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Workshop on Managing Nuclear Knowledge

8 - 12 November 2004

Managing Nuclear Safety Knowledge

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These are preliminary lecture notes, intended only for distribution to participants



International Atomic Energy Agency

MANAGING NUCLEAR SAFETY KNOWLEDGE (CONCEPTS AND APPLICATIONS)

Luis Lederman

Workshop on Managing Nuclear Knowledge 8-12 November, Trieste, Italy

WORKING KNOWLEDGE (Davenport, Prusak 1998)

Why sudden interest?

(courses, conferences, articles, journals, consulting)

- growing conviction that knowing about knowledge is critical to business success
- > more than a casual approach to knowledge is needed
- > driving force global competitiveness
- knowledge advantage is a sustainable knowledge because it increases with use
- new terminology: core competencies, knowledge creating organization, intellectual capital, strategy focus, networking



WORKING KNOWLEDGE

Firms are struggling to understand knowledge

- what they know, what they need to know, what to do about developing and sharing knowledge
- treating knowledge as a capital asset which needs to be managed
- tremendous excitement about benefits of knowledge initiatives in the corporate world (e.g. Boeing, British Petroleum, Chrysler, Coca Cola, Ford, IBM)



CONCEPTS

Data

- set of discrete and objective facts about events
- > data is essentially raw material for creation of information
- > data contains no judgement or interpretation

Information

> is data plus added value

methods: add purpose of data collection, know key components of data, analyze data methodically or statistically, remove data errors, summarize data



CONCEPTS

Knowledge

- > is information transformed by humans
- requires comparison with other situations
- consider implications of consequences
- introduce expert evaluation and contains judgements
- knowledge creation takes place between humans.
- knowledge is about beliefs and commitments*
- when knowledge stops evolving it becomes opinion or dogma
- networks have created infrastructure for knowledge creation, exchange and management
- * Knowledge Creating Company (Nonaka and Takeuchi, 1995)





KNOWLEDGE GENERATION MODELS

Models

- acquisition
- > dedicated resources (e.g. R&D separate from everyday work)
- > fusion (bring together people with different knowledge)*
- adaptation (originality is less important that effectiveness)
- knowledge networking (informal to formal)

* Knowledge Creating company (Nonaka and Takeuchi, 1995) – do not be afraid of a little creative chaos



KNOWLEDGE CODIFICATION AND CO-ORDINATION

- tacit knowledge is almost impossible to reproduce in a document or data base
- tacit knowledge is transferred connecting people (narratives, interviews)
- mapping and modelling knowledge
 "Yellow pages" guide not repository (pointers)
 IT tools needed to make knowledge maps work
- > organizational knowledge maps are political documents

Overdoing would be an immense and futile effort



KNOWLEDGE TRANSFER

- knowledge is constantly transferred
- spontaneous transfer should be encouraged (avoid isolation)
 talk rooms Brownian motion theory of knowledge exchange
- > managers long after work hours together
- > meetings organized out of work place
- cultural hurdles (trust, language, what's real work)



KNOWLEDGE MANAGEMENT PROJECTS

knowledge repositories

external knowledge – competitive intelligence analysis internal knowledge – research reports, marketing material Informal internal knowledge – tacit knowledge

- knowledge access
 - knowledge yellow pages
- > improve knowledge culture

treating knowledge as a capital asset changing employees perceptions

"A healthy tension between knowledge and action is the key to organizational success".





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KNOWLEDGE MANAGEMENT AND NETWORKING FOR ENHANCING NUCLEAR SAFETY





"A safety improvement anywhere is a improvement of safety everywhere".



Integrated Safety Approach



Knowledge Base

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KM Practical Application

- Planned step by step process
- Promoted by upper management
- Implemented at the knowledge centers
- Environment conductive to knowledge sharing
- Incorporated in work routines



Safety Knowledge Domains



Process Flow for the Development of IAEA Safety Standards



Asian Nuclear Safety Network



Education and Training

Sustainability of national programmes IAEA exemplary training material Training to trainers



Safety Vision

"Global safety regime that protects people and the environment from effects of ionizing radiation, minimizes the likelihood of accidents that could endanger life and property, and effectively mitigates the effects of any such events".

Knowledge Management and Networking are essential elements to realize the vision





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Knowledge Management Portal for the Department of Nuclear Safety & Security

Background

- Department of Nuclear Safety & Security (NS), has approx. 170 staff
- 3 Divisions & 10 Sections each with related network drives
- Information exchange is mostly done through one common network drive or by e-mail
- Knowledge is currently stored in many different locations and databases



Objective

To provide an integrated solution for sharing knowledge among staff (and MSs.) and thereby enhancing the programme delivery.



Features

- Structured Corporate Repository
- Yellow pages
- Communities of practice



Safety Knowledge Portal



Methodology

- •Identify, Analyze and Structure Knowledge Domains
- Use modern CMS (Livelink) wherever possible
- Provide a consolidated and consistent platform, where useful nuclear safety knowledge can be accessed by safety experts
- Knowledge owners should be knowledge managers
- Later: Provide the knowledge to MS
- Also: Assist MS in establishing KM Portals



NSRW Thematic Areas



NSNI Thematic Areas



Structure of Safety Knowledge for Each Technical Area





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