Loading and unloading

LNG RISKS

- **Extremely flammable** gas (methane/natural gas).
- **Extremely low temperatures** (risk of freezing injuries and freezing of the surroundings).
- LNG is heavier than air when released (be aware of underground pools/sewers 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).

LOADING AND UNLOADING CHARACTERISTICS

- Tanker truck fills a storage tank (on the quay) or a fuel tank in a ship.
- Can take place at many locations (filling stations, bunker stations and mobile locations in public area).
- Various safety features have been built in in order to be able to stop the unloading process immediately if leaks occur.
- Pumping LNG is recognisable due to a **clearly audible (monotone) noise (120dB (A)).**
- During pumping, **white mist** will form on various parts of the system, including under the tanker truck, on the unloading hose and at the control panel.

The noise and white mist are **normal** in the loading and unloading process. If passers-by report an incident, first check that LNG leakage has actually occurred (instead of water vapour).

- Always consult the driver or measure with an explosion danger meter or gas sniffer (AGS).

MANAGING LNG SCENARIOS

Possible aids:

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

Always warn LNG accident experts (LIOGS, 010-2468642 or operator)

Scenario: blowing off LNG storage tank/tanker truck

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

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

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

- Press the emergency button in connection with emergency facilities (blow-off facility and stopping bunkering).
- Extinguish the fire at the storage tank/tanker truck.
- Screen off the surroundings (cool parts subject to radiated heat) **prevent freezing of the blow-off safety feature.**
- Examine (from a distance) damage to the parts subject to radiated heat (lack of vacuum – use IRC).
- Take account of the risk of the build up of pressure after lengthy heating by radiation. The blow-off safety feature will then activate.

Scenario: LNG leak (unloading hose/storage tank/tanker truck)

- Press the emergency stop button if possible. The system will stop pumping.
- Determine the (un)safe area with the explosion danger meter.
- Prevent fire and dilute any gas cloud with water (do not bring liquid LNG in contact with water. Only use water for an LNG leak in consultation with an expert).

Scenario: LNG Fire (Flare fire or Pool fire)

- Preferably do not extinguish an LNG fire. Only extinguish if necessary (prevent escalation).
- Check whether the ESD system (emergency shutdown) has been activated and check whether this is desirable in connection with management.
- **Cool the surroundings**

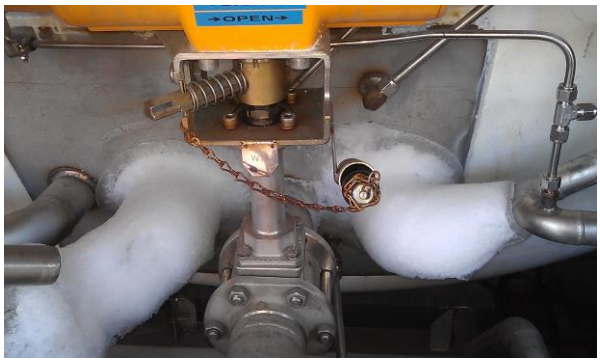
SITUATION SKETCH

Tanker truck blow-off pipe

LNG unloading hose

LNG tanker truck, with control box on the rear

LNG tanker truck, with control box on the side



Ice formation on the pipes and hoses due to the transfer of the LNG