



METHODOLOGY FOR THE KNOWLEDGE PRESERVATION IN THE CSN *PROYECTO RECOR*

This paper summarizes the RECOR Project carried out by the Spanish Nuclear Regulatory Authority (CSN) to develop a methodology to preserve nuclear knowledge, specifically adapted to the CSN regulatory functions. The project covers the development, implantation and verification of the methodology and the development necessary procedures and tools to align it with the CSN Integrated Management System. The Project is complemented with a number of sessions to motivate the CSN management with the methodology and training the staff in the use and implementation of the methodology.

INTRODUCTION

Knowledge management is increasingly positioned as a way of adding value and generating positive impacts on organizations. Economies and developed countries are putting emphasis on the management and development of intangible and how they contribute to create business value.

In the energy sector, and especially in the field of nuclear energy, knowledge management is positioned as an essential factor contributing to the development of a culture of safety, reliability, quality of operations and sustainability in generating energy considering in turn the relationship with the environment and commitment to people to build trust and positive perception towards the sector.

The International Atomic Energy Agency (IAEA), on its own initiative through the Action Plan on Nuclear Safety, and implementation of several specific resolutions of its General Conference, has been developing in recent years a series of activities aimed at helping its members in the creation and maintenance of the necessary capabilities to operate safely and efficiently form a nuclear system at the national and internal level of the organizations involved in it states.

Regulatory organizations and guarantors of safety, such as the Nuclear Safety Council, for its part should ensure the development of efficient and accurate practices to regulate, monitor and ensure the operation of

agents interacting in the process of power generation, ensuring at any times the highest levels of safety.

The knowledge that is generated and accumulated as a result of the domain of practice and development of experiences should therefore be managed efficiently to ensure traceability of their actions (and marks of knowledge generated), the continued development of the capabilities and skills of the people who make, and its assimilation and transfer to generate a dynamic of continuous improvement to ensure the proper functioning of the institution.

Key issues such as organization, socialization and exchange of know-how of experts is put on special relevance, to promote development processes based on the transmission of key expert knowledge capabilities, which represents a strategy for organizational learning that minimizes the risk of inefficiencies arising from the decoupling of key people in the organization, either by rotation in administration, voluntary redundancy or retirement processes.

KNOWLEDGE MANAGEMENT IN THE CSN

Since it was created in 1980, the Nuclear Safety Council (CSN) has devoted major efforts to training its staff to ensure that you have the knowledge, skills to contribute effectively to the fulfilment one's obligations and functions.

These efforts have been implemented through specific policies which

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have resulted, among other lines of action in:

- Equipped training plans and structured to meet and satisfy the training needs in accordance with the circumstances of the moment,
- Personnel selection processes transparent and rigorous established in accordance with the rules of giving access to public service as a civil servant,
- Development and use of management systems internal information based on updated information technologies that allow all staff access to their documentary databases,
- Agreements or collaborative arrangements with other regulatory bodies, international organizations and national institutions, to exchange practices, experiences and knowledge,
- Plans R & D + i to develop work methodologies that they enrich the necessary knowledge for the implementation of the processes carried out in the CSN.

The implementation of these policies has provided staff CSN a broad and deep knowledge of the science and nuclear bases as: technology, radiation protection and security of facilities, activities and nuclear and radioactive materials, as well as the applicable regulatory processes in licensing and control. This knowledge has become one of the major assets available to the CSN for the performance of its mission, with a level of effectiveness in keeping the requirements of its legal mandate.

Generally speaking, each of these lines of action has had its own identity and have implemented individually to meet the needs of capabilities, information or training identified at any times, and its definition and implementation are decided sometimes systematically and sometimes as a result of events of special regulatory relevance, involving facilities or activities of national facilities or other countries.

Today it can be said that although the CSN has a level of adequate information and knowledge to perform their duties, does not have an integrated and systematic program to manage the knowledge possessed, enabling him to optimize the resources available.

This situation, which is common to many nuclear organizations (operators, service providers, suppliers, regulators, etc.) throughout the world, has led in recent years to the development of important initiatives in organizations where knowledge is one of its main assets, and more specifically, in a number of regulatory bodies with which the CSN maintains a fluid exchange of knowledge and experience, so that knowledge management in organizations is reaching in recent years remarkable degree of maturity.

The CSN has joined this trend and has taken this opportunity to develop and implement a model of knowledge management, specifically tailored to your needs and integrated into its management system to optimize its resources of knowledge and information, and align them with the rest of their activities to achieve its strategic objectives.

In the first half of 2014, the CSN carried out a pilot project, which identified the main needs of the organization in this matter. After that experience the CSN launched an action plan in order to develop and implement a knowledge management model specifically tailored to your needs.

The action plan addresses knowledge management as a process over its Management System, whose main objective is to establish methodologies, plans, programs and procedures necessary to acquire, create, share, transfer, preserve and record the knowledge and information within your organization. The action plan includes likewise the incorporation into the process of evaluation and review mechanisms foreseen in the Management System.

The draft action plan includes a series of actions to be undertaken within 3 years according to three priority levels: urgent actions, structural measures and operational actions.

The urgent actions identified in the action plan include the development, testing and implementation of a methodology for the preservation of knowledge. This initiative has resulted in the RECOR project that CSN is carrying out with the help of an external consultant specializing in this type of action in bodies of public administration and engineering

and energy sector and particularly in the field nuclear.

Since in Spain the CSN acts within a framework of public administration, it is vital to develop agile and systemic schemes to ensure the preservation of knowledge, therefore, they are defined as strategic objectives of knowledge management:

- Articulate value added processes determined by the creation, preservation and exploitation of knowledge, and learn based on their own and outside the organization experiences.
- Define dynamic to facilitate the development of capabilities that permanently enrich the services offered by the organization, promote the development of synergies with stakeholders and improve their institutional positioning.

The action plan launched by the CSN to develop a management model adjusted knowledge to your needs includes actions which need to be addressed urgently, development and implementation of a methodology to transfer and preserve knowledge at risk lost and that the CSN considers to be essential for the fulfillment of its mission.

The risk of loss of this knowledge and experience is a direct result of aging staff of the Technical CSN, which currently has an average age close to 55 years and a significant number of its taskforce with an age above 60 years, ie, next to retirement processes with the consequent risk of loss of knowledge and experience they have, if appropriate measures are not taken urgently.

THE RECOR PROJECT

The RECOR* project aims to develop and implement the process of knowledge management in the CSN, performing the following tasks:

- Develop, verify and implement a methodology for the transfer and preservation of knowledge and experience of CSN staff in retirement processes, in the near future,

*The RECOR project has a time horizon of one year that aims to develop the methodology of preservation, implement it with the help of 16 performances with experts from CSN, and set up the formal procedure for the preservation of knowledge and a general framework for knowledge management in the CSN.



and implement the tools necessary to carry out and

- Align the methodology with a formal management model specific knowledge for CSN and integrate it as a process over its management system,
- Develop training activities required to publicize the model among those responsible for the process, operate their tools and procedures, and generate interest in it among all levels of the organization CSN.

The project has a strong support from the president, board and technical directions, leadership of the CSN, it intends to launch a stable methodology for the transfer and preservation of knowledge among its staff and especially among members of the coaching staff and is based, for reasons of economic and administrative rationality in staff resources and knowledge management available to the agency today efficiency.

Work on the project is carried out entirely under the supervision of the technical staff of the CSN, which once completed will be responsible for the project to continue the process, running its activities, evaluated their results and reviewing its methodologies, procedures and tools.

The basic activities of the project are as follows:

1. Selecting appropriate to the needs of the CSN for the transfer and preservation of knowledge of its staff and adapting it to the CSN Management System methodology.
2. Verification of the operation of the methodology and tools needed for use, by applying to four (4) persons CSN technicians, selected by the CSN between the technicians who are coming to retirement process.
3. Implementation of the methodology by developing a method and installation of the necessary tools to carry out the transfer process and preservation of knowledge in the CSN.
4. Definition of the bases of a formal model of adequate knowledge management for the needs of CSN, integrate it into its management system as a process more of the same, and align the methodology transfer and knowledge preservation with the model.

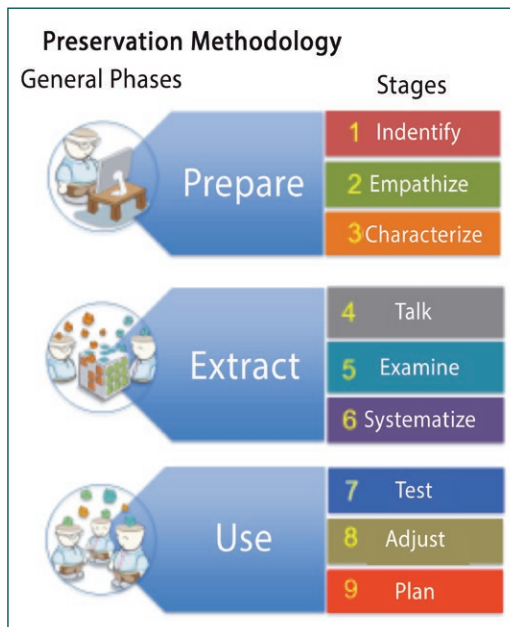


Figure 1. Schematic methodological RECOR.

5. Application of the methodology developed and verified for the transfer and preservation of knowledge to a number not less than 10 nor more than 15 workers selected by CSN between staff of its workforce that are near to leave CSN or in the retirement process
6. Delivery of training activities necessary to ensure the effectiveness of the process and operate the tools and procedures offered by the contractor, aimed at those directly responsible for its implementation; to publicize the bases, methodology and scope of process management levels of the CSN; and to generate interest in the process among all levels of the organization CSN involved in its implementation.

METHODOLOGY RECOR

The RECOR methodology is based on Knowledge of regulatory theory and practice is the critical asset that must be applied, preserved and updated, as a key element to ensure that the CSN fulfills its mission. All this not only to give continuity to his operation, but also support their strategic approaches.

Since the focus of preservation as a key exercise to ensure the availability of "know-how" of the CSN, the methodology RECOR has been specifically developed to provide the basis to formalize efforts that will develop in the path of the so-called "man-

agement knowledge" following the recommended international industry bodies such as the IAEA guidelines.

The implementation of the methodology requires the participation of the following actors:

Owner, CSN technician whose role is to ensure continuity, development, evaluation and update process

- Expert, coach CSN plans to leave the organization in a short period of time and whose participation in the process is to share the knowledge and experience he has, so that it can be used by the organization and more specifically by staff it is going to take care of the functions performed.

- Facilitator, flexible number of CSN technicians specialized in different specific areas of knowledge map of the body, whose participation in the process is to provide operational support when applying the methodology to each expert.

The overall methodological framework is structured in 3 phases each of which consists of three stages, which are implemented in accordance with a procedure CSN Management System.

Phase 1. Preparation

Organizations of the nuclear industry require formalize efforts to knowledge management given the need to value this asset both strategy and operation in addition to more effective initiatives and configured solutions already implemented to exploit the knowledge. Safety culture, generational change, the inspection work, the establishment of standards and guidelines, advice, national and international cooperation, etc, provide a clear need for preservation of knowledge in the CSN as the regulatory body that has very apparent specificity of knowledge and with an average age of the workforce that reflects the requirements associated not to decapitalize within its "know-how".

To achieve address this overall challenge we must prepare well, considering three stages that allow set, first, the criteria for identifying and selecting candidates / as they enter the process of preservation of knowledge, and later create transfer conditions and specific characterization

its “ecosystem” of action in order to facilitate the phase 2 is aimed at removing the “know-how”.

This characterization will allow the construction of “book knowledge” as a general staff structure that will integrate the different “knowledge products” that will be built in the exercise of preservation.

- **Stage 1. Identify.** At this stage you must set a successful start of the methodology considering an alignment with the overall objectives of the CSN, creating a protocol to formally identify people (candidates) that has specific attributes to be considered critical knowledge assets.

- **Stage 2. Empathize.** At this stage it comes into direct contact with the candidate considering priority the creation of a relationship and environment conducive to fostering the transfer of critical knowledge. It is a key preservation method since without a climate of empathy, clarity and purpose options for a successful outcome are reduced time. Here the signs of pieces of knowledge that will be validated by the CSN responsible in order to confirm interest in what you want to deepen later.

- **Stage 3. Characterize.** At this stage it is addressed as to the exercise of preservation, since the dynamic characterization of knowledge is opened, to be retained by setting the framework of processes and functions in which it is inserted. It is necessary, before entering specific knowledge, as part of the backing layer that helps later use, to understand its functional “ecosystem”. Thus, a first “map” of the critical elements that encapsulate knowledge that seeks to preserve (many of them explicitly or documentary nature) is generated.

Phase 2. Extraction

Once established the basis of preparation, it has already context variables and timely characterization leading the organization to focus on the concrete exercise of extracting the key knowledge that is associated with “know how” rather than the framework of expertise formalized. For this reason, the initial focus on the extraction is put into the dynamics of conversation

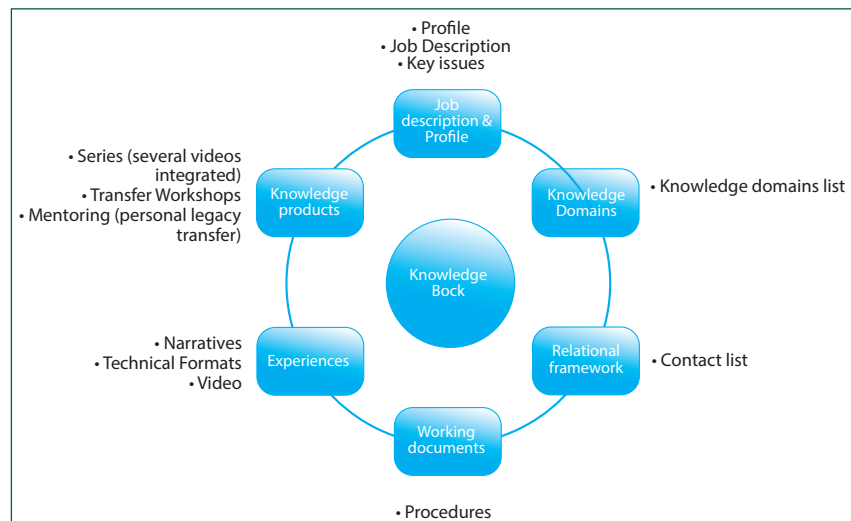


Figure 2. Knowledge book Structure.

that manage much of the relevant evidence tacit knowledge that is not written. The CSN for its particular scope treasures a very specific regulatory knowledge that goes beyond the rules and the cast of regulation.

To achieve this overall challenge, it must come gradually to “know how”, to that part of tacit and experiential knowledge, key to achieving satisfactory results in the operation of the CSN. Thus, following the metaphor of the “iceberg” they are addressing issues associated with “made of special regulatory relevance” (significant events) on the “legacy” real CSN is generated, expressed through good practices and learned lessons that systematize creating specific knowledge products.

Therefore this Phase 2 is built around three stages that are entering the most implicit, reaching the identification of critical knowledge linked mainly with experience.

- **Stage 4. Talk.** In this stage it is to get a set of undocumented knowledge, highly relevant, and are derived from the experiences, good practices and lessons learned. Therefore, it cannot investigate in the same way, it is necessary to open a space for dynamic conversation (formal and informal) already let go anticipating the creation of knowledge inputs that are part of the “knowledge book” that will be created as integrated structure of the exercise of preservation.

- **Stage 5. Deepening.** At this stage it is getting further deepening on the body of knowledge of the previous phase, reaching the essence of them, with high detail of experiences, good practices and lessons learned. Therefore, the comprehensive review of this knowledge is required to start giving them the necessary form needed to systemize, to create pieces of complete and understandable knowledge.

- **Stage 6. Systematize.** At this stage they are put in value inputs of knowledge identified and outlined in previous phases through a task systematization, ie packaging specific pieces of knowledge that generates high impact. Systematization is an important exercise for preservation but not all the extracted knowledge will aim the creation of a document as its tacitness may require direct action socialization (audiovisual or face). In order to improve the framework subsequent use must create knowledge products derived from parts, ie, the mixing of different parts can create an integrated product thereof that is about a specific topic (sometimes with reference a person or several). All this, both explicit part obtained in step 3 as the unspoken part of this phase 2 generate inputs for the “knowledge book” personal (see Figure 2).

Phase 3. Use

Finally, the last phase is linked with the most direct framework associ-



ated with the profitability of the effort made by the CSN for true preservation of key knowledge, which is none other than the scope of its use. In this case, most organizations have been characterized by initiatives whose purpose creating documents, records, forms, etc., ending in a repository waiting to be used. However, the absence of one, intentional, thoughtful agenda active and passive consumption is synonymous with file and not use. This is where the objectives of this Phase 3 concentrated to give the CSN an agenda of critical knowledge utilization.

To achieve address this overall challenge must confirm that the parts and knowledge products which standardizes discharge their responsibilities, they are quality and timely channeled through different media and formats which are complementary to generate socialization and knowledge transfer "captured ". Moreover, a control system is required to evaluate the success of this preservation process, ie monitor its "permeability".

Therefore this phase requires validate results and put them on a path of use, accurate, that it has the appropriate formats and channels to fulfill its purpose of socialization / transfer.

- **Stage 7. To test.** At this stage it is to confirm the quality of products produced knowledge in order to facilitate subsequent use and con-

sumption. Therefore, it is a task that requires filter analysis exercises utility and potential improvements identified. This test assumes the participation of the candidate him / herself and selected in the context of the CSN people.

- **Stage 8. Set.** At this stage it is a continuation of the previous phase so that they can polish some details of the "book knowledge" personal and knowledge products. Therefore, possible improvement proposals to consider their feasibility and in order to develop settings that are to be discussed at this stage.
- **Stage 9. Plan.** In this final stage is the one that allows capitalize all the efforts of the previous 8 stages. It is crucial to setting an agenda for specific use with different activities for different target audiences, setting expected for the work plan results. The "book knowledge" personal and knowledge products should be on a path recurrent use to make the exercise a regular dynamic preservation of knowledge.

CONCLUSION

The CSN, like most nuclear organizations, believes that the knowledge possessed by its staff is one of its most important assets, so it has launched a series of actions in order to optimize the resources of information and

knowledge it has generated since its inception, which aim to incorporate a knowledge management process to its management system. The process is based on a model that is referenced to the initiatives of other nuclear organizations and the recommendations given by the IAEA in this area. Currently, the aging of its workforce is now a cause for concern because it can lead to the loss of knowledge that may be required (critical knowledge) to fulfill the agency's mission. This has been crucial for the CSN urgently undertake the development of a specific methodology to preserve the knowledge possessed in order to ensure that their intellectual property is not undermined as a result of generational change. The methodology is structured in three phases (preparation, extraction and utilization) and is implemented through a procedure to be applied to each expert who leaves the organization, it makes sure its tacit knowledge explicit in a "knowledge book" summarizing the knowledge and experience of the expert that are critical, to the CSN can continue to fulfill its mission and strategic challenges, so that they are easily transferable to the rest of the organization and especially the technicians who will take charge in the future of their duties.■