

WellWatcher PS3 Passive Seismic Sensing System Optimizes Underground Gas Storage Capacity

Pressure in methane gas injection well is successfully monitored and controlled within tight governmental restrictions

CHALLENGE

Optimize underground gas storage (UGS) capacity and pressure for methane gas in an injection well located in a Mediterranean country.

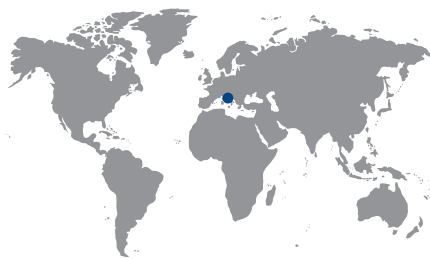
SOLUTION

Monitor and manage well pressures with WellWatcher PS3* passive seismic sensing system.

RESULTS

Safely increased well capacity and pressure in a gas injection well.

Because of the constant monitoring by the WellWatcher PS3 passive seismic sensing system and the enhanced safety that resulted, the operator was able to increase UGS pressure and volume without incident.



Underground methane gas storage increases well pressure and risks

Underground gas storage (UGS) in wells helps ensure the availability of gas in the event of an interruption in the supply. The wells used are sometimes located in depleted gas reservoirs into which gas from other sites has been injected, and they may cross multiple hydrocarbon zones. They must tolerate high injection pressures, high production rates, and frequent changes in pressure and temperature yet still deliver gas fast enough to meet peaks in demand. Meeting the increasing demands for natural gas requires better management of the existing gas reservoirs and storage facilities.

An operator needed to increase the maximum methane gas storage capacity in an existing reservoir in a Mediterranean country, mainly through an increase in storage pressure. The country's law allows methane gas to be stored at pressures higher than the original reservoir pressure only if a microseismic monitoring system is permanently installed in the field and is continuously monitored to prevent leaks and other damage to the storage system. The raw data must also be available for governmental agencies at any time.

Monitoring system records seismic waves created during gas injection

The operator selected the WellWatcher PS3 passive seismic sensing system for an observation well in the gas storage field. This system is able to record seismic waves generated during gas injection and recovery operations under rapidly changing reservoir pressure conditions.

The system uses seismic sensors that are typically either buried at the surface or mounted, temporarily or permanently, in a wellbore. Measuring the amplitudes and locating the source of the emissions provide important information about the reservoir, including its structure, fluid movement, and geomechanics. Technology that greatly reduces the noise associated with fluid flow allows the detection of microseismic signals during storage activities.

The retrievable monitoring system is connected to the surface by a quarter-inch electric cable passed through the tubing hanger and connected to a surface acquisition unit placed close to the wellhead.

Operator increases pressure and volume of UGS well without incident

To date, the WellWatcher PS3 seismic sensing system has worked flawlessly, and the acoustic data obtained, analyzed, and interpreted by Schlumberger has enabled the operator to increase the pressure and volume of this and additional UGS wells.



The WellWatcher PS3 passive seismic sensing system is deployed on tubing inside the casing.