LNG sites & safety
MJV workshop, Cyprus 2017

Christer Sandqvist, Swedish Civil Contingencies agency,
Section for Safe Handling of Hazardous Substances
Two terminals in Sweden

Nynäshamn, full containment tank, 20 000 m³
Lysekil, full containment tank, 30 000 m³
Delivery from terminal to user

Trucks with vacuum isolated pressure tanks.
LNG sites, industry

LNG stored in vacuum isolated pressure tanks
LNG sites, back up for biogas system in Stockholm

LNG stored in vacuum isolated pressure tanks
LNG sites, fuel for trucks

LNG stored in vacuum isolated pressure tanks
LNG sites, fuel for ships

LNG stored in vacuum isolated pressure tanks
The LBG is used as fuel for trucks
LNG/LBG – Liquid methane

- Methane gets liquid, LNG/LBG, when the temperature is -163°C.
- Volume decreases 600 times, the gas is purified and the energy density is increased.
- Is odorless
- Methane has a flammability range in air between 5 – 15%

Vapor pressure curve.
Liquid to gas.

- Transmission of energy upon conversion from liquid phase to gas phase occurs against the surface contiguous with the liquid, the outer surface of the vessel or surface.
- The transition to gas on a non-cooled solid surface takes place by evaporation of about 200 m$^3$/h/m$^2$.
- The transition to gas on a surface in balance with the liquid takes place by evaporation at about 20 m$^3$/h/m$^2$.
- The transition to gas on a water surface takes place at about 850 m$^3$/h/m$^2$.
The cold gas

Gas from liquid methane cooler than -107 °C is heavier than air and penetrates air.

Leakage of liquid methane affects the working environment, it gets cold!

In this situation there is a great danger of being in the area.
Gas clouds

1 m³ liquid methan expands to 600 m³ methan gas. The gas cloud gets lighter than air at -107°C. Liquid methan has no smell and no color. Water is only used to disperse a cloud of gas.
Thank you very much for your attention

Christer.sandqvist@msb.se