum, gaseous materials
ORANGE	Telephone, cable tv, communication, alarm, signal lines
BLUE	Potable water
GREEN	Sanitary sewers, storm sewers, drain lines
PURPLE	Reclaimed water, irrigation, slurry lines

2) **The locator is required to provide you with a locate document.** This document should include the **type** of facilities in the ground. You may receive this document in person, via fax or it may be secured to one of the locate flags. *(If the locator determines that Polyvinyl Chloride (PVC) pipeline exists in your dig area, ATCO Gas must supervise any ground disturbance around the pipeline. Please read more information on PVC pipeline on page 15, in the section called Facilities – What You Will See in the Ground).*

3) If you are on the worksite when the locator is finished identifying underground facilities, **review the document with the locator.** Ensure the locate document matches the temporary paint markings.

WHAT IF MY PROJECT GETS DELAYED OR REVISED?

What if my activity or weather disturbs the temporary paint markings and/or flags?

The person(s) requesting the locate is responsible to:

- > preserve the temporary paint markings and/or flags and protect the marks from adverse weather
- > provide reference marks that will not be disturbed

Should your project be delayed or revised beyond the **locate expiry date**, you may need to cancel and reschedule your locates to match your new work start date.

The expiry date is noted on the locate sketch/ document. An expiry date exists because:

- > temporary paint markings eventually fade
- > flags may be tampered with
- > new utilities are constantly being installed
- > existing utilities are often upgraded

Be aware of the possibility of other underground facilities in your dig area

(electricity, water, communications - telephone, cable television, etc.).

What if I have concerns about the locate?

Please contact ATCO Gas to discuss your concern. ATCO Gas is constantly striving to input processes that make excavation work as safe as possible.

Reporting in Calgary only

A Calgary-based information support service exists where you may report locating concerns involving natural gas, electric, telephone or water lines to one telephone number. Concerns in Calgary will be investigated by the specific utility during normal office hours.

After hours process: please leave a detailed message on the answering machine and the problem will be investigated on the next business day. The phone number is **(403) 245-7252**.

Ground disturbance

It is extremely important to hand expose the natural gas facility!

You **must** carefully hand expose the natural gas facility if you are disturbing the ground within one metre (39 inches) of the outside locate markings.

Remember that a main cause of pipeline digging accidents is failure to properly hand expose the natural gas facility.

SAFETY FIRST

It is always a good practice to assess what personal protective equipment you should wear prior to beginning a work project.

For ground disturbance work around natural gas distribution pipelines, you should consider the following to avoid injury from flying debris and possible natural gas ignition:

- > safety glasses
- > gloves
- > flame retardant coveralls
- > steel-toed footwear
- > remove sources of ignition

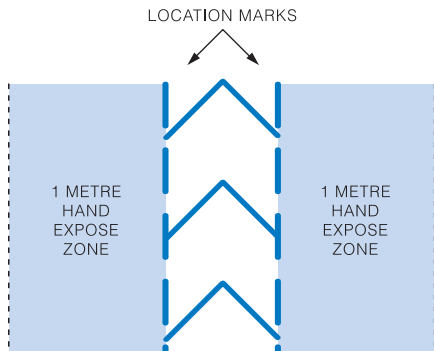
To ensure maximum safety, it is preferred that ground disturbance activities should be completed in **frost-free conditions**. Contact ATCO Gas prior to ground thawing when winter work is necessary.

GROUND DISTURBANCE NEAR THE HAND EXPOSE ZONE

Hand dig or hydrovac first; then use mechanical excavation!

All ATCO Gas lines must be hand exposed before commencing any mechanical excavation activity within the hand expose zone located one metre (39 inches) on either side of any locate marks.

FIG 3 [Hand expose zone]



TYPES OF EXCAVATION

1) Hand Exposure

It is very important to hand expose the natural gas facility first.

Use a shovel to expose the facility to at least one metre (39 inches) outward from the natural gas pipeline – this is the hand expose zone.

2) Hydrovacung

A hydrovac is a fast, convenient and safe method for exposing lines. A hydrovac combines water pressure and a vacuum to excavate. It is especially effective for exposing pipelines during frozen ground conditions.

Hydrovacung can replace hand exposure as an acceptable digging method in the hand expose zone.

NOTE: Hydrovac services are available for all sizes of excavation projects.

Remember that improper hydrovac techniques and equipment can damage natural gas facilities. (For more information, please refer to our brochure on Hydrovac Operation).

3) Mechanical excavation

Use of mechanical excavation is permitted only after the facility is hand exposed.

Mechanical excavation involves machinery that is powered by a pneumatic, electrical, or chemical energy source of operation. When excavating with machinery (other than a hydrovac):

- > two workers should always be present
 - the machine operator and a spotter
- > remove small layers of soil in sequence
- > dig parallel to the buried line whenever possible
- > observe the excavation at all times for movement (e.g., cable contact), soil consistency (trench line), or foreign objects identifying underground facilities.

Directional drilling (horizontal boring)

Directional drilling involves the use of mechanical equipment to excavate by drilling horizontally beneath the surface.

Perpendicular drilling: the excavator **must hand expose 0.3 metres (one foot) on all sides of the facility** to confirm the depth of the buried natural gas line at the exact point where the drill path crosses the line. (No assumptions should be made about the depth of the gas line.)

Parallel drilling: the excavator **must hand expose a number of points along the facility** to ensure the natural gas line does not deviate from the associated locates. The number of holes is determined by the drill path and facility depth.

FACILITIES - WHAT YOU WILL SEE IN THE GROUND

There are four types of ATCO Gas natural gas distribution pipelines:

1) Polyethylene (PE)

- > a type of plastic pipe
- > comes in various colours: yellow, black, orange, peach

2) Steel

- > appears as rough steel pipes or steel coated pipe (tar, grey paper, yellow jacket, blue, red, green)

3) Polyvinyl chloride (PVC)

- > a type of plastic pipe installed by ATCO Gas in the mid-1960s
- > comes in various colours: white, purple, grey, light blue, peach
- > **exposure of PVC lines requires the supervision and direction of an ATCO Gas company representative** (*please provide two full working days notice to arrange for an inspector*)
- > **crossing buried PVC lines with heavy equipment must be done following instructions provided by an ATCO Gas representative**

4) Aluminum

- > appears as light grey metal or covered with a yellow jacket
- > accounts for less than one per cent of ATCO Gas distribution pipeline in the province

Other facilities:

Mechanical couplings

- > you may see a mechanical coupling on any part of the pipeline system
- > a mechanical coupling is a fitting holding two ends of the pipeline together
- > mechanical couplings can pose a safety issue
- > **if you expose a mechanical coupling, ensure the coupling is supported to restrict movement. Call ATCO Gas as the mechanical coupling may require additional support.**

Sleeves

- > are installed to protect sections of the pipeline and fittings
- > common colours: black, brown, yellow

WHAT IS A TEMPORARY SUPPORT SYSTEM AND IS IT REQUIRED?

A **temporary support system** is a structure used to prevent sag, bending or deflection in pipelines during excavation and backfill. It is usually a structure made of steel or wood.

The **length of the natural gas pipeline** to be undermined is the determining factor on whether a temporary support system is required.

Figure 4 lists the maximum span of pipeline that can be undermined **without supports:**

FIG 4 [Maximum length of unsupported pipe]

PIPE SIZE		STEEL SPAN		PRESSURIZED PE		UNPRESSURIZED PE	
MM	(IN.)	M	(FT.)	M	(FT.)	M	(FT.)
15.9	(1/2)	1.5	(5)	1.5	(5)	3.0	(10)
26.7	(3/4)	2.0	(6.5)	1.5	(5)	3.0	(10)
42.2	(1 1/4)	2.5	(8)	2.0	(6.5)	4.0	(13)
60.3	(2)	3.0	(10)	2.0	(6.5)	4.0	(13)
88.9	(3)	3.6	(12)	3.0	(10)	6.0	(19)
114.3	(4)	4.1	(13.5)	3.0	(10)	6.0	(19)
168.3	(6)	5.0	(16)	3.0	(10)	6.0	(19)
219.1	(8)	5.7	(19.0)	3.0	(10)	6.0	(19)
273.1	(10)	6.4	(21.0)	3.0	(10)	6.0	(19)
323.9	(12)	7.0	(23)	3.0	(10)	6.0	(19)
406.4	(16)	7.8	(25.5)				
508.0+	(20+)	8.7	(28.5)				

NOTE: Maximum length of unsupported PVC pipe is 1.5 metres.

- If** a temporary support system is required:
- > supports must be installed prior to excavating below the pipeline
 - > discuss the method and materials to be used with an ATCO Gas representative
 - > the property owner or contractor is responsible for supplying all material, labour and equipment required
 - > beam(s) placed across the excavation should extend at least one metre (three feet, three inches) on either side of the trench, and the pipeline is to be attached to the support beam(s) with nylon slings retaining strips, NOT CHAINS, at intervals no greater than the maximum span of unsupported pipe, as shown in Figure 4

NOTE: an ATCO Gas representative must inspect temporary support systems.

Figures 5a, 5b and 5c are examples of excavated pipeline with a temporary support system.

FIG 5a [Pole supported pipe]

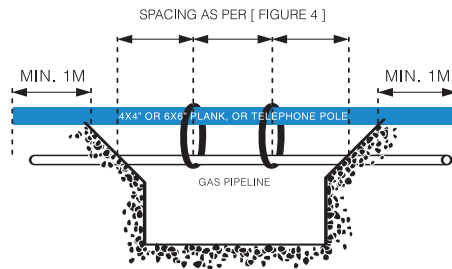


FIG 5b [Plank supported pipe]

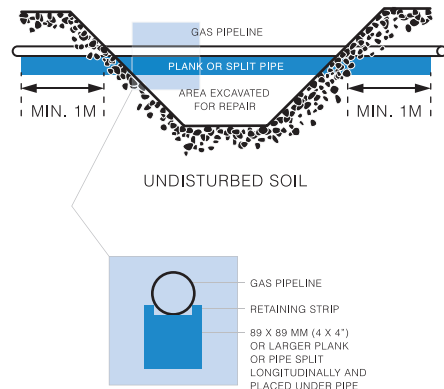
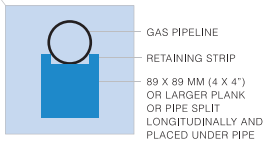
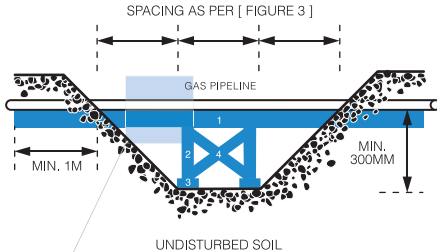


FIG 5c [Truss supported pipe]



MATERIALS

- 1 89 X 89 MM (4 X 4") OR LARGER TREATED PLANK WITH RETAINING STRIPS
- 2 89 X 89 MM (4 X 4") TREATED POST
- 3 89 X 184 X 610 MM (4 X 8 X 24") TREATED PLANK UNDER POSTS
- 4 38 X 89 MM (2 X 4") ANGLE BRACES

Support systems for parallel trenches

Supports are required if the distance from the pipe to the nearest wall of the proposed trench is less than the depth of the proposed trench. Please contact ATCO Gas for the support system design information.

What to do if you contact a natural gas pipeline and there is no apparent gas leak

Report **all contacts** to ATCO Gas. This includes all contact with pipeline, coatings and tracer wire.

Contact may cause damage upstream or downstream that can result in a leak that will require immediate attention.

WHAT DO I NEED TO KNOW ABOUT BACKFILLING?

- 1) Call ATCO Gas for local pipe inspection requirements prior to backfill.
- 2) Compact the fill under the pipe to provide support and prevent stress.
- 3) Requirements governing **depth of cover after backfilling** are specified by individual municipalities: however, certain minimum requirements are legislated provincially:
 - > excavation and backfilling activities should neither remove nor add to the depth of cover without ATCO Gas permission.
 - > use clean, lump-free material to cover the natural gas pipeline.
 - > do not place frozen dirt, rocks or lumps directly on the natural gas pipeline.

NOTE: Compaction of backfill may be required, especially for high traffic locations. Contact an ATCO Gas representative to help determine when compaction is needed and how it should be done.

Please contact ATCO Gas if you discover a natural gas pipeline with less than 0.6 metres (two feet) of cover.

FOR DEEP EXCAVATIONS WITH PIPE SUPPORTS

ATCO Gas must inspect deep excavation backfills before the natural gas pipeline is concealed. Please call ATCO Gas when the backfill is within six inches of the pipeline. This will help the ATCO Gas representative safely inspect the pipeline and repair any coating damage the support system may have caused.

Backfill must be compacted to provide support for the existing pipe.

Remember that it is important to carefully replace the ground that you disturbed during the backfilling process. Your work should ensure that it does not interfere with the integrity of underground natural gas facilities.

Emergency procedures

EMERGENCY PROCEDURES FOR HIT AND BLOWING/LEAKING NATURAL GAS PIPELINES

- 1) **Clear all people** from the vicinity of the natural gas leak.
- 2) **Shut-off or extinguish any source of ignition** including equipment and vehicles, communication equipment including cell phones, cigarettes and/or open flames.
- 3) **Contact ATCO Gas** for help.

ATCO Gas emergency numbers:

Edmonton and area	(780) 420-5585
Calgary and area	(403) 245-7222
All other areas	1-800-511-3447

- 4) **Remain a safe distance away from the leak** while you wait for assistance.

Do not attempt to repair the leak. Allow the natural gas to vent into the atmosphere.

(Attempting to repair the leak yourself can result in property damage and serious injury to yourself and others.)

Provincial legislation requires that the person responsible for causing the natural gas release must notify Alberta Environment at the first available opportunity. Call toll-free 1-800-222-6514.

NATURAL GAS FIRES

- 1) **Clear all people** from the vicinity of the fire.
- 2) **Contact the fire department and ATCO Gas immediately.**
- 3) **Stay a safe distance away from the fire** while you wait for the fire department.

Do not attempt to extinguish natural gas fires!

Beware of static electricity

- > it is a stationary electrical charge on an object generated by friction.
- > static electricity in the pipe or in your clothes can be a source of ignition around natural gas facilities. An accumulation of static electricity can cause a spark.

For more information:

For more information on working around natural gas or for service pipeline applications please contact ATCO Gas.

Edmonton

10035 – 105 Street
Edmonton, AB T5J 2V6
(780) 420- 7211

Calgary

909 – 11 Avenue SW
Calgary, AB T2R 1L8
(403) 245-7110

All other areas

310-5678

www.atcogas.com

1/06 5K

ATCO Gas

The logo for ATCO Gas features the text "ATCO Gas" in a bold, white, sans-serif font. Below the text is a white graphic element consisting of a horizontal line that tapers at both ends, resembling a stylized flame or a swoosh.