

Benefits of Siting a Borehole Repository at a Non-operating Nuclear Facility

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INTRODUCTION

In order to provide a solution for the two pressing matters in the viability of nuclear energy, spent fuel and power plants that no longer operate, a new design is proposed to construct a borehole-design repository at a shut-down nuclear power plant facility. This design will not only make economic use of the shut-down power plant, but also be able to empty the crowded spent fuel storage pools in many reactors.

Background

The benefits of using a borehole design repository of all kinds is that it allows for the creation of regional repositories. The geological requirement of a borehole design, crystalline basement rocks at 2,000–5,000 m deep, are relatively common in stable continental regions [1]. Also, its spacial requirements are significantly less than that of a geological repository, with only 2km long disposal zone for the amount proposed for Yucca Mountain [2]. The cost of a borehole repository system is significantly less than that of a geological one.

Also, one of the bigger costs of borehole design repository is the repacking of spent fuel assemblies to a waste canister. Siting a repository at a non-operating power plant facility, which already has the basic infrastructure to handle radioactive material, will be much more effective than building a new facility, in both cost and licensing. A facility with a dry cask storage site will very much likely have the capability to repackage the spent fuel shipments to borehole disposal casks. [percent of reactors that meet the 2 criterion]

Motivation

The proposed design, which is a borehole repository sited at a shut-down power plant that already has a dry cask storage and fuel handling facility, will be compared to a base design, which is to site a borehole repository at a similar location to that of Yucca Mountain. The proposed design has its advantage in the fact that it is more appealing to the stakeholders of this project. The stakeholders that will be examined in this paper are the federal government, the state government, the local government, and the utility company that owns the plant.

RESULTS AND ANALYSIS

Mainly, the proposed case will have a lower cost, lower new infrastructure construction, less time (both for construction and licensing), transportation, and a friendlier local community. The proposed design will make it significantly easier to proceed in a consent-based manner, where communities ask for the incentives emerging from the repository to make up for the economic void created by the shut-down of the power plant.

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REFERENCES

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