

Richard D. Miller, Richard Markiewicz, Bevin Bailey, Justin Schwarzer, Shelby Peterie, Julian Ivanov, Kristen Pierce, and Craig Hendrix (2012) Full Wavefield Seismic Analysis Beneath the A.V. Watkins Dam, Utah. Symposium on the Application of Geophysics to Engineering and Environmental Problems 2012: pp. 179-179.

A reliable measure of seismic properties as a function of depth is important to the Bureau of Reclamation's comprehensive and accurate appraisal of site response (ground motion and acceleration) along specific segments of A.V. Watkins Dam in Box Elder County, Utah. A series of seismic data sets were acquired along coincident profile lines at the downstream toe of A.V. Watkins Dam. Three distinctly different surveys, each tailored to a different portion of the wavefield, were optimally acquired and processed. Two three-quarter-mile-long high-hazard portions of the embankment were targeted for this study. Compressional- and shear-wave velocity information was tabulated from 10 ft to over 2000 ft below ground surface using a combination of MASW, tomography, and seismic reflection profiling. MASW data acquisition employed a weight drop and tow array. Tomography and reflection data were recorded by a 480-channel fixed spread used a weight drop and IVI minivib (respectively). Material response to shaking within and in proximity to the dam must be reasonably well known for accurate evaluation of failure potential and associated risk. From the V_p and V_s data, site response models can be accurately run with lateral variability consistent with actual subsurface conditions. Proven correlation between seismic properties and stiffness/rigidity is the basis for highly detailed measurements of the seismic wavefield at a dam site such as this. Current interest in this dam and reservoir is heightened due to its proximity to the Wasatch Fault and its associated significant ground motion potential. This site could experience significant horizontal and vertical ground accelerations in a foreseeable earthquake event, requiring accurate ground motion modeling and velocity structure.