

SMR.1589 - 6

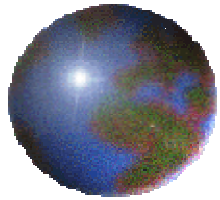
**Workshop on
Managing Nuclear Knowledge**

8 - 12 November 2004

Networking Education and Training

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



Networking

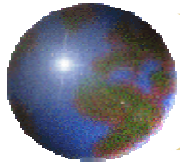
Nuclear Education and Training

IAEA – ICTP – WNU

Workshop on *Managing Nuclear Knowledge*

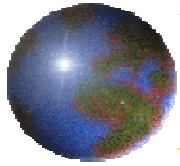
November 2004

Peter J. Gowin



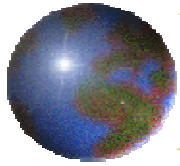
Nuclear Knowledge

- Nuclear knowledge is the basis for almost all nuclear activities
- History
 - Accumulated over 5 decades
 - IAEA established in 1957: international collaboration – a form of an "institutionalized network"
 - Factors affecting sharing of knowledge
 - military use, commercial use
 - sustainable development
- Where does nuclear knowledge reside today?
 - Governmental authorities, academia, private sector, individuals



Working definition

- *Knowledge* can range from technical information laid down on paper or electronically to knowledge embodied in people and in their capabilities and skills.
- Knowledge extends beyond *information* in that knowledge also includes the value added, that is, expertise required to turn raw nuclear information into an understanding of (nuclear) issues or, in other words, to give the information a *meaning*.
- *Nuclear knowledge* is specifically knowledge about or relevant to nuclear related activities.



Knowledge → human resources

● Issues in Member States

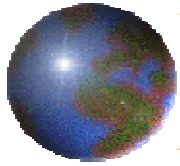
- Knowledge base erosion?
- Student enrolment
- Succession planning
- Stagnation vs. expected renaissance and expansion

● Existing nuclear knowledge can either be

- preserved for future use ("archived") or
- passed on to the next generation: human resources

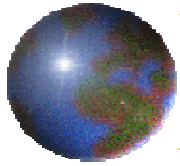
● Human resources

- Knowledge embodied in people ...
- ... for it's application and use in active projects



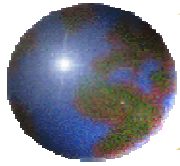
Human resources → education

- Means for intergenerational transfer of knowledge
 - Higher education (universities)
 - Training courses
 - On-the job training and mentoring
 - Indirectly (people – preservation – future use)
- Human resources in nuclear technology
 - Awareness is growing in most Member States
 - Great number and variety of actions taken
 - National plans, governmental funding
 - International initiatives
 - *Networking*



The need for human resources

- Nuclear human resources are needed for different reasons in different situations:
 - Operation of existing facilities
 - Capacity building
 - Innovation and R&D
- Education and training are priorities in many Member States, but with different motivation



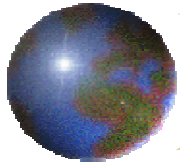
"Networking" - background

✚ Network types

- ▣ Networks of information or of people
- ▣ Formal or informal in character
- ▣ Outcome or framework/documentation oriented

✚ Means of exchange within the network

- ▣ Exchange of people
- ▣ Exchange of information



"Networking" background

✿ Key factors to be considered for networks

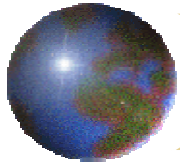
- ✦ Sharing information and knowledge
- ✦ Inter- and multidisciplinary approach
- ✦ Intercultural exchange
- ✦ Soft skills, tolerance, openness, respect...

✿ Timeframe

- ✦ Project experience suggests years to achieve full sharing culture and maximum benefit derived from it

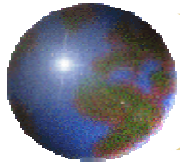
✿ Potential benefits

- ✦ Timeliness, efficiency and effectiveness of activities
- ✦ Quality control
- ✦ Stabilisation and flexibility



Networks in the nuclear field

- Overall number very large, possibly thousands of "networks"
 - Only a minor fraction of those is institutionalized, i.e. "formal" in character
 - A fraction of those networks in turn concerns education and training
- Driving forces for networks in education and training come from two sides:
 - From the educational side, e.g. universities and their teaching agenda
 - From the nuclear side, e.g. cooperation of nuclear centres



National educational networks

● Examples of university networks

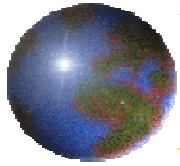
- University Network of Excellence in Nuclear Engineering (UNENE), Canada
- Belgian Nuclear Engineering Network (BNEN)

● Governmental programs with networking components

- US DOE programs
- Nuclear Engineering Departments Heads Organization (NEDHO), US

● Mixed networks

- Alliance for Competence in Nuclear Technology



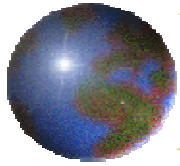
International educational networks

✚ Regional

- ▣ Asian Network for Education in Nuclear Technology (ANENT)
- ▣ European Nuclear Education Network (ENEN)

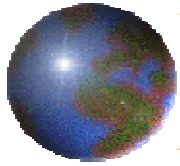
✚ Global

- ▣ World Nuclear University (WNU)



ANENT

- Proposed by Republic of Korea, supported by IAEA
- ANENT is a network of education and training institutions
 - Objective: *"to facilitate co-operation in higher education, related research and training in nuclear technology in the Asian region."*
 - Activities: Information sharing, distance learning, credit transfer, reference curricula and linking to other networks
- Status: operational
 - Preparatory meeting in 2003, Republic of Korea
 - 1st Coordination Committee meeting in February 2004, Malaysia
 - 18 institutions from 12 Member States, 3 collaborating institutions



From networks to institutions: example

- European FP 5 (2002-2003)

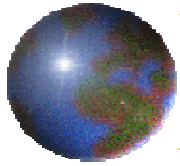
- Support for a new European Nuclear Engineering Network (ENEN)

- European FP 6 (2004-2005)

- NEPTUNO as follow-up project to ENEN
- Funding significantly increased

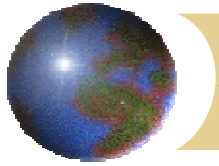
- Plus: In 2003 *ENEN Association*

- Stand-alone legal body
- Goal: administer and award the new degree



Conclusion

- ✚ Networking has become a key element of nuclear education and training and is shaping its character
- ✚ Benefits have been recognized, and networks are being established on national, regional and global levels
- ✚ Outlook: networking might even become more important in the future, both in terms of number and of depth of cooperation



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