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Feasibility Study for a New Research Reactor Project

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The number of new comer countries interested in developing a program to introduce a first research reactor for them has grown significantly. In addition, the number of projects to introduce a replacement research reactor or to expand the national research reactor capacity has increased as well. Thus, a guideline to insight the overall process of a research reactor project has been asked and the IAEA published a guidebook in 2012, which is often called a milestone document [1]. This guide specifies three phases before operation and they are Pre-project phase, Project formulation phase and Implementation phase. For the phase 1, i.e., pre-project phase, a preliminary strategic plan should be prepared and this report should show that there are sufficient needs at national level that justify the research reactor project. Another output of phase 1 should be a feasibility study report which demonstrates that a nation or an organization is in a position to make a decision whether to proceed with the new research reactor project or not. This report will show all the obligations and commitment involved and should include a long term national strategy.

The activities for a feasibility study or the contents of a feasibility study report may depend on countries, stakeholders or backgrounds of research reactor projects. However, basically, the feasibility study should include the analysis of cost, benefit and risk involved in the realization of the results of the strategic plan. In addition, the feasibility study should include a comprehensive assessment of all 19 national infrastructure issues described in the Milestone document. The benefit from a research reactor may be a direct benefit such as the revenue from the sales of products or services. For a research reactor, the most of the benefit may be indirect benefit such as the contribution to the basic research and the contribution to training and education. Also, there are many different ways to count the indirect benefit. The choice of analysis method will be a decision of a study team which should depend on the background of a research reactor project. As for the cost analysis, the project cost, the cost for operation and maintenance, the fuel cycle cost and the decommission cost should be included. The difficulties in the cost and benefit analysis are in that the study should predict the life time of a facility and in that a research reactor is a custom-design product which makes it very difficult to find good references for the cost estimation. The best way to overcome these will be to make many experts involved in the analysis and to have an enough time period for sharing idea and discussion. The risk analysis should involve the analysis of technical, social as well as financial risks. As for new comers, the establishment of the infrastructure at a time will be impossible and costly. Thus, a step-by-step policy may be taken and will be realistic. The feasibility study may be conducted by an operating organization or an independent organization depending on the decision or a rule of a country. An important aspect in this is that the technical capability as well as the independency of the study should be considered.

What is more important than the analyses of cost, benefit and risks is believed to be the strategic decision or the intension for a project. If a research reactor project is strongly recommended and supported, many good ideas will be proposed during the feasibility study and will be accepted for a positive decision. This will be also a key factor for the success in the next phases until the operation phases.

References

[1] IAEA, NP-T-5.1, ”Specific Considerations and Milestones for a Research ReactorProject”,2012.

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