Attachment 1

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Treatment of Uncertainty in the Geological Disposal of High-Level Radioactive Waste

2. AUTHOR(s)
Sitakanta Mohanty

3. NAME OF CONFERENCE, LOCATION, AND DATE(s)
The 9th International Probabilistic Safety Assessment and Management Conference

4. NAME OF PUBLICATION
PSAM9 Conference Publication

5. NAME AND ADDRESS OF THE PUBLISHER	TELEPHONE NUMBER OF THE PUBLISHER
Dr. B.L. Luk Department of Manufacturing Engineering and Engineering Management City University of Hong Kong Tat Chee Avenue, Kowloon Tong Kowloon, Hong Kong	852.2788.8429
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TREATMENT OF UNCERTAINTY IN THE GEOLOGIC DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTE

Abstract: (Your abstract must use 10pt Arial font and must not be longer than this box)

Safety or performance assessment of a geologic high-level radioactive waste disposal system is complex because such a system comprises many diverse components, involves many coupled processes, and, more importantly, must account for significant sources of uncertainty. The impact of these uncertainties is compounded by the need to project performance estimates thousands or hundreds of thousands of years into the future. An appropriate consideration of uncertainty in the repository safety or performance assessment is an important aspect of the U.S. Nuclear Regulatory Commission (NRC) regulations for the licensing of a potential high-level radioactive waste repository at Yucca Mountain, Nevada.

The objective of this paper is to present an overview of the treatment of uncertainty in safety and performance assessments for the disposal of high-level radioactive waste. The paper will discuss uncertainty in terms of its (i) sources, (ii) characterization, (iii) evaluation methods, (iv) presentation, and (v) propagation. Each of these aspects will be explained further by subdividing uncertainty into subcategories. As an example, the characterization of uncertainty in high-level waste disposal will be discussed in light of model completeness, model structure, and parameter selection. The discussion of completeness will encompass an appropriate treatment of features, events, and processes. The discussion of model uncertainty will highlight uncertainty about the hypothesis and constraints in model formulation and in estimating probability of the occurrence of features, events, and processes. The discussion of parameter uncertainty will deal with the appropriateness of parameter values. The paper will explore a general uncertainty treatment framework that may aid process-modeling experts in providing performance assessors with the uncertainty information that is consistent and coherent.

Acknowledgment: This abstract is an independent product of the Center for Nuclear Waste Regulatory Analyses and does not necessarily reflect the view or regulatory position of the U.S. NRC. The NRC staff views expressed herein are preliminary and do not constitute a final judgment or determination of the matters addressed or of the acceptability of a license application for a geologic repository at Yucca Mountain.

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