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Boyd, P. J., Martin, R. J., and Price, R. H. (1995) "Variability of the physical properties of tuff at Yucca Mountain, NV" Proceedings of 35th U.S. Symposium on Rock Mechanics (USRMS), 5-7 June, Reno, Nevada, 1995.

#### Abstract

Lateral and vertical variabilities in the bulk and mechanical properties of silicic volcanic tuff at the potential nuclear waste repository site in Yucca Mountain, NV have been evaluated. Laboratory measurements have been performed on tuff specimens recovered from boreholes located to support the design of the Exploratory Studies Facility / North Ramp (ESF/NR). The data include dry and saturated bulk densities, average grain density, porosity, compressional and shear wave velocities, elastic moduli, and compressional and tensional fracture strengths. Data from eight boreholes aligned in a northwest-southeast direction have been collected under the required quality affecting program. Three boreholes (UE25 NRG-5, USW NRG-6 and USW NRG-7fiA) have penetrated the potential repository horizon. The information collected provides for an accurate appraisal of the variability of rock properties in the vicinity of the boreholes. As expected, there is substantial variability in the bulk and mechanical properties of the tuff with depth (lithology). This is due to variations in gross characteristics of the tuffs (e.g., cooling units, mode of deposition, etc.), as well as smaller scale features (welding, porosity, and internal structures) that have developed as a result of depositional and post-depositional mechanisms. An evaluation of the lateral variability in bulk and mechanical properties is somewhat limited, at this time, due to a lack of borehole control to the north and south (parallel to the depositional flow direction). Initial observations indicate that there is minimal lateral variability within lithologic units. There are observable differences however, that can be related to variability in specific properties (e.g., porosity, and internal structures).

Contact NER for more information.

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