

HISTORY OF GEOPHYSICAL APPLICATION AT TVA

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From its inception, the Tennessee Valley Authority (TVA) has utilized geophysical methods as a tool for site characterization. Electrical resistivity surveys were used in the 1930's and 40's as a tool to characterize soil and rock conditions at dam sites. Later, in the 1960's, TVA conducted seismic refraction surveys to determine depth to top of rock at dams and nuclear plants. These were simple surveys that used a single channel seismograph, a single geophone, and a sledge hammer with a metal plate. In this period TVA was contracting borehole geophysical services for basic logs such as downhole seismic, natural gamma, caliper, single-point resistivity and long-short normal resistivity. By the 1970's, TVA's Geological Services Branch had developed a dedicated geophysics section equipped with a borehole geophysical logging truck, Bison seismographs, and a Lacoste & Romberg Gravimeter. TVA could run all basic borehole logs plus sonic logs and active source logging tools, such as 4-Pi density, compensated density, and neutron. In the 1980's, TVA converted their analog borehole geophysical logging truck to a digital logging system and added an acoustic televiewer. During the 1980's TVA also operated a truck mounted 48-channel Input-Output digital seismic recording system for seismic reflection surveys. TVA deployed and maintained a regional microearthquake seismic monitoring network that covered the TVA region from 1982 to 1995. TVA's use of geophysical tools waned during the 1990s, however, in the last decade, TVA began re-emphasizing the use of geophysics for investigations at dam sites especially to support the Dam Safety Assurance Program. Today, TVA has in house geophysical capabilities that include a borehole acoustic televiewer, downhole gamma and fluid resistivity tools, an AGI SuperSting ERI system and GPR system. TVA also continues to operate strong motion accelerographs at selected dams, an initiative that began in the early 1990's.