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

NUCLEAR WASTE TECHNICAL REVIEW BOARD
FULL BOARD MEETING

SUBJECT: FOCUSED MGDS DESIGN

PRESENTER: DEAN STUCKER

PRESENTER'S TITLE AND ORGANIZATION: CHIEF, FIELD ENGINEERING BRANCH
ENGINEERING AND DEVELOPMENT DIVISION

PRESENTER'S TELEPHONE NUMBER: (702) 794-7275

ARLINGTON, VIRGINIA
JANUARY 11,1994

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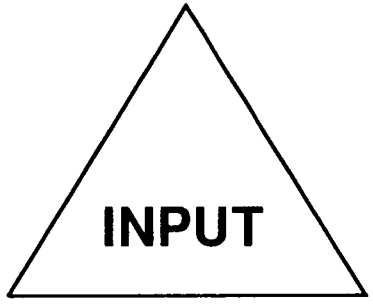
Discussion Points

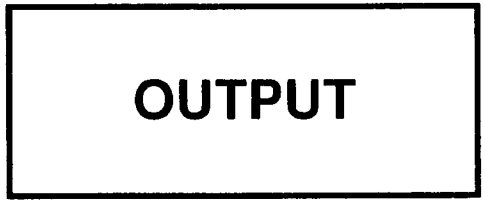
- Current design approach
- Need for change
- New ACD strategy
- Implementation

Current Design Approach

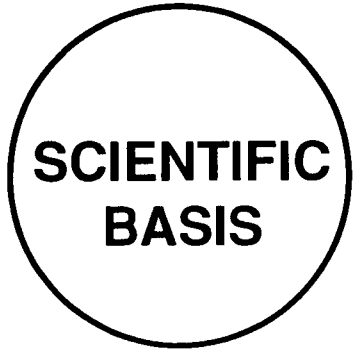
Key Activities Of The Design Process



Requirements, Criteria,
Constraints,
Specifications

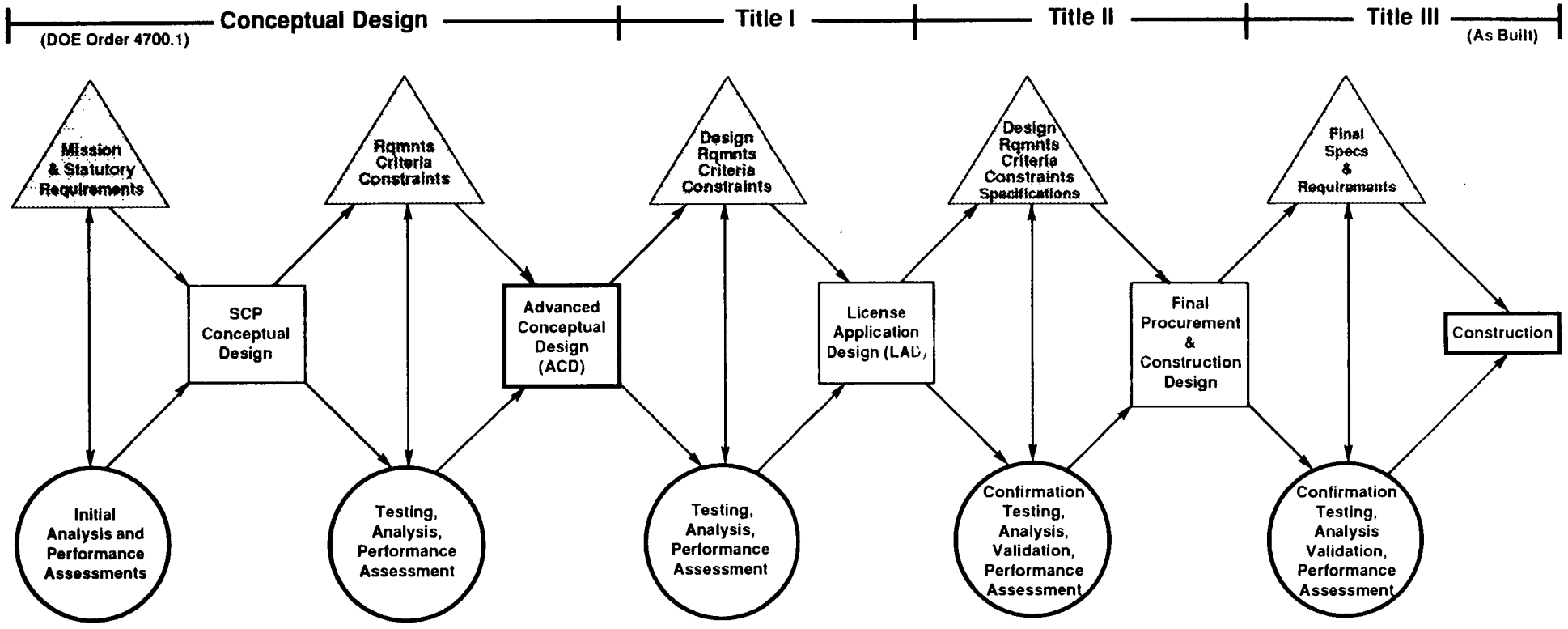


Concepts, Architecture,
Configuration



Testing, Modeling, PA,
Analysis

Current Design Approach
Phases

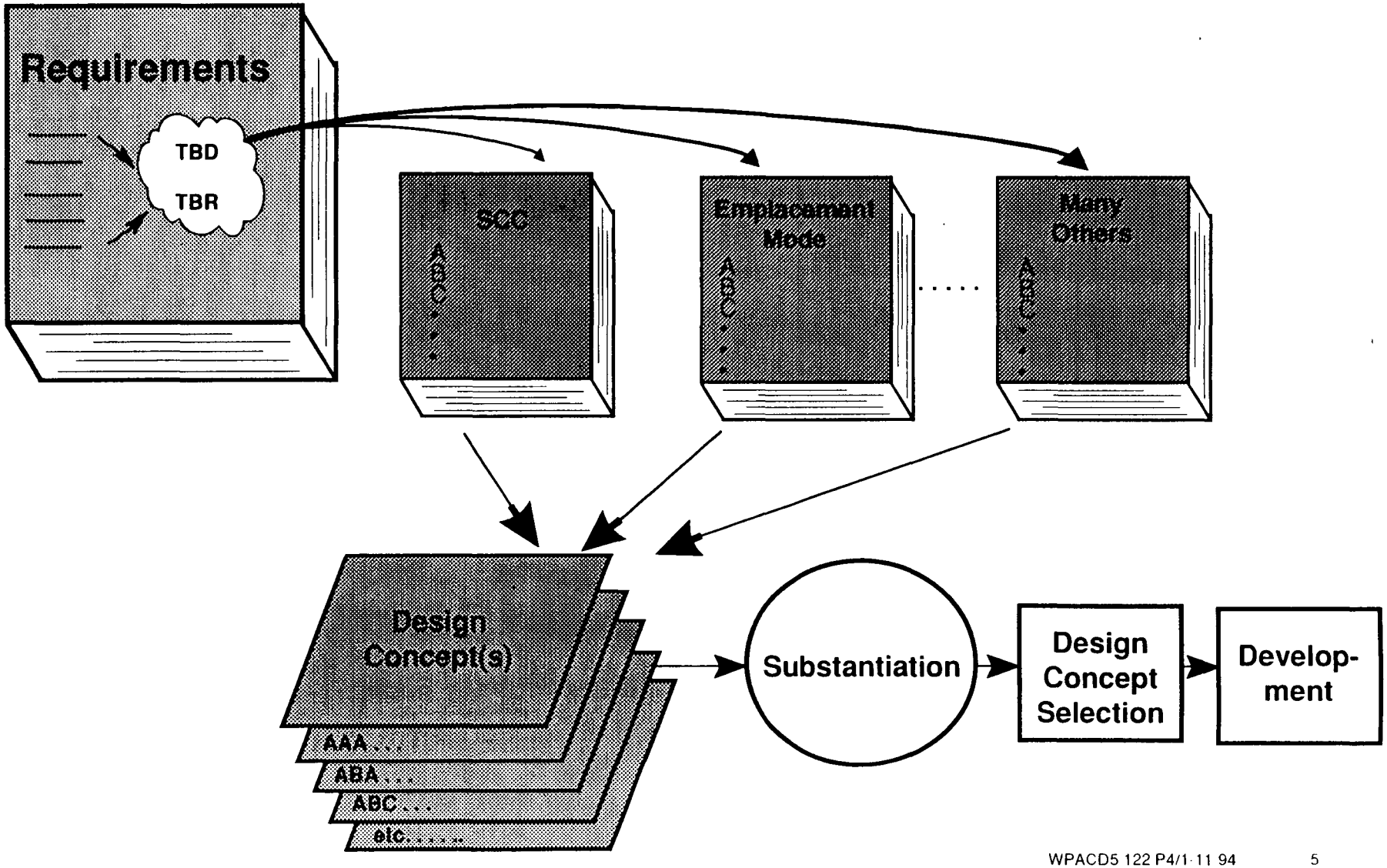


Current Design Approach

- Assumes all needed resources are available
- Is based on multiple design concepts that are developed in parallel until scientific basis is established and validated
- Low "Management Risk" - because architecture decisions are based on scientific basis
- One concept will be selected at the end of ACD

Current Design Approach

Example



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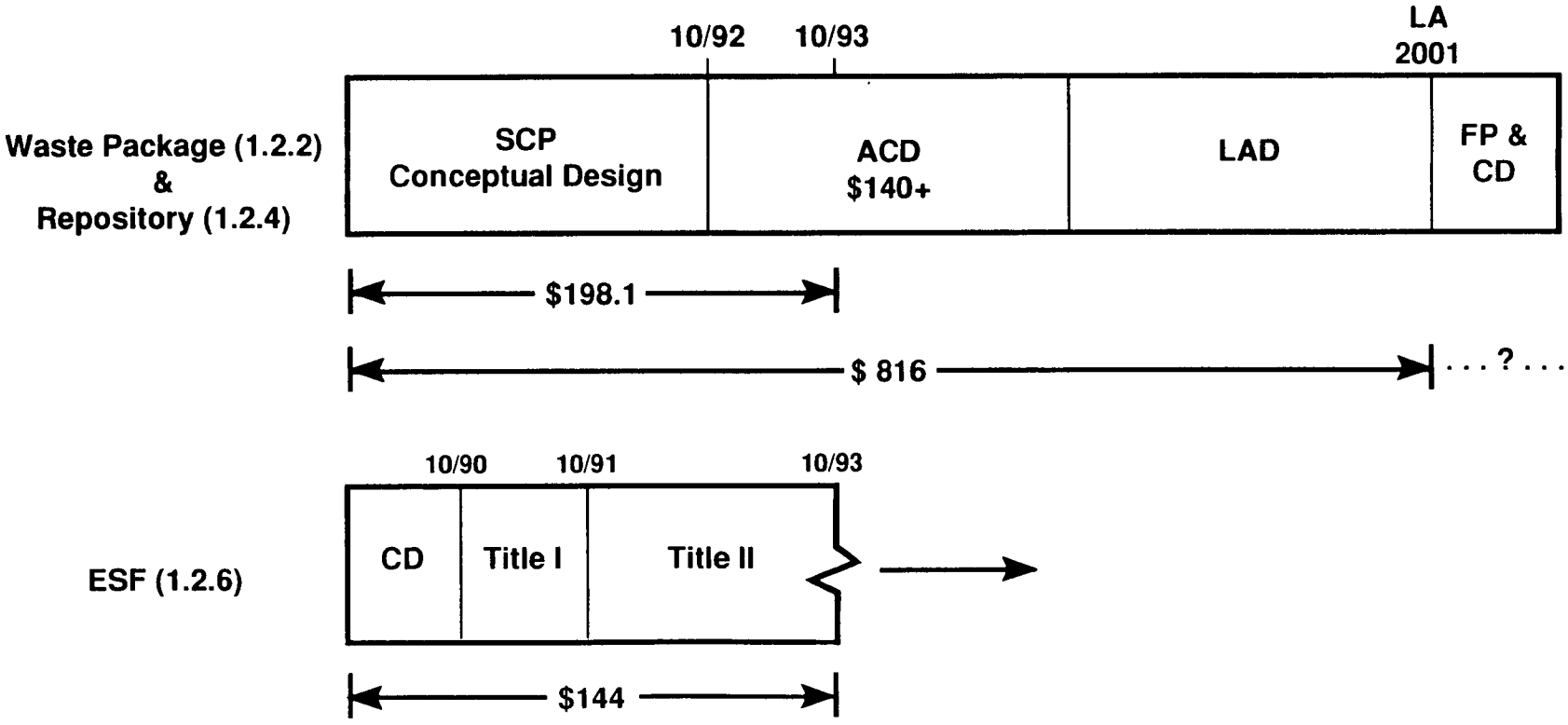
Need For Change

- **Pending changes in program technical baseline**
  - **MPC**
- **Limited resources**
  - **Design funding shortfalls in recent years**
  - **Anticipated funding limitations in the future**
- **Need for SCP-CDR to be replaced to reflect new requirements (technical and programmatic) and to support:**
  - **KD Milestones**
  - **TSLCC**
  - **Site Suitability Interim Evaluation**
  - **EIS**
  - **License Application**

Need For Change

Current MGDS Development Budgets ($M)

(Heavy Emphasis on Establishing/Validating Scientific Basis Prior to Design Decisions)



Need For Change

FY 1994 Budget ($M)

	WBS 1.2.2 Waste Package	WBS 1.2.4 Repository	Total
• Design input/output (M&O)	2.1	2.4	4.5
• Scientific basis (labs)	8.4	2.5	10.9
Total	10.5	4.9	15.4

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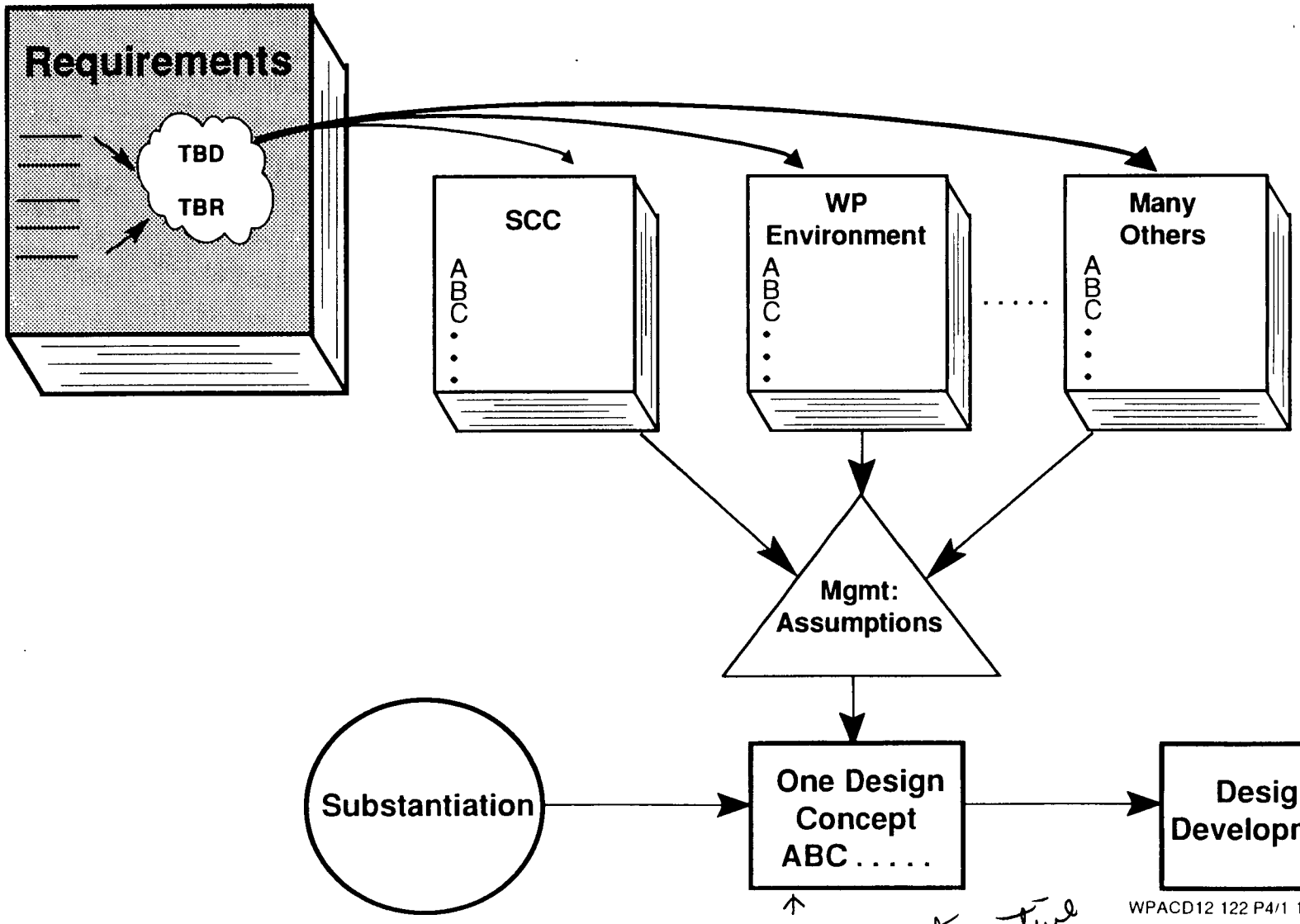
New ACD Strategy

- Develop a Repository Design Concept which fulfills the MGDS Technical and Programmatic requirements
- Adopt a design approach which uses management assumptions based on available information and judgement now
- Substantiate the assumptions as the design is developed
- One concept at the end of the ACD with detailed cost estimate to support:
  - KD Milestones
  - TSLCC
  - Site Suitability Interim Evaluation
  - EIS
  - License Application

New ACD Strategy
Example

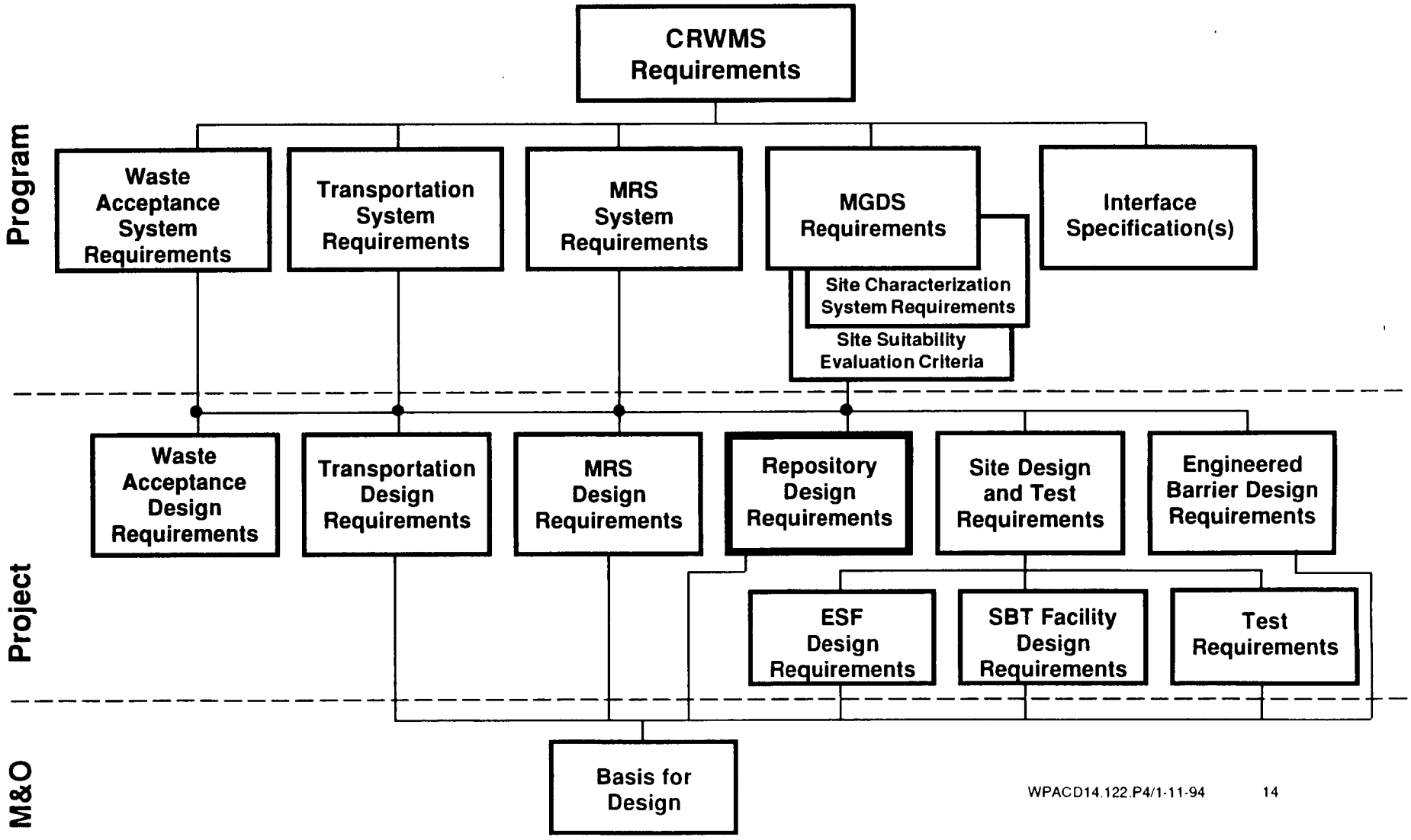


New ACD Strategy

- The Technical Requirements Documents currently list numerous TBD/TBR
- Management assumptions will be documented and marked TBV in the BFD
- After scientific/engineering substantiation of assumptions the Requirements Documents will be revised to eliminate TBD and TBR

New ACD Strategy

Requirements Document Hierarchy



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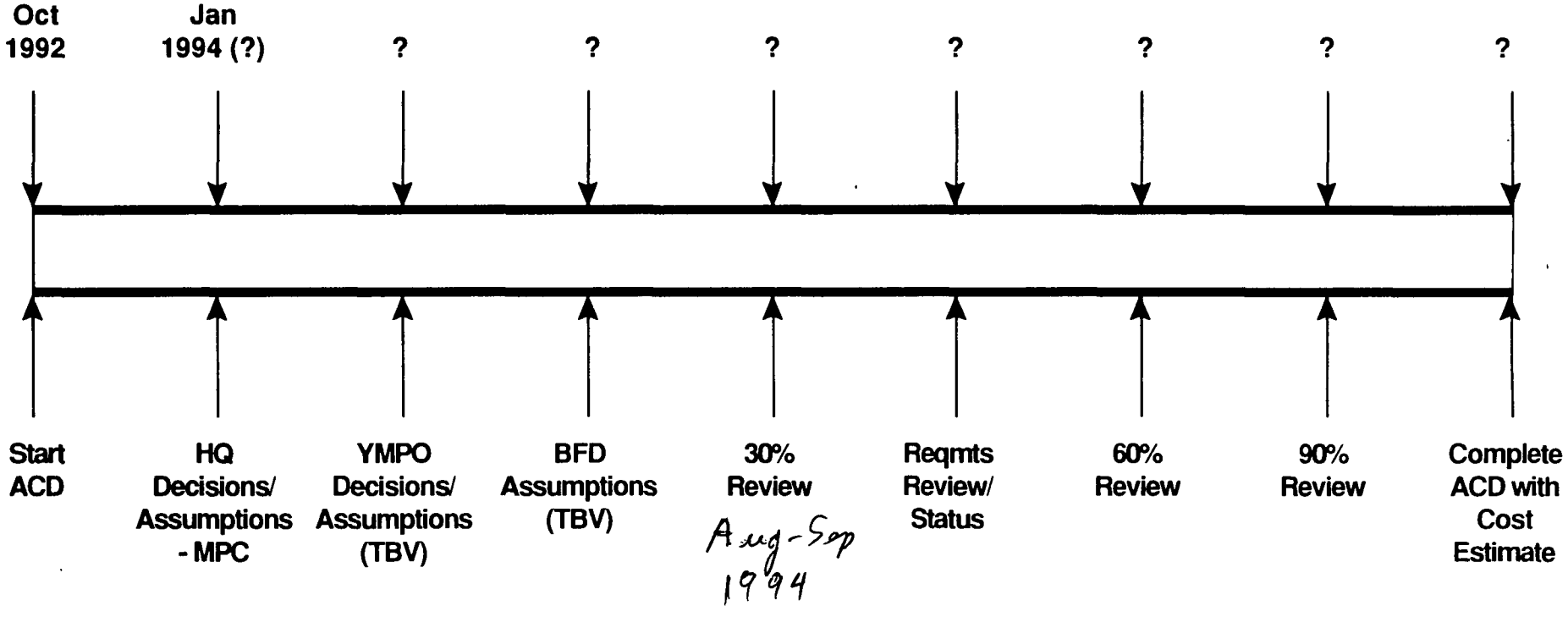
Implementation

- Conduct strategy briefings on focused design approach
- Identify the design assumptions needed
  - Program (MGDS Requirements)
  - YMPO (design requirements documents)
  - M&O (basis for design)
- Develop "new" ACD schedule
- Conduct focused workshops for each design decision/ assumption to document rationale
- Develop "validation" engineering/scientific work plans for each assumption
- Initiate focused ACD activities utilizing the design decisions/assumptions

Implementation

- **Conduct reviews**
  - **Design reviews (30%, 60%, 90%)**
  - **Requirements reviews (TBV status)**
  - **Pier reviews (for TBV if needed)**

Implementation Schedule



Implementation

Examples of Assumtions (TBV)

- Number/size/weight for SNF and HLW waste packages
- Thermal loading regime
- Emplacement mode
- Retrievability strategy
- Waste package performance objectives
- Backfill
- Fuel rod consolidation

Implementation

Alternatives to major design features
10 CFR 60.21(c)(1)(ii)(D)

"(ii) The assessment shall contain:

(D) The effectiveness of engineered and natural barriers, including barriers that may not be themselves a part of the geologic repository operations area, against the release of radioactive material to the environment. The analysis shall also include a comparative evaluation of alternatives to the major design features that are important to waste isolation, with particular attention to the alternatives that would provide longer radionuclide containment and isolation."