

## **COST ESTIMATION TOOLS IN GERMANY AND THE UK. COMPARISON OF COST ESTIMATES AND ACTUAL COSTS**

**W. Pfeifer**

Forschungszentrum Karlsruhe GmbH;

**S. Gordelier and V. Drake,**

United Kingdom Atomic Energy Authority

### **Abstract**

Accurate cost estimation for future decommissioning projects is a matter of considerable importance, especially for ensuring that sufficient funds will be available at the time of project implementation. This paper looks at the experience of cost estimation and real implementation outcomes from two countries, Germany and the UK, and draws lessons for the future.

In Germany, cost estimates for the decommissioning of power reactors are updated every two years. For this purpose, the STILLKO program of the NIS Company is used.

So far, Forschungszentrum Karlsruhe has successfully decommissioned two prototype reactor facilities. Recultivation of the premises has already been completed. At the moment, the activated components of the multi-purpose research reactor (MZFR), the first pressurized water reactor in Germany that was moderated and cooled with heavy water, and of the prototype fast breeder reactor (KNK) are being dismantled remotely. Consequently, vast experience exists in particular for the updating of total costs on the basis of actually incurred expenses. The further the dismantling work proceeds, the more reliable is the total cost estimate. Here, the development of the estimated MZFR decommissioning costs shall be presented and compared with the estimates obtained for a German reference PWR-type power reactor of 1200 MW.

In this way:

- common features of the prototype reactor and power reactor shall be emphasized,
- several parameters leading to an increase in the estimated costs shall be highlighted,
- cost risks shall be outlined with the remote dismantling of the reactor pressure vessel serving as an example,
- calculation parameters shall be presented, and
- recommendations shall be made for a consistent estimation of costs.

The United Kingdom Atomic Energy Authority (UKAEA) has a major programme for the environmental remediation of its former research and development sites at Dounreay, Windscale, Harwell and Winfrith together with the need to decommission the Joint European Torus (JET) fusion

facility at Culham when it has reached the end of its useful life. Total costs for this programme (including final disposal of arising wastes) are estimated at €14B, almost all of which will be funded by the UK taxpayer. UKAEA has developed a systematic approach to estimating the costs of individual projects (PRICE) which it has now been employed for estimates to a total value of €1.5B.

Costs from real projects are collected so that the system can be progressively improved by learning from real data. Benchmarking exercises with two other cost estimating systems have also been conducted.

### **Overall conclusions - Germany and UK**

Both the German and UK experience show that:

1. Attention to considerable detail in the scope of a decommissioning task is required if a realistic cost estimate is to be produced.
2. Despite attention to such details, decommissioning projects regularly produce the unexpected. Recognition of such changes is essential in collecting data relevant to future cost estimates. Flexibility in project management arrangements is necessary to accommodate these unexpected changes.
3. Accurate cost estimation is still difficult to achieve. There is considerable scope for international collaboration in building up a database of real implementation costs and in applying cost estimation methodologies.