

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

**NUCLEAR WASTE TECHNICAL REVIEW BOARD
PANEL ON STRUCTURAL GEOLOGY & GEOENGINEERING**

**SUBJECT: UPDATE ON
MIDWAY VALLEY TRENCHING**

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JANUARY 22-23, 1992

SCP Study 8.3.1.17.4.2

Evaluating the Location and Recency of Faulting Near Prospective Surface Facilities

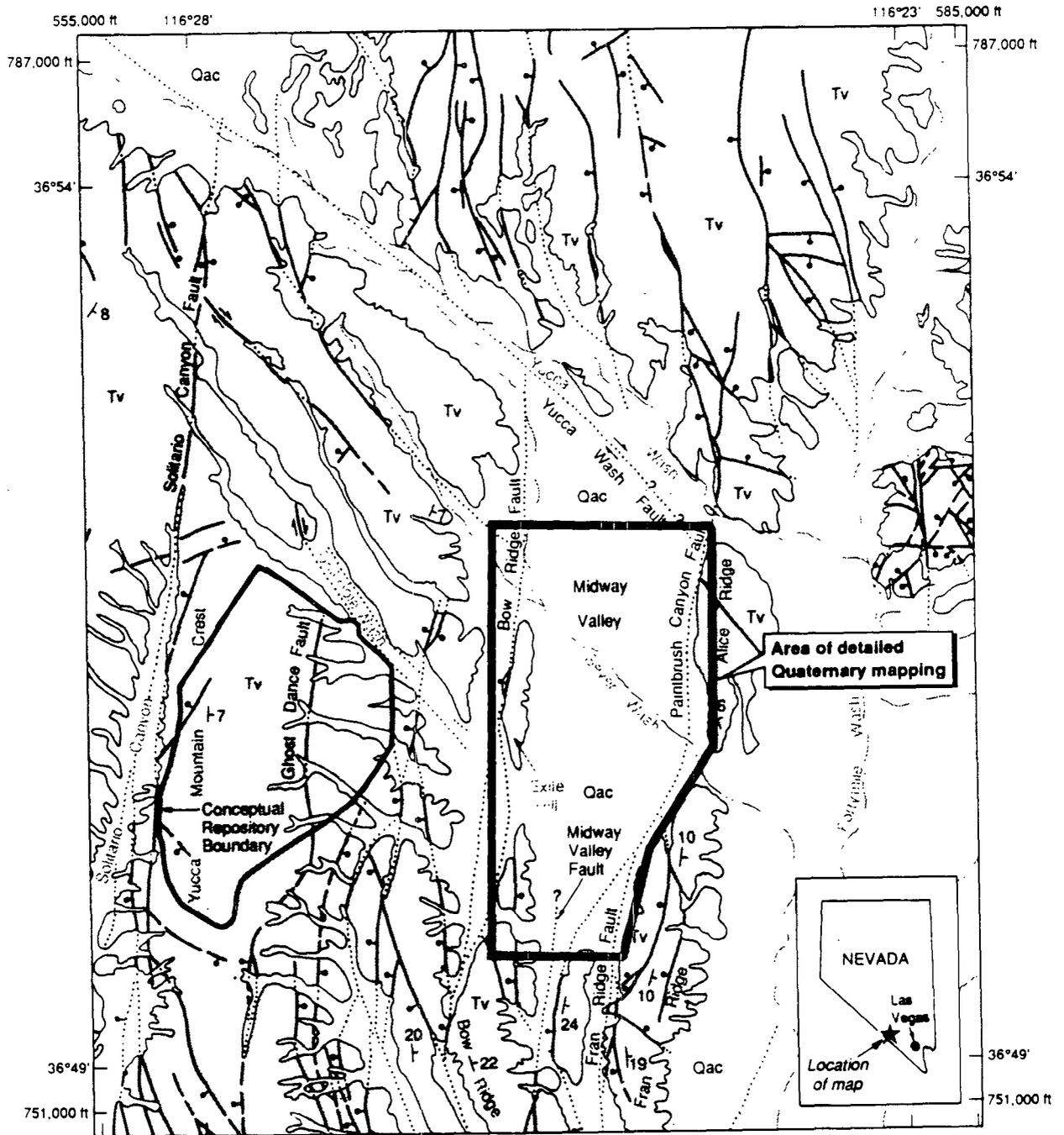
Activity 1:

- **Mapping Quaternary geology**
- **Soil test pits**
- **Exploratory trenches**

Activity 2:

- **Continuous trenches**
- **Supplemental trenches**

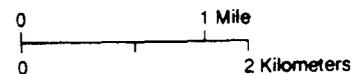
Generalized Geologic Map of Midway Valley



Geology compiled from Scott and Bonk (1984), Maldonado (1985), and Swadley and Parish (1988); conceptual repository boundary from Holmes and Narver (1988).

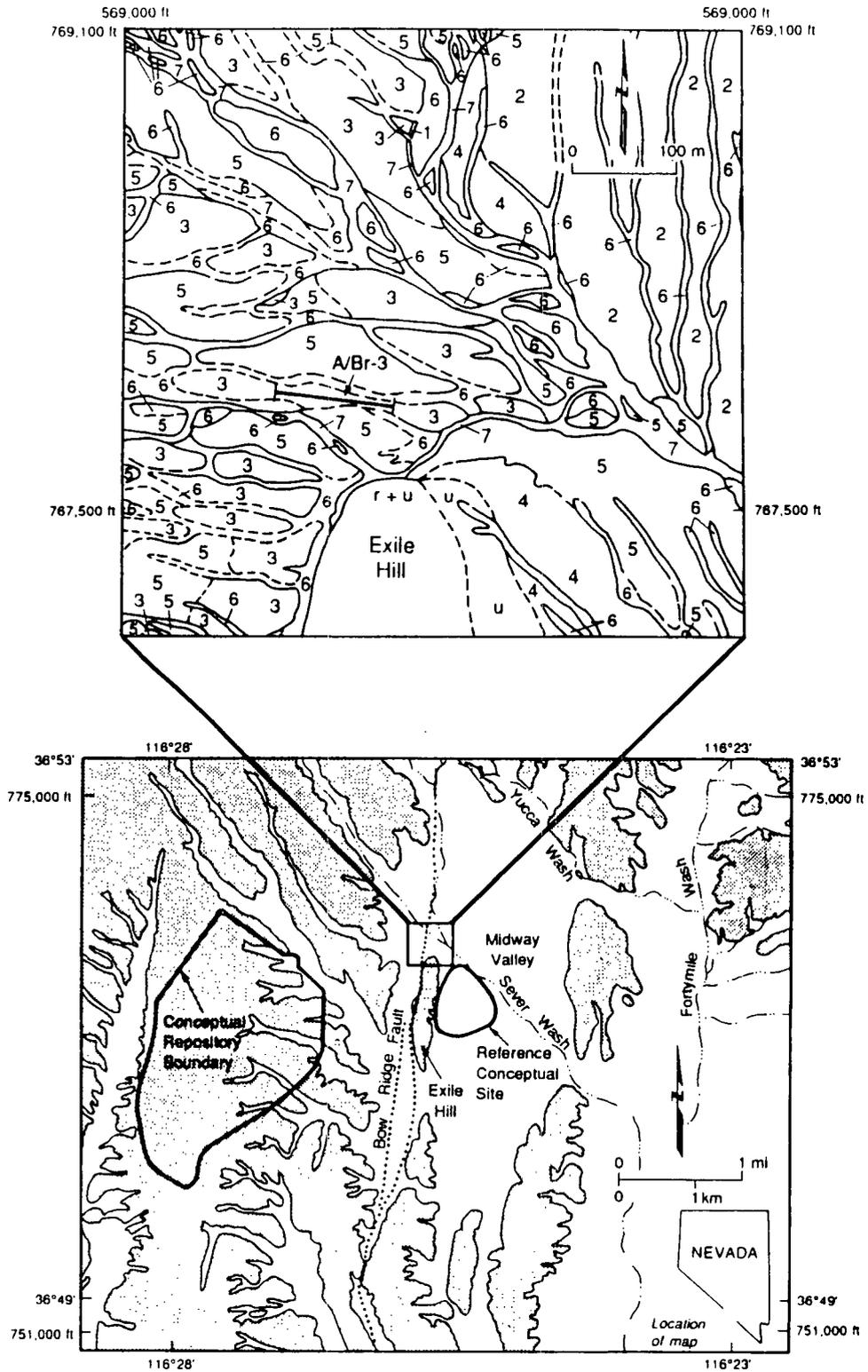
EXPLANATION

- Fault: dotted where concealed; queried where inferred; ball and bar on downthrown side; arrows indicate relative movement
- 17 Strike and dip of bedding or foliation
- Qac Quaternary alluvium and colluvium
- Tv Tertiary volcanic rocks



**Vertical Aerial Photo of Midway Valley
and Eastern Flank of Yucca Mountain**

Geologic Setting of Trench A/BR-3



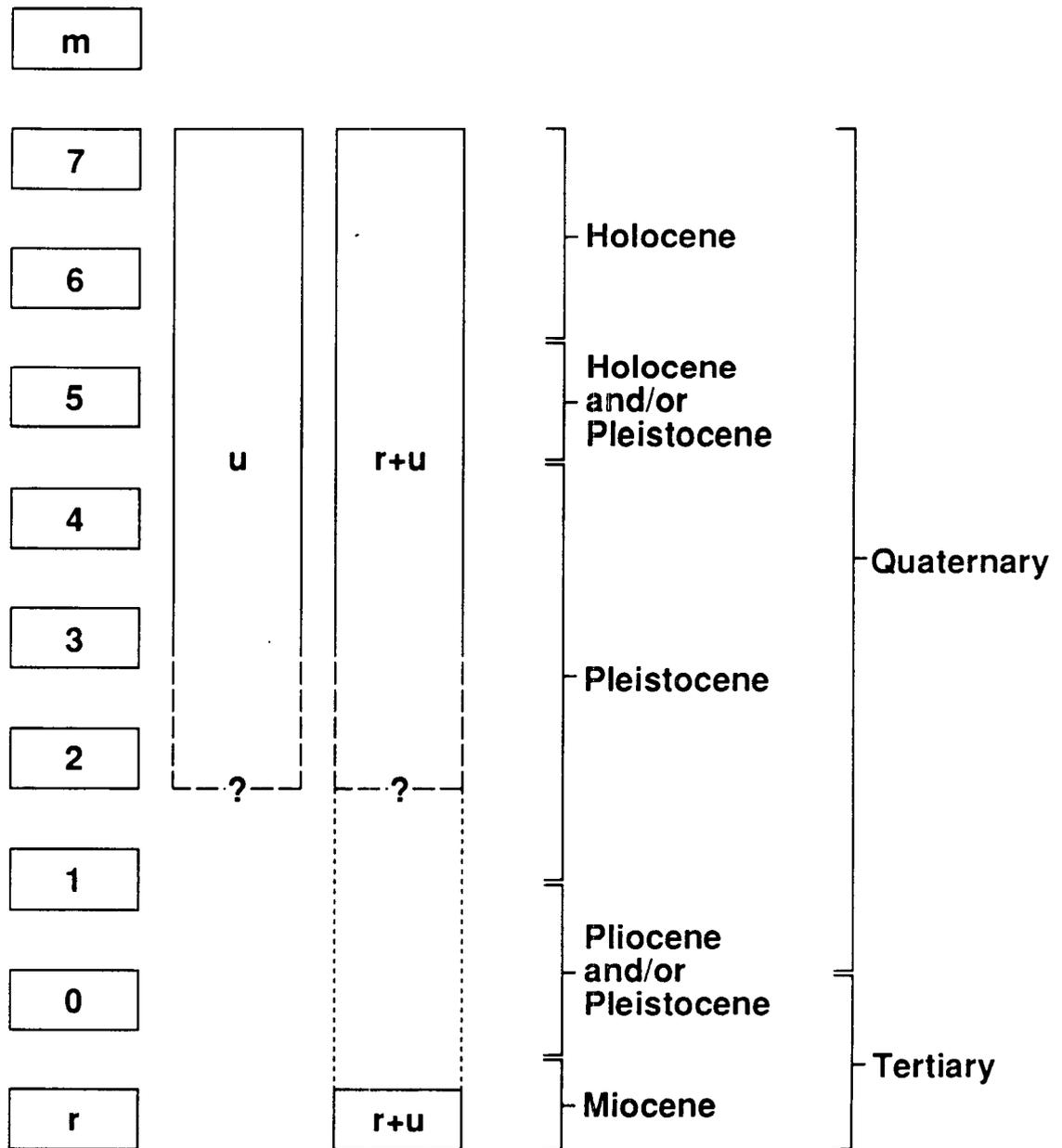
Preliminary Map of Surficial Geology Midway Valley Area

Description of Map Units

- Unit m** [Historical] — Disturbed ground
- Unit 7** [Holocene] — Active washes
- Unit 6** [Holocene] — Low terrace surfaces and vegetated bars along active washes
- Unit 5** [Holocene and/or Pleistocene] — Alluvial fan and terrace surfaces
- Unit 4** [Pleistocene] — Alluvial fan and terrace surfaces
- Unit 3** [Pleistocene] — Alluvial fan and terrace surfaces
- Unit 2** [Pleistocene] — Alluvial fan and terrace surfaces
- Unit 1** [Pleistocene and/or Pliocene (?)] — Alluvial fan surfaces
- Unit 0** [Plio-Pleistocene (?)] — Degraded terrace surface
- Unit u** [Pleistocene and Holocene] — Hillslopes mantled by undifferentiated colluvium and debris flows; locally may include some areas mantled by eolian and reworked eolian deposits
- Unit r+u** [Tertiary (r) and Quaternary (u)] — Mixed bedrock outcrops and hillslopes mantled by colluvium and talus
- Unit r** [Tertiary] — Bedrock

Preliminary Map of Surficial Geology Midway Valley Area

Correlation of Map Units



Explanation

———— Lineament trace

(27) Lineament trace identification number

Geomorphic/Vegetative Features

- AS Alluvial scarp
- BIS Break-in-slope
- BS Bedrock Scarp
- LD Linear drainage
- T Tonal contrast
- TS Topographic saddle
- V Vegetative contrast/Alignment of vegetation

Geologic Features

- DM Displaced lithologic marker horizon
(U = up; D = down; arrows indicate sense of movement)
- TM Terminated lithologic marker horizon

Features of Uncertain Origin

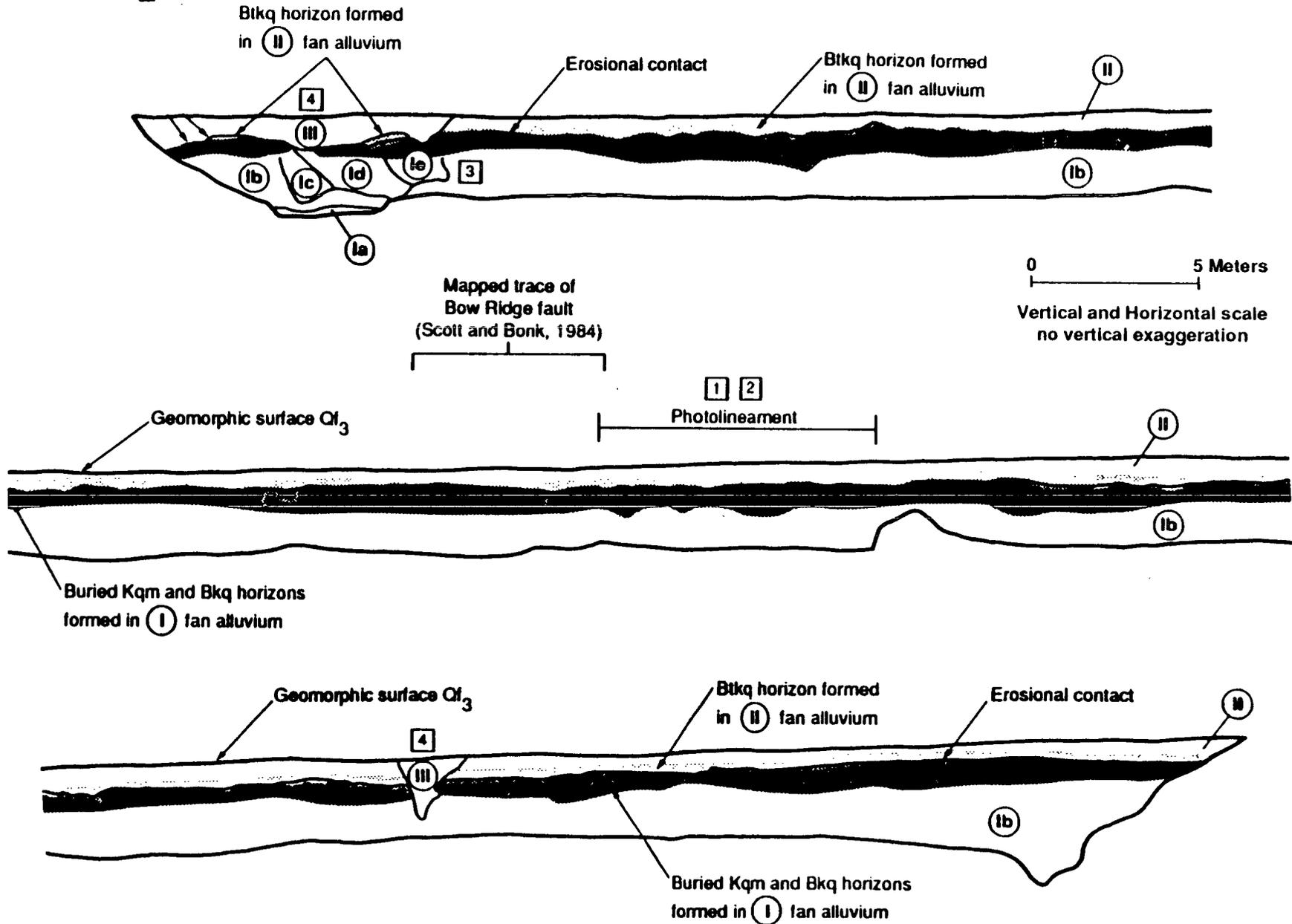
- L? Possible nontectonic lithologic contact
- C? Possible cultural feature

Lineaments Identified in the Midway Valley Area	
Sandia National Laboratories and Geomatrix Consultants, Inc.	SAND91 - 0607
	March, 1991

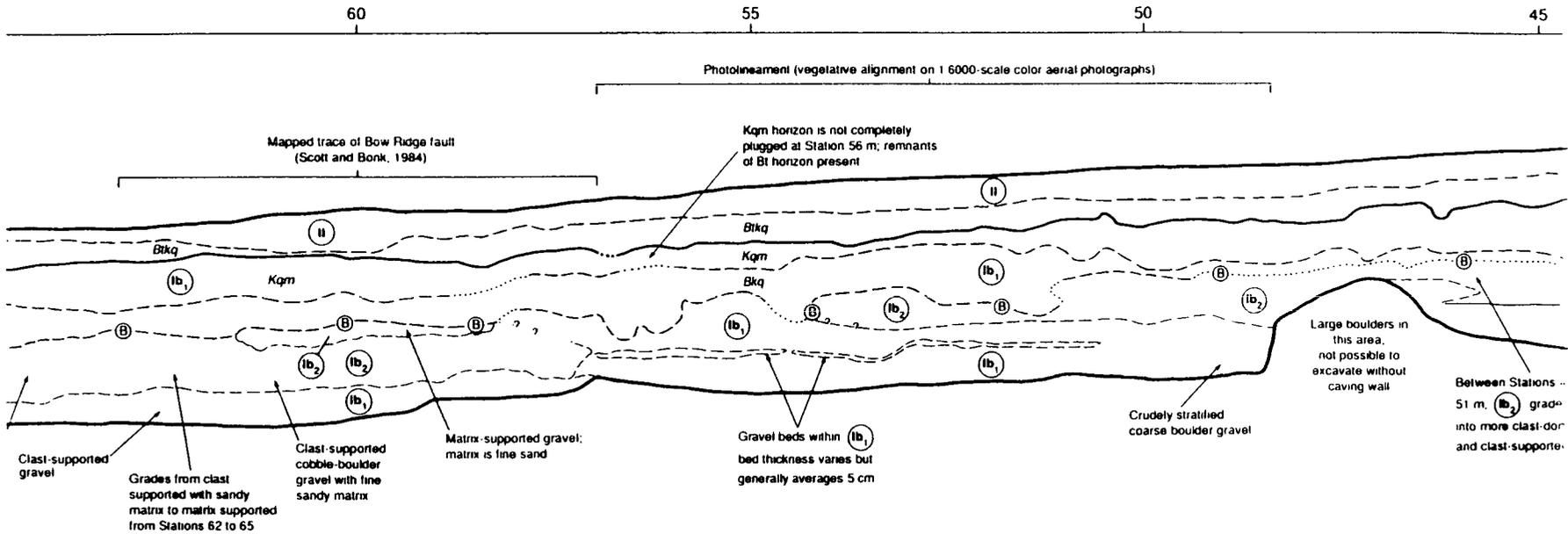
**Oblique Aerial Photo
View is South Along Trace
of Bow Ridge Fault
on West Side of Exile Hill**

Geologic Interpretation: Trench TR-A/BR-3

E



Central Part of Trench TR-A/BR-3 (South Wall)



Preliminary Correlation of Geologic Units Midway Valley Trench TR-A/BR-3

<u>Trench</u> <u>TR-A/BR-3</u>	<u>Geologic Map</u> <u>(Wesling et al., 1991)</u>	<u>Age</u>
Unit III	Unit 4(?) (Qaf₄)	Holocene to Late Pleistocene
Unit II	Unit 3 (Qaf₃)	Late Pleistocene
Unit I	Unit 2 (Qaf₂)	Middle Pleistocene

Quaternary Boundary Dates of the NTS Area

(Quaternary time scale is based on Imbrie et al. [1984])

Latest Holocene	Historic
Late Holocene	Historic - 3 ka
Middle Holocene	3 - 7 ka
Early Holocene	7 - 10 ka ⁽¹⁾
Late Pleistocene	10 - 128 ka ⁽²⁾
Middle Pleistocene	128 - 736 ka ⁽³⁾
Early Pleistocene	736 - 1600 ka (1.6 - 1.7 Ma) ⁽⁴⁾
Pliocene	1.6 - 5.0 Ma (5.0 - 5.5 Ma)

⁽¹⁾ Arbitrary age suggested for Pleistocene-Holocene boundary (Hopkins, 1975)

⁽²⁾ Astronomical age of marine O-isotope stage 5e boundary

⁽³⁾ The Brunhes-Matuyama geomagnetic reversal

⁽⁴⁾ Provisional age of the proposed Pliocene-Pleistocene boundary at the end of the Olduvia polarity subchron (event) in the Vrica stratotype section, southern Italy (Agrirre and Pasini, 1984)

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Observations/Preliminary Conclusions Trench A/BR-3

- **Trench A/BR-3 crosses:**
 - **Two vegetative lineaments (17/82 & 17/83, Wesling, et al., 1991, Plate 4)**
 - **The mapped trace of the Bow Ridge Fault (Scott and Bonk, 1984)**
- **The Bow Ridge Fault displaces colluvial deposits at Trench 14 that correlate to units 2 and 3(?) of Wesling et al. (1991)**

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Evaluating the Location and Recency of Faulting Near Prospective Surface Facilities

Observations/Preliminary Conclusions (Continued)

- **Alluvial fan deposits and buried paleosols exposed in Trench A/BR-3 that correlate to units 2 and 3 are not faulted**
- **Degree of Resolution (Apparent vertical displacement)**
 - **Unit 2(?) alluvial fan deposits < 5 to 30 cm**
 - **Erosional contact, base of unit 3(?) 0 to 10 cm**