

**LNG RISKS**

- **Extremely flammable** gas (methane/natural gas).
- **Extremely low temperatures** (risk of burn injuries and freezing the surroundings).
- LNG is heavier than air when released (be aware of lower spaces and ships holds where LNG can accumulate).
- Risk of **explosion in closed spaces**.
- **Suffocating** in high concentrations (take victim to fresh air and resuscitate).
- Heated gas is no longer visible (cloud is no longer visible as white vapour).
- Frequently **large quantities of LNG** present (bunker storage).
- Bunkering takes place in the vicinity of water (use life jackets if necessary).
- Risk of Rapid Phase Transition (RPT) if liquid LNG comes into contact with water (due to LNG expansion).

**MANAGING LNG SCENARIOS****Possible aids:**

- Infra-red imaging camera (IRC)
- Explosion danger meter (or sniffer)
- Infra-red temperature meter (AGS)
- Overpressure ventilator
- (Street) water cannons

**Scenario: blowing off LNG storage tank/tanker truck/tank container**

*If the pressure in the tank becomes excessive, the system will blow off using a blow-off safety feature. The blow-off safety feature is fitted in order to maintain the low temperature in the tank and is also an overpressure safety feature (releasing Boil Off Gas; BOG).*

- Determine the (un)safe area with the explosion danger meter.
- **Ventilate closed rooms in connection with the risk of explosions!**
- Do not extinguish any burning blow-off safety feature. Allow flares to gently blow off.

**Scenario: damaged storage tank as a consequence of an accident (external influence)**

- Warn the operator and the national alarm centre for LNG accidents (**LIOGS, 010- 2468642**)
- Determine the nature of the damage (leakage, risk of accelerated pressure build-up, etc. Use an infra-red imaging camera)
- Check (un)safe area and assess escalation risks.

**Scenario: heat radiated onto the installation (components) (different type of fire than LNG)**

- Consider pressing the emergency button for emergency facilities (blow-off facility and stopping bunkering).
- Extinguish the fire on the installation components.
- Screen off the surroundings (cool parts subject to radiated heat) and **prevent freezing of the blow-off safety feature**.
- Examine damage to the parts subject to radiated heat from a distance (lack of vacuum, use infra-red imaging camera).
- Take account of the risk of pressure build-up after lengthy exposure to radiated heat. The blow-off safety features will then be activated.

**Scenario: LNG leakage**

- Determine the size of the leak and the (un)safe area (with an explosion danger meter).
- Prevent fire starting.
- Dilute any gas cloud with water (do not allow liquid LNG to come into contact with water!). Only use water for an LNG leak in consultation with an expert.



**Scenario: LNG fire (Flare fire and Pool fire)**

- Preferably do not extinguish an LNG fire. Only extinguish if necessary (prevent escalation).
- Check whether the ESD system (emergency shutdown) is activated.
- Cool the surroundings.

**SITUATION SKETCH**



Storage tank with heat exchanger



Recognisability of LNG & contact details of the operator in the vicinity of the storage tank



Mobile bunker location from tanker truck

**BACKGROUND INFORMATION**

The PGS33-2 has been determined for bunker stations. There are currently (early 2016) not yet any permanent bunker locations. However, ships are supplied with LNG fuel from mobile installations (tanker trucks or tank containers).

A white cloud of condensed moisture is created every time loading and unloading occurs. This is because the components of the tanker truck, the unloading hose and installation on the ship must be cooled. This vapour is therefore NOT LNG.

There are bunker locations in the public space. They do not have a stationary set-up (only tanker truck present for bunkering). Listen for characteristic noises during bunkering and look for effects such as ice formation and mist formation.