NOT FINISHED, BUT ABANDONED

by

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A dissertation submitted in partial fulfillment of
the requirements for the degree of

Doctor of Philosophy

(Nuclear Engineering and Engineering Physics)

at the

UNIVERSITY OF WISCONSIN–MADISON

2011

Please insert your dedication here.

ACKNOWLEDGMENTS

It is customary for authors of academic books to include in their prefaces statements such as this: "I am indebted to ... for their invaluable help; however, any errors which remain are my sole responsibility." Occasionally an author will go further. Rather than say that if there are any mistakes then he is responsible for them, he will say that there will inevitably be some mistakes and he is responsible for them....

Although the shouldering of all responsibility is usually a social ritual, the admission that errors exist is not — it is often a sincere avowal of belief. But this appears to present a living and everyday example of a situation which philosophers have commonly dismissed as absurd; that it is sometimes rational to hold logically incompatible beliefs.

— David C. Makinson (1965)

Above is the famous "preface paradox," which illustrates how to use the `wbepi` environment for epigraphs at the beginning of chapters. You probably also want to thank the Academy.

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Kathryn D. Huff

Under the supervision of Professor Paul P. H. Wilson
At the University of Wisconsin-Madison

FIXME: basically a placeholder; do not believe

I did some research, read a bunch of papers, published a couple myself, (pick one):

1. ran some experiments and made some graphs,
2. proved some theorems

and now I have a job. I've assembled this document in the last couple of months so you will let me leave. Thanks!

Paul P. H. Wilson

ABSTRACT

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1 INTRODUCTION

1.1 Cyclus : Fuel Cycle Simulator

Cyclus is a fuel cycle simulation software created at the University of Wisconsin.

2 MOTIVATION

This is a motivational chapter.

3 LITERATURE REVIEW

The following literature review addresses four areas of current research integral to the work at hand. First, a review of the contribution of computational nuclear fuel cycle simulation tools to sensitivity analyses of repository performance for various fuel cycles. A review of current computational repository models both standalone and those incorporated into nuclear fuel cycle simulation tools, follows. Special focus is paid to the availability and parametric regimes of supporting data and algorithms informing geochemical and hydrogeological transportmodels on long time scales. Finally, a gap analysis demonstrates the reange of available waste form performance models applicable to used fuel streams likely to result from various advanced fuel cycles.

3.1 Sensitivity Analyses of Repository Performance

Independent Fuel Cycle Parameters

¡++¿

Repository Performance Metrics

¡++¿

Current Methodologies

¡++¿

3.2 Geochemical Migration Models

3.3 Repository Models

Stand Alone Models

FSCNE

A^{3}MCNP

SCANS 1A

ReFREP

Refrep is a near-field model. A. Hautojarvi and T. Vieno Model For A Spent Fuel Technical Research Centre of Finland (VTT) Repository.**?**

Models Incorporated into Systems Analysis Codes

VISION

DANESS

¡++¿

COSI

¡++¿

DYMOND

¡++¿

NFCSim

¡++¿

CAFCA

¡++¿

SMAFS

¡++¿

NFCSS

¡++¿

3.4 Waste Form Models

Borosilicate Glass

Glass Ceramic

Metal Alloy

Advanced Ceramic

Separated Streams

Classes A, B, and C waste

GTCC LTHLW

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