

# Process Safety Webinar Series - Part 4

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## PSM Lagging and Leading Indicators

Ngaka Mogale



# BACKGROUND

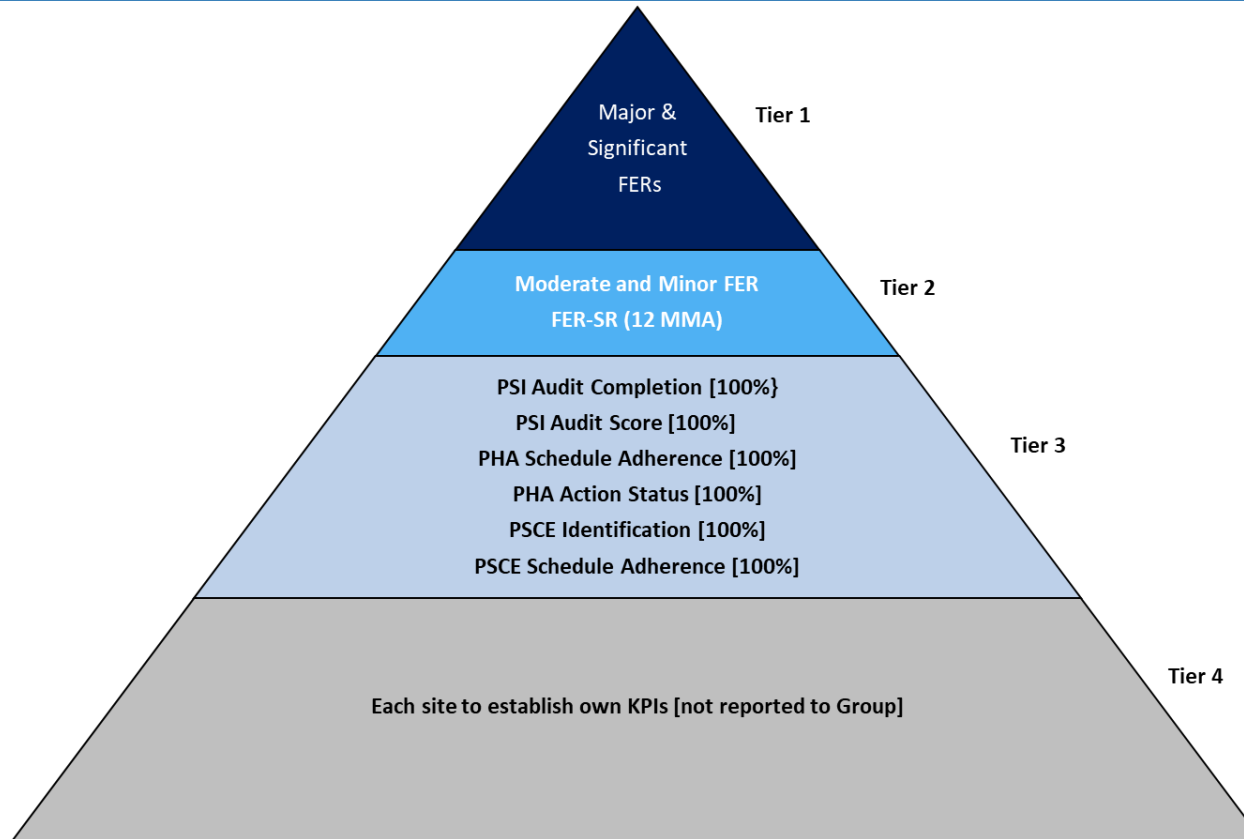
- **Incidents within the industry**

- Lack of adequate process safety indicators have been cited in a number of major accidents [US Chemical Safety Board 2007, UK HSE 2003, Hopkins 2000].

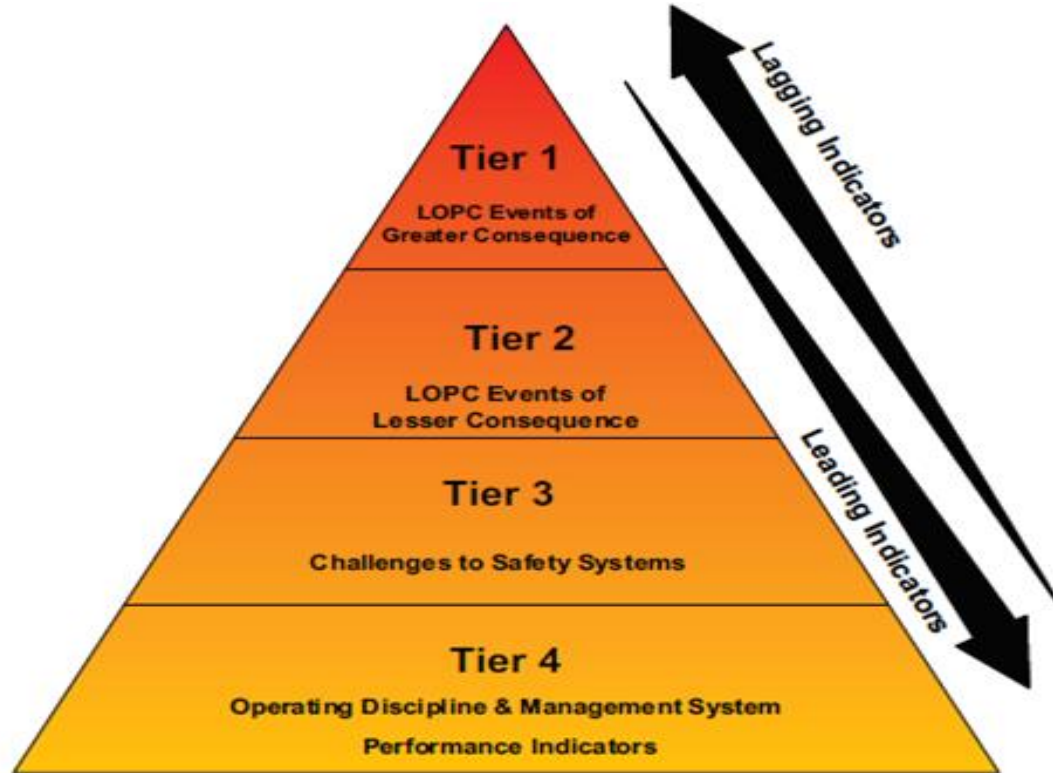
- **Practices within the industry in mature PSM systems**

- Process safety indicators are continually reviewed and modified to remain appropriate for the business needs.
- Measure the effectiveness of preventive controls as well as failures and incidents.

# OLD PSM KPI TRIANGLE



# ALIGNMENT WITH API 574



# CASE FOR CHANGE (1/2)

- **Align indicators with the definition of Tier 3 and Tier 4 in API RP 754**
  - PSI audit score (ensuring availability and accessibility of PSI).
  - PSI audit completion.
  - PHA 5 yearly schedule.
  - PSCE identification.
- **Weaknesses with early stage indicators when the PSM system has matured**
  - Focus is on the degree of compliance not on effectiveness of controls.
  - Not aligned with specific controls to prevent High Severity Incidents.
  - Ineffective controls not flagged early enough to prevent High Severity Incidents.
  - Failure of management systems supporting specific controls might go unnoticed.
  - 100% performance is not an indicator of the effectiveness of the controls.

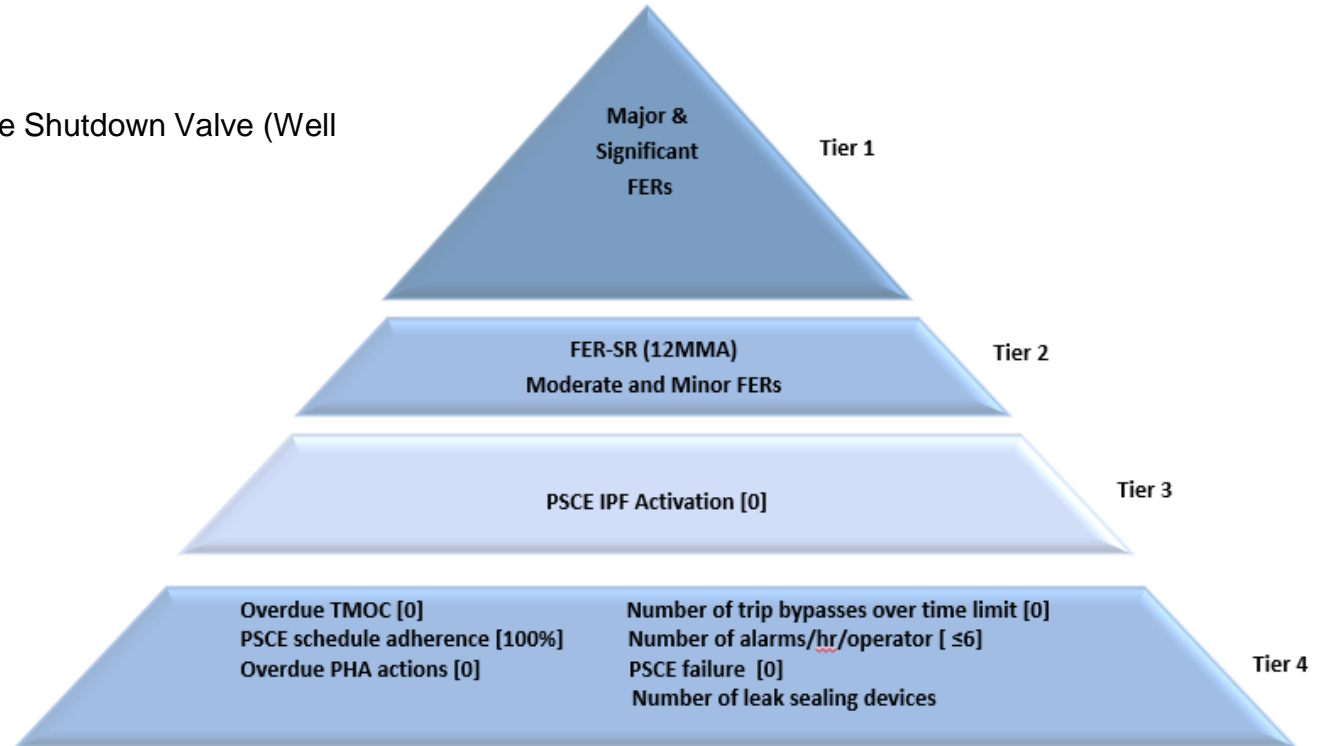
# CASE FOR CHANGE (2/2)

- **New indicators developed using controls in the process safety bowties and past incidents**
  - Trip systems rated for safety (IPF Activation).
  - Temporary MOC – failure to close on time.
- **Proactively strengthen the controls to prevent high severity incidents (HSIs)**
  - Focusing on controls and escalation factors in the process safety bowties.
  - Learning from failures with less serious outcomes.
- **Weaknesses in maintenance strategies for PSCE identified before actualization of HSIs**
  - PSCE failing before scheduled maintenance.
- **Management systems rendering controls ineffective are monitored and controlled**
  - Trip bypasses going over controlled set time limit.
  - Temporary non-standard repairs ( e.g., on-line leak sealing devices).
- **Removes over reliance on ineffective controls**
  - Alarm flooding due to lack of alarm rationalisation.

# GROUP LEVEL KPIs

## Other Tier 3 examples

- Relief valve activation.
- Number of non-compliant Safe Shutdown Valve (Well Integrity).
- IPF fail to danger.



# GUIDANCE ON SITE SPECIFIC TIER 4 KPIs

PSM Element	Leading Indicator	Lagging Indicator
Process Safety Information	Number of MOCs where PSI was not updated	Number of process safety incidents due to inadequate PSI
Standard Operating Procedures	% Overdue SOPs for review	Number of process safety incidents due to inadequate SOPs
Incident Investigation	Number of overdue actions	Repeat process safety incident – failure to learn
Training	% critical tasks overdue	Number of process safety incidents due to training issues
Auditing	Overdue actions from audit findings	N/A



# Thank you

## Any questions?

