Building Safety in Petroleum Exploration and Production in the Northern Regions

WP4 Early warnings
"Mini-workshop"

Project Advisory Board Meeting
2/2/2009
Gardermoen
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- Mini-workshop; Good criteria for early warning indicators
Objectives of WP4

The objective of WP4 is to provide early warnings of major accidents*, requiring development of new models and methods, or the adaptation of existing ones.

*) Focus on environment means that also minor events will be included.

In WP4 we will develop indicators providing early warnings of accidents, including events with environmental consequences, for petroleum activities in the Northern Regions in general and for the Goliat field in particular. The work will be based on:

1. Analysis of the underlying causes of selected events (e.g., Texas City, Eirik Raude and the Riser event),
2. Analysis and adaptation of existing methods, e.g. LIOH used in the nuclear industry (with links to the RE characteristics treated in WP1)
Overview of WP4

- The problem description (task 4.1) and the literature review (task 4.2) provide information to and from each other, and both gives input to the study of accidents (task 4.3), from which the results are generated (in task 4.4 and task 4.5).
Deliverables of WP4 - status

Challenges
- Memo
  - Problem description
- Task 4.1
  - Problem description
- Task 1.2
  - Case description
- Task 4.3
  - Study of accidents
- Task 4.4
  - Case specific advice
- Task 4.5
  - General knowledge

State-of-the-art
- Memo
  - Literature review
- Journal article
- Memo
  - Leading indicators

Texas City, Eirik Raude, Ocean Vanguard
- Memo
  - Case description
- Conference Paper (PSAM9)
- Eirik Raude
- Texas City

Memo
- General knowledge
Main challenges

1. Sufficient focus on major accidents
2. Exceptional conditions for the Northern Regions
3. Evaluation of criteria for "good" indicators
1. Sufficient focus on major accidents

- “The lost time rate is not a measure of process safety” (Kletz, 2003).

- “In many of the accidents the companies concerned had very low lost-time accident rates. This introduced a feeling of complacency, a feeling that safety was well managed” (Kletz, 2001).

- However, even though the critical overdue maintenance log could provide an early warning, i.e., the system was in place, failure in using the system correctly resulted in the system failing to provide an early warning (ref. Eirik Raude).
2. Exceptional conditions for the Northern Regions

- No discharge is allowed in the northern regions and areas as the Barents Sea.
- One of the challenges with this is that it involves the surveillance of systems and equipment that previously have not been considered critical.
- Petroleum exploration and production in the northern regions is an area of social debate in Norway. One ‘minor mistake’ by one of the actors involved may harm the whole petroleum industry.
3. Criteria for “good” indicators

It is also possible to include criteria for the safety information system as a whole, such as:

- Efficient and understandable
- Administratively feasible
- Able to be integrated into normal operational activities
- Promotion of involvement

A – Absolute requirement
V – Very important requirement
## Evaluation of criteria

<table>
<thead>
<tr>
<th>No</th>
<th>Criteria</th>
<th>Kriterier</th>
<th>Evaluation (A, V, -)</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Data available</td>
<td>Data tilgjengelig</td>
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</tr>
<tr>
<td>2</td>
<td>Data capable of being generated</td>
<td>Data kan framskaffes</td>
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</tr>
<tr>
<td>3</td>
<td>Accurate data</td>
<td>Nøyaktige data</td>
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<tr>
<td>4</td>
<td>Data (or indicator) having adequate coverage</td>
<td>Data eller indikator er dekkende (for forholdet)</td>
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<tr>
<td>5</td>
<td>Observable</td>
<td>Observerbar</td>
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<tr>
<td>6</td>
<td>Quantifiable</td>
<td>Kvantifiserbar</td>
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</tr>
<tr>
<td>7</td>
<td>Valid</td>
<td>Valid (måler det den skal måle)</td>
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<tr>
<td>8</td>
<td>Sensitive</td>
<td>Sensitiv (følsom/foranderlig)</td>
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<td>9</td>
<td>Compatible</td>
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<tr>
<td>10</td>
<td>Transparent</td>
<td>Klar (gjennomsiktig/forståelig)</td>
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<tr>
<td>11</td>
<td>Robust against manipulation</td>
<td>Robust mot manipulasjon</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Direct relation between indicator and safety</td>
<td>Direkte sammenheng mellom indikator og sikkerhet</td>
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<tr>
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<td>Unambiguous</td>
<td>Utvetydig/entydig</td>
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<tr>
<td>14</td>
<td>Significance should be understood</td>
<td>Betydning må være forstått</td>
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<td>Manageable set</td>
<td>Håndterbart sett (av indikatorer)</td>
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<td>Kontrollerbar (mulig å påvirke/forandre)</td>
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<td>19</td>
<td>Other:</td>
<td>Andre:</td>
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Examples:
- Number of leaks
- Percentage of maintenance actions identified which are completed to specified timescale