March 9, 1988

Jerry,

Here is a set of 'consultation' notes for discussion purposes.

Prasad

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/bsc

cc: Joe Bunting

OVERALL APPROACH TO COMPLIANCE DETERMINATION FOR EBS

1. PROACTIVE

2. ENHANCE CENTER LONG-TERM CAPABILITIES

3. ACCELERATED BUILDUP OF CENTER TECHNICAL POSTURE

4. METHODOLOGIES TO BE 'SYSTEM INTEGRATABLE'

PLAN OBJECTIVES FOR COMPLIANCE DETERMINATION FOR EBS

1. To transfer the current version of CONVO to Center. To include both the mainframe and PC versions.

2. Exercise the CONVO Code at the Center and Evaluate its capabilities.

3. Continue development of the Probabilistic Methodology for future applications to Tuff repository.

   a. Develop a new framework for the probabilistic approach to incorporate features like sensitivity analysis and improved computational techniques.

   b. Revise and/or modify and/or upgrade current modules in CONVO requiring adaptation to the Tuff repository design.

PLANNED ACTIVITIES

1. Technology Transfer of CONVO to Center

   * Acquire Code and install the main frame version on SwRI computer.

   * Install PC versions on IBM-PS at the Center.

   * Develop multi-user capabilities for accessing Code for both Center and NRC staff.

   * Maintain back-ups, i.e., archivable tapes for both CONVO versions.

2. Exercising and Evaluating CONVO

   * Run test cases on CONVO PC and the main frame versions.

   * Identify modules within CONVO requiring changes (for Tuff applications).

   * Develop a detailed plan for upgrading or enhancing the capabilities of the Code.

3. Development of the Probabilistic Methodology

   a. Fast Probabilistic Performance Assessment (FPPA)

      -Develop FPPA framework
      -Integrate CONVO modules
      -Debug FPPA system
      -Run test cases
      -Conduct verificaton studies
      -Compare with 'Simulation Techniques'
      -Develop Users Manual

   b. CONVO Modules Development

      -Verify the applicability of current CONVO modules for use in Tuff media.
      -develop and/or modify the modules requiring change
      -Develop new mechanistic modules to enhance long-term capabilities of the FPPA

Basis for: FAST PROBABILISTIC PERFORMANCE ASSESSMENT (FPPA)

* Based on Reliability Analysis Methods Currently Applied to Structural Systems

  -Uses sensitivity data and generates probability sensitivity factors
  -New technology Finding Wide Acceptance in Diverse Industries (Offshore, Civil, Aerospace)

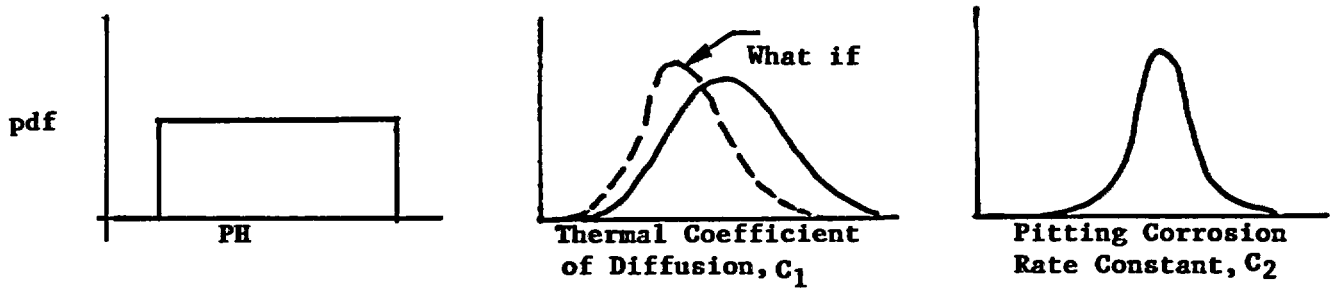
* SwRI Developed Advanced Probabilistic Methods most Suitable for Explicit Functions

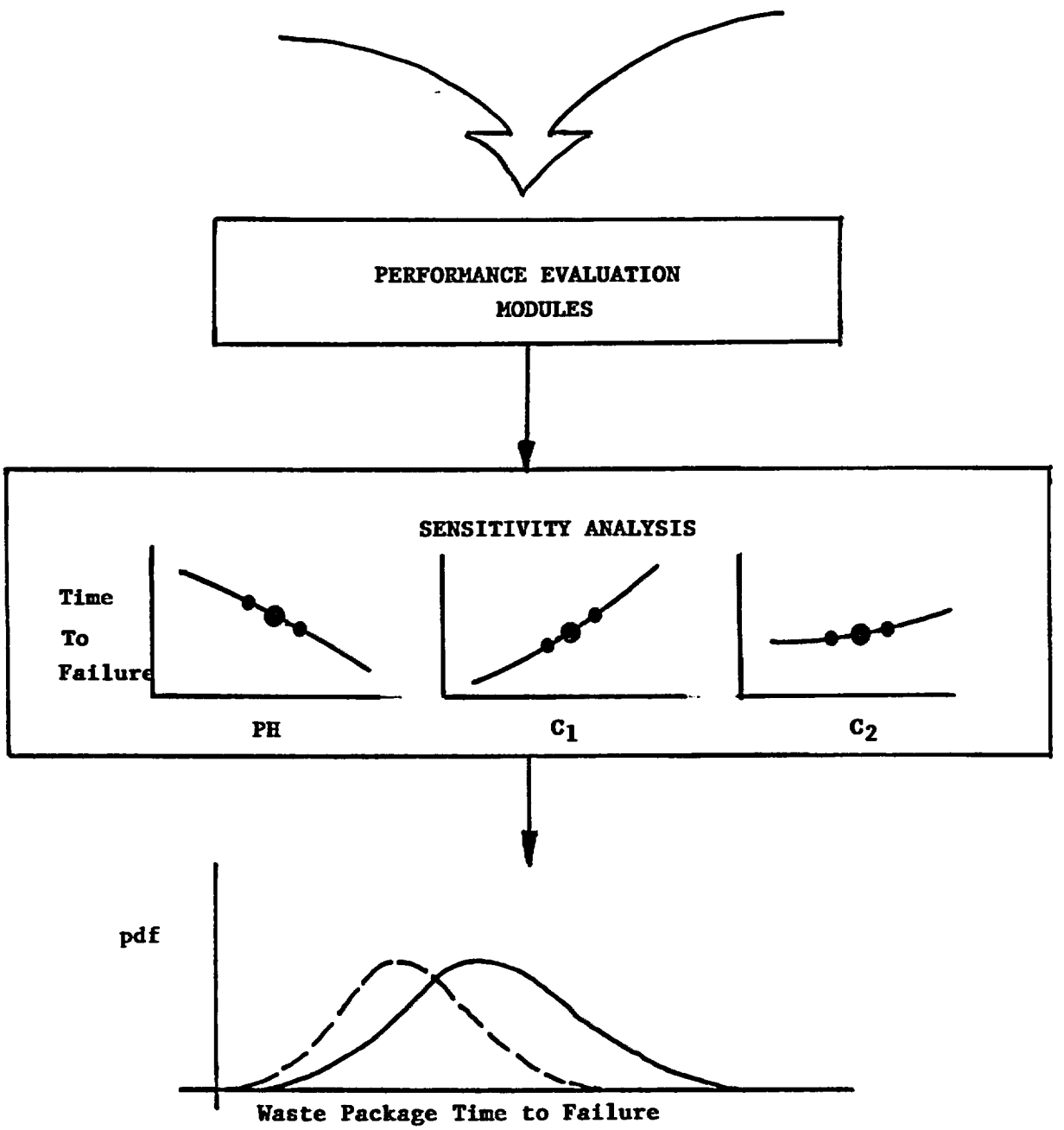
  -State-of-the-Art Technology
  -Accuracy Demonstrated
  -Several Orders of Magnitude Faster than the Conventional Monte Carlo Approach
  -Applicable to Waste Package Performance Assessment

MAJOR ADVANTAGES OF FPPA

* Identifies Key Random Parameters
  - Ability to prioritize parameters
* Provides Quick "What If" Answers
* Suggests Ways to Improve System Performance
  - Ability to access global and local impact of usages in parameters
* Useful for Trade-Off Analysis

FAST PROBABILISTIC PERFORMANCE ASSESSMENT PROGRAM STRUCTURE





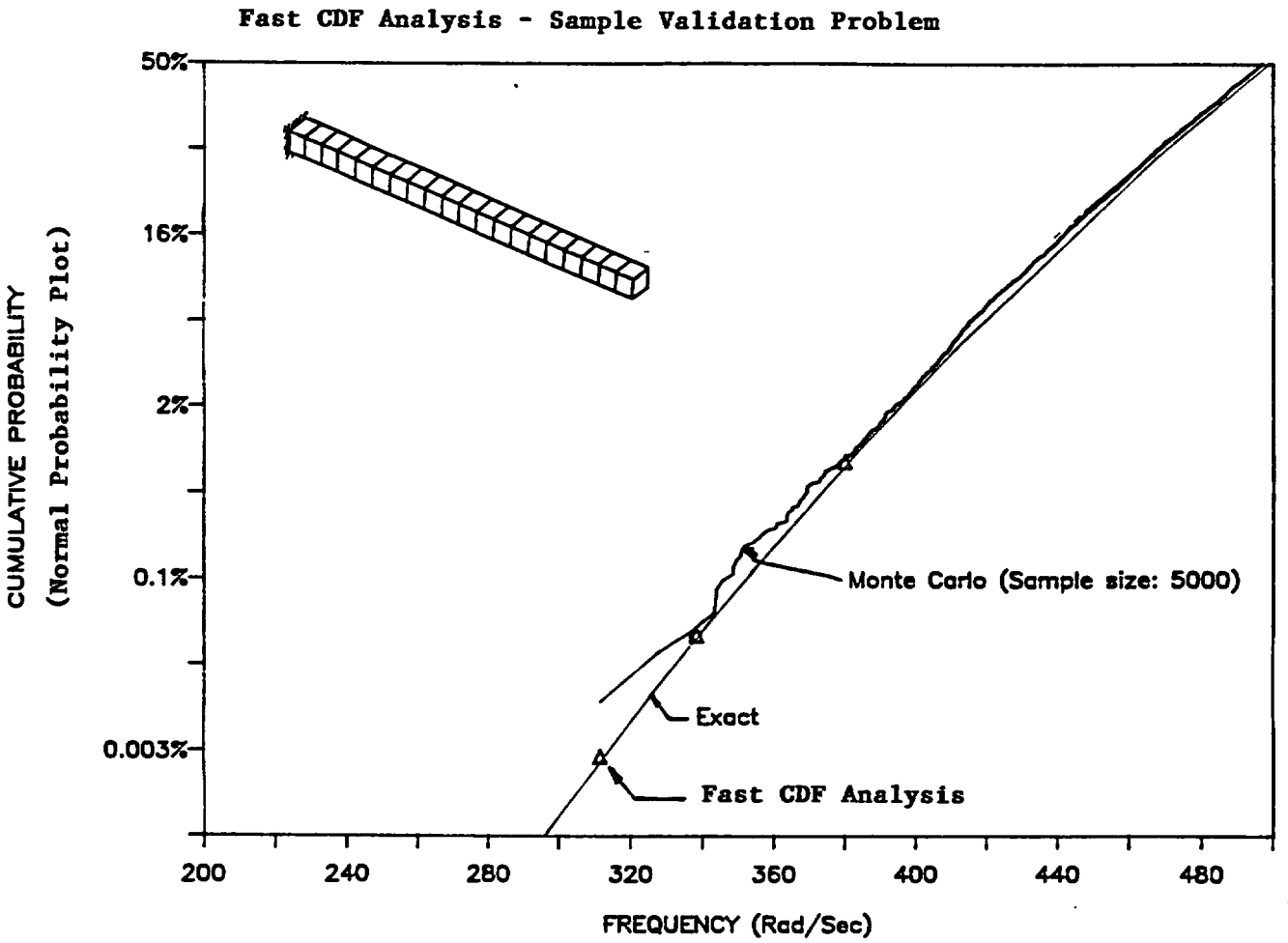

Fast CDF Analysis - Sample Validation Problem
CUMULATIVE PROBABILITY
(Normal Probability Plot)
50%
16%
2%
0.1%
0.003%
Monte Carlo (Sample size: 5000)
Exact
Fast CDF Analysis
200
240
280
320
360
400
440
480
FREQUENCY (Rad/Sec)

FIGURE 1. EBS PERFORMANCE ASSESSMENT PROGRAM STRUCTURE

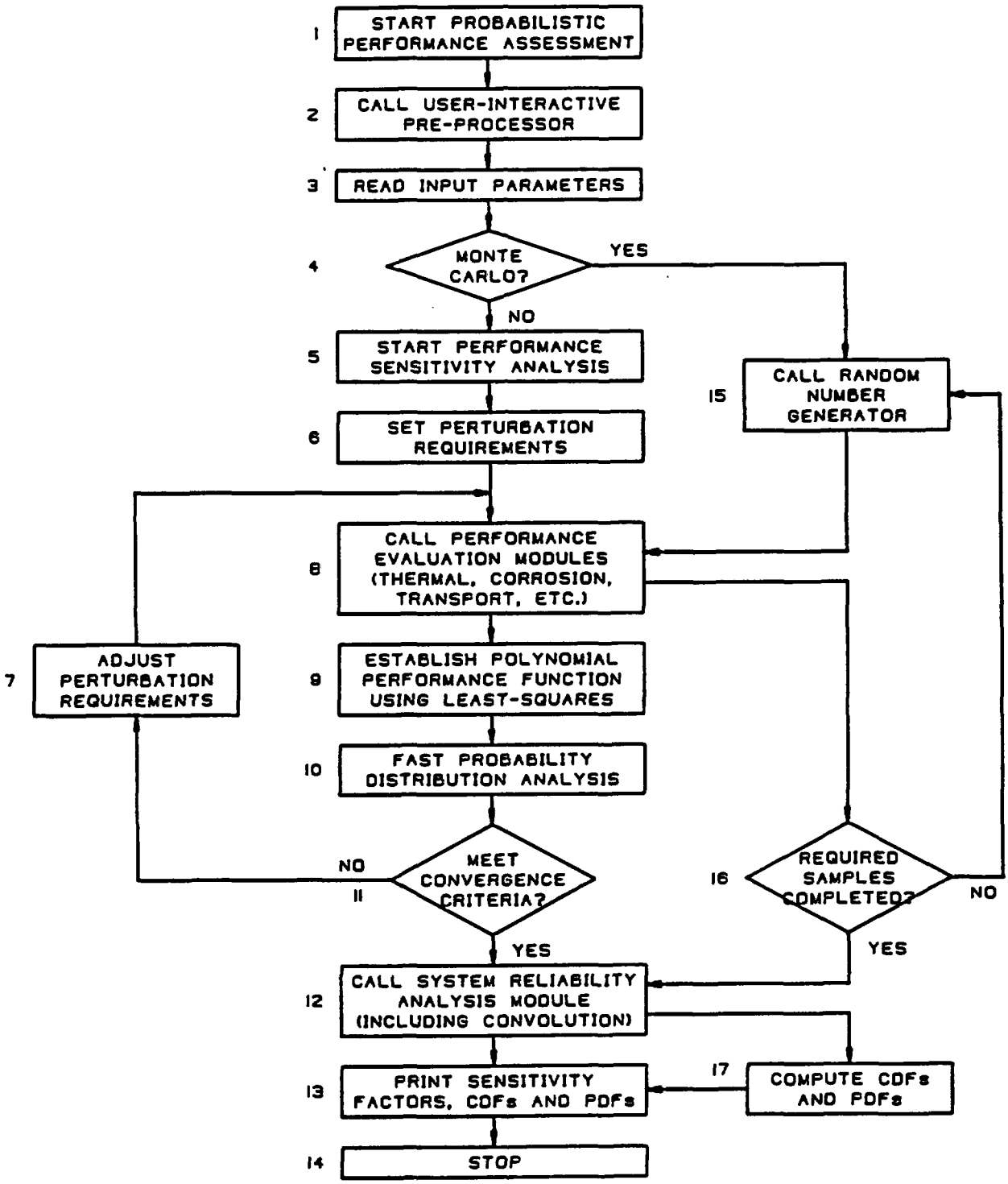
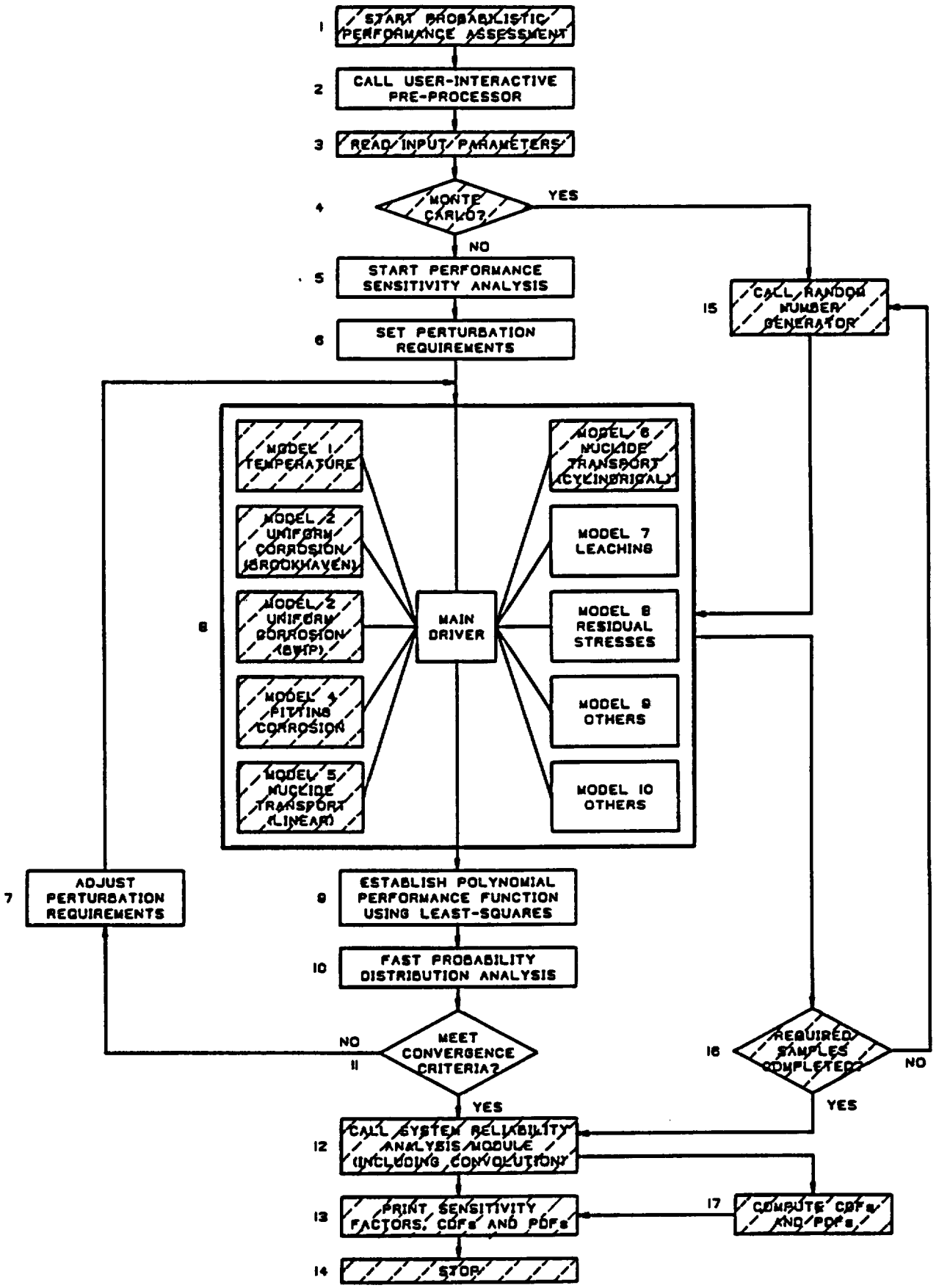


FIGURE 2. EBS PERFORMANCE ASSESSMENT PROGRAM STRUCTURE WITH DETAILED PROCESS MODULES (SHADED BLOCKS INDICATE CONVO MODULES)



IMPLEMENTATION PLAN

1. Personnel

CNWRA	Description of Involvement	Level of Involvement Current to 9/30/88	Level of Involvement 9/30-11/30
J. Wu	Principal staff to acquire CONVO technology, develop advance level probabilistic program and interact with other modelers.	65%	90%
P. Nair	To integrate and review models for incorporation	5-10%	5-10%
H. Cleary (to be hired)	Review and/or develop corrosion and material models	10%	10%
Geochemist (to be hired)	Review and/or develop geochemistry models Tuff environment	10%	10%

Rough Order of Magnitude $125K
(including travel and computer cost)

Subcontractor

System Support Inc.

Name	Description of Involvement	Level of Involvement Current to 9/30/88
R. Moler	Assist in transfer of technology on CONVO models, develop or enhance current models to support Center's Probabilistic Program	approx. 50%
G. Fuller	Assist in transfer of CONVO Code to Center. Work with Dr. Wu to facilitate new Code development.	approx. 50%

Rough Order of Magnitude $70K
(including travel and computer cost)

Consultant

Ken Stephens	To review overall compliance determination activity in the past with Center staff.

Rough Order of Magnitude $5K

2. Schedule

The work will start on approval of the Ops Plan modification. The following is the expected duration of the proposal activities.

	a.	Transfer of CONVO Code	1 month
	b.	Evaluation of CONVO	2 months
*	c.	Development of (i) new framework (preliminary)	4 months
		(ii) Tuff modules	6 months

*Milestone C will continue into FY89 and beyond as new information on corrosion, geochemistry, DOE designs, etc., become available.