



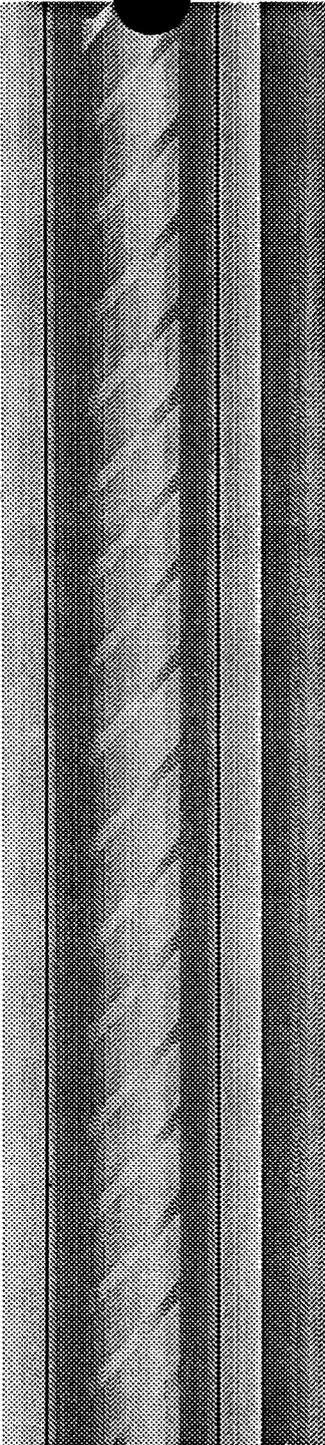
NYE COUNTY EARLY WARNING DRILLING PROGRAM UPDATE

**Nick Stellavato
On-Site Representative
Nuclear Waste Repository Project Office**

**Nuclear Waste Technical Review Board
Las Vegas, Nevada
June 24, 1998**

EWDP STATUS

- **8 Well locations have been staked and surveyed by GPS**
- **Preexisting well designated 'Washburn' to be included into program**
- **Felderhoff 25-1 O&G Test well to be completed as a deep carbonate well**
- **Well NC-EWDP-8S moved and renamed NC-EWDP-8D**



Progress

- **Evaluating existing gravity, magnetics and seismic surveys of the USGS, DOE and NRC**
- **Commissioned additional detailed grav-mag surveys near well locations to help define drilling targets**
- **Constructing Cross sections to evaluate subsurface structure**

Progress (Continued)

- **Developing program schedule and work plans**
 - Complete permitting by mid October
 - Develop drilling bid specs, secure bids and pick drilling contractor by October

NYE COUNTY EARLY WARNING
DRILLING PROGRAM

DEEP

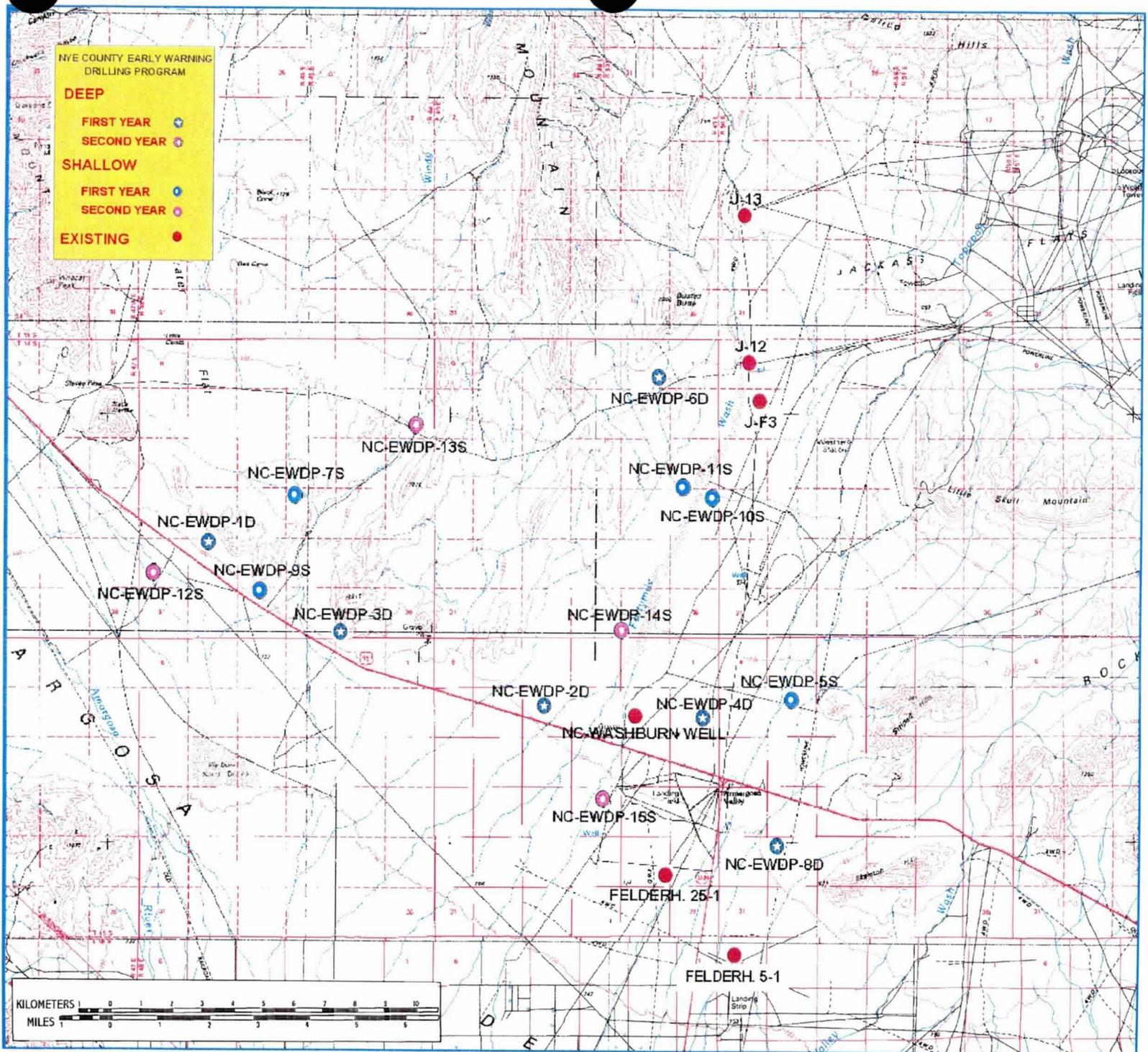
- FIRST YEAR (blue star)
- SECOND YEAR (purple star)

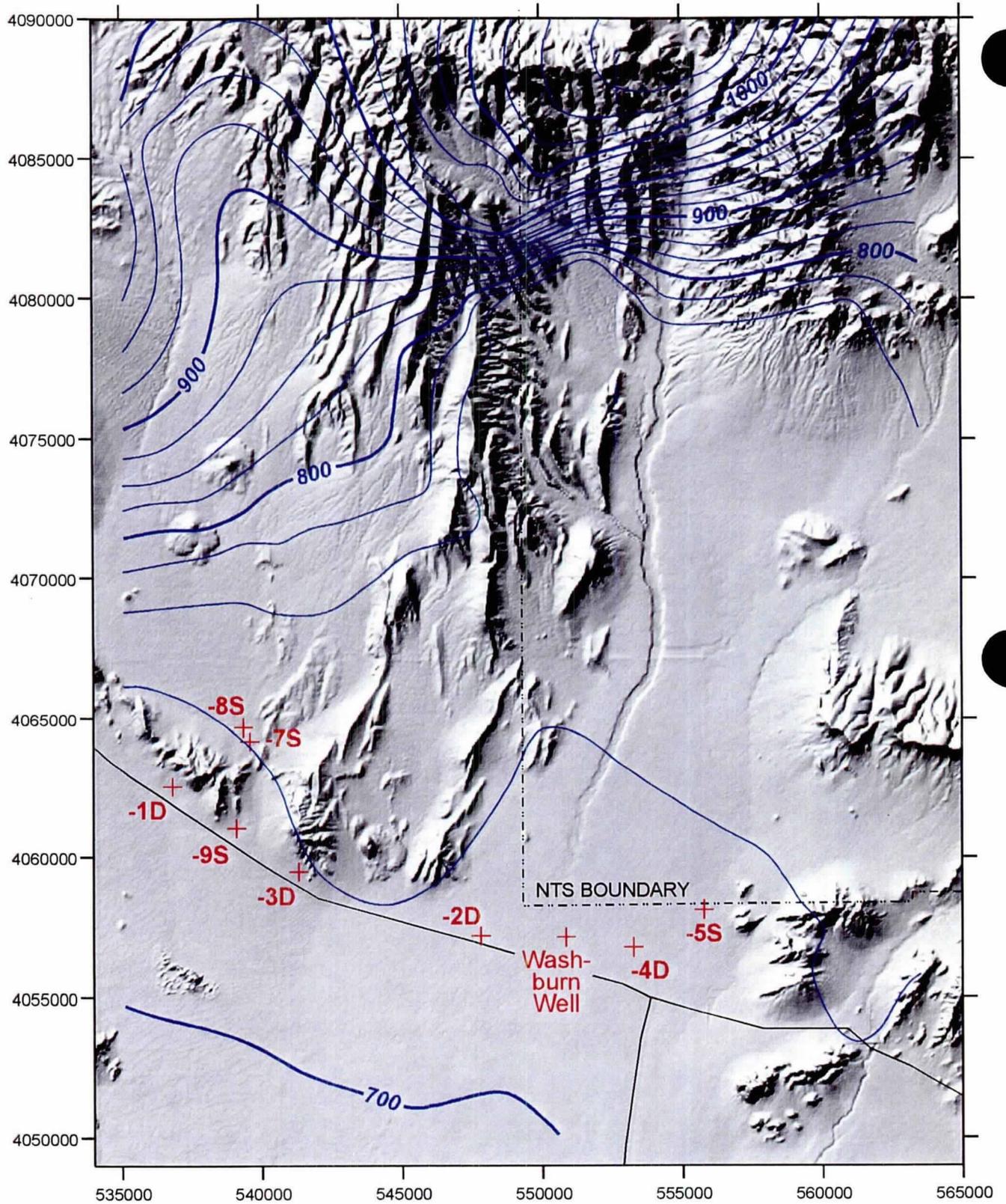
SHALLOW

- FIRST YEAR (blue circle)
- SECOND YEAR (purple circle)

EXISTING

- (red circle)





NYE COUNTY EARLY WARNING DRILLING PROGRAM
 Proposed Wells sited 5/19/98
 Water-level altitude contours from D'Agnes (1998)

EARLY WARNING SYSTEM
DRILLING BOREHOLES

FIRST YEAR

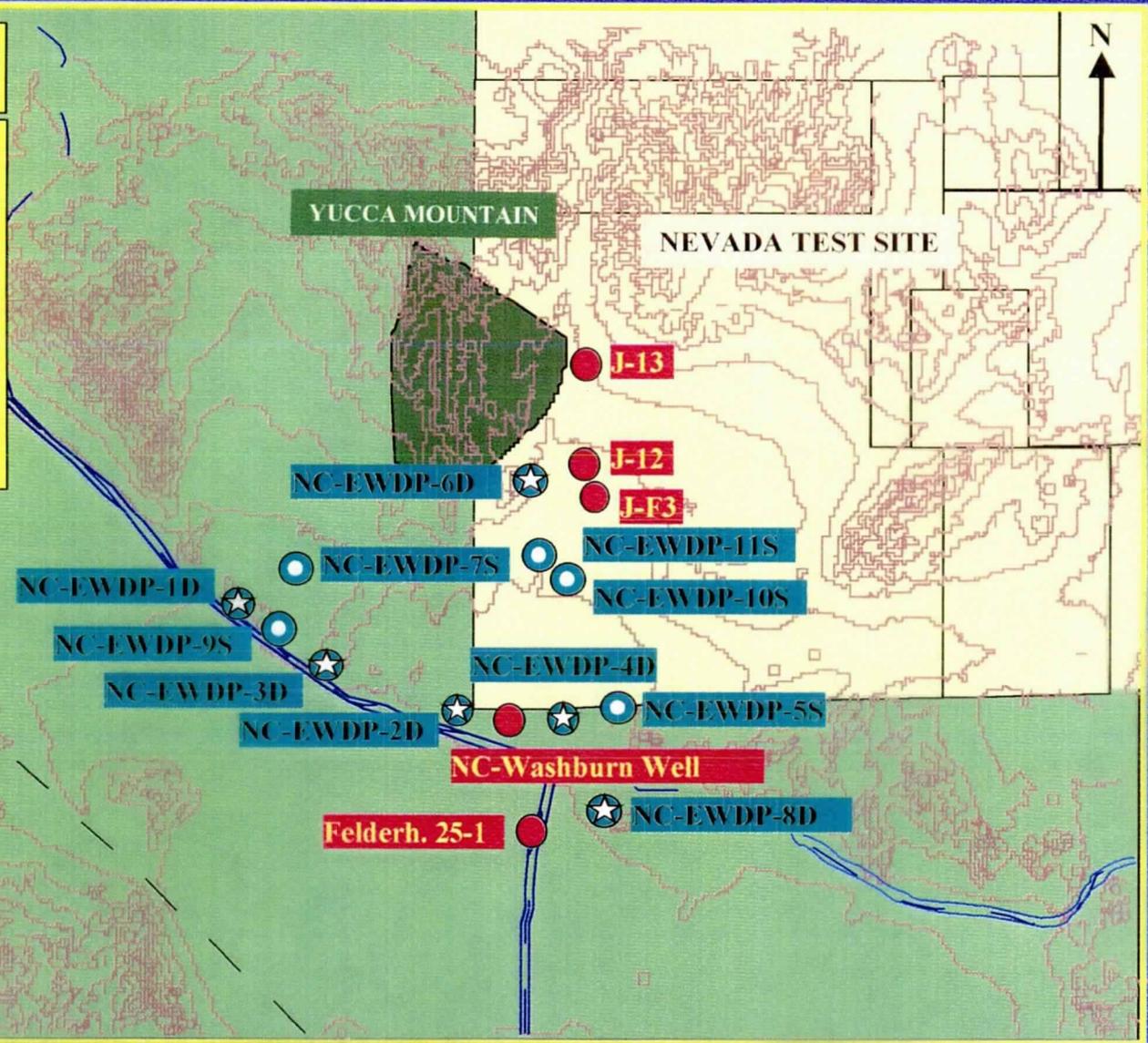
DEEP



SHALLOW



EXISTING



EARLY WARNING SYSTEM
DRILLING BOREHOLES

DEEP

FIRST YEAR



SECOND YEAR



SHALLOW

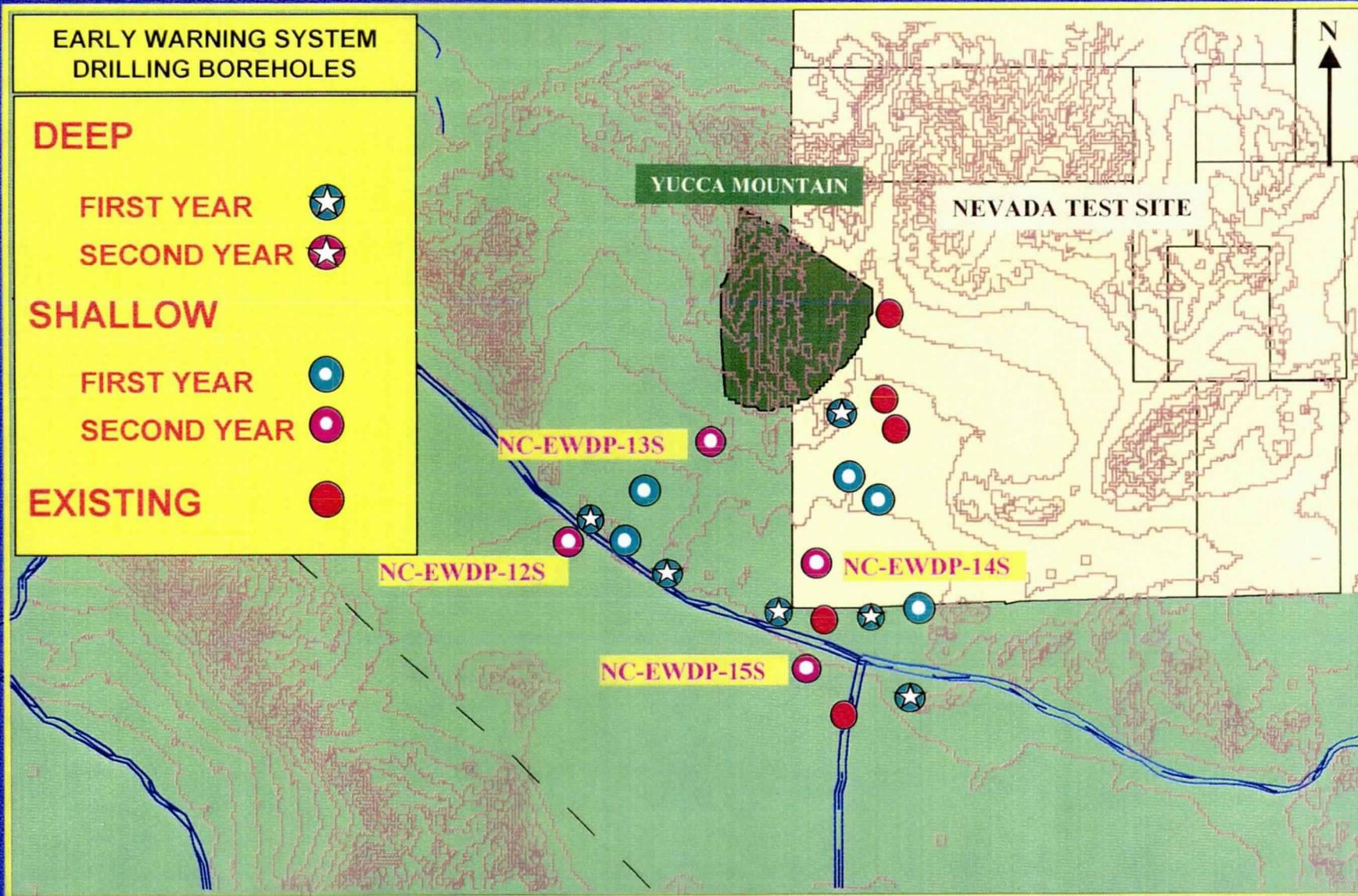
FIRST YEAR



SECOND YEAR



EXISTING



ALTERNATIVE REPOSITORY DESIGN

**NYE COUNTY NUCLEAR WASTE
REPOSITORY PROJECT OFFICE**

By:

Nick Stellavato and Parviz Montazer

Presented at Nuclear Waste Technical Review Board

June 24, 1998

NATURALLY VENTILATED REPOSITORY (NVR)

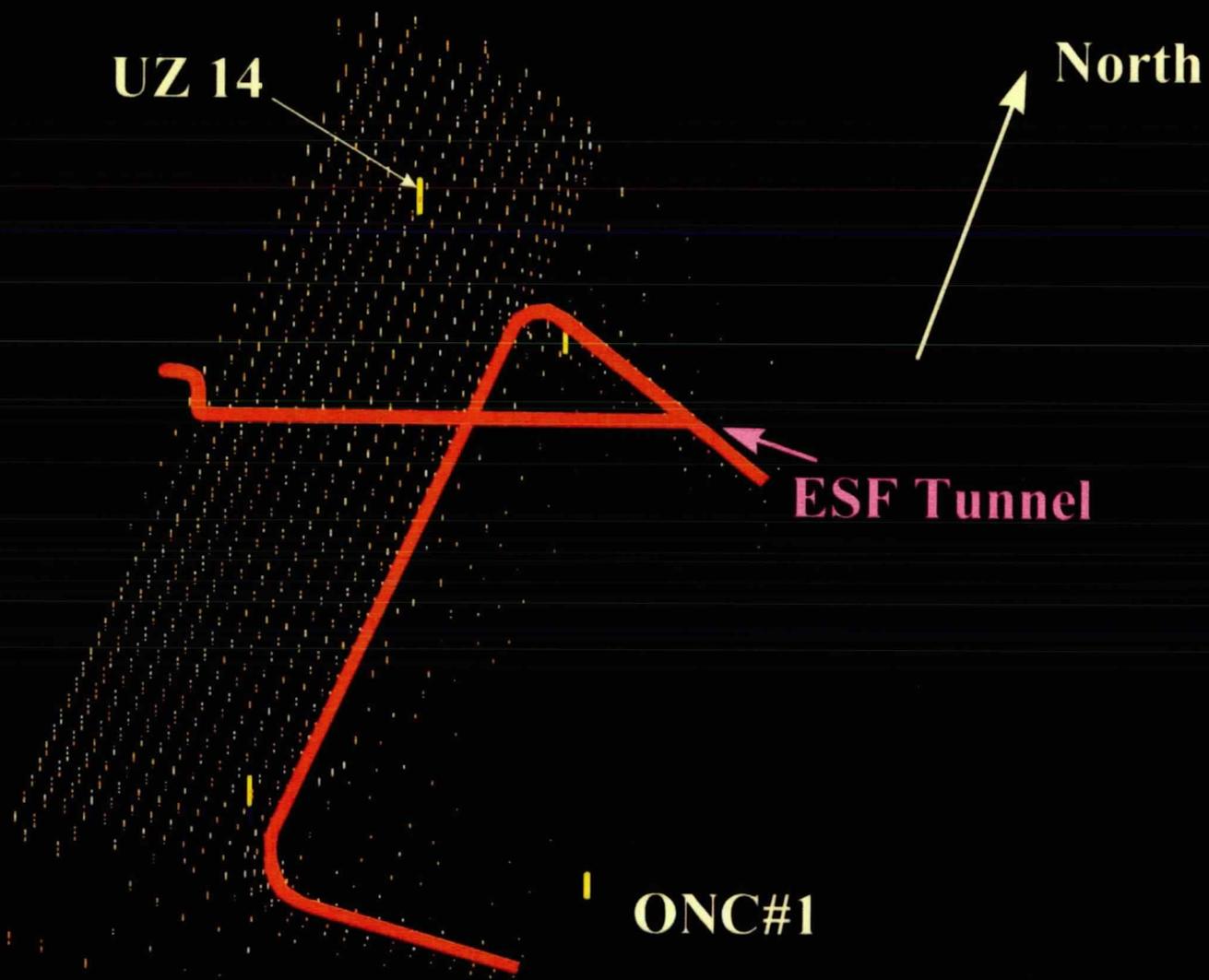
ADVANTAGES:

- ◆ **COOL REPOSITORY** (HOST ROCK TEMPERATURES LESS THAN 30 DEGREES)
- ◆ **DRY REPOSITORY** (FOR THE FIRST 1000 YEARS)
- ◆ **REDUCED ACREAGE REQUIREMENT** (POSSIBLY 1/4 OF PRESENT REQUIREMENT)
- ◆ **REDUCED UNCERTAINTY**

CONCERNS:

- ◆ **LONG-TERM STABILITY** (REPOSITORY MAY NEED TO BE OPEN)
- ◆ **HUMAN INTRUSION**
- ◆ **ATMOSPHERIC EMISSIONS**

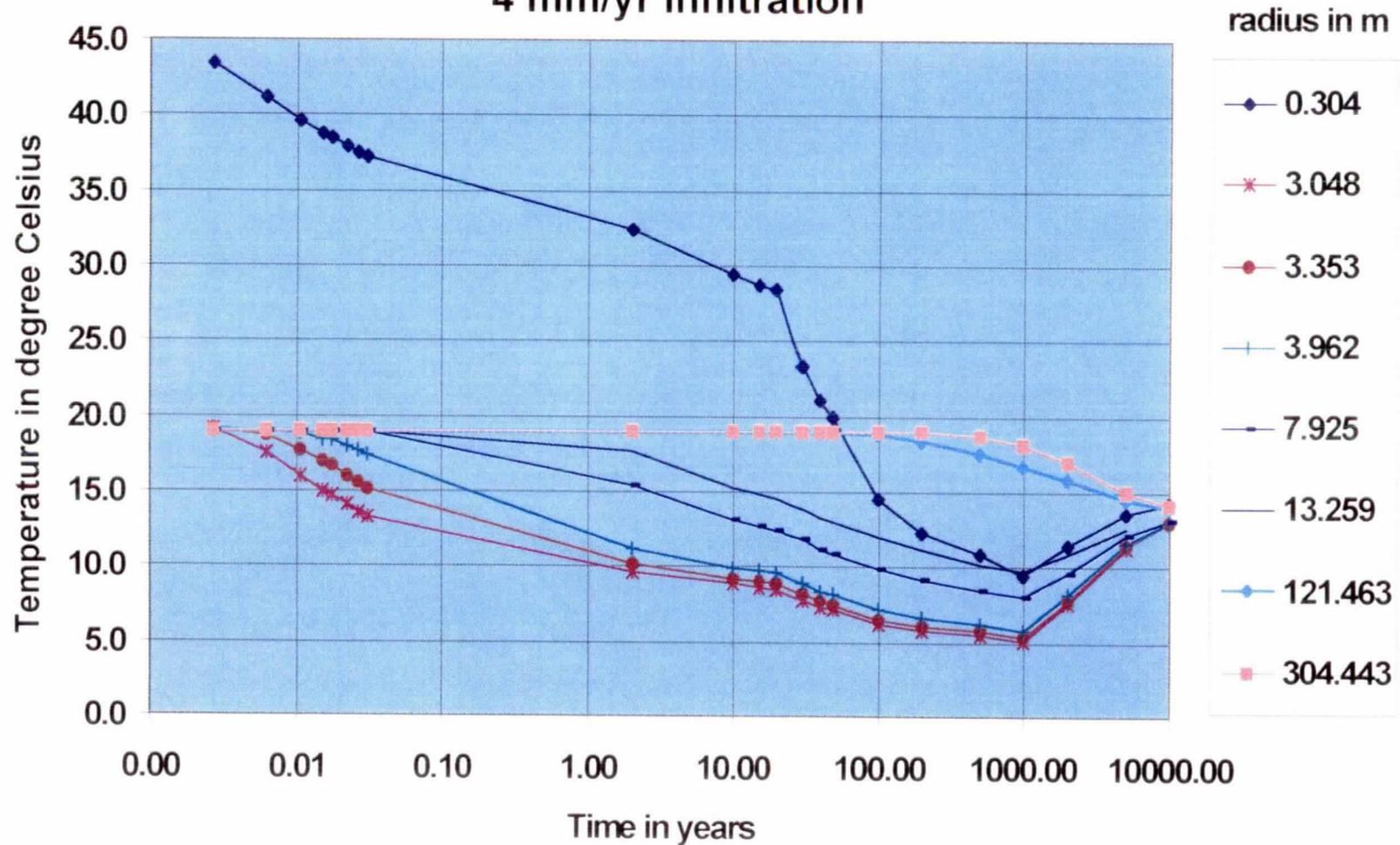
OBLIQUE VIEW OF THE MODIFIED UZ MESH



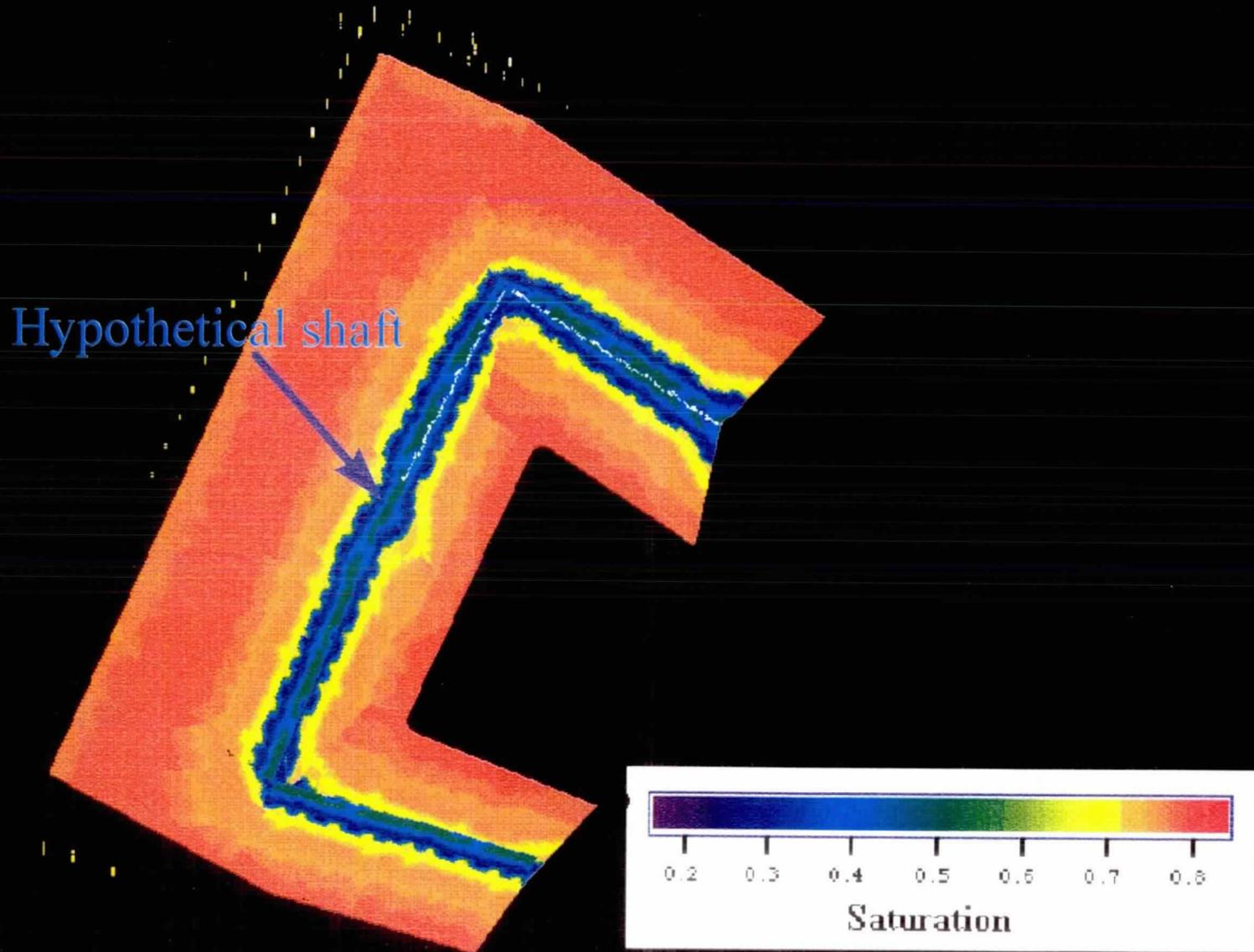
NATURALLY VENTILATED REPOSITORY (NVR)

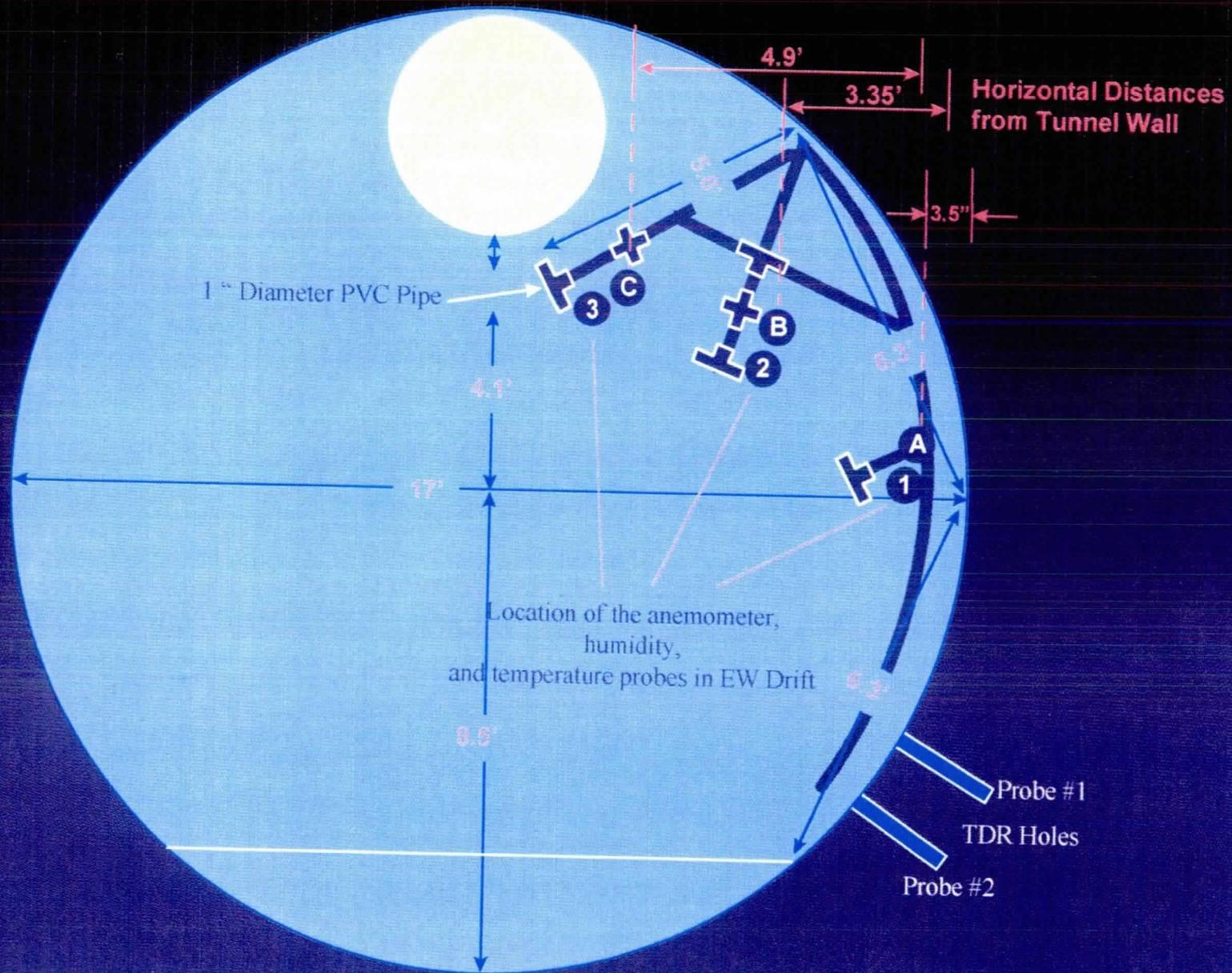
ADVANTAGES - REDUCED TEMPERATURE

Temperature versus time for $D_{atm} = 0.01$ with decayed heat load
4 mm/yr infiltration



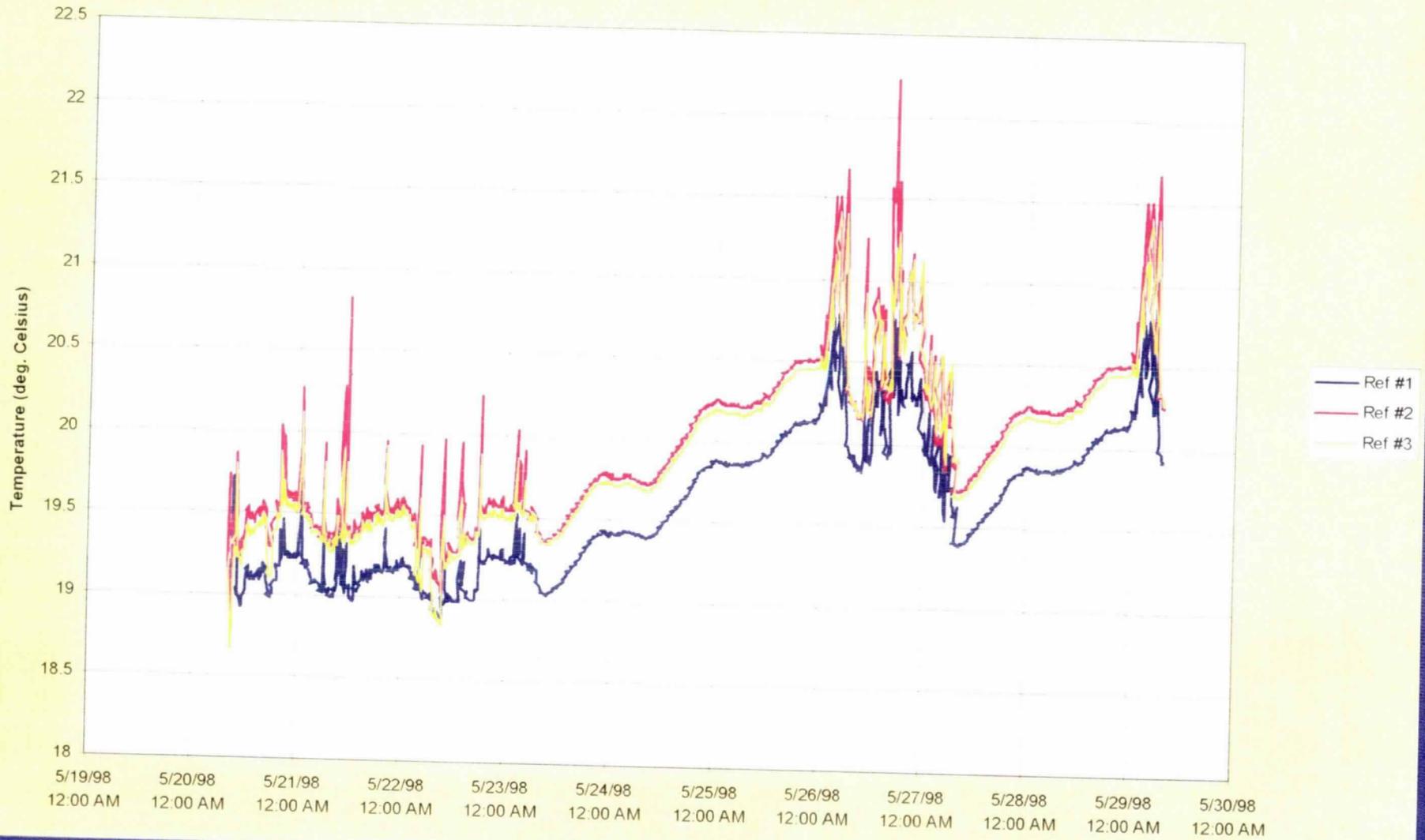
SATURATION LEVEL AROUND ESF AFTER 1000 YEARS



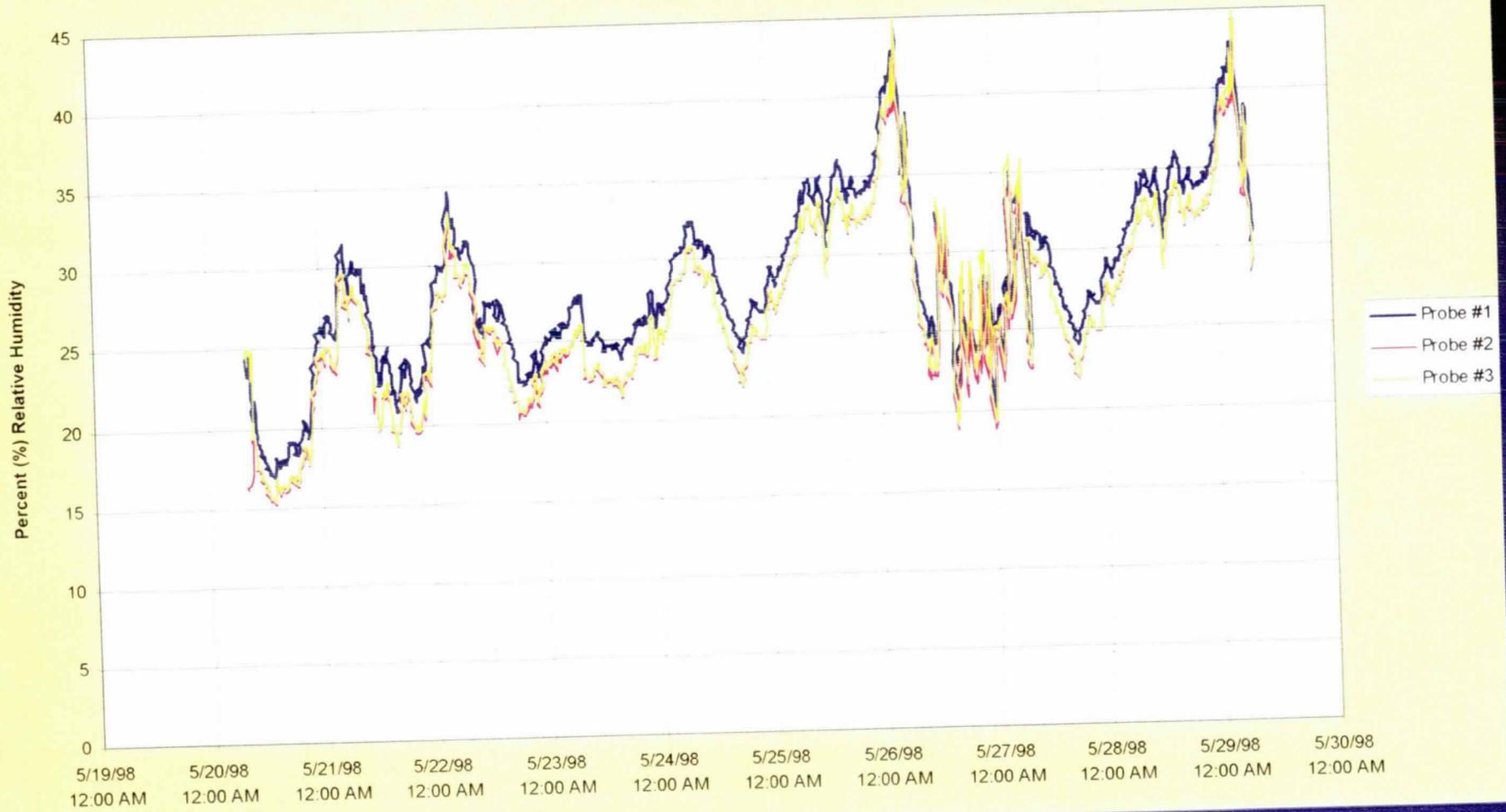


Configuration of Instrumentation Frame for 17' Diameter EW Drift

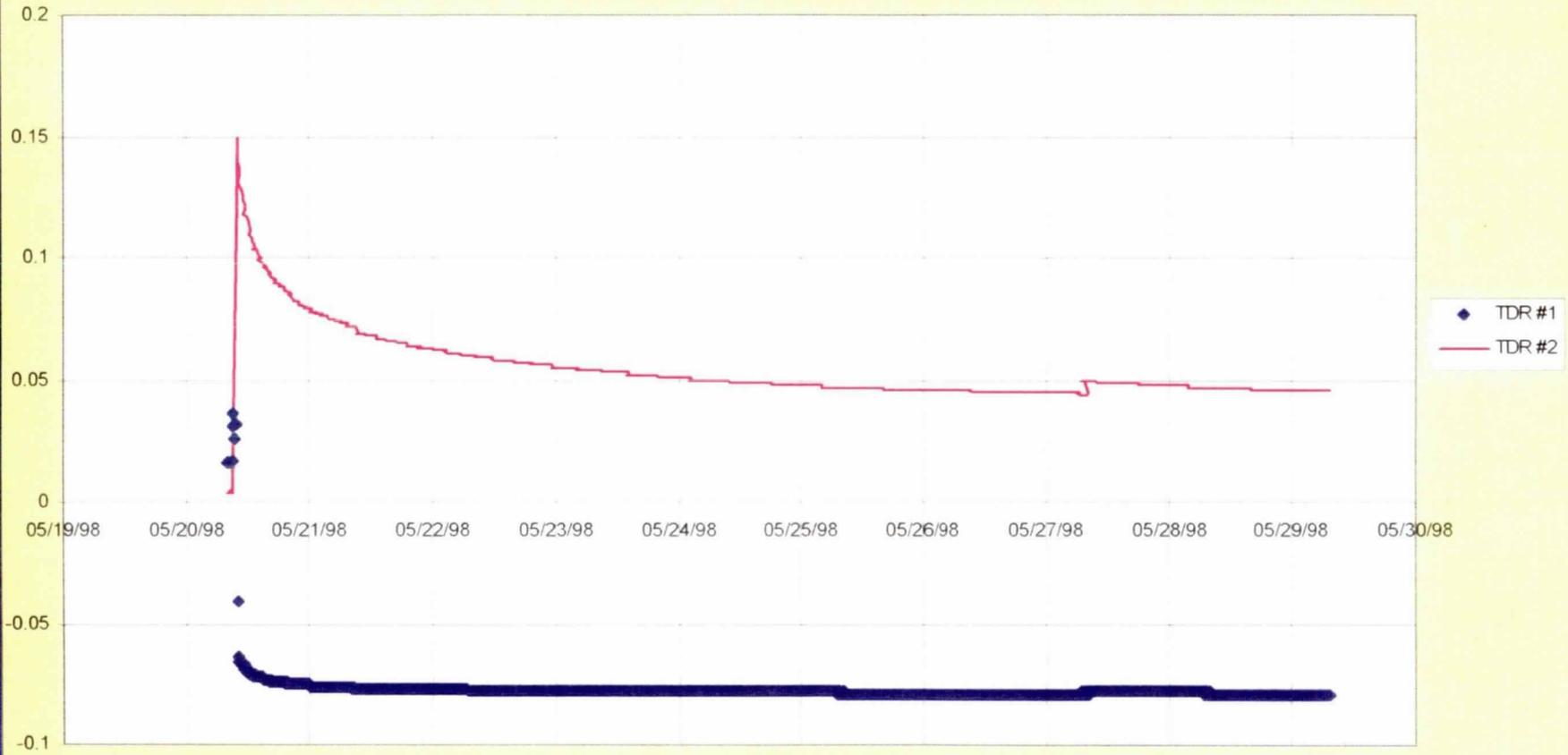
Temperature With Time in EW Drift



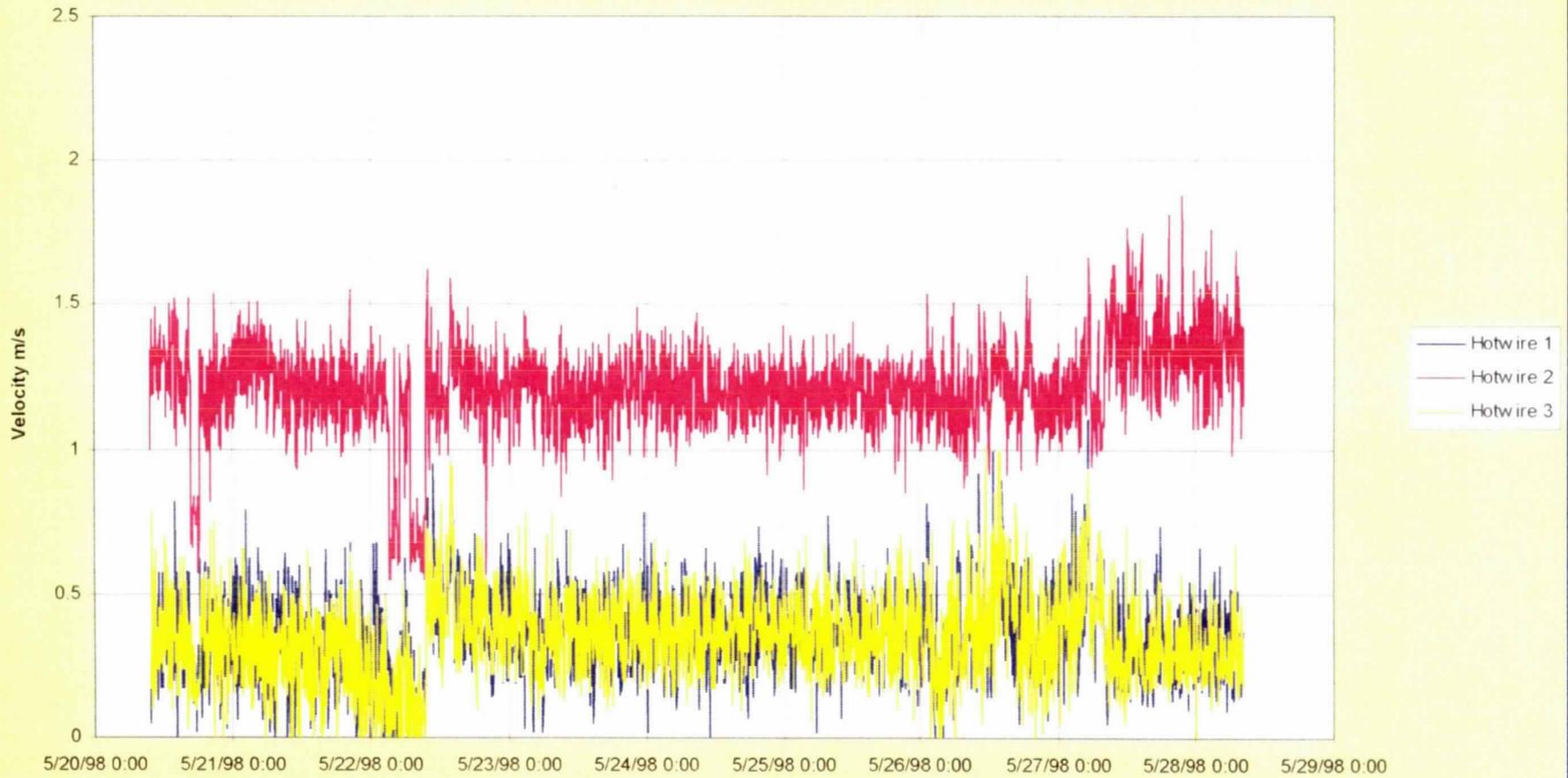
Relative Humidity in EW Drift



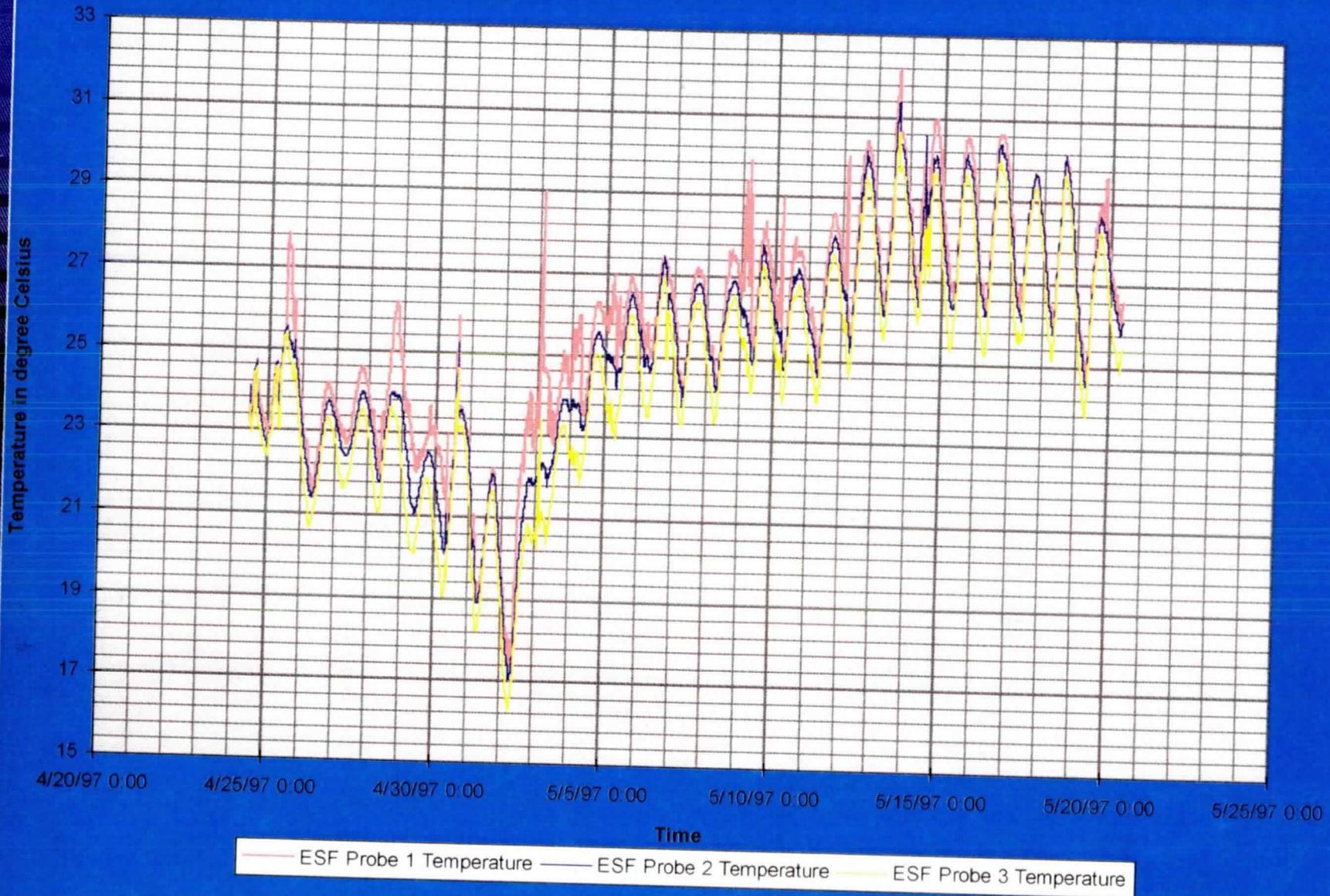
Volumetric Water Content in EW Drift



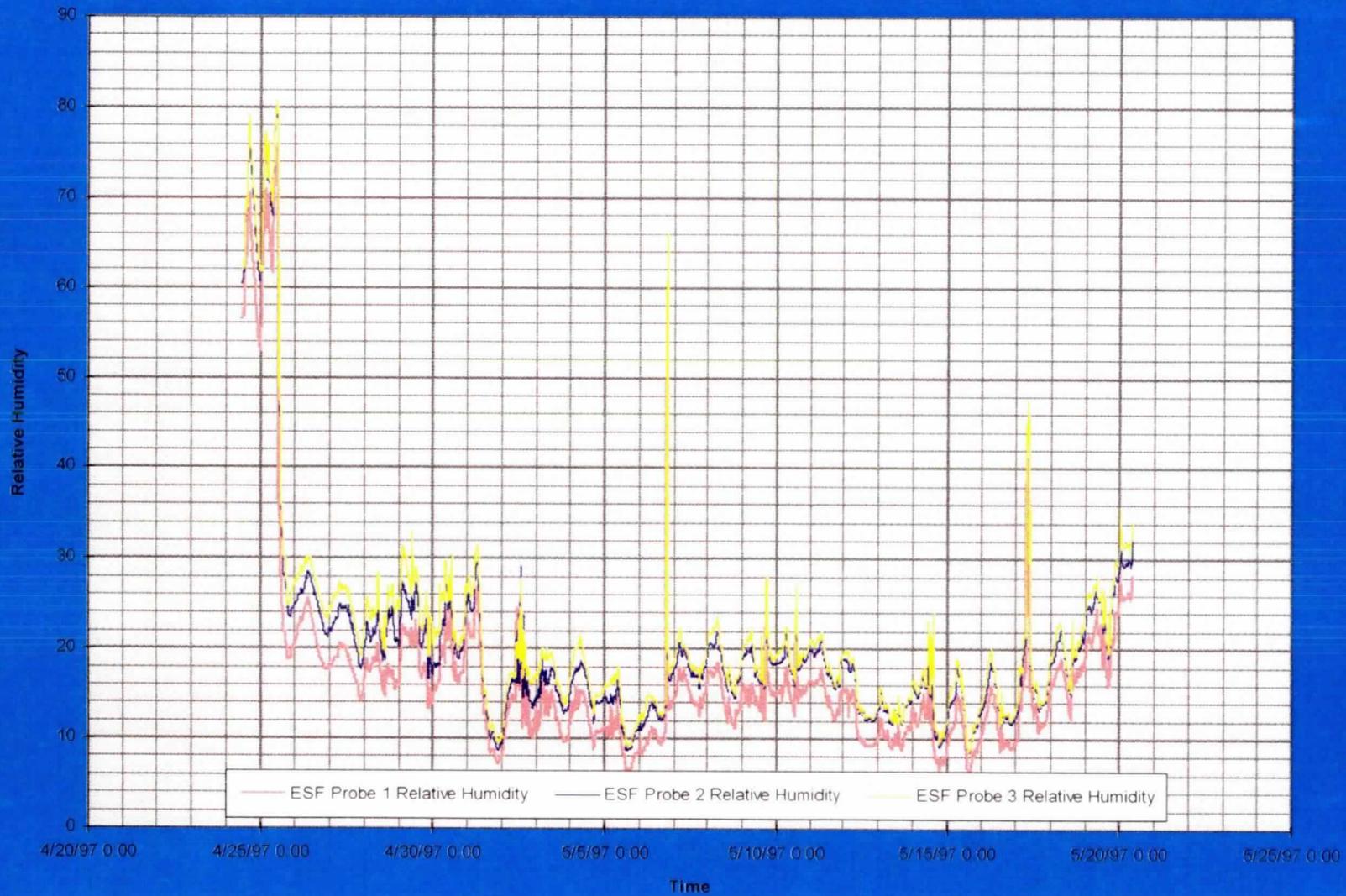
Air Velocity in EW Drift



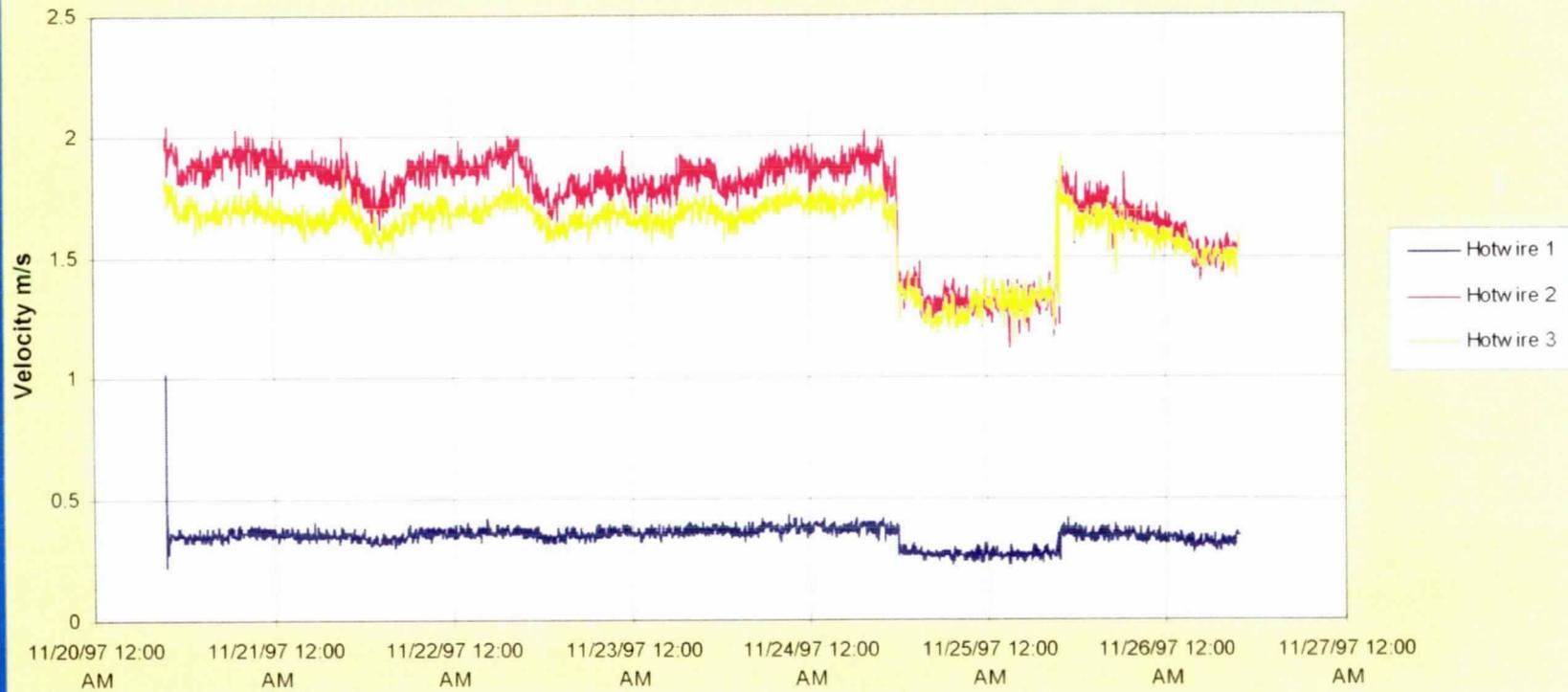
Temperature variation with time in ESF Tunnel



Relative Humidity variation with time in ESF Tunnel



Air Velocity in Tunnel



NATURALLY VENTILATED REPOSITORY (NVR)

ADVANTAGES

◆ **REDUCED ACREAGE REQUIREMENT (POSSIBLY 1/4 OF PRESENT REQUIREMENT)**

- **Current model indicates that packing density can be increased by four times.**
- **Increased packing density translates into reduced acreage and tunnel construction**

◆ **REDUCED UNCERTAINTY**

- **Current design cannot be verified with sufficient confidence**
- **Experience with long-term effects of heat and humidity on the host rock and canister is limited to only the past century**
- **Corrosion and rock stability at ambient temperature has been experienced for the past three millenium**
- **Concrete liners are not required and geochemical uncertainty is reduced**

CONCERNS:

◆ LONG-TERM STABILITY (REPOSITORY MAY NEED TO BE OPEN)

- **Many man-made and natural opening have been known to remain open for millennia.**
- **Engineering designs such as rubble back fill or concrete lining of the shafts will increase stability**
- **Remote monitoring may be required with plans for remedial measures**

◆ HUMAN INTRUSION

- **Multiple barrier cross bars and rubble zones can effectively deter unsuspected intruder. Intelligent intruders cannot be stopped regardless of the design.**

◆ ATMOSPHERIC EMISSIONS

- **Inventory of the gaseous radionuclides is negligible compared to the potential for dilution.**
- **Particulate emissions can be trapped without the use of filters by providing velocity-reducing cavities (to deposit particulate).**

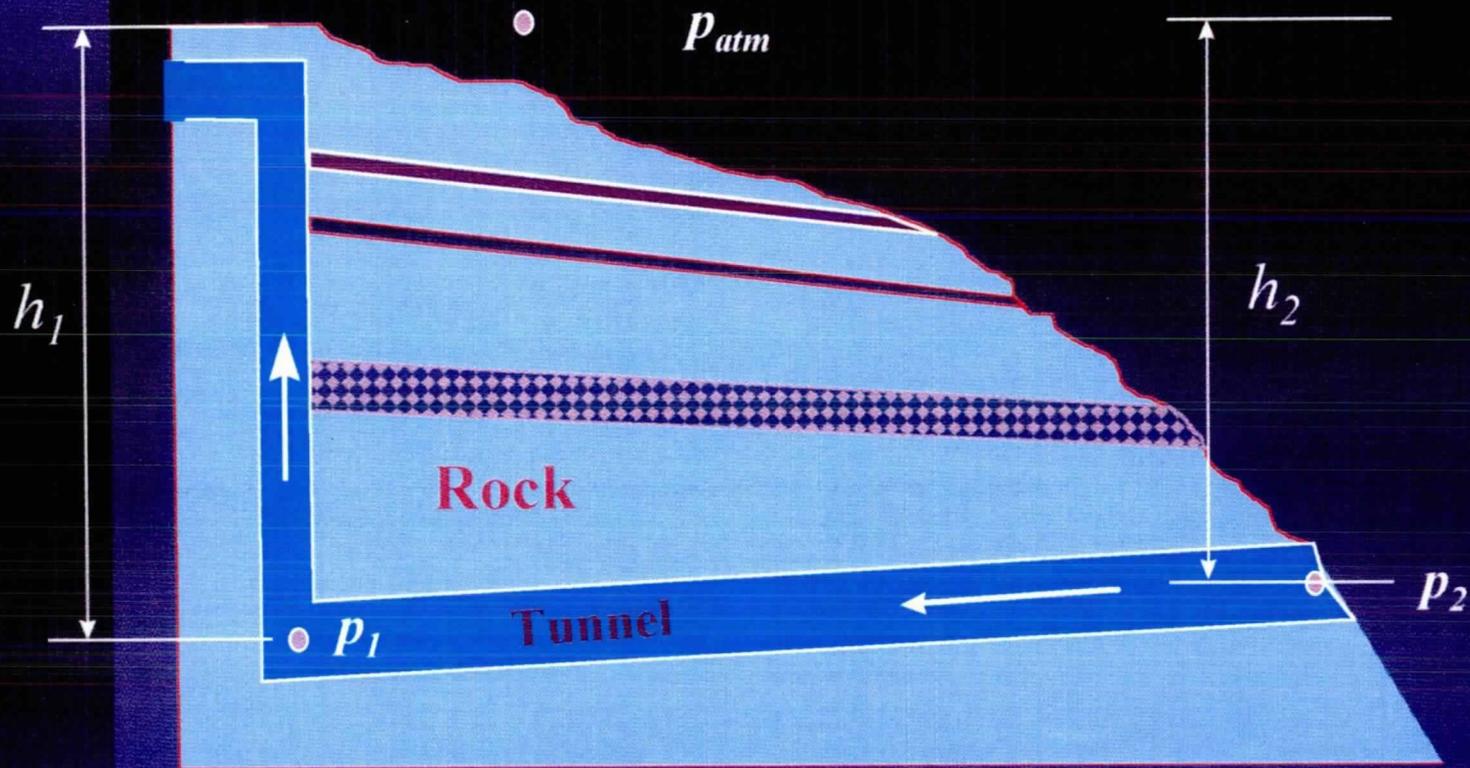
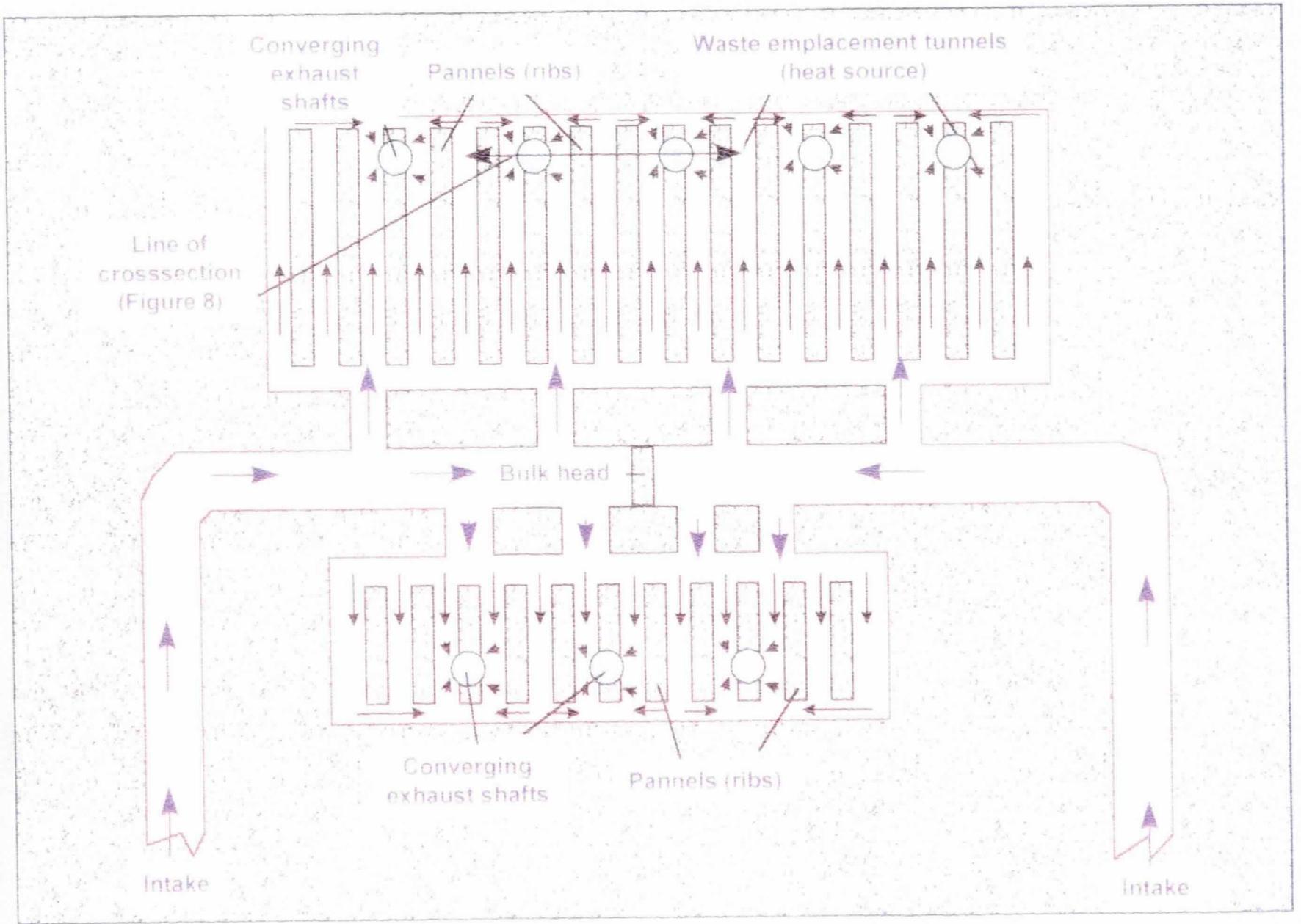


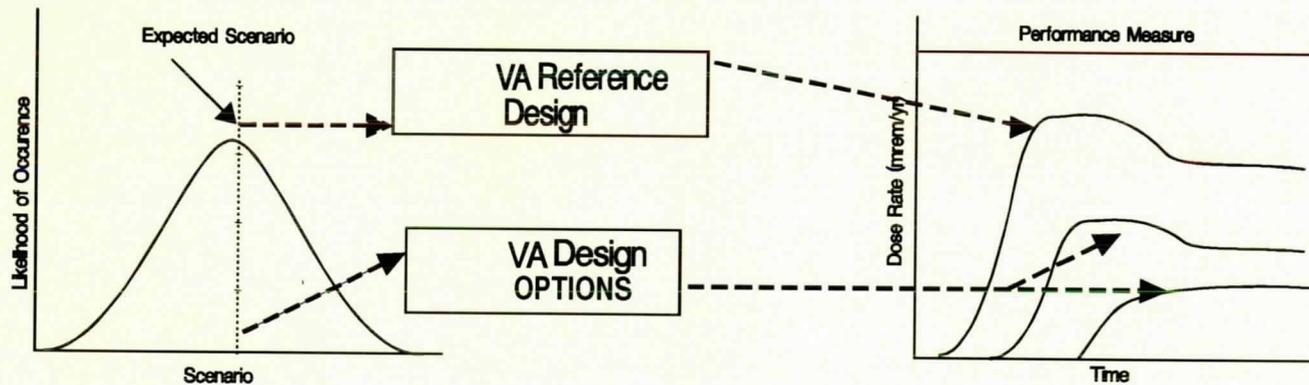
Figure 6-33 - Conceptualization of natural ventilation with horizontal outlet.



Plan view of the heat source and the intermediate exhaust shafts.

Design Development Strategy

VA Design Focus



SR/LA Design Focus

