



Managing and automating irrigation on mine sites

*Environmental monitoring,
management and accountability
are integral to the day-to-day
operations of mine sites.*

*They are also important variables
that need to be considered
and planned for in successfully
developing new sites.*

*Equally, they need to be taken
into account in decommissioned
mines.*

The issues

As a world leader in mining technology, Australian practices have evolved to reflect concerns for the environment and high expectations for its protection, as well as meeting regulatory requirements.

Practices have been shaped by the environment's value:

- to social and economic health
- as a recreational space, and
- as a "store" of valuable biological assets

They have also been shaped by:

- competing land-use demands, and
- the environment's aesthetic appeal

Water is integral to nearly all mining activities. As a major medium that can carry pollutants into the environment outside the mine, best-practice water management is critical — both to ecologically sustainable mining and in meeting regulations. It's also crucial in addressing public expectations.

The MAIT solution

MAIT's monitoring and control technologies allow:

- environmental monitoring for accountability
- sustainable management practices
- automatic irrigation when needed according to set and programmed parameters
- a creative approach with software, communications and data presentation
- records to be easily accessed and viewed on demand, and
- give mines the flexibility to measure whatever they need to (water in the soil profile, weather data, water quality, etc.)

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Example

Irrigating with tailing water

Tailing water can be re-used to irrigate pastures, woodlands and other land surrounding the mine site. But it must be managed correctly.

Changes to land-management practices at a particular site in northern NSW now stipulate that tailing water used in this way should not leach below 400mm.

This mine site engaged MAIT to supply and install a system that would allow it to monitor soil moisture and weather data and automate irrigation, so it could maximise the use of tailing water to irrigate sustainably and within regulations.

A sustainable and accurate solution

Aim: The project's aim was to maximise the amount of re-use water applied to pastures and woodlands through sustainable irrigation practices. The system is managed to reduce irrigation water leaching below 400mm.

Technologies: MAIT installed soil moisture probes in the areas irrigated with re-used tailing water. Field radio control and monitoring boards were also sited at each valve. In the office, the INTELLiPUMP control program and INTELLiGRAPH data-management program were



analysed collected data to optimise the moisture settings.

Further systems will be installed to both monitor and control applications. The mine can remotely monitor and manage these sites over the internet, making operation and maintenance easy.

The result:

i) The resulting system monitors, manages and automates the irrigation programs efficiently and sustainably, so greater volumes of water are being used while soil moisture levels remain within the optimum band.

The MAIT solution has removed any guesswork as to how wet the soil profile actually is at various points. The system turns on and off as it's needed, not when there is water sitting in the tailing dam. This means that saturated soil isn't watered, yet areas that dry out more quickly, and can therefore take more water, can be irrigated.

The MAIT system ensures no overwatering, reducing the likelihood of irrigated tailing water leaching below the 400mm mark.

ii) Detailed records are easily on hand, for reviewing either by mine personnel or authorities such as the EPA. They can also be used for public accountability.



installed on a PC, which was also fitted with a radio link to each of the field sites, pumps, flow meters and the weather station.

Without manual human intervention, data from the probes is collected and analysed. Irrigation is automatically initiated when moisture levels drop to the pre-set "dry point", and cease at the pre-set "wet point" (it doesn't matter whether the soil moisture is due to rain or irrigation). Both set points have been programmed to maximise water volume through the system, while reducing drainage below 400mm.

MAIT worked with the mine to establish each set point; then, over several months, monitored and



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