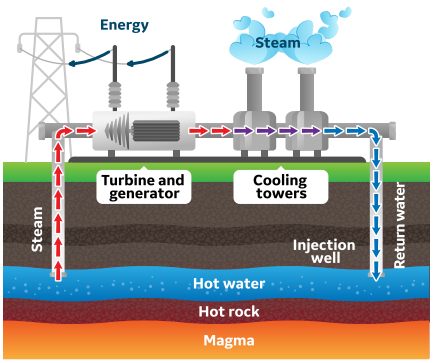
Application note

Brine flow measurement in a geothermal power plant

Summary:

- Easy to set up
- Easy to operate
- No process shutdown
- No downtime and no periodic maintenance/calibration needed
- Reliable



Geothermal Energy

Summary

Geothermal power plants use hydrothermal resources that have both hot water (from brine) and steam which can then be used to drive turbines connected to electricity generators.

Brine temperatures vary between 140 °C-200 °C for each well. With a separator in place to segregate water and steam, the latter is transported to the steam turbines while water feeds the heat exchangers.

Geothermal brine flow measurement is crucial for the efficiency of the wells. Better understanding the flow rate enables customers, firstly to control and optimize brine flow; and secondly help determine the amount of scale and corrosion inhibitor required to be injected into the well to maintain or even increase productivity. Flow measurement can have a positive impact on the well yield and subsequently the power generation production capacity.

Recognizing an opportunity to optimize its brine flow measurement process, a South Eastern European geothermal company contacted Panametrics.

Application

Medium: Brine

Temperature: 170 °C (338 °F)

Pressure: 10 barg (145 psig)

Pipe: 12" Sch 40 CS

Flow rate: 400 m3/h maximum (1.5 m/s) or 1,761 GPM (4.9 ft/s)

Challenge

Different flow meter technologies were used in this geothermal power plant to monitor and measure brine. However, these traditional technologies, such as differential pressure and electromagnetic flowmeters, failed mainly due to harsh conditions like solid content leading to erosion and high temperature. In addition, the customer was frustrated that the repair, refurbishment or calibration of these technologies required a process shut down, causing production losses during the turnarounds.

Solution

Flow verification tests were performed with the Panametrics PT900 Portable Ultrasonic Flowmeter.

Thanks to its internal data logger, data from the tested wells could be saved and recorded. The customer was also able to verify the flow rates without requiring an external power supply at remote locations. The clamp on capability ensured the meter could be installed quickly and easily without process disruption. This was highly appreciated by the customer.

After a successful measurement campaign, the customer purchased nine permanent Aquatrans AT600 meters with high temperature transducers. The customer is pleased to now be benefiting from unrivalled levels of flow measurement accuracy and reliability and is experiencing zero down-time to calibrate the flow meters or through unexpected repairs.

Panametrics, a Baker Hughes business, provides solutions in the toughest applications and environments for moisture, oxygen, liquid and gas flow measurement.

Experts in flare management, Panametrics technology also reduces flare emissions and optimizes performance.

With a reach that extends across the globe, Panametrics' critical measurement solutions and flare emissions management are enabling customers to drive efficiency and achieve carbon reduction targets across critical industries including: Oil & Gas; Energy; Healthcare; Water and Wastewater; Chemical Processing; Food & Beverage and many others.

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BHCS39082 (04/2023)

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