

# THE AUSTRALIAN MINING REVIEW

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# EnviroMist Case Study

## Significant Reduction of Dust Levels in Blast Hole Drilling Operations

An EnviroMist multi-nozzle spray bar.

In early 2020, Action Drill & Blast (ADB) approached EnviroMist® with the goal to reduce the levels of dust emitted during blast hole drilling operations.

The existing water used during drilling operations was effective in suppressing dust whilst drilling, however a secondary source of dust suppression was considered important to reduce exposure for any on-bench workforces.

Introducing a high energy water mist while drilling ensures that the hole collar is damp and creates a crust that is able to sustain dust suppression for a longer period of time.

This has significant benefits in terms of health and safety for shotcrew, maintenance personnel, and other mine personnel working out in the open, as well as the improvements to environmental responsibility.

The project testing phase was initiated with workshop bench testing and then moved onto site validation, testing and implementation. No additional mechanical or electrical systems were required during implementation due to the utilisation of the existing hydraulic circuits and onboard water storage present on the drill rigs, reducing costs and minimising extra components.

The system designed and implemented by EnviroMist and ADB has spray nozzles mounted within the plenum chamber of the drill mast, which can either be manually or automatically activated to supply a fine spray of water particles to the collar of the drill hole.

This in turn dampens the drill cuttings as they are dispersed from the drill hole and creates a crust on the collar of the hole once the drill has finished drilling and moved away. The crust then remains solid, and minimal dust is allowed to be exposed to any personnel loading explosives or working in the vicinity of the drill collars, dipping holes and dewatering holes.

Results have been overwhelmingly positive since completion of the project, with plans for further implementations of the EnviroMist systems.

### The EnviroMist Approach

EnviroMist is a leader in dust suppression technologies, supplying systems for a wide variety of mining applications.

The systems are currently being used in surface mining, underground mining, ROM bins, COS stockpiles, transfer chutes, drill and blast operations, materials processing plants and ship loading-unloading operations.

In conjunction with the International Solids Handling Research Institute, EnviroMist has conducted research into varying sized water droplets to better understand their particle size distribution, spread and characteristics.

The development of Computational Fluid Dynamic (CFD) models as part of this research provided insight into droplet dispersal and reactions to external influences such as air cross flows.

As a result, the company is able to create specialised systems that deliver unsurpassed dust suppression capabilities for even the most difficult to contain areas.

A major aspect of the research showed that matching water droplet size to the size of the dust particles significantly increased the chance of capturing dust when compared to larger droplets.

By customising our spray nozzles to each application, EnviroMist can deliver water in a form that efficiently reduces the dust liberated from iron ore or coal material streams alike.

This is possible due to the utilisation of high pressure in the systems, as this produces a large cloud of specified-sized water droplets that significantly increases the chance of droplets coming into contact with airborne dust particles.

In contrast to other low pressure, large droplet systems, the company's technology supplies a significantly increased number of water droplets while using significantly less water to reduce dust to environmentally acceptable levels.

In fact, testing on the installed systems has shown water usage reductions of over 50% when compared to low pressure dust suppression systems.

The water filtering and pressure boosting equipment is utilised to ensure that clean water reaches the sprays nozzles at the required output pressure. This is necessary to ensure the systems are able to fully cover a large ROM bin or COS stockpile in an efficient and reliable manner.

In the EnviroMist ROM bin systems, the power delivered behind the water results in a pressure curtain that prevents the air displaced from truck dumping from penetrating. Thus, the resulting dust cannot escape and is captured right within the dump pocket, as opposed to low pressure dust fogging systems.

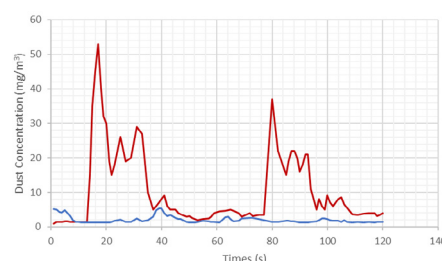
The captured air and dust are now contained for a sufficient enough time to ensure all the dust liberated from the material has been suppressed.

The COS systems are similarly designed to encapsulate the falling material stream within a high-pressure curtain of water droplets.

These droplets penetrate the material stream as it separates, reducing dust liberation from surface turbulence, cross winds or when the material comes into contact with the stockpile.



Wetting of the drill hole with the EnviroMist Dust Suppression System.



Dust Concentration measured with and without the EnviroMist Dust Suppression System.

EnviroMist uses certified stainless steel in its spray blocks and nozzles to provide a greater product life, and its experience with installed systems has shown that a correctly filtered system will result in nozzles that last for years without needing replacement.

The company makes sure its nozzles are manufactured using the latest in machining technology, and as a result it can provide nozzles that have never broken in operation.

By designing systems individually for each project, EnviroMist can adjust the required pressures and nozzle designs to achieve maximum dust suppression for the specific application while also meeting specific space, material, and site requirements.

The creation of 3D models as part of its

design process also ensures complete compatibility with existing equipment and communicates the design of the system to the client prior to manufacture and installation.

A customer-focused company, EnviroMist meets all reasonable client requests and has supplied emergency systems to meet short term, high priority customer requirements.

More information:  
[www.enviro-mist.com.au](http://www.enviro-mist.com.au)

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#### REFERENCES

Jon Roberts, Michael Hopkins, Peter Wypych, Vitold Ronda, 2019;

Application Of CAE Techniques In Combination With High-Energy Dust Suppression Technology To The Handling Of Coal





# EnviroMIST®

Micro Mist • Macro Solutions

## AN INDUSTRY LEADER IN DUST SUPPRESSION

We provide large scale dust suppression applications in iron ore and coal underground and above ground operations, with immediate and significant dust level reduction around material handling areas.

Our systems ensure maximum dust capture effectiveness through the control of droplet size, velocity, water consumption and spray angle based on CFD modelling techniques.

## APPLICATIONS

- Stockpiles & ROM Bins
- Crushers & Conveyors
- Mining Machinery
- Ship Loaders & Unloaders
- Transfer Points & Chutes
- Construction Machinery

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