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

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

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?

DESIGN REQUIREMENT	PRESENT APPROACH	50-YEAR OLD WASTE
LIMIT TEMPERATURES NEAR BOREHOLE	LIMIT APD	EASILY MET - TEMP. EVEN LOWER
LIMIT TEMPERATURES ON CONTAINER AND BOREHOLE WALL	LIMIT APD	EASILY MET - TEMP. EVEN LOWER
LIMIT SURFACE TEMP. RISE AND UPLIFT	NOT A SIGNIFICANT FACTOR	-
LIMIT THE EXTENT OF SATURATED CONDITIONS	COMPLEX LOCAL FLOW FIELD WILL REQUIRE BETTER UNDERSTANDING	LOCAL FLOW FIELD LESS ALTERED - ADVANTAGE INDETERMINATE
LIMIT THE CORROSIVENESS OF THE CONTAINER ENVIRONMENT	CONTAINERS CAN BE KEPT HOT AND DRY	CANNOT ENSURE A HOT ENVIRONMENT; POTENTIAL FOR DRYING IS LOWER
LIMIT THE TEMP. IN ADJACENT UNITS TO REDUCE MINERAL ALTERATION	TEMPERATURES CAN BE MET AND ALTERATIONS PROBABLY NOT IMPORTANT	TEMPERATURES LOWER - ALTERATIONS LESS LIKELY

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