

Appendix C

Lectures

1. Association of Engineering Geologists/American Association of Professional Geologists Joint Annual Meeting in Reno, Nevada: September 25 – September 29, 2002

Anderson, Thomas H., Vander Schrier, Ann L., and Deemer, Danielle L., 2002, *Tectonic evolution of the Yucca Mountain Region: Role of the Las Vegas Valley shear zone*, [abs.]: Program with Abstracts, AEG News, V. 45, p. 53.

Kinematic analysis of regional fault systems and field studies, (mainly west of Mercury, Nevada) provides insight into the tectonic history of Yucca Mountain. Our results support the previously offered interpretation of the Yucca Mountain region as a pull-apart basin filled with volcanic units erupted through thinned crust. The boundaries of the southern part of the pull-apart basin coincide with segments of major faults (Kawich Greenwater rift or Gravity fault, Rt. 95/Carrara and Bare Mountain) that may have accommodated multiple episodes of crustal extension during Tertiary time. These major fault structures have the potential to influence and possibly control the transmission of water from the proposed repository into Amargosa Valley. Tens of kilometers of right-lateral displacement along the Las Vegas Valley Shear Zone (LVVSZ) were accommodated by formation of a pull-apart basin at a northward releasing step along Forty Mile Wash. East of Forty Mile Wash, the trace of the LVVSZ trends westerly (roughly between Lathrop Wells and Mercury) probably along a pre-existing structure. Transpression along this left-step constraining bend is recorded by upright folds with local vertical limbs in layers of the rocks of Pavits Spring (17+ to 14 Ma) that crop out south of Little Skull Mountain. Tuff of the Crater Flat Group (~14 Ma) that directly overlies folded beds of Pavits Spring records eruption during deformation. Gentle folds and irregular bed geometries that have been mapped in units as young as the Timber Mountain Group are evidence that contraction continued contemporaneously with volcanism until 11 Ma. Contraction recorded by folds is not evident in units younger than 11 Ma suggesting cessation of transpression related to strike-slip movement along the LVVSZ. Subsequent development of north-striking normal faults commonly linked by northwest-striking right-lateral strike-slip faults (e.g., Yucca Wash; Sever Wash) and complementary northeast-striking left-lateral strike-slip faults (e.g., Mine Mountain; Rock Valley) records the transition to pure shear accompanied by local north-south contraction. Normal faults at releasing steps along the Rock Valley Fault that break across west-trending transpressional folds in the Specter Range reveal the relative ages of simple and pure shear deformation.

2. Geological Society of America Annual Meeting: October 27 – October 30, 2002

Anderson, Thomas H., Deemer, Danielle L., and Vander Schrier, Ann L., 2002

Tectonic history of major faults in the Yucca Mountain region: Potential pathways for fluid migration, [abs.]: Abstracts with Programs, Geological Society of America Annual Meeting, 34,6.

Kinematic analysis of regional fault systems and field studies (mainly west of Mercury, NV) provide insight into the tectonic history of Yucca Mountain. Our results support the interpretation of the Yucca Mountain region as a pull-apart basin filled with volcanic units erupted through thinned crust. The boundaries of the southern part of the pull-apart basin coincide with major faults (Kawich Greenwater rift or Gravity fault, Highway 95/Carrara, and Bare Mountain). These major fault structures may influence and possibly control the transmission of water from the proposed repository into Amargosa Valley. Tens of kilometers of right-lateral displacement along the Las Vegas Valley shear zone (LVVSZ) were accommodated by formation of a pull-apart basin at a northward releasing step along Forty Mile Wash. East of Forty Mile Wash, the trace of the LVVSZ trends westerly (roughly between Lathrop Wells and Mercury) probably along a pre-existing structure. Upright folds with local vertical limbs in layers of the rocks of Pavits Spring (approximately 17 to 14 Ma) south of Little Skull Mountain record transpression along the constraining bend. Tuff of the Crater Flat Group (approximately 14 Ma) that directly overlies the folded beds of Pavits Spring records eruption during deformation. Gentle folds and irregular bed geometries that have been mapped in units as young as the Timber Mountain Group are evidence that contraction continued with volcanism until 10 Ma. Contraction recorded by folds is not evident in units younger than 10 Ma suggesting cessation of transpression related to strike-slip movement along the LVVSZ. Paleozoic formations comprising the floor of the Tertiary basin were deformed concurrently as shown by steep bedding, brecciation, detachments, and thrusts. Subsequent development of north-striking normal faults commonly linked by northwest-striking right-lateral strike-slip faults (e.g., Yucca Wash; Sever Wash) and complementary northeast-striking left-lateral strike-slip faults (e.g., Mine Mountain, Rock Valley) records the transition to pure shear with local north-south contraction. Normal faults at releasing steps along the Rock Valley fault that break across west-trending transpressional folds in the Specter Range reveal the relative ages of simple and pure shear deformation.