

NUCLEAR WASTE TECHNICAL REVIEW BOARD
PANEL ON STRUCTURAL GEOLOGY AND GEOENGINEERING

HOW GOOD IS PSHA?

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PROBABILITY

DATA

FREQUENTIST



**DOCUMENTED
ANALOG DATA
&
EXPERT JUDGMENT**

**PSHA
PVHA**

**EXPERT
JUDGMENT**

DEGREE OF BELIEF

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3

EXPERT JUDGMENT MUST BE HIGHLY CREDIBLE

- **WELL-REASONED**
- **SUPPORTED BY AVAILABLE DATA**
- **CONSISTENT WITH SCIENTIFIC LITERATURE**
- **CONSISTENT WITH JUDGMENT OF AT LEAST A PORTION OF THE SCIENTIFIC AND TECHNICAL COMMUNITY**

**From Dr. D. Warner North
3 December 1992**

**WHAT FACTORS SHOULD BE CONSIDERED
IN PROVIDING GUIDANCE ON THE USE OF
FORMALLY ELICITED EXPERT JUDGMENT?**

- **IDENTIFICATION AND SELECTION OF EXPERTS**
- **DESIGN AND CONDUCT OF ELICITATIONS**
- **BIASES OF EXPERTS AND/OR ELICTORS**
- **DEPENDENCY AMONG EXPERTS**
- **CRITERIA AND PROTOCOLS FOR WEIGHTING THE
JUDGMENTS OF EXPERTS (AND OTHER INPUTS)**
- **AGGREGATION OF JUDGMENTS**
- **DOCUMENTATION**
- **THE INFLUENCE OF THE NORMATIVE EXPERTS**

NUCLEAR POWER PLANT - PROPOSED SEISMIC SITING CRITERIA

PROPOSED HYBRID APPROACH

SELECTED KEY ELEMENTS:

- **CONDUCT PROBABILISTIC SEISMIC HAZARD ANALYSIS**
- **CONDUCT SITE SPECIFIC AND REGION SPECIFIC GEOSCIENCE INVESTIGATIONS**
- **CHECK TO DETERMINE IF GEOSCIENCE INVESTIGATION CHANGE PROBABILISTIC RESULTS**
- **CALCULATE SITE SPECIFIC GROUND MOTION FOR PLANT**
- **INDEPENDENT STAFF CHECK OF PROBABILISTIC RESULTS AGAINST SIMPLIFIED DETERMINISTIC ANALYSIS**
- **UPDATE OF DATA BASE AND PROBABILISTIC METHODOLOGY EVERY TEN YEARS**

COMMENTS
NUCLEAR POWER PLANTS PROPOSED SITING CRITERIA

- 1. TRANSITIONAL PROCESS REQUIRING DETERMINISTIC AND PROBABILISTIC ANALYSES**
- 2. PROBABILISTIC ANALYSES SHOULD PREDOMINATE AT LEAST IN EASTERN U.S.**
- 3. ACCEPTABILITY - PARTLY BASED ON COMPARISON OF PSHA DETERMINATION WITH PREVIOUS DETERMINISTIC VALUES AT INDIVIDUAL PLANTS AND PAST EXPERIENCE**
- 4. WHAT IS PAST EXPERIENCE AND HOW DOES IT RELATE TO ACCEPTABILITY?**

EPRI, LLNL, WIPP PROBABILISTIC ASSESSMENTS - I

- **IMPORTANCE OF THESE STUDIES**



- **RESEARCH SHOULD BE CONDUCTED TO FACILITATE OR REJECT UTILIZATION OF EXPERT JUDGMENT IN DECISION MAKING PROCESS (PSHS, PSVA et al.)**

- **EPRI PSHA - A WELL PLANNED, WELL FUNDED AND WELL EXECUTED MASSIVE TRANSFER OF TECHNOLOGICAL INFORMATION. IT IS IMPORTANT NOT ONLY FOR PSHA RESULTS BUT ALSO BECAUSE OF INVOLVEMENT OF TECHNICAL COMMUNITY IN WORKSHOPS, COMMITTEES ETC.**

- **INVOLVEMENT LED TO CLEAR UNDERSTANDING OF METHODOLOGY, PURPOSE AND LIMITATIONS OF PSHA**

EPRI, LLNL, WIPP PROBABILISTIC ASSESSMENTS - II

- ⇒ ● THE EPRI STUDY IS A PARADIGM FOR SIMILAR ACTIVITY TO INFORM AND EDUCATE THE TECHNICAL COMMUNITY ON 10,000 YR. PSHA, PVHA et al.**

- ⇒ ● A PUBLIC DEBATE ON THE VALIDITY AND APPLICABILITY OF PSHA, PVHA et al. FOR THESE TIME PERIODS**

- ⇒ ● FINALLY, THE INTERESTS OF THE COUNTRY WILL NOT BE WELL SERVED IF DECISIONS ON APPLICABILITY AND ADMISSABILITY OF THESE METHODOLOGIES AND ASSESSMENTS ARE POSTPONED UNTIL THE LICENSING HEARINGS ARE UNDERWAY. RESOLUTION SHOULD BE SOUGHT BY A "MOOT COURT" HEARING. THIS COULD BE COMBINED WITH OR PRECEDED BY INFORMATIONAL TRANSFER AND DEBATE.**

CONCLUSIONS

- **RECOGNITION BY ALL PARTIES THAT THE UNDERLYING SCIENTIFIC BASIS OF EVERY EXPERT JUDGMENT IN PSHA, PVHA et al. WILL BE CHALLENGED MORE VIGOROUSLY THAN ANYONE IN ANY OF THE PARTIES CURRENTLY CAN IMAGINE**
- **RESEARCH ON USE OF EXPERT JUDGMENTS IN PSHA, PVHA et al. FOR THESE TIME PERIODS**
- **PUBLIC DEBATE OF ALTERNATIVE IDEAS REGARDING USE OF PSHA, PVHA et al.**
- **RESOLVE METHODOLOGICAL AND APPLICABILITY ISSUES IN ADVANCE OF ANY LICENSING PROCEDURE - A "MOOT HEARING" APPROACH**