ASU SCHOOL of SUSTAINABILITY

ARIZONA STATE UNIVERSITY

In Partial Fulfillment of the Requirements for the Degree of

Master of Science

Robert Horner

Will defend his thesis

The Meaning of Uncertainty in the Expert Elicitation Process: The Probabilistic Volcanic Hazard Assessment for Yucca Mountain and Two Comparative Cases

Abstract

Policy-making sometimes collides with the frontiers of scientific knowledge. In order to move forward, a method is needed that transforms current (inadequate) scientific knowledge into forms that, while not necessarily being uniquely correct or truthful, are at least useful. Expert elicitation (EE) is such a method. EE involves gathering and combining the educated opinions of experts in the form of subjective probability estimates. This study explores the articulation and meaning of uncertainty in the EE process. To do so, it first investigates the classifications of uncertainty and probability that inform the design of subjective probability assessments. Then it briefly explains the EE process before analyzing it in three case studies. The 1996 Probabilistic Volcanic Hazard Assessment for the proposed high-level nuclear waste facility in Yucca Mountain, Nevada and its 2008 Update provide the primary examples. In addition, two divergent applications of EE in oil and natural gas reserve estimation and climate sensitivity uncertainty analysis provide comparisons. The advantages and disadvantages of the different approaches to expert elicitation uncertainty are identified and the limits to EE's effectiveness are discussed. Finally, some alternatives are proposed.

Thursday, April 29, 2010
10:00 am
GIOS 481

Faculty, students, and the general public are invited.

Supervisory Committee:

Dr. Daniel Sarewitz (Chair)
Dr. Marty Anderies (Member)
Dr. Daniel Metlay (Member)
Dr. Andrew Hamilton (Member)