

# INTRODUCTION TO THE TRAINING CENTER & DEVELOPMENT OF SAT-BASED TRAINING MATERIALS AT PAKS NPP

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## Foreword

Hungary one of the little states of Central-Europe on a territory of 93000 km<sup>2</sup> with approximately 10 millions citizens. The industry-wise medium developed country in spite of many political-economical hindrances moves slightly in the direction of the United Europe. The long stagnation in the development in industry has effect on the evolution of the energy sector as well, indicated by the fact that contra the earlier plans there is still one nuclear site in the country, in Paks, which produce electricity that corresponds to 40 % of the domestic total consumption.

As in general, in all areas in the country the privatisation process currently underway in the energy sector as well, generates significant changes in the structure of electricity production, presumably affecting the plant's future.

As the Paks site 4 WWER-440/213 units can be found commissioned between 1982 and 86. The plant production and safety figures are extraordinary. The plant because its environment, or rather because of limits of Hungarian industrial-nuclear industrial infrastructure is self-supplier, therefor its operates with an organisation of huge size covering multiple functions in comparison with its total output capacity. Training of plant personnel today almost without exception takes places in the in-site training centre.

## Description of the Training Centre

Training of the plant personnel has always been a top-important issue for the top-management. Before commissioning of unit I. training had been delivered in training centres of neighbouring countries supporting WWER-440/230 units (Novovoronech, Trnava, Reinsberg, Greifsvald). The commissioning and operational experiences of the first years allowed establishing home training. For this purpose, training programs, Hungarian training materials and tools were developing. In this process, Hungarian academic and research institutes took part from the very beginning.

It was in 1986 when the TC was put into operation properly housing training. In the plant-site building 3 classrooms each taking 30-40 persons at one time, special cabinets for the primary and secondary circuits, electric and I&C in addition to of computer technologies can

be found for delivery of classroom training. The same building serves for the simulator training and video studio, as well as psychological lab are located. Development of training tools is an on going basis, mock-ups, models, simulation programs, proper computing environment, basic principle, reserve-control room and a full-scope replica simulator are housed in TC.

The full-scope simulator has been operating since 1988, today - after a number of minor developments - reconstruction affecting the overall computing environment is being prepared.

The number of training programs and courses delivered in the TC per annum is 150 with participation of many thousand employees and contractor workers.

TC staff is of 60 persons and the training manages reporting directly to the DG (director general) of the plant.

The TC besides training activities, actively participates together with domestic institutes - research and development activities that are in connection with the plant technical/safety-related improvements, safety analysis and human factor surveys.

However, the TC basically serves training of operational personnel and general employee training. In 1995, also on the plant site, construction of a Maintenance Training Centre (MTC) began the opening thereof providing opportunity for the same high-level environment for training of maintenance personnel as for operations staff.

### **The Hungarian Model Project**

In the period of 1992-93 many factors showed that in order to maintain the high performance and safety figures, the plant management should - in addition or further to gradual developments - commence a set of major steps leading to quality improvements in the area of training. The ever-increasing public and regulator demands for safety, the increased training needs explained by technical upgrading and changes in the structure, plus ageing of plant personnel are internal, exceptions of the IAEA for application of SAT-based training and an enhanced safety culture are external requirements having appeared.

For the purpose of upgrading training for plant personnel in an overall manner, at the beginning of 1994 upon Agency initiative and support a 4-year project commenced at Paks NPP called „ **Improving Training for Operational Safety at Paks NPP**”

The 3 main objectives of the project are

- to introduce SAT- based training in safety-significant job positions
- to establish a maintenance training centre
- to enhance safety culture

The project is considered as a model project by the Agency, and as a significant one by the Paks plant even among such as the establishment of a spent-fuel intermediate storage or the anti-earthquake reinforcements.

The total project budget is about 10 million USD the 30 % of which is provided by the IAEA and other international organisations, and 70 % by the Paks NPP:

Today the project is on the right track to finish as planned in all 3 areas.

Development of maintenance training is supported by an EU-PHARE project parallel to the Agency, with TECNATOM-Westinghouse participation.

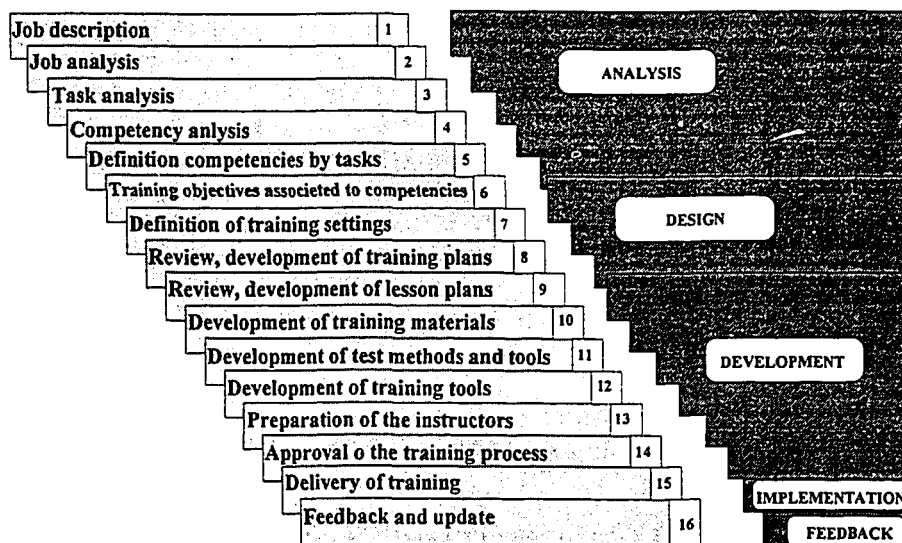
### SAT based training

For Paks NPP it is obvious, the basic, qualitative upgrading in training programs and materials can only be achieved with implementing SAT. Advantages of the SAT methodology are well known. It fully ensures competence required for safe plant operation and maintenance making training fiscally efficient on a long term, but disadvantages are also clear, its implementation is costly and painfully time and resource consuming.

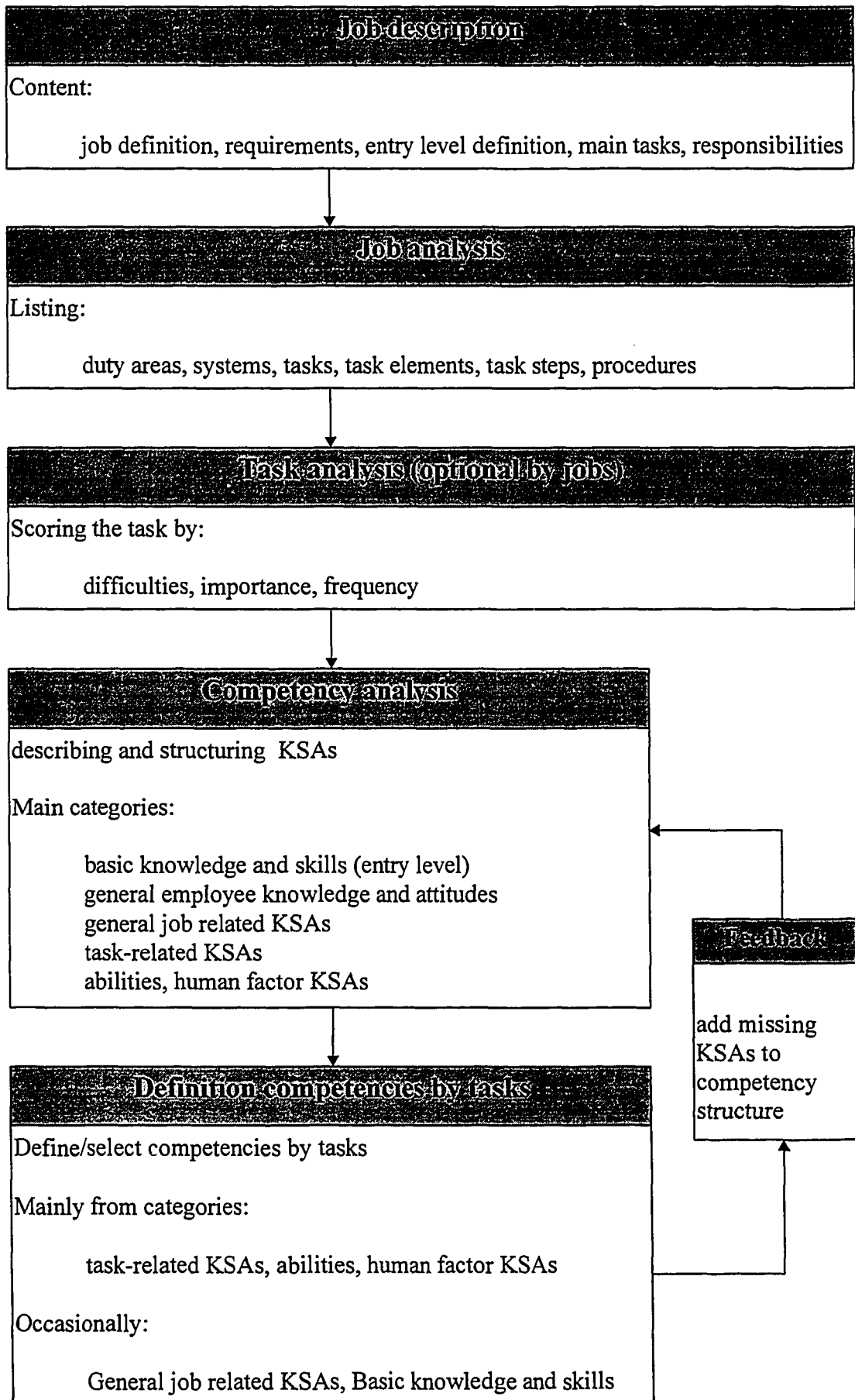
In the initial period of the project, the TEWCDOC-525 revision activities were running. The project was able to achieve the international ideology debates about SAT interpretations and applicable methodologies of implementation.

With the support from experts delegated by the Agency the project succeeded to formulate a methodology applicable in the Paks environment, yet considering new directions and approaches.

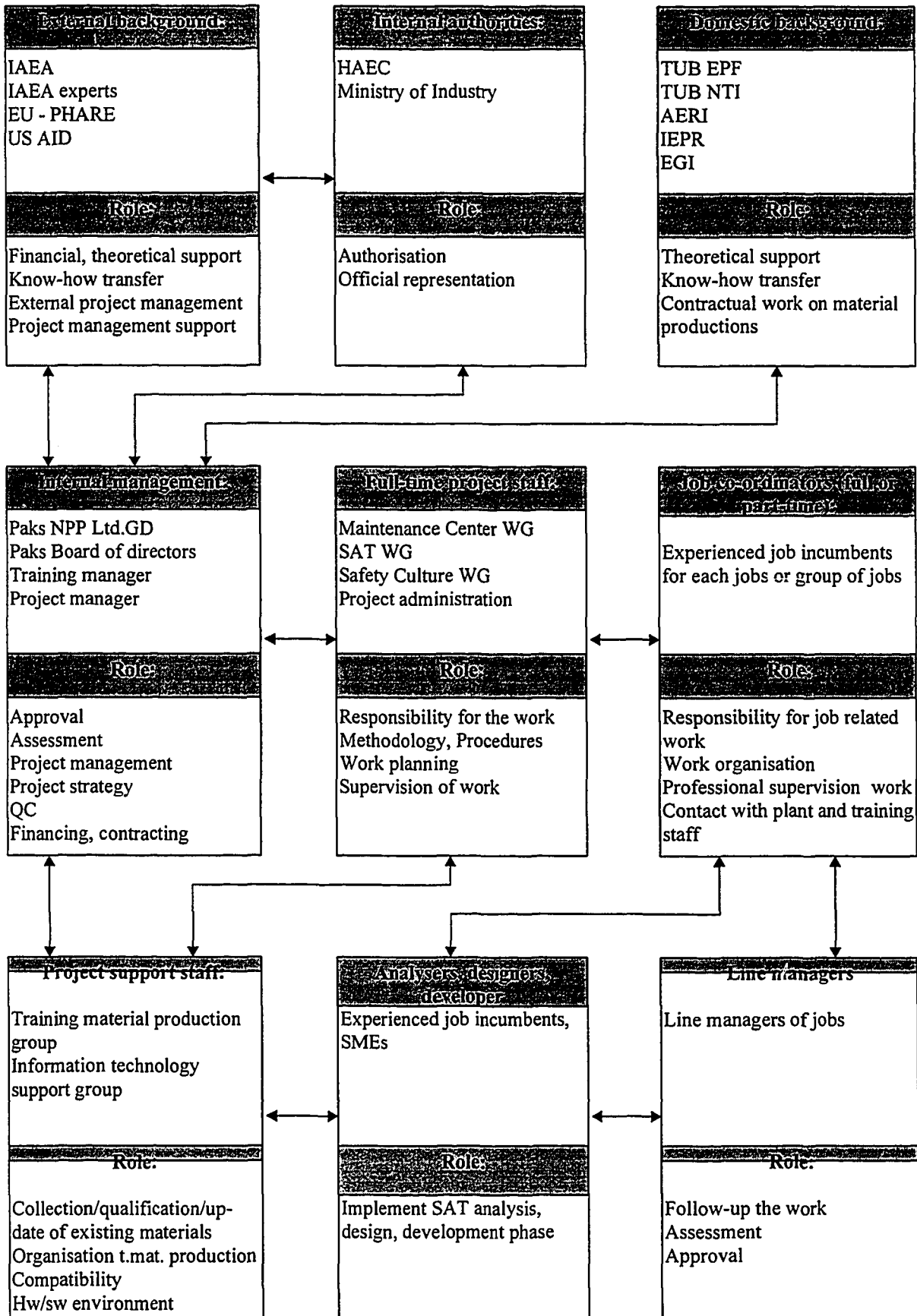
Main steps of the process are shown in the following picture:



Therewithin, analysis phase broken down goes like this:



The project operating mechanism, involved organisations and persons are depicted in the following picture.



As present, activities are going on in 16 job-positions parallel, among which maintenance positions have priority, due to the expected opening of MTC in March 1997.

reactor operator	Operation jobs
primary circuit field operator	
turbine operator	
secondary circuit field operator	
chief electrician	
I&C operation field operator	
reactor maintainer	Maintenance jobs
reactor technologist	
primary circuit armature maintainer team leader	
safety valve maintainer	
reactor maintaining preparation engineer	
welding technologist	
CRDM maintainer	
primary circuit ultrasonic test inspector	
QC inspector	