



CASE STUDY:

Underground Coal Mining & Processing

GRT: Activate

Underground & CHPP
Dust Suppression



Bowen Basin Coal Mine
QLD, Australia



01 About the client

OUR client is a global renowned mining and resource organisation that owns large scale, underground and open-cut mines in central Queensland.

The challenges they face underground and above ground differ, although the challenge has a commonality – how to best manage coal dust.

In underground mining water is sprayed in order to prevent spark arrest, however performs quite badly in its secondary role as a dust suppressant. As it is conveyed, crushed, and eventually stockpiled, again water is typically used to wet the coal enough to prevent dust generation.



About the client

The client had several major concerns in relation to managing coal dust:

Water is not working.

Workers are exposed to unacceptable levels of coal and silica dust in both the underground and coal handling and processing plant (CHPP).

Workers are also in and around the product all day, in a confined space – so the product must be very safe to be in contact with and of course non-flammable.

The availability of water to manage dust, and pressure to not consume natural resources also in demand from local communities and farming.

Above ground operations have the risk of impacting on adjacent land uses, community members, and the environment.



02 Why doesn't water work?

Water and coal, particularly as fine dust, just don't mix.

This is because water has a high surface tension and also the same surface charge as coal. So like the 2 positive ends of a magnet, water and coal dust repel each other.

When the dust is travelling at the high speeds associated with shearing and even crushing, it has no chance of interacting with the coal – and in fact can further exacerbate the situation by displacing the air in front of sprayed water causing it to swirl around.

We can't change the nature of the coal – this is where GRT: Activate comes in.

03 What is GRT: Activate?

GRT: Activate is a concentrated additive developed and manufactured here in Australia that changes the surface tension and charge of the water so it not only easily envelops the dust particles, it actually attracts them into the droplet. This results in total sequestration of the coal dust in the water droplet, which simply then falls to the ground.

GRT: Activate is dosed into the water used for spark arrest and dust suppression at a dosage range of between 1:1000 and 1:5000 – dependant on the risk, speed, and state of the dust we are treating.

As GRT is dedicated in developing sustainable, environmentally friendly products, **GRT: Activate** is also safe, non-toxic, has a low carbon footprint and is biodegradable.



04 3rd Party Verification

As part of our development and verification of the product, one of Australia's leading Universities undertook a range of tests to compare GRT: Activate with water, as well as a product manufactured overseas.

This was to test the adsorption dynamics of the 2 products at the air-water interface and their ability to enhance the capture of coal dust particles by water droplets.

THE TESTING INCLUDED:

- 1 Surface tension at short timescales by bubble pressure tensiometry.
 - 2 Particle capture by microdroplets using high resolution camera coupled to an optical microscope
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Effectiveness would be measured in speed of surface tension changes and capture and sequestration of coal dust. The results showed that GRT: Activate was up to twice as effective as the American product, and more than 12 times more effective than water alone.

05 Quantitative & Qualitative Benefits

These results in the laboratory, have also translated to the field. The product has been used on both the longwall and continuous manners, as well as in above ground crushing and processing applications.

06 Key Benefits of Using GRT: Activate & GRT Engineers

1

Reduction in respirable dust levels - quantitative

Independent testing of the product shows a 2 to 5 times reduction in the level of respirable dust for operations using GRT: Activate.

2

Reduction in visible dust - qualitative

As well as the measured reductions in respirable dust, the reduction observed visually in both underground and aboveground operations was an almost complete removal. Whilst visual dust is not often respirable, respirable dust is associated with it.

3

Water Optimisation

The use of GRT: Activate means that the amount of water used for dust suppression is actually doing its job. In addition, the expertise of our staff can assist you in tailoring your spray systems to the optimal use of product and water dependant on your sites' coal type and water availability.

4

Intrinsically safe

A term we borrow from the electrical systems for hazardous areas, GRT: Activate is also intrinsically safe – it is non-flammable and safe for workers to be in and around all day, everyday. GRT: Activate is derived from plant-based products grown here in Australia.

5

Efficiencies and equipment benefits

Reducing surface tension faster than any technology on the market, GRT: Activate also is non-corrosive and non-congealing so it will not impact on the durability or reliability of pumps and spray systems. In fact, it will also optimise mechanical means of suppressing dust such as fogging, by increasing the efficiency of the fogging process and preventing calcification at the nozzles.

07 GRT Dosing Units

A key part of the solution is the intrinsically safe dosing systems we have developed to accurately dose the product.

These units can run off a variety of power sources, however, we have developed options that can run off of air or even the water feeding the longwall or continuous miners. GRT strives to deliver site-specific solutions for its clients – no matter the situation.



08 Proudly Australian Made



GRT's supply chains are secure as we produce our mining products in Australia.

We are proud to say this is both the case for GRT: Activate and our Automated Dosing Units.

GRT

Dust Control at the Coal Face

GRT: Activate

The quickest and most effective way to capture and control hazardous dust

PRODUCT FEATURES:



12x more effective at dust capture than water alone



Operational benefits by improving the efficiency of longwall and continuous miner operations



Targets the cause of respiratory illness such as black lung and silicosis



Easy application through existing or bespoke systems



Safe for workers all day, everyday



Certified System
Quality ISO 9001
SAI GLOBAL



SAVE LIVES - PREVENT AIRBORNE DUST - SAVE WATER

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