



Original Article

An Approach to Improve Romanian Geological Repository Planning

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ABSTRACT

International standards recommend typical phases to be included within any national program for the development of a geological repository dedicated to disposal of the high level radioactive wastes generated in countries using nuclear power. However, these are not universally applicable and the content of each of these phases may need to be adapted for each national situation and regulatory and institutional framework. Several national geological repository programs have faced failures in schedules and have revised their programs to consider an adapted phased management approach. The authors have observed that in the case of those countries in the early phases of a geological repository program where boundary conditions have not been fully defined, international recommendations for handling delays/failures in the national program might not immediately help. This paper considers a case study of the influences of the national context risks on the current planning schedule of the Romanian national geological repository. It proposes an optimum solution for an integrated response to any significant adverse impact arising from these risks, enabling sustainable program planning.

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1. Introduction

Recent international reports and standards [1,2] do not give any detail on the management of geological disposal projects in individual countries, nor do they comment on the appropriateness of specific activities within a project from a national context. Moreover, in terms of the characteristics and needs of specific national programs, the results of

international peer-reviews cannot be simply transposed to any individual country without a more detailed and adapted analysis.

Several national geological repository programs have faced failures in schedules and have revised their programs to consider an adapted phased management approach. The failures often occurred in the schedules of the siting phase of the geological repository program. In particular, approvals of

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the national environmental regulatory panels have failed or been suspended due to insufficient support from civil society rather than due to technical reasons.

The risks resulting from immature national contexts were seen as one potential reason for early delays in the schedule of an early geological disposal program [3].

International recommendations could potentially help address such problems but the typical implementation phases recommended by international standards to be included within national programs for the development of a geological repository are not universally applicable. Hence, the content of each of these phases often has to be adapted for each national framework to deal with the national context, including the regulatory and institutional frameworks.

There is a great deal of literature on the lessons learned by those countries which have had long-term geological disposal programs e.g., Finland, Sweden, France, USA, UK, Switzerland, and Canada [4]. However, the current national context has changed from that of almost 30 years ago when the first geological disposal programs started. The complexity of the national context varies from country to country and each program will change at different rates of time.

This paper considers the major weaknesses that might arise in the national context which are often beyond the control and responsibility of the implementer. In order to respond to these program deficiencies in an efficient and appropriate manner, government, through state ministries with responsibilities in relation to geological disposal, needs to be involved. In the European Union, the governments through state ministries have the overall responsibility for safe disposal of radioactive waste, in accordance with the European Council Directive 2011/70/EURATOM (“Waste Directive”) [5].

A detailed and integrated response to identify those weaknesses in the national context that might cause program failures and how they can be prevented needs the input from individuals experienced in planning geological disposal programs. Often such expertise is not readily available to program managers or the responsible state ministries [3]. This paper outlines a case study of a systematic study on the influences of the national context risks on the current planning schedule of the current Romanian national geological repository. It aims to identify these influences, what their effects are, and proposes an integrated response to addressing these effects in support of sustainable program planning. The study adopted a risk management approach. This was deemed appropriate, since the current tendency in commercial nuclear projects is to use private companies which rely on risk management processes. In addition, key stakeholders are becoming more familiar with risk assessment terminology.

2. Case-study for Romanian geological repository planning

2.1. The need for a systematic study of the Romanian national context

Romania, as required by all European Union countries with nuclear power programs, has to provide appropriate national

arrangements [5] for safe spent fuel and radioactive waste management to protect workers and the general public from the danger of ionizing radiation. These arrangements include having a national program for radioactive waste management. Geological disposal is one of the components of the national program which is at an early stage of development in Romania.

The first geological disposal strategy for the spent fuel generated by Cernavoda Nuclear Power Plant (the current strategy, hereinafter referred to as the “current Strategy”), was developed by Romanian experts supported by the International Atomic Energy Agency (IAEA) experts in 2008–2009. The current Strategy includes a schedule for the commissioning of a repository by 2055 [6]. The schedule is a living entity that will be updated on a regular basis to provide a sustainable national geological repository (NGR) program.

A PESTEL (Political, Economical, Social, Technical, Environmental, Legal) analysis was used in this study to analyze the NGR program [7]. The aim of the PESTEL analysis was to identify the issues surrounding the NGR program and to identify their origin rather than trying to resolve them. The study focused on those issues that have a relatively significant impact on the development of the NGR program and which were more likely to happen or have already happened.

The overall results from the PESTEL analysis have identified several reasons for studying the national context when developing a detailed NGR program [8]. It was not in the scope of this work to examine any internal issues within the organization responsible for planning and implementing the NGR program. It is believed that the latter omission is not as important as taking the national context into account when a state ministry is considering geological disposal.

The PESTEL analysis identified those issues which represent the major risks to the developer of the NGR program. It is evident that:

- solutions to solve high and medium risks should be identified very early in the planning of the NGR program; and
- solutions which address, as far as possible, all issues identified as risks should be considered.

A Guide to the Project Management Body of Knowledge - PMBok [9] recognizes that the development of a project plan depends on the accuracy of estimating the duration of the individual activities in the project, and recommends that the uncertainties of those duration timescales be taken into account.

The PESTEL analysis showed that if the development of a repository program did not take into account the national context, and was not acknowledged by the Government/state ministries, then the NGR program was likely to fail at an early stage. If we take into account that the analysis of risks influence on schedule is typically ignored in any cost evaluation of the projects [10], then a potential failure of the repository program may not easily be recognized.

Ward and Chapman [11] argued that the term “risk” has become associated with “events” rather than more general sources of significant uncertainty, and project risk management processes had a limited focus which restricted

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