

# Process Safety Performance Indicators

*NVVK Congres 2015 Papendal*



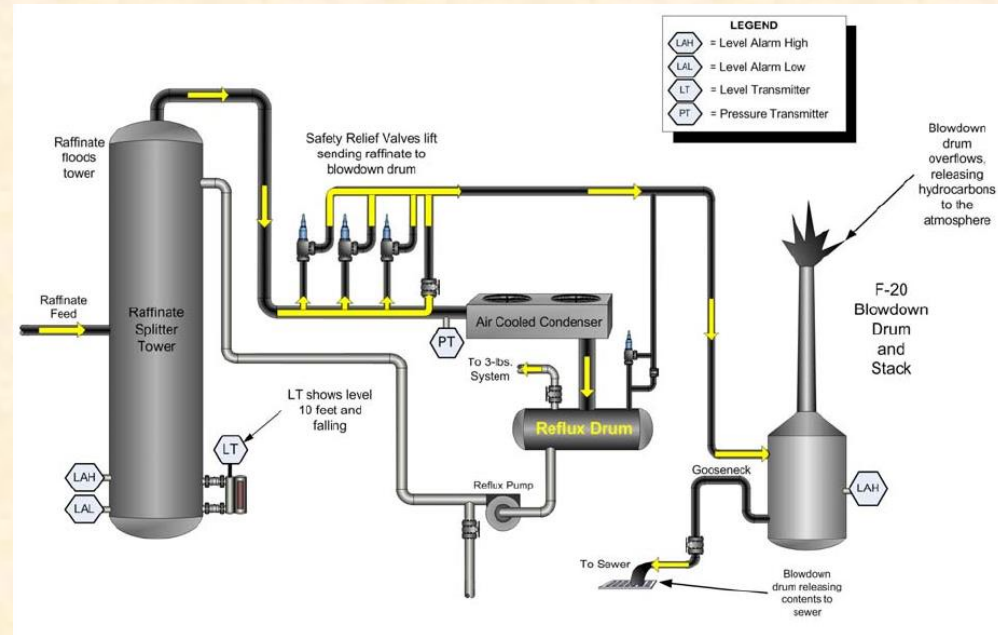
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# Incident that revived Process Safety



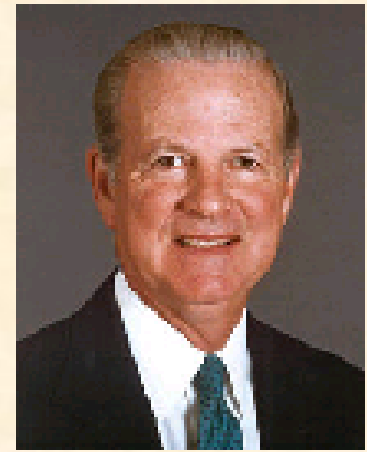
# BP Texas refinery incident: Key words

- Overfilling of a column
- Vapor cloud explosion
- 15 people died
- 1.6 B USD compensation
- Baker report
- Design KO drum not to flare
- Process vs Occupational safety
- Process Safety Culture
- “Paralyzed by cost cutting”



# Reinforced Legislation

- Facility Siting
- Process Safety Leadership
- Control QPV program
- Process Safety Performance Indicators



# Performance Indicators on Process Safety

Quote: "What you don't measure you don't improve"

Why a standard?

Europe: Concawe

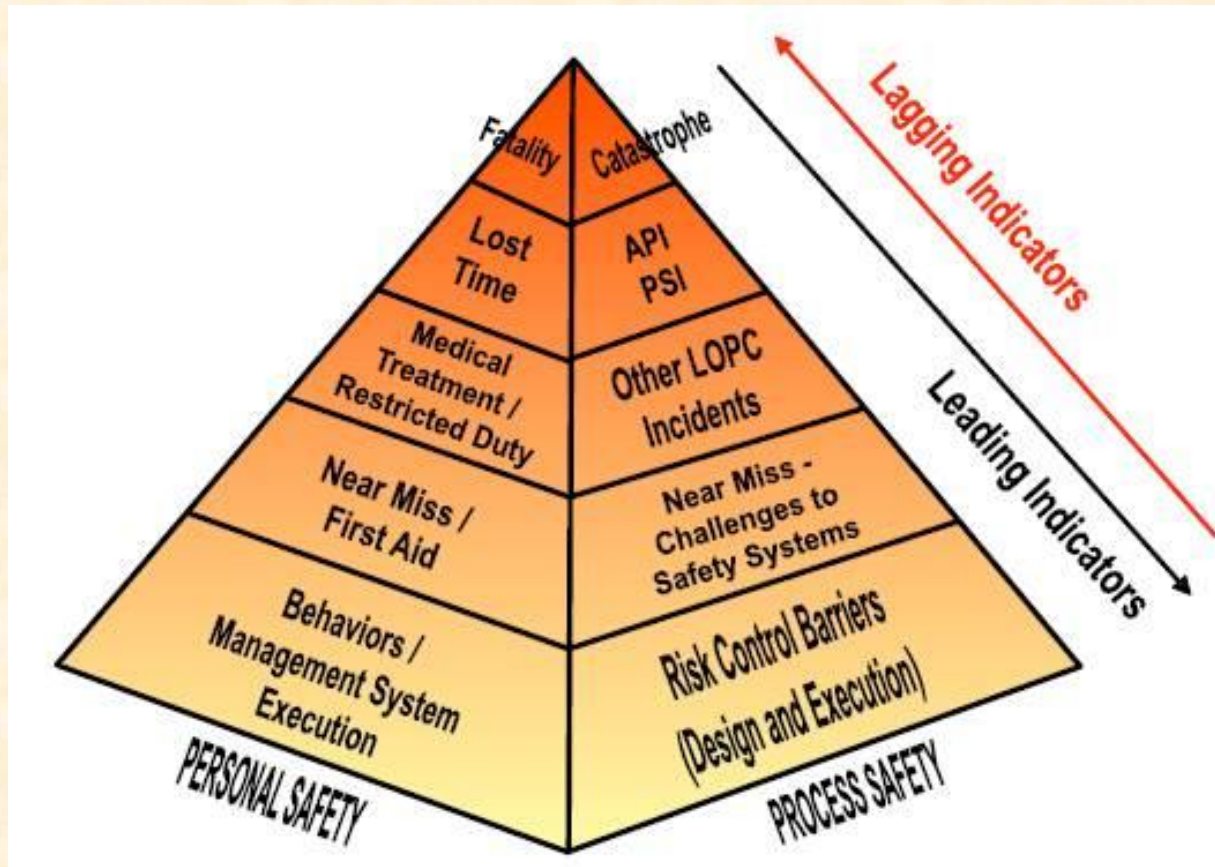
US: API 754

# How to measure process safety

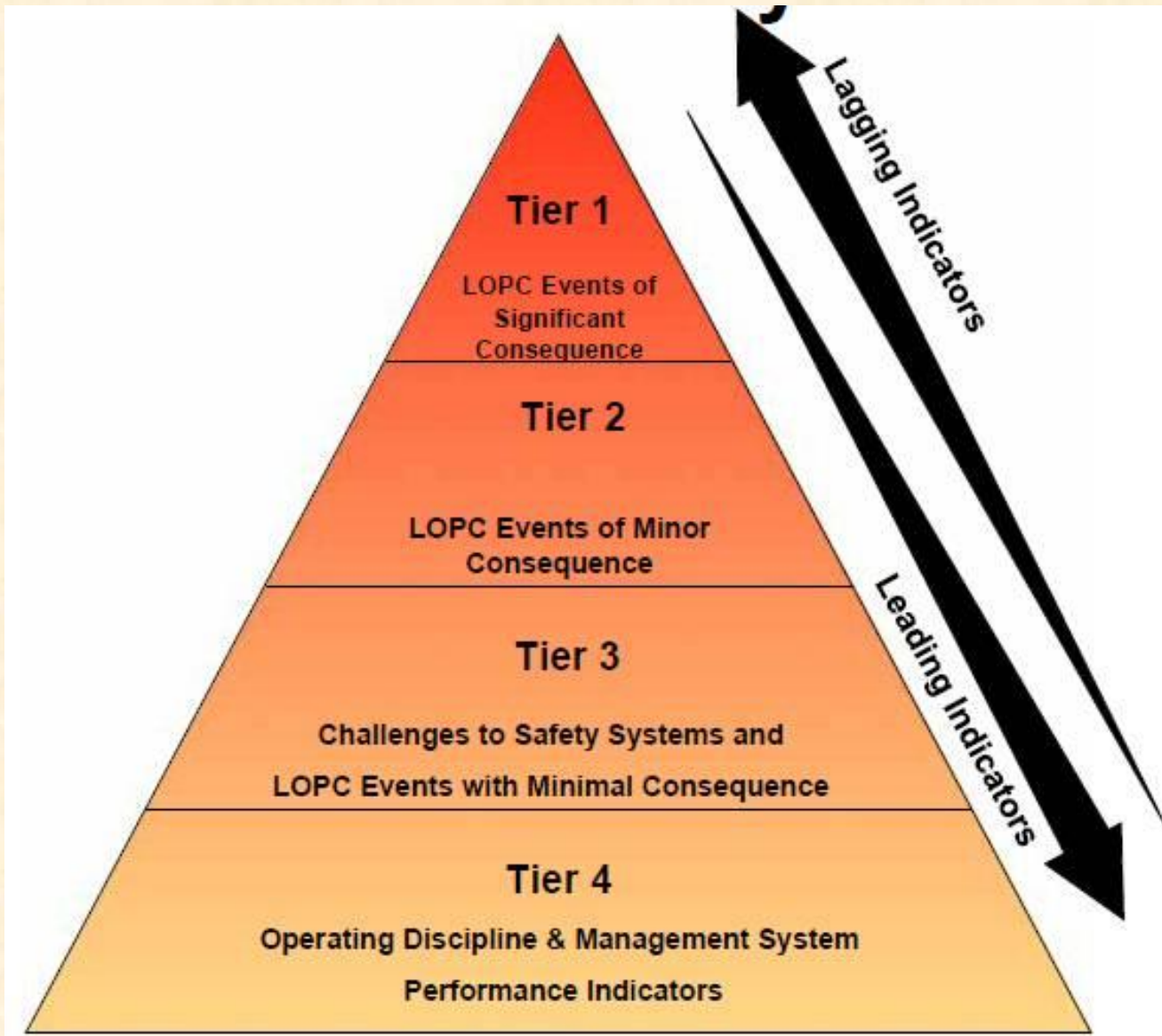
- OSHA Personal safety measures MTC, RWC, LWC for incident rate
- What characteristics indicate the process safety performance?

Loss of Primary Containment (LOPC)  
Fire & Explosion damage

# PSM (Bird) pyramid and metrics



# TIER classification: 1-4





# Process Safety Incident classification

## TIER class

- Fire, Explosion, Release with direct damage to people or equipment (LTI or > 25 k)
- Release quantity
  - From a process
  - Quantity in any 1 hour
  - Direct Toxicity classes (LD50 & TIH) (1-4)
  - Fire & Explosion hazard classes (5-7)
- Determine amount released & class of the substance
- The table provides the TIER class (1 or 2)

# Process Safety Incident Rate

- Normalize
- Number of Tier 1 + 2 per 200.000 work hours
- Benchmark & Improve

# KPI: Key Performance Indicators

Managing with Performance Dashboard with leading and lagging indicators

Lagging: Loss of containment

Leading: Lines of defence tested or failing

Design deficiencies

Risk evaluation not well done

Elements of the PSM system

# Thank you for your attention



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