

Plan for Using Solar-Powered Jack Pumps to Sample Groundwater
at the Nevada Test Site.

David Hudson¹, Charles Lohrstorfer¹, and Bruce Hurley²

Groundwater is sampled from 39 monitoring wells on the Nevada Test Site (NTS) as part of the Routine Radiological Environmental Monitoring Program. Many of these wells were not designed or constructed for long-term groundwater monitoring. Some have extensive completion zones and others have obstructions such as pumps and tubing. The high-volume submersible pumps in some wells are unsuitable for long-term monitoring and result in large volumes of water that may have to be contained and characterized before subsequent disposition. The configuration of most wells requires sampling stagnant well water with a wireline bailer. Although bailer sampling allows for the collection of depth-discrete samples, the collected samples may not be representative of local groundwater because no well purging is done.

Low-maintenance, solar-powered jack pumps will be deployed in nine of these onsite monitoring wells to improve sample quality. These pumps provide the lift capacity to produce groundwater from the deep aquifers encountered in the arid environment of the NTS. The water depths in these wells range from 700 to 2,340 ft below ground surface. The considerable labor and electrical power requirements of electric submersible pumps are eliminated once these pumps are installed. Access tubing will be installed concurrent with the installation of the pump string to provide downhole access for water-level measurements or other wireline instruments. Micro-purge techniques with low pump rates will be used to minimize purge volumes and reduce hydraulic gradients. The set depths of the pumps will be determined by the borehole characteristics and screened interval.

¹National Security Technologies, LLC, Las Vegas, NV

²U.S. Department of energy, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV