
IMPROVEMENT OF NPP TRAINING TO ENSURE A TRANSFER OF CRITICAL KNOWLEDGE

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Maintaining nuclear competencies in the nuclear industry and nuclear regulatory authorities will be one of the most critical challenges in the near future. The adequate management of human resources, proper educational system and training approaches and methods to achieve and maintain the proper competencies of personnel are indispensable elements of knowledge management for nuclear industry. To transfer the knowledge from the experience to the newcomers, to establish the consistent links between the national educational system and qualification needs, to respond to the changes in the nuclear technology, to ensure the adequate level of corporate memory are the examples of the links between the knowledge management and the training.

The paper presents the extensive information on the challenges, the nuclear industry encounters in the training and qualification (T&Q) of the personnel, and the good practises that are in use at nuclear power plants to respond to these challenges. The information presented is based on the experience from the IAEA OSART missions which review the training and qualification matters at the nuclear power plants among the other operational management programmes. IE/JRC-EC supports the OSART activities by providing the experts for the specific operational areas and participating in the development of the IAEA Safety Standards. New Project launched in the IE in 2007, SONIS (Safety of nuclear installations) is focused on the operational aspects of nuclear power plants, in particular maintenance, and the qualification and training of the maintenance personnel is of the particular interest of SONIS.

The information presented in the paper is the result of the thorough analysis of the OSMIR Data Base. This database is a compilation of recommendations, suggestions and good practices from OSART mission reports, and covers all missions from January 1991 to the most recent missions for which an official reports have been published.

It was found in several OSART missions that at some nuclear utilities human related factors including knowledge transfer are not properly addressed. The following deficiencies are the typical representatives of the shortcomings in training programmes which may lead to critical knowledge losses and not adequate competence of NPP staff:

- Lack of systematic job and task analysis as a basis for specifying the content of training programmes and assessment criteria;
- The refresher training is not based on the job specific needs and knowledge gap analysis;
- Insufficient details (e.g., description of training content, learning objectives, assessment criteria) of the training programme;
- Inadequate incorporation of lessons learned from external operational experience;

- Insufficient training in safety awareness and safety culture.

Many NPPs have well equipped Maintenance Training Centres with mock-ups of reactor, steam generator, reactor cooling pump, all types of valves (e.g. to train packing), control rod drives, rotating machines). This allows conducting effective training of maintenance personnel, however in some NPPs such equipment is missing. Main deficiencies in the maintenance training are that the maintenance training does not include lessons learned from experienced workers, from industry events, changes in plant maintenance programmes and approaches. Despite that the on-job training, which is the basis for the acquiring the adequate competence for some maintenance position, is not provided with job specific training in a facility workshops and does not ensure a transfer of knowledge.

The weak point of the training management is the assessment of the training results and acquiring knowledge. The lack of assessment of training effectiveness does not ensure that it will meet the quality standards for ongoing and perspective staff performance needs. In some cases the evaluation of training programmes focuses mainly on the numerical indicators (number of attendees, training events, training hours, etc.) and does not consider the quality of training delivered.

Common issue at the majority of nuclear power plants is the training of plant managers. Training programs for managers and supervisors are not always differentiated to focus on the competencies needed for particular jobs or levels of management. In many nuclear facilities there is a lack of formal programme to give all management and supervisory staff the full range of supervisory skills required to effectively manage the plant. Some managerial elements are missing in the training programmes, in particular, knowledge retention and transfer issues, the observation skills and identification of human performance deficiencies.

The information presented in the paper may be useful for the managers of the nuclear utilities and power plants to benefit from the experience of nuclear industry in the proper management of human resources to ensure the proper qualification of personnel and preservation of nuclear knowledge and experience for the sake of safe operation of nuclear utilities. The additional objective of the paper is to attract the attention of the nuclear industry to the IAEA OSMIR Data Base where the vast information on the subject is accumulated. The issues associated with knowledge transfer and personnel competencies identified by the OSARTs as well as the best practices in this area may serve as a good support in the development of training and knowledge management programmes for new nuclear facilities and improvement of the training programmes for nuclear facilities under operation.