

14/10/16

National Nuclear Safety Knowledge Management

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14 October 2016

Outline

- Why?
 - Why knowledge management?
 - Why for nuclear safety?
- National nuclear safety knowledge management
- Relationship ...
 - with Safety Standards
 - with capacity building
 - with GNSSN
 - ...
- Activities and approaches to be considered

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Importance of KM

- Knowledge Management has been identified as one of the key factors that can contribute to the safe and secure and efficient operation of nuclear activities and facilities in Member States
 - Safety Standards (Part 1, Part 2, several levels)
 - General Conference resolutions
 - IAEA conferences (HR 2014, NKM 2004, 2007)
 - Nuclear Safety Action Plan (elements)
 - IEM Reports

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Importance of KM for nuclear safety

- KM for nuclear safety poses special challenges
 - Knowledge base legally mandatory
 - Required for regulatory activity and operations
 - Manyfold types (legal, technical, operational ...)
 - Manyfold owners (regulators, TSOs, vendors, operators ...)
 - Lack of nuclear safety knowledge can have significant implications
 - Contrast to other knowledge types
 - Long timescales (decision basis)
 - Dual role of regulators (corporate and oversight)
- Strong "Nuclear Safety Knowledge Management" desirable

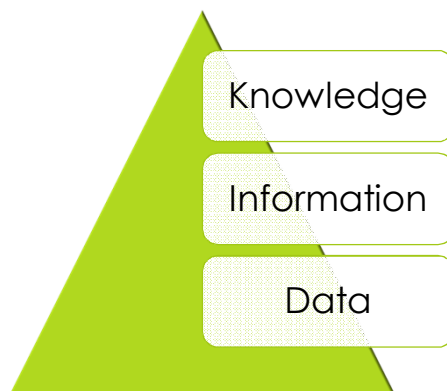
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Nuclear Safety Knowledge Management

- Nuclear Safety Knowledge Management as the management of knowledge relevant to or required for nuclear safety.

- Nuclear Safety Knowledge Management entails
 - ... using knowledge management approaches, tools and techniques
 - ... for the purpose of nuclear safety.

KM Basics



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Application of KM

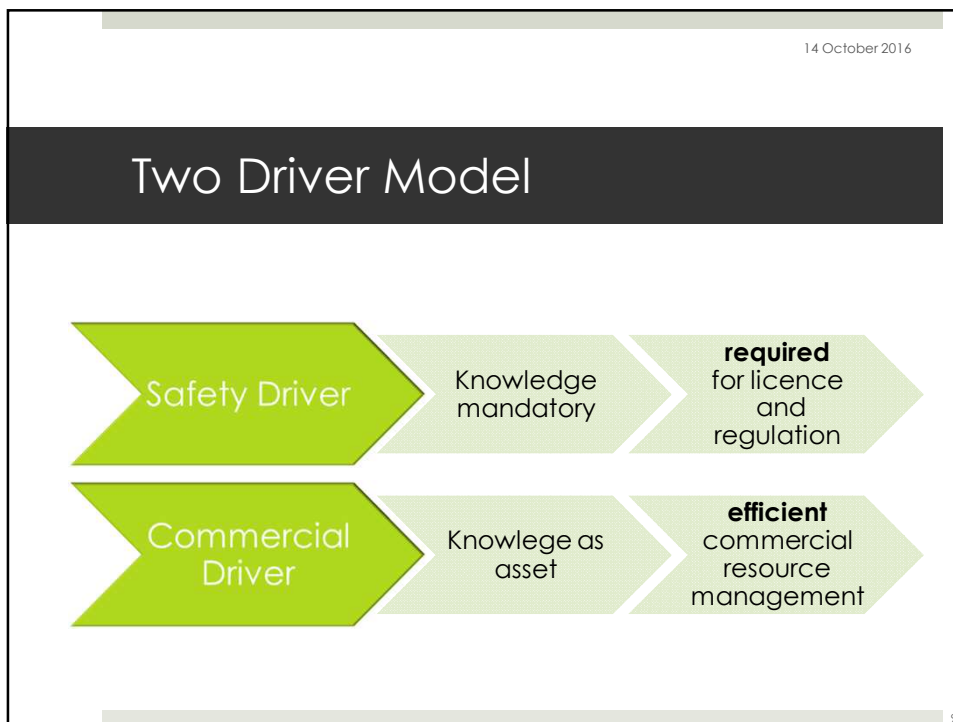
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Two Driver Model

- Explanation: look at loss of knowledge
 - Loss of **commercial** knowledge
 - Possibly less revenue for the utility
 - Possibly less commercial value of utility
 - Undesirable, but not critical
 - Loss of **safety** knowledge
 - Operator: stop operation?
 - Regulator: stop oversight = stop operation?
 - "Critical"

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Levels

Global	<ul style="list-style-type: none"> • Global safety experience, incl. EPR, NSK joint heritage • Globalization of nuclear sector, workforce migration
National	<ul style="list-style-type: none"> • Role of governments, national development plans • Interactions between regulator, TSO, operator
Organizational	<ul style="list-style-type: none"> • KM as part of integrated management system (IMS) • Responsibilities of regulator, TSO, operator
Individual	<ul style="list-style-type: none"> • Attitudes, learning, awareness • Career paths for each individual

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National level considerations

- Nuclear safety a national topic
 - Governmental role
- Nuclear safety involves many actors
- Several KM phenomena appear only on national level
 - National HRD planning (recommendation by HR conference 2014)
 - Workforce migration
 - University education
 - Existing nuclear safety networks (national, regional, global)
 - NS knowledge exchange with neighbouring disciplines and society
- National nuclear safety knowledge management desirable

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Focus: Organizational and National

- Several **individual** organisations have individual KM programmes
 - They are **not connected** on national level
 - Regulators – operators – academia – R&D organizations – designers: **separate** KM programmes
 - Lack of **efficiency, effectiveness, friction losses**
 - Risk of **segmentation**
- Side objective: **connect** individual KM programmes

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Focus: Knowledge Resilience

- "Knowledge resilience"
 - **Stability** against external distortions
- Organisational level
 - Continuity of business
 - Change management
- National level
 - Emergency preparedness and response
 - Changing environments
 - New, growing or phased out programmes
 - Role of governments

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NSKM and Safety Standards

- Importance and link to Safety Standards
 - GSR Part 1
 - NSKM as part of national endeavour
 - GSR Part 2 + Guide (under development)
 - NSKM as part of an organizations management system
- Publication: Knowledge management for Regulators and TSOs (under development)

Link to Capacity Building

- Umbrella approach for Capacity Building
 - Education and Training
 - Human Resource Development
 - Knowledge Management
 - Knowledge Networks
- 6th Meeting of the Steering Committee on Competence of Human Resources for Regulatory Bodies (Nov. 2014)
 - New name: Steering Committee on Regulatory Capacity Building and Knowledge Management

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Link to GNSSN

- KM is integral part of GNSSN mandate
- What do we have?
 - Existing GNSSN Platform: "Nuclear Safety Knowledge Platform"
 - "nuclear safety capacity building"
 - requires
 - "nuclear safety knowledge management"
 - requires
 - "nuclear safety knowledge platform"
 - The Platform as the **technology pillar of knowledge management for nuclear safety**

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Focus: Link to IEMs

- NSKM is in response to several IEM recommendations
 - IAEA Report on Reactor and Spent Fuel Safety in Light of Accident at Fukushima Daiichi Nuclear Power Plant
 - IAEA Report on Strengthening Nuclear Regulatory Effectiveness in Light of Accident at Fukushima Daiichi Nuclear Power Plant
 - Recommendations on KM for regulators
 - IAEA Report on Decommissioning and Remediation After a Nuclear Accident
 - IAEA Report on **Human and Organizational Factors** in Nuclear Safety in Light of Accident at Fukushima Daiichi Nuclear Power Plant
 - Recommendations on human resources and many KM issues
 - Integrated (systemic) approach to nuclear safety benefits from NSKM
 - IAEA Report on Radiation Protection After Fukushima Daiichi Accident: Promoting Confidence and Understanding
 - IAEA Report on Capacity Building for Nuclear Safety (under preparation)
 - Recommends using NSKM explicitly

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IEM: Systemic Approach to NS

- Integrated (systemic) approach to nuclear safety (SANS)
 - consider "... human, organizational and technical factors across all stakeholder organizations, different levels inside each organization and each phase of the nuclear facility life cycle ..."
 - "... involve "experts from the behavioural sciences"
- KM is a very good enabler for developing and transitioning to this SANS
 - People – process – technology
 - Comprehensive, all levels
 - Origins of KM in behavioural sciences

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All KM Types to be used

Explanation

- General observation: knowledge or management systems contain
 - People
 - Processes
 - Technology
 - (ref. also GSR Part 2, Req. 2)
- All three are relevant for nuclear safety
- NSKM must consider all three areas

The PPT Model of KM

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All KM Types to be used (2)

- Corresponding three historical sources and types of knowledge management today
- People – HR departments
 - Human resources, training, life-long learning, workforce development, migration, recruitment, generational transfers, ...
- Process - business consulting
 - Communities of practice, mentoring, knowledge cafés, structured and open interviews, knowledge mapping, ...
- Technology – ICT companies
 - Internet platforms, search engines, document repositories, proactive e-assistants, e-learning, ...

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Conclusion

- KM is of high relevance to nuclear safety
 - Specific requirements/conditions in nuclear safety context to be considered
 - Importance of several levels, including
 - organizational
 - national
 - → National NSKM needed
- National NSKM would
 - close a gap in the current IAEA programme spectrum
 - complement existing programmes (ET, HRD, CB)
 - fit well into GNSSN and use the existing platform

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Conclusion

- Nuclear safety knowledge management
 - ... is a part of nuclear safety capacity building
 - ... is linked to nuclear safety education and training and human resource development
 - ... is promoted through existing networks
- Nuclear safety knowledge management is defence in depth for nuclear safety knowledge

Thank you for your attention.