MINING INDUSTRY OCCUPATIONAL SAFETY & HEALTH

MINERALS COUNCIL SOUTH AFRICA

MOSH LEARNING HUB DUST TEAM

IN-STOPE ATOMISATION FOR DUST SUPPRESSION

JULY 2021

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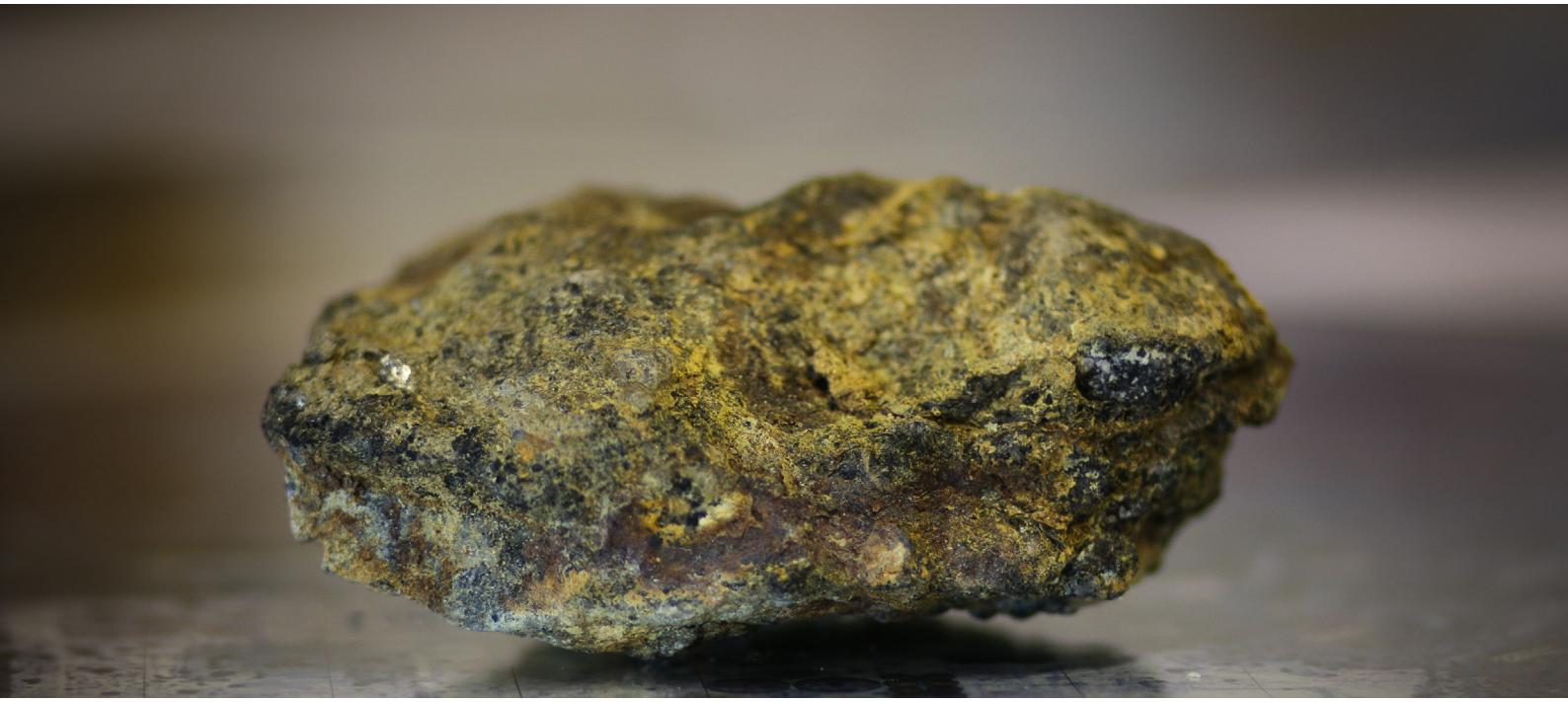
Executive Summary

Hard rock mining, specifically gold mining activities such as drilling, scraping, and tipping are known to yield high concentrations of airborne dust with detrimental health effects on mine employees, during and after term of employment. The total mine dust produced during gold mining activities has been scientifically proven to contain a high content of crystalline silica. The inhalation of finely divided crystalline silica is toxic and can lead to severe inflammation and fibrosis of the lung tissue thus causing diseases such as silicosis, bronchitis, lung cancer, and other systemic auto immune diseases. In South Africa, thousands of employees have been and may still be exposed to crystalline silica, and subsequently contracting silicosis.

The South African Gold mining sector has over the years not fully succeeded to control dust produced during mining activities. However, despite the challenge the mining industry has never seized their efforts to eliminate or reduce the risk of exposure to mine dust. The South African Mining Industry (SAMI) also collaboratively committed to setting and conforming to industry milestones towards elimination of lung diseases amongst mine employees. This milestone is set to achieve exposure limits which are at least 50.0% below the Occupational Exposure Limits (OEL's) stipulated by the MHSA 29 of 1996. Various mining companies have continuously engineered several controls, developed best practices and policies to eliminate the risk of exposure to dust.

The constant dust over-exposure of winch operators especially those on night shift, prompted the mine to conduct a study on the methods and practices that are employed during the early entry examination and during the shift, with special attention given to the watering down and dust suppression processes.

The conclusions drawn from the evaluations at the source mine were that the In-Stope Atomiser dust suppression technology is effective in capturing and reducing a significant amount of respirable dust emanating from the stopes and development ends and has the potential to reduce dust RQC (Respirable Quartz Concentration) at source by 79.2%. The principle of atomisation for dust suppression is widely used at underground mines within the South African mining industry and has the potential for a much broader application including installations at belt transfer points, crushers, tipping areas, as spray curtains in the haulages, etc."



1. STRATEGIC CONTEXT

Some of the most effective approaches to dust control & reducing the exposure of employees to respirable dust emanating from mining activity is to prevent the respirable dust from getting airborne and removing dust from ventilating air. Various methods have been employed across the world to achieve this.

Suppression of dust using water-based methods is a widely known phenomenon, and in most instances has proven to be effective. Water sprays have over the years been used for different applications to suppress dust emanating from of mining activities, and due to their varying designs in the market, these sprays have yielded different results in terms of efficiency and effectiveness in suppressing dust, as their principle of operation also differs.

Water Atomisation is a process of transforming bulk liquid or water droplets, into a fine and smaller liquid droplet (spray/mist) in a surrounding gas or vacuum using increased air pressure. Smaller water droplets travelling at higher velocity have proven to be more effective in capturing dust particles.

Water Sprays for Airborne Dust Capture

- Smaller and high velocity droplets are effective for airborne dust capture.
- Benefit obtained through nozzle design, selection and increased air pressure.

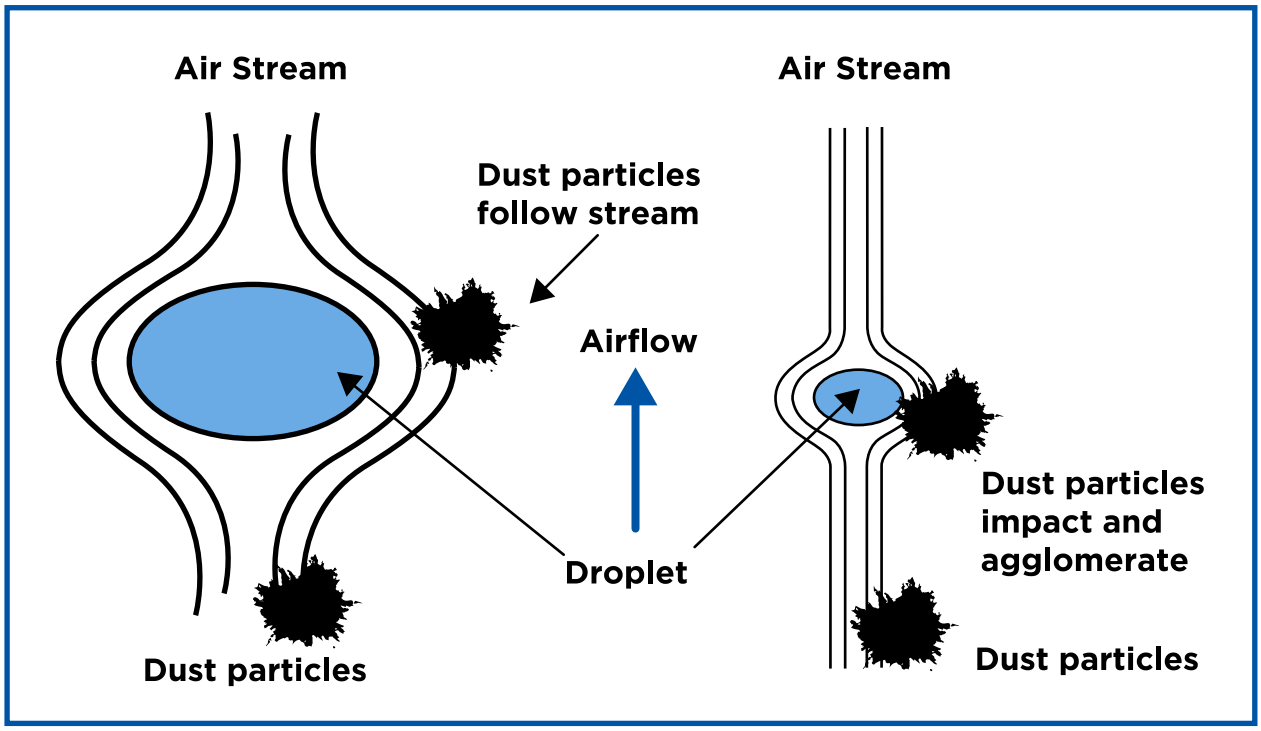


Figure 1: Illustration of the effect of droplet size on dust particle impingement.

(Source: NOISH Dust Control Handbook for Industrial Minerals Mining and Processing, 2nd Edition)

Impact of Water Sprays for Dust Control

- Suppression (S) - prevent dust from getting airborne.
- Capture (C) - remove dust from ventilating air.
- Redirect airflow (R) - direct dust away from workers.

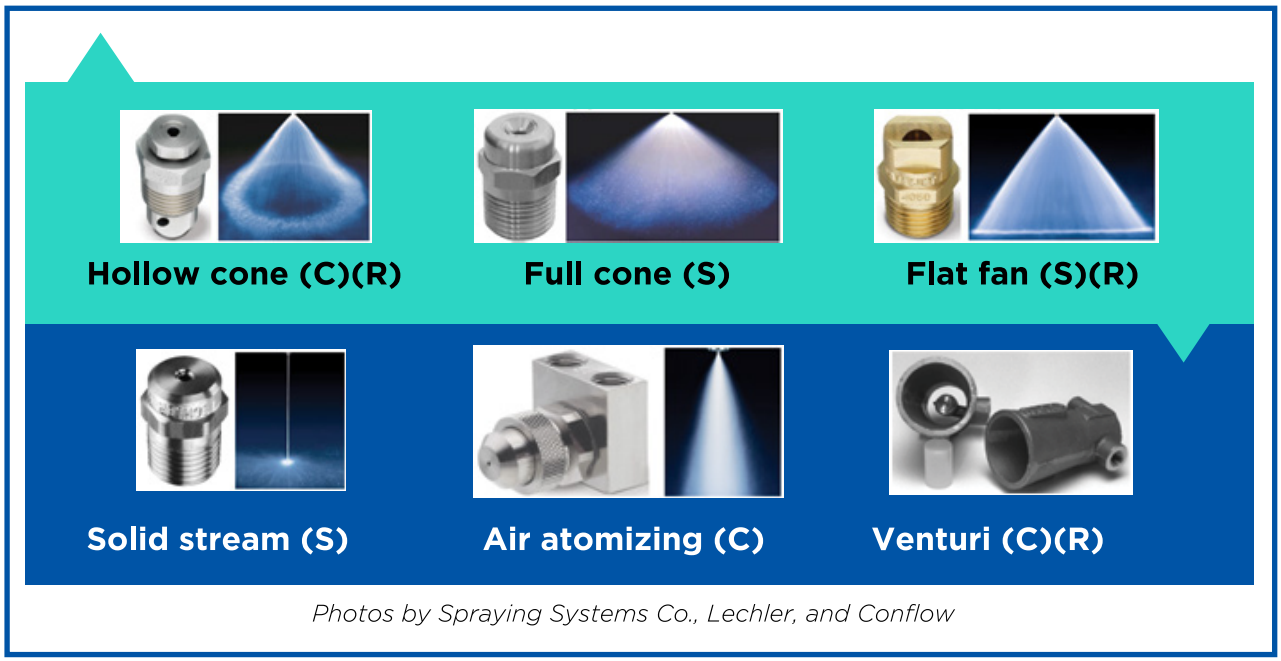


Figure 2: Types of water sprays and their impact for dust control.

(Source: NOISH Dust Control Handbook for Industrial Minerals Mining and Processing)

It is very important to note that NOT all water sprays applied for dust suppression can achieve atomisation of water, therefore careful selection of nozzle design and size, and the required operating air and water pressure are key to the effectiveness in this dust control mechanism.

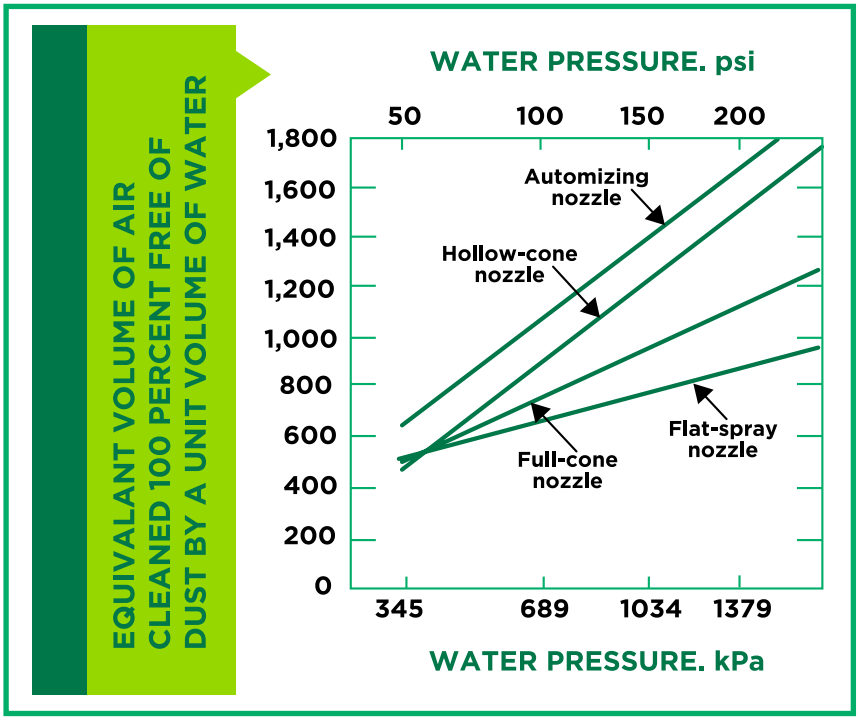


Figure 3: Airborne suppression performance of four types of spray nozzles. The atomising nozzle is air atomising. The hollow cone, full cone, and flat fan spray nozzles are hydraulically atomising [adapted from NIOSH 2003]

1.1. THE PROBLEM ADDRESSED

Dust liberated during scraping activities in a mine stoping panel travels with the ventilating air and may affect any employee working downstream of the ventilation. Most hard-rock stopes are ventilated in series (utilizing the same air stream) due to conventional mining methods. Therefore, any dust liberated from the furthest stope upstream (Intake side) will also affect next stope in series, and the next, thus exposing any employees working in the ventilation route (district) to respirable dust. Employees working at the stoping face, vamping stope, development ends and at areas near stoping and vamping activity are most affected by such dust exposure.

In-Stope Atomisation aims to primarily prevent respirable dust from getting airborne and removing airborne dust from the ventilating air by deploying fine water droplets at high velocity to capture dust particles, thus reducing the amount of dust liberated by scraping activities and ensuring cleaner ventilating air. The benefit of this reduction in dust level can have significant impact on the total ventilating air quality at any operation, thus reducing the total respirable dust exposure of employees in that operation. The following graphs from the source mine indicate the reduction in dust exposure measured during an eight (8) week trial period.

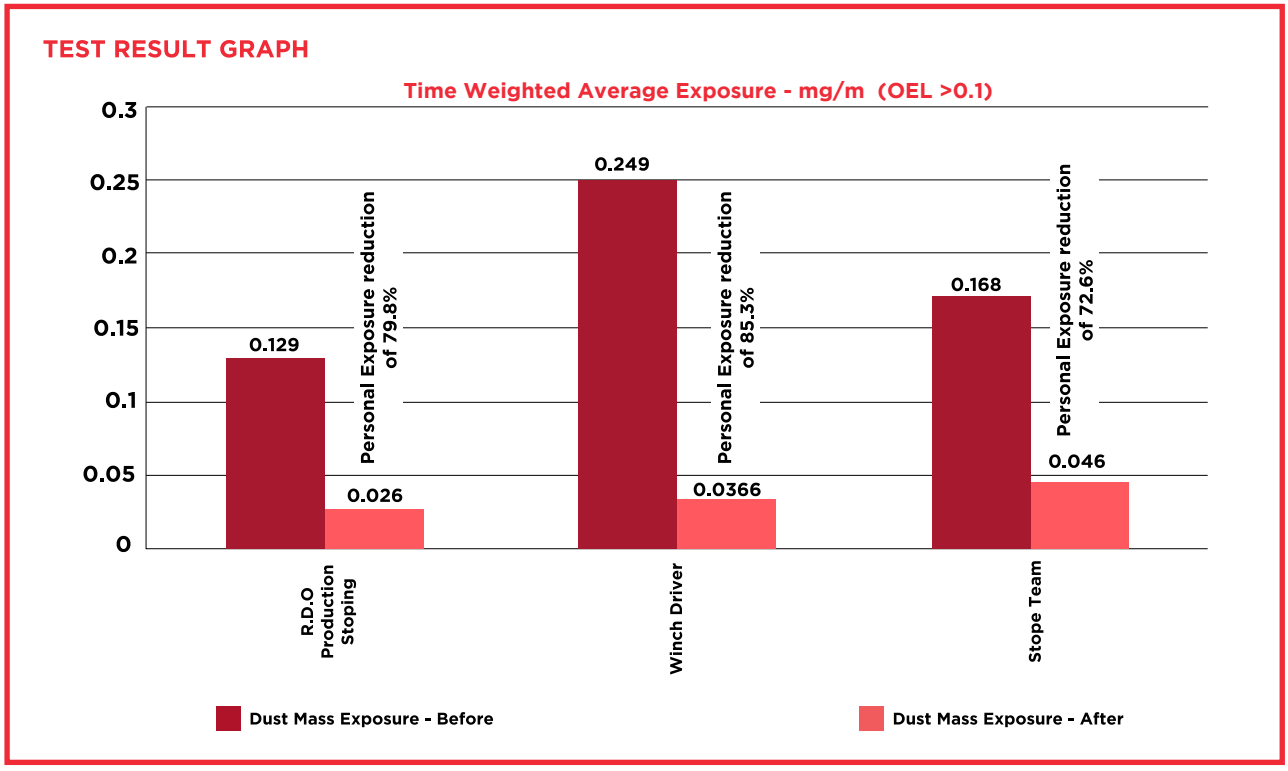


Figure 4: Time Weighted Average Exposure (TWA) over eight (8) weeks period.

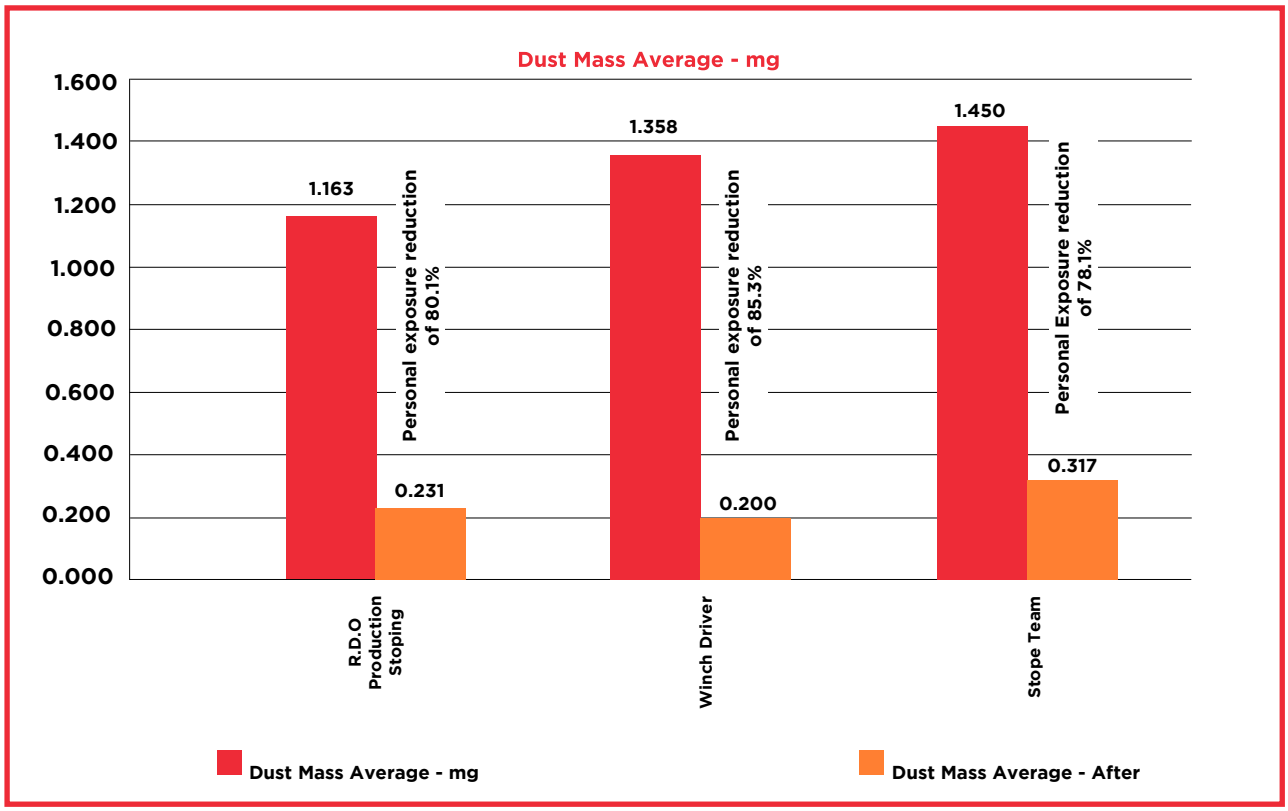


Figure 4: Average Dust Mass over eight (8) weeks period.

1.2. SUMMARY DESCRIPTION OF THE PRACTICE

The practice is currently applied/used at all source mine operations as one of their critical engineering controls to eliminate or mitigate against the risk of dust exposure emanating from activities such as scraping of ore during stope face cleaning after the blast, stope panel sweeping, vamping and general ore conveyance.

The practice involves installation of an "In-Stope Atomising unit" at strategic positions of the stope. The device is designed to capture airborne dust particles to prevent employee exposure to harmful airborne pollutants. The "In-Stope Atomising Unit" works on a principle of mixing compressed air (high pressure) and water, deployed into the atmosphere to form an atomised mist travelling at high velocity to capture the airborne dust particles efficiently.

The "In-Stope Atomising Unit" has two separate inlets where water and compressed air can be connected to the device using hoses. The device is manually activated by opening the compressed air and water valves until an atomised mist is attained. The device is usually activated before dust liberating activities such scraping commence in a stope **(and not to be used continuously for the entire shift duration)**.

1.3. SUMMARY OF DOCUMENTED PERFORMANCE AND IMPACTS

The introduction of the In-Stope Atomisation for dust suppression at the source mine has contributed to the dust load reduction in the stopping areas, and thus the overall mine. Over and above the existing dust controls and initiatives at the source mine, the impact of the In-stope Atomisation is clearly indicated on the graph below. The following graph further affirms the continued commitment of the source mine towards elimination of occupational lung diseases, as a number of leading practices have been adopted and initiatives rolled out, all contributing to elimination occupational lung disease

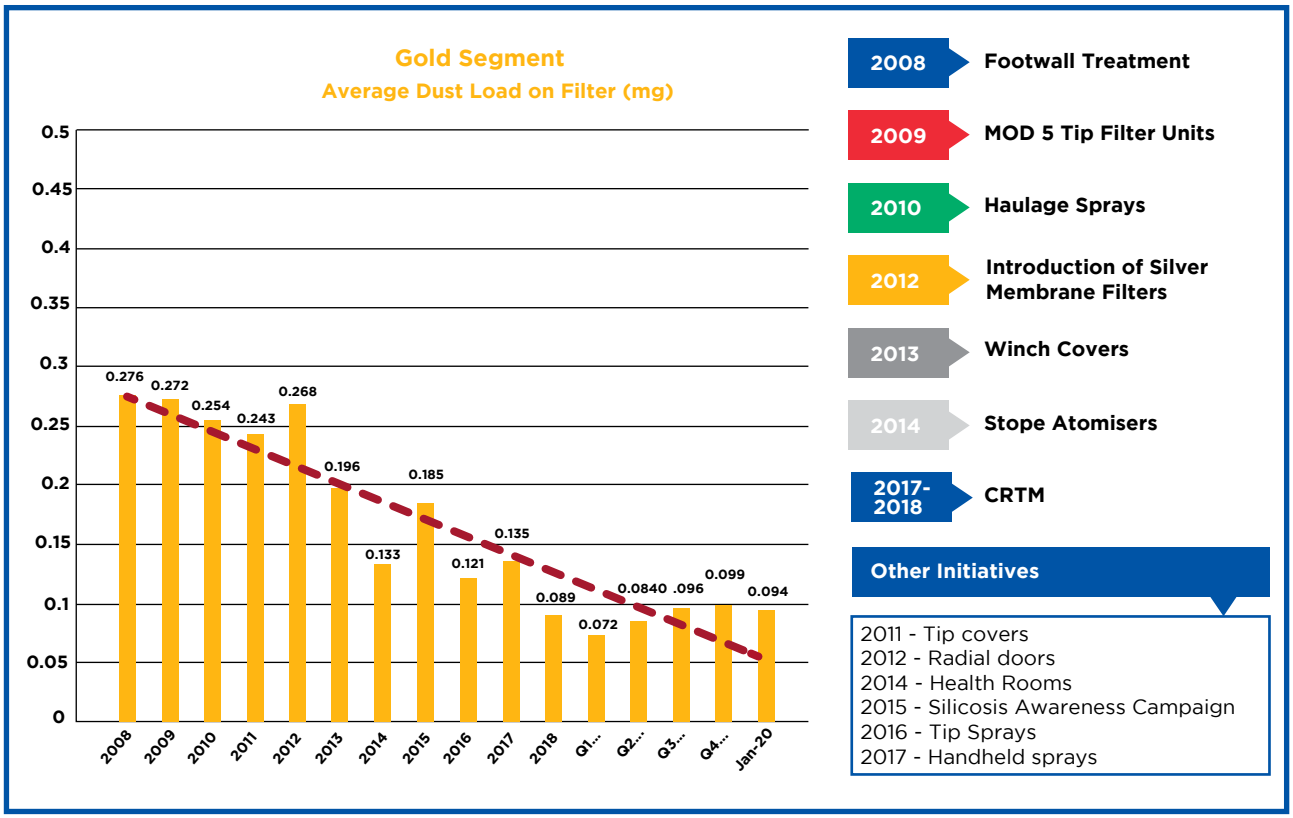


Figure 5: Source Mine Group average dust load on filter (2008- 2020)

1.4. SOURCE MINE VALUE CASE

The value case to enhance the decision making for adoption of the In-Stope Atomisation for dust suppression *Leading Practice* is outlined in this guide as follows:

FISCAL	Initial Cost	The cost of a single unit (In-Stope Atomiser) at the source mine was estimated to be approximately R1500 and can be purchased off the shelf. The practice bears no installation cost as it uses the water and compressed air manifolds which are already available at the stoping face.
	Maintenance & Operational Costs	No Maintenance required on the unit. The device is used to destruction. The only component of the unit that can be replaced if damaged is the housing. The mine can choose if this is feasible to do or not. The Original Equipment Manufacturer (OEM) at the source mine, estimates this replacement to be between R300 – R400 per unit.
HEALTH & SAFETY	OHS Benefit	The risk of occupational lung diseases to underground employees will be significantly reduced. This is of real value to both employees and management.
	Progress towards Zero Harm	Death from silicosis and other occupational lung diseases caused by excessive exposure to silica dust is the greatest cause of mortality in mine workers. Reducing this risk to underground employees most at risk will constitute a significant step towards achieving the ultimate goal of zero harm.
STAKEHOLDER RELATIONS	Improved Working Relationships	Implementation of the behavioral communication and leadership behavior plans has the potential to significantly improve the operational working relationship between supervisors and their staff.
	Buy-in and Support.	The mine-wide intervention in the interest of protecting the health of those most at risk will help engender buy-in and support for the intervention, from employees and relevant stakeholders.
	Improved Investor Relations	A positive outlook on the mine's commitment towards elimination of Occupational Lung Diseases.
Governace	Legal Compliance	The installation & use of In-Stope Atomising units will assist in meeting regulated permissible dust exposure levels. It will also be a good case of management doing what is reasonably practicable to provide and maintain a working environment that is safe and without risk to the health of all underground employees.
	Reduced Compensation	In the longer term the mining industry, including the mine, will benefit from a reduction in compensation and other costs associated with silicosis.

2. DETAILS OF THE LEADING PRACTICE

2.1. PRINCIPLE OF OPERATION

The practice involves the use of a water atomising device to capture airborne dust particles. The atomising unit is a locally manufactured “off the shelve” product.

- The operation of the atomiser unit is simple and practical. It entails a single unit with two valves to regulate water and compressed air through a housed orifice/nozzle.
- An 8 mm sized nozzle is required to achieve atomisation in this case.
- The optimal operating point is reached when the compressed air supply is between 4 and 6 kPa.

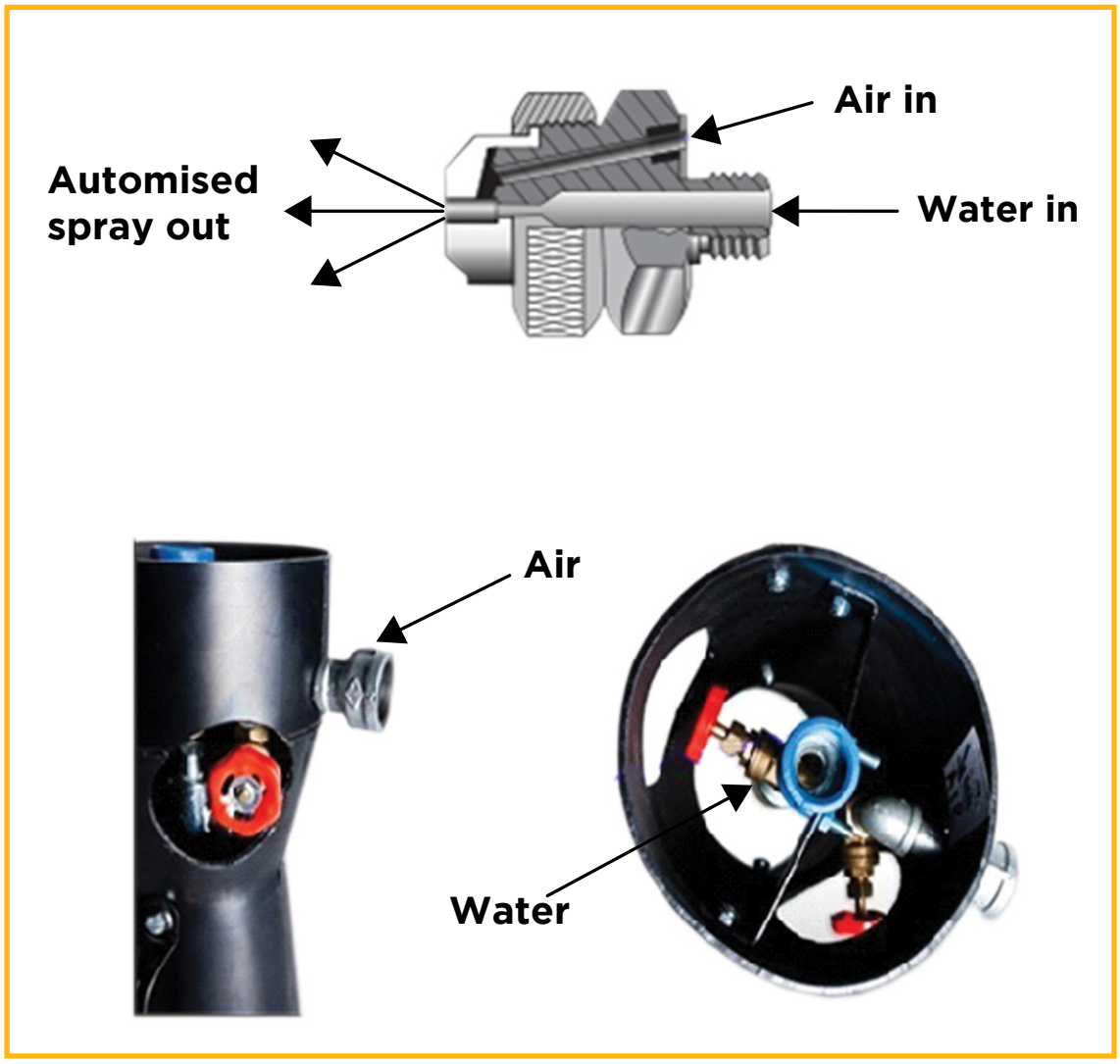


Figure 6 :Principle of operation of atomising unit

(Source: NOISH Dust Control Handbook for Industrial Minerals Mining and Processing, 2nd Edition) & Example of In-stope Atomising unit (Water and Air inlet and valves)- Source: Source mine.

2.2. SOURCE MINE BENEFITS

The average workers dust load reduction per at risk occupation is indicated below. The combined average reduction in the Time Weighted Average (TWA) quartz concentration across all occupations was calculated to be 79.2%

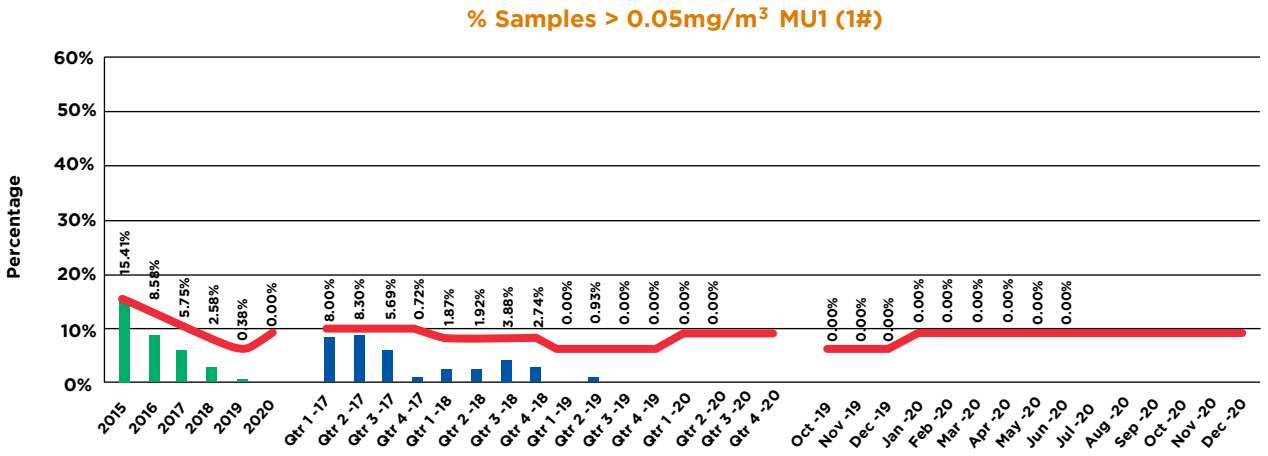
Table 1: Dust measurements indicating the benefit of the practice

OCCUPATION	BEFORE CONCENTRATION (mg/m^3)	AFTER CONCENTRATION (mg/m^3)	Exposure reduction (%)
ROCK DRILL OPERATOR (RDO)	1.163	0.231	80.1
Winch operator	1.358	0.200	85.3
STOPE TEAM	1.450	0.317	78.1

2.3. SOURCE MINE OPERATIONS DUST EXPOSURE PERFORMANCE

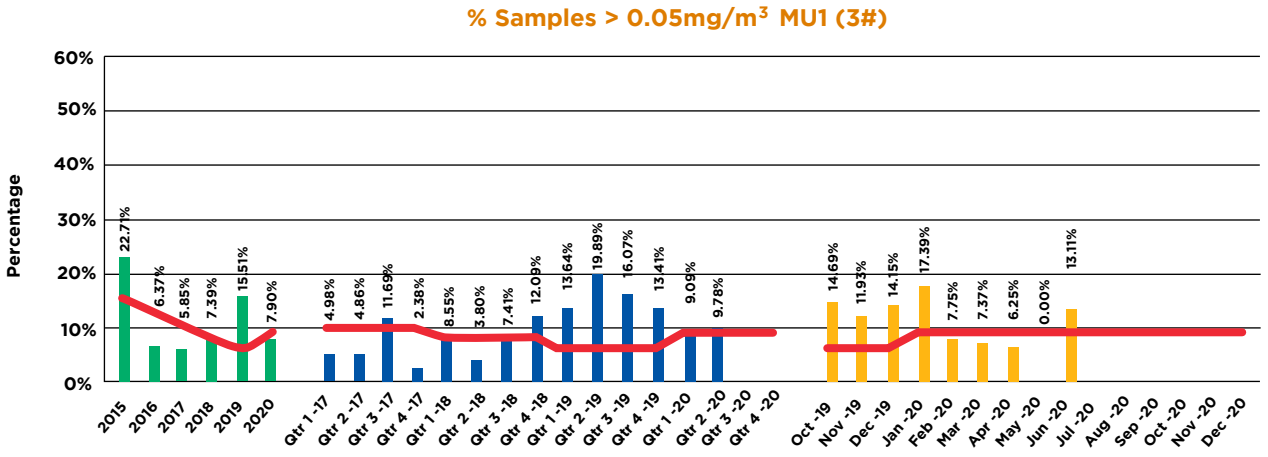
Additional data received from the source mine indicate the respective performance in terms of silica dust exposure for the three (3), Source Mine operations respectively after the introduction In-Stope Atomisation for Dust Suppression in 2014.

Mine 1#

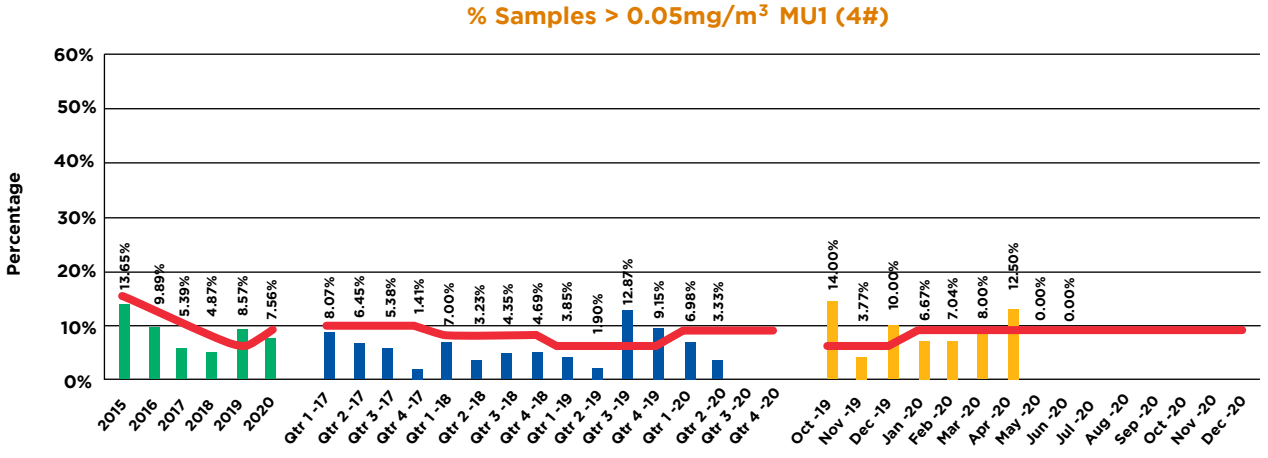


The above graph indicates significant improvement since the year 2015 to 2019 when the operations at this shaft were ceased.

Mine 3#



Mine 4#



The two (2) graphs above indicate the significant improvement since the year 2015 to 2018 at respective operations. In 2019, a regression was observed due to the failure and non-adherence to most dust engineering control measures, as a result of the absence of labour or workforce due to a prolonged industrial action at the source mine.

2.4. ADDITIONAL BENEFITS AT SOURCE MINE

- Portable to use: 500mm x 200mm diameter.
- Lightweight and easy to carry or move, 3.0kg – 4.6kg.
- Robust design for blast concussive environments and reduced water/air blockages. The Atomising unit is adequately designed to withstand the harsh underground conditions/environment.
- The unit requires no maintenance as it is being used to destruction.
- Economical water and compressed air consumption.

2.5. UNINTENDED CONSEQUENCES

- Unit used as a ventilation appliance to improve air velocity and cooling.
- Used for watering down.
- Used for the entire duration of the shift.

2.6. CRITICAL SUCCESS FACTORS FOR ADOPTION

- Top management buy-in and support
- A credible adoption champion with adequate time and support
- Proper identification, briefing and training of key people
- A well designed and executed adoption roll-out plan.

2.7. PRACTICE ELEMENTS TO BE ADOPTED.

2.7.1 Ventilation Layout

The "In-Stope Atomising unit" is installed on the air intake side of the stoping panel and one unit per panel is adequate to suppress airborne dust. The unit is generally easy to install, operation and the installation can be done by any of the stoping crew members. A layout will be issued by the Ventilation/Mine Environmental Engineering Department, the Miner to interpret the layout for the crew and explain the positioning of the units. Adherence to a ventilation layout for the positioning of the unit is of utmost importance. The Ventilation/Mine Environmental Engineering Department to monitor the correct positioning and use of the units.

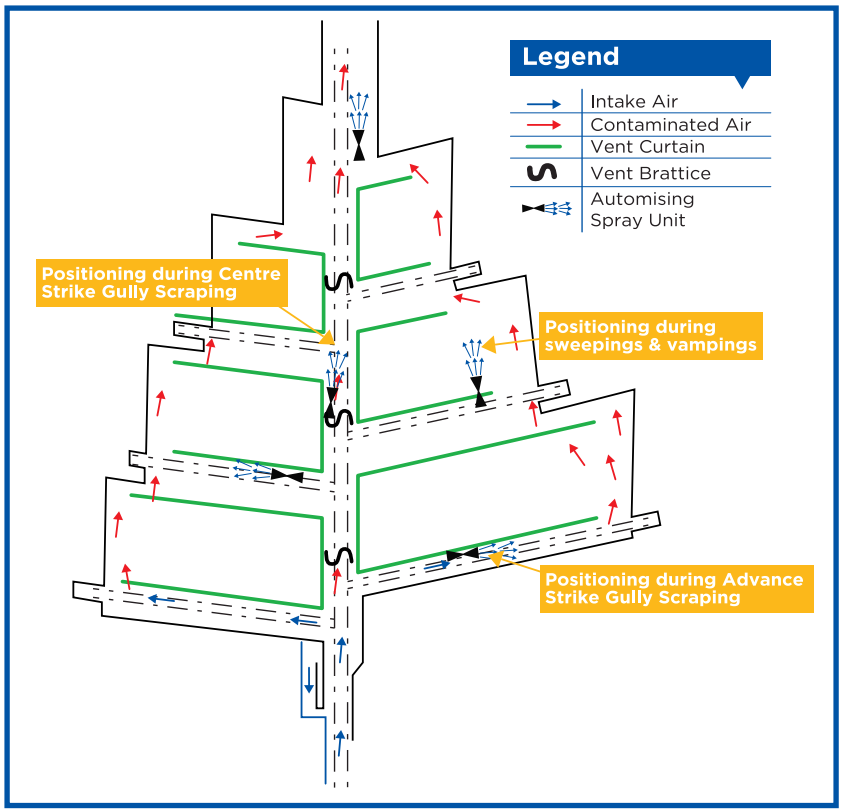


Figure 7: Typical positioning of atomising unit in a hardrock conventional stope considering different application.

2.7.2 Installation

The installation of the unit shall be performed by any person delegated by the Miner to do so (preferably a Scraper winch Operator), with over inspections conducted by the Team Leader to ensure correct installation, positioning and safety of the unit.

01 Conduct a pre installation risk assessment addressing the hang support, mobile equipment operating in the vicinity and the required PPE to be used during installation of the stope atomising unit.

02 Select a suitable site to install the stope atomising unit where the maximum spray cover of the area can be obtained. The site must have access to both water and compressed air connections.

03 Position the stope atomising unit to spray in the direction of the airflow (increased contact time) using the bracket.

04 Connect the water and compressed air supply from the manifold to the atomising unit using hoses. Ensure that the safety sling is attached to the compressed air hose prior to operating the unit.

05 Open the compressed air valve on the atomising unit fully to ensure maximum water atomisation.

06 Open and adjust the water supply valve on the atomising unit to attain an atomised mist and optimal spray coverage across the area where installed.

2.7.3 Supervision & Over-Inspection

The Miner must inspect the installation, positioning and use of each of the atomising units that are in use during a particular shift. Where challenges are found in terms of the installation or use of the unit, the Miner shall provide continuous coaching on those aspects. The Shift Supervisor to ensure that the units are used for the intended purposes and that maximum benefit is drawn in terms of reducing the dust load.

2.7.4 Behavioural Communication

The mine must establish platforms to communicate important messages or to further educate employees on a healthy and safe working environment. It is during this

session where all employees are mobilised to join the fight against silicosis and other occupational lung diseases. This can only be achieved if employees understand the dangers of silica dust causing silicosis, and therefore current controls and initiatives to prevent silicosis are explained. The source mine has set up an underground health room (Underground Mock-up training centre) for this purpose.

2.7.5 Leadership Behaviour

The commitment of the mine's senior management including all the organized labour unions and other relevant stakeholders is key to the success and sustainability of adoption of this leading practice and the elimination of occupational lung diseases.

Ideal Leadership Behaviour

- Measurement, assessment, and corrective actions where necessary.
- Development and continuous improvement of critical controls of airborne pollutants at source and elsewhere.
- Training and education of employees.
- Initiate awareness campaigns.
- Establish communication platforms.
- Enforcement of dust control procedures.
- Develop and live a set of values towards eradication of silicosis.

2.7.6 Training

Employee training on the installation and use of the In-Stope Atomising unit must be offered to all production employees at the training centre during annual refresher training. This training is not intense due to the simplicity of the practice. However, it is important to harmonise the leading practice with existing mine procedures and training lesson plans. Practical demonstration on the utilisation of the In-Stope Atomising unit is critical in ensuring the correct and efficient use of the unit. Continuous coaching and Planned Task Observations to be conducted by line supervisor.

Records of all training pertaining to the use of the atomising unit must be kept as per mine's document control procedure.

2.7.7 Cost

The cost of a single unit (In Stope Atomising) at the source mine is estimated to be approximately R1500 and can be purchased off the shelve from the **OEM**. The practice bears no installation cost as it uses the water and compressed air manifolds which are already available at the stoping face.

2.7.8 Availability & Sustainability

It is important to keep sufficient and enough stocks of the units at the mine stores for ease of ordering, thus always ensuring availability of the units and preventing the mining crews from encountering shortages of stock during new installations or exchange of damaged units. This will assist in sustaining the leading practice at an operation.

3. ADOPTION GUIDANCE

The MOSH Dust team will assist any mine or operation that is adopting the leading practice and ensuring the correct use and understanding of the **Leading Practice Adoption Guide (LPAG)**.

3.1. ADOPTION STEPS

The following Adoption steps need to be followed to ensure successful adoption of the **In Stope Atomisation for Dust Suppression Leading Practice**.

3.1.1 Facilitate Adoption Decision

Mine to assess the dust risk at their respective operation(s), investigate and decide on the case for adoption of leading practice. It is essential that top management fully understand the scope and detail of the adoption process, and the assistance that would be provided by the MOSH Dust Team, before making a decision.

3.1.2 Secure Support for Adoption

It is likely that mines will want to use their usual means of communicating management decisions to key stakeholder and mine employees. It will be important to ensure that the communication is effective and that it appropriately takes account of all stakeholders and any key elements identified in the change communication plan.

3.1.3 Establish an Effective Mine Adoption Team

A multidisciplinary Mine Adoption Team, led by an Adoption Champion must be established by the General/Mine Manager. The appointed incumbents must be suitable and competent on either the technical or behavioural elements of the leading practice. This team will be responsible for implementing the adoption plan and communicating feedback to all relevant stakeholders through existing or established platforms.

3.1.4 Prepare Initial Plan for Adoption

Initiation of the adoption process at the mine should be piloted in a carefully selected site. The selected site should be of sufficient size to meaningfully implement all aspects of the leading practice that will be encountered in extending its adoption across the Mine. The Mine Adoption Team must properly understand and take ownership of the adoption plan to be implemented. The mine team needs to allocate date specific timing to each of the various tasks & activities of the adoption. Consideration should be given to time required to secure funding for the practice roll-out.

3.1.5 Initiate Baseline Monitoring Programme

Mine to identify key dust measurements to determine performance of the practice:

- Identification and planning of the monitoring process to acquire data to quantify the impact of the leading practice should start as soon as possible after the decision to adopt.
- The key measurements needed to quantitatively indicate the performance and impact of the practice must be identified by the Mine Adoption Team well before adoption of the practice begins.
- Consideration should be given to measuring parameters or relevant OHS indicators.
- Arrangements to gather the necessary baseline data must be implemented as soon as possible, otherwise the opportunity to credibly quantify the performance / impact of the leading practice will be lost.
- The involvement of the Ventilation and Occupational Hygiene is crucial during this step.

3.1.6 Establish Effective Relationship with the COPA

Community Of Practice Adoption (COPA) is a platform for learning and sharing by all adopter mines. Feedback on implementation challenges / successes to COPA is voluntarily shared by the COPA members. MOSH Adoption Team Manager to clarify the mine's membership of the COPA, and the nature and extent of support and assistance that might be sourced from either the MOSH Adoption Team, the source mine, or COPA members. Active participation in the COPA enables the Mine Adoption Team to address needs that are likely to arise as the adoption process unfolds. COPA meetings are an ongoing activity and occur at frequencies determined by the members.

3.1.7 Update Key Stakeholders on Progress

Prepare and issue progress updates to key stakeholders, this must be an on-going activity.

- Brief progress updates should be prepared and issued regularly to the Union leaders, mine management, and the MOSH Adoption Team Manager.
- Progress on the adoption process should be reported to and discussed with the Mine Manager at least once per month.

3.1.8 Harmonise Leading Practice with Mine Standards.

Review leading practice against current mine operational standards:

- The operational details of the leading practice must be reviewed in relation to mine standards to identify any potential conflicts or operational problems.
- Identify non-core adjustments to harmonise practice with mine standards:
- Any changes or adjustments to the leading practice that need to be made to harmonise the practice with mine standards must be carefully assessed to ensure that they do not detract from the essence and effectiveness of the leading practice.
- If possible, this should be done before initiating the full piloting process.

3.1.9 Develop Training and Communication Materials

Plan the training necessary for successful adoption of the leading practice.

- The starting point of this planning process should be an in-depth consideration of the following:
  - The customised leadership behaviour and behavioural communication plans, to identify key elements that need to be built into the training materials for each level of the hierarchy involved in adoption of the practice.
  - An example of training materials included in this guide.
  - Any special training requirements identified by equipment or other service providers associated with supply of the leading practice.
- The mine's existing training arrangements should also be considered in relation to the findings from the above to clearly identify the scope and content of the additional training considered necessary for successful adoption.
- A schedule of who is to receive what training and when should be developed and agreed upon.

3.1.10 Brief and Train Key Mine Persons

Brief all persons involved in adopting the practice:

- The Mine Adoption Champion should discuss and agree on arrangements for briefing supervisors and workers involved in adopting the leading practice.
- The briefings should be held soon after identifying the key stakeholders and adopters involved in the adoption process.
- A brief description of the practice should also be given and an opportunity provided for any uncertainties to be raised and addressed either then or in follow-up sessions. The need for all mine workers to be properly briefed about what lies ahead should also be appropriately covered.

Train the persons involved in adopting the practice:

- Initiate the training process according to the training programme that has been developed, with the initial focus being on those who require training to enable successful adoption of the leading practice at the piloting site.
- Follow-up on the training programme according to plan, which should extend right through to completion of the mine-wide roll-out process for the leading practice.

3.1.11 Monitor, evaluate and report on performance.

Set up monitoring and data collection arrangements:

- The Mine Adoption Champion should ensure that effective arrangements are put in place for making and recording the necessary measurements, and for gathering any other data needed to assess the performance and impact of the leading practice being adopted.

Implement the monitoring and reporting programme:

- The Mine Adoption Team Manager must ensure consistent implementation of the monitoring and reporting arrangements that have been put in place, and that quality gathered data is being gathered, and regularly reported.
- Analyse the data to establish the performance and impact of the practice.

3.1.12 Finalise and implement mine-wide roll-out plan.

As soon as the leading practice is working satisfactorily at the pilot site(s), the roll-out process should be initiated. This should begin with a critical review of the roll-out plans developed earlier, to identify any adjustments that may need to be made to take account of experience to date. Once these adjustments have been made and effectively communicated to all concerned, implementation of the roll-out plan should proceed.

4. SUPPORTING DOCUMENTS

SUPPORTING DOCUMENTS
» Risk Review & Adoption Decision Template
» Mine Adoption Team Appointment Template
» Mine Wide Communication Brief Template
» Adoption Progress Tracker Template

RISK REVIEW AND ADOPTION DECISION

I, the undersigned have been made aware of the risk review checklist in terms of the following **Leading Practice(s):**_____

_____

I am representing _____ (Group), _____ (Mine)

and based on the findings as per risk review checklist below made the following decision:

Decision: Adopt the **Leading Practice**: | Yes | | No |

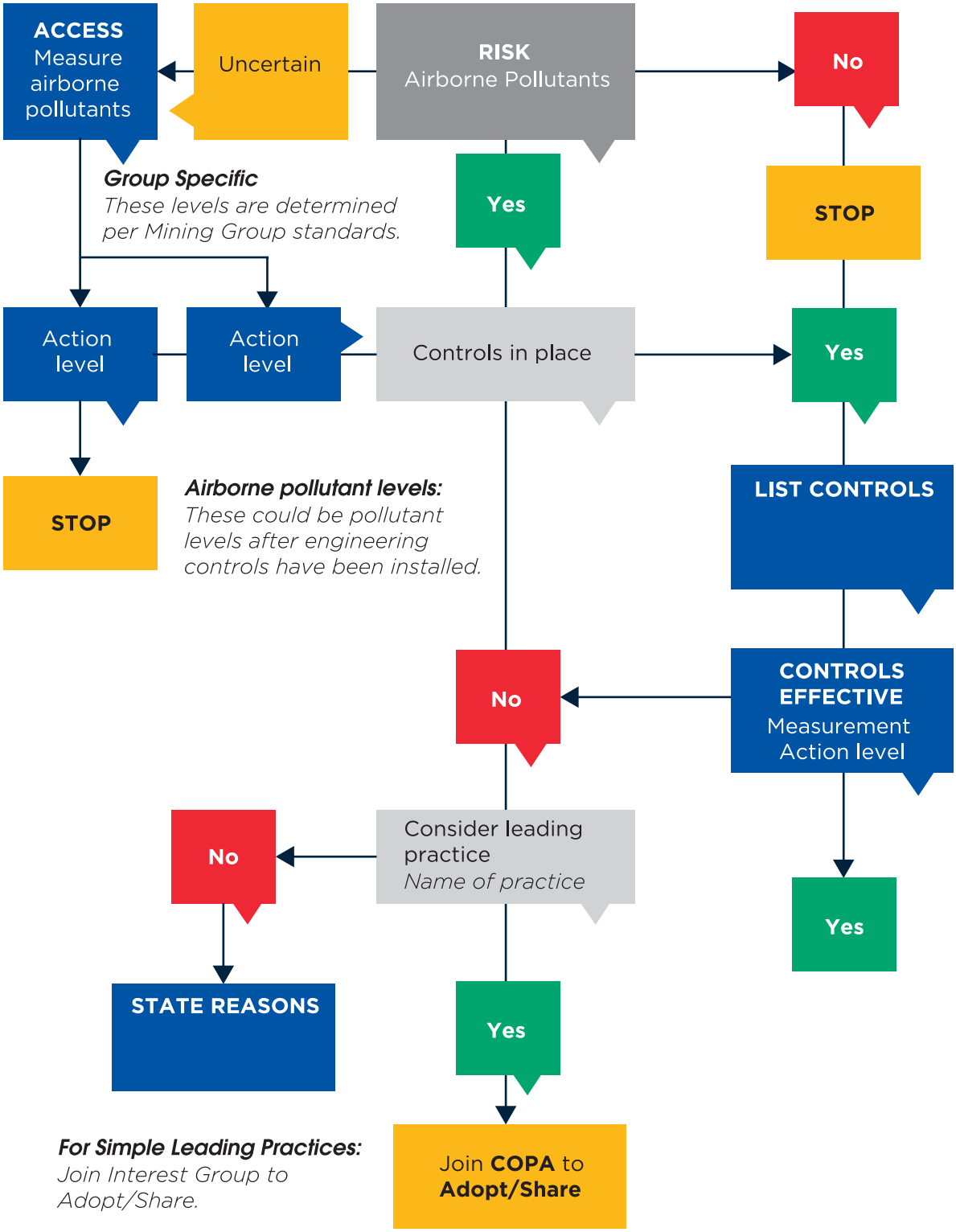
Signed: _____

Name: _____

Designation: _____

Date: _____

LEADING / SIMPLE LEADING PRACTICE REVIEW CHECKLIST



The Leading Practice Review Checklist, presented above also provides an easy-to-use aid in assessing the applicability and motivating the implementation of a particular practice for a potential adoption mine.

Signature and Designation

APPOINTMENT OF MINE ADOPTION CHAMPION

In terms of the adoption **Leading Practices** methodology as per the Mine Occupational Safety and Health (**MOSH**) process you are hereby appointed to be the Mine **MOSH** Adoption champion for the In Stope Atomisation for Dust Suppression

Your role will be:

1. Leading the project and championing the simple leading practice and the adoption process at the mine which is crucial to the success of the adoption process.
2. Commit time to fulfil the role of mine adoption champion, noting that systematic execution of the adoption process and successful adoption of the leading practice should become a key performance criterion in the selected person's performance contract with the mine.

I will provide the relevant resources for sustainable adoption.

Signed: _____

Name: _____

Designation: _____

Date: _____

I, the undersigned accept the appointment as the Mine **MOSH** Champion for the ***In Stope Atomisation for Dust Suppression***

Signed: _____

Name: _____

Designation: _____

Date: _____

APPOINTMENT OF MINE ADOPTION TEAM

In terms of the adoption of Leading Practices methodology as per the Mine Occupational Safety and Health (**MOSH**) process you are hereby appointed to be part of the Mine's adoption team for the *In Stope Atomization For Dust Suppression Leading Practice*. I am also aware that I am responsible for providing you with the relevant resources to ensure sustainable adoption of the leading practice.

Signed: _____

Name: _____

Designation: _____

Date: _____

I, the undersigned accept the appointment as member of the *In Stope Atomization For Dust Suppression Leading Practice.*

Signed: _____

Name: _____

Designation: _____

Date: _____

COMPANY LOGO

TO	:	All D-Band and above employees Union Representatives
FROM	:	General Manager
DATE	:	xx/xx/xxxx
SUBJECT	:	**MOSH** - ADOPTION OF LEADING PRACTICES

Photo of General Manager pasted here

Dear Colleagues

This is to inform you that we have made a decision to adopt the following **Leading Practices** as per the **MOSH** Learning Hub methodology:

- **In Stope Atomization For Dust Suppression**

We are of the opinion that by adopting this leading practice the health of our workers will immensely benefit in terms of reducing the dust load underground and therefore reduce the dust exposure levels to our workers. By doing so we re-iterate our commitment to zero harm and that we will do anything possible to ensure our workers return home safely and healthy.

Please ensure that the content of this brief is communicated through the entire mine's communication channels to all workers.

Together we can!

xyz

Designation *(General Mine Manager)*

NOTES