

**STATE OF NEVADA
CONCERNS ON PNEUMATIC TESTING**

PRESENTATION TO:

U.S. NUCLEAR WASTE TECHNICAL REVIEW BOARD

BY:

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**OCTOBER 19 - 20, 1993
LAS VEGAS, NV**

PNEUMATIC INCLUDES:

- **GAS**
- **AIR**
- **VAPOR**

NRC DEFINITION OF GROUNDWATER INCLUDES:

- **GAS CONDITIONS**
- **AIR CONDITIONS**
- **VAPOR CONDITIONS**

**NRC CONCERNS WITH INTERFERENCE
BETWEEN ESF AND SURFACE-BASED TESTING**

- **SCA COMMENT 123 - EFFECTS OF ESF VENTILATION ON SITE CONDITION TESTING**
- **STUDY PLAN 8.3.1.2.2.5 COMMENT - POTENTIAL FOR ESF EXCAVATIONS TO INFLUENCE DIFFUSION TESTING BY DRYING THE ROCK**
- **COMMENTS ON DOE SITE CHARACTERIZATION PROGRESS REPORTS 6 AND 7 - AIR MOVEMENT FROM ESF MAY ADVERSELY IMPACT COLLECTION OF GEOCHEMICAL DATA**

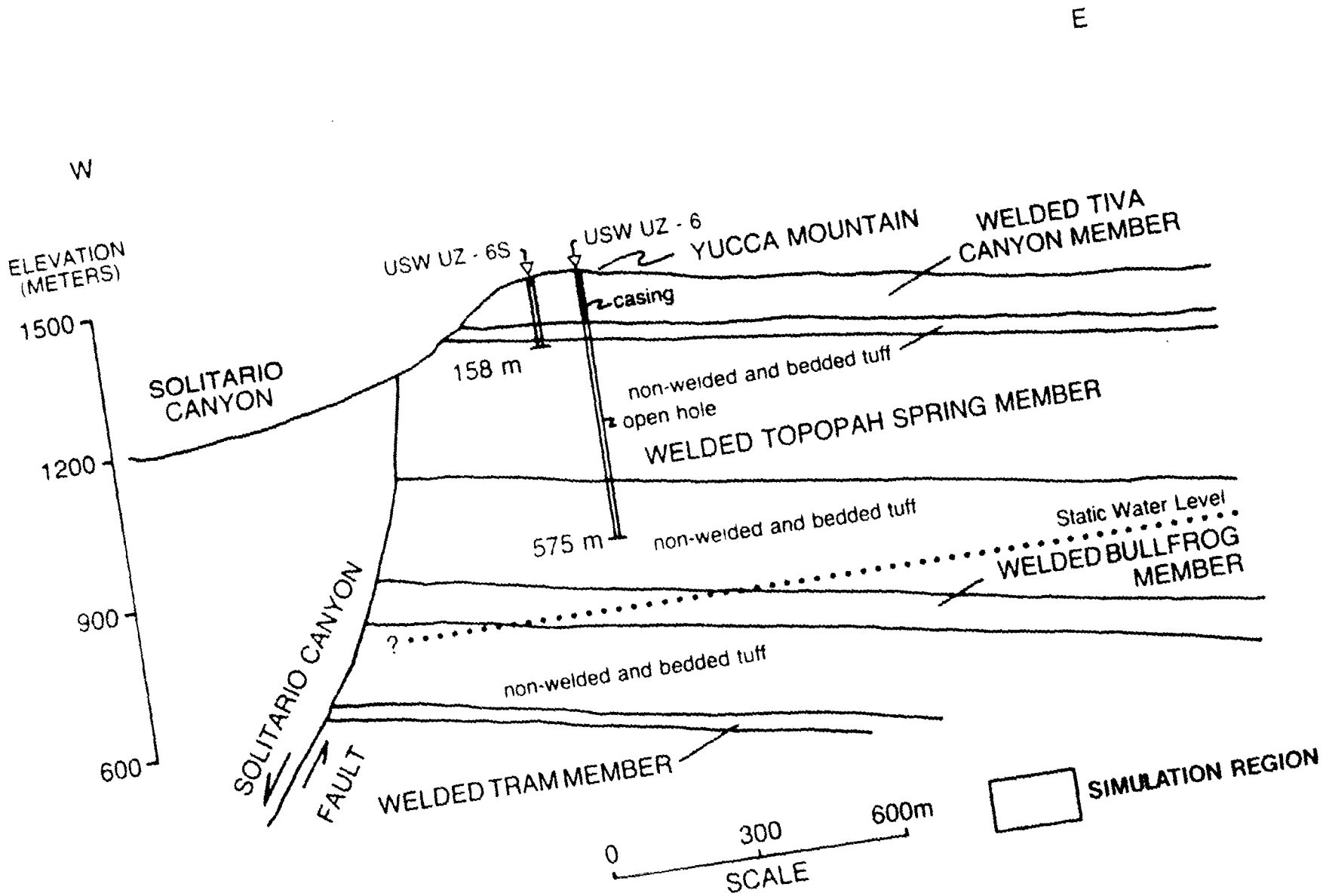
**DOE STUDY PLAN 8.3.1.2.2.6 - CHARACTERIZATION OF THE
YUCCA MOUNTAIN UNSATURATED - ZONE GASEOUS PHASE
MOVEMENT**

**"THIS STUDY WAS DEVELOPED IN RESPONSE TO THE
RECOGNITION . . . , THAT POTENTIAL EXISTS FOR
SUBSTANTIAL TOPOGRAPHICALLY AFFECTED GAS
CIRCULATION THROUGH YUCCA MOUNTAIN. PRESENTLY,
THE PHENOMENON IS LITTLE RECOGNIZED, AND ITS
POTENTIAL SIGNIFICANCE TO REPOSITORY
PERFORMANCE IS UNKNOWN."**

NEVADA COMMENTS ON S.P. 8.3.1.2.2.6

(ISSUED APRIL 27, 1992)

- **NO JUSTIFICATION THAT ONE STUDY SITE WILL PRODUCE REPRESENTATIVE DATA NECESSARY TO PROVIDE ADEQUATE UNDERSTANDING OF GAS-PHASE CIRCULATION PROCESSES**
- **NO JUSTIFICATION THAT UNDERSTANDING OF GAS-PHASE CIRCULATION PROCESSES CAN BE EXTRAPOLATED ACROSS THE REPOSITORY AND TO THE BOUNDARY OF THE ACCESSIBLE ENVIRONMENT SURROUNDING THE REPOSITORY**

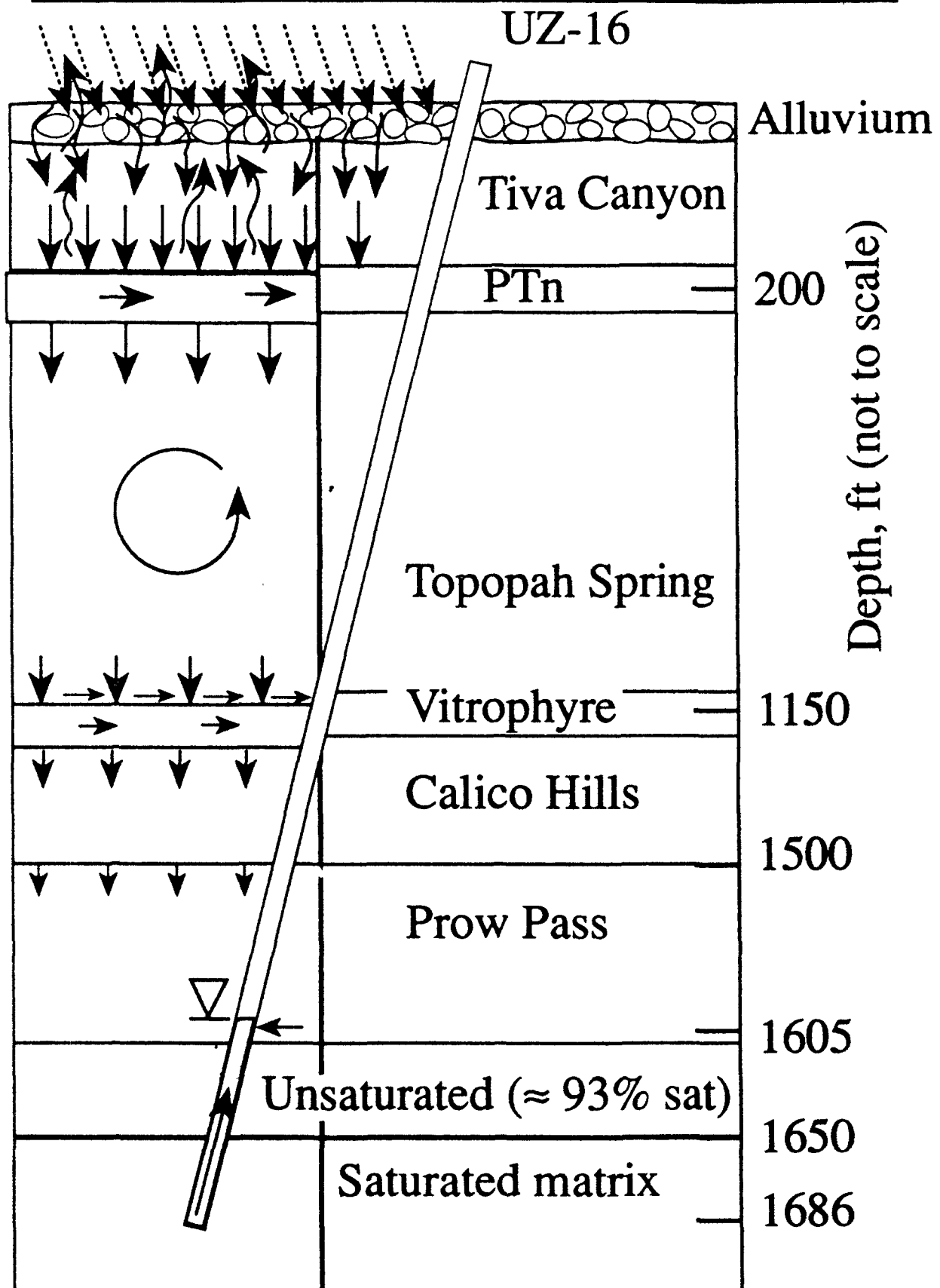


NEVADA LETTER TO NRC DATED FEBRUARY 4, 1993

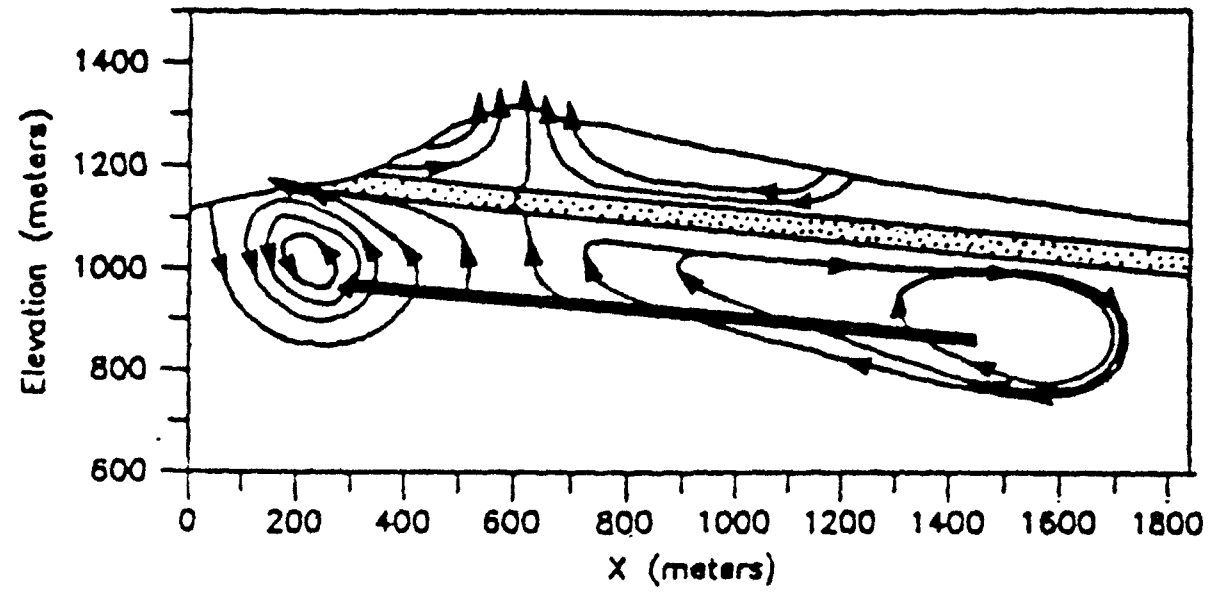
NEVADA'S CONCERN

- **EARLY EXCAVATION OF THE ESF MAY PRECLUDE ADEQUATE CHARACTERIZATION OF UNDISTURBED PNEUMATIC PATHWAYS**
- **MAY PREVENT NRC FROM MAKING A LICENSING FINDING ON ISSUE OF FASTEST PATHWAY FOR RADIONUCLIDE RELEASE**

Conceptualization of Percolation



Gas Flow at Repository



Ross, 1991

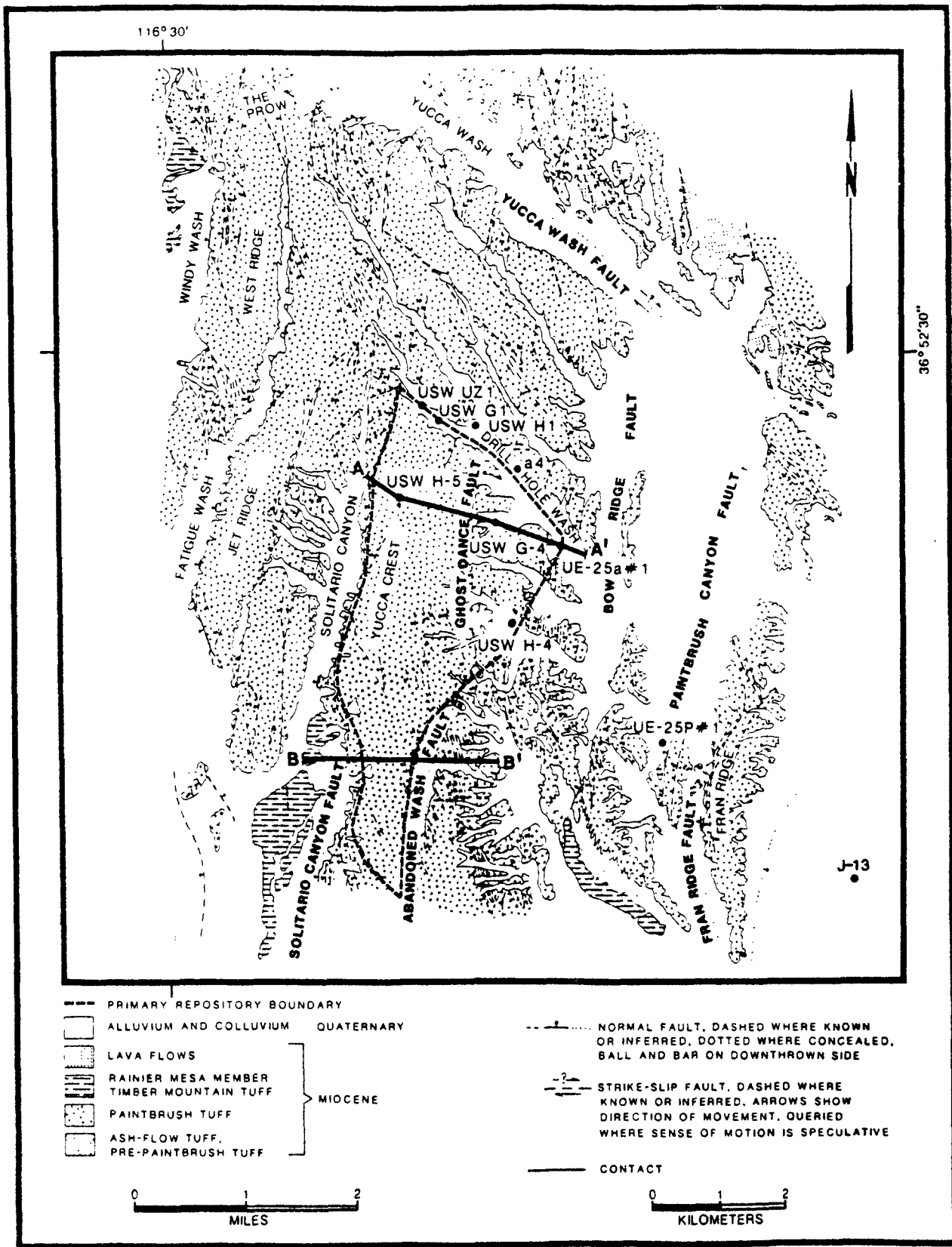


Figure 3-6. Geologic map of Yucca Mountain with approximate outline of primary repository area indicated by dashed line. Cross sections A-A' and B-B' are shown on Figure 3-7. Modified from Scott and Bonk (1984).

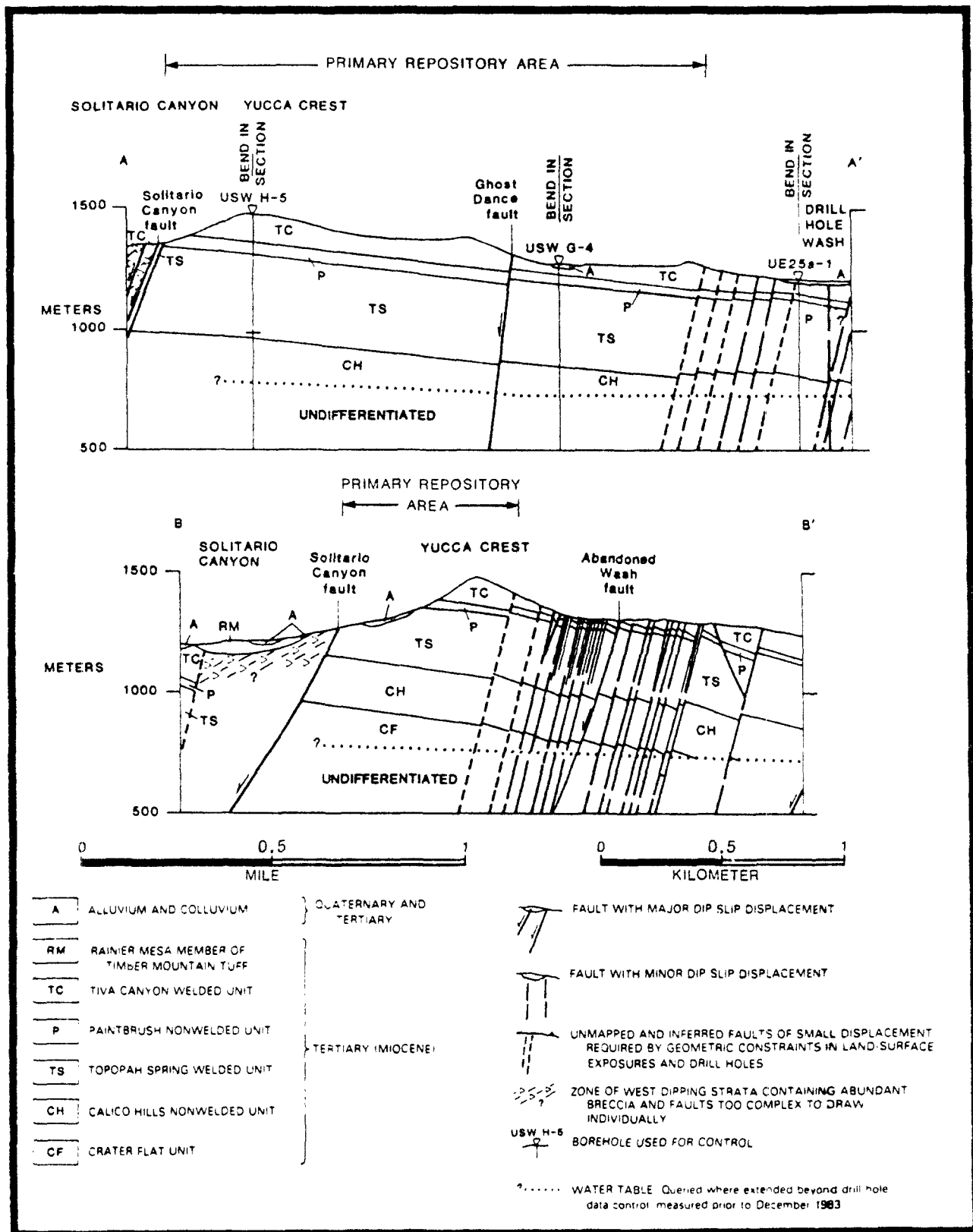
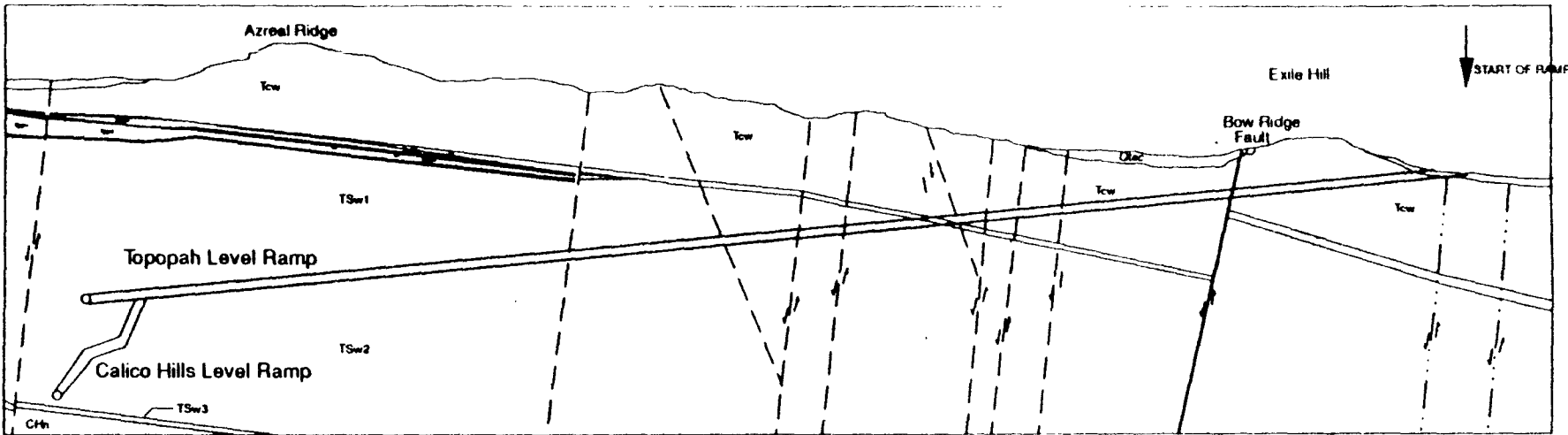


Figure 3-7. Approximately east-west hydrogeologic cross sections modified from Montazer and Wilson (1984) showing faults at and near Yucca Mountain as mapped by Scott and Bonk (1984). See Figure 3-6 for approximate locations of cross sections A-A' and B-B'.

NORTH RAMP

NW

SE



Thermal/Mechanical Units

- Tcw Tiva Canyon Member
- PTn Yucca Mountain Member
Pah Canyon Member
- TSw1 Topopah Springs Member
- TSw2 Topopah Springs Member
- TSw3 Topopah Springs Member
- CHn Tuffaceous Beds of Calico Hills
- TZZ Zeolite-Vitric Contact in
Calico Hills (TZZ)
(Not Present on This Section)

*Conceptual Illustration
Not To Scale*

GOAL OF PNEUMATIC PATHWAYS STUDY

**STUDY ADEQUATE FOR DEVELOPING AND CONFIRMING A
PNEUMATIC FLOW MODEL FOR THE UNDISTURBED SITE**

**KEY QUESTIONS WHICH MUST BE ADDRESSED
RELATIVE TO A PNEUMATIC PATHWAYS STUDY**

- **WHAT ARE THE PATHWAYS?**
- **WHERE ARE THE PATHWAYS?**
- **HOW FAST IS THE TRAVEL?**

WHY

- **UNDERSTANDING OF UNDISTURBED PNEUMATIC PATHWAYS**
- **DETERMINATION OF FASTEST PATHWAY FOR RADIONUCLIDE
RELEASE**
- **THERMAL PERFORMANCE MODELLING AT REPOSITORY SCALE**
- **IMPACT OF THERMAL LOADING ON DESERT ECOSYSTEM**

WHAT IS REQUIRED

A SURFACE-BASED PROGRAM OF SUFFICIENT BOREHOLES TO DEVELOP AN ADEQUATE DATABASE OF UNDISTURBED SOIL GAS PRESSURE AND FLOW IN RESPONSE TO BAROMETRIC PRESSURE CHANGES AT A REPOSITORY SCALE.