KNOWLEDGE MANAGEMENT AS AN ELEMENT IN REALIZING NUCLEAR TECHNOLOGY

K. J. Schmatjko
AREVA NP GmbH, Germany

E-mail address of main author: klaus-joachim.schmatjko@areva.com

A company is not defined by its competences but it lives in realizing these competences in products. The technical knowledge within the field, i.e. here in nuclear technology, is taken as granted at a first glance. For analyzing the role of knowledge management (KM) in the application this knowledge for our products, one can follow two different dimensions, thereby elucidating the needs and development requirements for KM methods:

When first considering the *'operational' dimension*, one can start from the scope of the manufacturer's knowledge which covers the construction of plants, then accompanying its life cycle, and pursues the development of the technology for the future. A board spectrum of KM activities has been established yet for these different phases, comprising tools with close product orientation or KM elements applied in 'support processes'.

In cases of close KM integration in the business process, diversity over the different sectors of the company has emerged: 'locally' optimized solutions are favoured due to specific requirements of the technical field, to continuity or to ease of daily application. On the other hand, 'global' KM tools are often preferred for integration in 'global' support processes (as human resource (HR) management).

This can be illustrated by some examples deployed yet, and their benefit:

- Feedback procedures for new plant projects:
  - capturing the experience during construction (e.g. by standardised reports), thereby strengthening quality criteria for the project and integrating evaluation into the project management (PM) process of the current project,
  - thus reducing erection time – and related capital cost – for future plants.
- Follow up event information on nuclear plants globally
  - by collecting and assessing events systematically for proactive technical action and as input for quality management (QM),
  - thus identifying market needs in advance also.
- IT based KM tool used in nuclear maintenance service:
  - supporting PM as a planning tool, making available technical data, checklists and 'lessons learned' by a systematic data base solution,
  - thus resulting in plant service optimized in respect to technical reliability and duration.
- Expert networks:
  - leading the technological progress in our own core competences, while keeping high quality by 'distributed' evaluation of the new developments,
  - thus optimizing R&D budget allocation and follow-up development success.

- ❖ Developing human resources (HR):
  - defining consistent knowledge profiles for the employees for future projects
  - thus ensuring a well adjusted workforce – a main cost factor within the company.
- ❖ Mentoring:
  - for transfer of project skills and experience, fostering new ways and solutions,
  - thus maintaining knowledge and facilitating the start-up phase for young employees.
- ❖ External co-operations in R&D:
  - an approach for complementing own knowledge by identifying alternative approaches,
  - thus resulting in mutual benefit for the external institution and the company, keeping it on the edge of progress in a competitive environment.

For the second step, the analysis of KM in the other – *'contextual' – dimension*, it becomes apparent from examples that knowledge is applied usually in the context of project management and quality management. Both PM and QM are well established and organized under standards and guidelines, using 'best practices' and tools often applicable in other industries as well – a goal for KM as well.

Obviously successful projects require close, complementary interaction of the three management aspects, and none of them can replace one of the others. KM is not a stand-alone basis for the product; in contrary, PM and QM are focused more tightly to the business process, relying on KM support in the 'back office' – and in many cases they are 'driving forces' for KM deployment. In this way, most of the aspects discussed usually for KM – as identification of knowledge gaps, acquisition of knowledge, its development, sharing, use, preservation and evaluation – derive the criteria from the business process and therefore they are in part tasks in PM or QM also.

In *summary*, key aspects for deployment of KM in the different 'operational' phases can be derived considering both dimensions:

- ❖ for construction:
  - intensify the integration of KM with PM and QM, as often they link KM more closely to the realization processes,
  - organize 'on-line' evaluation of project feedback information,
  - allow 'localized' tools and procedures, making easier adjustment and acceptance,
  - use the project environment for mentoring and employees' competence profile definition, fulfilling both training and QM needs;
- ❖ for accompanying the plant's life cycle in service and retrofitting:
  - structure the collection of information proactively and ensure the evaluation,

- develop KM based decision support for regular service (e.g. anticipating the risks),
- integrate KM, PM and QM in the related maintenance projects also;

❖ for technical development, complementing the company's strategic orientations:

- derive and select R&D objectives by the KM based results from erection and life cycle,
- link internal and global technology progress by expert networks,
- extend the innovative scope by conscious external R&D co-operations.

❖ Challenges remaining for further KM development are found at the interfaces mainly:

- the different 'localized approaches' should be integrated into a 'modular' KM landscape,
- well adjusted interaction of these tools and procedures among the phases should be intensified,
- the simultaneous use of internal sources and the KM tools in the public domain has to be fostered.