



How do you measure the flow rate of a highly corrosive solution in a partially full pipe?

Minera Escondida, the world's largest single producer of copper, was faced with this challenge in their heap leaching process in the Atacama Desert of northern Chile. Finding an accurate, reliable, non-contacting flow meter was very difficult. Pulsar Measurement developed a unique, area-velocity flow meter to fully meet the mine's needs.

The Process

In the heap leaching process, crushed sulfide ore is heaped onto lined leach pads where an acidic solution is sprinkled onto the ore. It percolates down through the heap until it reaches the liner

at the bottom. The leach solution containing the dissolved metal flows out of the heap through partially full pipes (406.4 mm to 1.07 m (16 in to 3.5 ft) HDPE pipes) at velocity rates between 1 m/s to 3 m/s (3.28 ft/s to 9.84 ft/s). Monitoring flow in the collection pipes contributes to better control of the process, increased mineral recovery, and reduced leach cycles.

The Problem

Shut down of the leaching process was not an option for Minera Escondida, so the flow meter had to be designed so that it could be installed with continuous flow in the partially filled pipes. It also had to be non-contacting so that it would not be affected by the highly corrosive, acidic solution. Francisco Southernland, Senior Engineer at Minera Escondida, turned to VSI Ltda of Chile, the representative for Pulsar Measurement, for a solution to monitor flow in this difficult application.



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The Solution

VSI and Pulsar Measurement Engineer Jose Castro configured the Greyline AVFM 5.0 Area-Velocity Flow Meter with a combination of two non-intrusive sensors: a clamp-on, Doppler, velocity sensor to monitor the flow velocity, plus a down-looking, ultrasonic, level sensor to measure level. Both sensors work from the outside of the pipe, so there is no obstruction to flow and no contact with the fluid. Stand pipes were added to the pipes so that the non-contacting, ultrasonic, level sensors were elevated above the flowing solution. By measuring velocity and level of the flowing solution, and knowing the pipe diameter, the Greyline AVFM 5.0 Area-Velocity Flow Meter is able to accurately monitor the flow rate. The flow meter displays, totalizes, and transmits the flow rate in real time to the mine's control system.

The first Pulsar Measurement meters were installed in January 2013 and since then 44 AVFM 5.0 Area-Velocity Flow Meters have been deployed in the project. Engineers at Minera Escondida now have a better understanding and greater control of mass balance, evaporation, and other physical mechanisms controlling this complex process which will increase the amount of copper recovered, and reduce the time of leach cycles. The Greyline AVFM 5.0, with a combination of two non-intrusive sensors: a clamp-on, Doppler, velocity sensor plus a down-looking, ultrasonic, level sensor has proven to be a unique, safe, and effective solution.

More Information

Greyline AVFM 6.1: <https://pulsarmeasurement.com/avfm-6-1.html>

BHP: <https://www.bhp.com/>

Featured Products



Greyline AVFM 6.1 Area-Velocity Flowmeter



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