

## **Trip Report for the 27-28 January 2009 Lee Nuclear Site Field Audit with USGS Specialists in Geology and Seismology**

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During the Lee Nuclear Site field audit conducted over 27-28 January 2009, NRC geologists, seismologists, and geotechnical engineers and USGS geologists and seismologists directly examined outcrops of the erosion-resistant quartzite unit at McKown's Mountain (Figure 1), which lies in the Lee Nuclear Site area, and reconfirmed that the mountain is held up by that erosion-resistant rock unit and is not related to tectonic faulting. The quartzite primarily reflects deformation fabrics that are probably > 251 Ma in age based on observed field relationships, rather than Quaternary (2.6 Ma to present) tectonic deformation. NRC staff and USGS geologists and seismologists also examined select rock exposures in the Lee Nuclear Site area (Figure 2) to aid understanding of the complex tectonic deformation history reflected in rock units at the Lee Nuclear Site location. "Site area" is that area within an 8-km (5-mi) radius of the site, and "site location" is the area within a 1-km (0.6-mi) radius of the site.

NRC staff and USGS geologists and seismologists also examined foundation bedrock in the excavations for former Cherokee Nuclear Station (CNS) Unit 2 and Unit 3 (Lee Nuclear Site Unit 2) to assess tectonic structures (including joints and fractures, shear and breccia zones, minor faults, folds, foliations, and lineations) and lithologies which occur at the Lee Nuclear Site location, as well as bedrock outcrops around the periphery of former CNS Unit 1 (Lee Nuclear Site Unit 1) where no concrete had been poured during original construction activities at the former CNS site. NRC staff and USGS geologists and seismologists did not find any geologic field evidence for either capable (i.e., Quaternary) tectonic structures or other potentially detrimental geologic features in the existing excavations. The CNS Unit 2 excavation was at foundation grade level; the CNS Unit 3 (Lee Nuclear Site Unit 2) excavation reached only top of sound rock, not foundation grade level; and the CNS Unit 1 (Lee Nuclear Site Unit 1) excavation lies under concrete poured during original construction activities at the former CNS site.

Deformation features observed in the existing CNS Unit 2 and Unit 3 (Lee Nuclear Site Unit 2) excavations and in the Lee Nuclear Site area reflect a complex, multiphase deformational history. Because such complex deformation features occur, NRC staff arranged to conduct a follow-up data documentation audit for examining geochronologic data acquired on samples taken at the former CNS site. These data were considered to be important because the applicant did not acquire new age dates for the Lee Nuclear Site COL application to constrain timing of deformation, but rather relied on age dates from samples collected during characterization of the CNS site.



Figure 1. January 2009 Lee Nuclear Site Field Audit: NRC Senior Geologist, Dr. Gerry L. Stirewalt, examining quartzite outcrops on McKown's Mountain with USGS geologists and seismologists and the applicant's geologic consultant, Dr. Malcolm Schaeffer. Dr. Schaeffer was the lead geologist involved with the original geologic mapping of all excavations at the former CNS site in the 1970s.





Figure 2. January 2009 Lee Site Audit: NRC Senior Geologist, Dr. Gerry L. Stirewalt, examining old deformation fabrics in the Lee Nuclear Site area with USGS geologists and seismologists and the applicant's geologic consultant, Dr. Malcolm Schaeffer. Based on radiometric age dates acquired by the applicant on samples collected for characterization of the former co-located CNS site, the deformation fabrics are most likely not younger than 251 Ma.