Process Safety Data
The Cornerstone of PSM (and often its’ undermining)

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• Summary
What is Process Safety Data?

- Asset/Equipment Information (Prescriptive)
  - P&ID’s, vessel datasheet, instrumentation, equipment inventory, etc
  - Details on PSV, Safety Instrumented Systems

- Process Information/Technology (Mostly Prescriptive)
  - Batch instructions, procedures, raw material information, SDS, process safety data, etc

- Process safety data includes information on:
  - Flammability
  - Highly energetic materials
  - Fire and burning properties
  - Thermally unstable materials
  - Exothermic / gas generating reactions

- Process Safety Data is NOT Prescriptive
### Comparing Strategies for Data Acquisition

<table>
<thead>
<tr>
<th>Approach</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete Dataset</td>
<td>A complete set of data on all materials and processes</td>
</tr>
<tr>
<td>Prescribed Dataset</td>
<td>A prescribed “list” of data requirements aligned with a specific “Basis of Safety”</td>
</tr>
<tr>
<td>Flowchart Approach</td>
<td>Prescribed flow chart dictates testing requirements to arrive at an ultimate “Basis of safety”</td>
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</table>
## Comparing Strategies for Data Acquisition

<table>
<thead>
<tr>
<th>Approach</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Tailored (Case-specific) Approach</td>
<td>Data requirements defined on a case-by-case basis.</td>
</tr>
<tr>
<td>Prescribed Data plus Situational Data</td>
<td>Key / prescribed parameters provide initial characterisation of the hazards. Post-PHA, specific situational data is obtained for specification of the basis of safety</td>
</tr>
<tr>
<td>Assume Worst Case Characteristics</td>
<td>Assume parameters are all at worst case limits</td>
</tr>
<tr>
<td>Ignorance</td>
<td>Thinking that all important process safety properties will be available on a Safety Data Sheet (SDS). Approach results from lack of hazard awareness (competence), lack of programs or poor organisational culture.</td>
</tr>
</tbody>
</table>
The Best Approaches…

- Best approaches are:
  - Tailored / Case-specific OR
  - Prescribed + situational approaches
- Most cost-effective and most effective
- Requires strong competence for consistent performance outcomes
- … but are hardest to apply in multinational organisations
The Criticality of Competence in Data Acquisition and Use

• Prescriptive techniques are easier to apply consistently but:
  ➢ are more expensive,
  ➢ inhibit “thinking” and are less flexible to changes

• Tailored / Situational solutions require strong competence across operating units to ensure consistency

• Ensuring this consistency is a challenge
  ➢ Use of “Centres of Excellence” / Regional Champions
  ➢ Central “peer review”
  ➢ Global training / competency development programs
Most Common Pitfalls

- Collecting safety data at the end of development
  ➢ Safety data should evolve with the process to inform process decisions
- Using the wrong lab equipment
  ➢ Over-reliance on equipment you have, not equipment you need
- No characterisation data at PHA stage
  ➢ Inability to answer PHA questions swiftly, leading to assumptions
- Lack of competence in extrapolating data
  ➢ Needs a specialist to interpret data on the PHA team
- Lack of a robust and documented basis of safety
- …and many more!
Specific Examples

• French clients process condemned on safety grounds at the end of development.
• DSC data (under nitrogen) used for drying temperature specification in a fluidised bed dryer.
• Numerous clients size emergency relief systems for the scenario of fire engulfment using API methods when runaway reaction scenarios exist.
• Hazop concludes “TEMPERATURE LOW” scenario is no risk as kinetics slower and further from boiling point.
Summary

• A clear and unambiguous strategy for process safety data collection is required which is robust and consistent across an organisation.

• Prescriptive techniques are rarely the most effective or cost-effective.

• Local competence to generate and interpret data – to link it to safety measures – is critical.

• Quality of PSI is a leading indicator of Process Safety maturity of a corporation.
Thank you for your attention

• Any Questions?

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