Break-Out Session 2
The Role of SPIs in Safety Performance

PLANT INTEGRITY

Group 1
PLANT INTEGRITY elements

- Primary containment, e.g., vessels, piping, pumps etc.
- Safety systems, emergency shutdown, overpressure, etc.
- Site layout
1. how often do operators use SPIs for plant integrity?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Number of inspectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>0</td>
</tr>
<tr>
<td>Nearly always</td>
<td>1</td>
</tr>
<tr>
<td>Sometimes</td>
<td>7</td>
</tr>
<tr>
<td>Almost never</td>
<td>2</td>
</tr>
<tr>
<td>Never</td>
<td>0</td>
</tr>
<tr>
<td>Not applicable</td>
<td>2</td>
</tr>
</tbody>
</table>
(2A) 2. What kind of SPIs should be used for each of the specific plant integrity categories?

Why different sites establish SPI for plant integrity?
- Improve and monitor the availability of the plant
- Operation integrity system: business risk as well as safety risks
- Reliability of equipment
- Overview for the management and benchmarking at corporate level (comparison between different sites)
- What about remotely operated sites or automated sites?

What kind of SPI are used?
- Inspections (tanks, piping, safety valves, SIF, ...) planned vs executed
- Overdue inspections
- Failure rate of equipment (pumps, valves, ...)
- Number of reported LoC related to mechanical integrity
- Number of non-programmed stops
What kind of SPI are used? (continued)
• Resources for programmed maintenance
• % overdue follow up actions after inspection
• Expected lifetime expectancy
• Number of activated barriers or layers of protection

**Conclusion**: both leading and lagging indicators are used for plant integrity monitoring

**SPI for site layout??**
• OBRA and MoC
(2A)2. What kind of SPIs should be used for each of the specific plant integrity categories?

Aging of plants?
- Also connected to maintenance/inspection programme and MoC
- Repairing vs replacing
- Leakage rate
- Cost of maintenance
- Difficult to define specific SPI for monitoring aging
- Not specifically designed for aging but could interpreted as a measure of aging
- Fitness-for-service analysis
Types of industries in which SPI might be more critical?

- Depends on the complexity of the sites and consequences/location of LoC
- More Critical: Refineries, multipurpose plants, continuous vs batch production, biocide production, production and storage of very toxic substances,
- Less critical: warehouses, simple storage (fuel storage), storage of ores and minerals, air separation units, power generation
Session 2B
1. How can you tell when SPIs are appropriate for plant integrity?

- Seveso-inspector cannot say if SPI/KPI alone is appropriate to monitor plant integrity as an inspector but should look at the systematic approach
- Use of SPI from industry association
- Some examples:
  - Test/inspections of SIF, safety interlocks, PSV: % passed vs % failed
  - Number of safety critical items passed the test should be 95% and adapting the inspection frequency accordingly
  - Investigate the failed 5% (same equipment?)
  - Failed test of safety critical equipment considered a near miss
- SPI can be good as well as bad depending on how operator is using them
- They should be dynamic: periodic re-evaluation
(2B) 2. How can you tell when the SPIs for plant integrity are having an impact on performance?

- Positive link and impact on performance
- Corrective actions linked to results of SPI
- Small spills, failure of SCE (related to plant integrity) are also specific SPI and the integrity system should take this into account to improve performance
- Performing spot checks
- How long after implementation of SPI you get successful results?
- Impossible to say because too many influencing factors but should give enough time in order to be statistically relevant
(2B) 3. How do sites manage follow-up of SPI results for plant integrity?

- Periodic management review
- Technical/maintenance department and upper management
- Not only give SPI as numbers but also background information and explanation
- Not only results of SPI but also meaning of failed or bad results of SPI