

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

NUCLEAR WASTE TECHNICAL REVIEW BOARD

**SUBJECT: OVERVIEW OF THE REVISED
YUCCA MOUNTAIN PROJECT**

PRESENTER: STEPHAN J. BROCOUM

**PRESENTER'S TITLE
AND ORGANIZATION: ASSISTANT MANAGER FOR SUITABILITY AND LICENSING
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT OFFICE
LAS VEGAS, NEVADA**

TELEPHONE NUMBER: (702) 295-9611

**AUSTIN, TEXAS
APRIL 30 - MAY 1, 1996**

Topics to be Discussed

- **Background leading to Revised Program Plan**
- **Rationale for Revised Program Plan**
- **Integrated planning process**
- **Project Integrated Safety Assessment**
- **Summary of Program element focus and changes**

Background

- **The SCP philosophy was to plan a comprehensive program to account for**
 - **Uncertainties in site features and processes**
 - **The absence of a robust Total System Performance Assessment (TSPA)**
- **The Project revised this approach in the 1994 Program Plan recognizing**
 - **Enhanced understanding of site processes and features and refined TSPAs**
 - **Limited resources**

Background

(Continued)

- **The Program Plan of 1994 reflected**
 - **Emphasis on data synthesis and documentation to better focus data collection**
 - **Enhanced integration through consolidation of the Labs and other technical contractors**
 - **Milestones to demonstrate clear and measurable progress in site suitability and licensing**

Rationale for Revising the 1994 Program Plan

- **Programmatic needs and Congressional actions required the Yucca Mountain Project to be refocused**
 - **Technical rational**
 - » Existing data and data syntheses allow for a reduction in the overall scope
 - » Better understanding exists for what information is necessary to meet Project objectives
 - **Regulatory initiatives**
 - » Need to update regulatory framework to reflect current understanding and Congressional intent
 - **Project efficiencies**
 - » Need to achieve greater efficiencies, a near-term viability assessment, and License Application

Technical Rationale

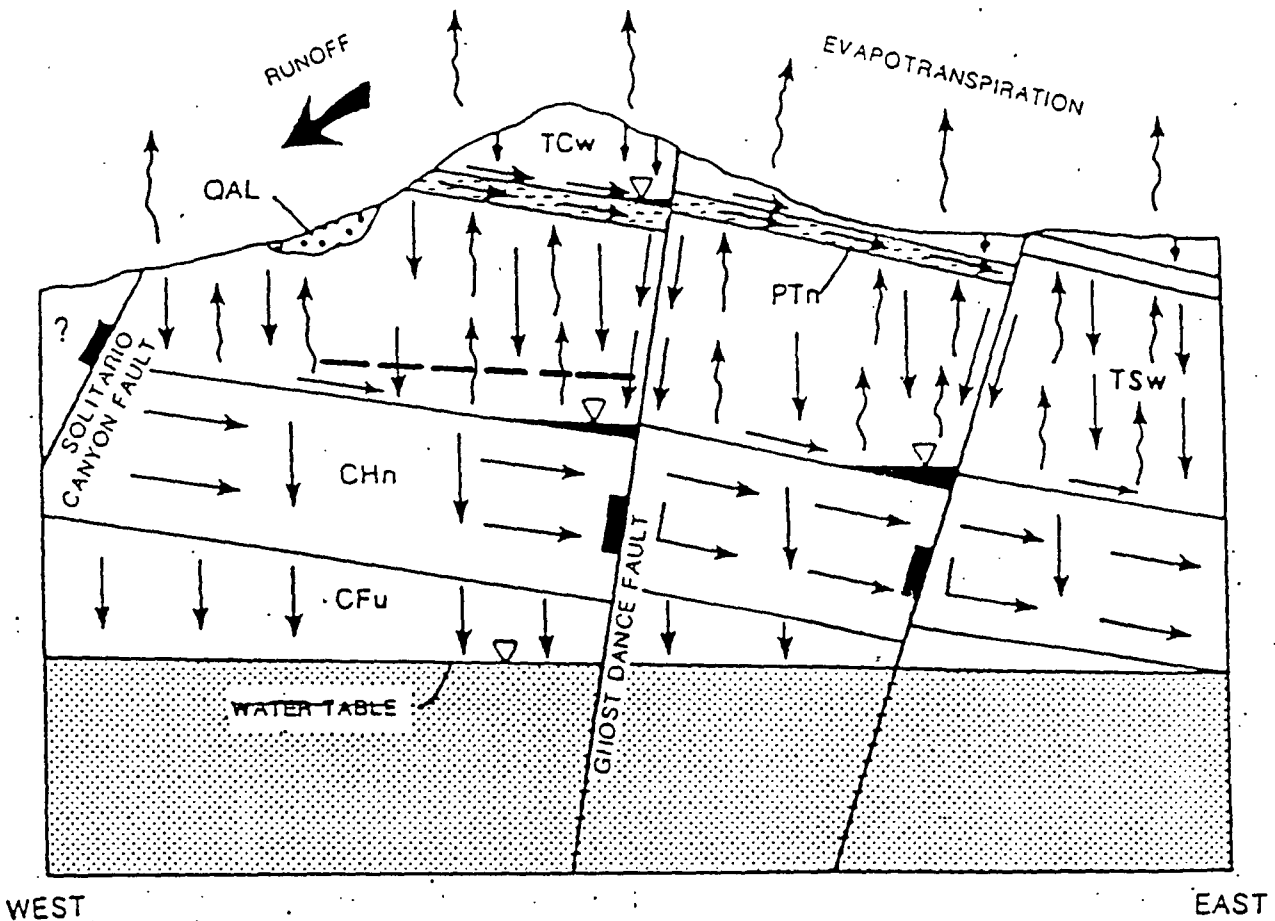
- **Investigations and synthesis of technical data have led to a better understanding of site conditions and processes**
 - **No major unexpected conditions have been encountered since site characterization began in 1986**
 - **Tunneling and testing are confirming EA/SCP hypotheses on site conditions**
- **The Waste Isolation Strategy aids in focusing the testing program on most critical testing to demonstrate pre- and postclosure safety of repository**
 - **Builds on 15 years of data collection**
 - **Supported in realistically conservative performance assessments**

Technical Rationale

(Continued)

- **Significant progress over the past 18 months**
 - **Performance assessments demonstrated an increased confidence that Yucca Mountain would contain and isolate radioactive waste under a reasonable EPA standard**
 - » **Disruptive tectonic events are unlikely to adversely impact performance**
 - » **An improved site and engineering database provides more realistic bounding conditions**
 - **Site hydrologic models indicate groundwater flux is limited at the repository horizon and that infiltration may be diverted laterally away from the repository horizon and vertically along fracture zones**
 - **Underground observations have increased our confidence in constructability and existing geologic characteristics**

EA/SCP Cross Section of Yucca Mountain (1984)

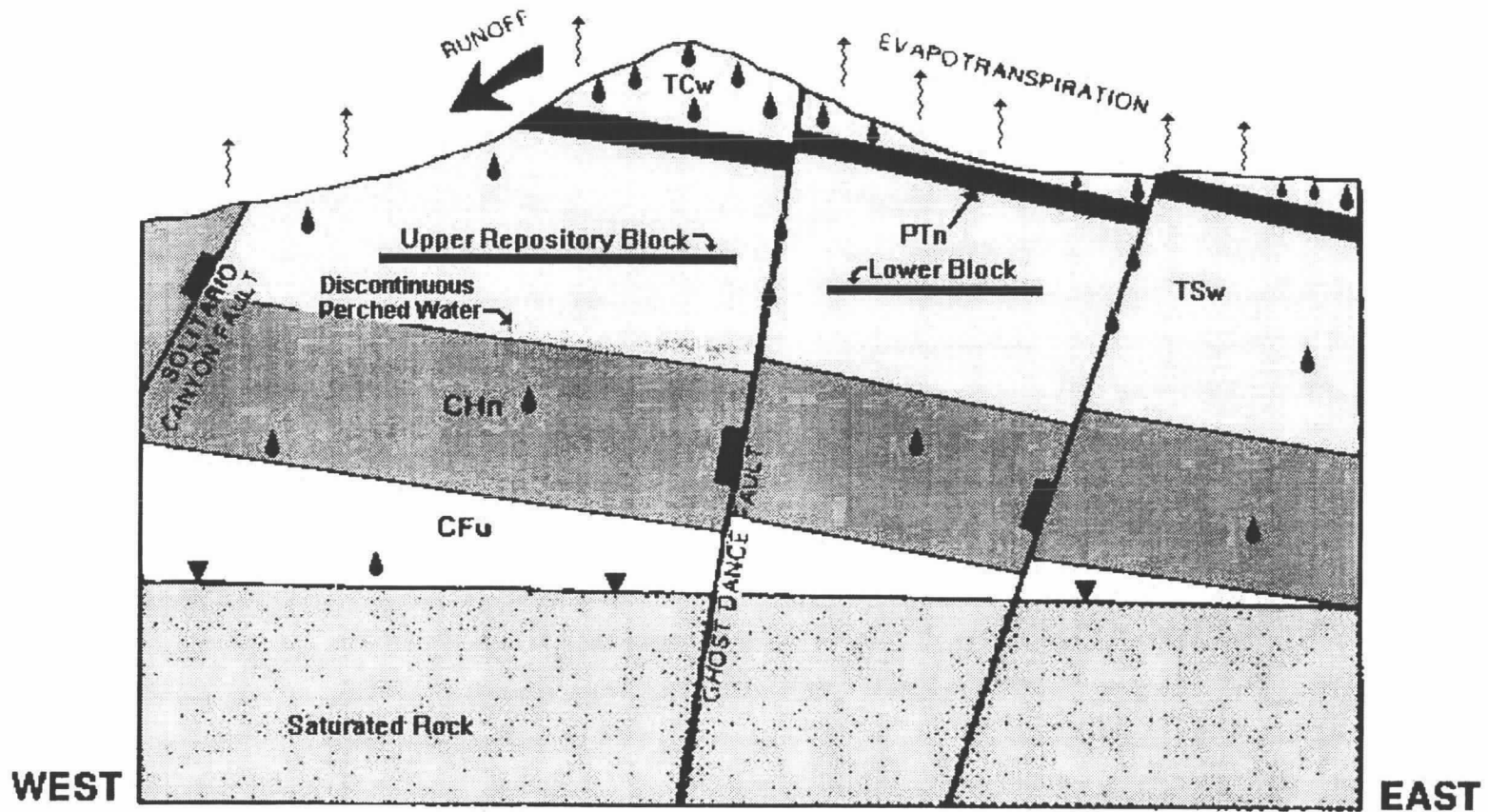


- QAL ALLUVIUM
- TCw TIVA CANYON WELDED UNIT
- PTn PAINTBRUSH NONWELDED UNIT
- TSw TOPOPAH SPRING WELDED UNIT
- CHn CALICO HILLS NONWELDED UNIT
- CFu CRATER FLATS (Undifferentiated) UNIT

- LIQUID-WATER FLOW
- WATER-VAPOR FLOW
- NORMAL FAULT
- WATER TABLE
- POSSIBLE PERCHED-WATER ZONE
- SATURATED ZONE

? UNIT UNCERTAIN

CONCEPTUAL MOISTURE FLOW SYSTEM



- TCw Tiva Canyon Welded Unit
- PTn Paintbrush Nonwelded Unit
- TSw Topopah Spring Welded Unit
- CHn Calico Hills Nonwelded Unit
- CFu Crater Flats (Undifferentiated) Unit

- Liquid Water Flow
- Water-Vapor Flow
- Normal Fault
- Water Table

Regulatory Initiatives

- **The regulatory framework needs to be updated to ensure a clear focus on health and safety aspects at Yucca Mountain**

Regulatory Initiatives

(Continued)

- **In response, DOE has taken the following actions:**
 - **Recommendations to the EPA on a revised standard**
 - » **Clearly define policy and technical considerations**
 - » **Provide appropriate degrees of conservatism to protect public health and safety**
 - **Plan to propose changes to 10CFR960 that focus on system performance**
 - **Planning to discuss with the NRC**
 - » **Possible changes to 10CFR60**
 - » **Process of regulatory reviews**

DOE Recommendations to EPA

- **DOE recommends a site-specific standard**
 - **Time frame for compliance**
 - » 10,000 years
 - **Exposure Limit**
 - » Risk limit based on 10^{-4} to 10^{-5} fatal cancers per year
 - » Dose limit on the order of 100 mrem/year
 - **Define reference biosphere**
 - » Critical population based on current characteristics

Potential 10CFR960 Revisions

- **Streamline compliance process to focus on aspects most important to protect health and safety at Yucca Mountain**
- **Focus on system performance guideline approach**
 - **Postclosure systems guideline**
 - **Preclosure radiological safety**

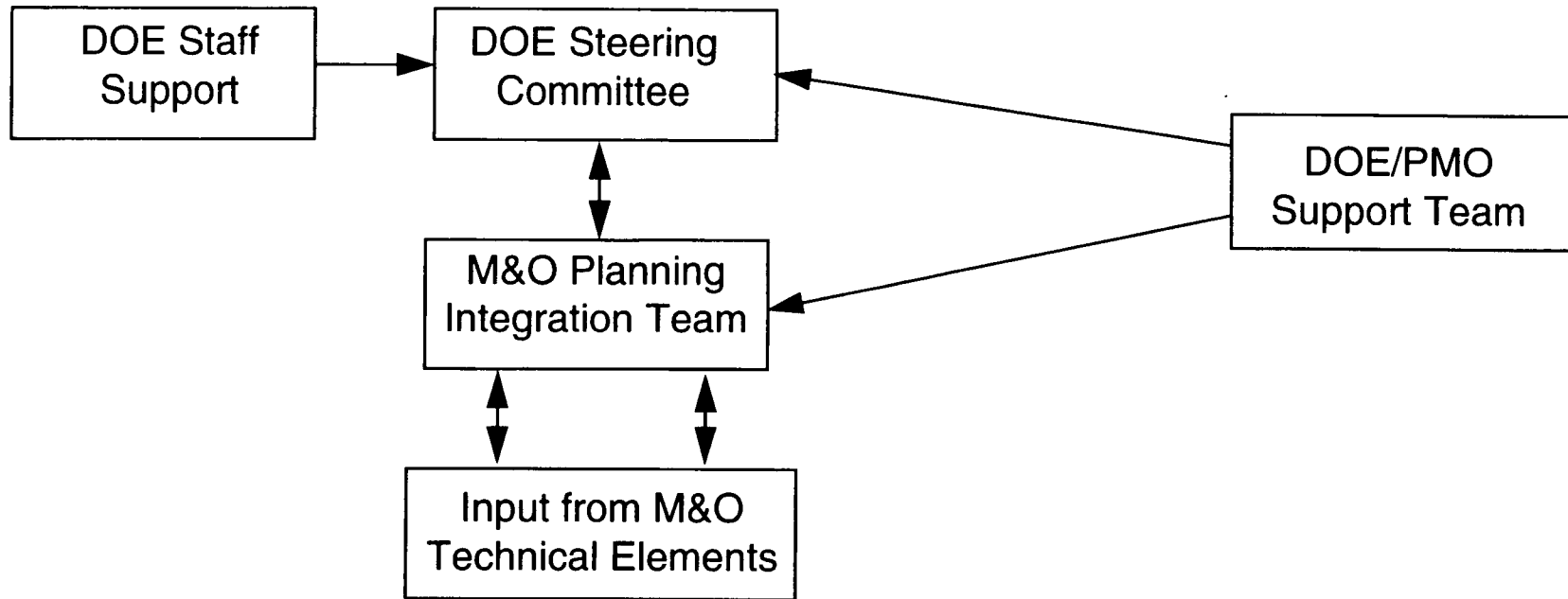
Suggestions for NRC on 10CFR60

- **DOE is considering making suggestions for modifications to 10CFR60**
 - **Focus on total system performance**
- **DOE philosophy for interactions with NRC**
 - **Focus on issues significant to performance**
 - **Request timely feedback on regulatory sufficiency**
 - **Viability Assessment is not a licensing document**
 - **Ensure actions planned are sufficient for developing a docketable License Application**

Project Management Efficiency

- **As part of the effort to streamline project management, a revised planning process was initiated that focuses on enhanced integration**
- **This revised planning process is iterative and interactive between DOE and its contractors and among all technical disciplines**
 - **Provides detailed guidance from DOE to its contractors**
 - **Ensures proactive DOE management involvement**
 - **Ensures that all upper-level activities and milestones are logically tied and the lower-level activities can be directly related to the upper-level milestones**

YMSCO Integrated Planning Process

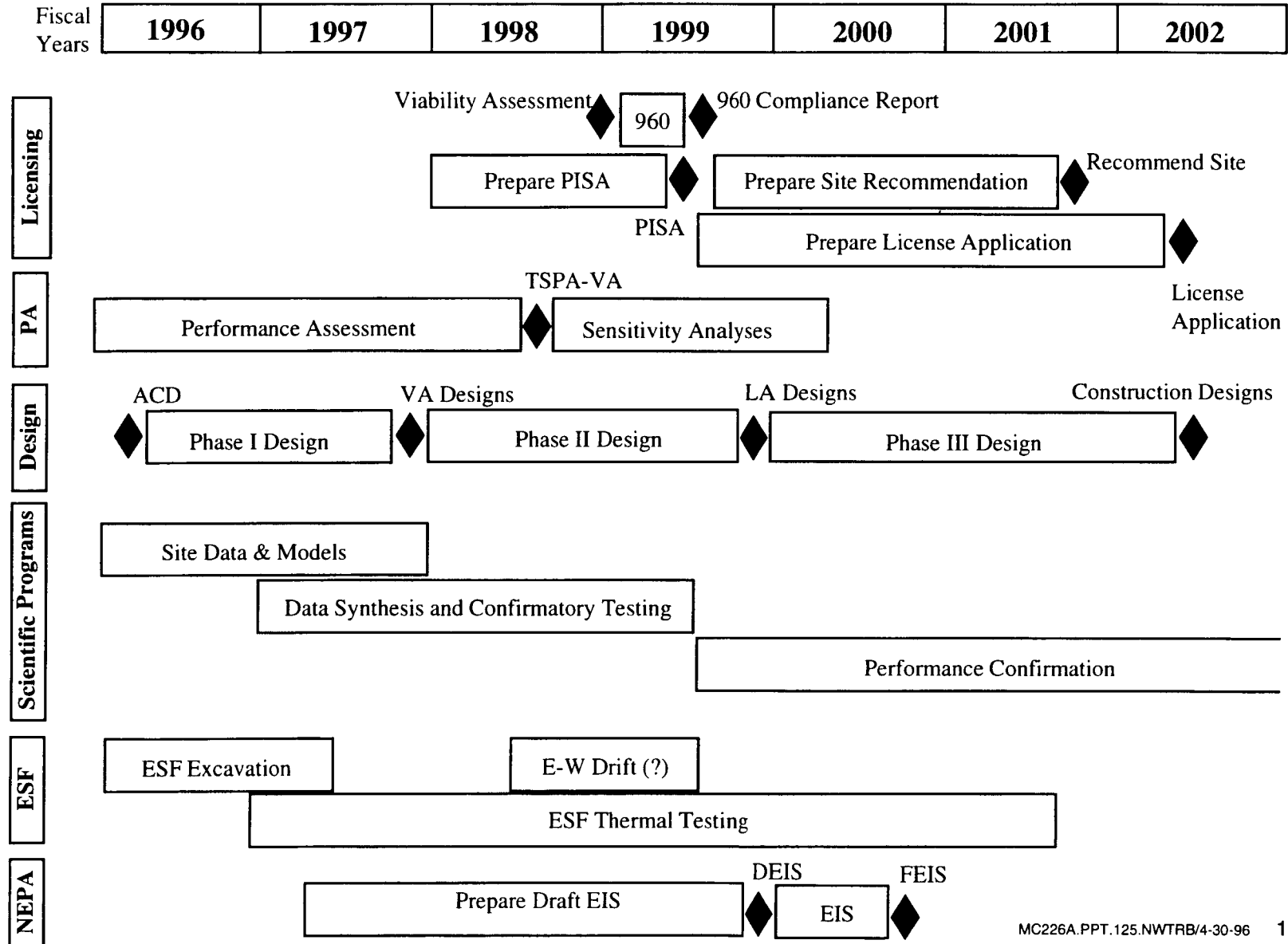


- **DOE steering committee provides planning guidance and Program Summary Schedule**
- **M&O provides detailed annual and long-range planning that is resource-loaded for review and acceptance by DOE**
- **DOE/PMO support team provides support to Steering Committee and guidance to M&O Planning Integration Team**

Revised Program Plan

- **The Revised Program Plan**
 - **Identifies the Project Integrated Safety Assessment (PISA) document that integrates technical elements of the program and minimizes redundancy**
 - **Focuses testing on the elements of the Waste Isolation Strategy and key public health and safety issues**
 - **Reflects a streamlined design process**
 - **Reflects an interactive performance assessment**
 - **Emphasizes technical data management and data integration**
 - **Incorporates an assessment of the viability in 1998, a site recommendation in 2001, submittal of an LA in 2002, and waste acceptance in 2010 under a constrained budget**

Summary Schedule



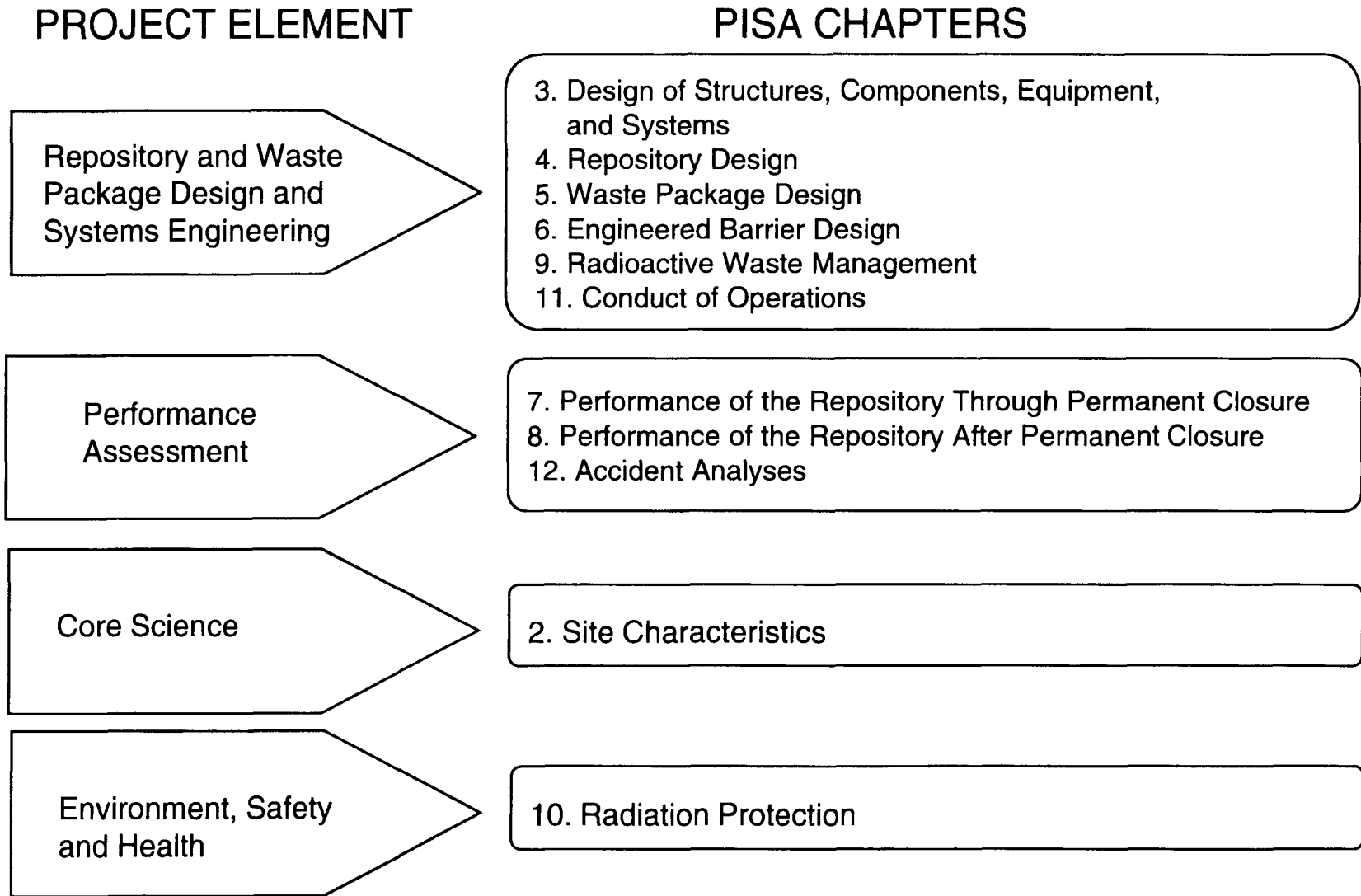
Approach to Integrating Technical Information, Analyses and Conclusions

- **Project Integrated Safety Assessment is a single document that integrates and coordinates the elements of the technical program**
- **Focuses on technical data management and information systems**
- **Uses Performance Assessment as a tool for integration**

Project Integrated Safety Assessment

- **Consistent with the elements of the Waste Isolation Strategy and incorporates TSPA**
- **Generally follows format of a Safety Analysis Report**
- **Produced by the technical organizations and coordinated by the regulatory organization**
- **Common data sets for VA, NEPA, SR, LA**
- **Minimizes excessive review cycles, inconsistencies, and redundancies**
- **Integrates major critical activities into a single document**
- **Establishes basis for 10CFR960 compliance document and License Application**
- **Serves as the basis for proceeding toward site recommendation and a License Application**

Development of the PISA



Technical Data Management

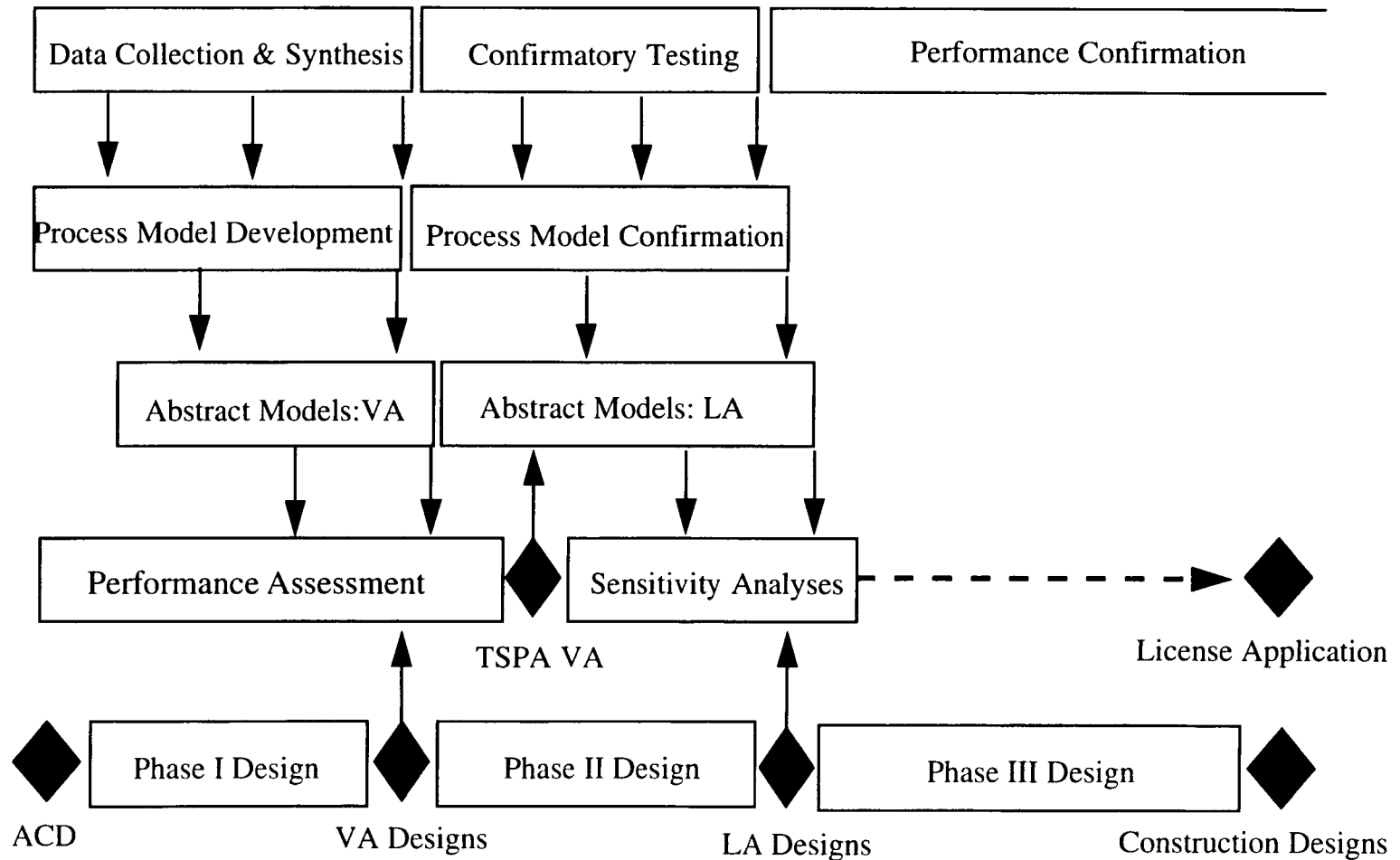
- **In response to the shift toward data synthesis and documentation, the emphasis on data integration, and the use of a common database (PISA), greater focus is placed on data management**
 - **Availability of latest data sets and synthesis for use in**
 - » **model development**
 - » **performance assessment**
 - » **design**
 - **Data integration and proper use**
 - » **data sets are tagged to track their use**
 - **More readily available use of referenced material**

Licensing Support System

- **10 CFR Part 2, Subpart J, requires a computer-based information management system**
- **NRC, DOE, and Affected Units of Government are working together to clearly define system expectations**
- **DOE records systems have been modified to assure that records can be easily converted to Licensing Support System format requirements**

Integration Through Performance Assessment

Fiscal Years	1996	1997	1998	1999	2000	2001	2002
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Performance Assessment

- **A Total System Performance Assessment will be completed in support of the 1998 viability assessment. Subsequent TSPA iterations or detailed sensitivity analyses will be conducted for the License Application**
 - **A phased review process with four major activities is being developed:**
 - **TSPA Orientation**
 - **Abstract PA Model Review**
 - **Process Model Review**
 - **TSPA-1998 Review**

Summary of Revised Program

- **Scientific Programs strategy, focus and schedule are based on addressing priority data needs, information requirements, and key interface issues for:**
 - **Site characterization activities**
 - **Moving to performance confirmation in 1998**
- **Design effort completed in three phases through LA and into construction**
 - **Greater focus on interface inputs and recognition of user needs**
 - **Minimizing number of discrete design reports**
- **Restart the EIS process in 1997 that will**
 - **Utilize a common data set from Site Characterization and design**
 - **Support PISA and TSPA**