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

PRESENTATION TO
THE NUCLEAR WASTE TECHNICAL REVIEW BOARD

SUBJECT: ALTERNATIVE DESIGNS
AND CONTINGENCY PLAN

PRESENTER: DR. THOMAS E. BLEJWAS

PRESENTER'S TITLE
AND ORGANIZATION: SUPERVISOR,
PERFORMANCE ASSESSMENT DEVELOPMENT DIVISION
SANDIA NATIONAL LABORATORIES
ALBUQUERQUE, NEW MEXICO

PRESENTER'S
TELEPHONE NUMBER: (505) 846-0541

MARCH 19-20, 1990
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ALTERNATIVE DESIGNS

PARAMETER VARIATIONS

• VARY BOREHOLE SPACING, DRIFT SPACING, STANDOFF, etc.

• BASED ON A GIVEN LAYOUT CONCEPT

• CAN ACCOUNT FOR DIFFERENT WASTE CHARACTERISTICS, INCLUDING AGE
ALTERNATIVE DESIGNS
(CONTINUED)

HORIZONTAL/VERTICAL OPTION

- PRELIMINARY RECOMMENDATION
  - VERTICAL AS THE REFERENCE ORIENTATION
  - TERMINATE ALL WORK ON LONG HORIZONTAL EMPLACEMENT
  - MAINTAIN FLEXIBILITY IN ESF TO POSSIBLY PERFORM HORIZONTAL TESTS
  - RE-EXAMINE THE ORIENTATIONS AT THE START OF ACD

OTHER OPTIONS ARE UNDER CONSIDERATION AS PART OF THE ALTERNATIVES STUDY
# Emplace Only Very Old Waste?

<table>
<thead>
<tr>
<th>Design Requirement</th>
<th>Present Approach</th>
<th>50-Year Old Waste</th>
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<tbody>
<tr>
<td>Limit Temperatures near borehole</td>
<td>Limit APD</td>
<td>Easily met - temp. even lower</td>
</tr>
<tr>
<td>Limit Temperatures on container and borehole wall</td>
<td>Limit APD</td>
<td>Easily met - temp. even lower</td>
</tr>
<tr>
<td>Limit surface temp. rise and uplift</td>
<td>Not a significant factor</td>
<td></td>
</tr>
<tr>
<td>Limit the extent of saturated conditions</td>
<td>Complex local flow field will require better understanding</td>
<td>Local flow field less altered - advantage indeterminate</td>
</tr>
<tr>
<td>Limit the corrosiveness of the container environment</td>
<td>Containers can be kept hot and dry</td>
<td>Cannot ensure a hot environment; potential for drying is lower</td>
</tr>
<tr>
<td>Limit the temp. in adjacent units to reduce mineral alteration</td>
<td>Temperatures can be met and alterations probably not important</td>
<td>Temperatures lower - alterations less likely</td>
</tr>
</tbody>
</table>
CONTINGENCY PLAN FOR REPOSITORY DESIGN AND OPERATIONS

- CONDITIONS OUTSIDE THE DESIGN BASIS
  - PERCHED WATER
  - WATER RECHARGE PATHWAYS
  - LITHOPHYSAE-RICH ZONES
  - OTHER

- RANGES OF PARAMETERS
  - BASELINE DESIGN APPLIES
  - CONTINGENCY PLAN DESCRIBES MODIFICATIONS
  - RANGE FALLS OUTSIDE THAT APPROVED IN LICENSING

- EXPECT TO USE EXISTING EMPIRICAL PROCEDURES FOR MECHANICAL STABILITY

- MAJOR FAULTS WILL BE INCLUDED IN THE BASELINE DESIGN

- MINOR FAULTS MAY TRIGGER CONTINGENCY MEASURES DEPENDING ON PARAMETERS
IMPLEMENTING MODIFICATIONS

- CONTINUE DEVELOPMENT, BUT WITH REVISIONS (e.g., INCREASED GROUND SUPPORT OR REDUCED THERMAL LOADING)

- SKIP AND ISOLATE UNFAVORABLE AREAS