Wellbore Integrity SOLUTIONS

Well·SENSE

Fiber Optic Logging in a European Geothermal Well

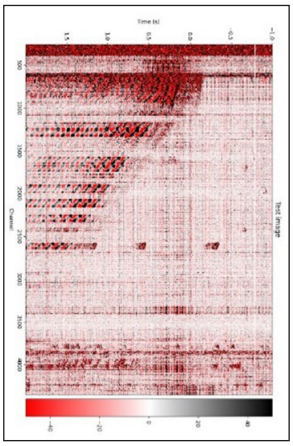
Following a well stimulation operation, FiberLine Intervention (FLI) technology, from Well-SENSE, was used successfully to provide a detailed temperature profile and seismic calibration data.

Efficient and high-quality data is provided offline and in an environmentally sensitive location. The wellsite contained no rig or intervention equipment.

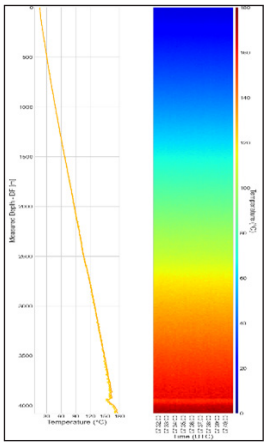
A customer had recently performed an intervention on a geothermal well with coiled tubing and had subsequently demobilized the intervention equipment. FLI technology, from Well-SENSE, was selected as an efficient solution and deployed to determine the impact on the temperature profile of the well and to calibrate the surface seismic monitoring network of geophones. The tools were deployed and, within 30 minutes, reached the required depth of interest at over 4000 m [13123 ft], capturing both distributed temperature and distributed acoustic sensing measurements throughout the wellbore. The temperature survey was completed in less than an hour.

An air gun source was fired into surface pits to calibrate the seismic network, the furthest being 2.7 km [1.7 miles] from the wellsite. Multiple shots were carried out over two days. Once sufficient data was collected, the master valve was closed on the wellhead, and the surface equipment was rigged down.

FLI tool - deployment ready.



Seismic data collected.



Temperature profile.

CHALLENGE

A customer had stimulated a Geothermal well and wanted to analyze the results of the stimulation. Calibration of the real-time seismic monitoring network was also required as they had previously been unable to accurately calibrate the depth of the seismic data. All of this needed to be achieved offline without a rig or intervention equipment, and it needed to be done with minimal impact on the environment.

SOLUTION

Wellbore Integrity Solutions (WIS) and Well-SENSE provided a disposable 2 ¾ inch FLI tool configured with DTS and DAS fiber. The tool was configured with a high-temperature DAS fiber to allow for extended life in the well. To calibrate the depth of the seismic monitoring network, an air gun source was used in water pits which were up to 2.7 km [1.7 miles] from the wellsite. Multiple shots were fired in each of the different pits.

RESULTS

- The tool was deployed into the well beyond 4000 m (13123 ft) depth within 30 minutes.
- The distributed temperature profile was obtained instantly
- The maximum temperature recorded was 177 deg C [350.6 deg F]
- Seismic data was recorded from an air gun source up to 2.7 km [1.7 miles] away.