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CENTER FOR NUCLEAR WASTE REGULATORY ANALYSIS

MEETING REPORT
November 17-20, 1992

SUBJECT: Attend DOE/NWTRB Expert Judgement Workshop.
20-5702-062
20-5702-002

DATE AND PLACE: November, 17-20, 1992 Hyatt Regency
Crystal City, Arlington, Virginia

AUTHORS: Renner B. Hofmann
Aaron Dewispelare

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PERSONS PRESENT:

CNWRA: R.B. Hofmann and Aaron Dewispelare; **NRC:** W. Reamer, D. Fehring, L. Abramson; **EPRI:** R.A. Shaw; **Panel Leader:** J. Bartlett (DOE). About 120 persons attended from the NWTRB, DOE, Sandia, Los Alamos and Lawrence Livermore National Laboratories, DOE contractors, USGS, EPA and visitors from foreign countries representing AECL, UK NIREX LTD and BGR. The representatives from the CNWRA and NRC cited above who attended the workshop have copies of the extensive overhead transparencies provided by most of the speakers as well as copies of the attendance rosters.

BACKGROUND AND PURPOSE:

CNWRA was informed of the workshop by DOE's Linda Evens. This workshop follows two EPRI workshops on elicitation for faulting and seismic hazards at Yucca Mountain. The organization of the Expert Judgement workshop had been recommended by the NWTRB. The purpose of the workshop was

to be to provide a broad perspective of the expert judgement process to a large number of people with varied backgrounds who are involved in the Yucca Mountain project. This theme was expanded upon by J. Bartlett's introductory remarks which are included in the attachments.

SUMMARY OF PERTINENT POINTS:

The workshop was comprised of several sections:

Introduction

DOE	J. Bartlett and R. Dyer
NWTRB	D. W. North
Stanford U.	R. Howard

Panel I

Process of Quantifying Expert Judgement

Lectures were given by R. Keeney of USC and by M. Merkhofer and P. Morris of Applied Decision Analysis Inc. (ADA). B. Judd of ADA chaired a discussion period. D. Fehringer of NRC with M. Federline as coauthor, presented an overview of the use of expert judgment in the NRC licensing process.

Panel II A

Expert Judgment as a Data Supplement

M. Harr of Purdue lectured on the practical aspects of expert judgment in establishing factors of safety for civil engineering use. P. Kaplan of SNL lectured on their expert judgement exercise concerning total system performance Assessment for Yucca Mountain (TSPA). R. Shaw of EPRI discussed their two prior workshops regarding faulting and earthquakes at Yucca Mountain. J. Duguid of INTERA moderated a discussion.

Panel IIB

Expert Judgment in Model Validation

C-F. Tsang of LBL discussed results of the recent INTRAVAL meeting in San Antonio. M. Kozak discussed use of expert judgment in low-level waste PA "validation". He also provided a copy of the Martinsville Illinois hearing. He stated that this site was investigated in finer detail than any other but that it was rejected because of uncertainty. The point was that data alone does not a low level site make. K. Trauth of SNL discussed use of expert judgment at WIPP. A. Van Luik moderated the following discussion.

Panel III

Expert Judgement in Programmatic Decisions

S. Frishman of Nevada presented his state's experience with Expert Judgement at Yucca Mountain - an adversarial position. No handout was provided. T. Issacs of DOE described the use of expert judgment in the high-level waste repository site selection process. S. Brocoum of DOE presented DOE's management perspective on expert judgment and L. Reiter described NRC's experience with the Eastern and Central U.S. study, particularly for the LaCrosse and Big Rock Point nuclear power plants. J. Younker of TRW chaired the discussion period.

Panel IV

Industry Experience with Expert Judgment

R. McGuire discussed details of the eastern U.S. probabilistic seismic hazard analysis his company performed for EPRI. R. Winkler outlined the EPA ozone study which employed expert opinions. R. Jackson described his experiences, while with the NRC,

with the G.E. Vallecitos Test Reactor analysis following discovery of a potential thrust fault beneath the site. (R. Hofmann was involved in the early stages of this effort) S. Hora compared international approaches to expert judgment elicitation. R. Shaw of EPRI moderated discussions.

Summaries and Open Discussion

B. Judd, A. Van Luik, J. Duguid, J. Younker, R. Shaw, A. Simmons, R. Dyer, J. Bartlett and D. W. North summarized the previous sessions and discussions. Further questions and comments were entertained.

Steering Committee Meeting, afternoon of Friday 20 November

Attendees were dismissed prior to this planning session at about noon on November 20th.

IMPRESSIONS/CONCLUSIONS:

After the first three speakers on Panel I, one might think that expert elicitation would soon replace the entire legal process. Dan Fehringer, of NRC, however, described the licensing process in some detail which dispelled this notion. Dr. Harr of Purdue described the evolution of civil engineering practice as it evolved from the experience of experts. His talk suggests that expert opinion has always been a part of technology and is built upon the collective experience of people in a given discipline. Panel IIA members agreed that supplementing data was a prime use for expert opinion. Panel IIB members were not so optimistic. A conclusion was that there can be no model validation for models which attempt to predict for a 10,000 year period. Dr. Tsang, particularly was enthused about INTRAVAL efforts and hoped that some of its participants would continue to struggle with the problems it attempted to address. Panel III members strongly advanced the concept that expert judgment was just one more tool for the decision-maker to use. They concluded that decisions would not and could not be based solely on expert judgment no matter how formalized the process became. Panel IV members discussed practical applications of expert judgement. Many of them were for faulting and seismic problems.

Consensus among a group of experts was a topic of discussion. The consensus seemed to be that it was not needed nor particularly desired. The matter of whether experts should be elicited in isolation or have opportunities for information exchange after a first round of elicitation appeared not to have a consensus. Dr. North preferred the latter as did the majority of those who spoke on the subject. The possibility of bias being introduced from face-to-face information exchange as indicated by Delphi studies, however, left some with a contrary view. Biases were discussed at length, including the potential bias of the elicitor. Having two elicitors with one being attentive to the biases of the other, was offered as a solution. Resolution of this potential problem however appears to require more effort.

A discussion ensued regarding the fact that NRC hearing boards had accepted aggregated expert opinions when they were supported by other studies. That NRC's empaneling of experts at ASLB hearings was discussed. Questions from attorneys are directed to expert panel members by a master expert who can judge who on the panel has the proper expertise to respond.

The EPRI eastern U.S. Probabilistic Seismic Hazard Analysis study and the Total System Performance Assessment by Sandia were frequently commented on. Dr. North of the NWTRB believed that the SANDIA effort was inadequate and an example of a "student project" and that the EPRI effort was a good example of expert judgment application. Many came to the defense of Sandia, however, stating that

the work was minimally funded and that it was a profound exercise considering the funding level. Principal criticism were that sensitivity studies were not made to eliminate factors with little effect on outcome from consideration, that documentation on the elicitation process was lacking and that only internal organization personnel were used as experts. The lack of sensitivity studies was deemed especially important because of the cost of a proper expert elicitation for every factor employed in an analysis. The Sandia effort did not include a sensitivity study because of time and cost constraints but such studies are now underway. This matter was the heart of a heated exchange between participants.

Dan Fehringer was asked about the NRC position on substitution of expert opinion for data. He stated that their position had moderated somewhat and that if unreasonable effort was required to obtain data, it was permissible to utilize expert opinion. He also mentioned that due to outside pressure, the NRC would be issuing a position or stance on the topic of expert elicitation in the HLW repository program in approximately a year. He stated that the "Federal Rules of Evidence" would be followed even though they are not technically required in the NRC hearing process. This means that each individual used must be established as an expert through credentials and experience, and that the elicitation process and products must be able to fair well in a peer review.

PROBLEMS ENCOUNTERED: There were no obvious problems.

PENDING ACTIONS: None

RECOMMENDATIONS:

Should invitations be extended to CNWRA to attend future such meetings, our attendance would be useful in helping us support NRC technical staff on Performance Assessment and Probabilistic Fault Displacement and Seismic Hazard Analysis issues.

REFERENCES: None

SIGNATURES:

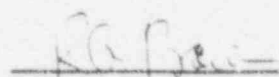
Renner B. Hofmann, Senior Research
Scientist - Geologic Setting

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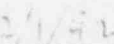
Aaron Dewispelare, Principal Research
Engineer - Performance Assessment

Date

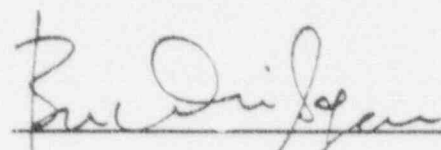
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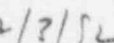
Robert G. Baca, Manager
Performance Assessment



Date



Budhi Sagar, Manager
Geologic Setting



Date

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