

MAKING PERFORMANCE ASSESSMENTS UNDERSTANDABLE
AND CREDIBLE

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WINTER MEETING

U.S. NUCLEAR WASTE TECHNICAL REVIEW BOARD

JANUARY 28, 1997

OUTLINE

- NRC'S REVIEW OF DOE'S TSPA-95
- TOPICAL AREAS REVIEWED
- GENERAL OBSERVATIONS
- TOTAL SYSTEM PERFORMANCE
- INFILTRATION AND DEEP PERCOLATION
- GROUNDWATER DILUTION
- MAKING PA'S UNDERSTANDABLE & CREDIBLE

AUDIT REVIEW OF DOE'S TOTAL SYSTEM PERFORMANCE
ASSESSMENT -1995

- SELECTED VERY SPECIFIC TOPICAL AREAS OF KEY IMPORTANCE
- HELD TECHNICAL EXCHANGE IN MAY 1996
- TRANSMITTED TO DOE SUMMARY COMMENTS IN JULY 1996
- TRANSMITTED TO DOE DETAILED COMMENTS IN NOVEMBER 1996
- CURRENTLY WRAPPING UP BROADER AUDIT REVIEW, EXPECT TO TRANSMIT COMMENTS IN MARCH 1997
- TECHNICAL EXCHANGE SCHEDULED FOR APRIL 10, 1997
- DOE IS ADDRESSING MANY OF NRC'S CONCERNS

TOPICAL AREAS REVIEWED

- TOTAL SYSTEM PERFORMANCE
- INFILTRATION AND DEEP PERCOLATION
- GROUNDWATER DILUTION
- CALCULATION OF TEMPERATURE AND RELATIVE HUMIDITY
- WASTE PACKAGE FAILURE MODES

GENERAL OBSERVATIONS ABOUT PA TRANSPARENCY

- NEED TO BETTER DOCUMENT DECISIONS AND RATIONALE
- INCOMPLETE DOCUMENTATION FREQUENT PROBLEM IN CONTENTIOUS CASES
- DOE DRAFT POSITION FOR DOCUMENTING DECISIONS; REVIEW BY EXPERTS IN THE HEARING PROCESS WOULD BE BENEFICIAL
- NEA/PAAG DRAFT REPORT OBSERVED THAT INCOMPLETE JUSTIFICATION AND DOCUMENTATION ARE RELATIVELY COMMON IN PERFORMANCE ASSESSMENTS, INCLUDING NRC'S. WE ARE GETTING BETTER

ISSUES RELATED TO TRANSPARENCY OF TSPA-95
TOTAL SYSTEM PERFORMANCE

- COMPLEMENTARY CUMULATIVE DISTRIBUTION FUNCTION PLOTS OF TOTAL RADIONUCLIDE RELEASES AND DOSES CRITICAL TO COMPLIANCE DETERMINATION
- DOE VARIED HEAT LOAD, BACKFILL, INFILTRATION RANGES, AND THERMOHYDRAULIC MODELS
- RESULTS NEED TO BE EXPLAINED IN TERMS OF CAUSAL FACTORS OR BASIC PERFORMANCE INDICATIONS
- DIFFICULT TO DETERMINE CORRECTNESS AND REASONABLENESS OF RESULTS, REQUIRING INDEPENDENT CALCULATION

ISSUES RELATED TO TRANSPARENCY OF TSPA-95 (CONTINUED)
INFILTRATION AND DEEP PERCOLATION

- TSPA-95 IDENTIFIED DISTRIBUTION OF PERCOLATION FLUX AS PRIMARY SITE CHARACTERIZATION ISSUE
- COULD NOT REPRODUCE TRANSPORT SIMULATOR BASED ON INFORMATION IN TSPA-95
- UNSUPPORTED ASSUMPTION THAT FRACTURES ARE COMPLETELY SATURATED
- POOR STATISTICAL CORRESPONDENCE BETWEEN PROCESS-LEVEL CALCULATION AND ABSTRACTED CALCULATION
- DEGREE OF CONSERVATISM UNKNOWN
- LACK OF TRANSPARENCY RESULTS IN DIFFICULTY IN PERFORMING PEER REVIEW

ISSUES RELATED TO TRANSPARENCY OF TSPA-95 (CONTINUED)
GROUNDWATER DILUTION

- COULD HAVE SEVERAL ORDERS OF MAGNITUDE IMPACT ON TOTAL SYSTEM PERFORMANCE
- DILUTION FACTOR CALCULATED OF LIMITED USE BECAUSE:
 - STIRRED TANK MODEL NOT ADEQUATELY SUPPORTED
 - ADVECTION-DISPERSION MODEL DID NOT CONSIDER FULL RANGE OF FIELD DATA
 - RELATIONSHIP OF RADIONUCLIDE CONCENTRATION IN AQUIFER TO RADIONUCLIDE CONCENTRATION AT "WELL HEAD" NOT CONSIDERED
- DOE IS RECONSIDERING MODELS

MAKING PA's UNDERSTANDABLE & CREDIBLE

- FOLLOW THE CANONS OF LOGIC
- CLEAR DOCUMENTATION: DATA, ASSUMPTIONS, JUSTIFICATION FOR MODELS
- WHO IS THE AUDIENCE: REGULATOR, POLICY MAKERS, PUBLIC
- ADDRESS THE CONCERNS
- SUGGESTIONS FOR IMPROVING TRANSPARENCY
 - "STORY BOARD" OF PROCESSES/EVENTS/FEATURES 10,000 YEARS IN THE FUTURE AND IN THE PAST
 - ANIMATED VIDEO OF PHENOMENA THAT IS INTERACTIVE AND USER FRIENDLY
 - INTELLIGENT BUT NON-TECHNICAL PEOPLE WRITE SUMMARY WITHOUT TECHNICAL JARGON