

**ACNW'S INTEGRATED  
STRATEGY TO  
EVALUATE THE STAFF'S  
LICENSING CAPABILITY  
AND SUFFICIENCY  
REVIEW**

**Dr. B. John Garrick  
Chairman, ACNW  
March 22, 2001**

# Introduction

- **Strategy involves evaluating the staff's licensing review capability**
- **Strategy integrates several ACNW first-tier priorities (Figure 1)**
- **Strategy features a “vertical slice review” of DOE's technical basis documents for the site recommendation**

# ACNW 2000 Action Plan

## *Tier One Priorities*

Site  
Suitability  
and License  
Application

RIPB

YMRP

Decommissioning

Transportation

## *Tier Two Priorities*

Research

LLW

Risk  
Harmonization

 = included in integrated strategy

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Figure 1

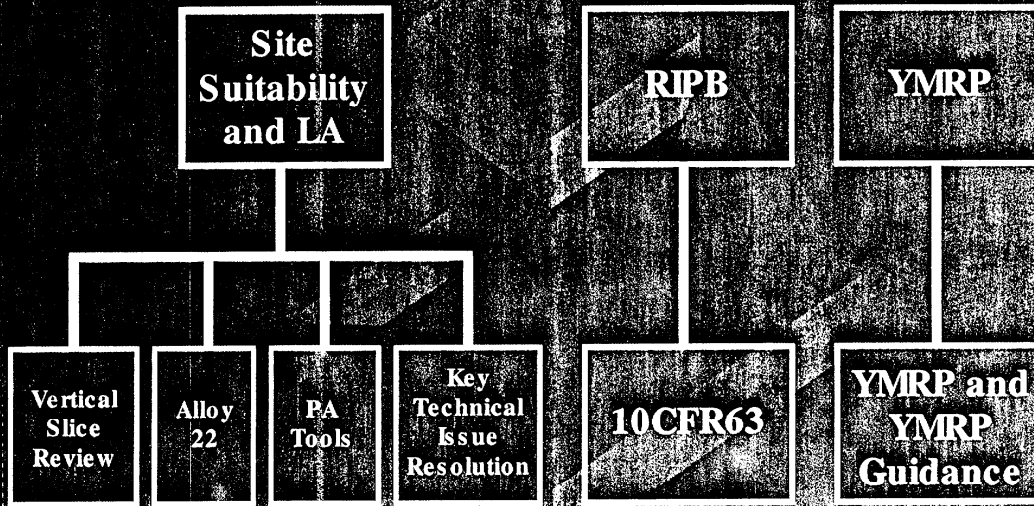
# **Introduction (Cont'd)**

- **Strategy Integrates (Figure 2):**
  - **Vertical Slice Review of Technical Basis Documents**
  - **Key Technical Issue (KTI) Resolution**
  - **Specific Technical Issues (e.g., Alloy 22)**

# **Introduction (Cont'd)**

- **Strategy Integrates (Figure 2) cont'd:**
  - **Performance Assessment (PA) tools**
  - **Proposed 10 CFR 63**
  - **Draft YMRP and Guidance**

# Topics of Integrated Strategy



= will be discussed in today's briefing

Figure 2

# **ACNW'S VERTICAL SLICE REVIEW**

**Dr. George M. Hornberger  
ACNW**

**March 22, 2001**

# **Vertical Slice Review**

- **ACNW's original approach to a sufficiency review (6/29/00) described an evaluation of DOE's technical basis documents**
- **Current approach is not a comprehensive review of DOE's technical basis**
- **Revised approach is a vertical slice review of NRC's sufficiency review**



# **Vertical Slice Objectives**

- **Is NRC's sufficiency review risk informed and performance based?**
- **Are the staff's sufficiency comments logical and defensible?**
- **Are there gaps in the staff's tools, guidance, and capability to review a possible LA for Yucca Mountain?**

# **Vertical Slice Approach**

- **Review selected KTIs to evaluate transparency, traceability, and defensibility**
- **Evaluate whether the staff's approach is reasonable and RIPB**
- **Become familiar with DOE's technical basis documents**

# **Vertical Slice Approach (Cont'd)**

- **Use YMRP guidance, IRSRs, and technical exchange agreements to guide review**
- **Interact with the NRC staff during review**

# **Vertical Slice Topics**

- **HLW chemistry review**
- **Saturated zone flow**
- **Thermal effects on flow**
- **Total system performance assessment**

# **Example of Vertical Slice Review – Saturated Zone KTI**

- **NRC subissue: ambient flow and dilution in the saturated zone flow**
- **NRC Status: closed-pending**

# **Example of Vertical Slice Review – Saturated Zone KTI**

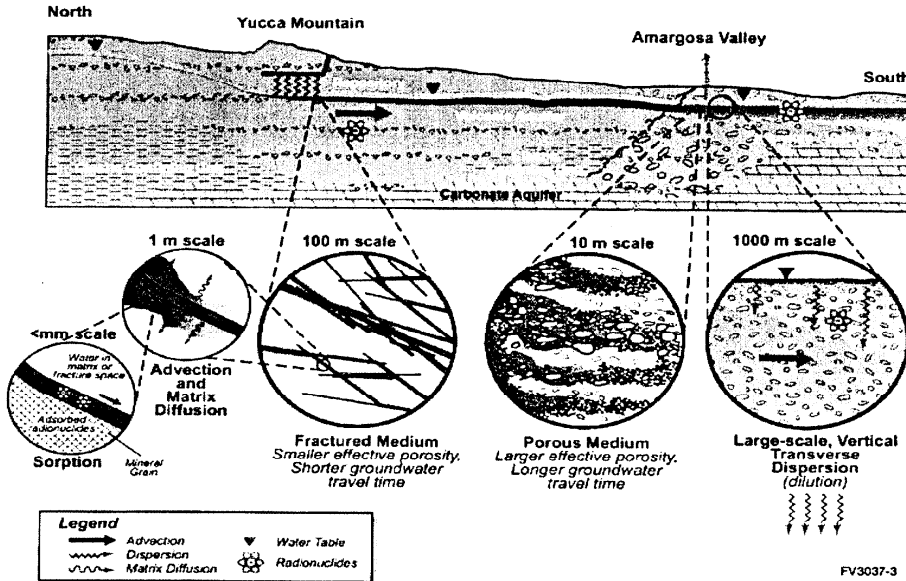
- **ACNW Approach:**
  - **Is the staff's basis for closed-pending status transparent?**
  - **Is NRC's approach RIPB?**

# **Example of Vertical Slice Review – Saturated Zone KTI**

- **DOE's current modeling approach**
  - **3D flow and transport model**
  - **principal axis oriented in SW-NE direction**
  - **anisotropic, stochastic parameters, alluvial uncertainty zone**

# Some NRC staff concerns about SZ flow:

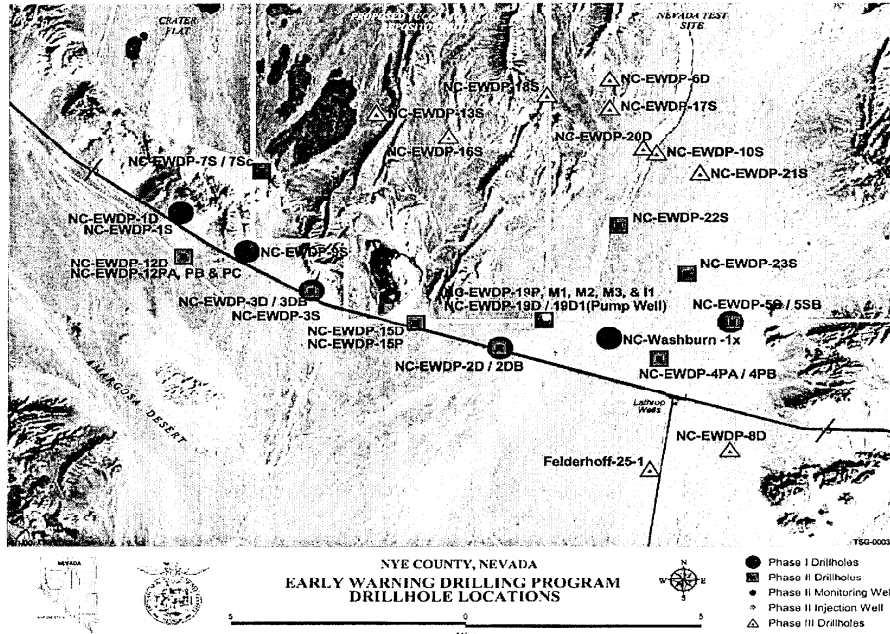
- Anisotropy?
- Flow paths in alluvium?
- Alternative conceptual models?





# Some NRC staff requests:

- Detailed plan for alluvial testing
- Justification for uncertainty of paths



# Products

- **Status of Issue Resolution**
- **Report on vertical slice reviews**
- **Comments on DOE's technical basis documents**
- **Report on the staff's sufficiency comments on DOE's technical basis documents**

**KEY TECHNICAL ISSUE  
(KTI)  
RESOLUTION**

**Mr. Milton Levenson  
ACNW  
March 22, 2001**

# **KTI Resolution**

- **Goal of issue resolution is to clarify what is needed for license application**
- **Based on technical exchange meetings, DOE submittals, and staff reviews**
- **Issue resolution is not compliance determination**

# Observations

- **Issue resolution process appears to be working**
- **Staff has capability to evaluate issue closure requirements**
- **Progress has been made in adopting risk-informed and performance-based (RIPB) approach**

# Concerns

- **Have all subissues been identified?**
- **Has integration been achieved?**
- **Has RIPB been implemented?**
- **Has public participation been appropriate?**
- **Will design evolution require major changes?**

# **Follow-up Questions**

- **Is the risk of the various KTI subissues and integrated subissues (ISIs) known or understood?**
- **Are the KTIs the most risk-significant issues identified by PA?**

# **ALLOY 22 CORROSION**

**Dr. Raymond G. Wymer**

**ACNW**

**March 22, 2001**



# **Importance of Issue**

- **Longevity of waste packages is a key attribute of DOE's Repository Safety Strategy**
- **DOE expects Alloy 22 to contain radionuclides for more than 10,000 years**

# **Previous ACNW Advice**

- **Bound environmental conditions affecting corrosion**
- **Understand corrosion mechanisms (e.g., stress corrosion cracking and pitting)**
- **Develop confirmatory data**

# **Observations and Conclusions**

- **Experiments by Nevada consultants not representative of Yucca Mountain**
- **Role of trace elements in corrosion not yet thoroughly investigated by DOE and NRC**
- **NRC and CNWRA identifying conditions where trace elements could influence results**

# Recommendations

- **Verify that absence of trace elements in previous work did not bias conclusions**
- **Evaluate key corrosion conditions at Yucca Mountain**
- **Understand corrosion mechanisms**

# Follow-up Questions

- **Are expectations of waste package performance limiting study of other features or processes (multiple barriers) that affect performance?**
- **For example, is radionuclide transport in the near-field being adequately addressed?**

**NRC STAFF  
PERFORMANCE  
ASSESSMENT  
CAPABILITY**

**Dr. B. John Garrick  
ACNW**

**March 22, 2001**

# **Previous Recommendations**

- **Strengthen capability in specific disciplines**
- **Improve methods for evaluating individual barrier performance**
- **Ranking importance of risk contributors**

# **Previous Recommendations (Cont'd)**

- **Peer review NRC's TPA code**
- **Utilize realistic models and parameters**
- **Improve transparency of the analyses**



# **TPA Peer Review**

- **Peer review of TPA Code conducted by independent team**
- **Peer members' comments currently being considered by staff**

# Conclusions

- **Staff is addressing ACNW concerns and improving their overall PA capability**
- **TPA code is evolving as an effective tool for evaluating DOE TSPA**
- **Committee is satisfied with progress**

# Follow-up Questions

- **How has uncertainty been evaluated?**
- **Are the key issues treated with conservative bounding assumptions or assessed more realistically?**

# Summary

- **Integrated strategy to evaluate staff's licensing capability and sufficiency review**
- **Includes works in progress and past letters**
- **Other aspects of the strategy include proposed 10 CFR 63 and draft YMRP**