GREYLINE instruments inc.

Application Note

Non-Contacting Flow Solution for Heap Leach Mining

Minera Escondida Copper Mine
The Atacam Desert, Chile

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 a difficult. But Greyline Instruments developed a unique area-velocity flow meter to fully meet the mine's needs.

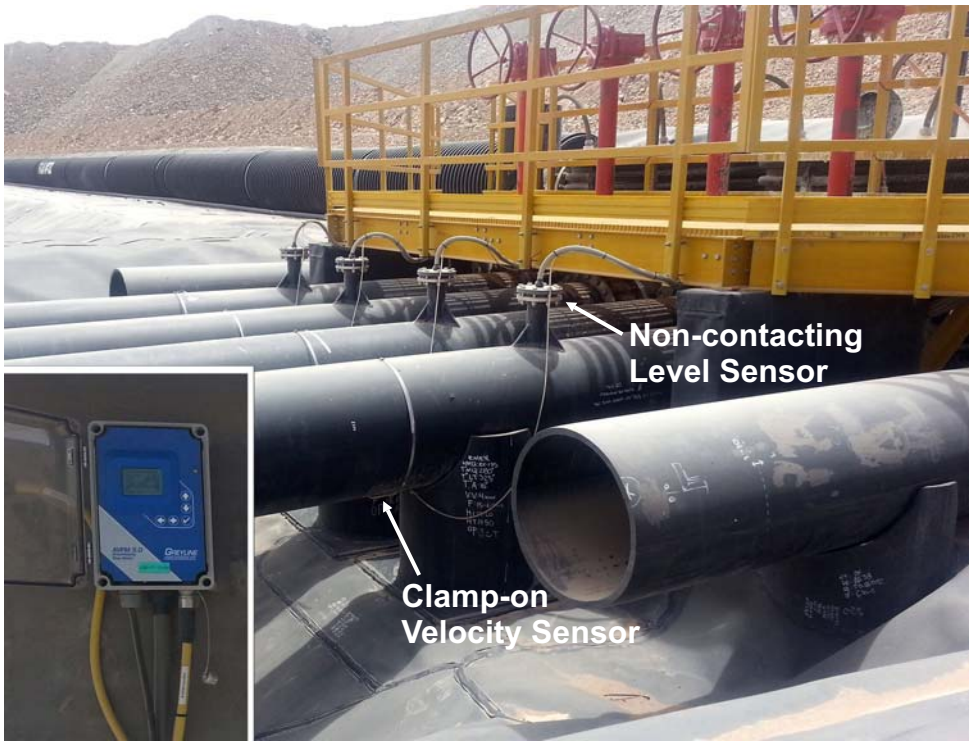
The Process

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 (16” to 42” HDPE pipes) at velocity rates between 1-3 m/sec. Monitoring flow in the collection pipes contributes to better control of the process, increased mineral recovery and reduced leach cycles.

Non-Contacting Flow Solution for Heap Leach Mining

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 be not affected by the highly corrosive acidic solution. Francisco Southernland, Senior Engineer at Minera Escondida, turned to VSI Ltda of Chile, the representative for Greyline Instruments, for a solution to monitor flow in this difficult application.



Greyline AVFM 5.0 Area-Velocity Flow Meter with Non-contacting Ultrasonic Level and Clamp-on Velocity Sensors

The Solution

VSI and Greyline Engineer Jose Castro configured Greyline's 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 Greyline 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. Greyline's 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 proved to be a unique, safe and effective solution.

More information

www.greyline.com/avfm50.htm
www.bhpbilliton.com/home/businesses/copper/Pages/default.aspx