

MINUTES  
U.S. NUCLEAR REGULATORY COMMISSION/U.S. DEPARTMENT OF ENERGY  
QUARTERLY MANAGEMENT MEETING  
MAY 8, 1996

On May 8, 1996, staff from the U.S. Nuclear Regulatory Commission, Division of Waste Management met with representatives of the U.S. Department of Energy (DOE), Office of Civilian Radioactive Waste Management (OCRWM) for a quarterly management meeting. The meeting was held at DOE headquarters in Washington, D.C. with a video conference connection to the Yucca Mountain Site Characterization Office in Las Vegas, Nevada. Other attendees represented the State of Nevada; the Environmental Protection Agency; the United States Nuclear Waste Technical Review Board; the Center for Nuclear Waste Regulatory Analysis and DOE contractors. Attachment 1 provides the meeting agenda and Attachment 2 lists the attendees.

**Opening Remarks:**

The meeting was opened with comments by Margaret Federline, Acting Director, Division of Waste Management, U.S. Nuclear Regulatory Commission. The NRC thanked DOE for their assistance in obtaining a large rock sample from the Exploratory Studies Facility (ESF) for the Center for Nuclear Waste Regulatory Analyses (CNWRA) studies. NRC also thanked DOE for its prompt response in providing the two documents on thermal testing. With regard to recent Appendix 7 visits, NRC expressed the opinion that the efforts to define clear objectives for all NRC/DOE interactions has resulted in the recent Appendix 7 visits being more focused and productive. DOE agreed with that assessment. The NRC provided a list of activities since January 19, 1996 management meeting (See Attachment 3) and a list of documents expected to be issued in the next six months (See Attachment 4).

**Program Status:**

o Budget/Legislative Update

DOE indicated it has put forward a request for 400M in the FY97 budget proposal, but they have received no feedback on the request, to date. With regard to the legislation (SB1271 and HR1020), the action currently resides with Congress, therefore, DOE is waiting for information. However, the Program Plan is being prepared independent of these bills in keeping with the FY97 budget proposal.

NRC also requested an update on the status of revisions to DOE's Waste Isolation and Containment Strategy (WICS) and a discussion of its impact on the Program. DOE indicated that the summary is expected to be completed

for the June Technical Review Board (TRB) meeting. However, DOE did not expect the document to be completed until the end of the summer. With regard to the Program, DOE indicated that they don't expect the higher level strategy, as currently defined, to change. With regard to the lower level strategies, DOE doesn't expect significant change. DOE agreed to provide a small portion of the document which had received the management approval (See Attachment 5).

- o Program Plan

The presentation on DOE's Program Plan was originally given at the TRB meeting of May 1, 1996. Since most of the attendees at the management meeting had heard the presentation at the TRB, Dr. Brocoum gave an abbreviated summary of the Program Plan. The slides used for this presentation are provided as Attachment 6.

#### Regulatory and Licensing:

- o Perspectives of Pre-Licensing Interactions with the NRC

DOE's perspectives on pre-licensing interactions emphasized a focus on potential licensing issues that are significant to repository performance with the goal of ensuring that actions do not preclude the ability to obtain a license in the future; achieve resolution of procedural and methodology issues; and develop a common understanding where agencies agree and differ on performance issues. The NRC expressed agreement with this statement. Another expectation for pre-licensing was to encourage NRC to provide timely feedback on regulatory sufficiency on our submissions in the context of licensing requirements. In order for the NRC to provide timely feedback on submittals, NRC and DOE agreed to continue to share schedules for document transmittals. And while it is understood that true sufficiency will be determined at hearings, DOE is interested in staff evaluations of sufficiency for issue closure from a technical perspective.

DOE's presentation continued with a reiteration of continuing concerns regarding the implementation of NRC's Key Technical Issues (KTI) Approach and a short overview of DOE approach during pre-licensing. With regard to the pilot program suggested by NRC during the January 19, 1996 management meeting, DOE recommended Volcanism, Climatology, or regional Hydrology as candidates for the pilot program. The NRC will evaluate DOE's proposal and will provide its reaction at the next management meeting. Discussions will continue to reach agreement on candidates for the pilot program. In addition, the NRC noted that climatology was not on our list of KTI's, except as a small part of the Infiltration KTI. A copy of this

presentation is provided as Attachment 7.

- o NRC Status Update on Commission Activities

At DOE's request, NRC summarized the April 4, 1996 briefing to the Commission entitled "High-Level Waste Management Program Overview and Program Highlights." A copy of this presentation is provided as Attachment 8.

- o Update on EPA Standard/Revision to Part 60

NRC provided DOE with the status of NRC's interactions with DOE and the resulting revisions to Part 60. The main point being that EPA is expected to send the draft EPA proposed rule to Office of Management and Budget (OMB) in early May. B. Lesley, EPA, indicated their submittal was working days away from going to OMB. Mr. Lesley did not know if OMB would be giving an expedited review or have any idea regarding a target date for completion of the review by OMB. With regard to revisions to Part 60, the NRC indicated that although it has one year from the issuance of the final EPA standard to revise Part 60, the staff is currently preparing the conceptual framework for the revision. The staff is considering several options with the current preferred option of issuing a new site specific subpart (ie., Part 60A) to the regulations, rather than revise Part 60. A copy of this presentation is provided as Attachment 9.

- o LSS

NRC summarized the staff position regarding Licensing Support System (LSS) as provided at the LSS Advisory Panel during the week of April 29, 1996. NRC emphasized the need for DOE to institutionalize its decision making process. In addition, the NRC's Regulatory Guide providing a list of topics to be included in the LSS has been released for publication. NRC noted that the LSS concept of Part 60 is outdated and, therefore, NRC is evaluating options for the future and developing a recommendation on how to proceed. Currently NRC is recommending that it provided access to appropriate NRC CDOCs databases through commercially available internet web servers and the DOE, State, Indian Tribe, and Affected Parties would provide similar access. Specifically, NRC recommended that a pilot program be developed whereby NRC could load some relevant data and let the LSSARP members to exercise the system. The LSSARP approved the pilot program and NRC is currently taking the steps to implement the system. A copy of this presentation is provided as Attachment 10.

- o Discussion of Procedural Agreement Working Group

DOE discussed the joint agency task force put together to consider revisions to the Procedural Agreement (PA) to streamline communications during the pre-licensing period. The task force conducted a telcon on April 2, 1996 to discuss its goals and schedule for the proposed revisions. During this telcon, DOE volunteered to prepare the first draft of the proposed revisions to the PA for task force review. A copy of this presentation is provided as Attachment 11.

- o DOE's Plan to Document Basis and Rationale for Decisions

NRC discussed the need for DOE to institutionalize its decision making process and its importance to both the viability assessment and licensing (See Attachment 12). The NRC indicated that DOE must not only document its decisions, but the underlying basis and appropriate supporting data for those decisions. In addition this information must be communicated to the NRC and other potential parties and Affected Units of Local Government in a timely manner with sufficient information lead time in order to support assertions made about site suitability. DOE indicated that they were preparing a white paper on the subject which would be complete in about three months. DOE indicated that the topic should be put on a future management meeting agenda.

#### Key Technical Issues Implementation Plans:

- o Overview of a KTI Implementation Plan

NRC gave an overview of the general format of the KTI implementation plans and as an example, provided a detailed presentation on the Repository Design and Thermal Mechanical Effects KTI (See Attachment 13). The NRC presentation defined the main topics of concern; the subtopic making up each topic; and the path for resolution. DOE expressed continued confusion regarding implementation of the KTI plans and renewed its request for copies of all the implementation plans. NRC indicated that DOE would be sent copies of the Interaction Section and Rationale Sections of the plans, but the remaining sections containing budget information would not be provided.

#### Open Issues from Previous Management Meetings:

- o Potential Pilot Program

This topic was covered above under "Perspectives of Pre-Licensing Interactions with the NRC", therefore, this topic was not discussed further.

Upcoming Items of Interest:

With regard to the upcoming items of interest, DOE indicated that the June 25, 1996 date for the next NRC/DOE management meeting would have to be rescheduled. In addition, NRC highlighted the May 15, 1996 Commission briefing on Performance Assessment and the June 26-27 ACNW Volcanology workshop as of possible interest to DOE.

Closing Remarks:

In closing, the NRC indicated that the two agencies are moving closer to understanding and working with each other. DOE agreed that we are making progress and our interactions are becoming more and more useful. The State of Nevada had no comments.

John O. Thoma for

Sandra L. Wastler  
High-Level Waste and Uranium  
Recovery Projects Branch  
Division of Waste Management  
Office of Nuclear Material  
Safety and Safeguards  
U.S. Nuclear Regulatory Commission

Priscilla Bunton

Priscilla Bunton  
Regulatory Integration  
Division  
Office of Civilian  
Radioactive Waste Management  
U.S. Department of Energy

**ATTACHMENT 1**

## **NRC/DOE MANAGEMENT MEETING AGENDA**

May 8, 1996

1:30 EST (1E-267); 10:30 PST (Blue Room, Hillshire)

- **OPENING REMARKS** ALL
- **PROGRAM STATUS**
  - Budget/Legislative Update DOE
  - Program Plan DOE
- **REGULATORY AND LICENSING**
  - Perspectives of Pre-Licensing Interactions with the NRC DOE
  - NRC Status Update on Commission Activities NRC
  - Update on EPA Standard/ Revisions to Part 60 NRC
  - LSS NRC
  - Discussion of Procedural Agreement Working Group DOE
  - Documenting Basis and Rationale for Decisions NRC
- **KEY TECHNICAL ISSUES IMPLEMENTATION PLANS**
  - Overview of a KTI Implementation Plan NRC
- **OPEN ITEMS FROM PREVIOUS MANAGEMENT MEETING**
  - Potential Pilot Program NRC
- **UPCOMING ITEMS OF INTEREST**
  - Affirmation of June 25, 1996 Management Meeting prior to DOE's July 15, 1996 Commission Briefing
- **CLOSING REMARKS** ALL

5:00 EST; 2:00 PST Adjourn

**ATTACHMENT 2**



**NRC-DOE MANAGEMENT MEETING ATTENDANCE LIST**

January 19, 1996

DOE DC/Forestal - Las Vegas/YMSCO

Videoconference DOE Forestal

Washington, D.C.

PRINTED NAME	ORGANIZATION/COMPANY	PHONE
Priscilla Bunton	DOE	202-586-8365
Stephen Brocoum	DOE	702-295-9611
Alan Brownstein	DOE	202-586-4973
Robert Gamble	M&O/WCFS	703-204-8520
John Austin	NRC/NMSS/DWM	301-415-7252
Bill Reamer	NRC	301-415-1640
Colin Heath	M&O/TRW	703-204-8563
John L. Russell	CNWRA	301-881-0281
Steve Frishman	NV/NWPO	702-687-3744
Judy Treichel	NV/NW Task Force	702-248-1127
John O. Thoma	NRC	301-415-7293
Michael Bell	NRC/NMSS/DWM	301-415-7286
Margaret Federline	NRC/NMSS/DWM	301-415-6708
Robert L. Johnson	NRC/NMSS/DWM	301-415-7282
R.E. Spense	DOE/YMPO	702-794-5584
Keith Lobo	PMO/AMEFO	702-794-5424
John Therien	YMQAD/QRTSS	702-794-5408
Diane McAlister	PMO/AMSL	702-794-1344
Claudia Newbury	DOE/YMP/AMSL	702-794-1361
David Warriner	DOE/YMP/AMA	702-794-1478
Hans Ebner	YMP/PMO	702-794-1460
Tom Bjerstedt	YMSCO/AMSL	702-794-1362
Abe Van Luik	YMSCO/AMSL	702-794-1127
Chris Einberg	DOE	202-586-8869

**NRC-DOE MANAGEMENT MEETING ATTENDANCE LIST**  
**January 19, 1996**  
**DOE DC/Forestal - Las Vegas/YMSCO**  
**Videoconference DOE Forestal**  
**Washington, D.C.**

<b>PRINTED NAME</b>	<b>ORGANIZATION/COMPANY</b>	<b>PHONE</b>
Susan Rives	DOE	702-794-7905
Dan Fehring	NWTRB	703-235-4473
S.E. LeRoy	M&O/Regulatory Office	702-295-5563
April Gil	DOE/YMPO/AMSL	702-794-5578
Mike Lugo	M&O/TRW	702-794-7830
Bill Belke	NRC/OR	702-388-6125
Sandra Wastler	NRC/DWM/PAHL	301-415-6724
David Fenster	M&O/WCFS	202-488-6723
Stan Exhols	Winston & Staun	202-371-5777
Ray Wallace	USGS	202-586-1244
Bob Clark	DOE	202-586-1238
Lake Barrett	DOE	202-586-6850
Wes Patrick	CNWRA	210-522-5158
Buhdi Sagar	CNWRA	210-522-5252
Bret Leslie	EPA	202-233-9201
Nancy J. Chappell	DOE	702-794-1928

**ATTACHMENT 3**

## NRC ACTIVITIES SINCE JANUARY 19, 1995

February 1, 1996	NRC letter (Bell to Brocoum) requesting references from Topic Report "Seismic Design Methodology for Geologic Repository at Yucca Mountain."
February 8, 1996	NRC letter (Bell to Brocoum) regarding resolution of a Volcanism Open Item on Study Plan 8.3.1.8.1.2
February 12, 1996	Observation of DOE QA audit of Sandia Laboratory (NRC report dated 2/12/96).
February 15, 1996	NRC/DOE Meeting on Exploratory Studies Facility.
February 28, 1996	Draft STP on Expert Elicitation.
February 29, 1996	NRC letter (Bell to Milner) providing issue resolution status report on extreme erosion.
March 11, 1996	NRC letter (Austin to Milner) transmitting minutes of the February 15, 1996 ESF Meeting.
March 13-14, 1996	Appendix 7 visit with DOE at Las Vegas, NV, on Seismic Design Methodology for Surface Structures, Topical Report 2.
March 14, 1996	NRC letter (Bell to Brocoum) regarding Open Items related to Study Plan 8.3.1.8.1.2.
March 14, 1996	NRC letter (Bell to Brocoum) regarding Resolution of Open Items related to Study Plan 8.3.1.8.5.1.
March 28, 1996	Issue Resolution Status Report on Scenario Methodology.
March 29, 1996	Meeting with DOE (EM) alternatives for disposition of foreign research reactor HEU spent fuel.
April 16, 1996	Meeting with DOE (EM) on criteria for cleanup and closure of Savannah River HLW tanks.
April 23, 1996	Appendix 7 visit with DOE at CNWRA, San Antonio, TX, on Seismic Design Methodology for Underground Facilities, Topical Report 2.
April 23, 1996	NRC letter (Bell to Brocoum) thanking DOE for assistance in obtaining large rock sample from ESF for CNWRA studies.
April 29, 1996	Observation of DOE QA Audit of the USGS.

May 7-8, 1996

Appendix 7 visit with DOE at CNWRA, San Antonio, TX,  
on Tectonic Models.

**ATTACHMENT 4**

## **NRC DOCUMENTS EXPECTED TO BE ISSUED IN NEXT 6 MONTHS**

Final STP on Expert Elicitation

Commission Paper on Draft Comments on EPA's Proposed Yucca Mountain Standard

Commission Paper on Revised High-Level Waste Program

Commission Paper on Conceptual Framework for NRC's Yucca Mtn Rule and Guidance

Auxiliary Analyses of Implementation Aspects of NAS Recommendations

Audit Review of TSPA 1995

Meeting Minutes on QA Quarterly Meeting

Meeting Minutes on KTI Technical Exchange

Final DBE rule

SER on Seismic Hazard Assessment TR (TR#1)

Letter Report on the Identification of Type II Faults in the Yucca Mountain Region

Ground Magnetic Survey of the Little Cones, Crater Flat, Nevada

Issue Resolution Status Report Letter on Scenario Analysis

NRC comments on DOE's Topical Report #2 on Seismic Design Methodology

Results of NRC's review of DOE's response to NRC's letter of December 14, 1995 on Design Control Process Issue.

Annual KTI Progress Report

Observe Performance based audit of 3-D Geologic Model Development, SNL/M&O

Audit Report of DOE's Topical Report #1 - Seismic Hazard Assessment Methodology

**ATTACHMENT 5**



## **Preliminary Draft**

### **UPDATING THE STRATEGY FOR EVALUATING WASTE CONTAINMENT AND ISOLATION**

#### **Rationale for an Updated Strategy**

The Project is in the process of updating its strategy for evaluating waste containment and isolation for the Yucca Mountain site. The original strategy was described in the 1988 *Site Characterization Plan*. Since that time, much has been learned about the site, as discussed above. What has been learned leaves a relatively few, but important, technical questions about significant features and processes of the natural geologic and hydrologic system that influence the functioning of the engineered systems (especially the waste package) that would be part of a potential Yucca Mountain repository. *The Program's strategy for evaluating the containment and isolation of radioactive wastes at Yucca Mountain is described in the box on the following page.*

Progress in characterizing the Yucca Mountain site is occurring in parallel with progress in defining the design of the engineered system. As engineered system concepts mature, testing of selected materials under conditions that either mimic or bound expected conditions can also become more focused.

Finally, the 1992 Energy Policy Act directed the Environmental Protection Agency to promulgate a site-specific radiation protection standard for Yucca Mountain. This standard is currently being developed and early indications are that it will be a health-based standard, likely requiring dose calculations to a critical group. To address this type of standard, modeling of the saturated zone and the biosphere needs to be enhanced over the types of models we have used to address the previously applicable release based standard.

## **Preliminary Draft**

## **Strategy for Evaluating Waste Containment and Isolation For The Yucca Mountain Site**

The Program's strategy for evaluating the containment and isolation of radioactive wastes relies on engineered barriers, geologic features, and natural processes to delay and minimize releases of radionuclides to the environment outside of the Yucca Mountain site and to minimize any exposure to the public. The strategy is based on the observation that there is very little available water in the rocks in and around the repository to dissolve radionuclides and transport them to the accessible environment.

**Engineered Barriers.** Waste arriving at the repository site will be placed in a special disposal container, or waste package, consisting of multiple metal barriers designed to contain the wastes by resisting corrosion for thousands of years. A backfill of crushed rock around the waste packages, an example of another engineered barrier, is being evaluated with the intent that it may be used to limit water contact with the packages, further delaying corrosion and, following corrosion, to limit dissolution and transport of radionuclides. The heat output of the waste will dry the rock, decreasing relative humidity and thus delaying corrosion of the disposal packages, while the major portion of hazardous radionuclides decay to background levels.

**Geologic Features and Natural Processes.** The repository's long-term behavior, following corrosion of the waste packages and transport of radionuclides from the engineered barrier, will be controlled by geologic features and natural processes. Water movement through the repository level, which could lead to dissolution and transport of radionuclides, is the most important feature for determining the long-term behavior of the potential repository. Based on observations of generally dry conditions in the Exploratory Studies Facility and preliminary analyses of age dates of water from the rock pores at the potential repository level and of mineral coatings deposited by water flowing along fractures, we believe today's dry conditions are likely to persist in the future. Mathematical models developed to characterize gas and fluid flow at Yucca Mountain predict that water movement will continue to be slow in the future even with potential changes in climatic and hydrologic conditions. Some of the radionuclides that are released from corroded waste packages will be delayed as they move through the rocks below the repository horizon. Radionuclides that reach the water table will mix with flowing groundwater and be diluted.

**Doses to the Public.** We have defined isolation with a system-level safety goal as "an acceptable dose to a member of the public living near the site." The project will report quantitative dose modeling results. More attention will be paid to evaluating potential doses for the first ten thousand years. However, evaluations will, qualitatively, be carried out over longer times in order to provide insight into peak dose potential and to support system enhancement studies.

Three developments have contributed to the need to update the strategy for evaluating waste containment and isolation: (1) new site characterization information; (2) updated repository and waste package conceptual designs; and (3) considerations related to the change from a release standard to a dose or risk-based standard, with an as yet unspecified regulatory time frame.

### Concepts and Status of the Updated Strategy

The Project's updated strategy for waste containment and isolation for a potential repository at the Yucca Mountain site will maintain the core strategy of the 1988 *Site Characterization Plan*: the Yucca Mountain site, at potential repository depth, is approximately 1000 feet above the water table and experiences very low rates of water infiltration from the surface. This site characteristic is the first line of defense against the corrosion of waste packages and the release of radionuclides from breached waste packages in the potential repository (leading to loss of containment). Secondary lines of defense to enhance containment and isolation lie in potential engineered barriers adjacent to the waste package and in the geochemical environment provided by the natural system, which suggests considerable sorption will exist along potential flow paths for many radionuclide species that could eventually be released from the waste package.

The updated strategy currently being developed maintains a number of fundamentals of the original strategy. The updated strategy continues to recognize the important role of the relatively "dry" conditions at Yucca Mountain, which contributed to the site originally being selected for characterization studies. The updated strategy also continues to recognize the geochemical setting provided by Yucca Mountain as important to determining the rate at which radionuclides may be released into the environment in the future, when containment by the engineered barriers is eventually lost.

However, this update differs from the original strategy for four reasons. First, because much has been learned since 1988, there is an opportunity to focus resources on the remaining technical questions that have been demonstrated, through total system performance assessments, to be important to waste containment and isolation. Second, to make an evaluation of the viability of committing further resources to the licensing process for Yucca Mountain, there is a need to make this appraisal independent of evolving specific regulations. Third, the strategy update incorporates an enhanced engineered system design that more effectively complements important features of the natural system. Finally, the updated strategy reflects the revised schedule and recognizes the need for a sufficient technical basis to support the viability assessment in 1998 and the license application in 2002.

In order to support the societal decision that needs to be made on geologic disposal, the Project is defining waste containment and isolation for purposes of conducting the viability assessment. We have defined waste containment as the "near-complete containment of radionuclides by waste packages for several thousands of years." We have defined isolation with a system-level safety goal as "an acceptable dose to a member of

# Preliminary Draft

the public living near the site." Quantitative dose modeling results will be reported by the Project. More attention will be paid to evaluating potential doses for the first ten thousand years. However, evaluations will qualitatively be carried out over longer times in order to provide insight into peak dose potential and to support system enhancement studies.

The technical questions identified in recent total system performance assessments as key to evaluating repository and waste package performance are related to the following key attributes of the system:

1. rate of water seepage into the repository;
2. integrity of waste packages (containment);
3. rate of release of radionuclides from waste in the breached waste packages;
4. radionuclide transport through engineered barriers and natural barriers; and
5. dilution in the groundwater below the repository.

The strategy will include more detail as to what we now understand about these five attributes, as well as what our approach is to gathering data and developing models to make better predictions of these attributes over time. As the repository generates heat and then gradually returns to ambient temperatures, it is expected that at least the first four of these attributes will be affected, changing their relative importance to system performance as a function of time.

The strategy will guide our plans for a viability assessment in 1998, but also looks forward to and beyond the license application. We will continue to conduct scientific and engineering studies to aid us in confirming or revising the basis for modeling performance of the repository system. This Program Plan indicates our expectation to have more information available for a license application. It also recognizes that, if a license is granted, confirmatory technical work will continue beyond the license application during the construction and operational phases of the repository.

## Preliminary Draft

**ATTACHMENT 6**

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

**NUCLEAR REGULATORY COMMISSION  
MANAGEMENT MEETING**

**SUBJECT: OVERVIEW OF THE PROGRAM  
PLAN**

**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) 794-1359

**MAY 8, 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 rationale**
    - » 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**

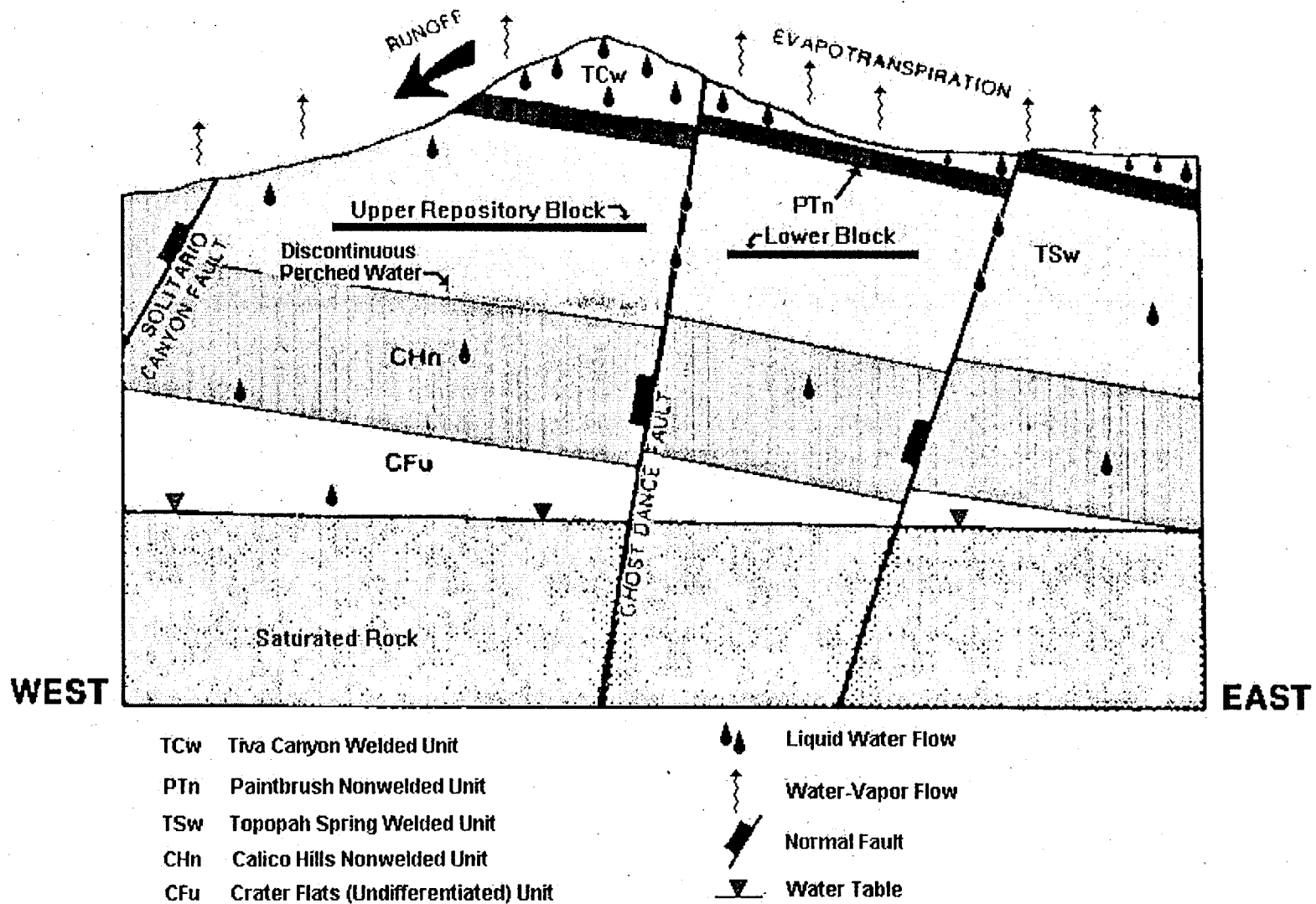
- **Investigations and synthesis of technical data have led to a better understanding of site conditions and processes**
  - **No major unexpected conditions have been encountered since site characterization began in 1986**
  - **Tunneling and testing are confirming EA/SCP hypotheses on site conditions**
- **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**

# CONCEPTUAL MOISTURE FLOW SYSTEM



# **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
    - » This is equivalent to a dose limit on the order of 20-200 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**

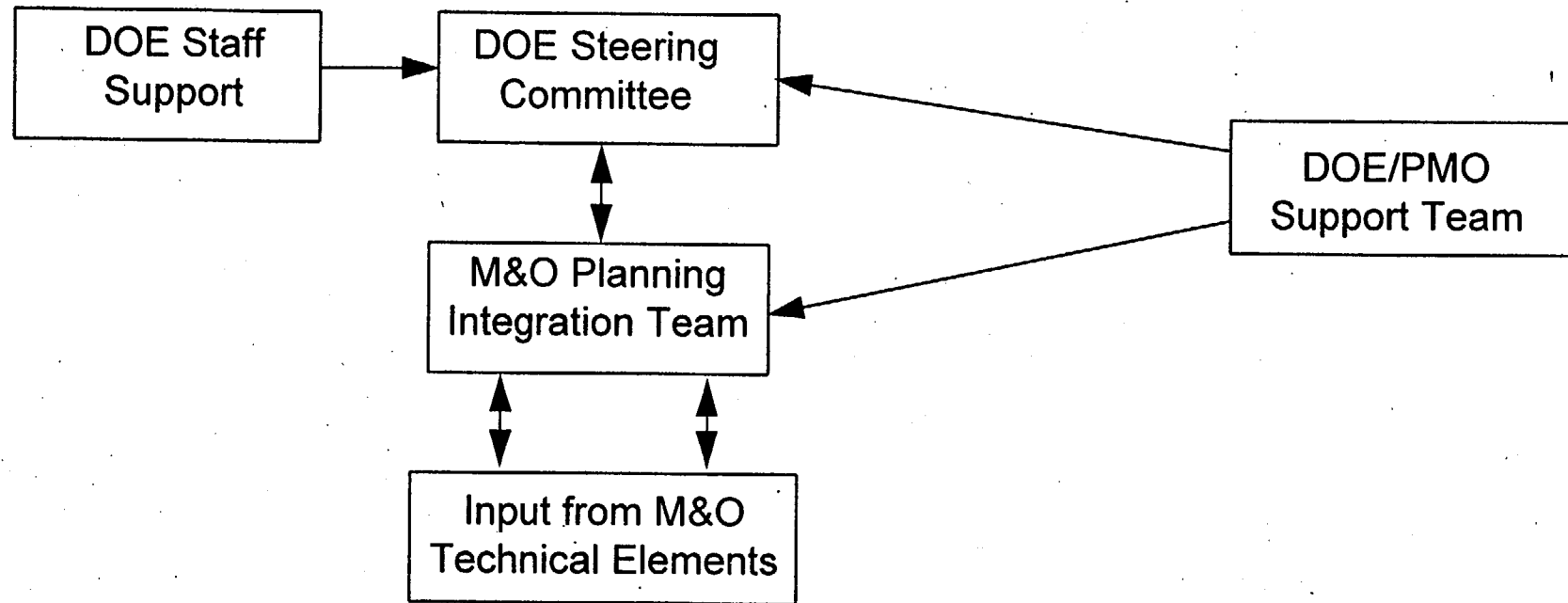
# **Suggestions for NRC on 10CFR60**

- **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 submittal**
  - **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

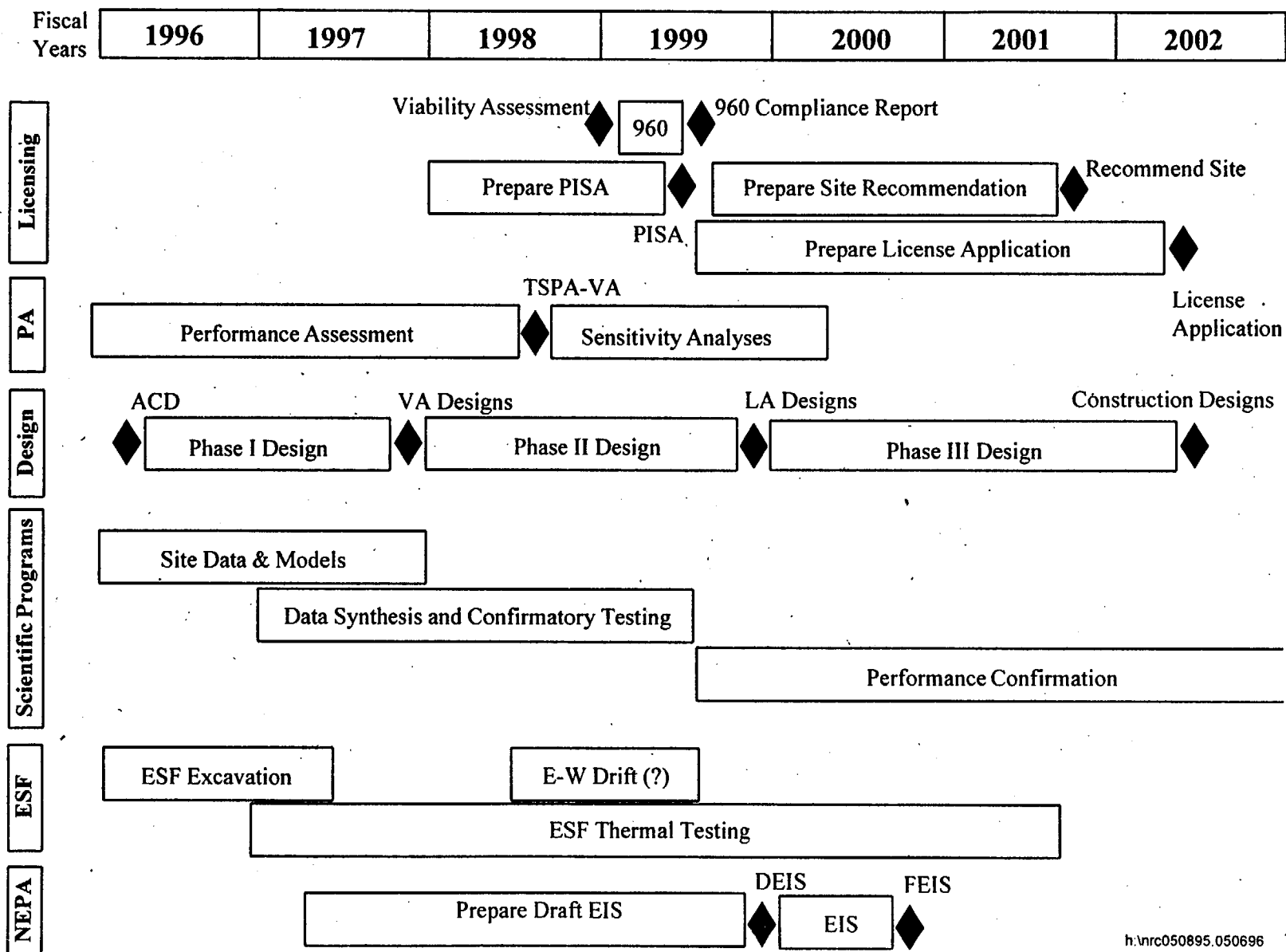


- DOE steering committee provides planning guidance and Program Summary Schedule
- M&O provides detailed annual and long-range planning that is resource-loaded for review and acceptance by DOE
- DOE/PMO support team provides support to Steering Committee and guidance to M&O Planning Integration Team

# **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**

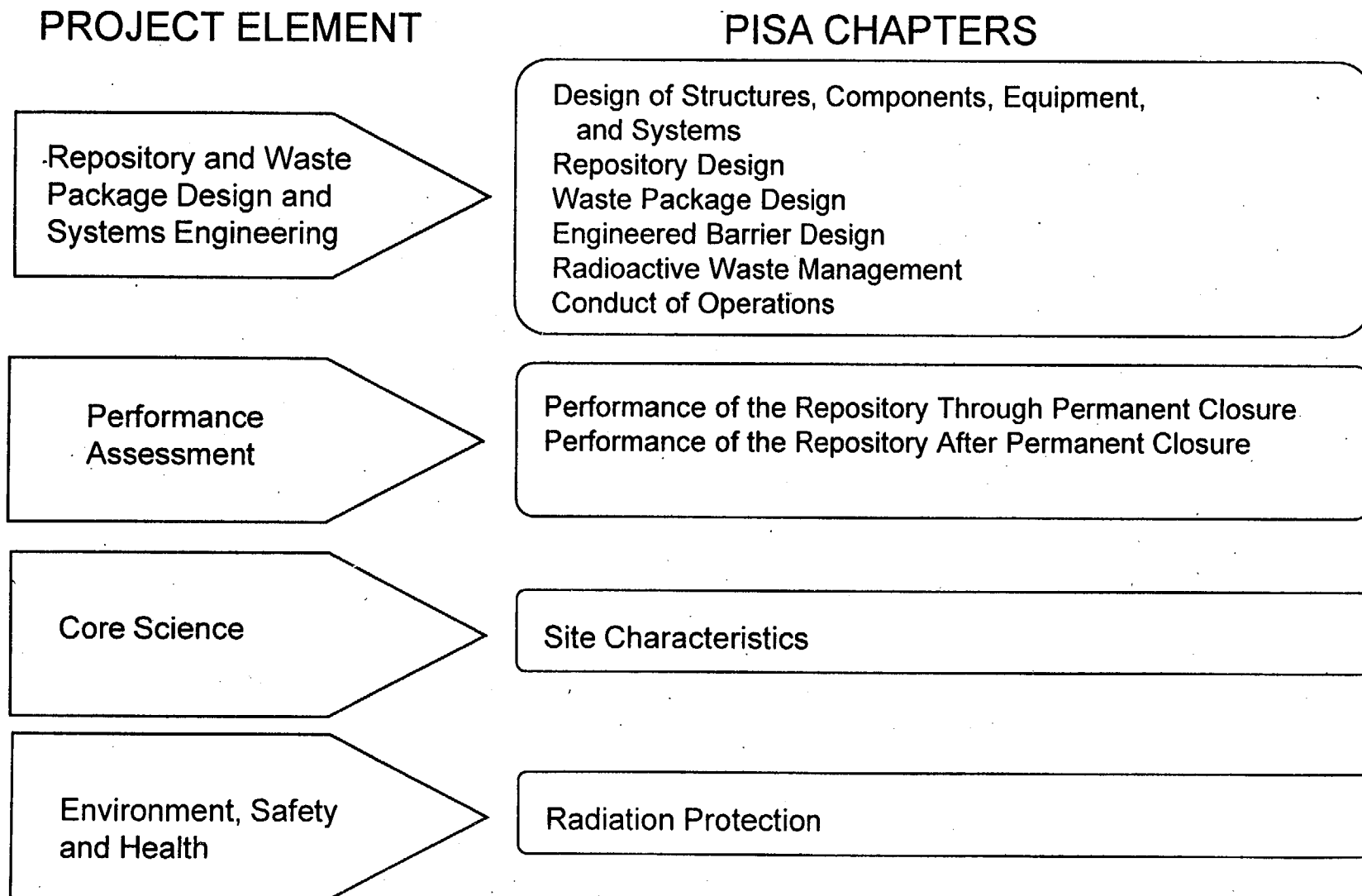
- **Project Integrated Safety Assessment is a single document that integrates and coordinates the elements of the technical program**
- **Focuses on technical data management and information systems**
- **Uses Performance Assessment as a tool for integration**

# **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



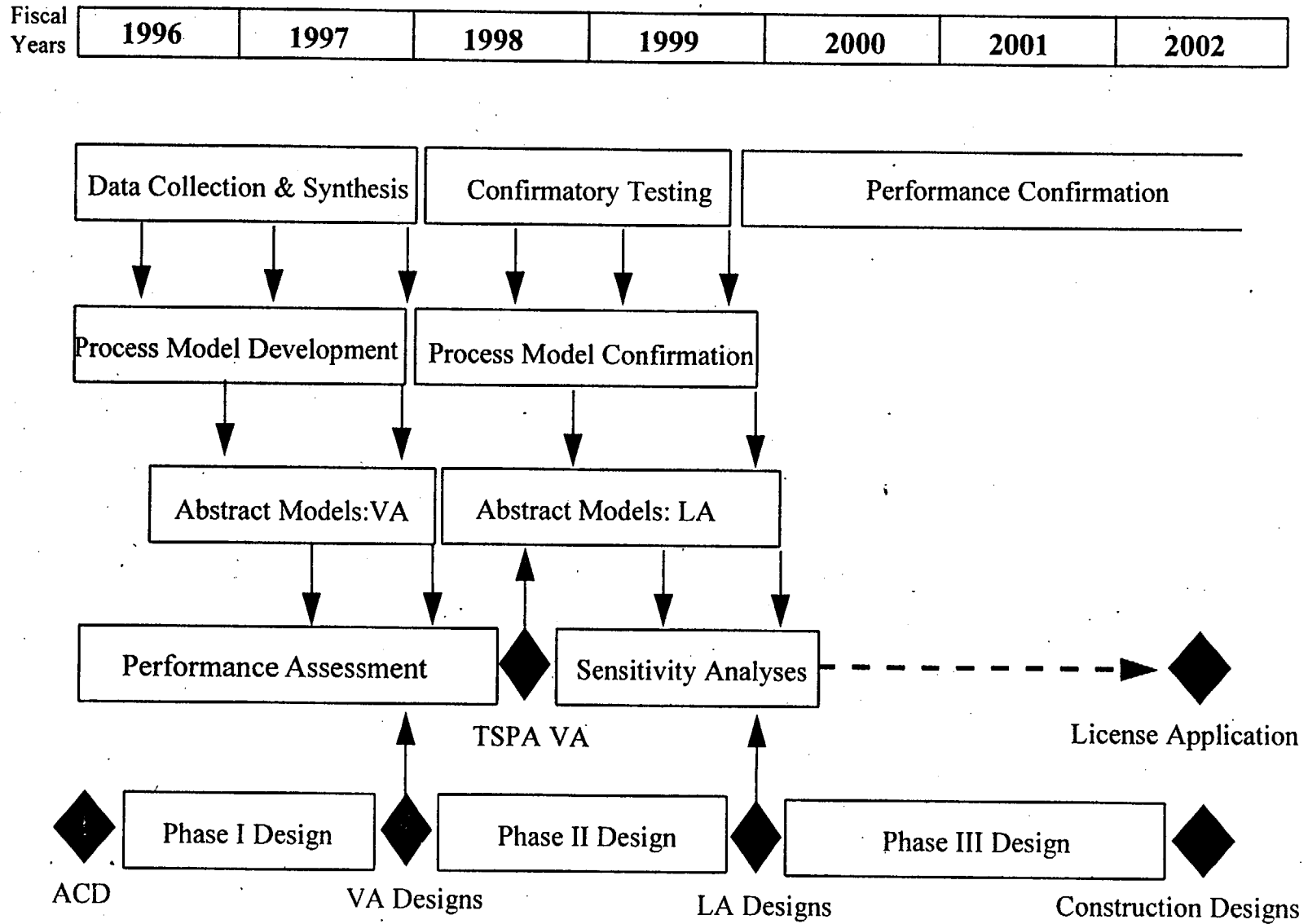
# Technical Data Management

- 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



# **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**

**ATTACHMENT 7**

# YUCCA MOUNTAIN PROJECT

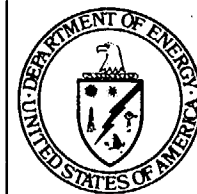
Studies

## DOE Perspectives on Pre-Licensing Interactions with NRC

Presented to:  
NRC-DOE Management Meeting

Presented by:  
Dr. Stephan J. Brocoum  
Assistant Manager for Suitability and Licensing  
Yucca Mountain Site Characterization Office

May 8, 1996



U.S. Department of Energy  
Office of Civilian Radioactive  
Waste Management



# Topics

- **Expectations for Pre-Licensing Interactions**
- **Comments on NRC's Pre-Licensing Regulatory Program**
- **Overview of Proposed DOE Approach**
- **Recommended Pilot Program**

# **Expectations for Pre-Licensing Interactions**

- **Focus on potential licensing issues that are significant to repository performance**
- **DOE goals for pre-licensing interactions:**
  - **Ensure actions do not preclude the ability to obtain a license in the future**
  - **Achieve resolution on procedural and methodology issues**
  - **Develop common understanding between NRC and DOE on where agencies agree and differ on performance issues**

# **Expectations for Pre-Licensing Interactions (cont'd)**

- **Encourage NRC to provide timely feedback on regulatory sufficiency on our submissions in context of licensing requirements**

# **Comments on NRC Pre-Licensing Regulatory Program (cont'd)**

- **Historically, issue resolution interactions have produced only limited results**
- **We are concerned that NRC's new approach is:**
  - **Focused on developing “checklists” of potential issues and sub-issues**
  - **Seeks to establish procedure for issue resolution that relies on developing NRC-DOE task force(s)**
  - **KTI priorities do not reflect TSPA sensitivities**

# **Comments on NRC Pre-Licensing Regulatory Program (cont'd)**

- **Approach appears to assume that detailed guidance for resolution of issues can be developed now**
  - **Detailed guidance for first-of-a-kind facility can only be developed as issue is fully understood**

# **Overview of DOE Approach**

- **Through 1998, DOE will focus on:**
  - **Viability Assessment**
  - **Streamline DOE Siting Guidelines and discuss proposed changes to 10 CFR 60**
- **Identify issues and develop information needed to address them**
  - **Use TSPA to determine priorities**
  - **Describe what can be done within Congressional budgetary constraints and provide information to NRC**

# **Overview of DOE's Approach (cont'd)**

- **Focus interactions on addressing issues that are important to repository performance**
- **Increase use of ORs as focal points for questions and requests from NRC staff and management**
- **Continue issue resolution on Topical Reports**
  - **Seismic Topicals 1 and 2**
  - **Criticality**

# **Recommended Pilot Program**

- **Possible Proposals for Pilot program:**

**Volcanism**

**Climatology**

**Regional Hydology**

**Purpose: to test issue resolution process  
before devoting resources to develop  
procedure that relies on developing NRC-  
DOE task forces**



# Summary

- **We need to develop a common understanding on where we agree and differ on technical site performance issues**
- **We should work together to put in place an efficient pre-licensing interaction process to move the program forward**

**ATTACHMENT 8**



# **NRC HIGH-LEVEL WASTE MANAGEMENT PROGRAM OVERVIEW AND PROGRAM HIGHLIGHTS**

**Presented by**

**Margaret V. Federline  
Wesley C. Patrick**

**April 4, 1996**

# **OUTLINE OF BRIEFING**

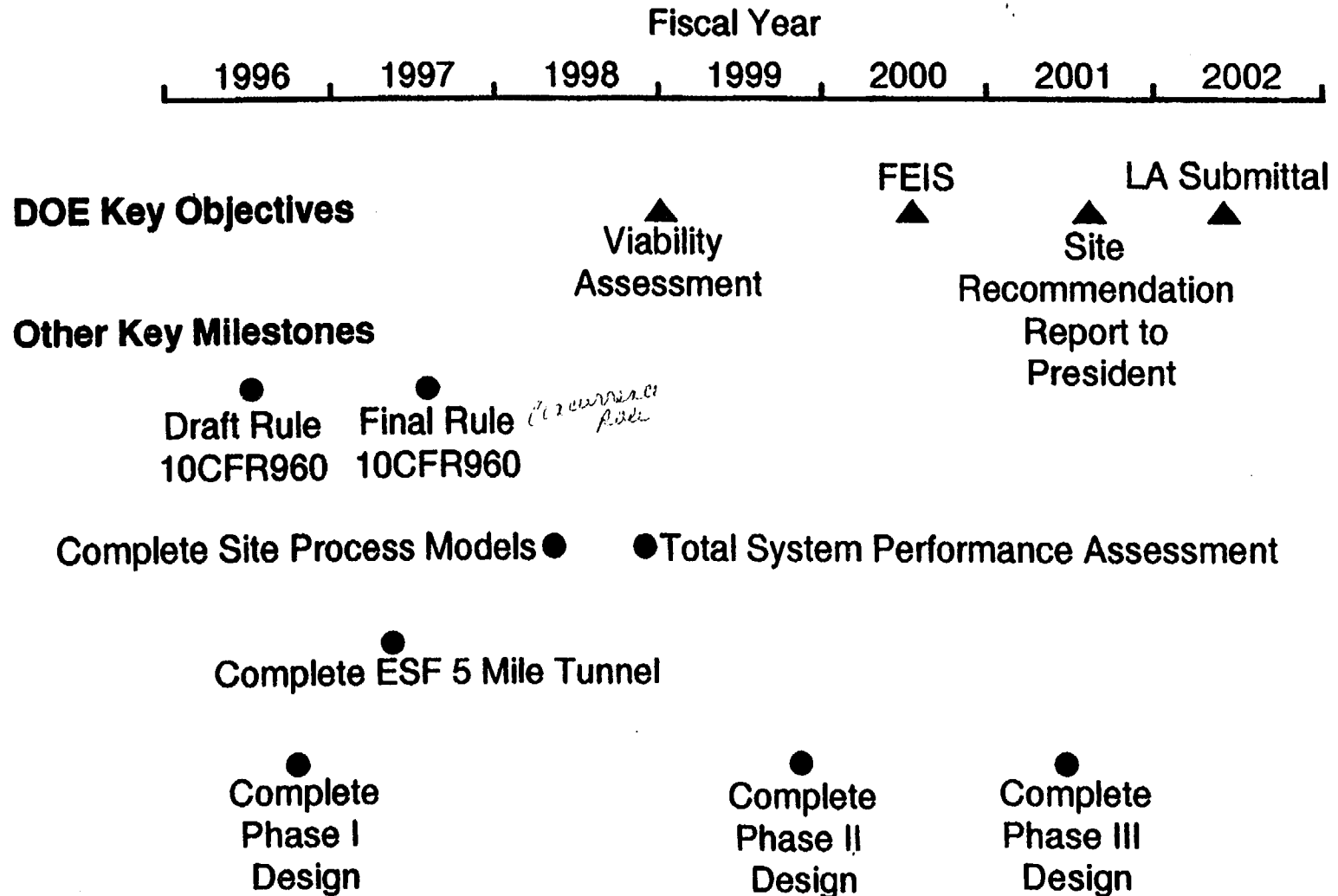
- **Factors Influencing the NRC-HLW Repository Program**
- **Revised NRC HLW Program**
- **NRC Key Technical Issues and the Issue Resolution Process**

# **FACTORS INFLUENCING THE NRC-HLW REPOSITORY PROGRAM**

# **FACTORS INFLUENCING THE NRC-HLW REPOSITORY PROGRAM**

- **Legislative Initiatives**
- **NAS Report on Yucca Mountain Standard**
- **NRC FY96 Budget Reduced from \$22M to \$11M**
- **DOE FY96 Budget Reduced to \$400M, with  
\$250M for Repository**
  - **Transportation systems developed based on  
market-driven approach**
  - **Nuclear Waste Fund support for multipurpose  
canister eliminated**
  - **Repository Program refocused on design and  
performance issues**

# DOE'S REVISED PROGRAM MILESTONES



# **DOE VIABILITY ASSESSMENT**

- **Design of Critical Elements of the Repository and Waste Package**
- **Total System Performance Assessment**
- **Plan and Cost Estimate for Licensing Work**
- **Cost Estimate for Constructing and Operating the Proposed Repository**



# **CURRENT STATUS OF DOE'S SITE CHARACTERIZATION PROGRAM**

- **ESF Tunneling Operations Ahead of Schedule**
  - No construction-related disqualifying conditions noted
  - Access to Ghost Dance Fault anticipated in 07/96
- **Site Investigations Scaled Back**
  - Focused on testing waste isolation strategy
  - Surface investigations limited to long-term monitoring and saturated zone testing
- **In Situ Thermal Testing**
  - Alcove under construction in emplacement horizon
  - Testing to commence 10/97

# **REVISED NRC-HLW PROGRAM**

# NRC HLW PROGRAM: BUDGET REDUCTION

	FY95		FY96		FY97	
	FTE	\$M	FTE	\$M	FTE	\$M
<b>REPOSITORY PROGRAM</b>						
Staff, Benefits, and Travel	57	5.6	41	3.8	41	3.8
Program Support	--	16.2	--	12.9	--	12.9
(CNWRA FTE—part of \$M)		(54)		(46)		(46)
<b>INTERIM STORAGE PROGRAM</b>						
(Based on limited generic work)						
Staff, Benefits, and Travel	2	0.2	2	0.2	2	0.2
Program Support			--	0.1	--	0.1
Total	59	22.0	43	17.0	43	17.0

- FY96 Appropriation = \$11M, Previous Year Funds = \$6M
- FY97 Request = \$14M, Previous Year Funds = \$3M
- \$14M in FY98 would continue to support 41 NRC FTE for the repository program but would further reduce CNWRA FTE to 36
- No Nuclear Waste Fund previous year funds available in FY98

## **NRC HLW PROGRAM: CONCERNS STEMMING FROM BUDGET REDUCTIONS**

- **FY 96 Reductions to NRC and CNWRA Result in a Minimally Acceptable Regulatory Program**
- **Credible Regulatory Program is Important to the Success of the National Program**
  - **If significant, new issues are raised at licensing, proceeding could be jeopardized; timely licensing is also a priority**
  - **Ensure practical, implementable safety standards**
  - **Provide a sound technical basis for evaluating DOE's Viability Assessment which could trigger early Commission waste confidence review; ensure reasonable projections of licensing costs and schedules**
- **Sustained Funding at Current Levels is Essential to Continue a Credible Regulatory Program Focused on Key Safety Issues; Development of Practical, Implementable Safety Regulations; and Timely Licensing**

## **NRC HLW PROGRAM: REVISED OBJECTIVES**

- **Cooperate with EPA in Development of a Practical and Implementable Safety Standard**
- **Implement HLW Standards through Site Specific, Performance-Based Regulations**
- **Set Program Priorities on Key Technical Issues that are Most Important to Repository Performance**
- **Achieve Agreement and Resolve KTIs with DOE**

## **NRC HLW PROGRAM: REVISED OBJECTIVES (CONT'D)**

- **Provide Early Feedback to DOE on Potentially Significant Site, Design, or Assessment Flaws for Licensing Prior to DOE's 1998 Viability Assessment**
- **Improve Program Efficiency by Streamlining Interactions with DOE and Other Parties**
- **Develop and Exercise Capability to Critically Review DOE Pre-Licensing Submittals and the License Application**

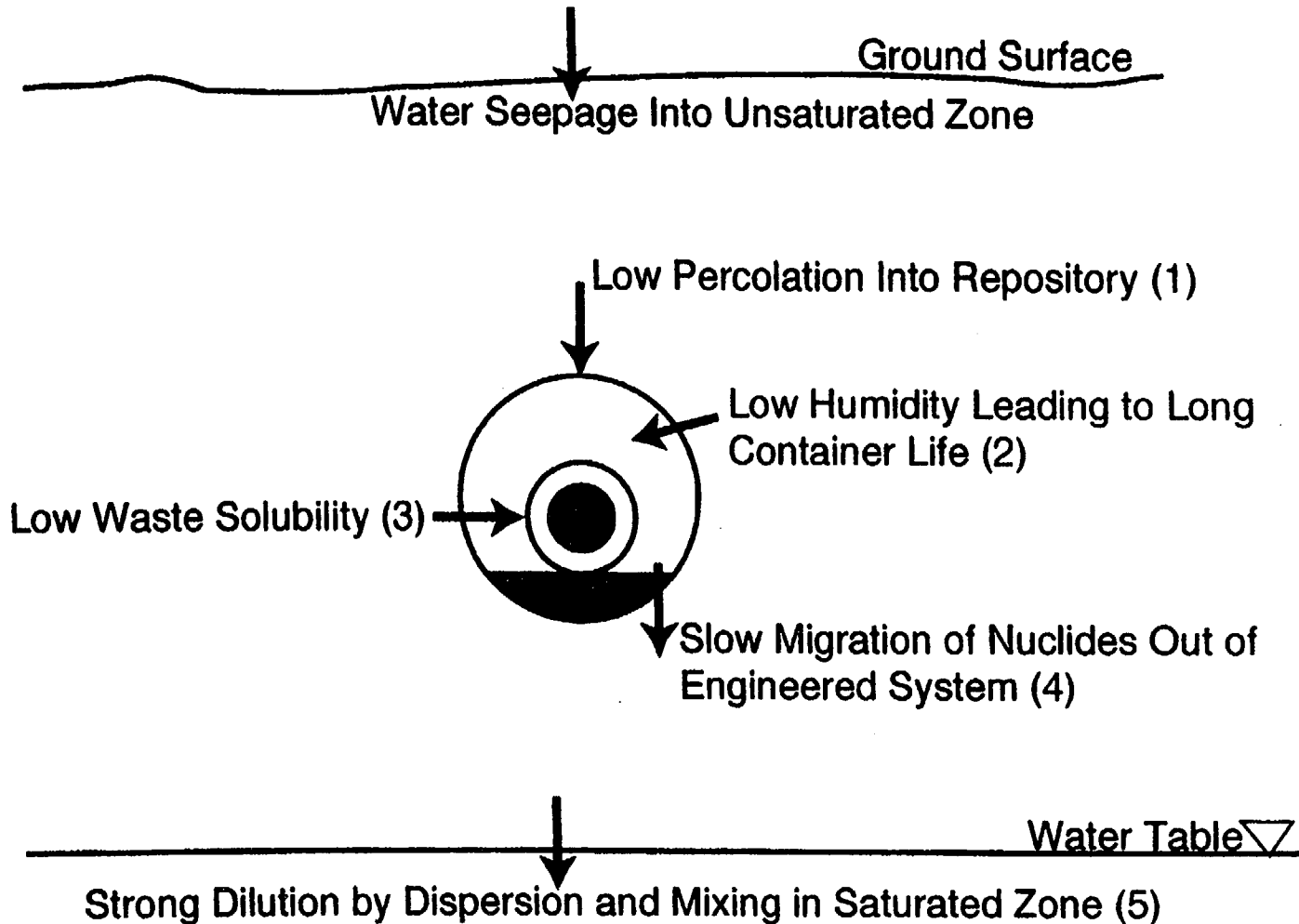
## **NRC HLW PROGRAM: IMPLEMENTATION OF TECHNICAL PROGRAM**

- **Systematically Identify Key Technical Uncertainties (KTU) and Consolidate into 10 Focused Key Technical Issues (KTI)**
- **Establish a Management Board and Multidisciplinary Issue Teams**
- **Develop KTI Implementation Plans, Including Path to Resolution**
- **Delineate Inputs and Outputs Among KTIs to Enhance Integration**
- **Use Sensitivity Analyses to Independently Assess Relative Importance of KTIs**

# **NRC KEY TECHNICAL ISSUES AND THE ISSUE RESOLUTION PROCESS**



# DOE WASTE ISOLATION AND CONTAINMENT STRATEGY



# **NRC KEY TECHNICAL ISSUES**

	<b>Priorities</b>
● <b>Igneous Activity (Volcanism)</b>	<b>1</b>
● <b>Flow Under Isothermal Conditions</b>	<b>1</b>
● <b>Thermal Effects on Flow</b>	<b>1</b>
● <b>Total System Performance Assessment and Integration</b>	<b>1</b>
● <b>Revision of the EPA Standard and NRC Rule</b>	<b>1</b>
● <b>Structural Deformation and Seismicity</b>	<b>2</b>
● <b>Evolution of the Near-Field Environment</b>	<b>2</b>
● <b>Container Life and Source Term</b>	<b>2</b>
● <b>Radionuclide Transport</b>	<b>3</b>
● <b>Repository Design and Thermomechanical Effects</b>	<b>3</b>

# **NRC TECHNICAL APPROACH TO ISSUE RESOLUTION**

- **Evaluate Adequacy of DOE Data to Support Assumptions and Bounds**
- **Evaluate DOE Assumptions Through Applied Technical Investigations**
- **Assess Models Supporting DOE Waste Isolation and Containment Strategy**
- **Test DOE Hypotheses Using Total System Performance Calculations and Sensitivity Analyses**

# **CY1996 ISSUE RESOLUTION PRODUCTS**

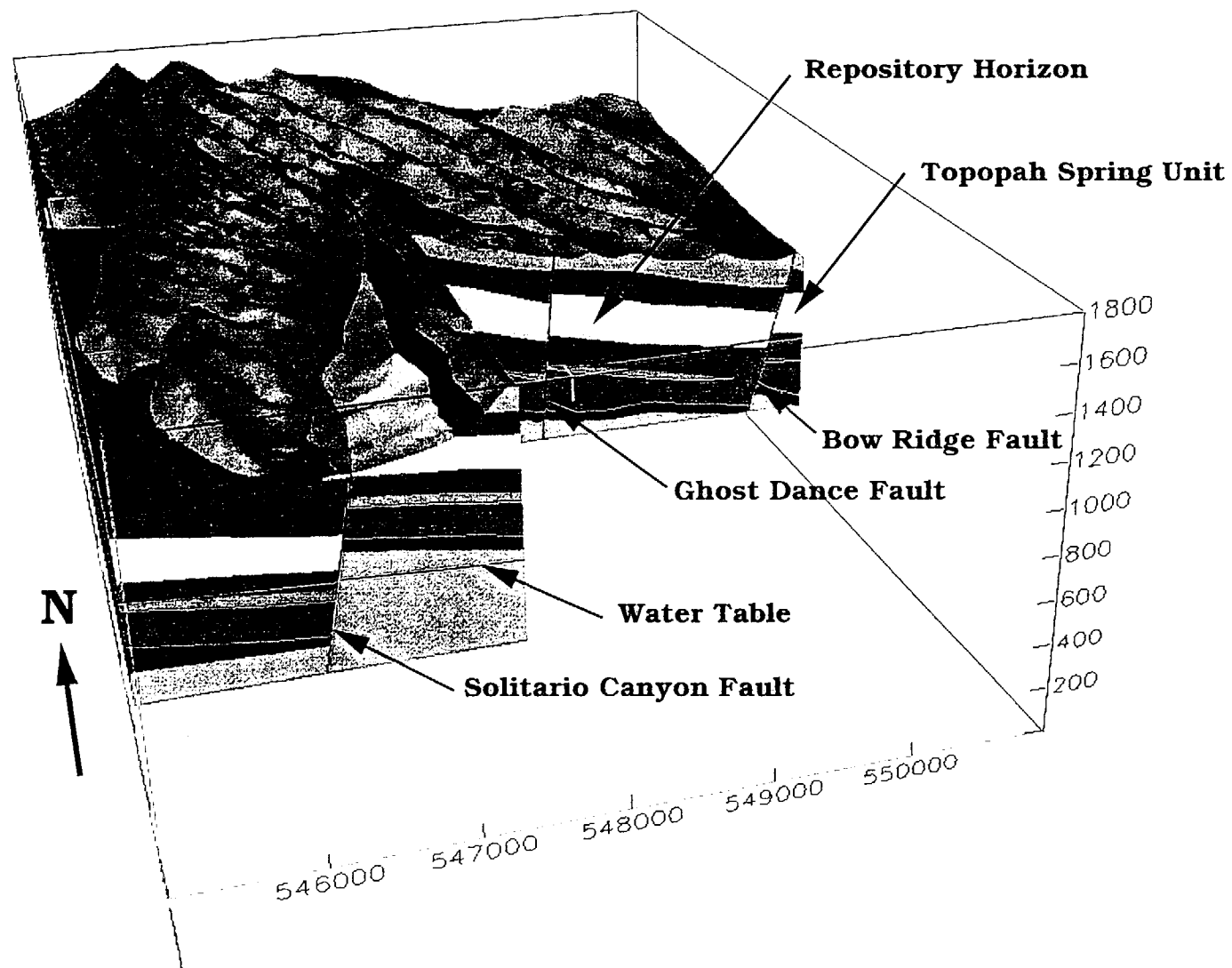
- **Scoping Calculations on Topics Related to EPA Standard**
- **Sensitivity Analyses (selected areas, only)**
- **Commission Paper on EPA Standard**
- **Report on Review of Type I Faults**
- **Acceptance Criteria and Procedures for Review of DOE Viability Assessment (selected areas, only)**
- **Focused Technical Exchanges on Key Technical Issues (4)**
- **Critical Review of DOE TSPA '95**
- **Annual Issue Resolution Report**

# **AN EXAMPLE OF THE ISSUE RESOLUTION PROCESS: INFILTRATION**

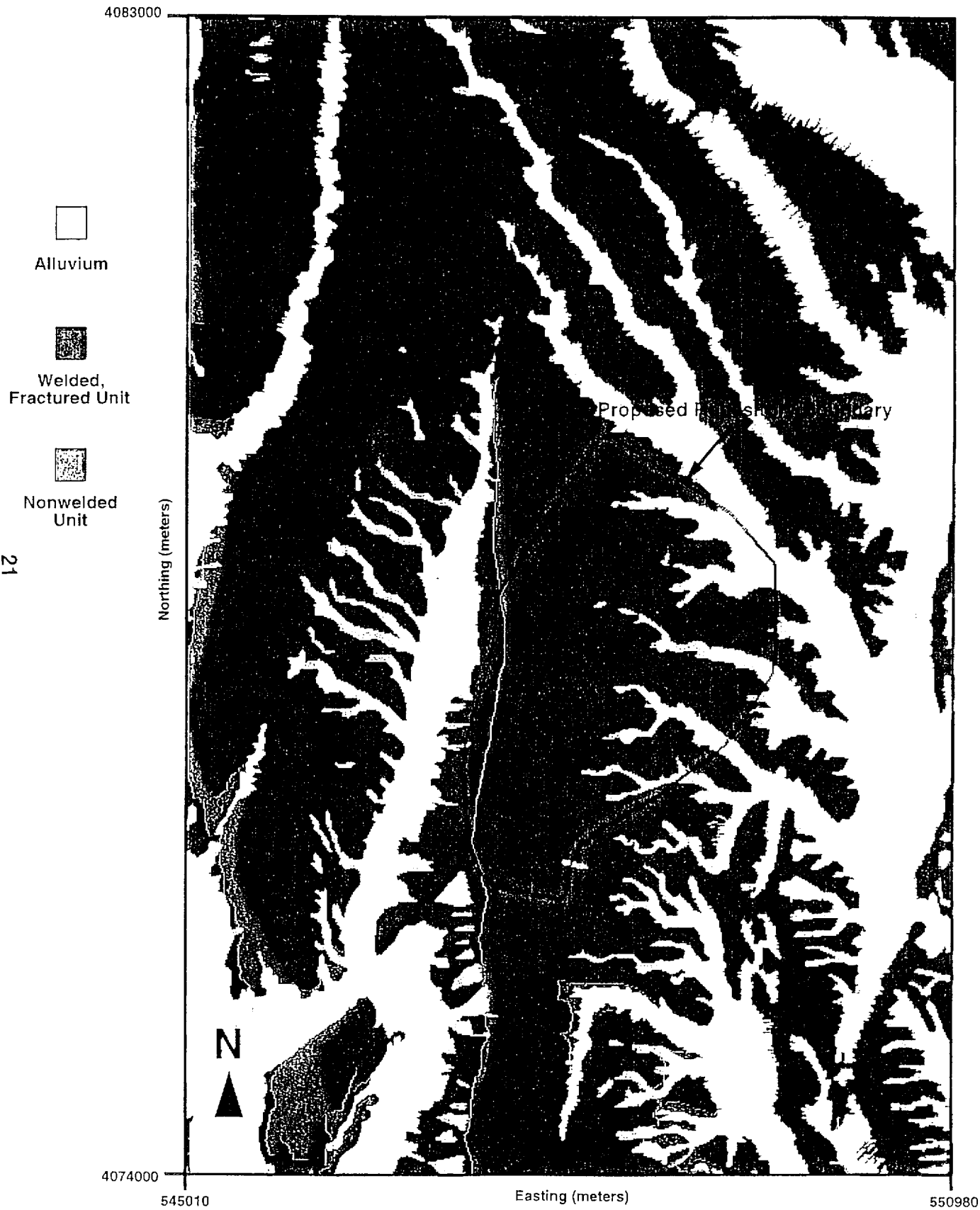
- **Evaluate Data Quality and Sufficiency**
  - Obtain appropriate three-dimensional spatial coverage of data
  - Critically review the DOE Data Synthesis Reports
- **Evaluate Model Adequacy**
  - Assess Appropriateness of DOE conceptual models
  - Independently Test DOE hypotheses related to flow and transport
- **Evaluate Bounds on Future Climate**
  - Review DOE's method for addressing climate change
  - Evaluate potential for formation of perched water zones and their impact on performance

# CNWRA GEOLOGIC FRAMEWORK MODEL (GFM)

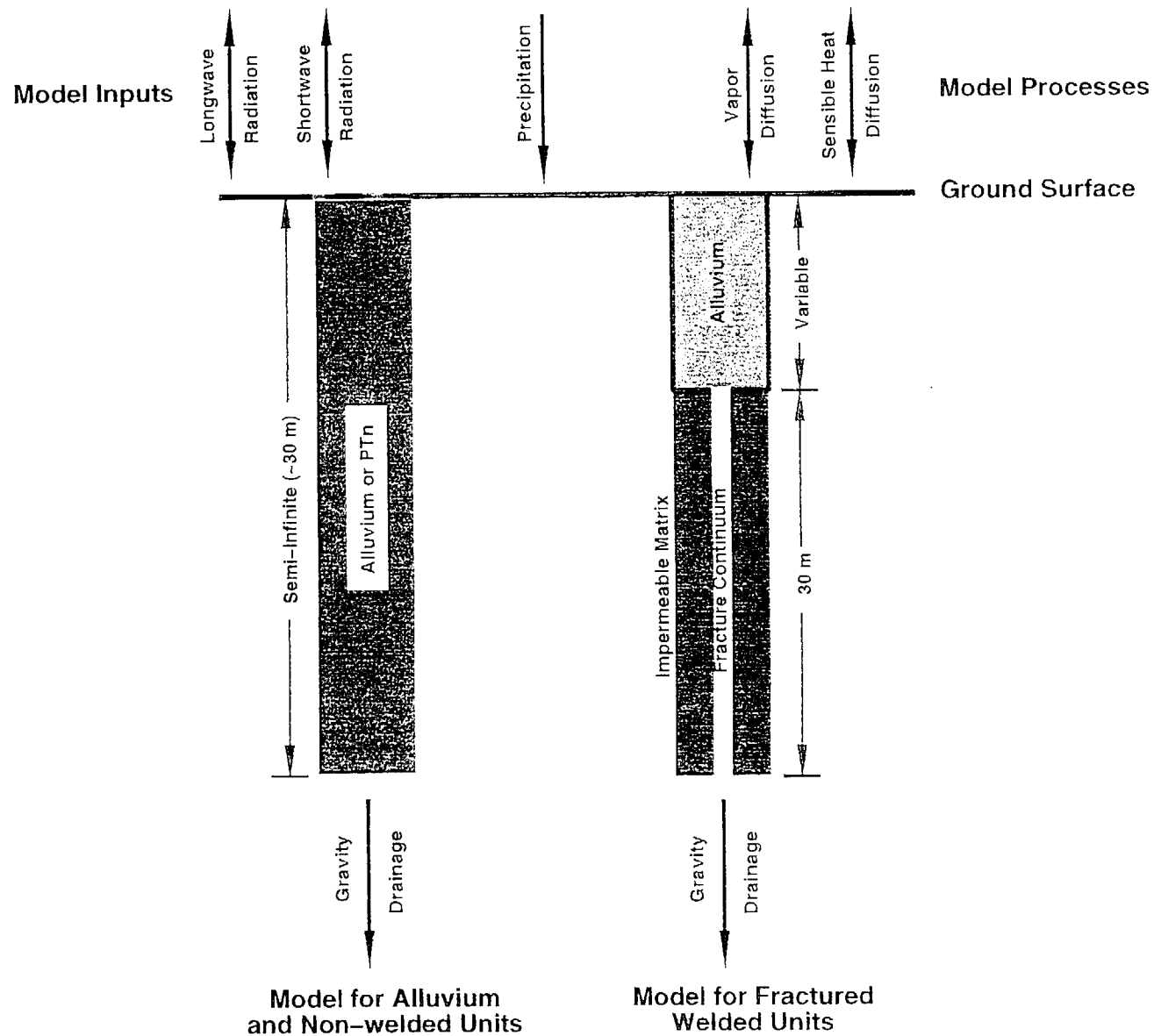
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# ROCK UNITS EXPOSED AT SURFACE

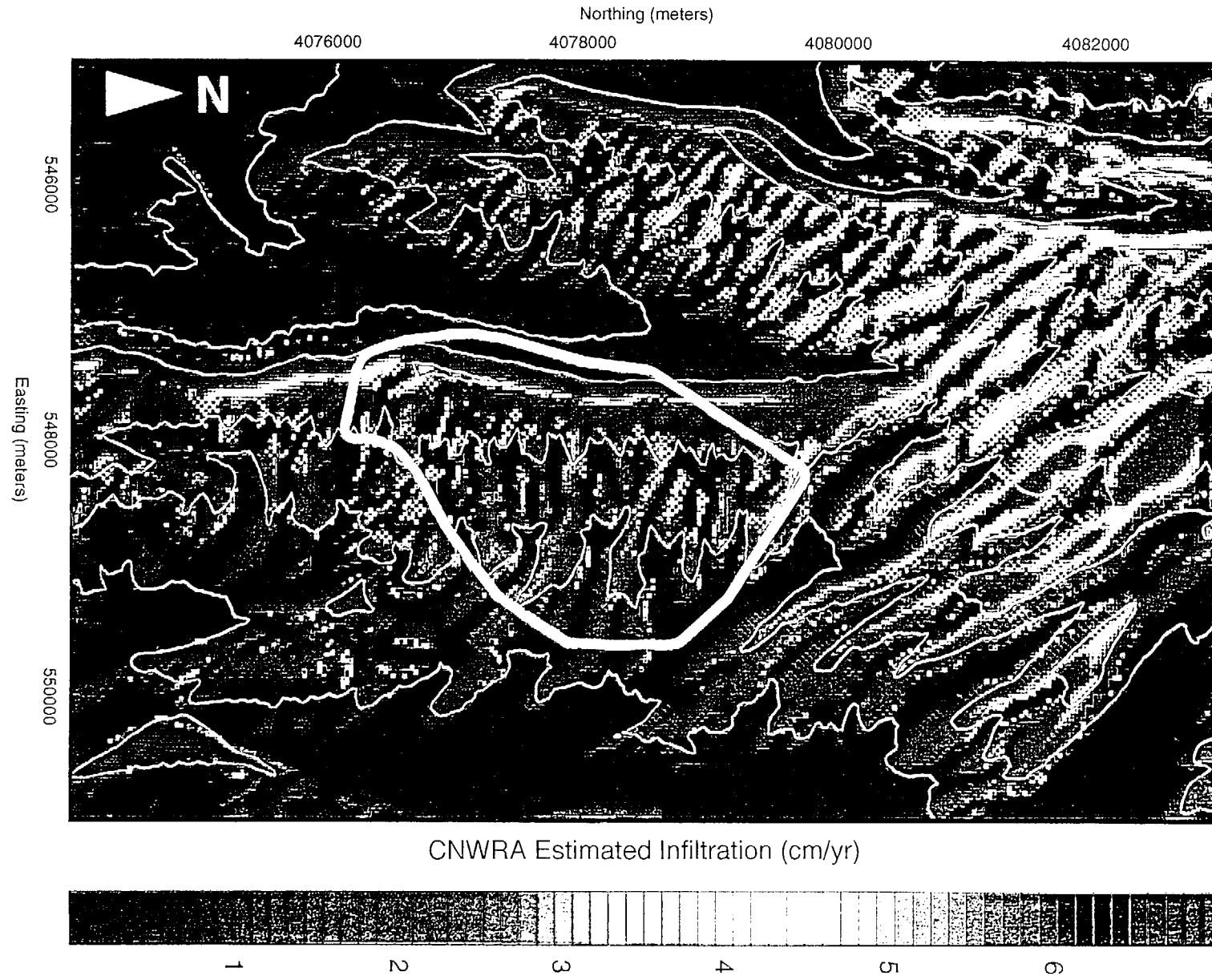


# CONCEPTUAL MODELS USED FOR INFILTRATION ANALYSES





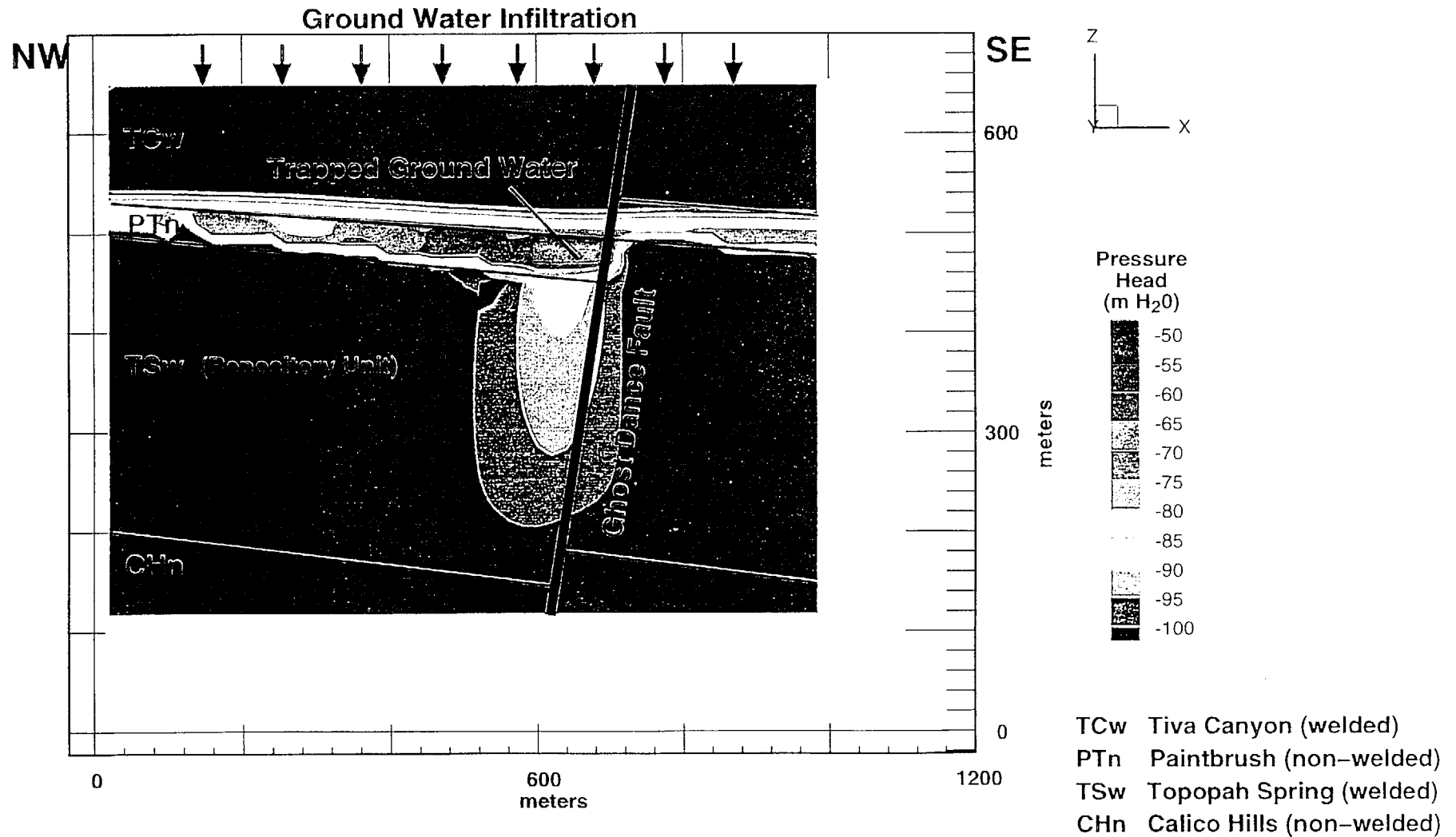
# ESTIMATE OF SHALLOW INFILTRATION



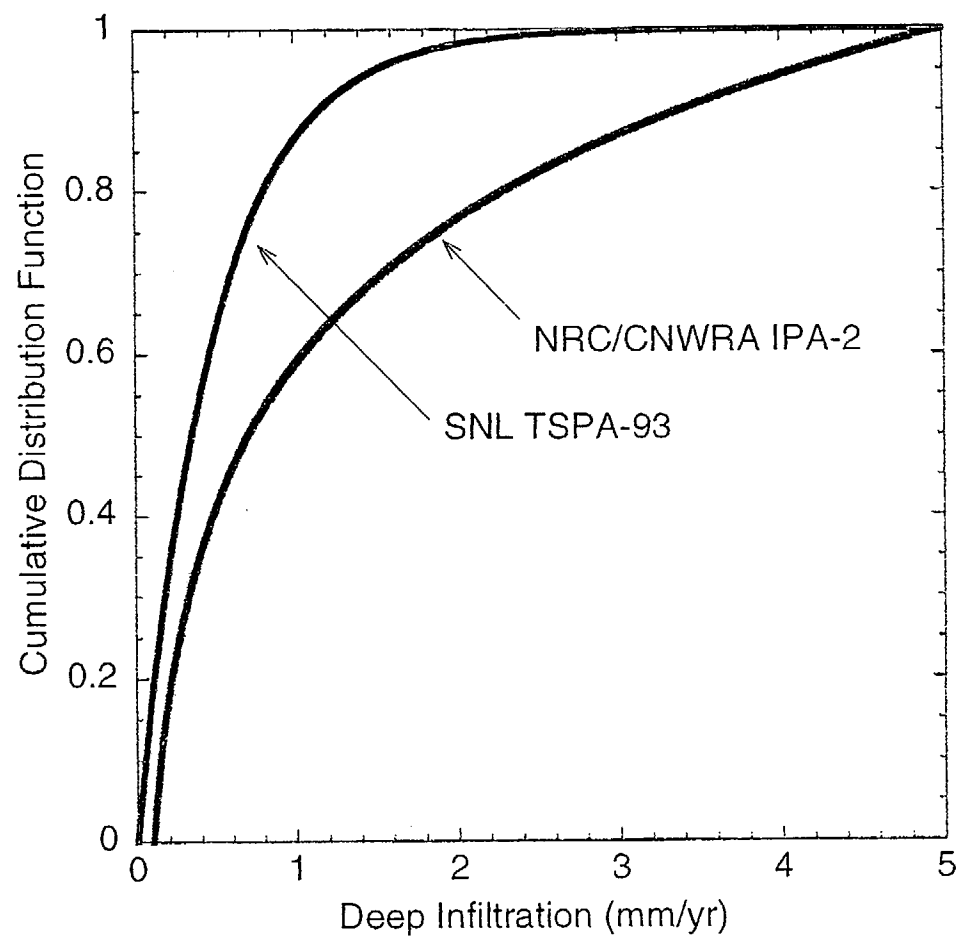
# **ACCOMPLISHMENTS TOWARD RESOLVING INFILTRATION**

- **Developed and Applied a Method for Estimating Shallow Infiltration Rate at Yucca Mountain**
- **Estimated Average Value of Shallow Infiltration as Approximately 12 mm/yr that Compares to the Recent USGS Estimate of 25 mm/yr**
- **Work is Ongoing to Resolve the Values of Deep Infiltration and the Potential for Formation of Perched Water Table**

# PROFILE VIEW OF FAULT-PLANE SECTION FOR GHOST DANCE FAULT

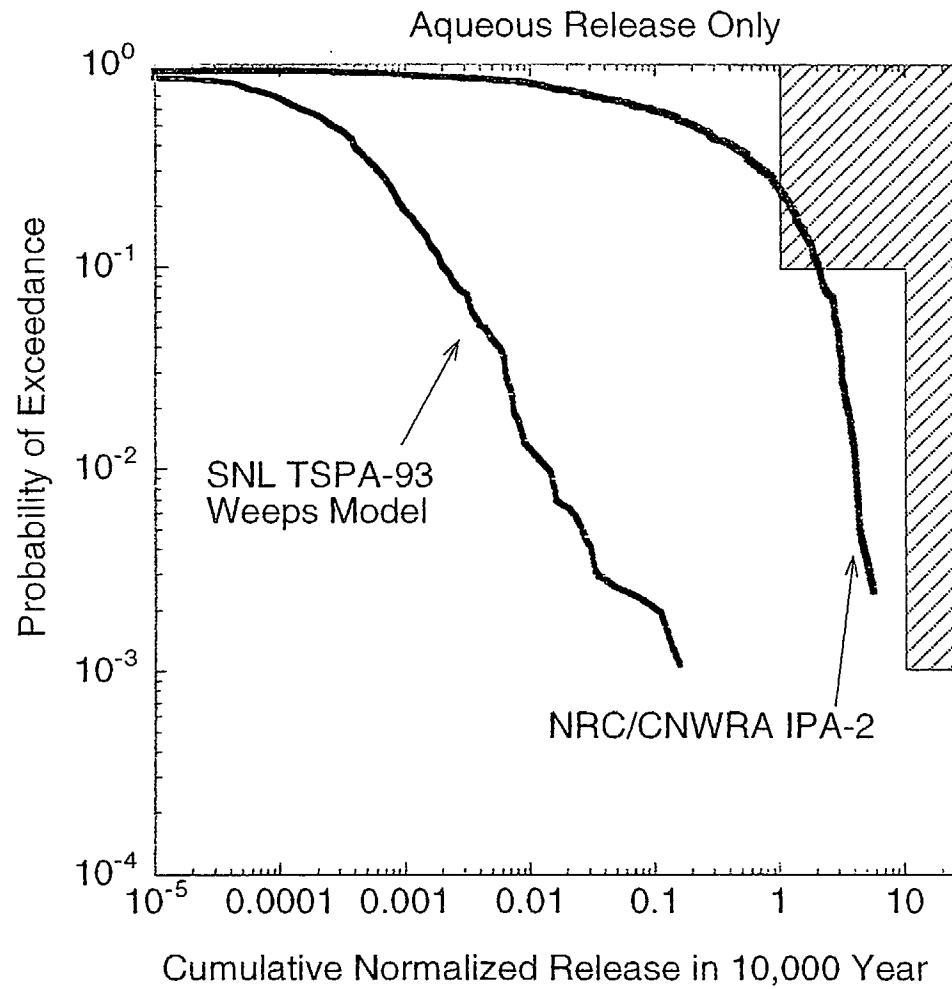


# PROBABILITY DISTRIBUTIONS FOR DEEP INFILTRATION



# COMPARISON OF TSPA RESULTS

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# **ROLE OF ITERATIVE PERFORMANCE ASSESSMENT IN ISSUE RESOLUTION**

- **Incorporate New Site Data and Models**
- **Conduct Sensitivity Studies Regarding the Relative Importance of Processes and Conditions**
- **Assess Adequacy of DOE Data for Bounding and Hypothesis Testing**
- **Incorporate New or Revised Models in the Total System Performance Assessment (TPA) Code**
  - Focused infiltration
  - Ash-dispersion model
  - Dose and risk calculations

# **SUMMARY**

- **Uncertainties Remain Regarding HLW Legislation, Out-Year Funding, and Regulatory Environment**
- **NRC Has Restructured its HLW Regulatory Program to Prepare for DOE's Viability Assessment and Subsequent License Application**
- **NRC Has Focused on Issue Resolution and Testing DOE's Waste Isolation and Containment Strategy Assumptions**
- **Major Concerns Due to Budget Actions**
- **Maintaining a Credible Regulatory Program is Vital to the Success of the National Program**

**ATTACHMENT 9**



## INTERACTIONS WITH EPA

- STAFF IS COOPERATING WITH EPA TO
  - Share results of CNWRA/NRC staff technical analyses
  - Achieve a consistent understanding of NAS recommendations
  - Acquire early insights on EPA strategy for proposed standards
  - Identify implementation difficulties early
  - Be prepared to draft formal agency comments on EPA proposal
- MEETINGS BETWEEN NRC AND EPA STAFF MEMBERS
  - October and December 1995
  - February 1996
  - March 1996
  - Weekly contacts between designated liaisons
- DRAFT OF EPA PROPOSED RULE TO OMB IN EARLY MAY
- AREAS OF KEY INTERACTIONS WITH EPA
  - 1) Risk Limit
  - 2) Compliance Period
  - 3) Specification of Exposure Scenario(s)
  - 4) Use of Assurance Requirements
  - 5) Specification of Separate Ground-Water Limits
- REVISION TO PT60 - 1 YEAR AFTER FINAL EPA STANDARD ISSUED

**ATTACHMENT 10**

## LICENSING SUPPORT SYSTEM

- DOE needs to institutionalize its decision making process
  - Document decisions into some type of electronic, retrievable format
  - Decision documentation must include underlying bases and appropriate supporting data
  - Decision documentation must be communicated to the NRC and other potential parties
- Topical Guidelines - guidance on the LSS topics, placed on hold at the Commission level, has been released for publication and should be issued soon
- HLW Licensing Support System
  - Current Status
    - NWPA targeted date of 1991 not met - current estimate > 1999
    - Original LSS assumptions no longer valid:
      - Full text database with images available 1991
      - Central repository essential to shared costs
      - Custom software needed to accomplish LSS goals
    - Document database does not meet Subpart J assumptions
    - Technology has changed
    - Cost estimates unreliable
    - Email now widely used for service
  - Options for the future
    - Abandon Subpart J and use Subpart G
    - Pursue off-the-shelf software
    - Rewrite Subpart G and J and consider other hearing alternatives
  - Developing a recommendation
    - Senior Management Team (SMT) recommends LSS reexamination
    - Consultation with LSSARP
    - New Commissioner views
    - Staff paper developed with SMT options
    - Commission decision on how to proceed mid-summer 1996
- Current status of NRC/DOE computer systems designed to support the HLW program:
  - NRC system is called the Consolidated Document Management System (CDOCS). CDOCS is a document management, full text/image storage and retrieval, software program.

- DOE system is its records management system not designed specifically for LSS support. The DOE system captures bibliographic headers, bit-mapped images, and some full text.
- The two systems are not directly compatible. System components are as follows:

AGENCY/ DEPARTMENT	SERVER/OPERATING SYSTEM	DATA BASE	SEARCH ENGINE
NRC	SUN (UNIX)	ORACLE	TOPIC
DOE	VAX (VMS)	INGRES	FULCRUM

- In the past, the NRC was developing three separate database systems which have been combined in CDOCS:
  - o Open-Item Tracking System (OITS)
  - o Technical Document Reference Database System (TDOCS), and
  - o Regulatory Program Database (RPD).

● NRC Recommendation

- Make respective data and existing systems available through the Internet via a web site
- NRC could provide access to appropriate CDOCS databases through commercially available Internet web servers such as Topic.
- As a pilot program, NRC could load some relevant data and let the LSSARP members exercise the system.
- Specifications would need to be developed for electronic document exchange
- State or outside groups could enter their data in a designated file on our host system
- Discussions would be necessary concerning appropriate distribution of waste fund money for continued support of the LSS.

**ATTACHMENT 11**

## STATUS OF PROCEDURAL AGREEMENT REVISION EFFORTS

- DOE and NRC formed a joint-agency task force to consider revisions to the Procedural Agreement to improve communication between agencies during the pre-licensing period. The members include:

### NRC

John Thoma  
Sandra Wastler

### DOE-HQ

Priscilla Bunton  
Chris Einberg

### DOE-YMP

April Gil  
Tom Bjerstedt

- DOE and NRC conducted a telecon on April 2, 1996 to discuss the goals of the task force and the schedule for revision to the Agreement.
- DOE has prepared a proposed revision to the Agreement which is now being reviewed within DOE; held joint discussion with NRC on a draft of the proposed revision on May 1, 1996.
- Proposed Schedule:

April 30, 1996

Draft for review and discussion

May 21, 1996

Task force meeting

**ATTACHMENT 12**

## DOCUMENTATION OF DOE DECISION MAKING PROCESS

- DOE needs to institutionalize its decision making process and put the documentation into some type of electronic, retrievable format.
  - Important for both the viability assessment and licensing.
- Not only must DOE decisions be documented, but the underlying bases and appropriate supporting data for those decisions must be documented. The safety case for the site and the licensing basis for the site are fundamentally the same case. DOE technical and licensing staff must work closely with the DOE legal staff to determine the level at which decisions do not need to be documented to support the licensing case. Decisions are made daily and at all levels of the organization. Many of these decisions are not relevant to the safety case to support licensing. For important decisions, elements that should be included in this institutionalized decision making process include the following:
  - The level and source of knowledge relevant to the licensing case will logically provide the basis for a specific decision. This would include all key references that were instrumental in the decision. Depending on the source of information, this may include key references contained in the references to a basic document describing the decision.
  - The DOE Office of General Counsel should set criteria according to the rules of evidence regarding the admissibility/defendability of the technical justification in a licensing hearing.
  - All the information meeting the criteria discussed above should be placed in a document retrievable system. The ideal case would be to place it in the LSS or some type of licensing document management system. However, if the LSS or licensing documentation does not exist or will not exist for some time, DOE should ensure the basic documentation remains retrievable from its own system until the time of licensing.
- The documented decisions and underlying bases must be communicated to (or be made available to) the NRC and other potential parties and Affected Units of Local Governments in a timely manner with sufficient lead time -- and in sufficient volume and detail -- in order to support assertions made about site suitability.



**ATTACHMENT 13**

# **NRC KEY TECHNICAL ISSUE RESOLUTION PLAN OVERVIEW AND EXAMPLE**

*Presented by:*

**Michael J. Bell**

**NRC-DOE Management Meeting  
May 8, 1996**

## **OUTLINE OF BRIEFING**

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- **OUTLINE OF A TYPICAL KTI IMPLEMENTATION PLAN**
- **RELATIONSHIP BETWEEN KTI AND PERFORMANCE**
- **RDTM KTI**
- **EXAMPLE SUBISSUE - SEISMIC DESIGN**
- **ISSUE RESOLUTION APPROACH**

# **OUTLINE OF A TYPICAL KTI IMPLEMENTATION PLAN**

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## **1.0 RATIONALE**

### **1.1 KEY TECHNICAL ISSUE (KTI)**

### **1.2 SIGNIFICANCE TO REPOSITORY PERFORMANCE**

## **2.0 FOCUS OF THIS KEY TECHNICAL ISSUE**

### **2.1 SUBISSUES**

### **2.2 KEY TECHNICAL UNCERTAINTY**

### **2.3 RELATIONSHIP TO LICENSE APPLICATION REVIEW PLAN**

## **3.0 PERSONNEL**

## **4.0 NRC TECHNICAL NEEDS**

### **4.1 PRIORITIES AND RESOURCES OF TECHNICAL NEEDS**

### **4.2 KTI INPUTS AND OUTPUTS**

### **4.3 ON-SITE REPRESENTATIVE SUPPORT**

## **5.0 SPECIFIC ACTIVITIES THAT MIGHT IMPACT DOE IN FY 96**

### **5.1 INTERACTIONS**

### **5.2 INFORMATION REQUESTS**

## **6.0 PRODUCTS, MILESTONES AND SCHEDULES FOR FY 96**

### **6.1 CNWRA RDTM ELEMENT AND NRC OPS PLAN DELIVERABLES**

# **ROLE OF GEOLOGIC REPOSITORY OPERATIONS AREA (GROA) IN MEETING PERFORMANCE REQUIREMENTS**

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## **PRECLOSURE PERFORMANCE OBJECTIVES**

- **PROTECTION AGAINST RADIATION EXPOSURE AND RELEASE OF RADIOACTIVE MATERIALS**
  - 'Safe' Operations
- **RETRIEVABILITY OF WASTE**
  - Maintain Retrieval Option  
(Stability of Openings)

## **POSTCLOSURE PERFORMANCE OBJECTIVES**

- **CONTAINMENT REQUIREMENT FOR THE WASTE PACKAGE**
  - Evaluate Near-Field TM Impacts (300-1000 YRS)
- **GRADUAL RELEASE OF RADIOACTIVE MATERIAL FROM WASTE PACKAGE**
  - Evaluate Near-Field TMH Impacts on EBS (Long-Term)
- **EPA STANDARD**
  - Evaluate Seal Design/Construction
  - Evaluate Seal Materials

# **RDTM KTI**

## **MAIN TOPICS AND SUBTOPICS**

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- **REPOSITORY DESIGN CONSTRUCTION OPERATION**

- ESF Design Construction Operation
- Design Control Process

→ ● **TM IMPACT EVALUATION**

- What are the Impacts of Thermal Loads on Design?

→ - What are the Impacts of Seismic Loads on GROA Design?

- What are the Long-Term Effects of Thermal and Seismic Loads on Rock Mass Performance and Resulting Impacts on WP Performance?
- What are the Long-Term Impacts on Total System Performance?

## **EXAMPLE SUBTOPIC FOR RESOLUTION**

### **WHAT ARE THE IMPACTS OF SEISMIC LOADS ON DESIGN?**

#### **NRC ACTIVITIES**

- **EVALUATION OF SEISMIC DESIGN**
  - **Review of seismic topical reports**
  - **Evaluation of rock joint constitutive model and modification to account for repetitive seismic loads**
  - **Sensitivity study and development of inputs to performance assessment**
  - **Development of review procedures/acceptance criteria**

# **PATH TO RESOLUTION: SEISMIC DESIGN**

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## **RESOLUTION REQUIRES:**

- **Evaluation of Data Quality and Sufficiency**
- **Evaluation of Acceptability of Seismic Design Methodology**
- **Evaluation of Adequacy of Models/Codes**
- **Evaluation of Adequacy of Design Inputs**
- **NRC/DOE Interactions**



## **DATA QUALITY & SUFFICIENCY**

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### **PATH TO RESOLUTION:**

- **DOE Collection of Data from ESF, Laboratory Studies, and Surface-Based Testing**
- **NRC Review of DOE Data and Synthesis Reports**

# **ACCEPTABILITY OF SEISMIC DESIGN METHODOLOGY**

## **PATH TO RESOLUTION:**

- **DOE Submits Revised Seismic Topical Report #2**
- **NRC Staff Reviews and Prepares Issue Resolution Report**

## **ADEQUACY OF MODELS/CODES**

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### **PATH TO RESOLUTION:**

- **DOE Presents “Verified” (Generally Accepted) TM Models/Codes**
- **NRC Selectively Evaluates DOE TM Models/Codes/Analyses  
Using its Own Models/Codes/Analyses**

## **ADEQUACY OF DESIGN INPUTS**

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### **PATH TO RESOLUTION:**

- **DOE Submits Seismic Topical Report #3 (?)**
- **NRC Staff Reviews and Prepares Issue Resolution Report**
- **NRC Staff Prepares Safety Evaluation Report for Topical Reports 1, 2 and 3**

## **NRC INTERACTIONS WITH DOE ON THIS SUBTOPIC**

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### **PERIODIC**

- **Quarterly ESF Technical Exchange  
(Next one scheduled for June 3, 1996)**

### **COMPLETED**

- **NRC/DOE Appendix 7 Meetings on Seismic Design at Las Vegas  
(3/13-14/96) and San Antonio (4/23/96)**

### **PROPOSED**

- **Appendix 7 Meetings to Discuss TR-3 (?)**

## **SUMMARY**

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- **FOCUS ON ISSUE RESOLUTION**
- **EFFICIENT AND EFFECTIVE INTERACTIONS**
- **TIMELY FEEDBACK**
- **CLEAR DOCUMENTATION OF ISSUE RESOLUTION**