

Improving efficiency and sustainability at remote leach pads with smart valve automation and wireless PID control

RESULTS

- Enhanced operational efficiency via real-time, precise flow control enabled by electric actuation and wireless PID
- Achieved energy independence through solar power
- Improved safety by minimizing manual intervention and hazard exposure
- Reduced operational costs by lowering labor and infrastructure expenses through automation



APPLICATION

A mobile leach pad control skid monitors and regulates raffinate flow in the copper extraction process, where a liquid solvent dissolves copper from stacked ore. Equipped with a wireless flowmeter, pressure sensor and control valve, the system automatically adjusts flow based on pressure changes to meet daily application targets.

CUSTOMER

A major international metal mining company.

CHALLENGE

The legacy system, combined with the remote and harsh site conditions, presented several operational and safety issues:

- **Remote Location with Limited Infrastructure** - No grid power or conventional communications hindered automation.
- **Manual Valve Control** - Despite wireless monitoring of flow and pressure, the lack of a DCS required operators to adjust valves manually.
- **Inefficient, Labor-Intensive Operation** - Operators walked up to 500 acres to adjust ~270 valves, increasing labor costs and reducing efficiency.
- **Safety Risks** - Extreme heat, rugged terrain, stacked leach pads (15 to 40 ft) and limited vehicle access posed serious hazards.

SOLUTION

During a routine site walkdown, Caltrol—Emerson’s local channel partner—identified inefficiencies in the manual valve system and proposed a tailored automation solution. With support from the site’s general manager, a pilot was approved for one leach pad.

Caltrol designed and patented a compact, solar-powered control system featuring:

Remote mining operations are often challenged by limited grid power and communication infrastructure. A WirelessHART network, actuator-integrated PID local control and solar panels help overcome these challenges



Rugged terrain, harsh conditions and limited accessibility of remote leach pads pose safety risks and operational difficulties

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EMERSON™

- Bettis™ RTS CM intelligent actuator
- 775 THUM™ WirelessHART adapter
- Fisher™ V-Ball valve
- Rosemount™ 3051S multi-variable transmitter
- Solar panel skid with battery backup
- Emerson AMS asset management software

The design leveraged the existing WirelessHART network and the actuator's built-in PID controller for local closed-loop control—using real-time flow data and a setpoint stored directly in the actuator, eliminating the need for a DCS or PLC.

In collaboration with Emerson, the team validated the actuator's integrity and functionality with the THUM adapter, including the ability to remotely set the setpoint and monitor operation via HART communication.

The solar-powered system provides 3 to 4 days of energy reserve for reliable, off-grid operation. Through Emerson AMS, operators can now remotely monitor and adjust key variables such as valve position, flow rate and setpoint.

BENEFITS

The solution was successfully pilot-tested over six months and received strong positive feedback. The RTS actuator performed exactly as intended and delivered a range of benefits:

- **Precise, real-time control** – PID controller adjusts flow based on pressure changes for consistent application.
- **Reliable, cost-effective connectivity** – WirelessHART enables seamless communication without cabling infrastructure.
- **Improved efficiency and safety** – Automation and remote operation reduce manual adjustments and exposure to hazardous conditions.
- **Sustainable, off-grid power** – 24 V low-energy design supports solar-powered operation and ESG goals.
- **Operational cost savings** – Labor reduction and increased system efficiency led to a decrease in operating expenses.

Following this success, the solution is being considered for broader deployment across other mining sites and is well-suited for remote applications in industries like oil and gas, pipelines and other off-grid operations requiring automated flow control.

Emerson offers advanced valve, regulator, and actuator solutions for reliable, efficient, and sustainable mining operations.

Learn more: [Emerson.com/MiningValves](https://www.emerson.com/MiningValves)

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The Bettis RTS CM intelligent electric actuator provides high reliability, safe operation, precise control and low power consumption

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