



MAREN GEOTHERMAL PLANT IMPROVES HOT BRINE FLOW MEASUREMENT RELIABILITY WITH ROSEMOUNT™ MAGNETIC FLOW METER

Application

Hot geothermal brine flow to power generators

Customer

Maren

Challenge

Maren, a Turkish company that owns and operates four power plants in the area of Germencik/Aydin for a total of 92 MWe, was facing challenges involving the measurement of water to their power generators. Water coming from wellheads at temperatures between 160 °C and 175 °C is driven to flash separators while maintaining optimal process conditions to maximize electricity production. To determine the efficiency of the generator, Maren evaluates all process measurements such as actual pressure, temperature, and flow rate. This allows the plant to determine if generators are working properly and performing at peak efficiency and productivity. Maren had tried several different technologies to measure the flow rate including other magnetic flow meters, in-line ultrasonic (USM), and vortex flow meters. Despite the wide range of technologies tested, Maren was unable to find a meter with sufficient performance to meet their needs, especially magnetic flow meters as they were experiencing bubbles on liners.

To address this issue, Maren first attempted to change the position of the meter in the process; this approach was unsuccessful. Maren also determined it was nearly impossible to find a magnetic flow meter with a liner capable of withstanding the 175 °C process temperature, despite most supplier data sheets claiming 177 °C as a maximum working temperature for their PTFE liners. Other technologies, such as in-line USM, clamp-on USM, and insertion-type vortex meters experienced sensor coating issues and could therefore not be used.

Results

- Total reliability in application at 175 °C
- Eliminated maintenance activity and costs
- Improved availability generates 200 MWh
- Established a new standard for geothermal plants

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“Together with Emerson we could measure brine flowrate which is very important for our effectiveness. It was a measurement that we could not perform since 2011 with other producers. Rosemount magnetic is reliable and accurate.”

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Mehmet Şişman
General Manager

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Clamp-on USM was also very costly due to the continuous maintenance required to periodically reposition the sensors in the hot line.

Maren struggled with getting an accurate flow measurement on their hot brine flow since 2011. The wellhead flow rate changes over time, requiring process adjustments to maintain peak efficiency and productivity. Additionally, without a reliable flow measurement, Maren was unable to determine if the well was producing at peak efficiency or if a new well would be needed. When their previous magnetic flow meters failed, Maren had to shut down the entire plant, resulting in 10 hours of downtime to remove and replace the failed flow meter. Maren estimated that for every magnetic flow meter failure and subsequent plant shutdown, they lost 200 MWh production for each plant. These outages were happening so frequently that Maren was forced to stop using the measurement in the production line, resulting in reduced efficiencies and performance. Maren estimated this lack of measurement and a conservative loss of 1% in flow rate accuracy caused them to lose \$500,000 per year.

Solution

Maren contacted Emerson™ to explore solutions to this challenging application. Thanks to the experience Emerson has in critical process flow metering and in the specific field of geothermal applications, a Rosemount Magnetic Flow Meter was proposed on a three-month trial basis in the brine line at 175 °C. During the trial period, the meter worked perfectly enabling Maren to operate the production line in automatic control resulting in optimized production and increased efficiency.

As a result of the trial meter success, Maren has changed all meters in the power plant, adopting 58 units of Rosemount 8705 Magnetic Flow Meters. The meters have been operating without issue since their installation resulting in the elimination of the frequent flow meter maintenance, improved measurement accuracy resulting in greater productivity, and extreme reliability in this difficult application. Thanks to this success, Maren intends to use Emerson's Rosemount Magnetic Flow Meters in the next two power plants they plan to build in the same region.



Rosemount 8705 Magnetic Flow Meter installed in the brine line.



"No downtime with Emerson flow meters, easy to use and operate, almost no operation cost: exactly what I need."



Radek Jarka
Maintenance Engineer

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