



## Break-Out Session 3

# Risk Assessment for Emergency and Land-Use Planning on LPG/LNG Sites Group 1

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"Break-out Session 3 \_Group 1\_Presentation"*

# 1. Hazard identification and risk assessment process



WHAT KINDS OF SCENARIOS DO INSPECTORS USUALLY EXPECT?

- Mainly LPG Storage and distribution in our group
- BLEVE scenario expected for LPG in most countries, associated with above ground storage tanks, especially loading/unloading with rail and road transport and the flexible pipe
- LPG Pipelines that go into reservoir must have an instantaneous loss of containment scenario (RO)
- In Finland, new sites must all be under ground
- No BLEVE scenario for LNG
- Some countries have minimum standard scenarios, others do not.
- Not necessary to request a worst case scenario because it is always a BLEVE
- Most countries have guidance.

# 1. Hazard identification



## WHAT HAZARD IDENTIFICATION METHODS ARE EXPECTED?

- In LPG are a standardized installation, so safety is designed already into the sites, so there is more flexibility with LPG/LNG in many countries (Hazop is optional)
- In some countries, both deterministic or QRA is acceptable
- The operator usually hires one of the approved consultants to perform the hazard identification (RO)
- Hazop required and some countries but not in all (but another appropriate method can be used, e.g., checklist)
- Some inspectors verify risk assessment with their own model, and compare the numbers.
- Some look at the inputs to the model only, accepting the results of the model if a standard accepted model is used (e.g., PHAST, TNO, Aloha).

# 1. Hazard identification



## REVIEWING/CHECKING SCENARIOS

- Some countries examine the scenario with a model (e.g., TNO)
- Typical scenarios for land-use and emergency planning
- Some countries inspect and review the scenario via checklist
- Look at eMARS database
- If they have reported accidents or near misses, it should be in the hazard identification
- Scenarios can vary a lot with the size of the tanks
- Small and large plants can have same scenarios but different consequences

# 1. Hazard identification



## MANAGEMENT OF CHANGE

- Management of change triggers a change usually when
  - -they move the vessel or have new equipment, e.g., new vaporizer

## ALIGNMENT WITH SAFETY MEASURES

- During inspection, check the risk assessment and hazop against what is actually on the site
- AT – Prioritize inspection of certain technical measures that are critical, e.g., safety valves, arms, hoses
- RO- Uses BAT and BREF to also check conformity with minimum requirements

## COMMUNICATION WITH EMPLOYEES

- Standard checks for communication with employees, e.g., documentation and interviews of staff

# 1. Hazard identification



## QUESTIONS/TIPS

- Check that assumptions of risk assessments are fulfilled (e.g., technical measures, documented procedures)
- Check that changes are documented and evaluated
- Check that personnel pay attention to abnormal indicators from safety critical instrumentation
  - -Sometimes sensors don't match changes in the facility (and everyone knows they give a wrong signal)
  - -Alarm prioritization is important. Inspector can check how it is done with control room operators

## 2. Zoning and land-use planning around LPG/LNG sites



### WORST CASE

- BLEVE, (U)VCE, Flash fire and Jet fire are all credible worst case scenarios for LPG
- Pool fire is usually the worst (credible) case for LNG
- DISTANCES
- Some countries use standard distances. Some countries use the scenario generated from the risk assessment
- Austria is writing guidance now. Scenarios are not directly taken into account in land-use planning. Land-use distances are strictly based on quantities. 100% of lower tier = 100m, 100% of upper tier = 300m, there is a curve that increases the distance based on quantity
- Also some countries have guidance for authorities about what are or are not compatible land uses around Seveso plants



## EMERGING RISKS

- No particular emerging risks in some countries.
- -Even if use increases, they are sites that are simple and standardized compared to many other kinds of Seveso industries. (Risks have clear boundaries.)
- In Norway, operators in many industries are replacing heavy fuels as source of energy with LNG and LPG. The operators are less familiar with LNG and LPG risks
- Increase in farmers use LPG can be a higher risk because of low safety competence
- Also farmers rent LPG (often seasonally) and unclear distribution of responsibility between farmer and owner