Is sense-making key to organizational barriers?

Experiences from the nuclear industry
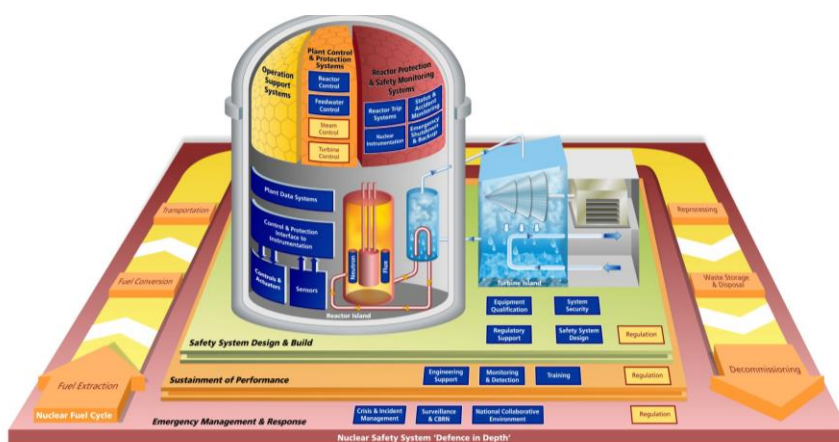
Jan Skriver

Resilience AB

jan.skriver@resilience.se

# Defence-in-depth

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2016-05-02

Defence-in-depth

- Strong belief that nuclear power is safe
- That nearly all potential accidents can be foreseen
  - Those that can't, can still be controlled through the application of procedures
- That Tjernobyl was a unique

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Dilemma

- Imagine that you as a manager of a nuclear power plant has just invested in increasing the height of a sea wall from 4 to 6 meters at the cost of many millions because of a risk analysis
- A new risk analysis shows that you have the potential for a tsunami of 15 meters
- The highest you have experienced before is 3.7 meters
- 300 years of historical data indicates the highest tsunami to have been under 4 meters
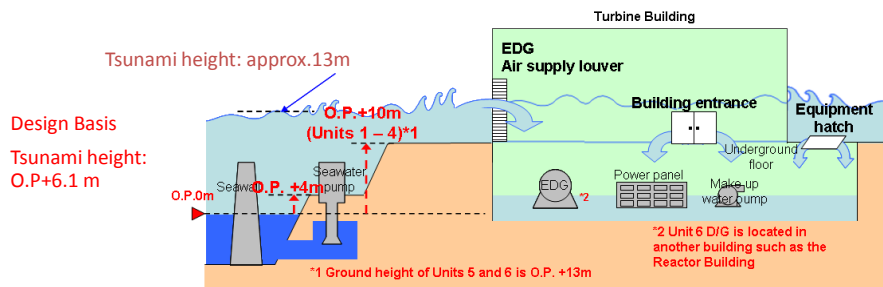- **How likely are you to act on the new risk analysis?**
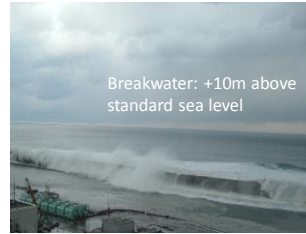
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Fukushima Daiichi

Fukushima Daiichi

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Organizational barriers

- The nuclear industry distinguishes between:
  – Nuclear safety (process safety)
  – Industrial safety (person safety)
- Barriers for nuclear safety are primarily technical
- Barriers for industrial safety are primarily non-technical
- However, organizational barriers are non-technical barriers for nuclear safety
  – Solutions often borrowed from industrial safety

Organizational barriers

- Organizational barriers depends on:
  – Compliance with regulations
  – The current economic climate
  – Human understanding and sense-making of complex systems
  – The national culture

Organizational barriers

- Organizational barriers are similar to safety culture traits, e.g. WANO (2013):
  - Individual commitment to safety
  - Management commitment to safety
  - Managements system

Individual commitment

- Personal accountability
- Questioning attitude
- Safety communication

Management commitment

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- Leadership accountability
- Decision-making
- Respectful work environment

Management system

RESILIENCE
- engineering safety

- Continuous learning
- Problem identification and resolution
- Environment for raising concern
- Work processes (planning, follow-up, QC)

Organizational barriers

- Solutions often based on control and monitoring
  - Procedures
  - Risk analyses
  - Work orders
  - Training and competence
  - Behavioural intervention
  - KPI

Challenges

- Engineering solutions to human/organizational challenges
- Human behaviour theory vs. practice
- Culture for questioning senior personnel
- Balance between regulator requirements and worker needs
- Competence - short term vs. long term
- National culture

Conclusion

- Organizational barriers need a strong foundation:
  - Prioritization of safety from senior management
  - Trust between management and workers
  - Continual safety dialogue
  - Active inclusion of workers in safety initiatives
  - Relevant training and competence
  - Interventions should be made on-site

Conclusion

- Success depends on sense-making
  - If it isn't relevant and applicable it won't work