

LNG Safety

Is liquefied natural gas flammable?

No, liquefied natural gas isn't flammable in its liquid state and its vapours are only flammable within a limited range of concentration. If the percentage of vapour in the air is less than 5%, there isn't enough natural gas to be flammable. If there is more than 15% natural gas, there is too much gas in the air and not enough oxygen for it to burn.

Is liquefied natural gas explosive?

Liquefied natural gas is stored at atmospheric pressure and isn't explosive. When vapourized, natural gas is flammable in the concentration of 5 to 15%. It won't explode unless ignited in a confined area. In open areas, natural gas will not explode.

How is it stored?

Liquefied natural gas is stored in specially designed tanks consisting of an internal layer of metal that includes 9% nickel for superior strength at cryogenic temperatures. Canaport LNG will use full containment tanks to store the gas. These tanks will include an inner metal tank, insulation, second metal tank and a thick concrete outer tank and roof designed to hold 110% of the gas inside the metal tank. The concrete outer tank also contains the gas at cold temperatures, increasing the safety of the storage system. These tanks will meet world-class safety standards, and the Canadian Standards Association's requirements for natural gas storage.

What is the safety record of LNG?

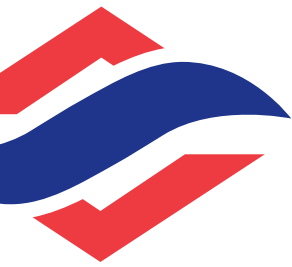
When transporting fuel, whether by truck, rail, ship, or pipeline, safety is always a priority. Liquefied natural gas has an excellent safety record. There have been only three incidents in the history of liquefied natural gas terminals in North America: two in the 1970s and one in 1944.

Of the two in the 1970s, one was a construction accident and wasn't related to the gas. The other was the result of a faulty seal that allowed gas to leak into an electrical substation that wasn't equipped with natural gas detectors. These incidents led to major design code changes, including mandatory gas detectors in all related buildings. The incident in 1944 was the result of safety standards being compromised due to the fact that nickel, which is essential to the storage tanks used to hold liquefied natural gas, was diverted due to the war effort and a lower percentage of nickel was used in the construction of the storage tanks.

The Canaport LNG project will follow all safety standards, including those set out by the Canadian Standards Association, which regulates everything from bike helmets to propane tanks. The technical review committee, which approved our environmental impact study, included representatives from the provincial government, and several federal agencies including Transport Canada. Additionally, Repsol has built a number of these facilities around the world and we will fully utilize these expertise at the Canaport terminal.

What if there is a power-outage or power surge?

The plant will be designed with a backup power supply and safety shutdown feature that will be implemented in the event of a power loss.



Safety

What sorts of safety standards will you meet to ensure the safe operation of the Canaport LNG facility?

The Canaport LNG project will follow all safety standards, including those set out by the Canadian Standards Association, which regulates everything from bike helmets to propane tanks. The technical review committee, which approved our environmental impact study, included representatives from the provincial government, and several federal agencies including Transport Canada. Additionally, Repsol has built a number of these facilities around the world and we fully utilize these expertise at the Canaport terminal.

What did the Environmental Impact Assessment conclude about safety?

Based on extensive safety modelling, the Environmental Impact Assessment reported on the effects of various spill scenarios, although these are considered unlikely to occur. The modelling results show that there is no danger to residents in the area, even during a worst-case scenario, which would be the loss of an entire tank of liquefied natural gas, and ignition of that fuel as it regassified.

What security measures have you taken at Irving Canaport?

Safety and security are priorities at Irving Canaport. Physical security at the property has been increased and a fence has been constructed around the property. Barriers, such as perimeter fencing and barricades, are standard practice at energy supply facilities.

Access to the terminal and pier are tightly controlled with detection systems and security cameras providing constant surveillance of the area. Regular patrols provide further security for the facility.

There are extensive, state-of-the-art warning systems, including gas detectors, ultraviolet or infrared fire detectors, smoke or combustion product detectors, low temperature detectors, and detectors to monitor gas levels and vapour pressures. In addition to these sensors, liquefied natural gas terminals have automated fire fighting systems, including foam, dry chemical, or water dispersal and automatic shutdown systems.

The design and security systems of liquefied natural gas tanks are very difficult to breach. Safety modelling done as part of Canaport LNG's environmental approval process showed that even during a worst-case scenario (such as a terrorist attack), there would be no danger to neighbours if a large tank fire were to occur as the fire would be completely confined within the boundaries of the Canaport site.

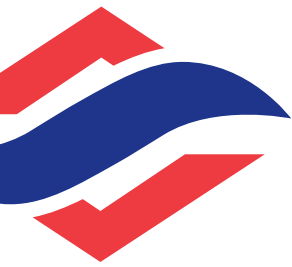
Port security plans are submitted to Transport Canada, who review and approve the plans. According to the International Ship and Port Facility Security code (ISPS), however, it is a violation of national security to discuss specific security measures for facilities like Canaport.

How is liquefied natural gas transported?

It is transported in double-hulled ships that are specifically designed to handle the liquefied gas at -162 degrees Celsius and are designed with many safety features to ensure safe marine transportation. There are two types of double-hulled ships used to transport LNG: membrane tankers and MOSS tankers. Both types of tankers are designed with safety features to ensure safe marine transportation of the gas.

What is the shipping safety record of liquefied natural gas?

Liquefied natural gas has a 40-year record of safe operations in North America, with extensive safeguards protecting its transportation and storage. It is transported in double-hulled ships that are specifically designed to handle the low-temperature liquid gas. Liquefied natural gas ships have made over 40,000 voyages covering more than 60 million miles without a loss of LNG either in port or at sea.



Safety

Will Irving Canaport have its own liquefied natural gas ships?

Repsol has considerable experience in the transportation of liquefied natural gas. Irving Canaport will use both Repsol owned ships and LNG ships chartered by Repsol. The double-hulled ships will be both membrane tankers and MOSS tankers. Both types of ships are designed with safety features to ensure safe marine transportation of liquefied natural gas.

Who determines crew qualifications?

Crews on all liquefied natural gas ships must clear checks by the Canadian Coast Guard, as well as Canadian Customs and Immigration. This is true for all ships and crews entering Canadian ports.

How often will LNG ships arrive at the terminal?

It is expected that a liquefied natural gas ship will arrive every two to three days.

Is it safe to use a pier to unload LNG?

Yes. The pier will be designed and built to withstand worst-case scenario weather. A ship will be brought to the pier only when the weather conditions are right. Canaport is the single most important step in the Irving Oil supply chain.

What will you do to ensure safe unloading?

Ships will contact terminal operators before their arrival at the pier. The ship will then be guided by tugboats and be secured to the pier by multiple docking lines and stabilizing connections. The unloading arms, equipped with automatic shut-off switches and emergency equipment, will protect workers and equipment in the unlikely event that the transfer of liquefied natural gas needs to be stopped.

Prior to unloading, communication cables are attached to the ship from the dock to enable communications during the unloading process. Meetings are held between the ship's cargo officer and the dock-unloading officer to review procedures and communications. During arrival and departure, constant radio communication will be maintained between the terminal and ship. The emergency systems are tested to insure they are operational and secure. Only then can unloading begin.

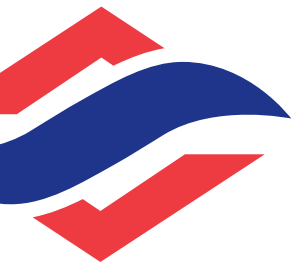
The transfer of liquefied natural gas takes place using detailed and proven safety procedures under the constant supervision of the crew and the terminal operators. After the transfer and disconnecting, the ship departs, guided by tugboats, in the same manner it arrived.

What is a marine safety zone and why do we need a safety zone?

A marine safety zone is used for the protection of crew, fishers and other ships in the area. A safety zone is already in place at Irving Canaport when crude carriers arrive to offload crude oil and measures one kilometer in diameter as determined by Transport Canada and the Saint John Port Authority. A similar safety zone will be used for liquefied natural gas ships and will be in place during unloading of the gas. Crude oil ships currently take an average of 28 hours to unload while liquefied natural gas ships are expected to take 24 hours to arrive, discharge and depart.

What kinds of safety zones will there be when liquefied natural gas ships offload?

There will be exclusion zones but they haven't been determined yet.



Safety

How will the safety zone affect fishers?

In certain areas, at certain times, there will be a restriction on boats. There will also be a restriction on fishing gear in some areas.

Will the safety zone affect cruise ships?

No. The safety zone will apply to the area around the unloading pier only. The ships will not be in the pathway of any cruise ships. Cruise ships won't be required to carry additional insurance due to the presence of the terminal or ship.

What would happen if there were a spill or a release from a tanker?

In the unlikely event that liquefied natural gas is spilled during shipping or during storage, the gas would float on the surface of the water or on the surface of the land until it evaporated. Valves on LNG storage tanks are designed for quick closing to minimize any potential spills. The Pneumatic Emergency Release Coupling (PERC) on the unloading arm is designed and tested so that less than a gallon of liquefied natural gas is released in an emergency un-coupling of the unloading arms.

As liquefied natural gas evaporates, it turns into natural gas and its vapours are only flammable within a limited range of concentration. If the percentage of vapour in the air is less than 5%, there isn't enough natural gas to be flammable. If there is more than 15% natural gas, there is too much gas in the air and not enough oxygen for it to burn.

Natural gas won't explode unless ignited in a confined area. In open areas, natural gas won't explode but instead burn back to its source.

Safety zones around the ships and the tanks will help to ensure the safety of all people even in the unlikely event of an accident.

Will the liquefied natural gas tankers be docked close to the existing monobuoy?

The unloading pier is fixed and ships will be able to unload liquefied natural gas and crude oil at the same time. All ships brought into Canaport for unloading, whether at the monobuoy (where crude oil is unloaded), or at a pier, are brought in based on the safety of the weather. The pier will be built to withstand worst-case scenario weather, and ships will only be brought to the pier when the weather permits.

Will there be a no-fly zone?

At this time, there is no requirement for a no fly zone. Even if a no-fly zone is set for this project in the future, it would have no impact on commercial air traffic.