

EPRI

**EPRI / EEI HLW
METHODOLOGY DEVELOPMENT
PROJECT**

**Presented to the
Nuclear Waste Technical Review Board
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EPRI HLW Project Objectives

- To develop an integrated methodology for early site performance assessment and to identify and prioritize crucial issues
- To involve DOE in this methodology development and its implementation

EPRI High Level Waste Project

Methodology Development Team

<u>Name</u>	<u>Affiliation</u>	<u>Expertise</u>
Daniel B. Bullen	Georgia Tech	Waste Package
Neville Cook	Univ. of Calif, Berkeley	Rock Mechanics
Kevin Coppersmith	Geomatrix Consultants	Seismic Geology
Ralph L. Keeney	Univ. of Southern California	Risk/Decision Analysis
John M. Kemeny	University of Arizona	Rock Mechanics
Austin Long	University of Arizona	Climatology
Robin K. McGuire	Risk Engineering	Risk Analysis
F. Joseph Pearson, Jr.	Consultant	Geochemistry
Frank W. Schwartz	Ohio State University	Hydrology
Michael Sheridan	State Univ. of NY, Buffalo	Volcanology
Robert A. Shaw	EPRI	Project Manager
J. Carl Stepp	EPRI	Seismology & Geophysics
Robert F. Williams	EPRI	HLW Sciences
Robert Youngs	Geomatrix Consultants	Geotechnical Engineering
Delbert S. Barth	UNLV/ERC	Observer
Russ Dyer	Department of Energy	Observer

EPR/NPD

Methodology Development Team Meetings

7/24-25/89	Brainstorming
11/28/89	Qualification check
12/19-20/89	Problem definition
1/15-17/90	Model formulation
4/24-26/90	Model presentation
7/30-8/1/90	Model completion

HLW / SFS

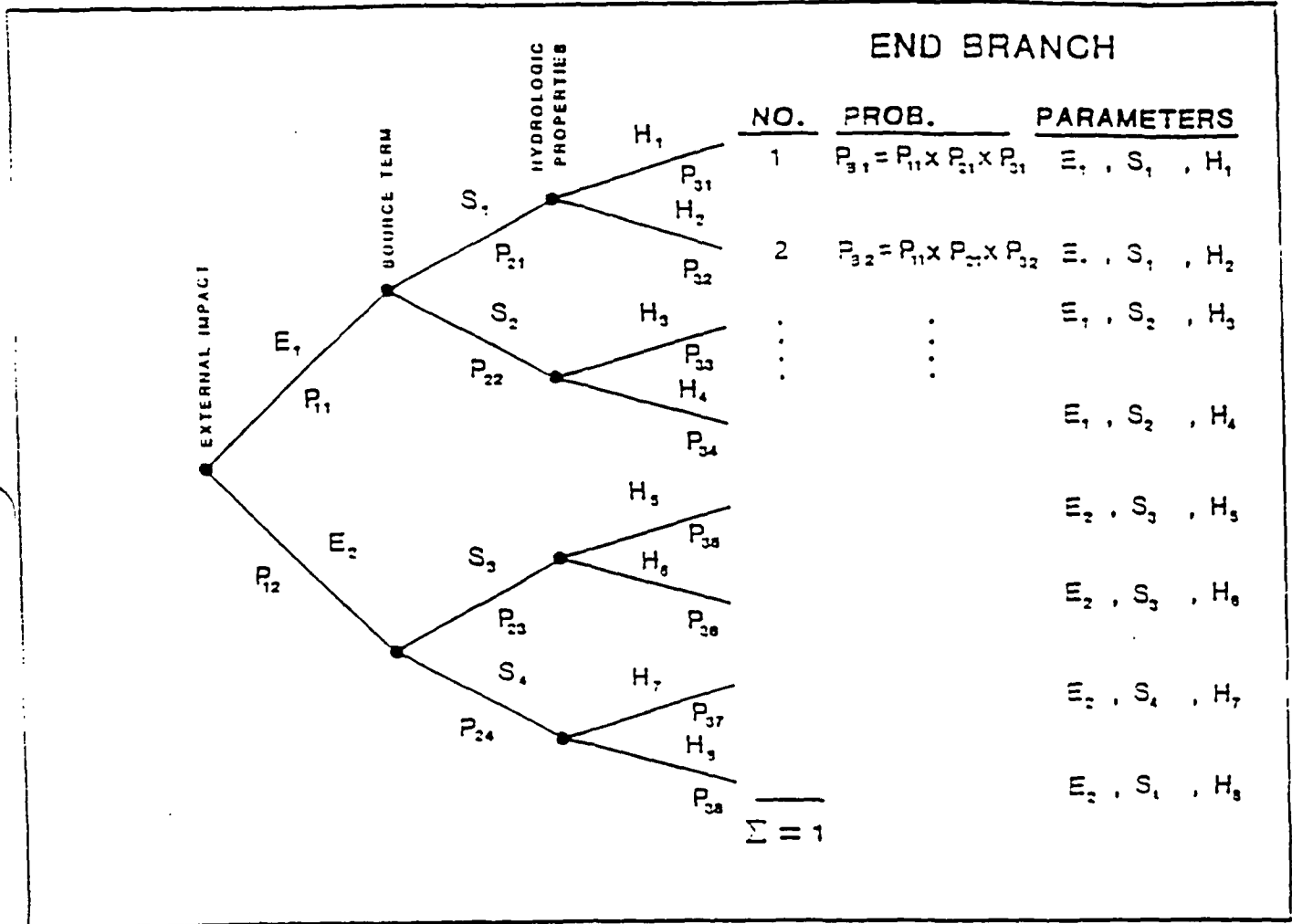


Figure 9-1. Example logic tree.

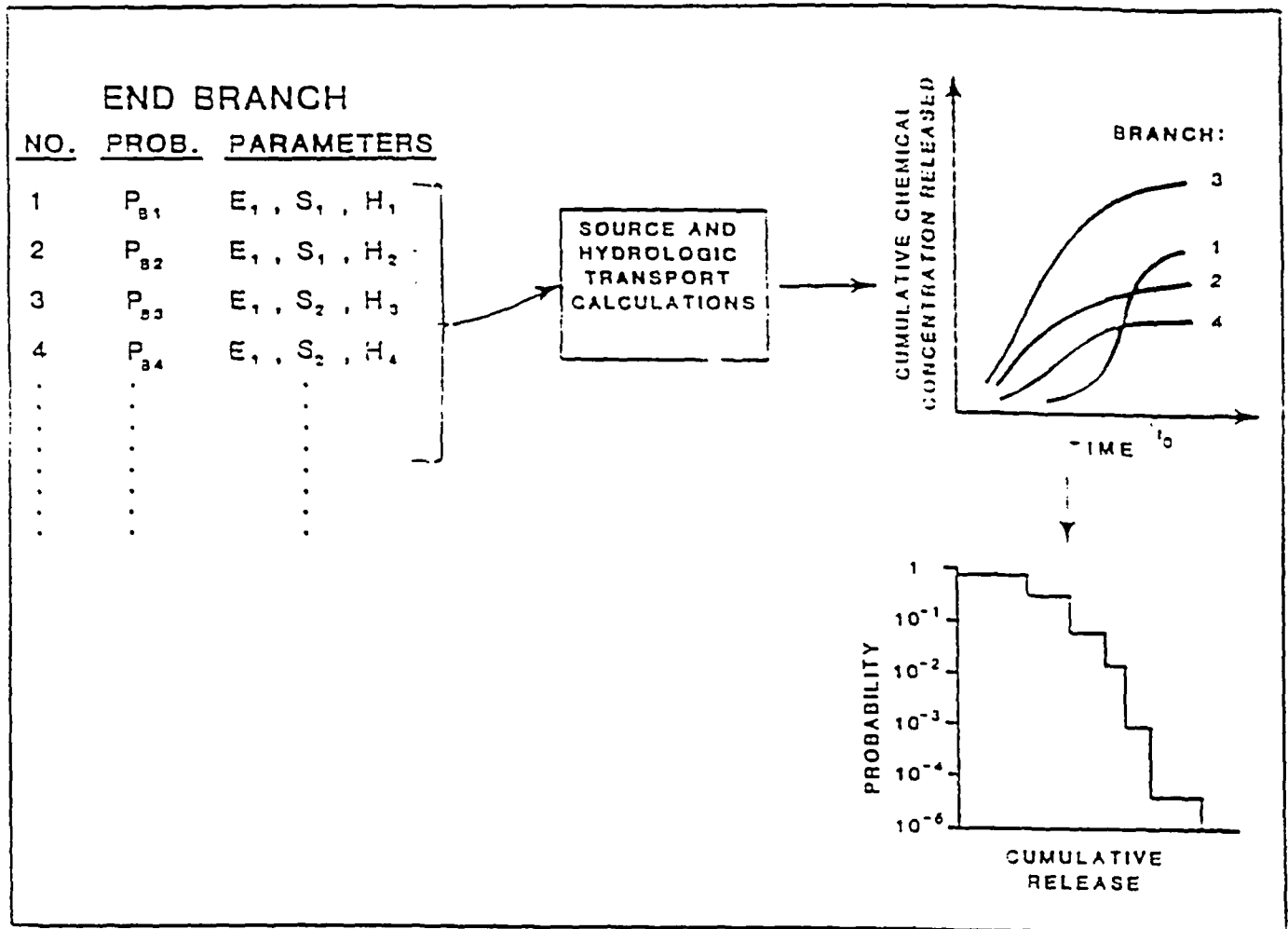
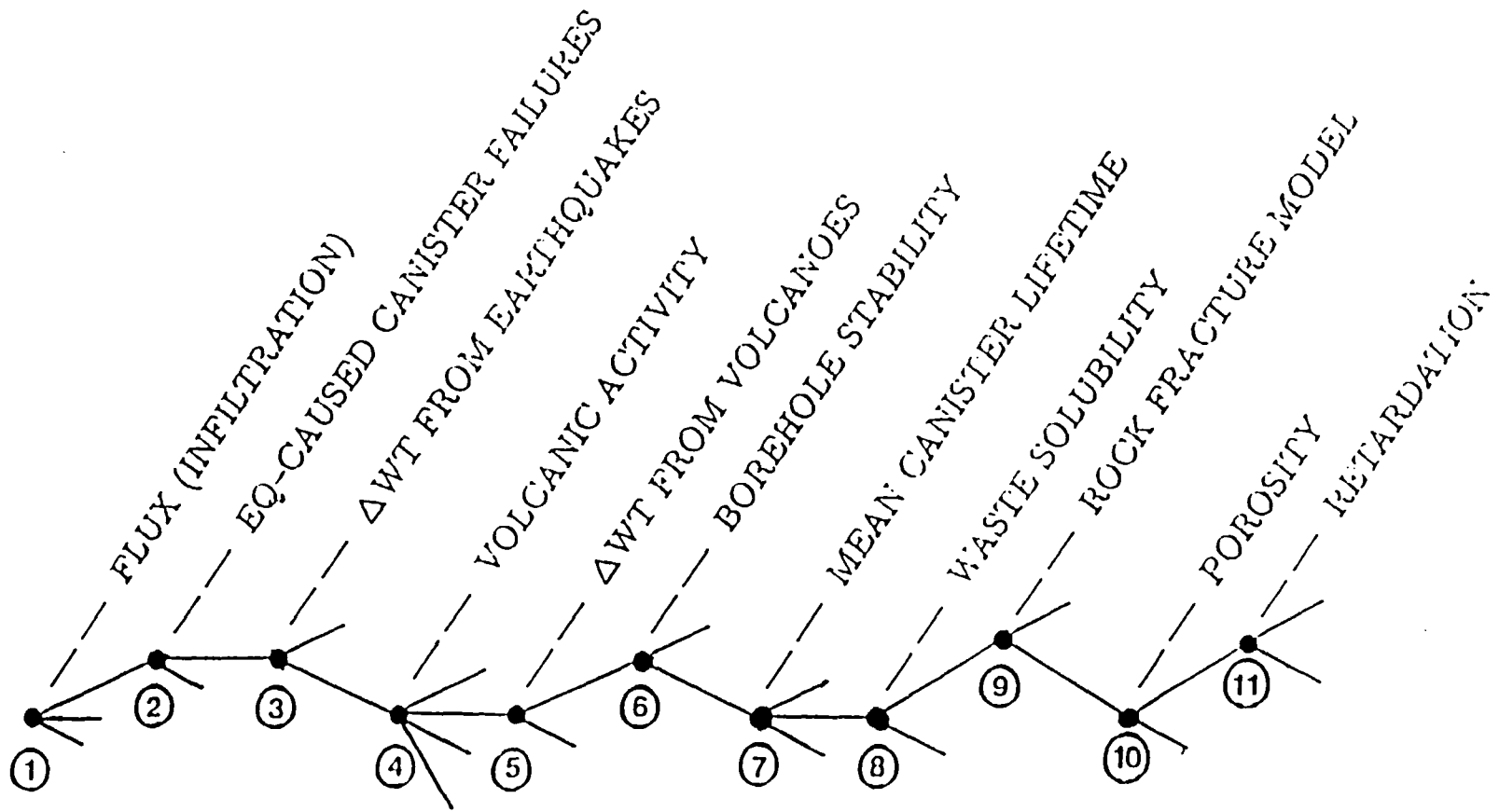


Figure 9-2. Illustration of use of logic tree parameters to form CCDF of cumulative chemical concentration released.



EQ = EARTHQUAKE
ΔWT = CHANGE IN WATER TABLE

Figure 9.3. Master logic tree for demonstration calculations.

Technical Issues

- Keeping in mind that the MDT results are illustrative, the following are found to be more influential on site performance
- Hydrology
 - Infiltration (recharge) from precipitation
 - Water flow pathways
 - Influenced by extent of rock fracture and porosity
 - Significant rise in water table
- Geochemistry
 - Uranium solubility, as influenced by dissolution chemistry and temperature
 - Chemical retardation of released radioisotopes

Conclusions

The use of multi-disciplinary scientific and engineering expertise to conduct a risk-based evaluation of a HLW repository is achievable with current knowledge and technology.

- A structured approach is required; the workshop format is suited to this approach.
- The use of logic trees is a convenient and credible format
- Results of the methodology should be obtained during the process of model development, i.e., the process should be iterative.

A methodology of this type can be applied on a larger scale, in which a larger body of expertise participates. This application will lead to realistic (rather than simple demonstrative) results.

Near-Term Plans

- Prepare working version of Methodology Development Team performance assessment model and report (9/90)
- Phase 2: Join with DOE in sponsorship of workshops on performance assessment methodologies to identify crucial technical topics for workshops
- Phase 3: Support DOE in conducting expert workshops on crucial technical topics identified in Phase 2

Phase 2

- Series of workshops on performance assessment methodologies
 - Participants
 - DOE YMPO contractors
 - DOE HQ Contractor, Golder Associates
 - NRC
 - EPRI/UWASTE's Methodology Development Team
 - Objectives
 - Exchange detailed explanations of each P/A methodology
 - Revise methodologies where appropriate
 - Obtain consensus on highest priority technical areas
 - Schedule
 - Series of 3 workshops starting in late '90 with completion in '91

Phase 3

- Series of workshops on highest priority technical areas identified in Phase 2
 - Sponsored by DOE
 - Used by EPRI to update and revise P/A methodology
 - One to three workshops per year
 - Significant independent technical expert input to DOE

Roles of Respective Parties in Performance Assessment Methodology

	<u>Phase 1</u>	<u>Phase 2</u>	<u>Phase 3</u>
EPRI	major	major	minor
UWASTE	major	major	supportive
DOE	supportive	minor	major