



Safer Nuclear Power

Strengthening Training for Operational Safety at Paks nuclear power plant - Hungary

For a nuclear power plant, safety must always be paramount. There can be no compromise on safety to meet production targets or to reduce costs. For any reactor, and in particular where older type reactors are in place, their operational safety can be enhanced by upgrading the training of personnel responsible for operating and maintaining the plant.

The Department of Technical Co-operation is sponsoring a programme with technical support from the Nuclear Energy and Nuclear Safety Departments to help improve facilities at the Paks plant in Hungary and establish self sufficiency in training to the highest international standards for all levels of nuclear power plant manpower.

Paks

Hungary has four WWER-440 type pressurised water reactors and they are all located at one nuclear power plant (NPP) site at Paks, 70 miles south of Budapest. They generate approximately one half of the country's electricity. Any disruption to supply would have serious consequences for the population and the Hungarian economy, and therefore unplanned outages must be kept to a minimum. This requires the highest standards in operation and maintenance of the plant for which training is essential. The nuclear power plant at Paks not only has excellent safety and production records but it also has excellent training facilities for nuclear power plant personnel. Paks is the site for this Model Project.

Simulator training at Paks results in dedicated and well-motivated personnel.

Below: The Paks nuclear power plant site in Hungary



The need for training

WWER type reactors are unlikely to be replaced in the near future. However, provided that operating and maintenance standards are adhered to, the reactors can be no less safe than NPPs in Western countries.

Paks NPP operators, unlike NPP operators in Western countries, cannot rely on the suppliers' support for training and maintenance of the plant. Hungary has therefore developed its own training infrastructure which comprises:

protection, emergency procedures and planning, radiological accident management for radiation workers.

- A 100kW training reactor at the University

In addition, the Hungarian Atomic Energy Research Institute undertakes research and development on behalf of the country's nuclear energy industry.

New systems in safety and training are now being recommended by the Agency on a world wide basis and the Hungarian authorities requested Agency help to meet these requirements.

- A training centre, built at Paks in 1986 when the third of the four reactors came on stream. It was designed initially to train mainly operators rather than maintenance workers. It is well-equipped with up to date facilities including a full scope simulator. Training and re-training of personnel takes place at the centre on a regular basis and the results of this are to be seen in a dedicated and well-motivated staff.

- B.Sc. and M.Sc. degree courses in Nuclear Engineering at The Technical University of Budapest.

- Basic theoretical training provided by the University for NPP personnel in radiation



Safer Nuclear Power

The Model Project

The Hungarian authorities have contributed over \$9million to further development of the Paks training centre, demonstrating commitment to its success.

The Model Project objectives are:

- to achieve self-sufficiency at the highest standards at all levels of NPP manpower training through the application of the Systematic Approach to Training (SAT)
- to enhance safety culture at the NPP site and beyond
- to upgrade the Paks Maintenance Training Centre through the provision of necessary tools, equipment and computer-assisted facilities.

The Agency is uniquely placed to provide the expert services, fellowships and equipment required. An additional result of the Agency's assistance has been the launching of the European Union's PHARE project for the development of training programmes at the Centre.

Systematic Approach to Training

The outcome of training is likely to be most successful if a systematic approach is adopted from the start. First of all, the skills required to perform a job to a satisfactory standard must be identified. Appropriate training methods have then to be designed, developed and implemented with the objectives of achieving these skills. Later, evaluation of the training is necessary to find out whether the needs have been addressed. Re-training, possibly involving improvements in training methods, may be necessary in certain areas based on the evaluation.

SAT has many advantages over curriculum based training:

Consistency - skill requirements for all jobs can be established and met.

Efficiency - training programmes are tailored to the specific needs of the job, and wastage of time and resources is avoided. This also helps to retain trainee motivation.

Quality Assurance - Standard assessment procedures and training records demonstrate that required skills have been attained. This provides management and regulators with evidence that personnel are appropriately qualified and competent. This in turn helps to promote public confidence.

All these features are highly relevant in the training of NPP personnel.



The new Training Centre under construction

Enhancing a Safety Culture

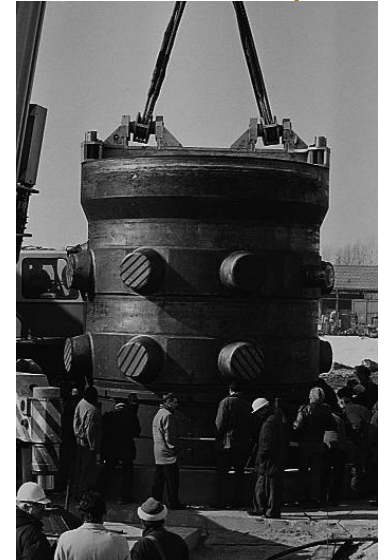
Safety culture is a set of personal attitudes towards safety measures. It is the type of attitude which refuses to compromise safety through taking risks or failing to follow laid down procedures. At all levels, NPP personnel must put safety considerations above those of production targets and they must be supported at higher management levels in the decisions taken on that basis. Important for a safety culture is knowledge about:

- job-specific safety issues such as the use of appropriate safety equipment
- risks associated with task performance
- technical and non-technical aspects of the task, such as the use of proper work control methods.

A safety culture is promoted as an integral part of the training programme supported by the Model Project.



The pressure vessel, which weighs 250 tonnes, being lowered into position at the Paks training centre.



The Paks Maintenance Training Centre

The Centre is unique in that it has full-size WWER-440 power plant components for training. Other countries have similar facilities but these are for different reactor types and normally use mock-ups. The Model Project has supplied equipment such as a steam generator, reactor pumps, pipes, valves, etc., and a 250 tonne pressure vessel which are all new and uncontaminated. The advantages over smaller scale models are:

- actual components provide the best experience for training
- improved training reduces the time required for maintenance shut down and helps to avoid mistakes
- safety of maintenance workers is improved because they spend less time working in a radioactive environment.

Future prospects

The Model Project will have a direct impact on the improvement of operational safety and performance at Paks NPP. It will lead to a more efficient use of resources which in turn will result in lower electricity generation costs. The impact of the project is not expected to be limited to Hungary. WWER reactors are common in Eastern Europe and provide one third to one half of the electricity supply to the region. The training programmes and facilities at Paks offer a possibility in the future to provide training to experts from other countries operating WWER units and serve as a model to be emulated. Slovakia and the Czech Republic have already expressed interest in using the Paks experience for improving training of their own NPP personnel.

Department of Technical Co-operation Programmes
International Atomic Energy Agency, Wagramerstrasse 5, PO Box 100, A-1400 Vienna, Austria
Telephone (+43 1) 2060 • Fax (+43 1) 20607
<http://www.iaea.or.at:80/programs/tc/index.htm>.

