

June 08, 1995

MEMORANDUM TO: Carl Paperiello, Director, NMSS  
FROM: John Greeves, Director, DWM  
SUBJECT: BRIEFING SLIDES FOR FORTHCOMING COMMISSION BRIEFING ON NRC USE OF EXPERT ELICITATION IN HIGH-LEVEL WASTE PERFORMANCE ASSESSMENTS

Attached for your information are the proposed briefing slides for the subject briefing, currently scheduled for July 20, 1995. The staff proposes to use the same set of slides for a similar briefing of the ACNW on June 22, 1995, due to time constraints. The lead for both of these briefings is Dr. Janet Kotra.

Attachments: As Stated

cc: M. Knapp/NMSS  
M. Federline/DWM  
M. Malsch/OGC  
J. Wolf/OGC  
W. Reamer/OGC  
DWM Branch Chiefs

Contact: Janet Kotra/NMSS  
415-6674

TICKET:

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RJohnson JHolonich (HLUR) JAustin (PAHB) NMSS r/f DWM t/f  
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EDS PROOFED: \_\_\_\_\_

409,54  
NH1611  
WM-1

\*See Previous Concurrence

OFC	PAHB*		PAHB*		PAHB*		DWM		DWM
NAME	JPKotra/cj		NAEisenberg		JHAustin		MVFederline		JTGreeves
DATE	6/07/95		6/07/95		6/07/95		6/ /95		6/8/95

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PDR WASTE PDR  
WM-1

June 6, 1995

NOTE TO: Carl Paperiello, Director, NMSS

FROM: John Greeves, Director, DWM

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OFC	PAHB <i>JK</i>	e	PAHB <i>JA</i>	e	PAHB <i>JA</i>	e	DWM		DWM	
NAME	JPKotra/cj		NAEisenberg		JHAustin		MVFederline		JTGreeves	
DATE	6/7/95		6/7/95		6/7/95		6/ /95		6/ /95	



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

June 08, 1995

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FROM: John Greeves, Director, DWM *Michael J. Bell*  
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ASSESSMENTS

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Contact: Janet Kotra/NMSS  
415-6674



**STAFF BRIEFING ON NRC USE OF EXPERT ELICITATION  
IN HLW PERFORMANCE ASSESSMENTS**

**STATUS REPORT**

**June 21, 1995**

**Contact: Dr. Janet Kotra  
Phone: (301) 415-6674**

**PURPOSE**

**Status Report on the Development Of An  
NRC Staff Technical Position On The Use Of  
Expert Elicitation In The HLW Program**

## **OVERVIEW**

- **Need For NRC Guidance**
- **Scope**
- **Role of Expert Judgment in NRC Licensing**
- **Staff Activities**
- **Proposed Positions**
- **Sample Process**
- **Schedule**

## **WHY DOES STAFF BELIEVE THERE IS A NEED FOR GUIDANCE?**

- **Large Uncertainties In Data, Modeling, And Knowledge Of Future States**
- **Expert Judgment Will Be Used To Support License Application (LA)**
- **Concern That DOE May Use Expert Judgment In Place Of Data**
- **Specific Concerns With Prior DOE Uses Of Expert Elicitation**
- **Under Program Approach, DOE Intends Greater Reliance On Expert Elicitation**
- **Elicitation Is Expensive And Time Consuming; Need To Foster Prudent And Appropriate Application**
- **Need To Address ACNW And NWTRB Concerns**
- **DOE Guidelines For Use of Formal Expert Judgment (6/1/95)**

## DOE APPLICATION OF EXPERT JUDGMENT

### Selected Examples

		NRC Staff Comments
● Site Characterization Plan	1988	1989
● Calico Hills Risk/Benefit Analysis	1991	1990 & 1991
● ESF Alternatives Study	1991	1992
● Total System Performance Assessments	1992 1994	1992 pending
● Volcanic Hazard Elicitation	report expected	Fall 1995
● Seismic Hazard Elicitation	report expected	mid-late 1996

**"...There is a need for systematic, visible, and easily understood protocols for elicitation."**

**ACNW, July 1991**

**"We recommend that the NRC staff expeditiously develop generic and detailed protocols for the elicitation of expert judgments..."**

**ACNW, September 1994**

**"It will be very important for the DOE and the NRC to achieve a common understanding on the appropriate methods for elicitation of expert judgments and on the use of such judgments in carrying out performance assessment."**

**NWTRB, December 1991**

**"...DOE should work together with the NRC in verifying that formally elicited expert judgment will be admissible in repository licensing hearings. They should also jointly address the definition of guidelines such that the probative value of this judgment is enhanced."**

**NWTRB, May 1994**

## **SCOPE OF GUIDANCE**

- **General Conditions Which May Warrant Elicitation**
- **Protocol For Acceptable Elicitation Process**
- **Does Not Prescribe Or Proscribe Specific Applications**
- **No Intent to Discourage Less Formal Uses of Judgment, If Properly Documented**

## **ROLE OF EXPERT JUDGMENT IN NRC LICENSING DECISIONS**

- **Licensing Decision Based On Fact Plus Opinion**
- **Judgments Used To Interpret Data, Predict Repository Performance, And Assess Uncertainties**
- **Judgments May Complement, But Not Substitute For, Data Collection, Analyses, And Experimentation**
- **NRC's Part 60 Regulations Require "Reasonable Assurance" Not "Proof" (§60.101)**
- **Licensing Process Provides Forum For Evaluating Facts And Opinions**

## **PRIOR TO LICENSING**

- **DOE Has Wide Latitude To Use Expert Judgment Without NRC Oversight**
- **NRC Concerned If Use Hinders High-Quality LA**

## **REVIEW OF LICENSE APPLICATION**

- **NRC Staff Reviews LA; Prepares Safety Evaluation Report**
- **Expert Judgment Used By DOE To Demonstrate Compliance Will Be Scrutinized**
- **NRC Staff Can Request Additional Information**

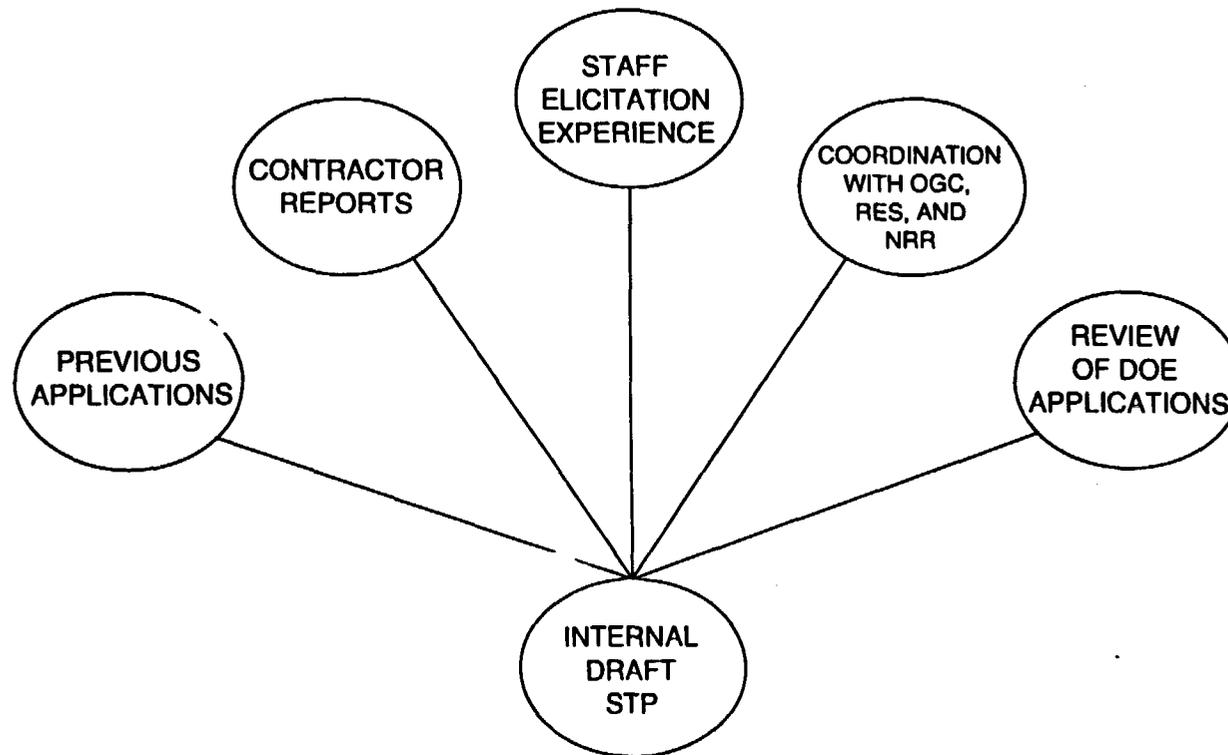
## **LICENSING BOARD REVIEW AND HEARING**

- **Written Evidence Followed By Sworn Testimony**
- **Federal Rules of Evidence Do Not Apply**
- **Criteria For Admission Of Judgments Into Evidence:  
individual's expertise, and demonstrated relevance**
- **Formal Methods For Obtaining And Documenting  
Judgments May Be Helpful, But Are Not Required**
- **Not Bound By Judgments Of Technical Experts**

## **APPEAL/COMMISSION REVIEW**

- **Based On Established Record**
- **Federal Rules of Evidence Do Not Apply**
- **Not Bound By Judgments Of Technical Experts**

## STAFF ACTIVITIES CONTRIBUTING TO GUIDANCE DEVELOPMENT



## **PROPOSED STAFF POSITIONS**

- 1. JUDGMENT INTRINSIC TO SCIENCE AND ENGINEERING; NRC WILL CONTINUE TO ACCEPT AS SUPPORT FOR LA**
- 2. IT IS NOT A SUBSTITUTE FOR OBJECTIVE ANALYSES AND DATA**
- 3. INFORMAL OR FORMAL JUDGMENT OK, IF PROPERLY DOCUMENTED**
- 4. FORMAL ELICITATION SHOULD BE CONSIDERED WHEN:**
  - Data Not Available Or Obtainable**
  - Uncertainties Large And Significant**
  - More Than One Model Explain Available Data**
  - Judgment Needed To Assess Bounding Assumptions**
- 5. USE CONSISTENT, DEFENSIBLE PROCESS; RESULTS SHOULD REFLECT STATE OF TECHNICAL KNOWLEDGE**
- 6. UPDATE RESULTS IF NEW DATA COULD ALTER ELICITED JUDGMENTS**

## **SAMPLE PROCESS FOR FORMAL EXPERT ELICITATION**

- **Define Objectives**
- **Select Experts**
- **Identify Issues**
- **Assemble and Disseminate Info**
- **Provide Pre-Elicitation Training**
- **Elicit Judgments**
- **Provide Feedback**
- **Accommodate Disparate Views**
- **Document**

## **DEFINITION OF OBJECTIVES**

- **Define Explicit Objectives**
- **Objectives Guide Choice Of Experts,  
Information Provided, And Form Of  
Judgments**

## **CRITERIA FOR SELECTION OF EXPERTS**

- **Knowledge And Experience**
- **Demonstrated Ability To Apply Knowledge And Experience**
- **Broad Diversity Of Independent Opinion And Approaches**
- **Willingness To Be Identified Publicly With Judgments**

## **IDENTIFICATION OF ISSUES**

- **" Decompose" Broad Objectives Into Simpler Subissues**
- **Experts Define Parameters Which Influence Overall Judgments**

## **ASSEMBLY AND DISSEMINATION OF BACKGROUND INFORMATION**

- **Assembled With Input Of Experts**
- **Full Range Of Views Should Be Represented**
- **Uniform, Balanced, And Timely Distribution**
- **Experts Should Have Equal Access To Materials**

## **PRE-ELICITATION TRAINING**

- **Elicitation Process**
- **Expression Of Judgments Using Subjective Probability**
- **Uncertainty Encoding**
- **Sources Of Potential Bias**

## **ELICITATION OF JUDGMENTS**

- **Each Expert Should Be Elicited Separately**
- **Review Definitions And Assumptions From Pre-Elicitation Meetings**
- **Uniform Questioning**
- **Internal Consistency Checks Of Each Expert's Views**
- **Individual Elicitations Should Be Recorded**

## **POST-ELICITATION FEEDBACK**

- **Prompt Feedback Of Results**
- **Need For Revision Or Clarification Of Individual Judgments Should Be Solicited From Each Expert**
- **Rationale For Any Revisions Should Be Documented**

## **AGGREGATION OF JUDGMENTS**

- **Individual Judgments Must Remain Available For Direct Use In Performance Assessments And In Sensitivity Analyses**
- **Experts Should Comment Explicitly On Opposing Views**
- **Document Bases For Differing Views**
- **If Judgments Are Aggregated, Rationale Should Be Provided**
- **Document Impact Of Individual Judgment On Consolidated Judgment**
- **Individual Judgments Must Be Preserved, Documented, And Made Available To All Parties**

## **DOCUMENTATION**

- **What Was Done, Why, When, And By Whom**
- **Clear Descriptions Of All Resulting Judgments And Reasoning**
- **Definitions Of Issues And Terms**
- **All Assumptions And Calculations**
- **Complete References To Scientific Literature**
- **Information Provided Directly By Individual Experts**
- **Reasons For Rejection Of Specific Data, Calculations, Or Models**

## **SCHEDULE**

- **Brief ACNW On Draft Positions** June 22, 1995
- **Staff Review/Concurrence** Summer 1995
- **Publish Draft STP For Public Comment** September 1995
- **NRC/DOE Technical Exchange** September 1995
- **Brief ACNW On Draft STP** October 1995
- **Analyze Comments And Prepare Final STP** Winter 1995/96
- **Brief ACNW On Final STP** Spring 1996
- **Publish Final STP On Expert Elicitation** Spring 1996