



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 07 1993

NOTE TO: File

FROM: Joseph J. Holonich, Director
Repository Licensing and Quality Assurance
Project Directorate
Division of High-Level Waste Management

SUBJECT: MANAGEMENT MEETING WITH THE U.S. DEPARTMENT OF ENERGY ON CHANGES
BEING CONSIDERED FOR THE EXPLORATORY STUDIES FACILITY

On July 2, 1993, Joe Youngblood, Director, Division of High-Level Waste Management (HLWM), John Linehan, Deputy Director, HLWM, Raj Nataraja and I met with Dwight Shelor and Carl Gertz from the U.S. Department of Energy (DOE). The purpose of the meeting was to have DOE make a short presentation on the changes under consideration for the Exploratory Studies Facility (ESF), and to discuss the considerations (pros and cons) regarding the proposed ESF changes. A copy of the two DOE presentations is attached. In addition to the technical information presented, DOE also provided its schedule for briefing other program participants including the Nuclear Waste Technical Review Board (TRB), the State of Nevada, affected units of local government, and others. Basically, DOE planned to present the same briefing to the State and local governments by July 9, 1993, and to the TRB at its next meeting on July 14 and 15, 1993. A copy of the DOE schedule is also attached.

Joseph J. Holonich, Director
Repository Licensing and Quality Assurance
Project Directorate
Division of High-Level Waste Management

cc: w/o Enclosure *on the shelf*
BJYoungblood
JLinehan
MNatagaja

w/Enclosures
RBallard
MFederline
PDR
LDPR

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TRW Environmental Safety
Systems Inc.

ESF CHANGES UNDER CONSIDERATION

PROGRAM MANAGEMENT REVIEW

R. M. SANDIFER

JUNE 30, 1993

B&W Fuel Company
Duke Engineering & Services, Inc.
Fluor Daniel, Inc.

INTERA Inc.
JK Research Associates, Inc.
E. R. Johnson Associates, Inc.

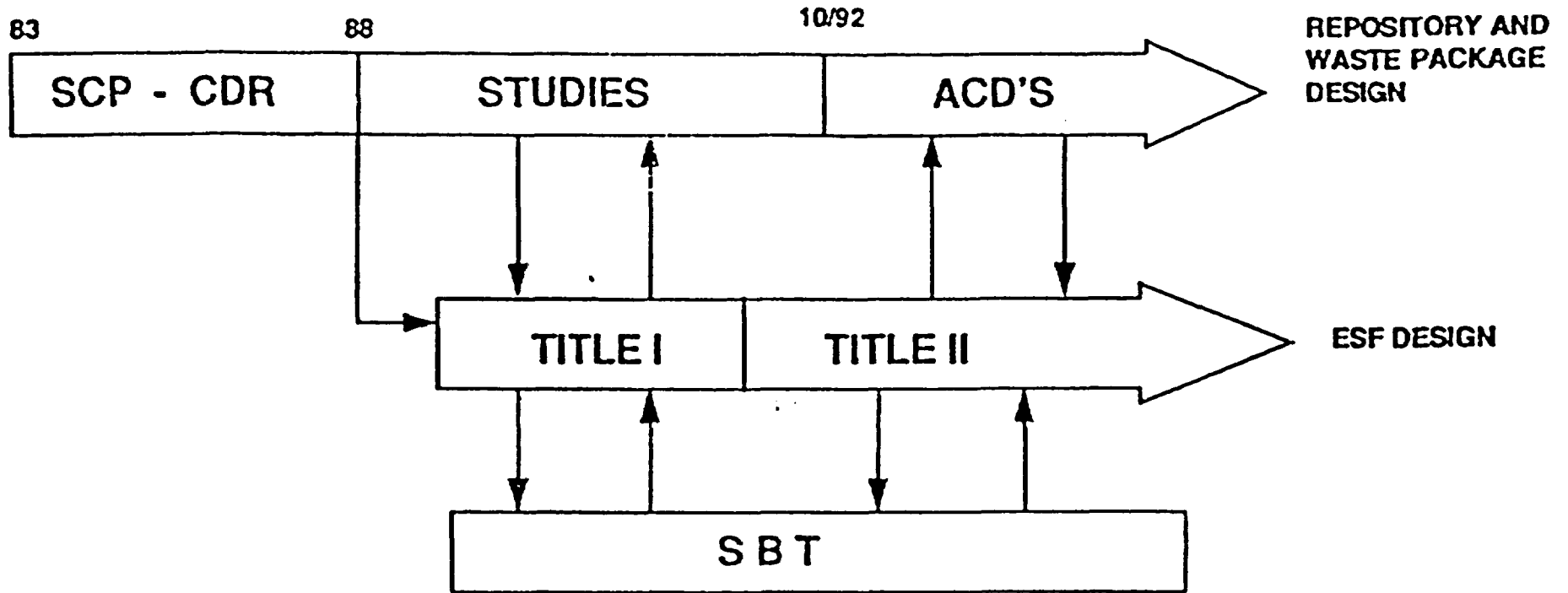
Logicon RDA
Morrison Knudsen Corporation
Woodward-Clyde Federal Services

ESF Changes Under Consideration

6-30-93

- **Introduction, Managing Design Change**
- **ESF Reconfiguration**
- **SBT Adjustments To Support Reconfiguration**
- **North Portal Entrance Redesign**

MANAGING DESIGN CHANGE



MANAGING DESIGN CHANGE

- **TITLE I/TITLE II**
- **CHANGE DRIVERS**
 - **New Information (ACD's, Underground Testing, and SBT)**
 - **Vendor Problems/Inputs**
 - **Design Refinements**

ESF RECONFIGURATION

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WHY DO WE NEED TO ADJUST THE ESF CONFIGURATION?

- **New Information**
 - Recent drilling results indicate the TSw1 - TSw2 contact is higher at the North end of the block than previously thought
 - Current waste package work is considering a much heavier waste package than before
 - Preliminary indications are that the Ghost Dance Fault may be a more significant feature than previously thought
- **Preserve Repository Design Flexibility**

WHAT DOES THE NEW INFORMATION PROVIDE?

- A higher TSw1 - TSw2 contact in the North allows the development of a flatter layout. (ie: one which allows the use of conventional rail haulage) Also allows the distance from emplacement area to water table to be increased
- A heavier waste package means that rail haulage in a potential repository would be much more desirable than previously thought
- A wide and highly fractured Ghost Dance Fault would put a premium on potential repository layouts which minimize the number of Ghost Dance penetrations

HOW DO WE PRESERVE REPOSITORY DESIGN FLEXIBILITY?

- **Develop an ESF configuration which can accommodate various underground repository layout and transportation concepts while accomplishing the objective of properly characterizing the site**

AN ENHANCEMENT TO THE CURRENT ESF LAYOUT HAS BEEN DEVELOPED WHICH WOULD:

- **Maintain the portal location and azimuth of the North Ramp**
- **Result in having no grade in excess of 2.7% in the North Ramp, Main TSL drift, and South Ramp**
- **Preserve repository design flexibility to a much greater degree than the current configuration, including concepts which increase the distance from emplacement drifts to the water table**

ENHANCEMENT

(continued)

- Better accommodate repository layouts having flat emplacement drifts, and layouts which seek to avoid having emplacement drifts cross the Ghost Dance Fault
- Maintain the full scope of site suitability and characterization testing provided by Option 30, and significantly enhance the characterization of the Ghost Dance without affecting repository layout flexibility

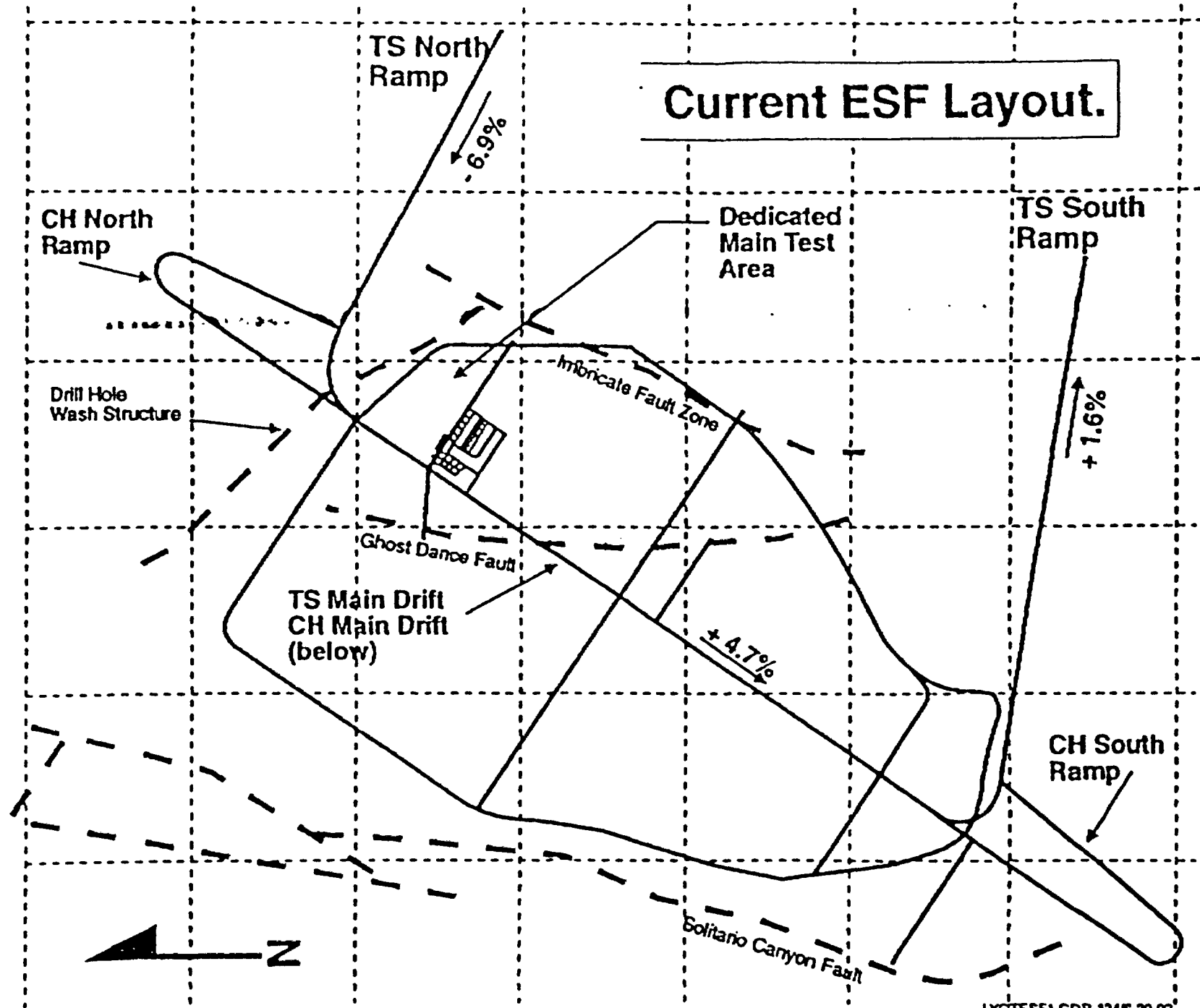
LINK TO PREVIOUS WORK

- The need for changes of this nature was foreseen at the end of the ESFAS, and was accounted for in YMP/91-28. This document provides the “bridge” between the selection of Option 30 during the ESFAS and the slightly modified “reference design concept” which was used to begin Title I Design

SUMMARY CHART FROM ESFAS

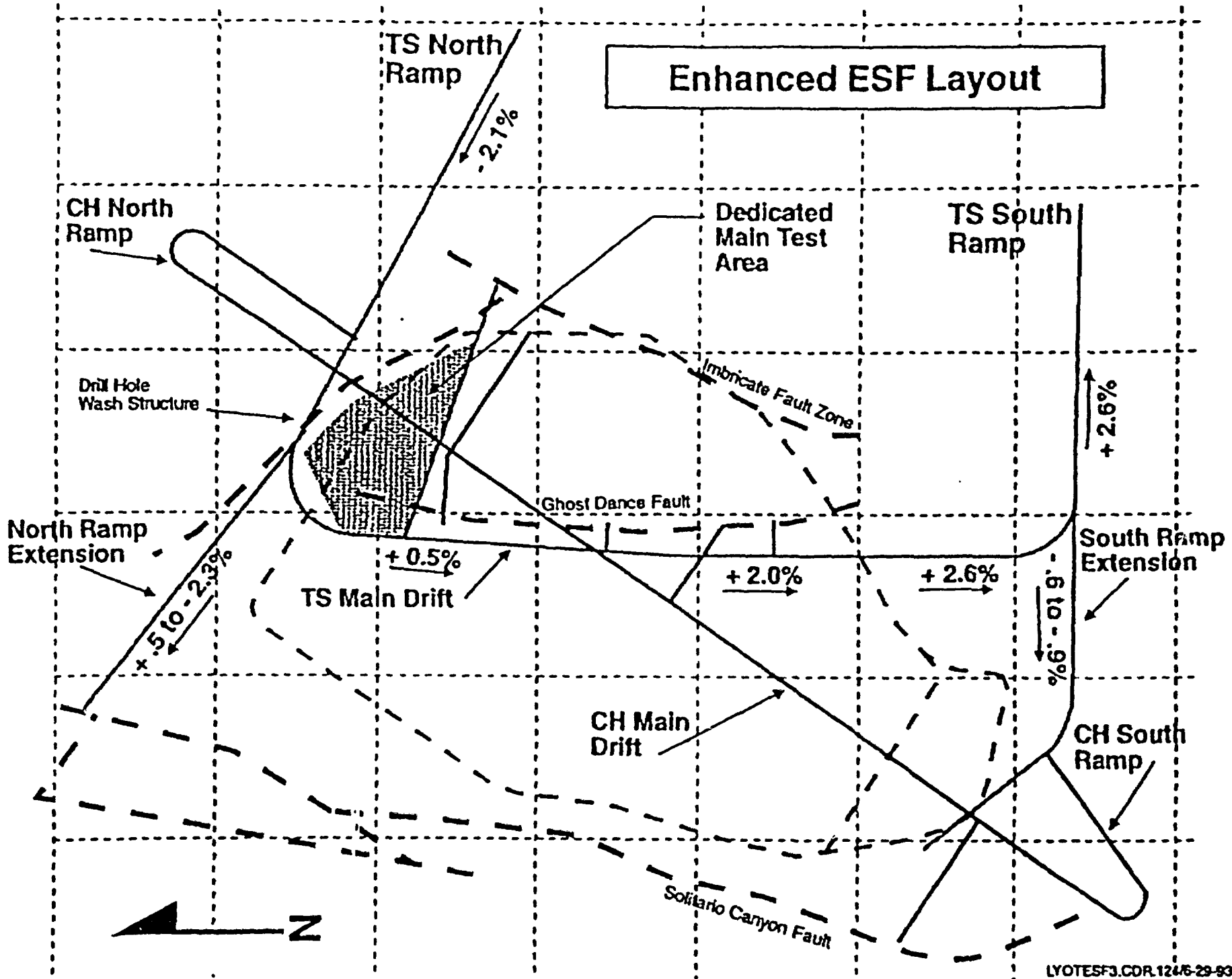
		1	2	3	4	5	6	7	8	9	10	11	12	13
RANK	TOP RANKED OPTIONS	NUMBER OF RANK (8)	NUMBER OF SHAFT (8)	NUMBER OF ACCESS	MT. LOCATION FLEXIBILITY	MECHANICAL-MINED ACCESS	NO GRAVITY FLOW PATHWAY FROM ITS UNITS TO CHK	MAXIMIZE DISTANCE FROM EMPACEMENT LEVEL TO WATER TABLE	AVOID EMPACEMENT CORIETS CROSSING GHOST DANCE FAULT	MAXIMIZE EXPOSED ROCK ON AND OFF BLOCK	FLEXIBILITY FOR EARLY DRIFTING IN ITS COR FOR BOTH	MINIMIZE GHOST DANCE FAULT IN ITS	MINIMIZE DRIFTING IN ITS	LARGER MTC AREA TO AVOID INTERFERENCES
1	30	2	0	4	✓	✓	✓	⊙	⊙	✓	✓	✓	✓	✓
2	23	2	0	4		✓					✓	✓	✓	✓
3	24	1	1	5		✓					✓	✓	✓	✓
4	13	2	0	4	✓	✓				✓	✓	✓	✓	✓
5	6	2	0	4		✓						✓	✓	✓
6	7	1	1	5		✓					✓	✓	✓	✓
7	2	1	1	5							✓	✓	✓	✓
8	19	1	1	5							✓	✓	✓	✓
9	25	1	1	5		✓					✓	✓	✓	✓
10	4	1	2	5						✓	✓	✓	✓	✓
.	.													
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20	15	1	1	4				✓	✓		✓	✓	✓	✓

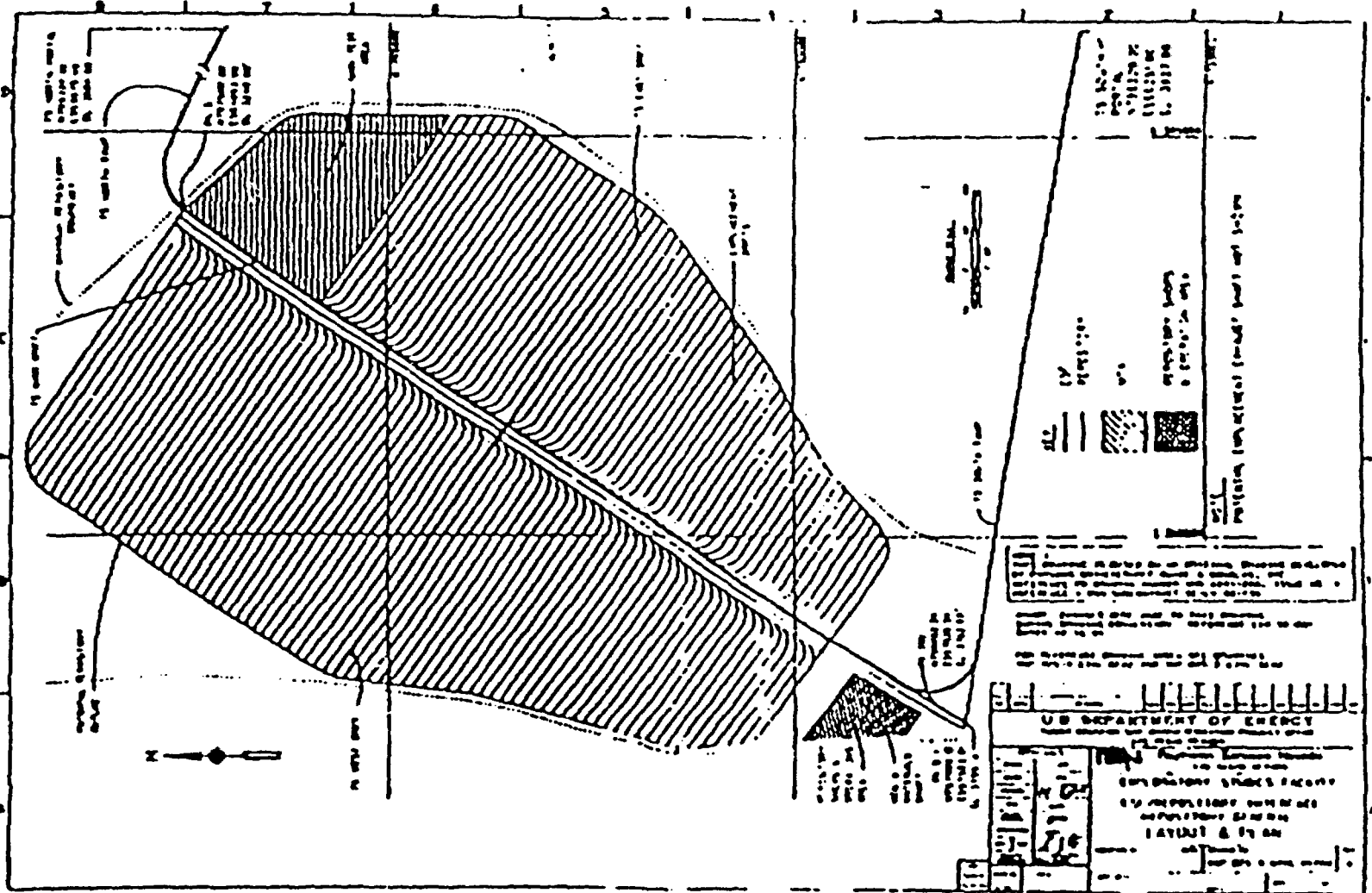
Current ESF Layout.



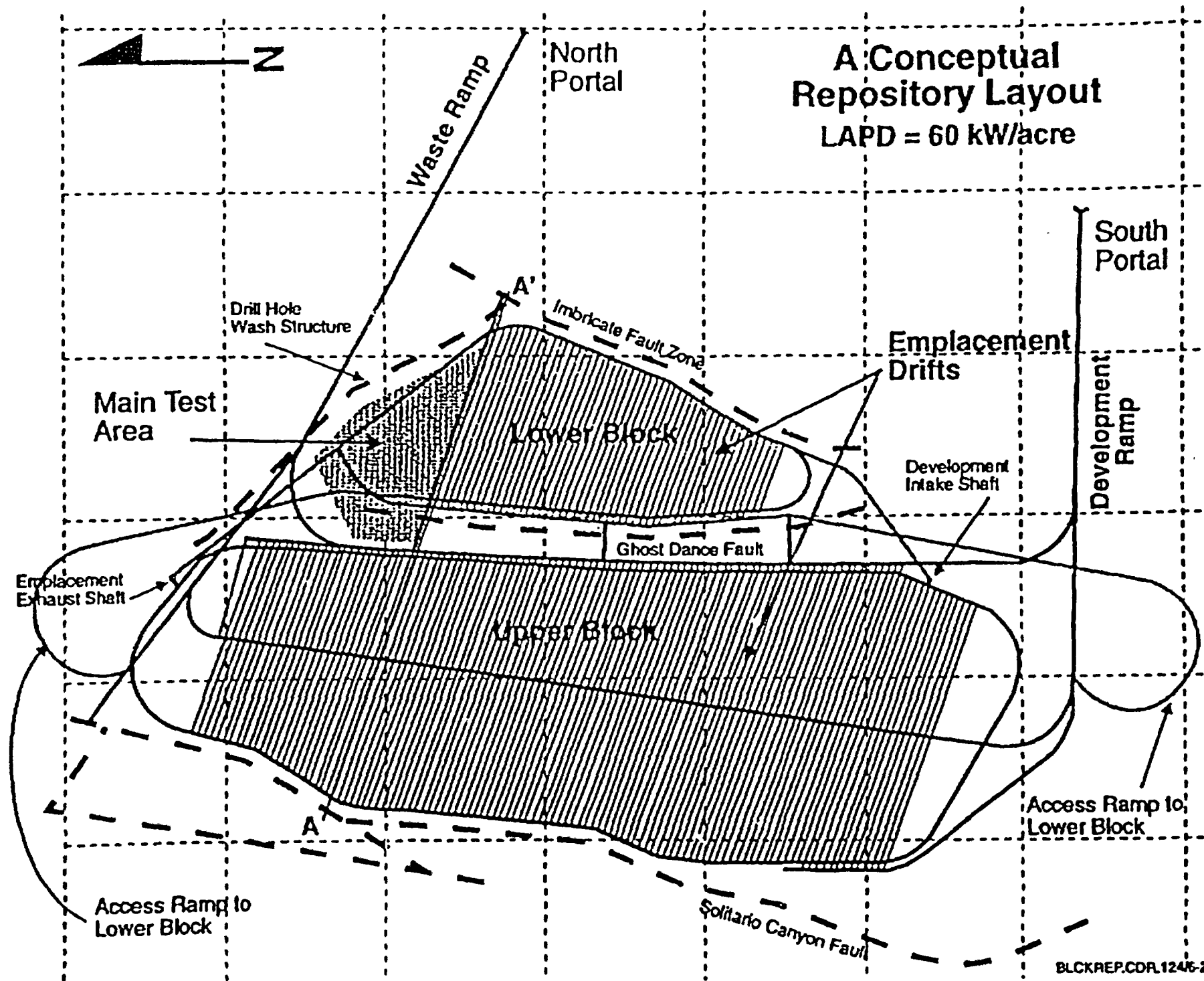
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Enhanced ESF Layout



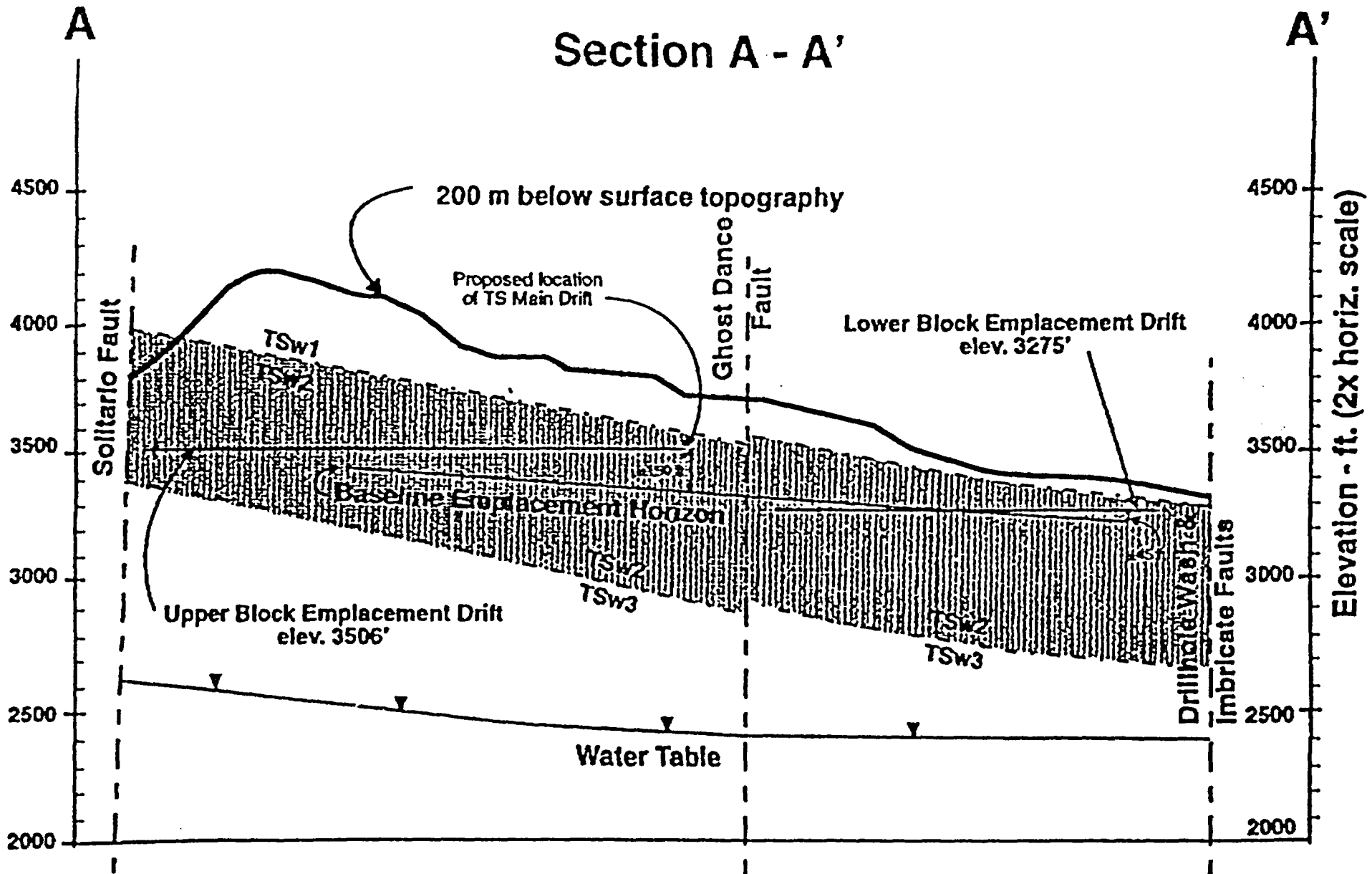


Repository Layout
Current Baseline



**A: Conceptual
Repository Layout**
LAPD = 60 kW/acre

Section A - A'



Note: Plane of section cuts through lowest emplacement drift in step-block layout.

ADVANTAGES OF THE ENHANCED ESF LAYOUT

- **Enhances Site Characterization ability**
 - **Multiple Ghost Dance Fault contacts can be made with relative ease**
 - **Two Solitario Canyon Fault contacts are planned instead of one**
 - **Ramp extensions give a good look at a large percentage of the vertical extent of the TSw2 interval**
- **Enhances Repository Design Flexibility**
 - **Preserves option for conventional rail haulage**
 - **Preserves option to increase distance from emplacement drifts to water table**
 - **Preserves option to avoid multiple crossings of Ghost Dance Fault with emplacement drifts**
 - **Does not preclude any conceivable repository layout option**

ADVANTAGES OF THE ENHANCED ESF LAYOUT (continued)

- **Enhances ESF Constructability**
 - **Flatter slopes significantly improve safety aspects of underground operations**
 - **Flatter slopes allow servicing the TBM using conventional rail haulage--as is the norm in virtually all TBM tunnels of comparable length**

DISADVANTAGES OF THE ENHANCED ESF LAYOUT

- **Requires redirection of SBT program**
- **Delays gathering of drill hole data regarding water table gradient and unsaturated zone conditions**
- **Potential programmatic impacts (NRC, TRB, State)**
- **Requires more definitive understanding of Ghost Dance Faulting prior to excavation of TS main drift**

PROJECT ACTION PLAN

- Proceed with construction of the starter tunnel at the reduced gradient (Package 2A)
- Continue analysis--prepare revised drawings showing details of the proposed change
- Prepare impact analysis which defines changes to baseline cost and schedule resulting from implementation of the proposed enhancement
- Present to the Project Change Control Board
- If approved by the CCB, proceed with change to Technical Baseline using normal change control procedures

SBT ADJUSTMENTS TO SUPPORT ESF RECONFIGURATION

**Civilian Radioactive Waste
Management System**

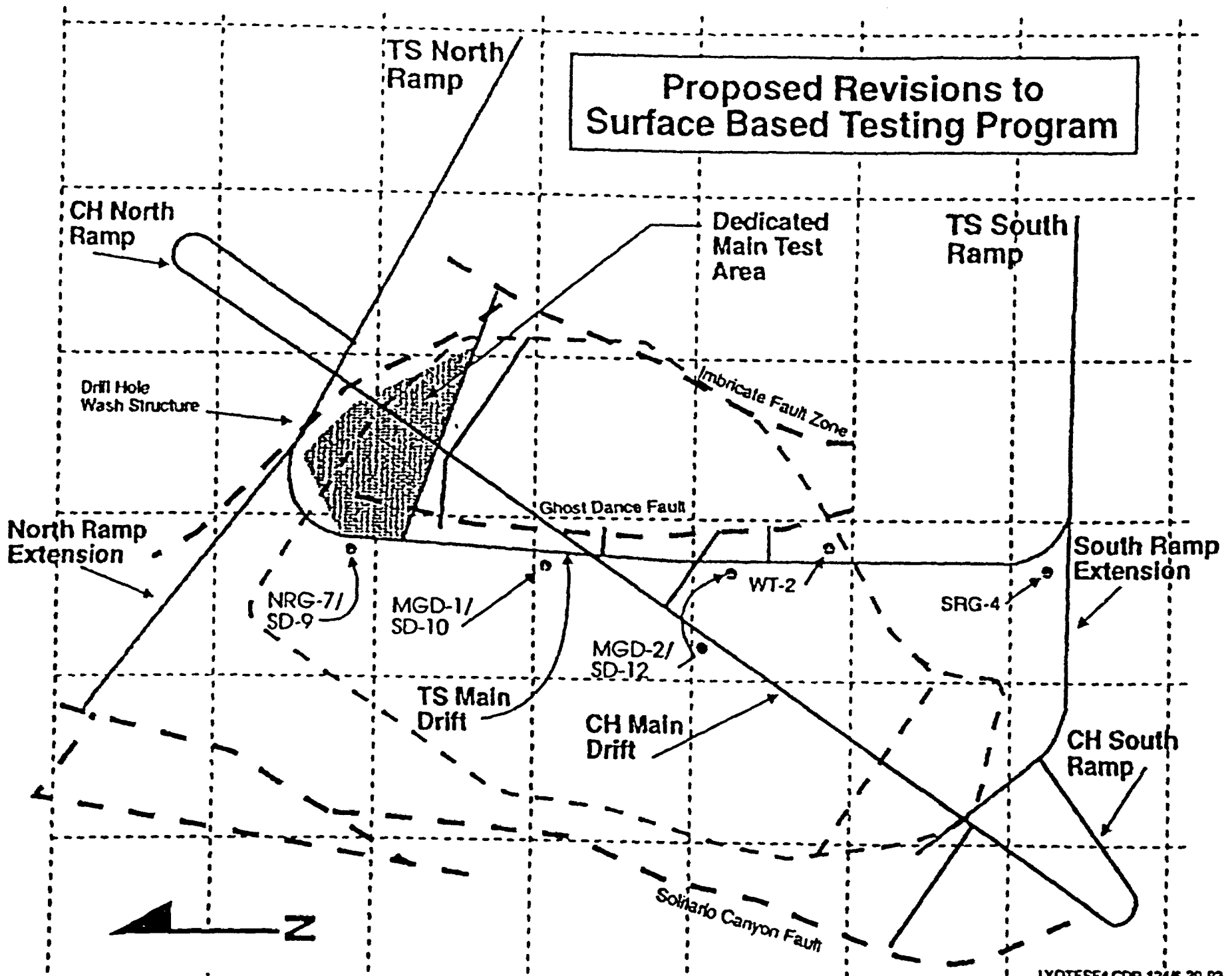
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Proposed Revisions to Surface Based Testing Program



NORTH PORTAL ENTRANCE REDESIGN

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LV 970.0000

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Multi-Plate Originally Chosen Because:

- **Lack of rock properties data for high wall**
- **Concern about safety of original high wall concept**
- **Concern with appearance and large scar on mountain**

Why Re-Evaluate North Portal Entrance Design?

- Rock properties data now known
- Opportunity to use less costly, but just as safe solution
- Difficulties with ARMCO procurement
- Design process is inherently interactive and subject to re-evaluation

CONCEPT 1 - Multi-Plate Structure

- **Box Cut with ARMCO and Backfill. Looks like highway culvert**
- **Use Cut and Cover Concept - cut out box, install tin whistle, and cover with soil**

CONCEPT 2 - Shotcrete

- Remove temporary chain link fencing, add wire mesh, and shotcrete (or gunite) the wall or walls

CONCEPT 3 - Steel Sets

- Specially designed, curved steel girders at 4' on-center with plate spanning between
- Or use pre-cast concrete arches
- Use cut and cover concept-similar to Concept #1

PROJECT ACTION PLAN

- **ARMCO Procurement Cancelled**
- **Existing box cut is safe in the short term, but seismic analysis will be performed soon**
- **Perform Value Engineering Study to determine optimal design solution**
- **Develop recommendation and implement through CCB**

Consideration Regarding Proposed ESF Changes

Considerations Regarding Proposed ESF Changes

1. Orientation of main drifts relative to fracture orientation and in situ stress could cause support problems
2. Upper limit of potential repository horizon is raised which may cause disqualification under 10 CFR Part 960 (200m depth)
3. Changes require demonstration that alternative design features have been considered (10 CFR 60.21) with respect to waste isolation capability

Considerations Regarding Proposed ESF Changes (Continued)

4. Need documentation that the proposed concept can function with a minimum number of accesses
 - NRC suggested 4 openings
5. Proposed changes may not provide representative data or adequate east-west exploration (NRC/NWTRB concern)
6. New data on Ghost Dance faulting needs to be assessed:
 - Offset data for Ghost Dance may be needed for parallel drifting
 - Development in SE quadrant may be precluded by other major faulting

Considerations Regarding Proposed ESF Changes (Continued)

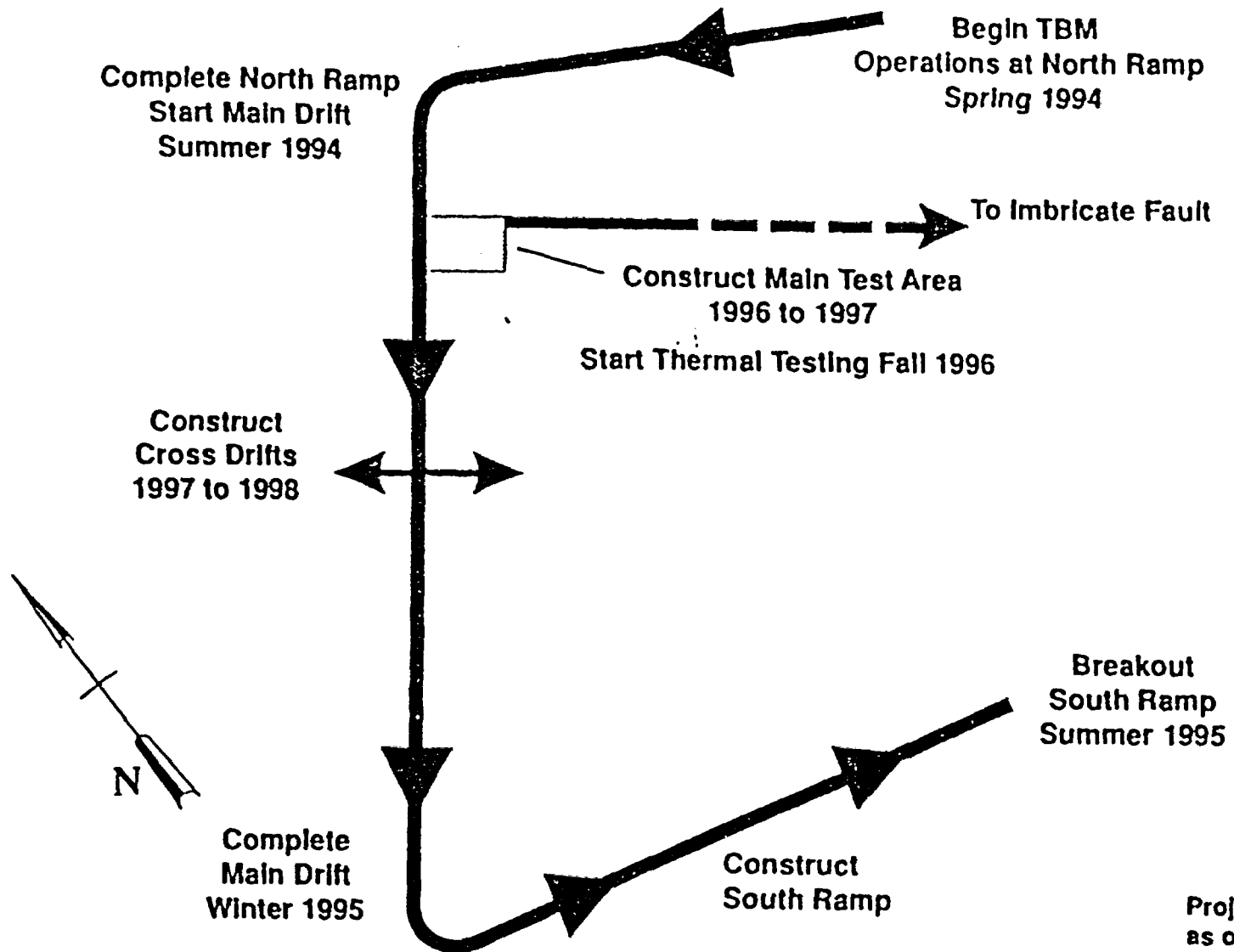
7. Address concerns about test program implementation:

- West ramp extension versus east-west drift
- Core test area access difficult and costly
- Representativeness of testing for south emplacement

8. East-west step in repository could induce perturbations in system performance, especially at high thermal loads

9. Changes to the baseline concept should be managed and reflect an effective design control program

INITIAL 5-MILE RAMP/DRIFT LOOP WILL PROVIDE EARLY SITE SUITABILITY INFORMATION



Projected schedule
as of April 20, 1993
Plan View

A Plan To Communicate Issues to the NRC, NWTRB, to Affected Parties and Others

Frequency: Quarterly Basis

Place: Las Vegas

Type of Meetings: Two held if appropriate. One to affected parties 1 week before NRC/TRB meeting; second 1 week after NRC/TRB meeting at information office

July 1993 issues:

- ESF design evolution**
- Thermal loading**

**A Plan To Communicate Issues to the NRC,
NWTRB, to Affected Parties and Others
(Continued)**

Action:

**Presentation to OCRWM/HQ by YMP on
Wednesday, June 30**

**Phone call July 1 from Ace to Dreyfus for
concurrence on meetings**

**July 1 or 2 - Send out letter to affected parties
announcing meetings**

**July 2 - M&O and YMPO work on presentation
concepts**

July 8 - Dry run for affected parties meeting

July 8 - Inform NRC on-site reps

**A Plan To Communicate Issues to the NRC,
NWTRB, to Affected Parties and Others
(Continued)**

Action:

July 9 - Affected parties meeting

**July 9 - Discuss possible story ideas with RJ
(Optional)**

July 13/14 -TRB meeting in Denver

Week of July 13 - Brief key Congressional staff

July 20 - Follow up MTG YMFO

July 28 - NRC Design control MTG