

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

Jin Whan Bae,\* Abraham Lincoln†

\*Dept. of Nuclear Plasma, and Radiological Engineering, University of Illinois at Urbana-Champaign, Urbana, IL

†State Capitol Building, Springfield, IL

jbae11@illinois.edu, honestabe@example.com

## INTRODUCTION

For decades the nuclear spent fuel problem has been ‘indefinitely postponed’, where sustainable solutions are halted by political and social components. Simply getting the nation to agree on such a massive undertaking was a stretch, let alone about a sensitive topic like nuclear waste. The engineering feats of various personnel both in industry and research have allowed the commercial power plant facilities to withstand such a stagnation with dry casks and denser pool packings. However, without a permanent repository, the spent fuel inventories keep accumulating.

On top of such an alarming situation, it is now the time when many power plant facilities are now approaching the end of their license, if not already. Provided the option, and with the dwindling economic advantage of nuclear power, with dropping gas prices and subsidized solar and wind, many corporations don’t find nuclear attractive any more. The cost of nuclear power is ever increasing, with all the cost incorporated with the spent fuel problem. Without a repository, even a decommissioned facility suffers a sunk cost maintaining the spent fuel.

The synchronized combination of the two unfortunate events is threatening the survival of nuclear energy, and instead of pouring money into another giant project that may or may not succeed, it is time to play smart.

Merging the two problems, and using crisis as an opportunity, may provide a viable solution that can kill two birds in one stone.

Siting a borehole-design repository at a shutdown (not decommissioned, for the license will be used) power plant facility will not only make economic use of the shutdown 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 2,000–5,000m 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].

Also, one of the bigger costs of borehole design repository disposal is the repacking of spent fuel assemblies to a waste canister. Converting 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 finance and licensing.

## Motivation

## RESULTS AND ANALYSIS

The results suggest that siting a borehole repository is beneficial in multiple aspects. The incorporation of a borehole repository creates economic opportunities like using of an otherwise sunk-cost of a non-operating power plant facility. Also, it eases the process of constructing and operating a repository facility with its already-built infrastructure. Lastly, it solves the two problem that nuclear power faces, with one simple solution.

## ACKNOWLEDGMENTS

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## REFERENCES

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