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-DISPERSSION 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