# Changing the Focus of Knowledge Management for Nuclear Decommissioning

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**Abstract**

Knowledge Management (KM) has long been a recognized tool for improving the safety, efficiency and effectiveness of nuclear facilities. However, the objectives, tools and mechanisms utilized are often focused on steady-state maintenance of established knowledge and on incremental improvements to current practice.

When nuclear facilities transition from routine operations to project-based decommissioning activities there is a need to reconsider the knowledge objectives, methodologies and tools to ensure that KM practices are relevant to the new activities being carried out and provide solutions to the new challenges posed in decommissioning. It is important that the changes required in preparation for and during the decommissioning phase are factored in to knowledge planning to ensure that KM activities are efficient and effective. This transition requires a change in the KM mind-set and a different way of setting new KM objectives.

(link: <https://conferences.iaea.org/indico/conferenceDisplay.py?confId=83>).

**1. KM in Steady-state operations**

The focus of KM in operational nuclear facilities is often targeted at maintaining safety, efficiency and effectiveness of the plant. Regulation and good practice require that we maintain the established *status quo*: managing an effective, qualified and experienced work-force; learning from events; and managing succession to ensure retention of critical knowledge. Embedding these activities into the management system so that they become ‘Business as Usual’ ensures that the key objective of maintaining existing knowledge is met and marginal improvements can be achieved. The costs and effectiveness of these activities can be measured against those knowledge maintenance objectives and optimum practices employed to achieve optimum outcomes.

**2. Decommissioning differences**

KM for decommissioning should start right at the beginning of plant design, development, construction, commissioning and throughout operations. Key information should be highlighted, codified and retained throughout the lifecycle to ensure that decommissioning can be carried out effectively and safely. However, the need for knowledge during decommissioning differs greatly from the knowledge required during steady-state operation. The focus in decommissioning is on project-based, novel, often ‘one-off’ activities. Projects may involve:

* new skill-sets
* new mind-sets/culture/environment
* extensive utilization of the supply chain, possibly having little experience of the nuclear environment
* different structures and teams with no established social network,
* external consultants and experts
* different risks – often conventional rather than radiological and,
* different end-points and objectives.

**3. Changing objectives**

For KM to be effective it needs to have a purpose and an objective. Doing KM for its own sake is unlikely to yield positive results in a sustainable and viable way. KM can be compared to education; there are benefits to being educated and similarly in sharing knowledge; both activities are positive, life-affirming, potentially financially rewarding and lead to the general good of society. However, few if any commercial organizations would spend significant sums on the general education of their employees or contractors unless there was a tangible financial benefit. For KM to be economically viable it needs to be directed towards the purpose of the organization, seek to remedy perceived weaknesses and to improve safety, economic performance or efficiency. It needs to be **S**pecific, **M**easurable, **A**chievable, **R**elevant and **T**imely – that is it needs to be SMART.

As nuclear facilities move from operational to decommissioning phases the general objectives and required outcomes change dramatically. This may happen slowly and in a planned way with progressive close-down of activities, reassignment of staff to new roles and a gradual transfer to decommissioning; or it may happen quickly as a result of external factors such as plant failure, accident or political will. However the phase starts, clear objectives for all aspects of the decommissioning process will be required to plan and execute the work.

**4. Targeted KM**

To make KM activity SMART it is necessary to have defined objectives ‘What are we trying to achieve’. In this sense, KM both follows and leads the decommissioning plan and the overall corporate objectives. By directing KM activity at defined SMART objectives it can be ‘held to account’ by both practitioners and management and as such can be evaluated to assess its benefits.

The principle proposed to deliver SMART KM is based on the concept of ‘Right to Left’ planning. The outcome of the decommissioning project is defined and then the steps required to reach that outcome are determined. Where there is a knowledge component in any of the steps then appropriate knowledge tools can be applied to meet the requirement.

The principle can be applied to both project desired outcomes (e.g. “We need to de-plant and demolish a Fuel Pond complex”) and equally to more generic corporate outcomes (e.g. “We need to reduce the number of lost-time accidents”). It can be directed at large scale change (e.g. “We need to move the workforce from process-focused operations to outcome-focused projects”), and equally to the small scale (e.g. “We need to get people into and out of a constricted area to carry out decontamination work quickly and safely”).

In any of these examples (and many more) there is a clear objective. If we have a clear objective we can design a knowledge process to support that specific objective, we can measure the costs and we can assess whether the objective has been met. In this way we can assess the value (benefits divided by cost) of the knowledge activity to the business. Learning from these measurable outcomes can assist in targeting future activity to where the maximum gains can be achieved and can ensure that costly and time consuming KM activities which do not yield results can be stopped, redesigned or avoided.

Whilst many of the knowledge practices utilized during operations continue to be of benefit, the ‘skills forward’ approach, there is a role for an outcome-based, objective-focused approach targeted at meeting SMART objectives. Equally we can apply a quantitative assessment of knowledge activities carried out during the operational phase to assess whether and when to stop investing in them as they cease to be economical.