

Hazard name	Respirable Coal Dust containing Crystalline Silica - Surface
Top event	Liberation of Respirable Coal Dust
Affects	Health







Respirable Coal Dust containing Crystalline Silica (Surface)

Hazard Description

Coal dust is generated by various mining activities.

Threats

Threat: Coal Transfer (Underground to surface silos)

Transfer of coal from one conveyor (Section Belt) to the other (Trunk Belt), or Trunk to Trunk belt, Trunk Belt to the Bunkers for storage or main conveyor belt to the Silo (Surface)







Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Transfer Point Water Sprays

Barrier Category	Object
Barrier Type	Active hardware
Effectiveness	30 - 60% Poor
Accountable	Engineer
Criticality	Med Medium Criticality

Description:

A water-based dust engineering control used to suppress dust or facilitate the airborne capture of dust particles at the conveyor belt transfer point.

Verification:

Routine inspections by belt attendants Scheduled maintenance Regular ventilation surveys (Monthly/Quarterly)

Barrier: CBAT-SLP

Barrier Category	Object
Barrier Type	Continuous hardware
Effectiveness	60 - 80% Good
Accountable	Engineering
Criticality	High Criticality



Respirable Coal Dust containing Crystalline Silica (Surface)

Description:

Primary dust engineering control system at ore conveyance transfer points. The system ensures that airborne dust particles are captured and trapped by increasing droplet of (atomization) one water to create mist vapor capable of capturing respirable dust particles. The coagulation and the absorption of the dust particle by water is further enhanced by adding low dose surfactants that descale, sterilize for fungal (treat the water and bacterial agents) and increase the dust binding effect.

Verification:

Routine inspections by belt attendants Scheduled maintenance Regular ventilation surveys (Monthly/Quarterly)



Respirable Coal Dust containing Crystalline Silica (Surface)

Threat: Drilling-Coal (Surface)

Drilling of coal face at open cast operation in preparation for blasting.







Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Suction Drilling/Dust collectors	
Barrier Category	Object
Barrier Type	Active hardware
Effectiveness	60 - 80% Good
Accountable	Engineer
Criticality	High Criticality

Description:

The use of dust suction system installed at surface drilling machines to collect fine dust into bags.

Verification:

Pre-Use Inspection at the start of each shift Scheduled maintenance Regular ventilation surveys (Monthly)

Barrier: Drilling Scrubber

Barrier Category	Object
Barrier Type	Active hardware
Effectiveness	60 - 80% Good
Accountable	Engineering Manager
Criticality	High Criticality



Respirable Coal Dust containing Crystalline Silica (Surface)

Description:

The extraction of dust particles through a scrubber device connected to the drilling machine.

Verification:

Pre-Use Inspection at the start of each shift Scheduled maintenance Regular ventilation surveys (Monthly)

Barrier: Wet Drilling

Barrier Category	Act
Barrier Type	Continuous hardware
Effectiveness	80 - 100% Very Good
Accountable	Shift Supervisor
Criticality	Medium Criticality

Description:

Introduction of water during drilling of long holes using steel drill rods with water outlets at drilling points to suppress dust.



Respirable Coal Dust containing Crystalline Silica (Surface)

Verification:

Pre-Use Inspection at the start of each shift Scheduled maintenance Regular ventilation surveys (Monthly)

Barrier: Dust Curtain (C/Belt dust deflector)

Barrier Category	Act
Barrier Type	Behavioral
Effectiveness	60 - 80% Good
Accountable	Shift Supervisor
Criticality	Med Medium Criticality

Description:

Conveyor belt material placed underneath the drill rigs to prevent dust propagation

Verification:

Pre-Use Inspection at the start of each shift Scheduled maintenance Regular ventilation surveys (Monthly)

Threat: Blasting - Coal (Surface)

Blasting of coal seam at opencast operations







Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Explosive Selection

Barrier Category	Act
Barrier Type	Behavioural
Effectiveness	60 - 80% Good
Accountable	Operations Manager
Criticality	High Criticality

Description:

The use of low explosives which are less invasive during blasting, these explosives create deflagration which is sufficient to fragment the coal seam.

Verification:

Routine explosives recon

Barrier: WaterBlast Canon

Barrier Category	System
Barrier Type	Behavioral
Effectiveness	30 - 60% Poor
Accountable	Shift Supervisor
Criticality	High Criticality



Respirable Coal Dust containing Crystalline Silica (Surface)

Description:

The use of highly pressurized water, which is pumped through nozzles, turning the water into mist through atomization. This mist then captures the dust particles and dissipates.

Verification:

Pre-blast inspection checklist Environmental Monitoring (Dust buckets)

Barrier: Burden & Spacing, patterns, stemming	
Barrier Category	Act
Barrier Type	Behavioral
Effectiveness	60 - 80% Good
Accountable	Mine Overseer

Description:

The spacing between the long holes affects the fragmentation of the coal seam, thus the dust generation.

Verification:

Pre-charge inspection checklist Blast advance rate

Threat: Loading (Surface)

Loading of blasted coal to Dump truck using excavators. Topsoil stripping, rehab??



Respirable Coal Dust containing Crystalline Silica (Surface)



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Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Water Blast Canon

Barrier Category	System
Barrier Type	Behavioral
Effectiveness	30 - 60% Poor
Accountable	Shift Supervisor
Criticality	High Criticality

Description:

The use of highly pressurized water, which is pumped through nozzles, turning the water into mist through atomization. This mist then captures the dust particles and dissipates.

Verification:

Pre-blast inspection checklist Environmental Monitoring (Dust buckets)



Respirable Coal Dust containing Crystalline Silica (Surface)

Threat: Hauling (Roadways - Surface)



Respirable Coal Dust containing Crystalline Silica (Surface)

Tramming of coal from the blasted coal face to the tipping area or stockpile





Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Roadway Dust Supression (Watering down)

Barrier Category	Act
Barrier Type	Behavioral
Effectiveness	60 - 80% Good
Accountable	Engineering Manager
Criticality	High Criticality

Description:

roadways involves of surfactants An engineering that watering by applying and control down water (Or other such hygroscopic salts bitumen etc.), dust particles agents as to consolidate the or and to prevent them from becoming airborne.

Verification:

Watering down schedules Scheduled inspections by Foreman Section dust control inspection by VOHE department



Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Environmental Roadway Construction		
Barrier Category	Object	

Barrier Type	Active hardware
Effectiveness	80 - 100% Very Good
Accountable	Engineering Manager
Criticality	High Criticality

Description:

Initial roadway construction using special dust binding and environmentally friendly agents to create a surface that prevents or minimizes dust liberation as the road is used.

Verification:

Environmental Monitoring (Dust Buckets)



Respirable Coal Dust containing Crystalline Silica (Surface)

Threat: Tipping/Dumping (Surface)

Tipping of coal from Dump truck to the tipping points or dumping point (Stockpile)



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MOSH-INDUSTRY DUST RISK BOWTIE ANALYSIS







Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Water Blast Canon

Barrier Category	System
Barrier Type	Behavioral
Effectiveness	30 - 60% Poor
Accountable	Shift Supervisor
Criticality	High Criticality

Description:

The use of highly pressurized water, which is pumped through nozzles, turning the water into mist through atomization. This mist then captures the dust particles and dissipates.

Verification:

Pre-blast inspection checklist Environmental Monitoring (Dust buckets)

Barrier: Tips Sprays

Barrier Category	Object
Barrier Type	Active hardware
Effectiveness	60 - 80% Good
Accountable	Engineering Foreman
Criticality	High Criticality



Respirable Coal Dust containing Crystalline Silica (Surface)

Description:

A water-based dust engineering control is used to suppress dust or facilitate the airborne capture of dust particles at the conveyor belt.

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Respirable Coal Dust containing Crystalline Silica (Surface)

Threat: Coal Conveyance (Surface Belt)

Transfer of coal from the tipping point conveyor belt to the crusher.

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Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Water Sprays

Barrier Category	Object
Barrier Type	Active hardware
Effectiveness	30 - 60% Poor
Accountable	Engineer
Criticality	Medium Criticality

Description:

A water-based dust engineering control used to suppress dust or facilitate the airborne capture of dust particles at the conveyor belt transfer point.

Barrier: CBAT-SLP

Barrier Category	Object
Barrier Type	Continuous hardware
Effectiveness	60 - 80% Good
Accountable	Engineering
Criticality	High Criticality

Description:

Primary dust engineering control system at ore conveyance transfer points. The system ensures that airborne dust particles are captured and trapped by increasing one droplet of water to create mist vapor (atomization) capable of capturing respirable dust particles. The coagulation and the absorption of the dust particle by water is further enhanced by adding low dose surfactants that

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descale,	sterilize	(treat	the	water	for	fungal	and
bacterial agents) and inc	rease the dust binding eff	ect.					



Respirable Coal Dust containing Crystalline Silica (Surface)

Threat: Coal Processing (Surface Plant)

Crushing & separation of large coal material to sizeable coal material.

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Respirable Coal Dust containing Crystalline Silica (Surface)



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Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Water Sprays

Barrier Category	Object
Barrier Type	Active hardware
Effectiveness	30 - 60% Poor
Accountable	Engineer
Criticality	Medium Criticality

Description:

A water-based dust engineering control used to suppress dust or facilitate the airborne capture of dust particles at the conveyor belt transfer point.



Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: CBAT-SLP

Barrier Category	Object
Barrier Type	Continuous hardware
Effectiveness	60 - 80% Good
Accountable	Engineering
Criticality	High Criticality

Description:

Primary dust engineering control system at ore conveyance transfer points. The system ensures that airborne dust particles are captured and trapped by increasing droplet of (atomization) to create one water mist vapor capable of capturing respirable dust particles. The coagulation and the absorption of the dust particle by water is further enhanced by adding low dose surfactants that descale, (treat for fungal sterilize the water and bacterial agents) and increase the dust binding effect.

Barrier: Water Sprays

Barrier Category	Object
Barrier Type	Active hardware
Effectiveness	30 - 60% Poor
Accountable	Engineer
Criticality	Medium Criticality



Respirable Coal Dust containing Crystalline Silica (Surface)

Description:

A water-based dust engineering control used to suppress dust or facilitate the airborne capture of dust particles at the conveyor belt transfer point.

Consequences

Consequence: Dust Inhalation - Acute Exposure

Coal dust inhalation which may result in short-term respiratory symptoms such as sneezing, coughing, lung-tissue swelling, asthma and throat infections.



Respirable Coal Dust containing Crystalline Silica (Surface)



Barrier: Travelling Speed Management

Barrier Category	System
Barrier Type	Behavioral

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Respirable Coal Dust containing Crystalline Silica (Surface)

Effectiveness	60 - 80% Good
Accountable	Operations
Criticality	Medium Criticality

Description:

A traffic management programme to regulate mobile equipment travelling speed to eliminate accident and damage of property.

Barrier: Cabin Integrity

Barrier Category	Object
Barrier Type	Active hardware
Effectiveness	60 - 80% Good
Criticality	Medium Criticality

Description:

the structural condition of the cabin must prevent ingress of dust particles into the cabin thus exposing the operator

Barrier: Windsock Indicator

Barrier Category	Object
Barrier Type	Continuous hardware
Effectiveness	30 - 60% Poor



Respirable Coal Dust containing Crystalline Silica (Surface)

Accountable	Engineer
Criticality	High Criticality

Description:

Determining the wind direction to ensure work is always conducted upstream of air direction thus preventing direct exposure. This air direction can be determined during truck spotting.

Verification:

Pre-loading inspection checklist Dust buckets

Barrier: Operator/passenger enclosed cabins

Barrier Category	Object
Barrier Type	Passive hardware
Effectiveness	80 - 100% Very Good
Accountable	Engineering
Criticality	High Criticality

Description:

Operator cabin enclosure (physical) to create a barrier between the operator and the airborne coal dust particles.



Respirable Coal Dust containing Crystalline Silica (Surface)

Verification:

Pre-Use Inspection at the start of each shift Scheduled maintenance Regular ventilation surveys (Monthly)

Barrier: Canopy Air Curtain Technology/Practice	
Barrier Category	Object
Barrier Type	Active hardware
Effectiveness	60 - 80% Good
Accountable	Engineering Manager
Criticality	Medium Criticality

Description:

Maintaining clean breathing air supply by maintaining a positive air pressure inside the cabin, through the introduction of filtered air to create a barrier and prevent any contaminated air into the cabin.

Verification:

Pre-Use Inspection at the start of each shift Scheduled maintenance Regular ventilation surveys (Monthly)



Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Job Rotation

Barrier Category	System
Barrier Type	Behavioral
Effectiveness	60 - 80% Good
Accountable	Operations Manager
Criticality	High Criticality

Description:

Multi license system that allows operators to change their work activities or between machines during the shift.

Barrier: Dust Mask (PPE)

Barrier Category	Object
Barrier Type	Active hardware
Effectiveness	60 - 80% Good
Accountable	HSE Manager
Criticality	High Criticality



Respirable Coal Dust containing Crystalline Silica (Surface)

Description:

Dust respiratory personal protection equipment with the correct protection index

Verification:

Supervision Visible Felt Leadership routines PPE withdrawal reports

Barrier: Respirators (PPE)

Barrier Category	Object
Barrier Type	Continuous hardware
Effectiveness	80 - 100% Very Good
Accountable	HSE Manager
Criticality	Medium Criticality

Description:

Dust respiratory personal protection equipment with the correct protection index

Verification:

Supervision Visible Felt Leadership routines Respirator Fit Testing



Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Real Time Dust Monitoring	
Barrier Category	System
Barrier Type	Continuous hardware
Effectiveness	0 - 30% Very Poor
Accountable	Engineer
Criticality	High Criticality

Description:

Electronic systems aimed at monitoring and communicating the performance of engineering controls in real time. This allows operations to act immediately in implementing appropriate dust control measures or procedures (administrative controls) where there are engineering control failures.

Verification:

Daily Exceptions Report Scheduled/Reported Dust Investigations Scheduled Maintenance

Barrier: Ventilation Control Systems

Barrier Category	System
Barrier Type	Continuous hardware
Effectiveness	80 - 100% Very Good



Respirable Coal Dust containing Crystalline Silica (Surface)

Accountable	Production Manager
Criticality	Medium Criticality

Description:

Installation of ventilation control appliances to dilute/remove dust using ventilating air.eg. Fans, vent brattices, etc.

Verification:

Regular ventilation surveys (Monthly) to determine sufficient/required air quantities. Early Entry Examination (Shift) Regular inspection (Monthly) on surface performance Regular maintenance of surface fans (Quarterly) Quarterly inspection by external party



Respirable Coal Dust containing Crystalline Silica (Surface)

Consequence: Dust Inhalation -Chronic Exposure

Coal dust inhalation which may result in long-term adverse respiratory diseases (occupational lung diseases such as Coal Worker's Pneumoconiosis/Silicosis).





Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Travelling Speed Management

Barrier Category	System
Barrier Type	Behavioral
Effectiveness	60 - 80% Good
Accountable	Operations
Criticality	Medium Criticality

Description:

A traffic management programme to regulate mobile equipment travelling speed to eliminate accident and damage of property.

Barrier: Cabin Integrity

Barrier Category	Object
Barrier Type	Active hardware
Effectiveness	60 - 80% Good
Criticality	Medium Criticality



Respirable Coal Dust containing Crystalline Silica (Surface)

Description:

The structural condition of the cabin must prevent ingress of dust particles into the cabin thus exposing the operator.

Barrier: Wind Sock Indicator

Barrier Category	Object
Barrier Type	Continuous hardware
Effectiveness	30 - 60% Poor
Accountable	Engineer
Criticality	High Criticality

Description:

Determining the wind direction to ensure surface loading work is always conducted upstream of air direction thus preventing direct exposure. This air direction can be determined during truck spotting.

Verification:

Pre-loading inspection checklist Dust buckets



Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Operator/	/passenger encl	osed cabins	
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Barrier Category	Object
Barrier Type	Passive hardware
Effectiveness	80 - 100% Very Good
Accountable	Engineering
Criticality	High Criticality

Description:

Operator cabin enclosure (physical) to create a barrier between the operator and the airborne coal dust particles.

Verification:

Pre-Use Inspection at the start of each shift Scheduled maintenance Regular ventilation surveys (Monthly)

Barrier: Canopy Air Curtain Technology/Practice

Barrier Category	Object
Barrier Type	Active hardware
Effectiveness	60 - 80% Good
Accountable	Engineering Manager
Criticality	Medium Criticality



Respirable Coal Dust containing Crystalline Silica (Surface)

Description:

Maintaining clean breathing air supply by maintaining a positive air pressure inside the cabin, through the introduction of filtered air to create a barrier and prevent any contaminated air into the cabin during loading and transportation.

Verification:

Pre-Use Inspection at the start of each shift Scheduled maintenance Regular ventilation surveys (Monthly)

Barrier: Job Rotation

Barrier Category	System
Barrier Type	Behavioral
Effectiveness	60 - 80% Good
Accountable	Operations Manager
Criticality	High Criticality

Description:

Multi license system that allows operators to change their work activities or between machines during the shift.



Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Personal Dust Wonitoring	
Barrier Category	Act
Barrier Type	Socio technical
Effectiveness	60 - 80% Good
Accountable	General Manager
Criticality	Medium Criticality

Description:

A formal system of Occupational Hygiene Measurements where employees are sampled for dust based on their HEG (Homogeneous Exposure Group) allocation and classification.

Verification:

Monthly occupational hygiene sampling report

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Barrier: Periodic Medical Screening	
Barrier Category	System
Barrier Type	Socio technical
Effectiveness	60 - 80% Good
Accountable	HSE Manager



Respirable Coal Dust containing Crystalline Silica (Surface)

Description:

A formal system of medical surveillance where employees undergo medical examination (Lung Function Tests) at the start of their employment and at appropriate intervals as determined by the risk profile.

Verification:

Monthly COF (certificate of fitness) report

Barrier: Job Re-Classification

Barrier Category	Act
Barrier Type	Socio technical
Effectiveness	60 - 80% Good
Accountable	HR Manager
Criticality	Medium Criticality

Description:

The transfer of employees from high-risk areas (respecting their exposure to dust) to low-risk areas to prevent an occupational lung disease which may have already started showing signs.

Verification:

Monthly Employee report





Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Canopy Air Curtain Technology/Practice	
Barrier Category	Object
Barrier Type	Active hardware
Effectiveness	60 - 80% Good
Accountable	Engineering Manager
Criticality	Medium Criticality

Description:

Maintaining clean breathing air supply by maintaining a positive air pressure inside the cabin, through the introduction of filtered air to create a barrier and prevent any contaminated air into the cabin.

Verification:

Pre-Use Inspection at the start of each shift Scheduled maintenance Regular ventilation surveys (Monthly)

Barrier: Ventilation Control Systems

Barrier Category	System
Barrier Type	Continuous hardware
Effectiveness	80 - 100% Very Good



Respirable Coal Dust containing Crystalline Silica (Surface)

Accountable	Production Manager
Criticality	Medium Criticality

Description:

Installation of ventilation control appliances to dilute/remove dust using ventilating air.eg. Fans, vent brattices, etc.

Verification:

Regular ventilation surveys (Monthly) to determine sufficient/required air quantities. Early Entry Examination (Shift) Regular inspection (Monthly) on surface performance Regular maintenance of surface fans (Quarterly) Quarterly inspection by external party



Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Real Time Dust Monitoring					
Barrier Category	System				
Barrier Type	Continuous hardware				
Effectiveness	0 - 30% Very Poor				
Accountable	Engineer				
Criticality	High Criticality				

Description:

Electronic systems aimed at monitoring and communicating the performance of engineering controls in real time. This allows operations to act immediately in implementing appropriate dust control measures or procedures (administrative controls) where there are engineering control failures.

Verification:

Daily Exceptions Report Scheduled/Reported Dust Investigations Scheduled Maintenance



Respirable Coal Dust containing Crystalline Silica (Surface)

Consequence: Business Continuity Disruptions

Total or partial mine operation closure or production stoppage due to statutory instructions due to non-compliance.



Respirable Coal Dust containing Crystalline Silica (Surface)



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Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier:	Occupational	Health	Monitoring	Programme
			J	

Barrier Category	System
Barrier Type	Socio technical
Effectiveness	60 - 80% Good
Accountable	VOHE Superintendent
Criticality	High Criticality

Description:

System of Occupational Hygiene Measurements based on their HEG (Homogeneous Exposure Group) allocation and classification and linked with medical surveillance records of employees.

Verification:

Quarterly Statutory reporting

Barrier: Business Continuity Training					
Barrier Category System					
Barrier Type Behavioral					
Effectiveness 60 - 80% Good					
Accountable Corporate					



Respirable Coal Dust containing Crystalline Silica (Surface)

Criticality Medium Criticality

Description:

Training of all relevant personnel on Business Continuity Plan and the role of each incumbent during business disruption.



Respirable Coal Dust containing Crystalline Silica (Surface)

Consequence: Stakeholder Relations

Working relationship amongst the tripartite parties including investors and communities, in the interest of health & safety of employees. (Refer to description)



Respirable Coal Dust containing Crystalline Silica (Surface)



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Respirable Coal Dust containing Crystalline Silica (Surface)

Barrier: Stakeholder Management Plan				
Barrier Category	System			
Barrier Type	Behavioral			
Effectiveness	80 - 100% Very Good			
Accountable Public Relations Manager				
Criticality Med Medium Criticality				

Description:

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A management process that consists in managing the expectations and requirements of all the internal and external stakeholders that are involved with a project to ensure successful delivery of any project, programme, or activity.



Respirable Coal Dust containing Crystalline Silica (Surface)

Activities

DUST MANAGEMENT SYSTEMS

Code Details		Category	Frequency	Responsible	Barriers
A01 Training of e prevention	employees employees on risk	Training	Yearly	Training Manager	Transfer Point Water Sprays CBAT-SLP Suction Drilling/Dust collectors Drilling Scrubber Wet Drilling Dust Curtain (C/Belt dust deflector) Water Blast Canon Burden & Spacing, patterns, steming Roadway Dust Suppression (Watering down) Environmental Roadway Construction Water Sprays Dust Mask (PPE) Respirators (PPE) Real Time Dust Monitoring Periodic Medical Screening Job Re-Classification Occupational Health Monitoring Programme Business Continuity Training
A02 Planning of	mining activity	Planning	Monthly	Production Manager	Explosive Selection Burden & Spacing, patterns, steming



Code	Details	Category	Frequency	Responsible	Barriers
					WaterBlast Canon Roadway Dust Suppression (Watering down) Environmental Roadway Construction Job Re-Classification
					Occupational Health Monitoring Programme
A03	Dust Monitoring Systems	Monitoring	Continuous	Underground ventilation officer	Water Blast Canon Roadway Dust Suppression (Watering down) Real Time Dust Monitoring Personal Dust Monitoring Occupational Health Monitoring Programme
A04	Auditing Systems	Quality Assurance	As required	HSE Manager	Wet Drilling Water Blast Canon Roadway Dust Suppression (Watering down) Real Time Dust Monitoring Personal Dust Monitoring Periodic Medical Screening Stakeholder Management Plan
A05	Design & Selection Selection of suction equipment to be based on sound and proven efficiency and effectiveness	Planning	As required	Engineering Manager	Transfer Point Water Sprays CBAT-SLP Suction Drilling/Dust collectors Drilling Scrubber Explosive Selection Water Blast Canon Environmental Roadway Construction



Code	Details	Category	Frequency	Responsible	Barriers
					Water Sprays Dust Mask (PPE) Respirators (PPE) Real Time Dust Monitoring
A06	Design	Planning	As required	Engineering	Burden & Spacing, patterns, stemming
A07	Maintenance Suction units are to be maintained at a frequency determined by the Engineering dept. This maintenance is simultaneous with of the drill rig.	Maintenance	As required	Engineering	Transfer Point Water Sprays CBAT-SLP Suction Drilling/Dust collectors Drilling Scrubber Wet Drilling Dust Curtain (C/Belt dust deflector) WaterBlast Canon Roadway Dust Suppression (Watering down) Environmental Roadway Construction Water Sprays Real Time Dust Monitoring
A08	Medical Surveillance	Monitoring	As required	Occupational Medical Practitioner	Job Rotation Respirators (PPE) Periodic Medical Screening Job Re-Classification Occupational Health Monitoring Programme
AU9	Occupational Hygiene Programme	Monitoring	Continuous	HSE Manager	Suction Drilling/Dust collectors Drilling Scrubber Wet Drilling



Code	Details	Category	Frequency	Responsible	Barriers
					Dust Curtain (C/Belt dust deflector) Job Rotation
					Dust Mask (PPE)
					Respirators (PPE)
					Personal Dust Monitoring
					Occupational Health Monitoring Programme
A10	Operator Competency				Wet Drilling
					Dust Curtain (C/Belt dust deflector)
					Explosive Selection
					Water Blast Canon
					Burden & Spacing, patterns, steming
					Dust Mask (PPE)
A11	Early Warning Systems				Iransfer Point Water Sprays
					CBAT-SLP
A14	Control Performance Monitoring				Iransfer Point Water Sprays
					CBAT-SLP
					Water Sprays
					Real Time Dust Monitoring
A 1 F	lu stallation				Transfer Deint Water Consus
A15	Installation				CRAT SLD
					CDAI-SLP Dust Curtain (C/Polt dust deflector)
					Water Blast Canon



Code	Details	Category	Frequency	Responsible	Barriers
					Environmental Roadway Construction
					Water Sprays
					Real Time Dust Monitoring
A16	Interlocking to Conveyor Belt				Transfer Point Water Sprays
					CBAT-SLP
					Water Sprays
A17	Communication	Training			Job Rotation
					Business Continuity Training
A18	Shift Management				Job Rotation
A19	Multi-license/skill Training	Training	Yearly	HRD	Job Rotation
	Employee training in multiple				
	disciplines or skills and acquiring				
	license on skill.				
A20	PPE Inventory	Inventory	Continuous	Supply Chain	Dust Mask (PPE)
					Respirators (PPE)
	always Ensuring availability of dust				
	masks for employees				