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## EVOLUTION OF NPP PERSONNEL TRAINING: TRENDS, NEW NEEDS AND PERFORMANCE IMPROVEMENT FOCUS

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### INTRODUCTION

During recent decades new training needs and demands for improving human performance have appeared in the nuclear industry, including the following:

- integrated management systems;
- more demanding safety requirements;
- implementation of emergency procedures; more attention to emergency preparedness; training on the beyond design basis accident (BDBA) management;
- challenge to increase both NPP and training efficiency and effectiveness;
- equipment and workforce ageing;
- use of training as a tool for preservation of knowledge;
- modernization of plants;
- new designs;
- upgrades of training tools including full-scope simulators;
- programmes for optimization of NPP maintenance;
- a growing number of decommissioning projects;
- availability of new computer-based training technologies;
- increasing attention to the competence of NPP managers;
- development of infrastructures in countries expanding their nuclear power sectors or initiating nuclear power programmes.

The opening of electricity markets has led some nuclear power plant operating organizations to be under serious economic pressure with a demand for cost reductions and performance improvements. These factors necessitate NPP operating organizations to make their training more cost-effective. As the nuclear power industry continues to be challenged to maintain high safety standards, while responding to the pressures of more competitive energy markets, it becomes more important than ever to maintain excellence in human performance and ensure that NPP personnel training adds value to the organization. It has been increasingly recognized that in order to achieve excellence in human performance, in addition to technical competencies it is also important to focus on open communication; teamwork; leadership; problem resolution; safety consciousness; business performance; ethics and professionalism.

## TRAINING TRENDS

Operational and safety performance indicators have shown significant improvements in both NPP and human performance in the past twenty years. Training and human performance initiatives have contributed to these improvements; while the following new needs and trends are being addressed:

- Training focus (improvement of human performance).
- Training regulations, policies and procedures (integration into plant Management System; standardization of SAT procedures).
- Target job classifications (maintenance, management and contractor staff).
- Training for various NPP life cycle phases (decommissioning; construction and commissioning; plant life management; ageing management; long-term operation; plant modernization and upgrades).
- New NPPs (rising expectations; lack of skilled personnel; innovative designs; small and medium size reactors).
- Personnel competencies addressed in training (operational decision making; diagnostics; risk-informed decision making; professional ethics).
- Training methodology (wide but uneven use of SAT; use of job hazard analysis, human reliability assessment, project preview, PSA).
- Training methods (e-learning; structured pre-job briefings; coaching).
- Management of training (integration into NPP Management Systems; evaluation of training effectiveness).
- Changes to training departments and centres (decentralization due to the needs in mostly continuing training; sharing; communities of practice; centres of excellence; specialized training centres).
- Simulators (upgrades; various types of simulators; use for preservation of knowledge; job classifications other than control room shift; plant modernization projects; support of plant design and commissioning).
- Computer-based training (up to 30 % of training; Learning Content Management Systems; multi-functional use; a tool for knowledge preservation).
- Role and competence of instructors (changing the role to Performance Consultants).
- Development of NPP management competence (integrated approach to selection, training, performance assessment and development).

## SUGGESTIONS FOR FUTURE COOPERATION

To effectively change human performance in the workplace, training must be a strategically applied tool supporting behavioural change and results-based training. A new IAEA document entitled “Increasing Training Effectiveness and Improving Organizational Performance in Nuclear Power Plants: Management Perspective” is being developed to provide Senior and Line Managers with techniques and practices to systematically evaluate the effect of training on individual and organizational performance. Pilot sessions for the

application of this document at working facilities are planned. These sessions will focus on taking Line Managers from gauging the success of the training programme in terms of learning scores to monitoring the success of the training through measurable and observable predetermined goals grounded in workplace behaviours. The application of a systems approach to the Line Management System will help move Managers toward thinking holistically about the common goal of meeting individual and organizational needs rather than treating human performance as a simple, linear, cause and effect relationship.

### **INFORMATION SOURCES**

Useful information; publications; knowledge preserved from various projects, workshops and meetings can be acquired through the Electronic Nuclear Training Catalogue ENTRAC <http://entrac.iaea.org>.