Earthquakes and Pipeline Safety

KINDER MORGAN CANADA
Earthquakes and Pipeline Safety

Through our experience operating pipelines in varied terrain across North America, we are aware of the effects of the geologic environment on our infrastructure. This brochure provides information about the measures we take to protect our pipelines and facilities and mitigate the risk of earthquakes and other geohazards.

Earthquakes and Pipelines

Major earthquakes around the world have shown that ground shaking poses a relatively low likelihood of damage to buried transmission pipelines if they are constructed with high-quality steel. Steel pipelines are very resilient. They are inherently flexible and move with the ground, which helps them withstand significant seismic activity.

The most significant earthquake geohazard our pipelines could be exposed to is lateral spreading. Understanding location, estimated frequency, and magnitude of the potential lateral spreading is sought by designers and operators of infrastructure in seismically active regions.

Earthquakes and Terminal Facilities

Our oil storage tanks are constructed with steel and are designed to absorb shock waves from an earthquake. In the unlikely event of a leak, each storage tank has containment berms, or dykes, that are designed to hold more than the capacity of each tank.

We continually review all aspects of our operations and make improvements to incorporate seismic upgrades at the existing facilities.
Our Natural Hazard Management Program is one of the key tools for managing the risk of earthquakes and other natural hazards to pipeline infrastructure. The Program includes annual field assessments along each of our pipeline systems at locations where river erosion or ground movement, such as landslides, are active or potentially active. The Program includes regular site inspections, detailed site studies, monitoring, and mitigation. We work closely with specialized geoscientists and hydrotechnical and geotechnical engineers, who are experts in geohazards.
Mitigation Measures

As with all organizations with infrastructure exposed to seismically triggered geohazards, our objective to reduce the seismic risks is ongoing and includes several investigations and major construction mitigation measures including:

- System wide assessments of earthquake hazards along the pipeline right-of-way.
- An evaluation of potential lateral spreading sites across the Lower Mainland and the Fraser Valley.
- Characterization of potential earthquake triggered landslides at select locations along the pipeline.
- Preparation of an Earthquake Action Protocol to rapidly prioritize locations for pipeline inspection following an earthquake. The installation of automated seismic sensors alert staff and initiate procedures for shutting down and isolating the pipeline in the event of a serious earthquake.
Pipeline Markers and Right-of-Way

Our pipelines are found in a road allowance or right-of-way, which is a narrow stretch of land that provides access for pipeline monitoring and maintenance.

Pipeline markers provide important safety information such as the type of product carried, the local One Call number, and KMC’s 24-Hour Emergency Notification Line.

Although markers identify that a pipeline is in the area, they do not give the exact location or depth – only a qualified KMC representative can do so.

Call or Click Before You Dig

Our pipeline infrastructure and right-of-way must be treated with caution when crossed by heavy equipment outside of established roadways. In the event of an earthquake or any other natural disaster, call your local One Call centre and indicate that it is an emergency before bringing any heavy equipment onto the right-of-way.
Emergency Preparedness and Response

We are prepared to respond quickly to all types of emergencies with detailed emergency response procedures and trained personnel. If needed, we can isolate and shut down the pipeline. Oil Spill Containment and Recovery (OSCAR) trailers are located strategically along the pipeline right-of-way and can be activated at a moment’s notice. We also activate response personnel and procedures and launch our air monitoring program for the protection of emergency responders and the community.

About Kinder Morgan Canada

Kinder Morgan Canada (KMC), operates the Trans Mountain Pipeline system. The Trans Mountain Pipeline transports crude oil and refined petroleum products from Edmonton, Alberta to Burnaby, British Columbia and into Whatcom and Skagit Counties in Washington State. The Trans Mountain Jet Fuel Pipeline transports jet fuel from Burnaby to the Vancouver International Airport. We are committed to safe, reliable and efficient operations of our pipelines.
How to Recognize a Pipeline Leak

In the unlikely event of a pipeline leak, you may notice the following warning signs:

- **You may smell:**
  - A strong petroleum odour (like gasoline or diesel fuel)
  - A strong sulphur odour (like rotten eggs)

- **You may see:**
  - Dead or discoloured vegetation
  - Pools of liquid when the right-of-way is dry
  - An oily or rainbow sheen on water

- **You may hear:**
  - An unusual hissing or roaring sound

What to do in a Pipeline Emergency

If you notice any of the warning signs of a pipeline leak, follow these guidelines:

**Do:**
- Turn off vehicle engines
- Leave area immediately, on foot, and in an upwind direction
- Warn others to stay away
- Eliminate ignition sources (keyless door entry, cell phone, flashlight)
- Call 911 from a landline
- Call KMC’s 24-Hour Emergency Notification Line: **1.888.876.6711**

**Do Not:**
- Re-enter the area
- Touch or operate the pipeline valves
- Touch or contact any liquids
- Attempt to extinguish any fires
- Use any equipment or vehicles that could create a spark
- Use a cell phone
This brochure contains important pipeline safety information. Please have it translated. If you have questions, email pipelinesafety@kindermorgan.com.

For more information, please contact our Pipeline Protection Department:

Phone: 1.888.767.0304 | E-mail: pipelinesafety@kindermorgan.com
Website: kindermorgan.com/pipelinesafety

Call or Click Before You Dig

BC One Call: 1.800.474.6886
Alberta One-Call: 1.800.242.3447
clickbeforeyoudig.com

Washington State: 811
callbeforeyoudig.org

If you suspect a pipeline emergency, immediately call our 24-Hour Emergency Notification Line:
1.888.876.6711