

**U.S. DEPARTMENT OF ENERGY  
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT**

**NUCLEAR WASTE TECHNICAL REVIEW BOARD  
FULL BOARD MEETING**

**SUBJECT: PURPOSE AND SCOPE OF  
TOTAL SYSTEM PERFORMANCE  
ASSESSMENT**

**PRESENTER: DR. JEREMY BOAK**

**PRESENTER'S TITLE  
AND ORGANIZATION: ACTING CHIEF OF THE TECHNICAL ANALYSIS BRANCH  
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT  
LAS VEGAS, NEVADA**

**PRESENTER'S  
TELEPHONE NUMBER: (702) 794-7588**

**DALLAS, TX  
APRIL 7-8, 1992**

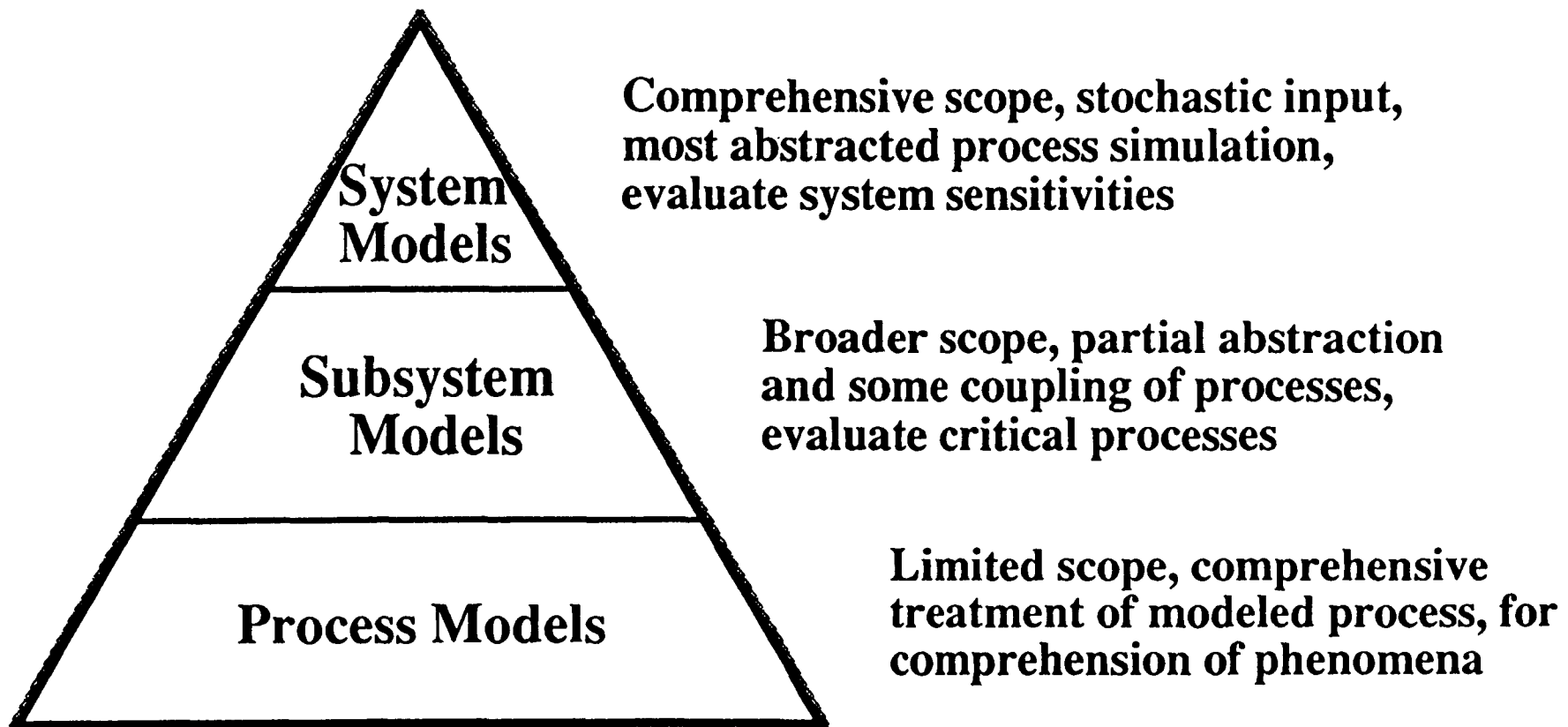
# Outline

- **Purpose**
- **Scope of the Total System Performance Assessment (TSPA)**
- **Participants**
- **Selected steps in TSPA analyses**
- **Caveats**
- **Schedule**

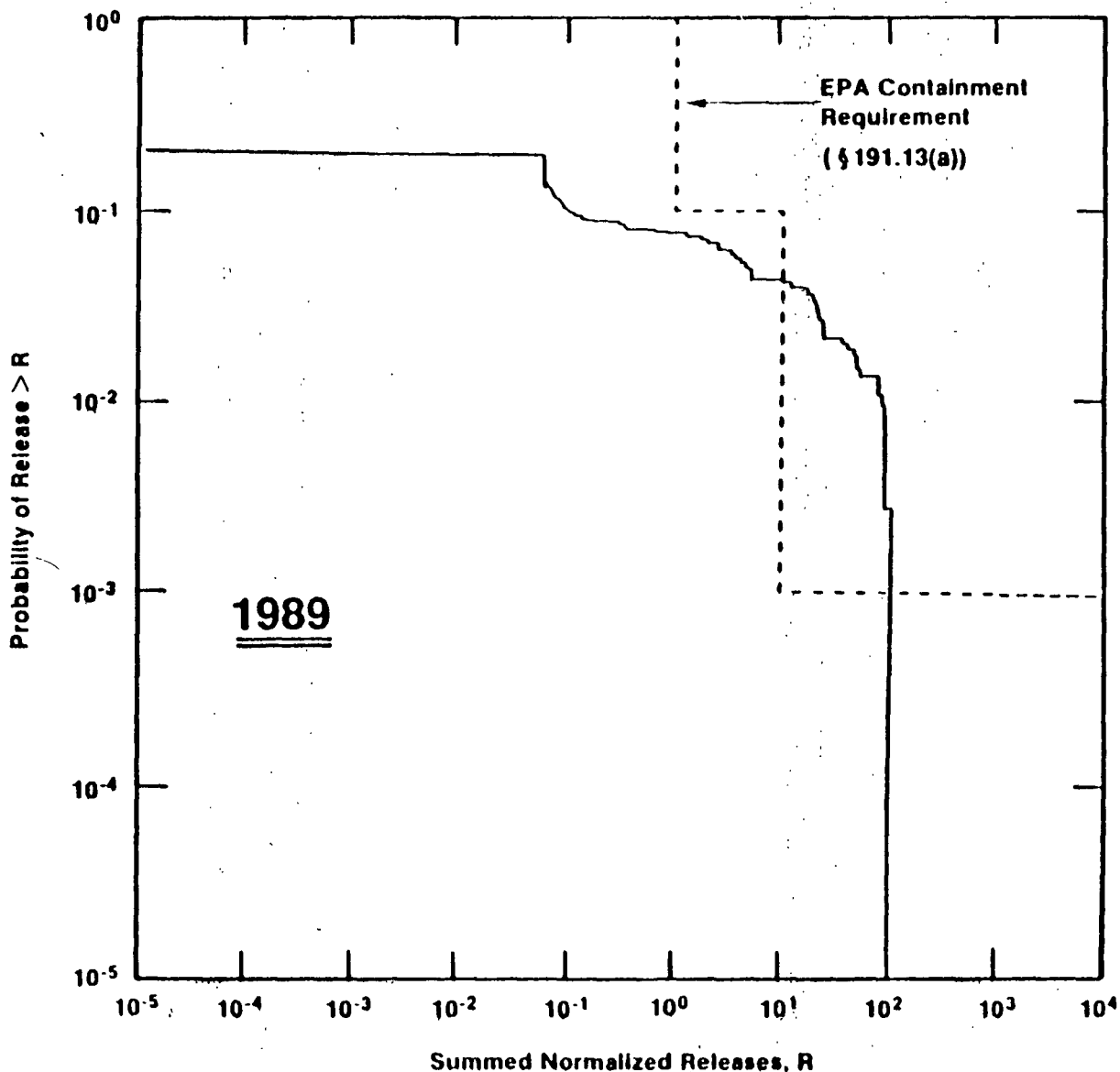
# Purpose

- **Help develop an "abstraction" process necessary for future total-system performance assessments**
  - Essential features distilled from computationally complex models
  - Not necessarily "simple"
- **Compare results from two alternative approaches**
  - Common information set established
- **Demonstrate production of a meaningful estimate of system performance**
  - Release of nuclides at the AE shown via Complementary Cumulative Distribution Functions (CCDF)

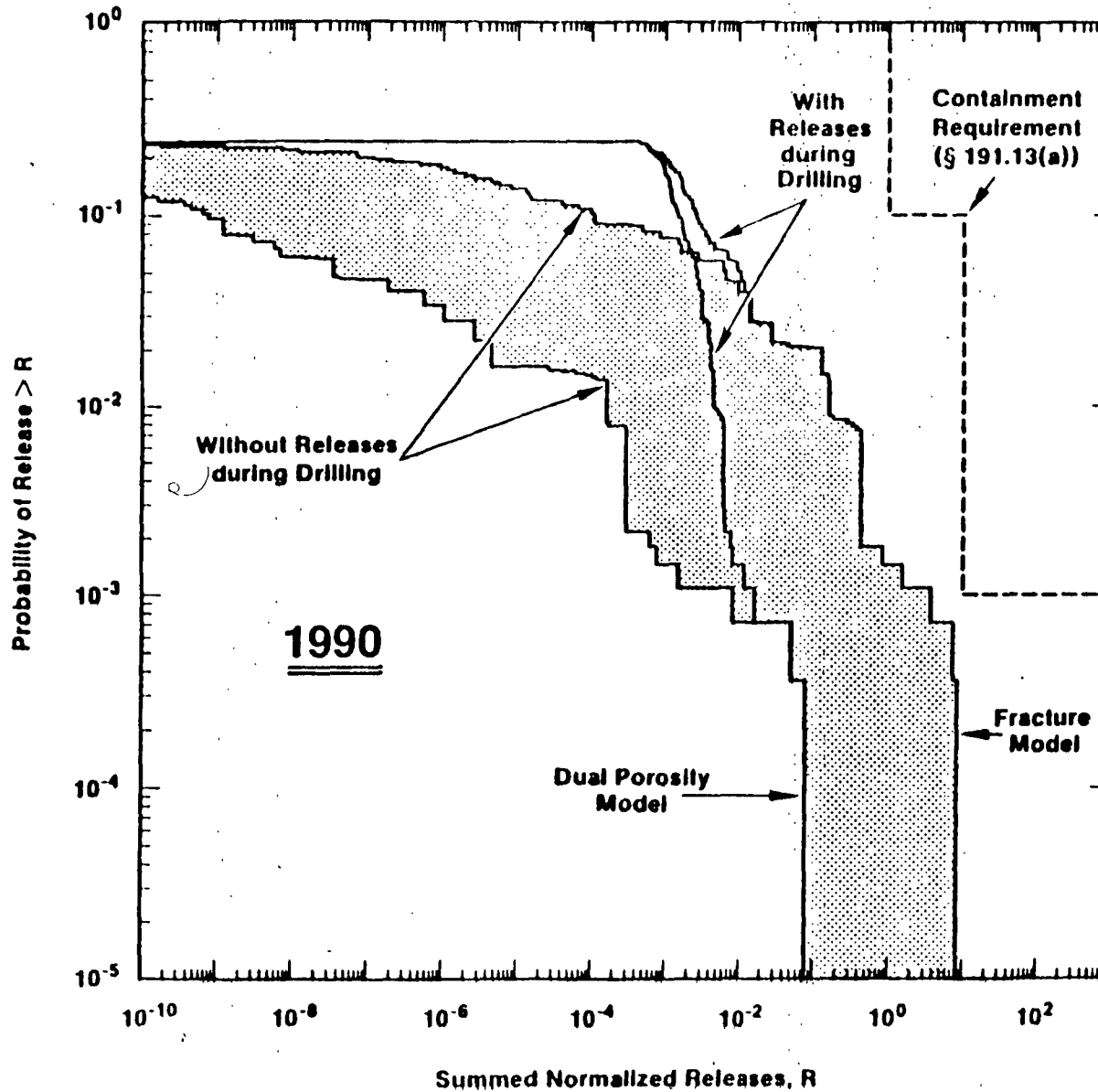
# **The PA Pyramid: A Hierarchy of System Assessment Tools**



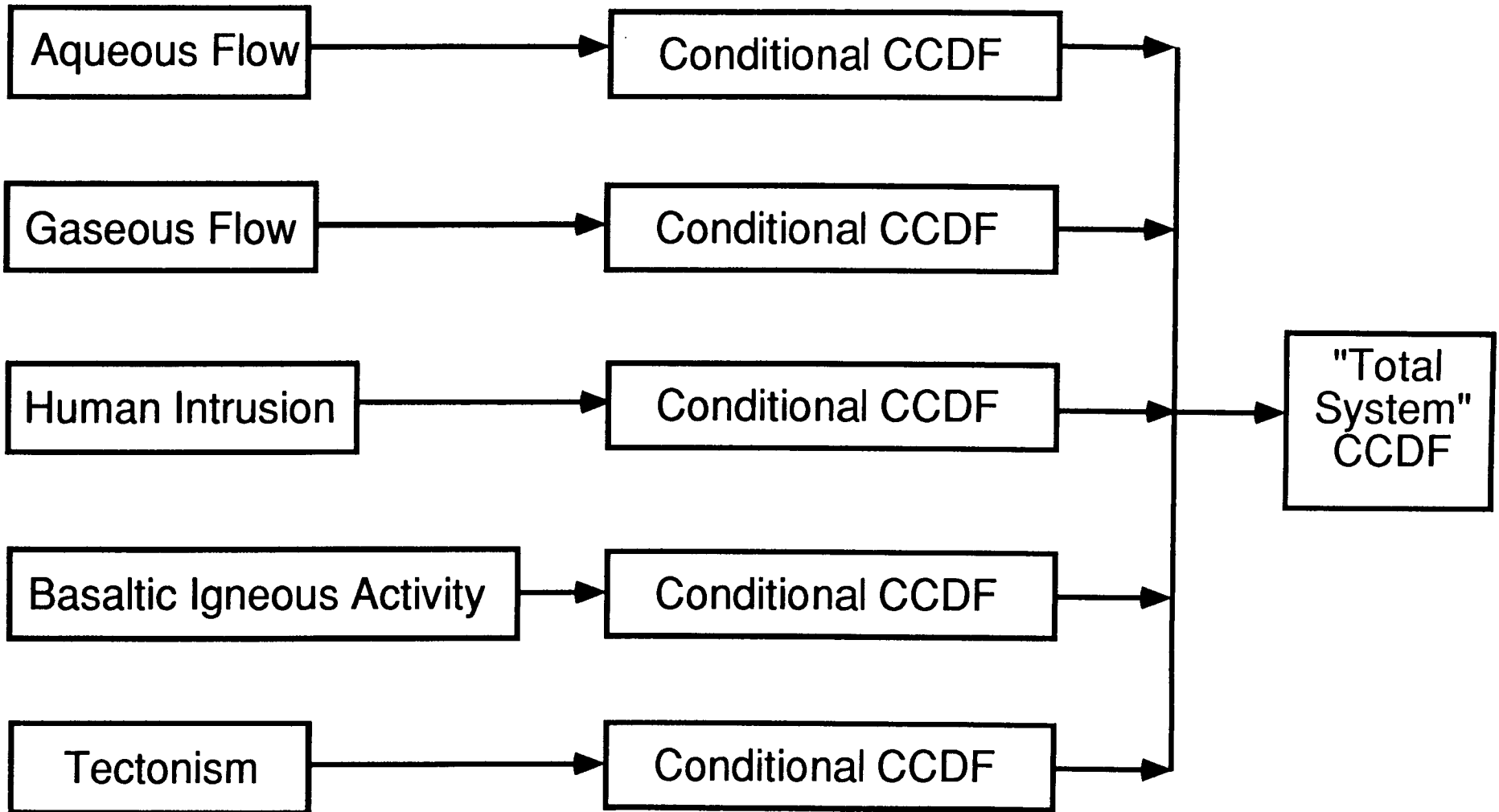
# 1989 CCDF from "Performance Assessment Methodology Demonstration: Methodology Development for Evaluating Compliance with EPA 40 CFR 191, Subpart B for the Waste Isolation Pilot Plant



1990 CCDFs from "Preliminary Comparison  
with 40 CFR Part 191, Subpart B for the  
Waste Isolation Pilot Plant, December 1990"



# Scope of the TSPA



# Participants

- **Sandia National Laboratories**
  - Coordinated initial stages of the (TSPA)
  - Performed calculations using abstracted models
- **Pacific Northwest Laboratory**
  - Performed calculations using detailed models
  - Performed dose calculations
- **Los Alamos National Laboratory**
  - Provided information used in volcanic analysis
  - Defined parameter distributions for retardation
- **Lawrence Livermore National Laboratory**
  - Specified SNL source term

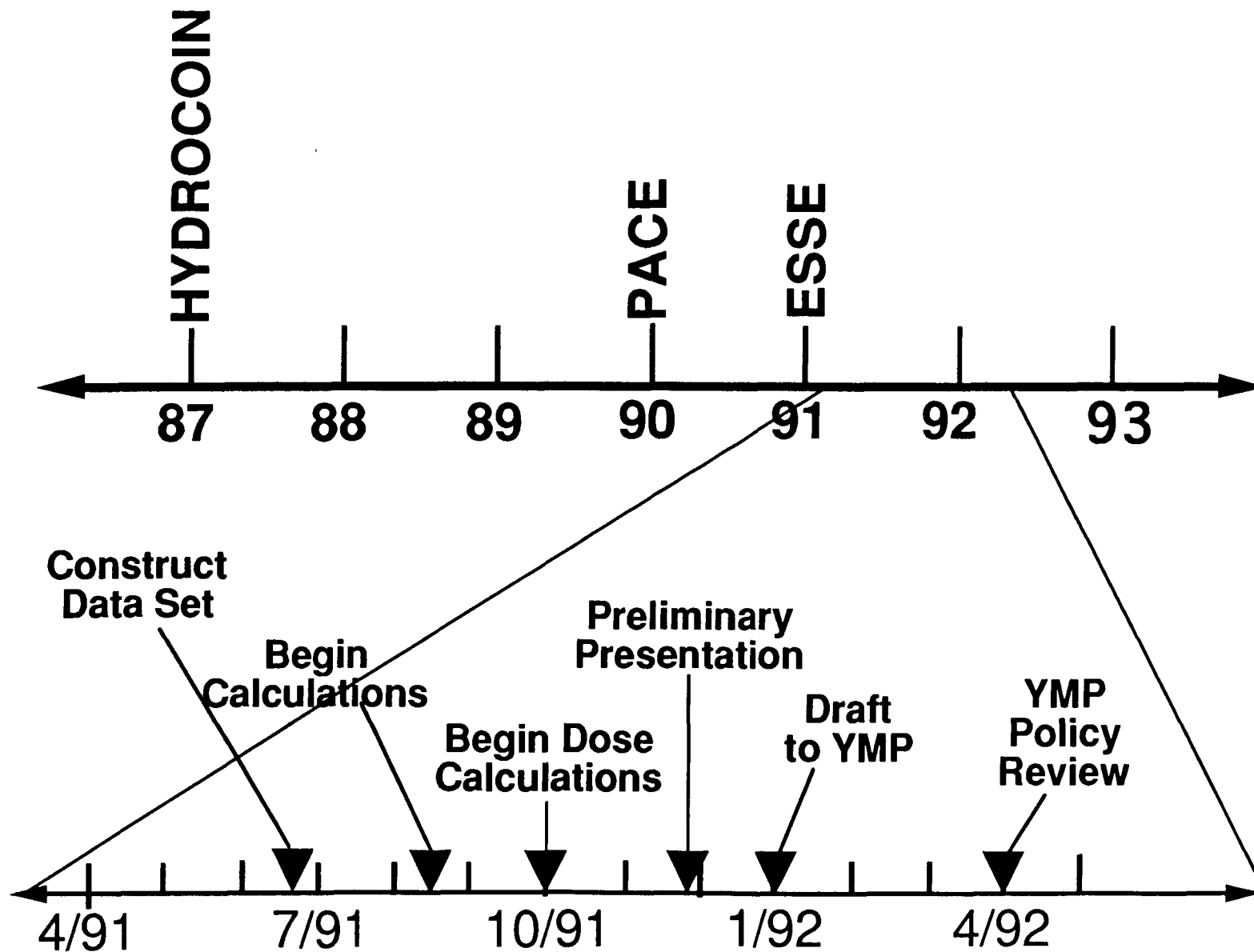


# **Caveats**

**This exercise reflects our current understanding of the site and is expected ultimately to contribute estimates of the ability of a potential repository system at Yucca Mountain to comply with regulations; however,**

- it is not comprehensive in terms of modeled components**
- the data and models used are not validated**
- the ranges of values are very broad**

# TSPA Schedule



# **Process for Interim Exercises**

- 1. Screen Scenarios**
- 2. Estimate probabilities**
- 3. Choose conceptual models**
- 4. Estimate parameter uncertainties**
- 5. Calculate releases**
- 6. Interpret results**



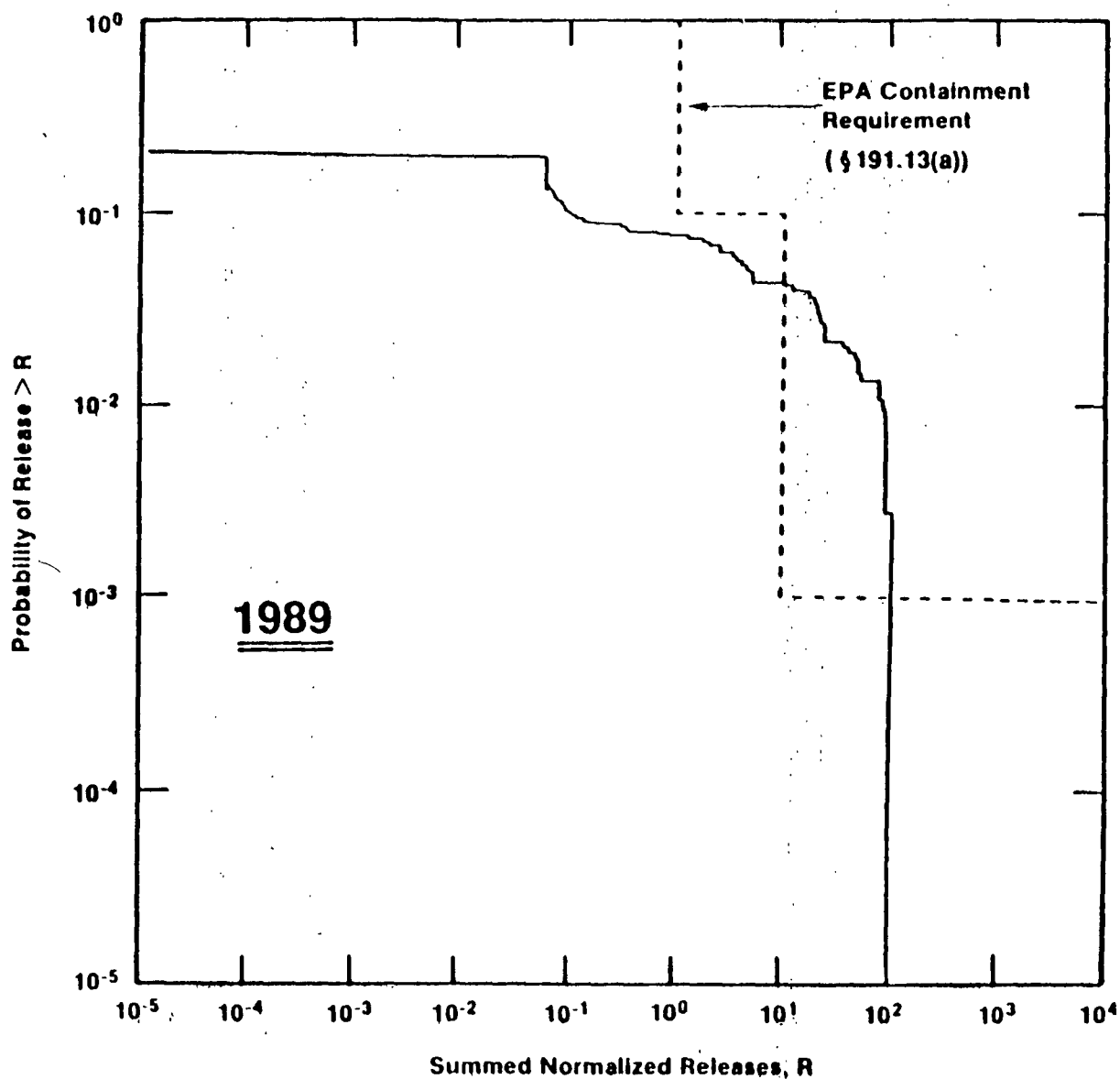
# **Time Scale**

**6/91**            **Initial request for study from YMPO**

**11/91**           **Informal results presented in Las Vegas**

**3/92**            **Draft report submitted to YMP for review**

1989 CCDF from "Performance Assessment Methodology  
Demonstration: Methodology Development for  
Evaluating Compliance with EPA 40 CFR 191, Subpart B  
for the Waste Isolation Pilot Plant



# 1990 CCDFs from "Preliminary Comparison with 40 CFR Part 191, Subpart B for the Waste Isolation Pilot Plant, December 1990"

