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Title:	Seismic Hazard Analysis at Los Alamos
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Seismic Hazard Analysis at Los Alamos

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The presentation will address fault historic earthquakes and paleoseismology on the Pajarito Plateau. The Pajarito Fault Zone is a series of normal faults that drop the Pajarito Plateau down relative to peaks in the Jemez Mountains. Scientists identify prehistoric earthquakes by digging trenches across the fault to look for evidence of offset strata. Once an offset stratum is located, the size of the prehistoric earthquake is estimated by the size of the offset. The date of the event is determined by radiogenic processing of organic material. Although there are many minor fault strands across the Pajarito Plateau, there is no evidence of any faulting at TA-55.

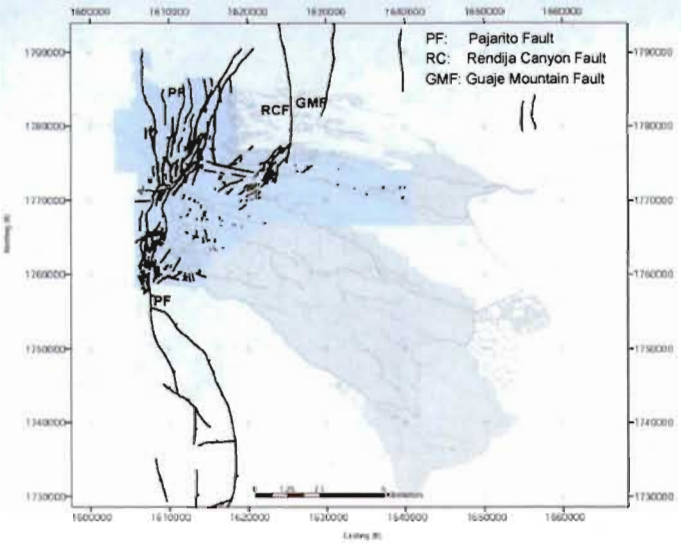
Seismic Hazard Analysis at Los Alamos

Fault Historic Earthquakes and Paleoseismology

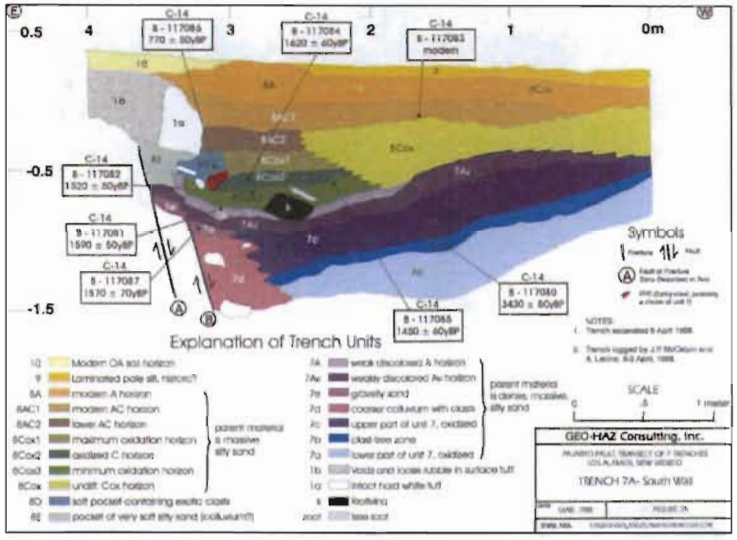
April 27, 2011

TA-55

The Pajarito Fault Zone (PFZ) Is a series of normal faults that drop the Pajarito Plateau down relative to the peaks in the Jemez Mountains. The PFZ trends north-south for approximately 50 km. There are three distinct strands: the Pajarito Fault, the Rendija Canyon Fault, and the Guaje Mountain Fault.

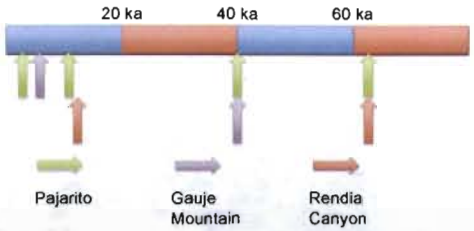


Map of the Pajarito Fault System in the vicinity of Los Alamos. LANL is shaded grey.

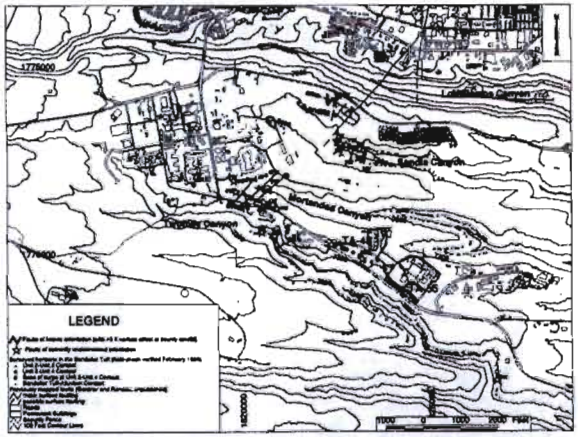


Trench logs

Prehistoric earthquakes are identified by digging trenches across the fault and looking for evidence of offset strata. Once an offset stratum is located, the size of the prehistoric earthquake is estimated by the size of the offset. The date of the event is determined by radiogenic processing of organic material.



Chronology of Seismic Events



Map of geologic features from TA-55 to the eastern edge of TA-3.

Although there are many minor fault strands across the Pajarito Plateau, there is no evidence of any faulting at TA-55.

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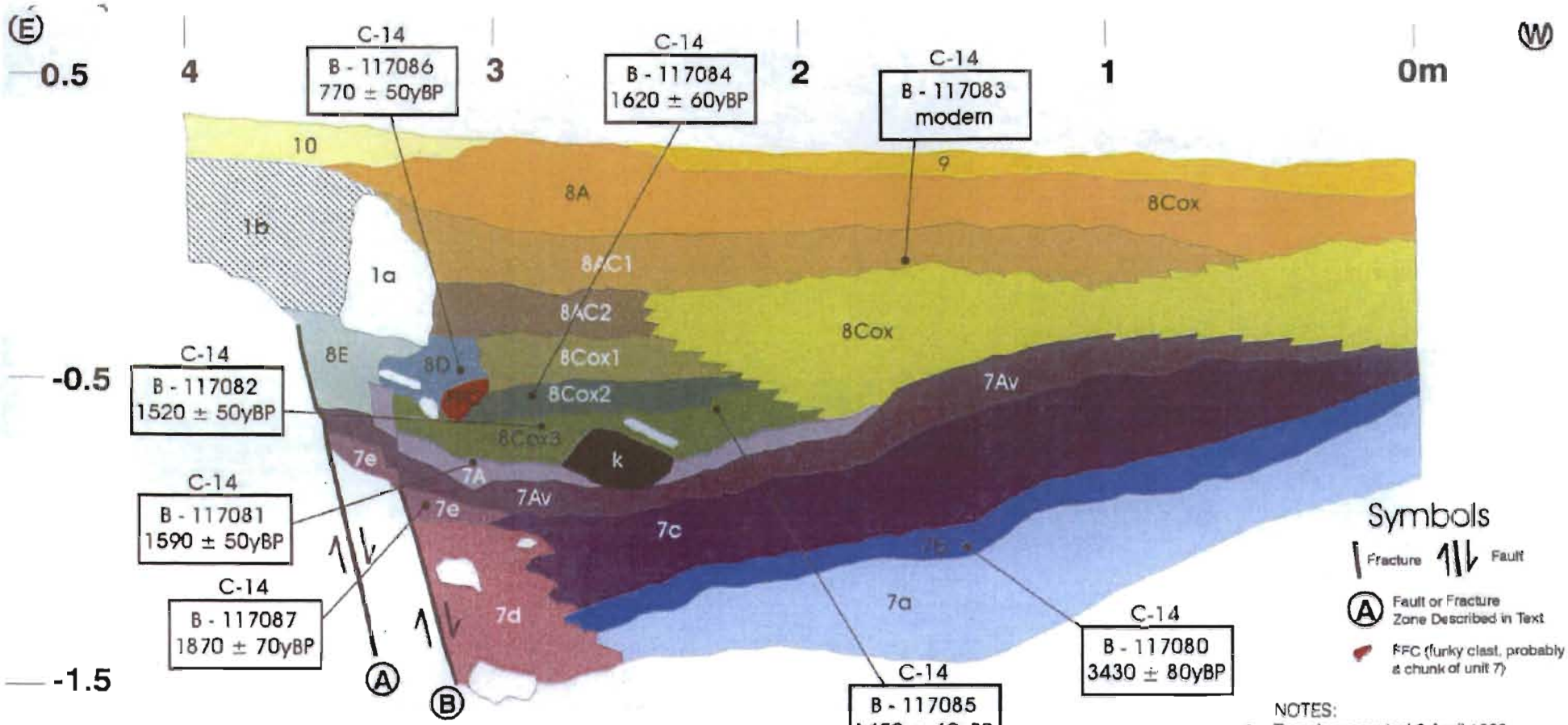

Symbols

- Fracture
- Fault
- A — Fault or Fracture Zone Described in Text
- FFC (funky clast, probably a chunk of unit 7)

NOTES:

1. Trench excavated 6 April 1998.
2. Trench logged by J.P. McCalpin and A. Lavine, 6-9 April, 1998.

SCALE

0 .5 1 meter

Explanation of Trench Units

10	Modern OA soil horizon	
9	Laminated pale silt, historic?	
8A	modern A horizon	parent material is massive silty sand
8AC1	modern AC horizon	
8AC2	lower AC horizon	
8Cox1	maximum oxidation horizon	
8Cox2	oxidized C horizon	
8Cox3	minimum oxidation horizon	
8Cox	undiff. Cox horizon	
8D	soft pocket containing exotic clasts	
8E	pocket of very soft silty sand (colluvium?)	
7A	weak discolored A horizon	parent material is dense, massive, silty sand
7Av	weakly discolored Av horizon	
7e	gravelly sand	
7d	coarser colluvium with clasts	
7c	upper part of unit 7, oxidized	
7b	clast-free zone	
7a	lower part of unit 7, oxidized	
1b	Voids and loose rubble in surface tuff	
1a	Intact hard white tuff	
k	Krotivina	
root	tree root	

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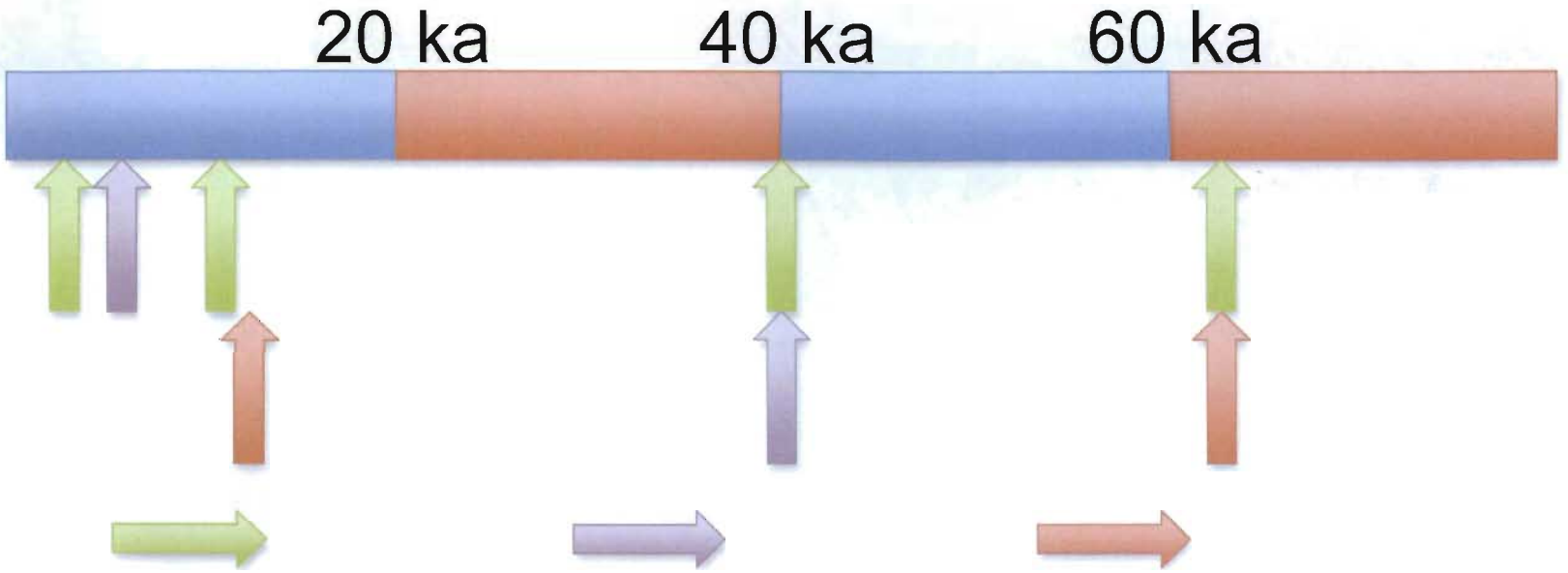
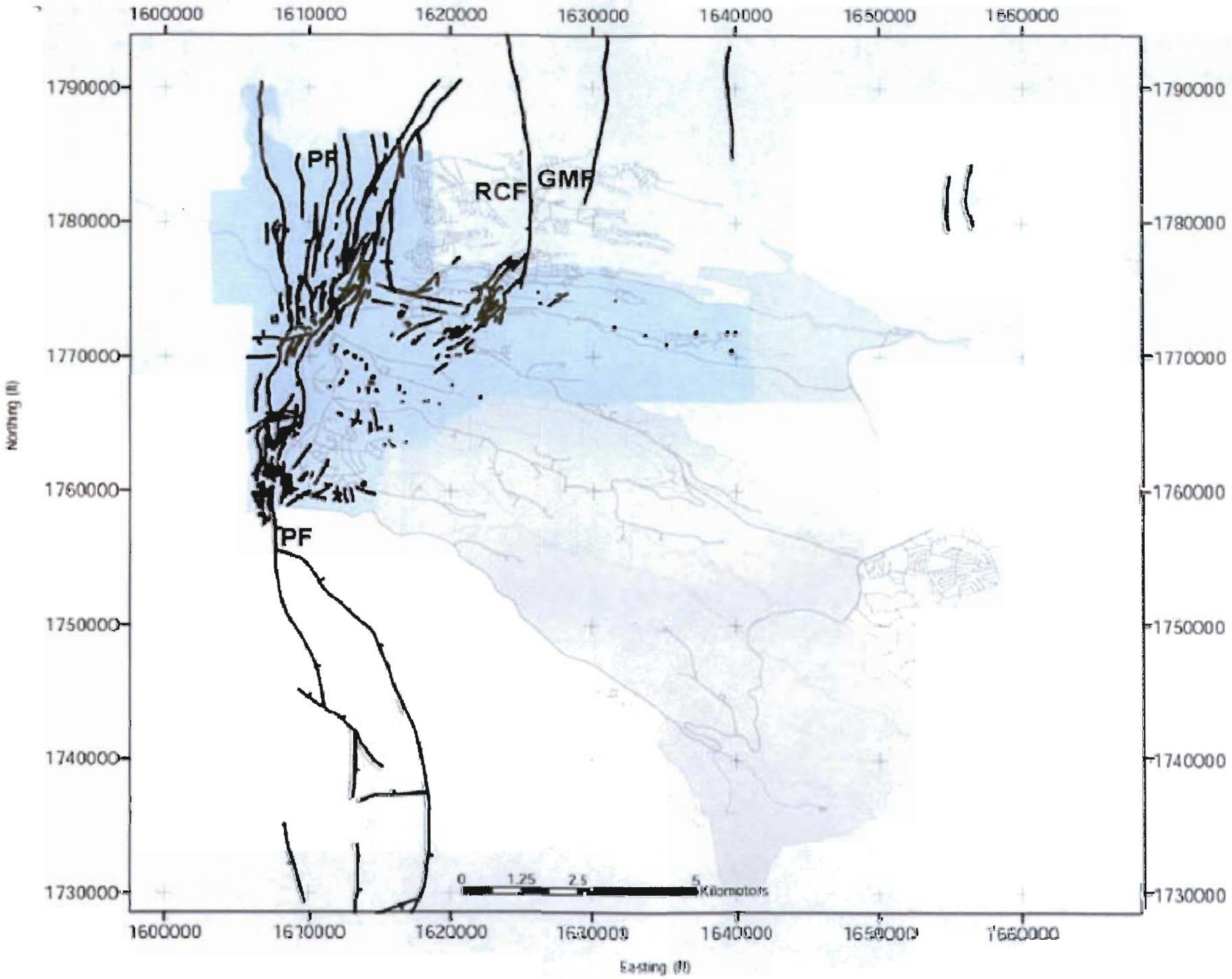
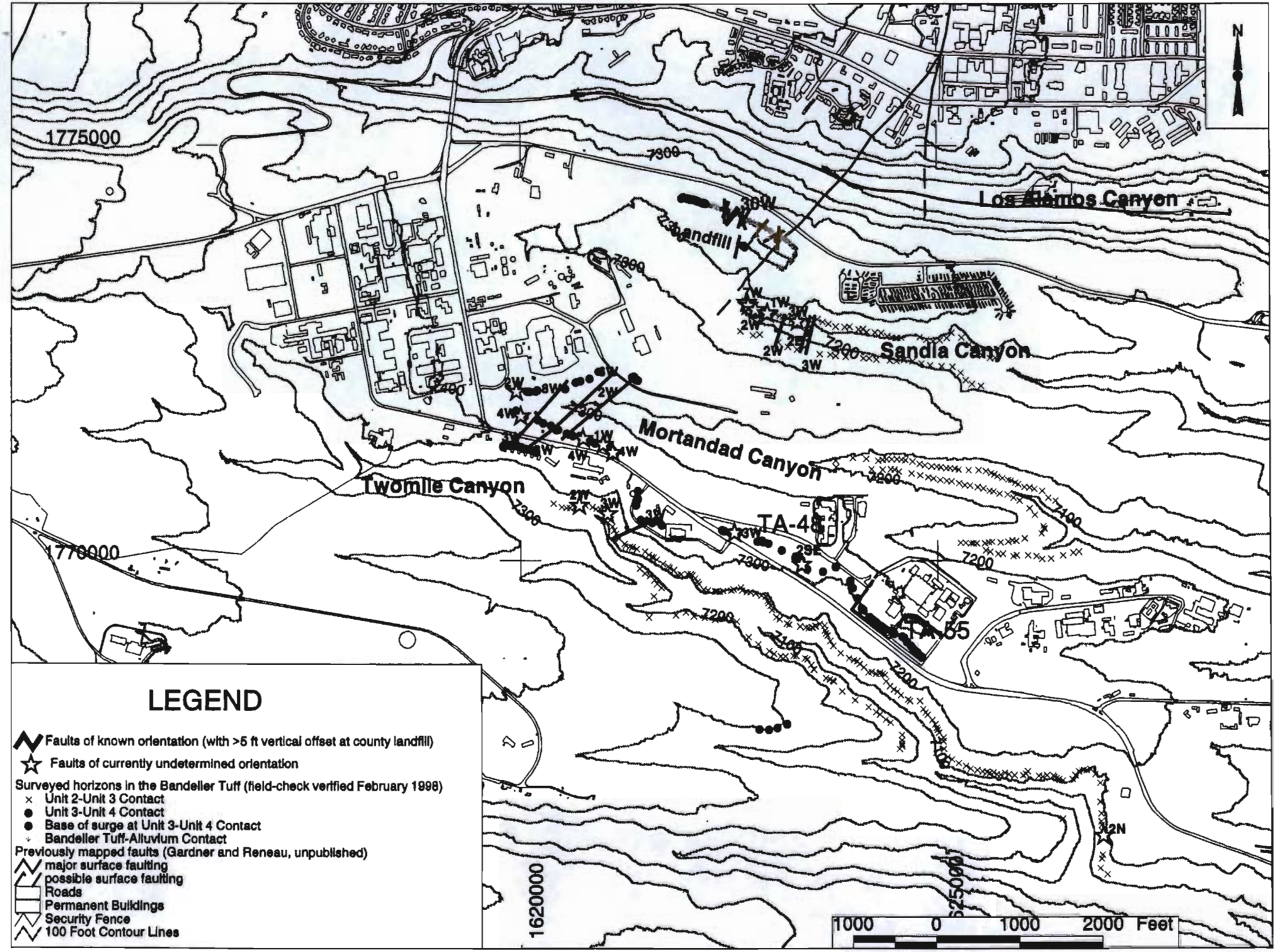
PAJARITO FAULT, TRANSECT OF 7 TRENCHES
LOS ALAMOS, NEW MEXICO

TRENCH 7A- South Wall

DATE MAR. 1998	FIGURE 7A
DWG. NO. C:\GEOHAZ\LANL\ALAMOS\TRENCH7A.CDR	


20 ka
40 ka
60 ka
Pajarito
Gauje Mountain
Rendia Canyon


1600000
1610000
1620000
1630000
1640000
1650000
1660000
1790000
1780000
1770000
1760000
1750000
1740000
1730000
PF
RCF
GMF
PF
0
1.25
2.5
5
Kilometers
Northing (ft)
Easting (ft)


1775000
1770000
1620000
7300
7200
7400
7100
Los Alamos Canyon
Sandia Canyon
Mortandad Canyon
Twomile Canyon
TA-48
TA-55
landfill
30W
7W
1W
3W
2W
2E
4W
2N
N
1000 0 1000 2000 Feet
LEGEND
Faults of known orientation (with >5 ft vertical offset at county landfill)
Faults of currently undetermined orientation
Surveyed horizons in the Bandelier Tuff (field-check verified February 1998)
Unit 2-Unit 3 Contact
Unit 3-Unit 4 Contact
Base of surge at Unit 3-Unit 4 Contact
Bandelier Tuff-Alluvium Contact
Previously mapped faults (Gardner and Reneau, unpublished)
major surface faulting
possible surface faulting
Roads
Permanent Buildings
Security Fence
100 Foot Contour Lines