



International Atomic Energy Agency

**IAEA-Introduction: Knowledge Management - #14
(Paper IAEA-CN-215)**

How IAEA NKM Approaches Support the Building and Sustaining Nuclear Capacity in Member States

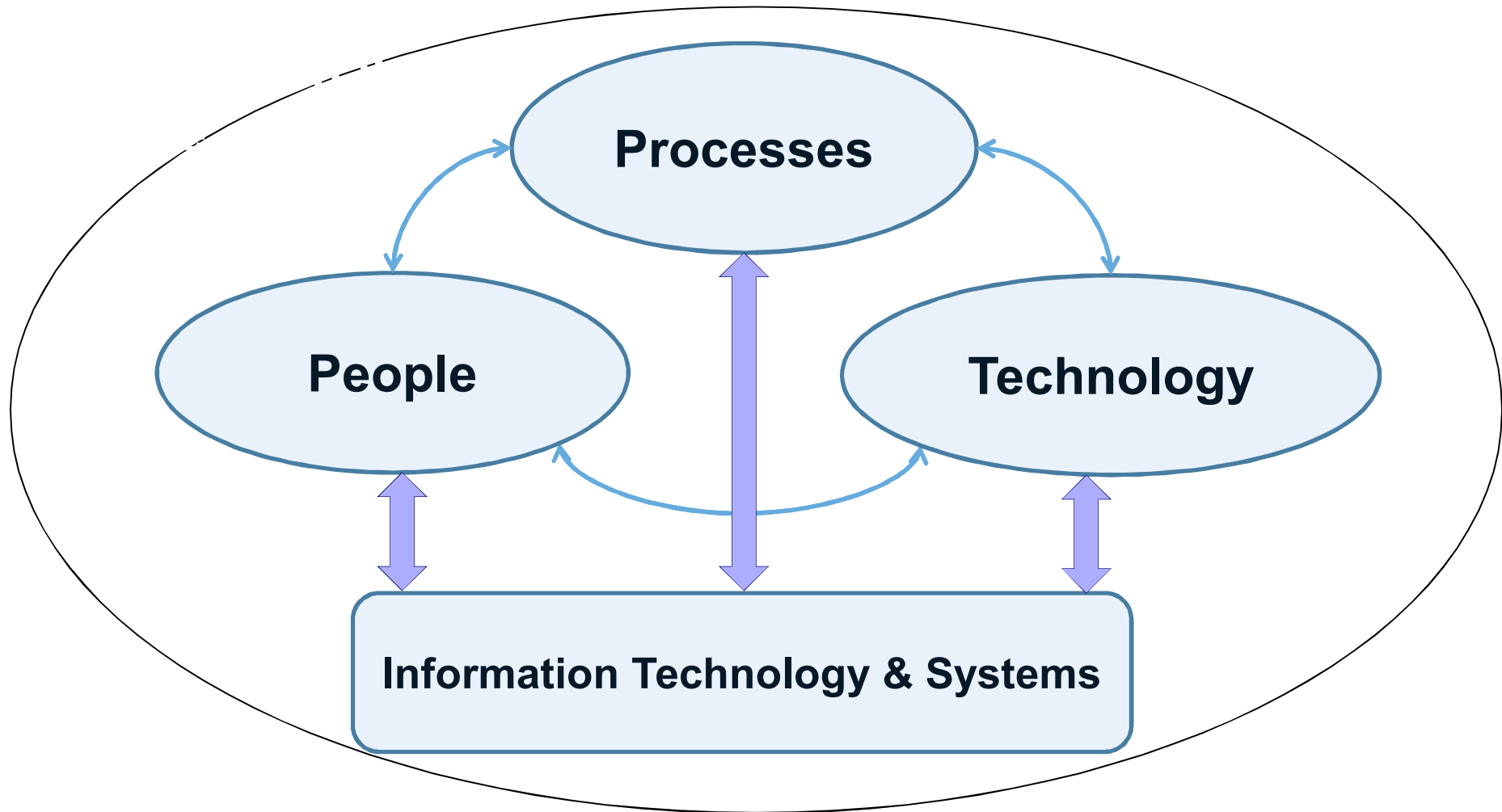
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Outline

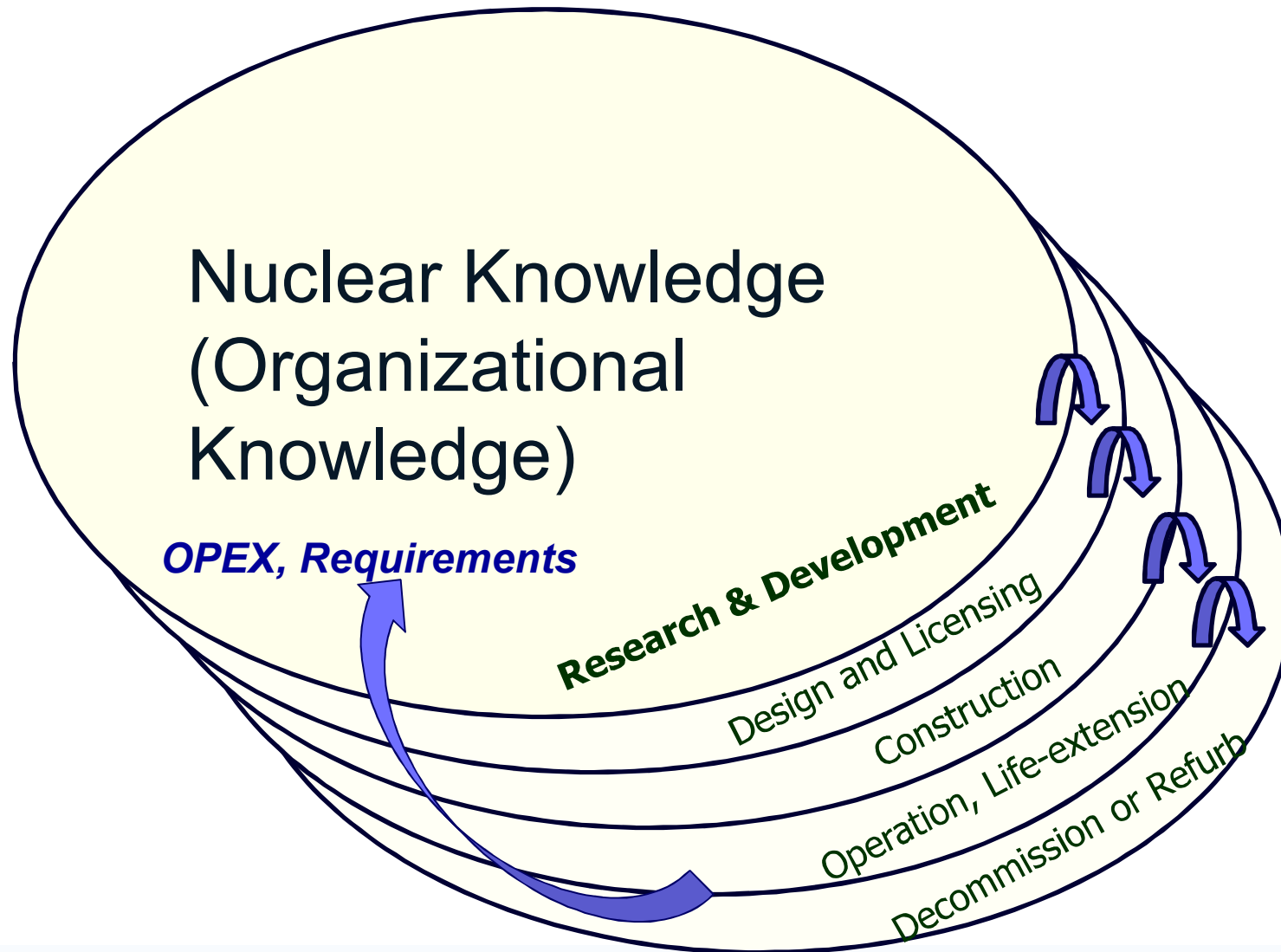
- What is Knowledge Management (KM) ?
- What is “*Nuclear Knowledge Management*” (NKM) ?
- What’s the IAEA NKM Programme about?
 - Objectives
 - Key focus areas
 - Highlight some elements



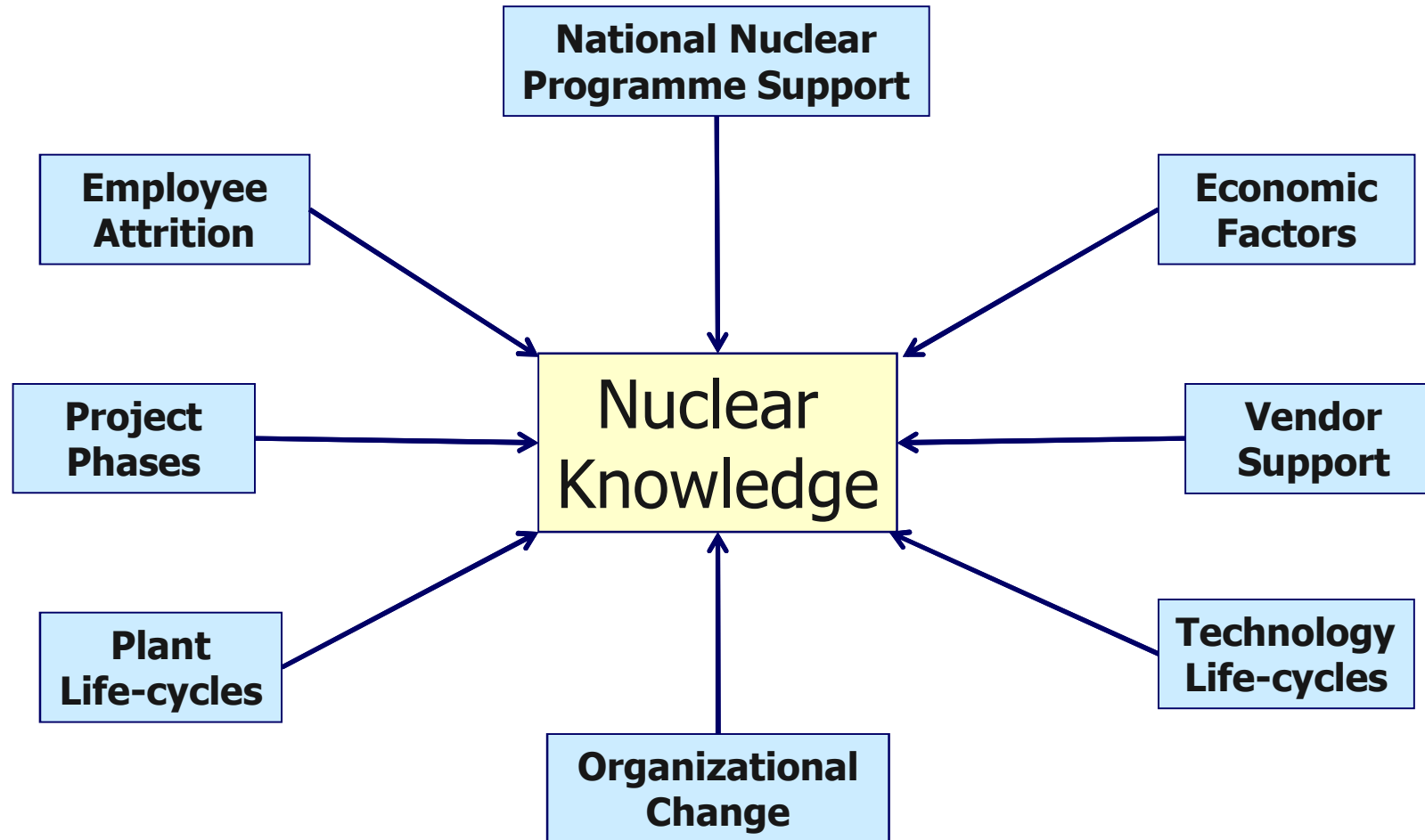
Organizational Knowledge Assets



Maintaining Knowledge Over the Life-cycle



Threats to Nuclear Knowledge



Consequences of Knowledge Loss

- Inability to make decisions effectively
- Higher risk of making incorrect decisions
- Potential high cost to recover lost knowledge
- Potential adverse impacts on:
 - performance etc.
 - schedule
 - reliability
 - safety
 - cost



***Having needed knowledge is a strategic asset!
Lacking needed knowledge is a strategic threat!***

Nuclear KM Focus Areas & Scope



KM in Nuclear is Challenging

- **a complex technology base**
- **long life-cycles**
- **high capital costs**
- **multi-disciplinary technologies and expertise**
- **competing operational objectives**
- **complex socio-technical system**
- **a regulated industry (safety, EQ, QA, ERP, etc.)**
- **different organizational contexts, issues**
- **understanding of KM issues and benefits varies**



KM in a Nuclear Organization

- Understanding KM link to safety for facilities
- Recognizing important knowledge assets
- Understanding KM domains & perspectives
- Recognizing life cycle phases and KM issues
- Understanding K renewal and decay cycles
- Pro-actively managing knowledge assets (e.g. core competencies, design knowledge)
- Understanding & strengthening K-processes

Implementing effective KM requires strategic thinking, integration and leadership!



IAEA NKM Programme Objectives

- **increase Member State awareness and understanding of risks and challenges of KM in nuclear**
- **development and dissemination of good KM practices in Member States**
- **promote implementation in Member State nuclear energy programmes**

How?



10+ Years of NKM Programme



2 Focus Areas



1. Implementing NKM in Nuclear Organizations

- Methodology (documents, methods & tools)
- Services and support (assist missions, resources)

10+ Years of NKM Programme



2. Facilitating Sustainable Nuclear Education

- Nuclear Education (schools, VNMU, networks)
- e-Learning

Implementing NKM in Nuclear Organizations (1)

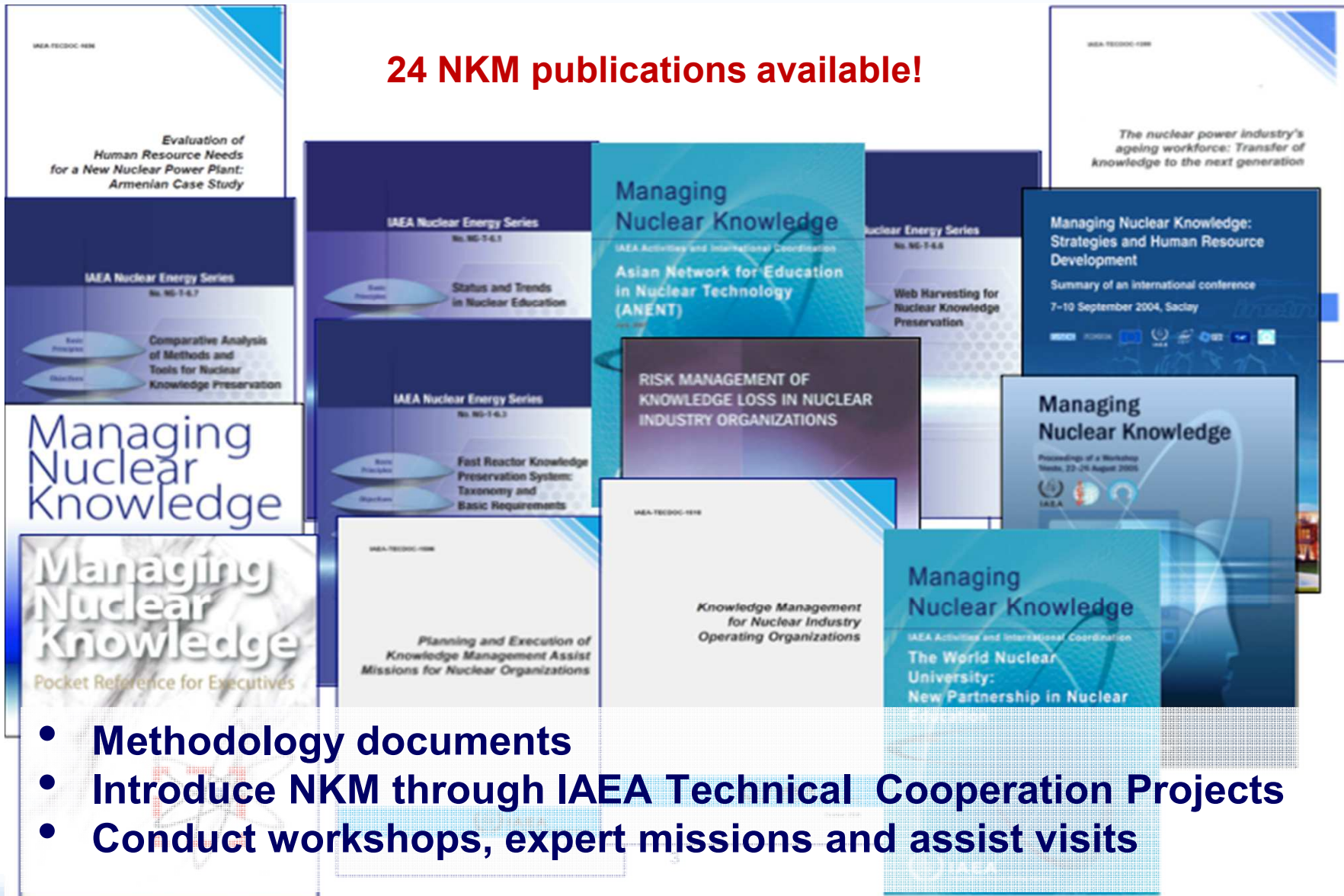
Help Member State Organizations to:

- develop policy and programmes
- identify critical knowledge
- evaluate knowledge gaps, knowledge loss risks
- implement effective approaches to prevent knowledge gaps and loss
- Integrate KM thinking and practices into the management system



Implementing NKM in Nuclear Organizations (2)

24 NKM publications available!



- Methodology documents
- Introduce NKM through IAEA Technical Cooperation Projects
- Conduct workshops, expert missions and assist visits



Implementing NKM in Nuclear Organizations (3)

Documents in Development:

- **Guide on Nuclear Knowledge Management**
- **Risk Management of Knowledge Loss**
- **Process-oriented Knowledge Management**
- **Mapping organizational competency**
- **KM in Nuclear Management Systems**
- **KM for Radioactive Waste Management Organizations**

Knowledge Retention (Taxonomies, Repositories):

- **Fast Reactor**
- **VVER**
- **Major Nuclear Accidents**



Implementing NKM in Nuclear Organizations (4)

New directions...

- **Developing Communities of Practice (COP)**
- **Life Cycle Design Knowledge Management**
- **KM in new build projects (especially newcomers)**
- **Managing K-loss with outsourcing and suppliers**
- **KM in nuclear decommissioning and environmental remediation projects**
- **Developing KM indicators, measures, and metrics**
- **Plant Information Models (PIM) to support and manage design knowledge throughout NPP Life Cycle**



Facilitating Sustainable Nuclear Education (1)

Nuclear Energy Management (NEM) Schools

- **5th NEM School at ICTP in Trieste, Italy – Nov. 2014**
- **3rd NEM School at U of Tokyo, Japan – June 2014**
- **Since 2010 trained over 150 nuclear professionals and managers and conducted schools in ICTP, Japan, UAE, USA etc.**
- **About 125 applications/yr, ~35 participants selected.**

Nuclear Knowledge Management (NKM) Schools

- **10th NKM School at ICTP in Trieste, Italy – Aug. 2014.**
- **Since 2004 trained over 300 young nuclear professionals.**
- **About 150 applications/yr, ~30 participants selected.**



Facilitating Sustainable Nuclear Education (2)

Networking in Nuclear Education

- Asian Network for Education in Nuclear Technology (ANENT)
- Latin American Network for Education in Nuclear Technology (LANENT), and
- African Network for Education in Nuclear Science and Technology (AFRA-NEST)
- European Nuclear Education Network (ENEN)

IAEA Cyber Learning Platform for Nuclear Education and Training (CLP4NET)

- Facilitating access to educational
- Resources and teaching experience
- Enabling a user friendly and flexible e-learning environment
- Supporting blended learning approaches that young professionals expect today



Facilitating Sustainable Nuclear Education (3)

Int'l Master's in Nuclear Management Programme

- Need for competent nuclear managers
- Nuclear specific master's programme needed
- Agency to facilitate university programme peer-reviews
- Universities to provide all course delivery
- Difficult for one university to meet all needs
- Development of common programme elements, collaboration
- Promote accessibility - remote or blended learning

In 2014-2015, 8 start-up assist missions planned:

- | | |
|---|---|
| <input type="checkbox"/> U of Tokyo, Japan etc. | <input type="checkbox"/> North-West, South Africa |
| <input type="checkbox"/> MEPHI, Russia | <input type="checkbox"/> TAMU, USA |
| <input type="checkbox"/> Manchester, UK | <input type="checkbox"/> Wits, South Africa |
| <input type="checkbox"/> Tsinghua, China | <input type="checkbox"/> Aachen, Germany |



Facilitating Sustainable Nuclear Education (3)

Future initiatives.....

- **4 NEM Schools planned in 2015 (UAE, Japan, ICTP and South Africa)**
- **3 NKM Schools planned in 2015 (ICTP, Korea and Ukraine)**
- **Formation of CIS-Region Network (“STAR-NEN”) underway**
- **National-level Nuclear Educational Capability Assessment & Planning (E-CAP) Framework (piloting in African Region)**
- **Several e-learning modules in development on subjects like: energy planning, NKM, reactor physics, nuclear medicine, preservation of knowledge on WWER reactor pressure vessel embrittlement**



IAEA NKM is here to help!



Nuclear Knowledge Management



e-Bulletin

Nuclear Knowledge Management Section
January 2014

www.iaea.org/nuclearenergy/nuclearknowledge/

Contents

- Networks for Collaboration in Nuclear Education and Training.....1
- Message from the Section Head.....2
- France signs Agreement in Nuclear Education and Training.....3
- Mapping Organizational Competencies...3
- IAEA's Nuclear Energy Management School Opened in the U.S.A.....4
- More Women at 8th IAEA Nuclear Energy Management School in Trieste.....4
- IAEA's Nuclear Energy Management School in Japan.....5
- Annual ICTP/IAEA Nuclear Knowledge Management School in Trieste.....5
- IAEA Launches Virtual Nuclear Management University Initiative.....6
- Practical Approaches to Risk Management of Knowledge Loss in Nuclear Organizations.....7
- 1st AFRA-NEST General Assembly.....8
- Design Basis Knowledge Management...9
- EMSNE Award Ceremony.....9
- Upcoming Meetings.....10
- Recent Publications.....10
- The NKM Team.....11

Networks for Collaboration in Nuclear Education and Training



Network reps.: Mr Mallam (AFRA-NEST), Mr Hadijahyono (ANENT), Mr Ambrosini (ENEN), Mr Barrachina (LANENT)

The role of networks for collaboration in nuclear education and training was highlighted at a side event during the IAEA's 57th General Conference. With

Thank You!

