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TESTS ON ROCK SALT FOR COMPRESSED AIR ENERGY STORAGE

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ABSTRACT

A program is described for tests of rock salt under conditions typical of compressed air energy storage (CAES) reservoirs. Findings were used as a basis for criteria for long-term stability of operational CAES caverns in salt. Both laboratory and in situ tests in salt mines were performed. Laboratory studies included a series of tests with triaxial cyclic loads and elevated temperatures. In situ studies included pressurized borehole tests, cross-borehole permeability, and small-scale hydraulic fracturing. Data collected included applied pressures and resulting displacements of specimens and boreholes along with accompanying acoustic emissions.

Results indicate: (1) Rock salt exhibits good endurance to cyclic loads within ranges anticipated for CAES applications. (2) Permeability of rock salt both in the laboratory and in situ depends upon confining stresses and disturbance history. (3) Performance of storage caverns in salt can be monitored with acoustic emissions.