

From: [SSHEG Health](#)
To: [IPCN Enquiries Mailbox](#)
Cc: [SSHEG Health](#)
Subject: Rixs Creek SSD6300 MP08 - 0098 Mod 13
Date: Friday, 4 October 2019 3:20:19 PM
Attachments: [SSHEG IPC Rixs Creek SSD 6300 October 2019 issue.pdf](#)
[MD NTH Air Quality Project issue.pdf](#)
[SSHEG Response to IPC Report August 2018 NEPM issue.pdf](#)
[SSHEG Rixs Creek Mod 10 Mar 2019 issue.pdf](#)
[SSHEG Singleton Air Pollution Health Reporting May 2019 IPC Issue.pdf](#)

Commissioners

Please find attached Five 5 PDF Files as Submission and 4 attachments

Dr Neville Hodgkinson PhD

Singleton Shire Healthy Environment Group

Upper Hunter Mining Dialogue Application Form for Consideration of Dialogue Project Proposals

Projects brought to the attention of the Upper Hunter Mining Dialogue's (Dialogue) Joint Advisory Steering Committee (JASC) for consideration will need to provide a detailed description of the project's background, a clear outcome being sought, and the resources required to support the proposal. Please note that the Dialogue will not support any sponsorship proposals seeking monetary support. Any sponsorship proposals are to be directed to the NSW Minerals Council.

Background / Key Issue(s)

Provide a brief description of the project, outlining the key issue or problem to be addressed. Detail how the project relates to the Dialogue's primary objective to address cumulative impacts of mining.

Prepared by Dr Neville Hodkinson PhD Mar- Sept 2019

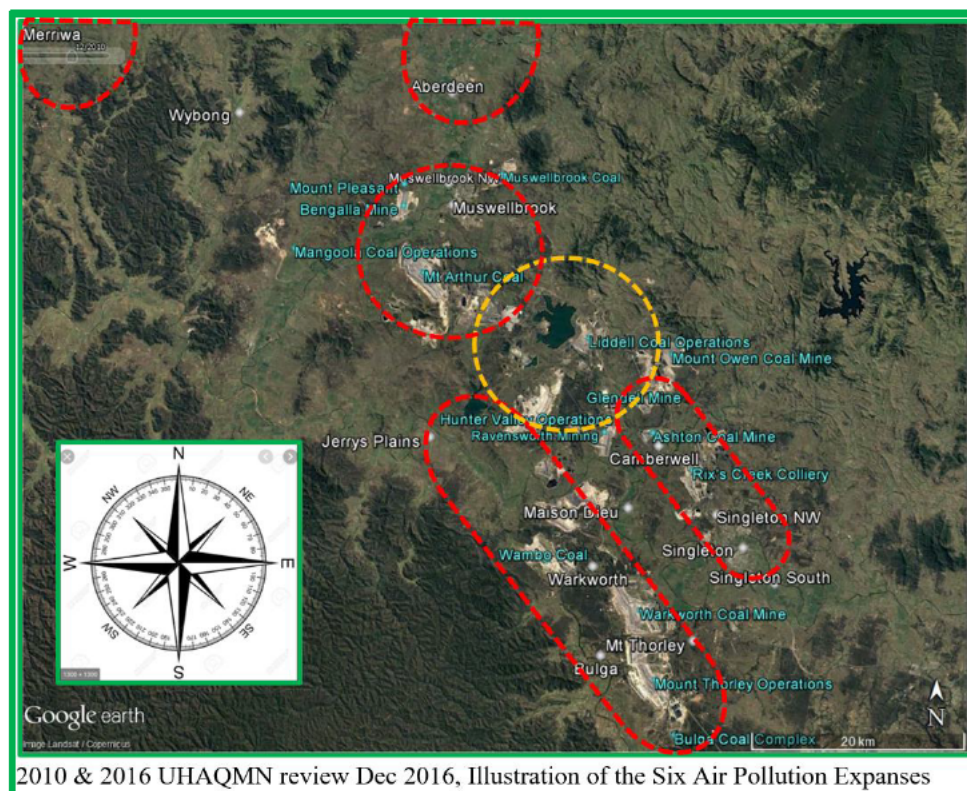
“Coordinated Coal Mining Air Pollution Mitigation Controls, Options as WHO & NEPM Standards lower in the Hunter”.

The focus of this Mining Dialogue^{//} Project is to develop alternate Mining Industry Air Pollution Emission Mitigation Options that can be introduced over and above existing 2019 Mine Operating Practices (Dust Stop, Weather forecasting, Blast size & Stemming, etc) to firstly (Stage 1 by 2020) lower the Air Quality Particulate Matter Exposure experienced especially by Singleton Shire Residents to achieve the Feb 2016 National NEPM(Ambient Air Quality) Standards requirements.

<https://youtu.be/q4TojwxKVRQ>

Secondly (Stage 2 by 2030), to progressively implement Mine Air Pollution Mitigation Protocols for yet further lowering below these 2016 NEPM Australian National Standards to minimum levels as guided by World Health Organisation initiatives since 2013; such as the provision for their further reductions foreshadowed under WHO PM Disease Review since 2016. This is especially so for the emerging Nanoparticle Disease Research of Combustion formed, and Diesel Particulate Exhaust Emissions from mining equipment now confirmed as present penetrating into Human Brains and Organ Tissues. Nano Diesel Particles currently would only be so far included as NEPM PM2.5 reducing goal in 2025. [NEPM - National Environment Protection (Ambient Air Quality) Measure Feb 2016]

This Mining Dialogue Project targets to identify over two Stages, a Suite of Mine Pollution evolving Mitigation Options, preferable targeting Pollution Emission Sources and their *Air Pollution Drifting Patterns and Cumulative Air Pollution Expanse influences* that daily expose Near Neighbour Residents: and thus provide the basis for Pollution Mitigation Strategies that can be progressively incorporated by Hunter Valley Mining Industry Companies over the next 25 Years to catch up with, and achieve the ever reducing and emerging Human Health Air Quality Standards as detailed by the United Nations, WHO and IARC since 2013 for Mortality, Morbidity, and Loss of Life Expectancy. (refer **Figure MD1** below)



Background

In 2008 the Singleton Shire Concerned Residents Disease observations of the Hunter Valley Mining and Power Station Air Pollution Cocktail Drifting Patterns provided the layman's view and the basis (SSHEG 2010 Dec doc) for NSW Chief Health Officer's Expert Advisory Group investigations into Local General Practitioner Doctors and Resident's Disease associations of the Mining Industry Airborne Pollution; especially "Near Neighbours to Industrial Emission Sources of Air Pollution".

Community observations of hours and days of accumulated "Valley Haze and Mine Dust Drifting Patterns" remains at odds with the Atmospheric Dispersion EIS 25 Year Models that estimate only the Downwind Air Pollution Contaminants, as a "*form of concentration contours that merely reduce to reflecting Wind Rose information averaged over long Time Periods*". As early as 1985, ANU were investigating as a prelude to Industrial Development, a Risk Assessment Scheme for Air Quality in the Hunter Valley of NSW; proceeding from the identification of the Particle Pollution Sources, their transport Pathways from the Sources to Residents Sites, their eventual Environmental Impact from the transported Pollution Dose Exposure of Residents as well as their atmospheric stability conditions limitations that remain in use today; although refined by PAE Holmes et al since, through to 2010.

Resident's Hour by Hour Mine Drifting Air Pollution Exposure Disease Impacts are being encountered daily by Singleton GP's soon after these hourly Mine Pollution Exposures Camberwell and Maison Dieu UHAQMN SMS messaging Alerts and exceedances are glaring examples of these unacceptable Disease Impacts!

The Diurnal Variability, the Time of Day Air Drifting Patterns, Seasonal Weather

Patterns, the changing Landscape of working Mine Voids, Overburden Mountains and their Orientation over 25year Mine cycles are critical elements to the Dispersion of Mining Industry Air Pollution containment changes. Mine Air Pollution should otherwise be contained within the Mine Lease boundaries and by any Buffer Zones provided.

The Hunter Valley Coal development focus emerged shortly after the establishment of the Electricity Commission of NSW formed in 1950; taking over and managing Electricity Generation across the State, connecting to Snowy Mountains Generation, Coal and Generation in Central Coast by 1960's, and Liddell Power Station developed in association with Kurri Kurri Aluminium Smelter by 1971. **Air Pollution Dispersion in the enclosed Hunter Valley then and now was fundamental to Community Health Protection.**

In 1980 the role of Electricity Commission was extended to manage the use of Coal for the generation of Electricity or sell for profit; reduce the cost of Electricity Generation and Supply, and to promote and encourage research into the development of Coal Resources in NSW. The era of cheaper Open Cut Coal Mining emerged in the Hunter Valley, with Bayswater Power Station and Tomago Aluminium Smelter by 1985. Still today Tomago uses 12% of NSW Electricity Capacity, while Newcastle Port Exports up to 100 million Tons of Hunter Coal pa mostly from Open Cut Coal Mining in the Hunter Valley.

The continuation of Open Cut Mining currently without Population Protection Buffer Zones interspersed within Farming Localities, Villages and Towns of the enclosed Hunter Valley in 2019 depends entirely on more accurate Mining Air Pollution Dispersion Methodologies Mitigation Controls that can cater for existing and envisaged Hour by Hour Air Drifting Mine Pollution Dose Exposure of Residents; incorporating the "Near Neighbours Downstream Individual Disease Status Propensity" that lowers allowable PM10, PM2.5 (Fine) and PM10-2.5 (Coarse) hourly Limits of Mine Air Pollution Mitigation Controls.

Outcomes / Benefits

Provide a brief description of the goals, objectives and outcomes being sought for the project, including how this will benefit the Dialogue and the Upper Hunter community. E.g. seeking Dialogue support for an existing project, or to pursue a project through the Working Groups.

Project Goals, Objectives & Outcomes

- ✓ Develop alternate Mining Industry Air Pollution at Source-Emission Mitigation Options for Stage 1 by 2020 that can be introduced over and above existing 2019 Mine Operating Practices (Dust Stop, Weather forecasting, Blast size & Stemming, etc) to firstly lower the Air Quality Particulate Matter Exposure experienced especially by any Near Neighbour Residents that at any time are likely, or predicted by UHAQMN Air Pollution Drifting Patterns from other Sources, to exceed the Feb 2016 National NEPM (Ambient Air Quality) Standards requirements of below 50ug/m³ PM₁₀ Daily Average and 25ug/m³ PM_{2.5} Daily Average.
- ✓ Develop an alternate Suite of Mining Industry Air Pollution Emission Mitigation Options for (Stage 2 by 2030) that can be introduced over and above Stage 1 2020 Mine Operating Practices, to progressively implement Mine Air Pollution Mitigation Protocols for yet further lowering below the 2016 NEPM Australian National Standards to minimum levels as targeted by World Health Organisation initiatives since 2013; preferable targeting the Pollution Emission Source and their Air Pollution Drifting and Dispersion Patterns that daily expose Near Neighbour Residents, and so as to achieve further reductions foreshadowed under WHO and IARC Particulate Matter Disease Review since 2016. This is especially so for the emerging Nanoparticle Disease Research of Combustion formed and Diesel Particulate Exhaust Emissions from mining equipment now confirmed as present throughout Human Brains and Organ Tissues.
- ✓ This Mining Dialogue Project Objective, focuses upon the implementation of effective Mine Pollution Mitigation Controls that are seen to recognise the Community Pollution Disease concerns as recently adjudged by the Centre for Air Pollution, Energy and Health Research summary status and references in June 2018 as illustrated above:-
A Comparison of the Health Effects of Ambient Particulate Matter Air Pollution from Five Emission Sources
 - ✓ [Neil J. Hime](#),^{1,2,*} [Guy B. Marks](#),^{1,3,4} and [Christine T. Cowie](#)^{1,3,4}
 - ✓ [Int J Environ Res Public Health](#). 2018 Jun; 15(6): 1206.

Objectives Stage 1 by 2020

Priority 1

- ✓ Develop Hunter Valley Mine Blasting Protocols to “**Eliminate Visible Mine Blasting Plumes into the Atmosphere**” certainly as Visible Plumes rising above the Mine Working Void, by incorporating “Blast Hole Matrix Surface Disturbance” Video refinement that utilises (a) Smaller Blasts Volumes, (b) Improved Blast Hole Stemming Material & Depth by introducing Stemming effectual Calculation KPI’s limits. (e.g. Oresome articles)
- ✓ Establish the Criteria that warrants **Increased Evacuation Zones and specifically likely impacted Residents evacuation Zones** around Mine Blast Localities for Designated Planned Blasts adjudged by Weather Conditions, Mine Safety, and Plume Propensity to drift as a Hot Toxic Gas Bubble rather than Disperse within the Mine Lease and Buffer Zones environs.

The practical alternate is to eliminate these Visible Blast Plumes.

Analyse for Hunter Valley Mines, Complaints and Compliance Reports 2008 – 2019 to establish the Environmental Air Dispersion Stability Conditions that existed at the time leading up to and the Blast Plume Air Drifting downstream paths and Near Neighbours associated directions impacted by Blast Plumes returning to Ground.

Currently, Blasting Plume Toxic Gases, Dust and Particulate Matter, and Some Colourless Rated Plumes that return to Ground are adjudged as Fume; while the reality is that since 2010 Residents, Individuals and Mine Workers have been Hospitalised within 2 – 5 Km of Mine Blasts; other Residents report to Local GP’s they suffer severe Asthma attacks as close 2- 4 kms of Blast sites. Singleton and Muswellbrook Hospital Visits of breathing difficulties, same day or post 2 days of Blast complaints since 2007 identifies the Mine Blast Markers for this analysis.

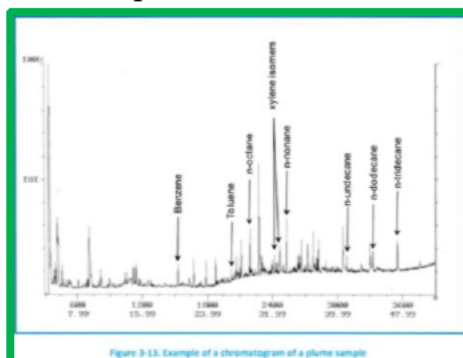


Figure 3-13: Example of a chromatogram of a plume sample

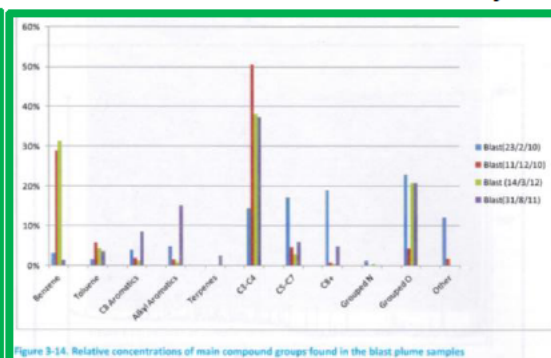
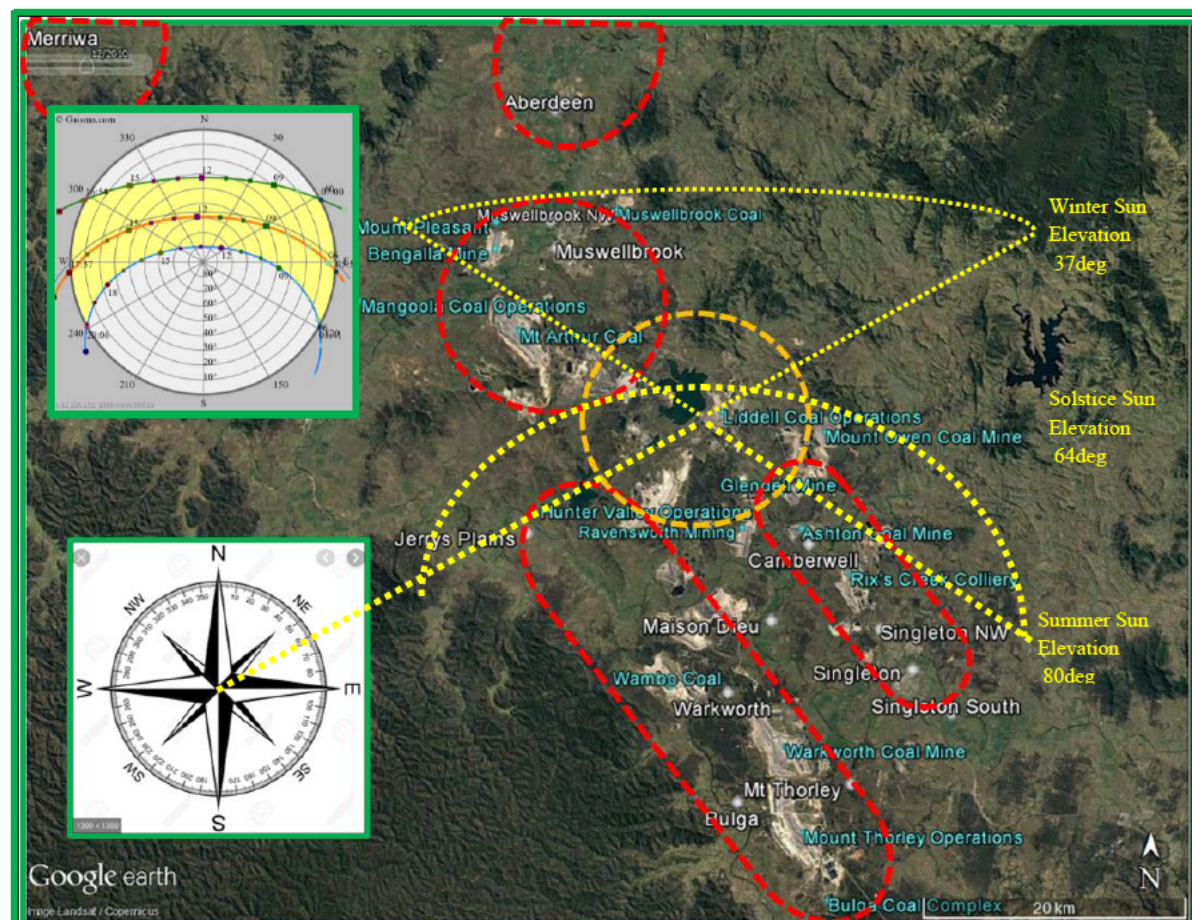


Figure 3-14: Relative concentrations of main compound groups found in the blast plume samples

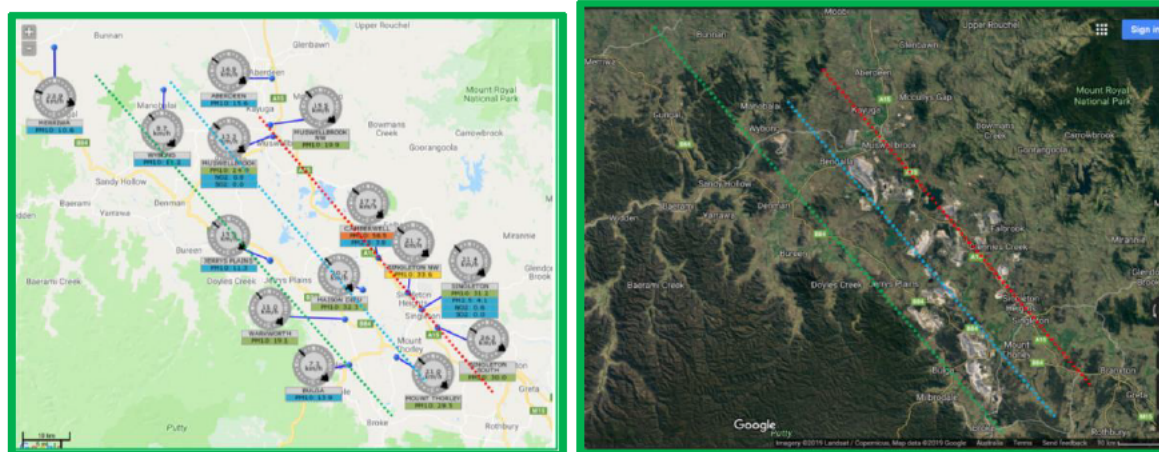
ACARP Project C18034 Emissions from Blasting in Open Cut Coal Mining June 2013

- ✓ Expand the role of UHAQMN to provide a set of “**Air Pollution Mitigation Control Operations Displays**” that monitor, minute by minute and Alarm, the impending approach of **Accumulated Valley Air Pollution Expanse Pockets (Figure MD1&2)** to Mine Operations as they Drift towards Individual Mine Sites where elevated Resident’s Exposures downstream of these Mines currently show as UNAQMN PM10 exceedances.

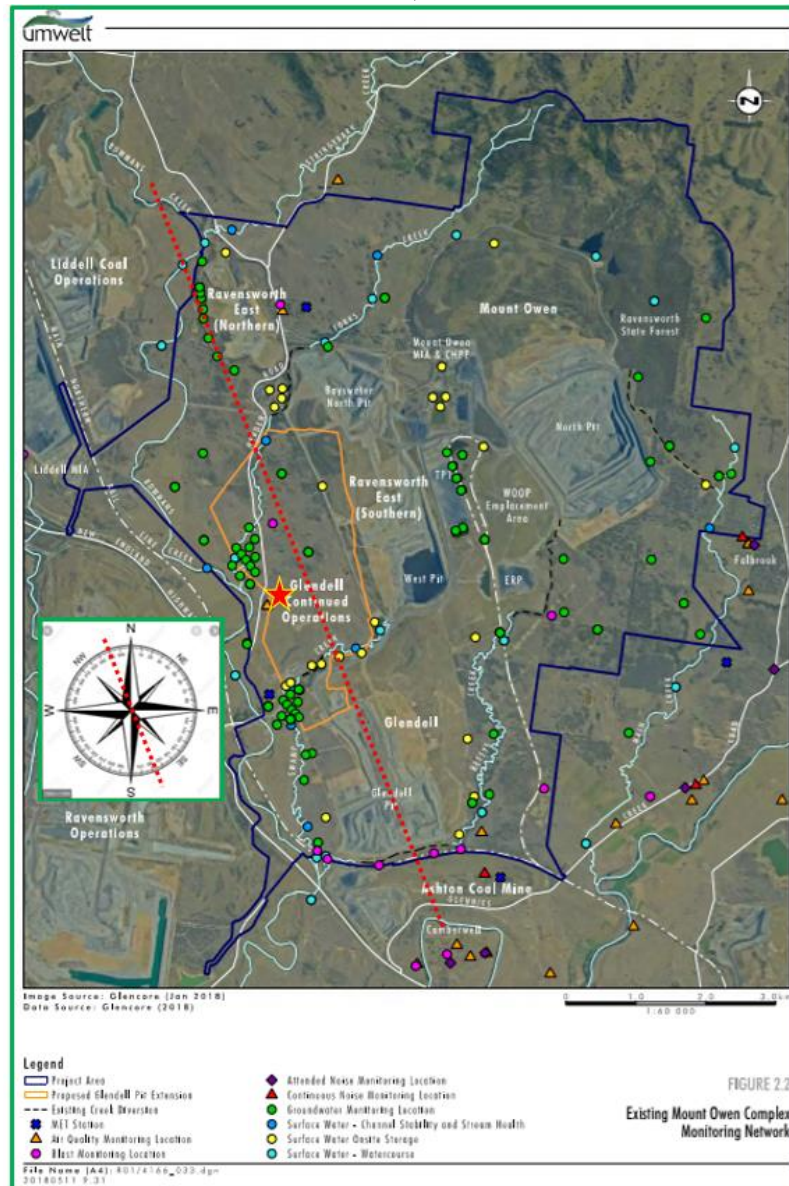


2010 & 2016 UHAQMN review Dec 2016, Illustration of the Six Air Pollution Expanses

Figure MD1 with Solar Exposure orientation



- ✓ Incorporate Mine Control Centre, Red, Amber & Yellow Alarms designed to alert Mine Controllers for the progressive Shutdown of Mining Operations as “Valley Cumulative Air Pollution Expanses” should they Drift across individual Operating Mines, that would yield at downstream UHAQMN Monitors Daily Average 50ug/m3 PM10 NEPM standard exceedances; and or exceed a 1 Hour Average of say 75ug/m3 PM10. Incorporate the “NEPM “Goal of reducing the 1 Year and 24 Hour PM2.5 Standard from 8 to 7ug/m3 and 25 to 20ug/m3, respectively by 2025”.
- ✓ Expand the role of UHAQMN to provide Mitigation Control protection for Camberwell Resident’s excessive UHAQMN PM10 & PM2.5 Exposure by the inclusion of a sigma theta composite Met Station, with PM10 & PM2.5 continuous Monitoring just North West of Glendell Mine to provide for Ravensworth, Mt Owen – Glendell Mines Progressive Shutdown Mitigation Controls. (also, Rixs Creek Mine South East of Camberwell)



- ✓ Provide [All of Mine Region Pollution Mitigation Options](#) to address Upper Hunter Valley Resident's Cumulative Pollution Exposures, including the Power Stations Plume Dispersion Stability contribution to the observed poor Pollution Dispersion UHAQMN Trends. The formation of "*Six Valley Haze and Mine Dust Drifting Pollution Expanse Pockets*" that Drift across Operating Mines, are evidenced as UHAQMN occasional Daily exceedances on Camberwell, Maison Dieu, Jerrys Plains and Singleton Residents, and their associated Disease Impacts.
- ✓ [Standardise Individual Mine Air Quality Environmental Control Centres Facilities to continuously Monitor and Mitigate by responding to Three Stage Alarming – Red, Amber, Yellow](#) to address Singleton Shire Resident's 2019 Concerns related directly to take into account the *Cumulative Disease Impact* from Open Cut Mining for each of the following Health Concerns in Priority Order: 1. Air Pollution at ground level Exposure & Disease, 2. Mine Low Frequency and Character Noise & Vibration with sleep disruption 3. Water Contamination incl Rainwater Tanks, and 4. Sense of Place & Social Impact and dislocation.

Objectives Stage 1 by 2020

Priority 2

- ✓ [Develop Operational Alarms by the analysis of UHAQMN 2012-2019 1 Hour PM10 Data](#) so that Mines can continuously trace their Air Pollution Drifting Patterns from their Emission sources, and understand the Air Pollution Drifting Patterns both entering and exiting their Mine leases, and especially Cease Operations where any Resident Localities impacted by these changing Air Pollution Drifting Patterns are exceeding NEPM guidelines.
This extends The EPA Spring 2017 trial defined high dust risk as a 24 hour average increment of PM10 between Merriwa and Singleton of 25µg/m3 or more. Mines also recorded PM10 upwind and downwind of each mine site during the trial, and the mass of material moved at each mine on each day. This was a measure of the level of activity at each site. Mines will complete optimisation of mine-operated monitors by 1 September 2017, establishing continuous PM10 monitoring, unwind and downwind of mining activity.
- ✓ [Establish Miners & Community Education Training Regime focusing upon Community Health and Individual Mine Mitigation connectivity to their Near Neighbour Resident's Exposure](#) to Drifting Mine Air Pollution associated WHO Human Disease Propensity "KPI's", with PM10 the indicator of Mine Dust intensity; PM10-2.5 (Coarse) from Blasting, Fugitive Emissions, Draglines, Shovels & Dump Trucks with WHO Disease Impacts; PM2.5 (Fine) WHO Disease Impacts; PM2.5 – PM1 – PM0.1 Diesel Exhaust & Aerosols WHO Disease Impacts; PM0.1 Nano Diesel Particles Disease Impact; Gases, CO, NOx, SOx, O3, PAH's, etc; Vapours, Moulds & Spores.

[Minerals Council Air Video https://youtu.be/q4TojwxKVRQ](https://youtu.be/q4TojwxKVRQ)

Some references suggest the following PM size distribution of Airbourne Particulate matter from Mining is associated with certain pathway penetration Health Risks.

PM size	Airbourne Dust Size Distribution		Dust Mass Distribution	
	PM %	Pathway Penetration	Mass %	Mass Size umetres
PM50	55%	Inhalable fraction	90%	90.4 (PM90)
PM10	20%	Fine fraction	50%	21.4 (PM20)
PM4	5%	Respirable fraction	10%	4.5 (PM4)
PM2.5	1%	High risk, children & CNSLD suffers		

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27/10/2010

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- ✓ Develop Pollution Mitigation Strategies to address the Community Representative Report:-
 - “ Air Quality and living with coal mines: insights from the Bulga community”
 - Mr Krey the Community Member of Upper Hunter Air Quality Advisory Committee reported in the 22nd November 2018 meeting:
 - The main objective of air quality management is to protect human health and it is a basic human right to breathe clean air and live in a healthy environment.
 - Coal mining is the main source of air particles in NSW. PM10 levels increased at most Upper Hunter sites during the past three years. Annual PM2.5 is consistently above the benchmark in Muswellbrook and is nearing the benchmark in Singleton.
 - Mines seem unwilling to accept responsibility for Hunter air quality, Local government should be more vocal in raising concerns about air quality. State government is not trusted to regulate air quality. The Upper Hunter Mining Dialogue has not produced results. OEH's categorisation of air quality is misleading because there is no safe level of particulate matter.
 - Mr Krey suggested that the committee be more active in making recommendations on how to reduce air pollution in the Hunter Valley. He suggested debating and making recommendations on the following issues:
 - Local EPA compliance officers.
 - Using drones for mine surveillance.
 - Mine and power station expansion.
 - Complaint responses.
 - Involvement of mining representatives to recommend ways to reduce pollution.
 - Increased mine rehabilitation.
 - Back-filling mine voids.

Days above benchmark concentrations

There were 29 days over the PM₁₀ benchmark in winter 2018, with sites closer to mines recording the highest number of days. There were two days over the PM_{2.5} benchmark in winter 2018.

Table 1 Number of days above the relevant national benchmarks – winter 2018

Station type*	Station	PM ₁₀ daily [50 µg/m ³ benchmark]	PM _{2.5} daily [25 µg/m ³ benchmark]	SO ₂ hourly [20 ppbm benchmark]	SO ₂ daily [8 ppbm benchmark]	NO ₂ hourly [12 ppbm benchmark]
Population centre	Aberdeen	0	-	-	-	-
Population centre	Muswellbrook	4	2	0	0	0
Population centre	Singleton	3	0	0	0	0
Smaller community	Bulga	1	-	-	-	-
Smaller community	Camberwell	19	0	-	-	-
Smaller community	Jerrys Plains	0	-	-	-	-
Smaller community	Maison Dieu	9	-	-	-	-
Smaller community	Warkworth	1	-	-	-	-
Smaller community	Wybong	2	-	-	-	-
Diagnostic	Mount Thorley	15	-	-	-	-
Diagnostic	Muswellbrook NW	1	-	-	-	-
Diagnostic	Singleton NW	6	-	-	-	-
Background	Merriwa	1	-	-	-	-
Background	Singleton South	3	-	-	-	-

µg/m³ = microgram per cubic metre and ppbm = parts per hundred million by volume (i.e. parts of pollutant per hundred million parts of air)
- = not monitored. * For explanation, refer to the end of the report Definitions. Upper Hunter monitoring station types.

There were 13 days over the PM₁₀ benchmark in autumn 2019, with all sites recording days over the benchmark. There were no days over the PM_{2.5} benchmark in autumn 2019.

Table 1 Number of days above the relevant national benchmarks – autumn 2019

Station type*	Station	PM ₁₀ daily [50 µg/m ³ benchmark]	PM _{2.5} daily [25 µg/m ³ benchmark]	SO ₂ hourly [20 ppbm benchmark]	SO ₂ daily [8 ppbm benchmark]	NO ₂ hourly [12 ppbm benchmark]
Population centre	Aberdeen	2	-	-	-	-
Population centre	Muswellbrook	3	0	0	0	0
Population centre	Singleton	2	0	0	0	0
Smaller community	Bulga	2	-	-	-	-
Smaller community	Camberwell	8	0	-	-	-
Smaller community	Jerrys Plains	2	-	-	-	-
Smaller community	Maison Dieu	3	-	-	-	-
Smaller community	Warkworth	4	-	-	-	-
Smaller community	Wybong	2	-	-	-	-
Diagnostic	Mount Thorley	10	-	-	-	-
Diagnostic	Muswellbrook NW	3	-	-	-	-
Diagnostic	Singleton NW	5	-	-	-	-
Background	Merriwa	3	-	-	-	-
Background	Singleton South	4	-	-	-	-

µg/m³ = microgram per cubic metre and ppbm = parts per hundred million by volume (i.e. parts of pollutant per hundred million parts of air)
- = not monitored. * For explanation, refer to the end of the report Definitions. Upper Hunter monitoring station types.

Objectives Stage 2

Priority by 2030

- ✓ Develop Mitigation Controls for all Mining Operations to meet evolving WHO Guidelines & NEPM Standards using a “*Mine Surrounding PM10 & PM2.5 Networks Day & Night Patrols alongside Noise Alarm Patrols*” for each Near Neighbour Resident’s Protection, or otherwise at 30degree quadrants. Specifically, cater for the 1 Year & 24 Hr PM2.5 Standards lowering from 8 to 7 ug/m3 and 25 to 20 ug/m3 respectively by 2025.
- ✓ Evaluate Mine and Valley Cumulative Air Pollution consecutive days of accumulated “Valley Haze and Mine Dust Drifting Expanses” by Analysis for the 2012 – 2019 Years of UHAQMN 10 Minute to 1 Hour PM10 & PM 2.5 Data Patterns, and establish Mine Mitigation Options by [Prediction and Reactive Mitigation Control coordinated across all Mining Sites to achieve Valley wide NEPM Standards Compliance](#). Pollution Expanse Pockets already considered are: NW Valley Cassilis to Merriwa, NE Valley Scone to Aberdeen, North Muswellbrook Region, Central Power Station Region, SE Corner Camberwell to Singleton South, and SW Corner 5 Mines Region. **(Figure MD1)**
- ✓ Develop detailing for [Mine Control Centre Alarm Displays \(15 Minute based\) at Individual Mines referencing the Location Direction and Distances of their Near Neighbours Residents](#), Wind Drifting Pathways, Dispersion Stability, with three stage Pollution Mitigation Alarms based on the extent that PM10 values exceed 50ug/m3 PM10 and 25ug/m3 PM2.5 for any contiguous 24 Hr period at Residents localities throughout the Upper Hunter Valley; Analysis of Particulate Monitors 1 Hour and Rolling 24 Hour Particulate Matter of the UHAQMN 2012 – 2019 Years and all other individual Mine Particulate Monitors.
- ✓ Evaluate the [Mine Mitigation Option for Mines to continuously at 5 or 10 Minute intervals, Pathway Trace and Control by reducing](#) their Air Pollution Drifting Patterns at Mine Emission Sources; their Air Pollution Dispersion Patterns both entering and exiting their Mines; and especially Cease Operations where at any Resident Localities they are known to be impacted for one hour by any changing Air Pollution Drifting Patterns that exceeding say 75ug/m3 PM10 one hourly Average exiting the Mine.
- ✓ [Expand the role of UHAQMN to provide Mitigation Control protection for the entire Upper Hunter Valley impacted by Coal Mining and Coal fired Power Stations](#) by the inclusion of a sigma theta composite Met Stations, with PM10 & PM2.5 continuous Monitoring at all sites; adding Cassilis, Scone, Denman, Broke, Glendon Brook and Cessnock for Residents Air Quality protection. Incorporate Singleton (Defence), Cessnock & Scone Airports, Merriwa (Roscommon), Murrurundi Gap, and Mt Pleasant Public-School Met Stn. Sites.

- ✓ Develop **Modern Dispersion Visualisation Real Time Displays and Dispersion Parameter Studies** to reintroduce the Data Intelligence to the Movement of Mine Pollution from Sources to Dispersion, and to provide the basis for the development of Real Time Air Pollution Dispersion Characterisation Studies.

Hunter Valley Coal Mining Air Pollution Dispersion (Concept)					
Air Pollution Dispersion	HIGH A D		Medium		LOW G
SEASON	SUMMER Nov Dec Jan		Feb Oct	Mar Sept	Apr Aug WINTER May June July
Time of Day DST +4Hr	3Pm 7pm	Noon 4Pm			Night
Air Temperature	45°C	38°C			Day Minimums
Solar Radiation	A HIGH Mid afternoon		Medium D		LOW G Cloudy
Sun Elevation	Summer 80 deg		Solstice 64 deg		Winter 37 deg
Local Wind Speed	>5m/sec Horiz. Dispersion		D 2-3m/sec		Still/ CALM G
Turbulent Boundary Layer	A Therm Updraft 1000m Layer				Near Ground 100m Layer
Recent Rain Events	DRY				➤ mm/Hr in last 8 Hr
Elevation Gradient	Deep Mines Valleys & Cliffs		Stockpiles Orientation to N		Flat Plains
Surface Drifting	>6m/sec Horiz Dispersion				CALM
Air Stability Class	Instability A		Neutral D		Stability G
					Horiz./Vertical Drift Balanced in Class D

- ✓ Expand the role of UHAQMN to provide NSW Health Disease Risk Evaluation at Muswellbrook, Singleton and Cessnock for Ozone, and PM1.0 with PM2.5 referenced continuous Monitoring and Particle Filter Particulates Microscopy and Composition, especially for Diesel Particle Emissions, Elementary Carbon, Nanoparticles and Substance Type Analysis.

Diesel exhaust particles are primarily composed of elemental carbon, with a smaller proportion of organic carbon and toxins (such as PAH and nitro-PAH, aldehydes, ketones and heavy metals) ad/ab-sorbed to the primary (amorphous elemental carbon) particles. Many of these components are created through incomplete fuel combustion and unburned engine lubricating oil. Particulate matter PAH's, aldehydes and ketones are implicated as major contributors towards diesel exhausts carcinogenic effects.

Application of Modern Technology & Science to Dispersion

Our Holistic investigations into the establishment of Power Stations and Open Cut Coal Mining in the Hunter Valley – a decision in 1981 related to the expanded role of NSW Electricity Commission in exploiting of Coal Resources for sale and to reduce the Cost of Electricity Generation in NSW.

Unearthed in the investigations was the need for the Australian University to show that Mining, Power Stations and Aluminium Smelters Air Pollution could be Dispersed upward into the atmosphere in the somewhat enclosed Hunter Valley. While this USEPA based Air Pollution Dispersion Modelling is still used for Mine Approvals and Residents Acquisition Rights, the understanding has not progressed beyond that approach.

Modelling however is based upon their Fixed location Meteorological reference Data, which has little provision for the subsequent horizontal downwind Drifting Air Dynamics that unfolds as Pathways across the contours of mine leases and over Near Neighbour properties.

Certainly, the use of Minute to Minute Real Time Mine Air Pollution Drifting Visualisation is much closer to the reality of the Pathways that result; seen in Resident's Complaints, and even a casual inspection of the UHAQMN Maps over time – exposes that "Dispersion into the Atmosphere" is indeed the heart of the problem.

Stability class is used to determine the rate at which the Air Pollution "Plume" disperses by growth by the process of Turbulent Mixing.

Modern Dispersion Visualisation Displays and Dispersion Parameter Studies in Real Time proposed here would reintroduce the Data Intelligence to the Movement of Mine Pollution from Sources to Dispersion. i.e. Actual Measurements compared to Modelling!!!

What has been gleaned so far from UHAQMN Data and OEH Reports since 2011?

Traditionally Mines rely upon Air Pollution Dispersion updraft by Thermals into the Atmosphere or Buffer Zones for Horizontal Dispersion; however without Buffer Zones the UHAQMN Data indicates that Dispersion occurs Horizontally across Near Neighbours downwind and/or Accumulates in Still and/or Sunless Conditions.

Proposed here are Mine Control Displays that Monitor and Alarm for High, Medium and Low Mine Dispersion Status Conditions based on each of the following Parameters for example:- Season, Time of Day Diurnal, Air Temperature Diurnal, Local Wind Speed, Solar Radiation Flux, Recent Rain events, Topography, Emission Source Elevation and Turbulent Boundary Layer.

Dispersion physical parameters that are measured directly by instrumentation and can be Displayed and Alarmed, include Surface and Air temperature, dew point, wind direction, wind speed at 10m, cloud cover, cloud layer(s), ceiling height, visibility, current weather, precipitation, Diurnal cycle, Sunrise to Sunset Solar Radiation, Night and cloud cover, Seasonal variations- Low May to July, and High Nov to Jan.

"Higher, more positive values of surface heat flux (classes A to C) indicate the presence of upward thermal air currents, which aid a real dispersion.

Comparably lower and negative values of surface heat flux (classes E to G) prevent the particulate plume from rising into the atmosphere and restrict areal dispersion".UK Appleton 2006

Air Pollution, Emissions and Health Background

World Health Organisation Precautionary Guidelines for Human Exposure to Air Pollution Disease Impacts, emerged after 40 years of Medical Research in October 2013 – “*There is no evidence of a safe level of exposure or a threshold below which no adverse health effects occur- it is necessary to reduce health risk to a minimum*”; while in the Hunter Valley Mining Companies and the Community were being advised since 2005 that there was “*No Convincing Evidence*”.

Five Years later in 2018, NSW Authorities now spruik these WHO, IARC and Lancet Carcinogenic and Minimisation relationships between Air Quality Particulate Matter and Community Diseases associations; and now as more targeted Research occurs, the WHO review since 2016 is expected to further lower their Precautionary Guidelines which will challenge Hunter Valley Mining Operations that are imbedded within Populated Rural Localities.

The Air Pollution Particulates and Combustible Gasses Toxic Emissions Mix Dispersion rely upon suitable Atmospheric Stability in the somewhat enclosed Rural Hunter Valley; namely for Power Station Stack Emissions & Fly Ash Particulates, Open Cut Mining Blast Plumes, Diesel Exhausts, Operational Dust, Fugitive Emissions, Windblown Emissions, Highway & Railway Emissions, and the Aerobiological Calendar, all setting this area aside from all other Urban Pollution Mixes.

In the last ten years the Overall Specific Hunter Valley Air Pollution Studies, along with the WHO associated Disease Propensity References, listed below, provides the focus here for better Emission Source Minimisation Controls. Consequently, Mines will need to accept greater responsibility for the Cumulative Particulate Pollution exiting their Mines as they drift downwind at ground level over Resident’s Localities.

- NSW Chief Health Officer Expert Panel Investigations of SSHEG 2009 submission
- **World Health Organisation 2013**, “*Health Effects of Particulate Matter*”, No evidence of a safe level ... it is necessary to reduce Health Risk to a Minimum.
- **ACARP 2013**, “*Emissions from Blasting on Open-Cut Mining*”, CSIRO Energy Technology, C18034 S.Day et al, June 2012 -Blasting Plume Emissions Composition; and C22025 “*Real Time Monitoring and Prediction of Open Cut Blast Fumes*”.
- **NSW Health, OEH 2013**, “*Upper Hunter Valley Particle Characterization Study*”, Hibbard & Cohen CSIRO & ANSTO, 17 Sept 2013.
- **IARC Vol 105 2014**, “*Diesel and Gasoline Engine Exhausts and some Nitroarenes*”, IARC Monographs on the evaluation of Carcinogenic Risks to Humans.
- **NSW EPA 2014**, “*Upper Hunter Air Particle Model*” 9 Oct 2014; Pacific Env. Ltd, 2012 UHAQMN with Wind Speed, Mine & Diesel Emissions - CALPUFF.
- **Hunter New England Population Health, NSW Health Nov 2014** “*Investigating the Health Impacts of Particulates associated with Coal Mining in the Hunter Valley*”, CB Dalton, DN Durrheim, G Marks, CA Pope III, Air Quality and Climate Change Volume 48 No 4. Nov 2014 Pg. 39-43.

- SSHEG “*Rural Health Study Review July 2015*”, SSHEG to NSW Health 11 Aug 2015 including Mining Dialogue Review May 2015.
- NSW Health, EPA 2015, “*Review of the health impacts of emission sources, types and levels of particulate matter air pollution in ambient air in NSW*”, Woolcock Institute of Medical Research, Centre for Air Quality and Health Research and Evaluation (CAR); Neil Hime, Christine Cowie, Guy Marks, Dec 2015.
- NSW EPA 2018, “*Review of Coal Fired Power Stations Air Emissions and Monitoring*”, and EPA Licences Attm B, March 2018.
- M. Power Thesis 2002, “*Air Pollution Dispersion within the Tamar Valley TAS*”.
- Uni Newcastle 2018, “*The Health Burden of Fine Particle Pollution from Electricity Generation in NSW*”, Dr Ben Ewald Nov 2018.
- Woodcock Institute 2018, “*A Comparison of the Health Effects of Ambient Particulate Matter Air Pollution from Five Emission Sources*” (with listed Reference Research Table 1 & 3 illustrated)
- ✓ [Neil J. Hime](#)^{1,2,*}, [Guy B. Marks](#)^{1,3,4} and [Christine T. Cowie](#)^{1,3,4}; [Int J Environ Res Public Health](#). 2018 Jun; 15(6): 1206.
- ✓ **Extract related to Source Specific Health Impacts Page 16:** “*This review has a focus on epidemiological studies that compare different PM emission sources. However, toxicological studies in humans and research animals will help to inform the likely health effects of exposure to source-specific PM. Unlike epidemiological studies, toxicological studies have the advantage of being able to associate effects with precise exposures. Their disadvantage is that they lack the “real-world” conditions within which population relevant exposures occur. It is likely that no one study type will be able to determine the relative health effects of PM from different sources, and that only the cumulative evidence from a range of study types, each with different strengths and limitations, will provide some clarity in this area.*

Research described in this review has linked a variety of health effects to source-specific PM. However, more advanced approaches to modelling, measurement, and statistics will be required to more precisely quantify health effects attributable to exposures in the multi-pollutant atmosphere. Determination of the relative health effects of different source-specific PM will help to inform policy and regulatory strategies to reduce the public health burden of ambient PM. Enhanced understanding of these relative health effects offer the potential for better targeted public health protection than the current recommended practice of minimising exposure to total PM mass, regardless of the source”.

Table 1. Conclusions from previous reviews of the differences in the health effects of different components and sources of PM air pollution.

Reference	Study Conclusions in Relation to Health Effects of Source-Specific PM Air Pollution
[38]	The black carbon, for which vehicles and particularly diesel vehicles are a major source in urban areas, in PM might make PM from those sources the most harmful. The relative toxicity of wood smoke compared with vehicle exhaust emissions is unclear.
[29]	Current evidence does not allow a precise differentiation to be made as to which constituents or sources of PM are most closely related to specific health outcomes. However, three components, black carbon, secondary organic aerosols, and secondary inorganic aerosols may be important contributors to PM toxicity.
[39]	Current knowledge does not allow precise quantification or definitive ranking of the health effects of PM from different sources. However, some results suggest that a range of serious health effects are more consistently associated with traffic-related PM and specific metals and elemental carbon in PM.
[40]	There is a lack of information by which to differentiate the toxicity of different components of PM.
[41]	Evidence suggests that carbon components and several metals in PM are associated with health effects however it is unclear whether these components are responsible for health impacts or they are surrogates for other pollutants.
[31]	Cardiovascular health effects may be associated with PM _{2.5} from crustal or combustion sources, including traffic, but at this time, no consistent relationships have emerged. Collective evidence has not yet isolated factors or sources that would be closely and unequivocally related to specific health outcomes.
[42]	There is evidence that metals within PM affect health but considerable uncertainties about causality remain.
[43]	Evidence relating to the toxicity of inorganic components of PM _{2.5} is not consistent. Crustal components of PM _{2.5} are not likely, by themselves, to be a significant health risk.
[44]	Public health will likely be better protected by reduction of various vehicular emissions than by regulation of total PM _{2.5} mass as if all PM _{2.5} is equitoxic. However, the knowledge base is incomplete.
[45]	There is little support for the idea that any single major or trace component of PM is responsible for the adverse health effects of PM.

From previous reviews of the differences in the health effects of PM from different sources it is unclear if there is a hierarchy in the harmfulness of PM from different sources. Therefore, this current review was undertaken with the following objectives:

Table 3

Summary of PM emission sources and reported health and physiological/toxicity effects (physiological/toxicity effects includes animal studies).

Specifically traffic PM	all-cause, respiratory and cardiovascular mortality, cardiovascular, stroke and heart failure morbidity [54,55,56,57,58,70,71,72] cardiovascular toxicity and various cardiovascular effects [50,60] cytotoxicity, pulmonary inflammation [62,63]
Coal-fired power stations	all-cause, cardiovascular, respiratory, ischaemic heart disease, pneumonia, lung cancer mortality [19,34,57,58,69,70,71] respiratory morbidity [48,49,65,66,67,68,72] cardiovascular morbidity [48,49,68]
Diesel exhaust	respiratory mortality [54] lung and oesophageal cancer mortality [84,85] allergic inflammation, asthma symptoms, lung cancer [79,81,82,83] cardiovascular morbidity [72,89] cardiovascular changes indicative of increased coronary event risk, changes in lung function, nose and throat irritation [48,49,90] atopy and susceptibility to infection [98,99,100] effects on offspring from exposure during pregnancy [101,102,103]
Domestic wood combustion heaters (studies of outdoor exposure to heater emissions)	respiratory symptoms and exacerbations [109,110,111,112,113,114] cardiovascular morbidity [72] respiratory morbidity [115] compromised lung immunity, airway inflammation [112,116,117,118]
Crustal dust	all-cause and cardiovascular mortality [120,121,122,123,124] respiratory mortality(>75 years of age) [141] respiratory and COPD morbidity [127,137,138] asthma exacerbation [125,132,133,134,135,136] reduced lung function in children [151] pneumonia [142,143] lung inflammation [147,148] infectious disease [144,145,146]

Resources required

Provide a brief description of the resources required from the Dialogue to facilitate the project's success. For example, time, personnel, target groups. Detail any external financing or in-kind contributions sought.

- **Project Duration:-** Intended as a two year Dialogue Project :
One year of draft preparation of forward-thinking strategy,
Second year of Implementation Trial and review.
- **Target Groups:-** Dialogue team with the appropriate UHAQMN involvement and knowledge, and Mine Operational Environmental Control Centre involvement for Screen Display Trials of three Stage Alarms and Dispersion outcomes.
- **Project Benefit:-** Project relates directly to the integration the Mine Operational Centre Strategy to Lower the overall Air Pollution Levels, fewer UHAQMN Exceedances, and Recognition of Community Health improvements by Local GP's.
- **Requires**
 - Initial Minerals Council and Mining Dialogue agreement in principle, and
 - Connects directly with the Cumulative Health Impacts of "Air Quality and Emissions and Health"; as discussed and detailed at 2018 Annual UHMD Forum Report.

Other information

Other Information

SSHEG and Health Concerned Residents as “Near Neighbours to Open Cut Mines” are asking the Question: -

“Why after 10 years of Community detailing the observed Diseases impact of sudden exposure to Mine Air Pollution; three years NSW Health, CSIRO & ANSTO Research 2010 -2013; WHO Air Pollution & Disease Declarations Oct 2013; eight years Upper Hunter Mining Dialogue, Mines, EPA & OEH initiatives 2011- 2017; after all this combined effort; why are Singleton GP’s again reporting worsening Community Disease in 2019?”

SSHEG 10year review concludes that each individual Mine now operate, targeting not to exceed their Daily 24 Hr Average PM10 at midnight of 50ug/m³(Compliance), however their “*actual Cumulative 1&24 Hr Average PM10 that Residents are exposed too*” often range from 70 - 150ug/m³, because the Valley inflow PM10 from other upstream Mines has been conveniently ignored as inconsequential somehow! **The Cumulative Polluted Air is the so-called Healthy Air we Breathe criteria!**

Independently the World Health Organisation Scientific Advisory Committee and Expert Reviewers on Air Quality in October 2013 declared “*There is a linear Dose-Response Relationship between Particle Levels and Human Disease with No Threshold that is Safe*”; having previously in June 2012 declared “*Diesel Engine Fumes can cause Lung Cancer and belong in the same potentially deadly category as asbestos, arsenic and mustard gas*”.

It is clear that insufficient Mine Industry Pollution Mitigation Controls has adopted the precautionary guidelines of the World Health Organisation Air Pollution and Human Disease associations. Additionally, the Community identified Priority Air Quality Action List summarised in 2014 in Tables 1 & 2, has been mostly ignored.

What the Community of Singleton Shire is asking of the Mining Industry is that at all times for Resident’s PM10 not to exceed the NEPM 50ug/m³ limit, and that Mine further operate well below this upper limit to “Minimise the PM10 and PM2.5 Rate of Rise frequency” at UHAQMN Continuous Monitoring localities where Residents are being excessively exposed to Mine Air Pollution Drifting Patterns.

Therefore, both PM10 and PM2.5 Monitoring of known Mine Blast Fume & Odour Resident Localities, and other Near Neighbour Air Pollution localities now, and in the future, will become mandatory for Community Disease Protection.

What are the SSHEG 2014 Priorities

- (a) Elimination of Mine Blasting Plumes into the Atmosphere
- (b) "Near Neighbours to Mining" as "Occupationally Exposed Persons".
- (c) Air Quality Particulate Matter as 15 Minute Avg STEL based.
- (d) Holistic Air Quality Toxicity – Gases, Vapours, PM's, as STEL.
- (d) Air Quality Australian Standards – SSHEG Rural Zones Proposal

SSHEG	PM10	Annual Avg 12ug/m3,	Daily Avg 25ug/m3
Proposal	PM2.5	Annual Avg 6ug/m3,	Daily Avg 15ug/m3
(Rural)	PM10-2.5	Annual Avg 8ug/m3,	Daily Avg 20ug/m3

- (e) Scientific Biological versus Air Pollution Asthma Study
 - Pollens, Spores, Fungi, Vapours, Fragrances etc
 - Bushfires & Backburning, Forests, Grasslands, Biomass Smoke etc
 - Domestic Heaters, WoodSmoke

Mining Dialogue Meeting 17 Feb 2019

➤ Australian Air Quality Standards were subsequently lowered

Following much review and consultation, the Air NEPM, which had been last updated in 2003, was amended on 4 February 2016 with the following changes:

- The PM_{2.5} standards were upgraded to performance standards from their previous status as advisory reporting standards.
- A standard for 1-year average PM₁₀ of 25 µg/m³ was added. This complements the existing standard for 24-hour average PM₁₀ of 50 µg/m³.
- The allowance for exceedance of the PM standards on a maximum of 5 days per year was replaced by an 'exceptional event rule'. An exceptional event is a fire or dust occurrence that adversely affects air quality at a particular location; causes an exceedance of 1-day average standards in excess of normal historical fluctuations and background levels, and is directly related to bushfire, jurisdiction authorised hazard reduction burning or continental-scale windblown dust.
- A goal was added of reducing the 1-year and 24-hour PM_{2.5} standards from 8 to 7 µg/m³ and 25 to 20 µg/m³, respectively, by 2025.
- A PM_{2.5} population exposure metric was added, to be reported on annually from June 2018. Development of this metric is still in progress, but a nationally consistent approach will be used for evaluation and reporting based on agreement by participating jurisdictions.

The jurisdictions (6 states and 2 territories) monitor air quality at about 75 locations across Australia. These stations are in the major metropolitan areas and some regional centres, and are sited to measure air quality that is representative of that likely to be experienced by the general population in the region. Jurisdictions report annually on their compliance with the Air NEPM based on the data from their monitoring networks.⁴ Some jurisdictions have additional monitoring networks, such as the NSW Upper Hunter Air Quality Monitoring Network (OEH 2016), but results from these stations are not included in the above compliance reports.

Particles in ambient air range in diameter from approximately 0.001 micrometres (μm) to about 30 μm . Figure 2-1 shows the size range of typical particles and gas dispersoids (Lapple, 1961).

ICC 8 - 4 FRASER ET AL.: VARIATION IN COMPOSITION OF DIESEL PARTICLE EMISSIONS

Table 5. Molecular Composition of Organic Particulate Matter Emitted From Four Diesel Vehicles Under Load and for a Compositd Idle Sample^a

Compound	HEB 7242	HEB 7238	Idle	Metro	School
<i>n-Alkanes</i>					
n-heptadecane	420	480	680	3560	1120
n-octadecane	430	650	1240	3260	2100
n-nonadecane	960	820	2210	6160	4740
n-cicosane	1820	1500	3670	6300	11910
n-hencicosane	2750	2850	5950	6610	12500
n-docosane	2400	2860	4290	5750	7060
n-triacosane	1410	1760	2390	4260	3410
n-tetracosane	950	1210	1420	3250	1730
n-pentacosane	760	870	940	2510	1100
n-hexacosane	nd ^b	200	460	1480	400
n-heptacosane	nd	nd	290	950	150
n-octacosane	nd	nd	200	730	nd
n-nonacosane	nd	nd	160	450	nd
n-tricontane	nd	nd	nd	380	nd
<i>Petroleum Biomarkers</i>					
18 α (H)-22,29,20-trisnonohopane	210	200	140	110	160
17 α (H),21 β (H)-29-norhopane	850	760	430	240	720
17 α (H),21 β (H)-hopane	650	550	310	310	540
22R + S, 17 α (H),21 β (H)-30-homohopane	330	280	150	nd	190
22R + S, 17 α (H),21 β (H)-30-bisohomohopane	240	210	110	nd	150
20R + S, 5 α (H),14 β (H), 17 β (H)-cholestane	80	90	90	70	210
20R, 5 α (H),14 α (H), 17 α (H)-cholestane	50	30	40	60	120
20R + S, 5 α (H),14 β (H), 17 β (H)-ergostane	50	60	20	40	110
20R + S, 5 α (H),14 β (H), 17 β (H)-sitostane	70	70	60	50	190
<i>Oxygenated PAH</i>					
9(H)-fluoren-9-one	150	150	110	830	170
9H-xanthen-9-one	30	20	40	100	80
<i>Polycyclic Aromatic Hydrocarbons</i>					
Fluoranthene	87	115	43	525	53
Acphenanthrylene	18	31	1	4	4
Pyrene	214	283	71	471	130
Benzo[ghi]fluoranthene	16	15	8	24	18
Benzo[a]anthracene	12	13	91	137	70
Chrysene/triphenylene	24	28	117	161	100
Benzo[k]fluoranthene	11	7	153	160	128
Benzo[b]fluoranthene	8	7	134	168	113
Benzo[c]pyrene	2	nd	4	15	4
Benzo[a]pyrene	8	8	142	179	125
Benzo[ghi]perylene	9	8	177	284	161

^aCompound emissions are in ng compound per mg OC.

^bThe abbreviation nd stands for not detected.

Compound Emissions (ng per mg OC)

Real-World Particulate Matter and Gaseous Emissions

Table 5. Emission Factors from LD and HD Vehicles of Key Species from IMPROVE Samplers Along with Regression Uncertainty

Species	LD Emissions \pm SE (μ g/mi)	HD Emissions \pm SE (μ g/mi)
Hydrogen	2,090.38 \pm 1079.05	9,367.45 \pm 4,835.43
Sodium	3,834.55 \pm 337.84	-660.72 \pm -58.21
Magnesium	467.31 \pm 285.34	819.71 \pm 500.52
Aluminum	875.11 \pm 650.56	-124.71 \pm -92.71
Silicon	1,188.34 \pm 1,197.10	1,407.12 \pm 1,417.49
Sulfur	1,881.85 \pm 1,067.94	430.14 \pm 244.10
Chlorine	899.05 \pm 791.57	3,782.46 \pm 3,330.27
Potassium	443.17 \pm 593.33	834.52 \pm 1,117.27
Calcium	449.83 \pm 258.28	1,127.95 \pm 647.65
Titanium	83.29 \pm 36.31	402.00 \pm 175.23
Vanadium	11.99 \pm 8.53	14.23 \pm 10.13
Manganese	644.04 \pm 200.52	4,454.68 \pm 1,386.93
Iron	335.06 \pm 145.40	3,194.28 \pm 1,386.13
Copper	23.70 \pm 29.56	141.62 \pm 176.63
Zinc by XRF	73.23 \pm 49.07	219.86 \pm 147.34
Mercury	2.75 \pm 0.72	18.03 \pm 4.71
Lead	17.74 \pm 12.28	59.75 \pm 41.37
Selenium	17.72 \pm 9.44	-78.12 \pm -41.60
Bromine	-1.22 \pm -1.08	25.51 \pm 22.60
Strontium	-3.13 \pm -1.05	60.79 \pm 20.48
NH ₃	55.13 ^a \pm 29.21 ^a	42.62 ^a \pm 22.58 ^a
EC	5.32 ^a \pm 1.91 ^a	296.17 ^a \pm 106.47 ^a
OC	4.55 ^a \pm 1.75 ^a	179.84 ^a \pm 69.13 ^a

^a Measured in mg/mi.



Glenda Project – Weatherpak Ground Station

Coastal Environmental Wireless HazMat Weather Station



Sigma Theta Overview

Frank Pasquill took the next step, and determined levels of Sigma Theta for differing degrees of atmospheric stability. He created a seven tiered system from "A" to "G", where Class "G" reflects the most stable atmospheric condition, to Class "A" which reflects the highest level of atmospheric in-stability.

His results are shown in the table below:

Stability Class	Description	Definition
1	A	Extremely Unstable
2	B	Moderately Unstable
3	C	Slightly Unstable
4	D	Neutral
5	E	Slightly Stable
6	F	Moderately Stable
7	G	Extremely Stable

Based on this Stability Class table, we can now make determinations of atmospheric stability based on ground station data and not have to rely on balloon launched radiosondes, or rocket launched payloads.

Table 8. DEFINITION OF THE PASQUILL ATMOSPHERIC STABILITY CATEGORIES

Surface wind speed at 10 m (m/s)	Day			Night	
	Incoming solar radiation			Thinly overcast or	≤3/8 Cloud cover
	Strong	Moderate	Slight	≥4/8 low cloud cover	
<2	A	A-B	B		
2-3	A-B	B	C	E	F
3-5	B	B-C	C	D	E
5-6	C	C-D	D	D	D
>6	C	D	D	D	D

SOURCE: Pasquill, 1961.

Note: Types a, b, and c are associated with strong, moderate, and slight instability, respectively; type d corresponds to a neutral lapse and should be assumed for overcast conditions during day or night; and types e and f are associated with slight and moderate inversions, respectively.

each stability class corresponding to the six classes defined by Pasquill (1961). The surface roughness is also considered. It is expected that this parameterization is more appropriate than the Pasquill values for distances between 1 and 50 km. The horizontal dispersion coefficient, σ_y (m), for rural conditions is calculated for the downwind distance, x (m), using the formula

$$\sigma_y = \alpha x (1 + 0.0001x)^{0.5} \quad (II-4)$$

The vertical dispersion coefficient, σ_z (m), for rural conditions is calculated using the formula

$$\sigma_z = p x (1 + qx)^f \quad (II-5)$$

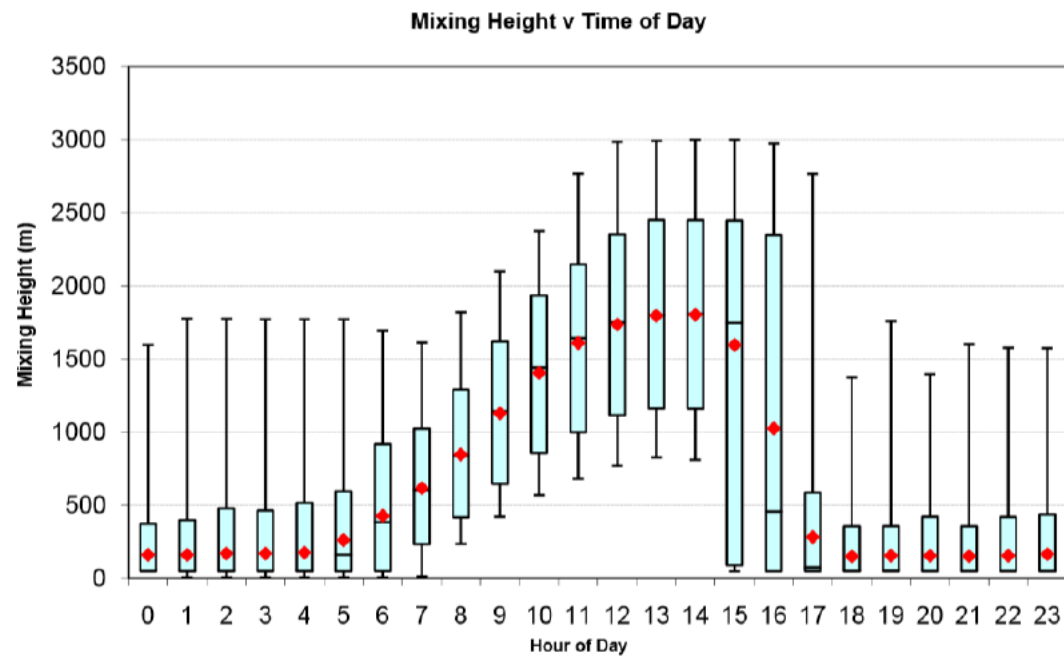
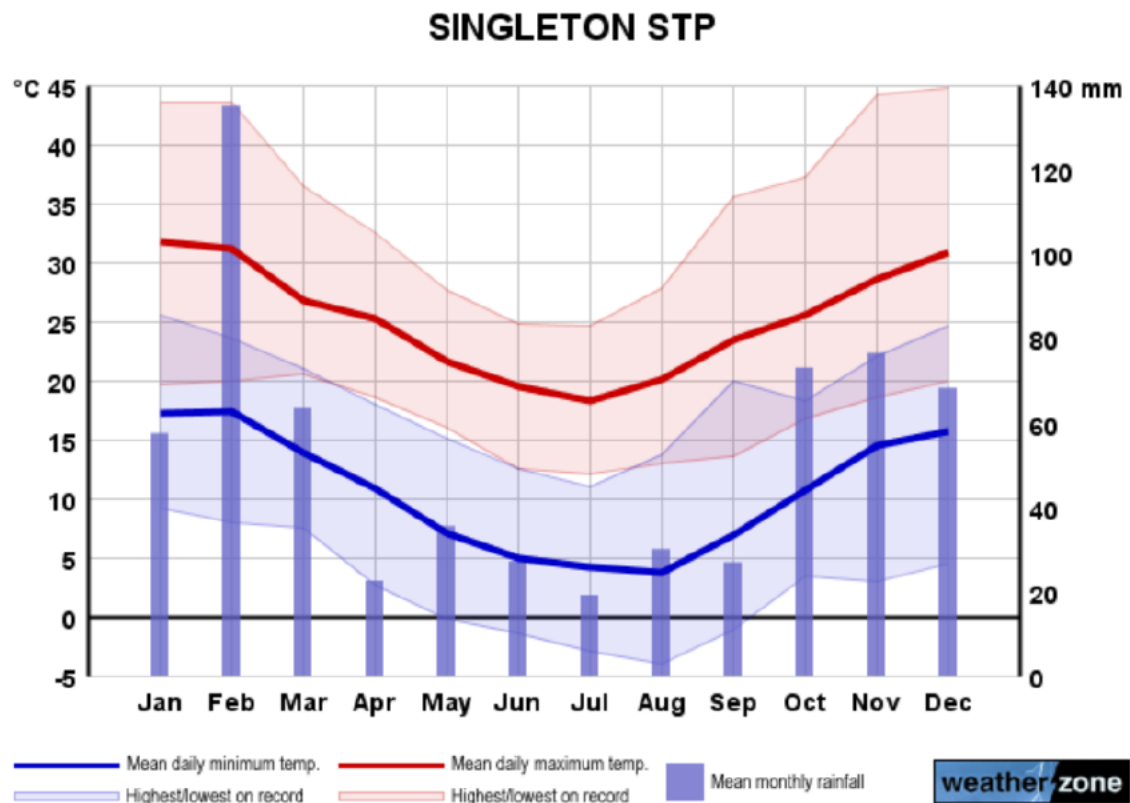


Figure 5.5: Mixing Height by Hour of the Day (generated by CALMET)

Maules Creek PAE Holmes 2011

Singleton Annual Temperatures & Rainfall



2002 to 2017 Records

Table 7 provides an abbreviated summary of stack test results for select pollutants, reviewed for the period 2011-2016. A full summary table of results is included in section 3 of Attachment C.

Table 7: Maximum and average reported results of air pollutants from stack sampling reports (2011-2016)

		Solid Particles (Total) (mg/m ³)	Total Fluoride (mg/m ³)	Sulfuric Acid Mist (H ₂ SO ₄ as SO ₃) (mg/m ³)	Mercury (mg/m ³)	NO _x (as Equivalent NO ₂) (mg/m ³)	Hydrogen Chloride (mg/m ³)	Chlorine (mg/m ³)
Bayswater	Licence Limit	100	50	100	1	1500	100	200
	Average	15	13	13	0.0014	659	13	19
	Max	68	54	55	0.0053	940	24	200
Liddell	Licence Limit	100	50	100	1	1500	100	200
	Average	24	11	9	0.0004	724	14	0.04
	Max	58	17	58	0.0015	930	28	0.20
Mount Piper	Licence Limit	50	50	100	0.2	1500	100	200
	Average	11	6	21	0.0010	767	1	1.3
	Max	39	11	120	0.0019	1200	2	13
Eraring	Licence Limit	50	50	100	0.2	1100	100	200
	Average	9	10	11	0.0010	415	4	0.40
	Max	19	32	68	0.0022	593	13	1.8
Vales Point	Licence Limit	100	50	100	1	1500	100	200
	Average	2	3	15	0.0012	881	4	1.1
	Max	7	12	42	0.0078	1099	8	3.8

Notes:

- Cells in bold text exceeded the EPL concentration limit.
- Emission limits in italics.

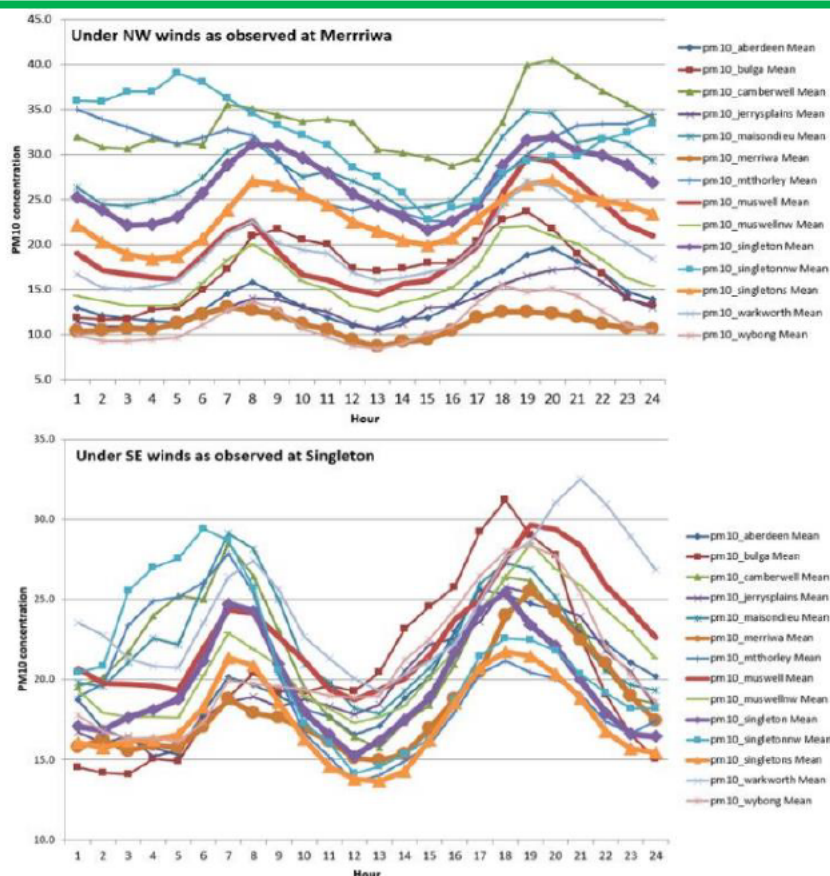


Figure 25: Diurnal variations of PM₁₀ concentrations by site under NW and SE wind conditions. The curves for Singleton, Singleton South (singletons), Muswellbrook (muswell) and Merriwa are highlighted with thicker lines

NSW OEH Report Aug 2017 ISBN 978-1

Real Time Air Quality Triggers

This section refers to Real Time air quality trigger levels. The real time air quality monitors have been setup to record directional dust sources. Alarms have been set up to trigger when one the following criteria is exceeded. The criteria are summarised below:

- Yellow Dust Alarm
 - Short Term Trigger is a site specific contribution 30 mins rolling average greater than 80 $\mu\text{g}/\text{m}^3$;
 - Long Term Trigger is a site specific contribution 24-h rolling average greater than 40 $\mu\text{g}/\text{m}^3$;
- Orange Dust Alarm
 - Short Term Trigger is a site specific contribution 1-h rolling average greater than 80 $\mu\text{g}/\text{m}^3$; or
 - Long Term Trigger is a site specific contribution 24-h rolling average greater than 45 $\mu\text{g}/\text{m}^3$.
- Red Dust Alarm
 - Short Term Trigger is a site specific contribution 1-h rolling average greater than 200 $\mu\text{g}/\text{m}^3$; or
 - Long Term Trigger is a site specific contribution 24-h rolling average greater than 50 $\mu\text{g}/\text{m}^3$.

Singleton Shire Healthy Environment Group

“Response to IPC Rixs Creek Report Aug 2018”



A community-based group looking to address Environmental issues affecting Singleton Shire residents

P.O. Box 626

Singleton NSW 2330

ssheg@hotmail.com

Author: Dr Neville Hodkinson PhD

We seek identification as to what is making our Children and Community Sick so they can be mitigated by OH&S Compliance Orders.

SSHEG Focus on Health

SSHEG is Not Anti Mining or Anti Power Stations

Independent Planning Commission NSW
Level 3, 201 Elizabeth St.
Sydney NSW 2000
[Email: ipcn@ipcn.nsw.gov.au](mailto:ipcn@ipcn.nsw.gov.au)

“Rixs Creek Continuation of Mining Project SSD 6300”


Clearly the Independent Planning Commission to be truly Independent needs Specialist Health & Coal Industry Pollution Disease Expertise in order to adjudicate, especially for “Near Neighbours to Open Cut Coal Mines – McDougalls Hill, Singleton Heights, Country Acres Caravan Park”.

Thus, SSHEG calls for a Culture Change to “*Minimise Mine Air Pollution Emissions at their every source*”, and referencing 15 Minute PM10 and PM2.5 Real Time Monitoring at specific Resident Localities for Mitigation.

The 28th August 2018 IPC Report for Rixs Creek Continuation 2015 demonstrates that NSW Health[#] is insisting upon “*Mitigation of impacts below traditional acquisition zones*“, while the mine to gain approval is simply trimming its Coal Mining Rate to fall below the already outdated Evaluation Modelling Guidelines and NEPM WHO 2005 based Standards.

SSHEG Community Healthy Living focuses upon Mine Pollution Disease Impacts on Residents - breath by breath; insisting that mines Mitigate Pollution by “*Minimising to World Health Organisation ongoing identified Guidelines*” over each 15 Minute period, of Cumulative Locality readings for PM10 and PM10-2.5 & PM2.5: **That is the Healthy Air we Breath criteria!**

Hunter New England Local Health District
Hunter New England Population Health
Direct Contact Details
Phone: (02) 49246395 Fax: (02) 49246215
Email: david.durrheim@hnehealth.nsw.gov.au



Health
Hunter New England
Local Health District

#

29 June 2018

Ms Genevieve Seed
Senior Planning Officer
Resource Assessments | Planning Services
NSW Department of Planning and Environment
320 Pitt Street | GPO Box 39 | Sydney NSW 2001

Dear Genevieve

Re: RIX'S CREEK COAL MINE CONTINUATION OF MINING PROJECT SSD 6300 - RESPONSE TO REVISED RESPONSE TO SUBMISSIONS

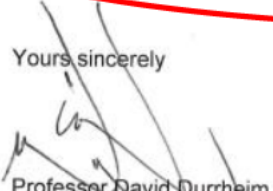
We understand that the Independent Planning Commission have sought further clarification as to whether NSW Health's concerns with regard to air quality have been addressed in the proponent's response to submissions and revised response to submissions.

Further review of Appendix H has revealed that the new NEPM air standard for annual average PM10 of 25 $\mu\text{g}/\text{m}^3$ is not predicted to be exceeded in the residential areas immediately north of Singleton are but at least one residence is predicted to reach 25 $\mu\text{g}/\text{m}^3$ and many other residences will be in the vicinity of the goal due to incremental emissions from Rix's Creek and existing air pollution from surrounding mines. Many private residences that are not in the acquisition zones within McDougall Hill and Singleton Heights will have significantly increased predicted daily PM10 impacts from the mine – many with an incremental average 24 hour PM10 impact of 20 to 30 $\mu\text{g}/\text{m}^3$ (Appendix H, Table 3). The cumulative impact at the Country Acres Caravan Park is predicted to exceed the NEPM average 24 hour PM10 goal of 50 $\mu\text{g}/\text{m}^3$ (Appendix H, Table 6, Figure 3 and 4 - noting that the tolerance of 5 days of exceedance of the goal per annum has been removed from the revised NEPM). There are also incremental impacts in mine owned residences and residences subject to acquisition.

While the EIS focuses on assessment criteria we note that there is no evidence of a threshold below which exposure to particulate matter (PM) is not associated with health effects. Therefore, it is important that all reasonable and feasible measures are taken to minimise human exposure to PM.

On review of the revised response to submissions we note that multiple residential areas will experience increased PM10 impacts. If the project is approved it will be important to consider the need for mitigation of impacts beyond traditional acquisition zones, the impact on residential expansion surrounding the mine and targeted interventions such as those promoted through the Dust Stop Program.

Yours sincerely


Professor David Durrheim

Its Community Healthy Living versus Mining Employment Balance!!

The extent of the Disease Concern is outlined in SSHEG Submission of Dec 2015 and the Response to Mine Response to Submissions (RTS) by NSW Health and EPA as illustrated below:-

L, however, we note these were difficult to identify in this document. Figure E26 in Appendix L provides the most detailed cumulative annual average PM₁₀ predictions for the highest impact year of 2023 (below). The areas highlighted with orange lines indicate significant population areas predicted to lie between 20 and 30 µg/m³ in Singleton Heights and McDougalls Hill and higher in Camberwell. This suggests the annual PM₁₀ emissions will exceed the current NEPM of 25 µg/m³. We acknowledge the response that health impacts are predominantly driven by PM_{2.5} rather than PM₁₀ effects, however, there is emerging evidence that the long term exposure to the coarse fraction (PM_{2.5-10}) can have respiratory impacts.

NSW Health Response to RTS 8 Dec 2016

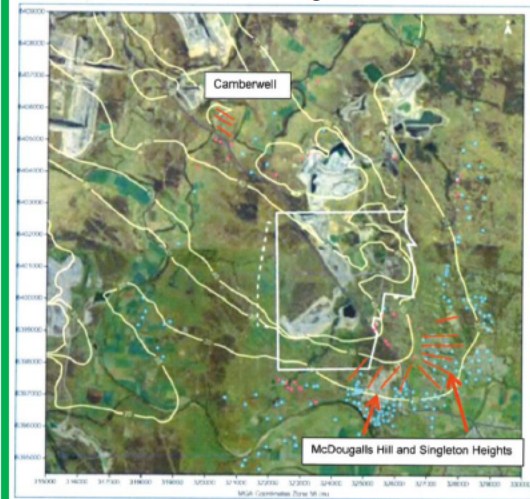


Figure E-26: Predicted annual average PM₁₀ concentrations due to emissions from the Project and other sources in 2023

SSHEG Rixs Creek Mine Continuation Dec 2015

In the Short Term, the Upper Hunter Air Quality Monitoring Network has confirmed the Valley Air Pollution Streamline Flow Drifting behaviour of PM₁₀ and PM_{2.5}. The WHO Disease significance now of Rixs Creek Mine Daily PM_{2.5} Emissions is coupled with the South Easterly Valley Air Drifting Flow Patterns towards Singleton Residents is illustrated in Figure 1 below. This combination establishes the requirement for Rixs Creek Mine along with other Hunter Valley Mines to strategically locate “Concurrent PM₁₀, 2.5 TEOM Type Monitors”, which are then expected to provide the basis for PM_{2.5} Fine, PM_{2.5-10} Coarse, and PM₁₀ Real Time Pollution Mitigation Controls to protect Residents.

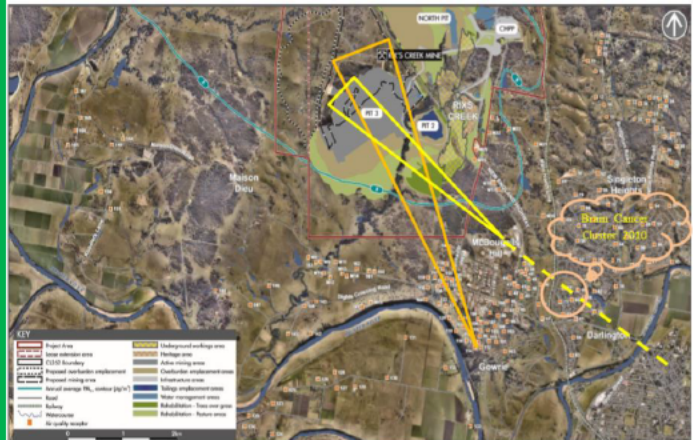


FIGURE 1 Illustration of Air Pollution Drifting Impact on Singleton Assessment Resident Groups

EPA Response to RTS Report 15 Nov 2016 ATTACHMENT A:

Environment Protection Authority's Air Quality Assessment Review RTS

The Environment Protection Authority (EPA) has undertaken a review of the Response to Submissions (RTS) report titled “Rixs Creek Mine – Continuation of mining project Environmental Impact Statement Response to Submissions”, dated 20 October 2016, in relation to the Rixs Creek Coal Mine Extension Project, SSD 8300. The EPA has also reviewed the documents titled “Air quality and greenhouse gas assessment, Rixs Creek continuation of mining project” by Todoroski dated 26 August 2015 (Todoroski 2015) and the Environmental Impact Statement dated 26 October 2015. The EPA provides the following comments in relation to air quality matters.

Estimated Impacts from the proposal

The assessment predicts exceedances of the air quality impact assessment criteria at non-mine receptors as summarised in the table below, taken from Todoroski 2015.

Impacts greater than criteria – non-mine receptors

Receptor ID	24-hr				Annual			
	PM ₁₀				PM _{2.5}			
	50	2017	2020	2023	30	8	90	4
Criterion	year max	2017	2020	2023	year max	year max	year max	year max
1	2020 71 2023 77	2	21	32	4	2020 34 2023 36		
19		1	1	3	1			
61		2	5	5	4			
140		3	2	4	1			
161		1	1	2	1			
163		3	3	1				
164		1	1	1	1			
170					2017 79 2020 100 2023 103 2026 99	2017 14 2020 16 2023 17 2026 16		2020 5.3 2023 5.4 2026 5.3
171					2017 41 2020 47 2023 46 2026 43	2017 9 2020 10 2023 10 2026 9	2020 101 2023 99 2026 95	
172					2017 43 2020 39 2023 39 2026 34	2017 9 2020 9 2023 9 2026 9	2017 92	
173					2017 37 2020 37 2023 36 2026 33	2017 9 2020 9 2023 9 2026 9		
174					2017 35 2020 36 2023 36 2026 39			
175					2017 38 2020 39 2023 38 2026 36	2017 9 2020 9 2023 9 2026 9		
176								

Rixs Creek planned 40yr Mine Life approval in 1995 included Air Quality Assessments for 22nd year 2018, only for Annual Average **Dust** Deposition & **Dust** Concentration levels; with 24 Hour TSP (<50µm) HVAS sampling at Singleton Heights, Retreat and East of the Mine. Most common winds were WNW-SE or SSE, as now illustrated.

More Residents now live SE of Mine Pollution Plumes.

Mine Polluted Air Drifting SE Patterns impact Singleton Heights; as does the Diesel Exhausts of the New England Hwy & Coal Trains, & Power Stn Fly Ash Plume drifts.

RIX'S CREEK MINE COMMUNITY CONSULTATIVE COMMITTEE MEETING MINUTES –27/05/2014

Rehabilitation has been designed to shield the operation from nearest residences / townships to move away aligned to production rates.



Red = 1989 Population area. Green = 2013 Population area.

Singleton Heights is of particular Community Health concern having previous Disease form following on from the Brain Cancer Cluster Study in 2010 in this area; located then just to the East of Rixs Creek Open Cut Mine and on the Eastern downhill slope depression which is conducive to “*Ground Impacting SE Air Drifting Pollution Patterns*” moving from the Upper Valley Composite Air Pollution with its Power Station Fly Ash and accumulated secondary aerosols Air. This descending SE Drifting Air Pollution Cocktail leaving the Rixs Creek Mine further adds the Diesel Exhausts of Trucks climbing the Hill of the New England Hwy and further adds the Coal Trains Diesel and Track Pollution (Residents Homes that back onto the Railway line). This Cumulative SE Drifting Air Pollution “Descending into the Singleton Heights Homes would be expected to take the line of least resistance – in this case apparently following the SE directional road pathways thus concentrating the Air Pollution Jetstream passing Homes at street corners – such as was inferred in Singleton Heights Cancer Cluster Study [Method 1](#) evaluation related to “*The cluster was reported in two intersecting streets*”- Statistical assessment of the chance of occurrence of geographic clustering.

It is the SE – NW Road orientation sloping further downhill that can concentrate the SE flowing of Air Drifting Pollution providing the Topography passage at “*Intersecting Streets*” compared to the obstacle to free flowing that Homes exhibit. Somehow what the Community reported as a Statistically significant Cancer Cluster was turned into a study of Street corners Statistically, whereas the Community was reporting the observed Air Pollution SE Drifting Flow over this area of the Singleton Heights.

SSHEG considers [Method 2](#) employs the “Statistical Averaging” disguise of hiding the “*Data Intelligence*”. Firstly, the Community had separately identified the “*Specific Environmental Hazard*” at Singleton Heights as the locality closest to the Railway line, Highway and the proximity to Rixs Creek Mine. Secondly, the Poisson Statistical Analysis should have been restricted to the entire area of Singleton Heights at the time, not to distort the study by including the distant area of Singleton Township.

Recognising the difficulty in confirming Cancer Clusters and since the 1995 Rixs Creek Mine Approval Air Quality is now heeded, it still remains that **Singleton Heights Air Pollution Disease Risk is a Community Red Flag.**

Serious questions were posed to EPA in the SSHEG Submission of 20 Jan 2017 on “Clean Air NSW Consultation 2017”; extract below:-

Without prejudice

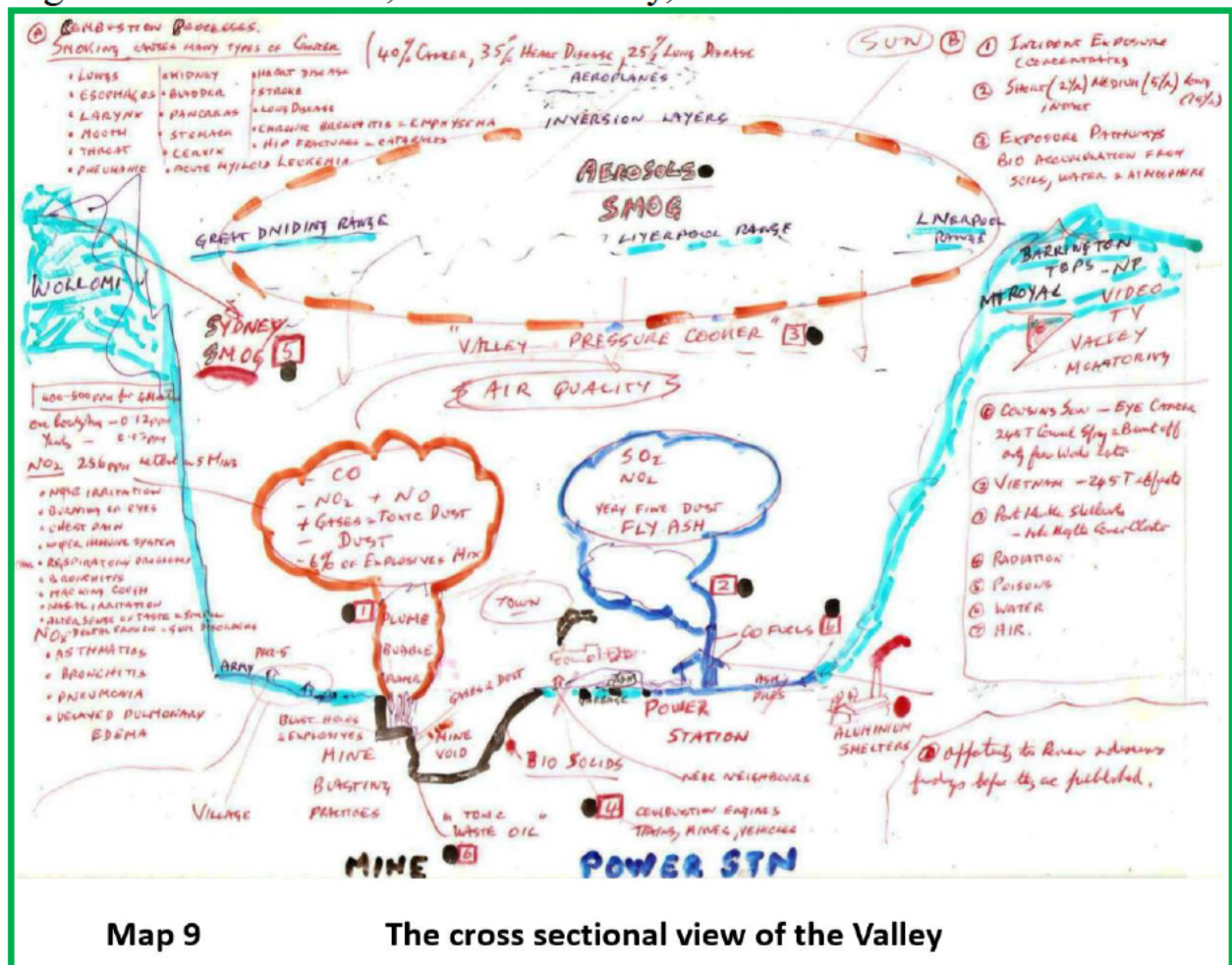
Part B Why has NSW Heath and NSW EPA been unable to utalise the Minimisation provision of Government Air Pollution Acts, and what guidelines could be used to facilitate their use to “Clean Air in the Hunter Valley” ?

Firstly a lead by NSW Health and NSW Environmental Health is needed to set Compliance standards for “Hunter Valley Open Cut Coal Mines Precincts” separate to other Jurisdictions and based on three factors not catered for by existing National Standards. Developments in better targeted Short Term Air Pollution Disease associations Research and progressive World Health initiatives since 2014 provide an ongoing basis for these changes.

- I. Mines without Buffer Zones with Residents forced to Coexist beside Open Cut Black Coal Mines.
- II. Resident Disease Impact criteria from PM2.5 and PM1.0 (Mine Diesel use), Black Carbon Air Pollution.
- III. Demography of “Near Neighbour Residents in terms of Air Pollution Disease Susceptibility. Eg Schools, Elderly, etc
- IV. Disease latency from repeated 15 Minute Air Pollution Exposure spikes related to concentrated Mine Pollution Air Drifting patterns in addition to the local Environs Cumulative Air Pollution levels at the time.
- V. Quantitative Analysis to Exposure the fallacy that Indoor Air Quality is not related to Outdoor Air Pollution levels, thus how should farmers be protected ?

Serious questions are now being posed here to The Independent Planning Commission to provide true “Independent Air Quality and Community Health Guidance” to further substantiate the NSW Health’s reaffirmation of the “*No Threshold of Airborne Particles that is Safe*”, and the responsibility to enshrine in any Mine Approval Consents and Operations that “*At all times Mine Operations are to Minimise Air Pollution release to Atmosphere at each Pollution generating Source*”.

SSHEG in its 10 Year review is turning back the clock to the detailing that was supplied to NSW Health Expert Advisory Panel on Community Disease from poor Air Quality and the Cocktail of Airborne Pollution in the Singleton Shire in 2010; still valid today, and illustrated below:-



Since 2007, SSHEG members active in Mine and Power Station Community Consultative Committees along with Mine Management were being advised by eminent Medical Specialists that “*No convincing evidence of mining impact on Community Health*”; impact on Health of Mine Dust”.

Independently the World Health Organisation Scientific Advisory Committee and Expert Reviewers on Air Quality in October 2013 declared *“There is a linear Dose-Response Relationship between Particle Levels and Human Disease with No Threshold that is Safe”*; having previously in June 2012 declared *“Diesel Engine Fumes can cause Lung Cancer and belong in the same potentially deadly category as asbestos, arsenic and mustard gas”*.

Together, whether its Air Pollution from Mining or living close by to Exhausts and other Pollution Emissions of Highways or Railways, or a Cocktail of both; it's the Air Pollution Drifting Pattern of these Emissions at Ground level that determines the Expose Risk they pose to Human Health, short and long term.

In the Hunter Valley the *“Corridors of Mine Air Pollution”* are observed to generally Drift across the Valley floor on the WNW-SE and SSE Corridors, as well as into Microvalleys pockets adjoining the Escapements.

The 1995 Rixs Creek Mine Consent apparently recognised these impacts by limiting Mine operation when Air Drifting Wind Velocity was adjudged at the time to impact Camberwell, Maison Dieu and Singleton Heights. **Perhaps this continues today!**

AIR QUALITY

23. (i) The Applicant shall cease all mining operations at any time when the average hourly wind velocity from any direction exceeds 10 m/s.
- (ii) The Applicant shall cease all out-of-pit overburden dumping and shaping, topsoil stripping and emplacement and bund wall and earthworks construction at any time when the average hourly wind velocity exceeds 5.6 m/s from the segment due west clockwise through to the northeast.
- (iii) The Applicant shall cease all mining operations at any time when visibility is impaired on the New England Highway as a result of mining operations in accordance with the requirements of the Council.

36 Km/hr

20.16 Km/hr

Bloomfield Collieries Pty Limited - EIS - Rixs Creek

F1117A.H/ew, November 1994

DUST SUPPRESSION

24. (i) The Applicant shall provide a standby water cart for each operating water cart proposed in the EIS at each stage of mining.
- (ii) the Applicant shall install automatic water sprays on the coal stockpiles such that the stockpiles are sprayed when the wind speed from any direction exceeds 5.6 m/s.

20.16 Km/hr

Automatic water sprays have been installed on coal stockpiles in compliance with this condition. Refer to Section 3.8. As part of the future operations it is proposed that adequate road watering equipment will be available for the scale of the operation.

ENVIRONMENTAL OFFICER

25. Prior to the commencement of any construction or operations in the coal lease application area the Applicant shall appoint an on-site environmental officer responsible directly to the mine manager whose qualifications are to the satisfaction of the Department.

Bloomfield Collieries Pty Limited - EIS - Rixs Creek

F1127A.H/ew, November 1994

Today, SSHEG calls for a Culture Change to *“Minimise Mine Air Pollution Emissions at their every source”*. Our comprehensive 10 years Air Quality Health investigations Outlined below are worthy of further consideration by all as a way forward.

Outline of SSHEG Focus on Health

“SSHEG contend that all Major Projects, especially Mining and Power Station Operations, both Existing and Proposed should be subject to **Cumulative Health Impact Studies and Health Risk Assessments** in order to restore the balance between Employment and Financial Revenue on one hand, and Community Health on the other hand”. Don’t ignore **WHO Air Pollution carcinogen announcements** in Oct 2013.

It is clear that **new Health Research Methods need to be developed** to provide perhaps a Real Time Technological based **Health Study approach** which will overcome the current Medical Impasse where Epidemiology Cohort studies for **small Community Localities** are statistically excluded from Health Studies.

In the meantime the Coal Mining juggernaut rolls on unchecked, creating unbearable “**Dust, Fumes, Plumes, Fly Ash, Combustion Gases, Diesel Exhaust Pollution, Incessant Mine Noise** and Trains rattling through beside Houses, Ground Vibrations, Glaring lights, Sleep disturbances, Psychological Pressure, Irrigation Creek Water unfit for cropping, squeezing out Near Neighbours and Villages, encircling Villages and “plundered Communities and Prime Agricultural Land”.

It should be noted ** that Individual Open Cut Coal Mines across the Hunter Valley from 2006 onwards provided 24Hr continuous Particulate Matter PM10 Realtime Monitors at around **76 locations** (2013 SSHEG Senate Attachment S15). These **Monitors are mostly under utilised for reducing Dust and Pollution Emissions**, being tagged as “Realtime PM10 Monitors” but reported as 24 Hour Average PM10 Monitors”.

The insistence by “Environmental Authorities” to allowed the farcical situation of “**Data Averaging**” to flourish and distort the Pollution Emission reporting by Operating Industries in NSW; while at the same time equating this to **Resident’s Minute to Minute Pollution Exposures** to Gases, Dust, Fumes and Vapours and the Hunter Valley Brown Haze Aerosols build up during the Day, and with Industry impunity.

A strong argument therefore exists to base PM measurements on 15 Minute Averages to bring “**Near Neighbours who are Occupationally Exposed Persons to Mining**” onto the same footing as Underground Miners exposed to Air Quality similar to that being experienced from time to time by farming families above ground nearby.

SSHEG were of the opinion in Oct 2011 that an **Holistic Technical Investigation using Particulate Real Time Monitors (PM10, PM2.5 & PM1) and the collection of Airborne Particulates on special Filter Media** from these monitor sampling streams was needed to determine what substances were in the Air.

Our Atmosphere is a mixture of Air constituent Gases - O₂ - N₂ - Ar - water vapour - trace gases; Pollutants - Gases, Ozone, Dioxin - Vapours - liquid droplets - Composite Particulates - Fly Ash, VOC’s - aerosols, Pollens, Spores, Fungi, and other Biological materials and Organisms.

The Time of Day Measurement variations of each component part of the Air is the mixture the Community breaths, and it is not unreasonable to expect the above constituent Measurements would form the level of detail knowledge needed to establish a definitive Air Composition and Speciation Analysis, from which the Health Risk considerations may be evaluated, leading to **better targeted Pollution Mitigation Controls to safeguard the Health of the Community**.

The Health Risk is Real, as all it takes is a repeat like the 1948 Donora Pennsylvania five day stable layer of Valley Air where on day three 17 (1 in 1000) people died; overall 40% Health affected, 800 animals died with 15% dogs dying.

In 2008 two Singleton Medical Doctors were reporting to NSW Health that Open Cut mining and Coal fired Power Stations were Polluting the Hunter Valley Air to the extent that Residents and especially Children experienced Medical episodes the likes of which were previously unheard of, and medications were struggling to counter these Disease impacts. Especially, Mine Blasting drifting Plumes were responsible for Orange skies, single breath Respiratory Attacks, Hospitalisation etc. now only treated as Fume EPA Non-Compliances.

As early as 2005, both Mining Companies and the Community were being advised by eminent Health Authorities “*No convincing evidence of mining impact on Community Health*”.

Since then, the World Health Organisation in June 2012 declared “*Diesel Engine Fumes can cause Lung Cancer*” related to the composition and attachment of Toxic substances to Carbon Particulates, especially PM2.5 and PM1.0; and in October 2013 declared “*There is a linear Dose-Response Relationship between Particle Levels and Human Disease with No Threshold that is Safe*”; again, identifying PM2.5 (Fine) and PM10-2.5 (Coarse) Disease Relationships.

It is therefore surprising that NSW EPA and OEH have not so far acted to incorporate these Mining related Pollution Human Disease PM2.5 Mitigation Controls; and in the case of Rixs Creek allowed the exclusion of the PM2.5 evaluation for the 2014 Continuation, while allowing what amounts to a fresh Project by altering the mine Plan in the years 2021 – 2025 Mine extraction Rate to apparently sneak under the somewhat lax Air Pollution Modelling limits.

It is no wonder that NSW Health would not water down its objections to the guidelines to Mine Approvals, rightly reminding the Independent Planning Commissioners, as is also the SSHEG opinion, that lower Mine Pollution over, and well below the “Industry Status Quo” are now overdue. **That is “*Minimisation of Mine Pollution At all times*”.**

What then is the basis for the Serious Questions being posed by NSW Health on Mine Planning for the reduced levels of Mine Pollution below 2005 World Health Organisation Declarations, and for Mining to heed the need for Australian 2015 NEPM Standards?

It's no longer a matter of Australian NEPM “Guidelines” being exceeded in the Hunter Valley on a daily basis, but the Community demanding recognition that “There is No Safe Threshold Air Pollution”.

SEPTEMBER 5 2018 - 11:00AM NEWCASTLE HERALD

Doctors invite NSW Government ministers for a coalfields stay to experience air pollution first-hand

Joanne McCarthy

- HUNTER doctors have taken the unprecedented step of inviting government ministers to stay overnight near Upper Hunter coal fields and experience the “crisis” in air quality first-hand because “we’re not sure people outside the region understand how bad the situation is”.
- More than 30 doctors have sounded the alarm after a spate of recent air quality alerts in the Upper Hunter, including five straight days of poor air quality in August, even before an expected extreme drought-linked hot, dry and windy summer ahead.
- They have signed a letter inviting Environment Minister Gabrielle Upton and Health Minister Brad Hazzard to the coal region before summer after a [dramatic spike in Singleton Hospital](#) emergency department admissions in 2017 coinciding with hot, dry conditions and declining air quality.
- In the letter to Ms Upton and Mr Hazzard the doctors, including pediatrician and University of Newcastle Associate Professor John Boulton, described worsening air quality as a “crisis... that is causing serious health damage”.
- “This pollution is harming people. It is difficult for people outside the region to understand the effect this pollution is having on people in the Hunter. We ask you both to come for a one or two day trip to the region to meet affected communities and health professionals to discuss this crisis,” the doctors wrote in the letter which was supported by more than 70 community and environment group members.....etc
- The Upper Hunter also experienced increased toxic air pollutants from Bayswater and Liddell coal-fired power stations, doctors said.
- Doctors are concerned that modelling commissioned by the EPA showed that annual average fine particle air quality standards were “unlikely to be attained in Singleton and Muswellbrook into the future as coal production in the Hunter Valley is expected to continue to increase”.
- The modelling found human-made sources of fine particle pollution needed to be reduced by 50 per cent to meet the standard.
- Singleton doctors Tuan Au and Robert Vickers said the region needed stronger action from the NSW Government to protect public health.
- “When there are spikes in coarse particle pollution there is a decline in the health of local residents, particularly those with asthma, heart and lung disease,” Dr Vickers said.
- “The number of spikes we have seen recently shows the government is not holding up its responsibility to maintain air pollution standards and our population is the one suffering.”

Health Authorities and Governments around the World, including the NSW Government have been struggling with the Oct 2013 WHO declarations after 40 years of Medical Research on Air Pollution and Human Diseases associations; **A paradigm shift in Air Pollution Knowledge** now demand changes to protect Community Health.

Within two years in Feb 2016 the National Environmental Protection (Ambient Air Quality) Measure NEPM took effect, this new Air Pollution Knowledge impact on Open Cut Coal Mining and Coal fired

Power Stations now sees Communities demanding action to reduce Short term Mine Pollution, while NSW Health are also insisting upon changes that amount to tighter EPA restriction on Airborne Mine Pollution at all times.

Now after five years delay, and the last three years delay by NSW EPA since Feb 2016 “to introduce the amended NEPM criteria”, this now leaves Community Health Protection in the hands of National Legislation to address the new WHO Air Pollution Knowledge impact of Open Cut Coal Mining and Coal fired Power Stations, while NSW Health continues to remind Mining of the Disease Risk situation of all Mines.

Air Quality

There is no evidence of a threshold below which exposure to particulate matter (PM) is not associated with health effects. Therefore, it is important that all reasonable and feasible measures are taken to minimise human exposure to PM, even where assessment criteria are met.

On 15 December 2015, the National Environment Protection Council (NEPC) agreed to vary the National Environment Protection (Ambient Air Quality) Measure (NEPM). The amending instrument took effect on 4 February 2016. The new standards are as follows:

Pollutant	Averaging Period	Maximum concentration standard	Maximum allowable exceedances
Particles as PM ₁₀	1 day	50 µg/m ³	None
	1 year	25 µg/m ³	None
Particles as PM _{2.5}	1 day	25 µg/m ³	None
	1 year	8 µg/m ³	None

Reference: <https://www.legislation.gov.au/Details/F2016C00215>

The EIS explains that, at the time of preparation of the report, the Environment Protection Authority (EPA) had not yet prescribed changes to the air quality criteria for NSW following the amendment to the NEPM. However, it would be expected that the EPA will introduce the amended criteria within the foreseeable future, and the EIS should have taken this into account.

NSW Health Agency submission 22 Sept 2016

SSHEG remain of the opinion expressed in Oct 2011 after discussions with the “NSW Health Expert Advisory Panel” that Holistic Technical Investigation based upon Particulate Real Time Monitors with 5-15 Minute readings of PM10, PM2.5 & PM1.0, in combination with the collection of Airborne Particulates on Special Filter Media from these monitor Sampling Streams was needed to determine what substances, what variations and what levels of Pollutants are in the air Residents breath at any one time.

Based upon these detailed Particulate Monitoring Studies the Health consequences of these Airborne Pollutants could then be evaluated.

The reality is the NSW Chief Health Officer and Expert Advisory Committee abruptly ceases investigations in the Upper Hunter Valley in Oct 2013, which soon coincided with the abandonment of the “Interagency Taskforce on Air Quality in the Hunter Valley” set up in 2014.

Interagency Taskforce on Air Quality in NSW

As a key regulator of air pollution, the EPA established the high-level Interagency Taskforce on Air Quality in NSW in 2016 to address significant air quality issues across NSW.

The taskforce

provides input to and advice on air quality management through cross-agency collaboration and support prioritises strategies to reduce exposure to particulate matter, which has major impacts on human health develops cross-government recommendations and actions to meet national air quality standards coordinates communication of government actions to manage significant air quality issues in NSW

The taskforce includes representatives from

NSW EPA

Office of Environment and Heritage

NSW Health

Department of Planning and Environment

NSW Department of Industry - Division of Resources and Energy

Transport for NSW

Department of Premier and Cabinet

The Taskforce replaces the Interagency Taskforce on Air Quality in the Hunter, by expanding the remit of the previous taskforce to consider significant air quality issues across NSW.

Is it that Residents Health in the Upper Hunter Valley has been left in the hands of the debating club of the “Interagency Taskforce on Air Quality in NSW”, with NSW Health, NSW EPA sidelined in the decision making process????

Clearly the Upper Hunter area of NSW is treated as a separate Environmental Entity for the Mining Industry while the rest of NSW is reported against outdated 2012 Standards and Disease Risk Guidelines.

Thanking you in anticipation of your considered response.

Dr Neville Hodkinson PhD

Singleton Shire Healthy Environment Group

SSHEG Rixs Creek Mine Continuation Dec 2015

Without Prejudice

Singleton **S**hire **H**ealthy **E**nvironment **G**roup
“Rixs Creek Mine Continuation Dec 2015”



A community-based group looking to address Environmental issues affecting Singleton Shire residents

P.O. Box 626

Singleton NSW 2330

ssheg@hotmail.com

Author: Dr Neville Hodkinson PhD

We seek identification as to what is making our Children and Community Sick so they can be mitigated by OH&S Compliance Orders.

SSHEG Focus on Health

SSHEG is Not Anti Mining or Anti Power Stations

RIXS CREEK Continuation 2015

elle.donnelley@planning.nsw.gov.au

SSHEG Submission of concern regarding the

Rixs Creek Mine Continuation of Mining Project 2015-2037

Mining Pollution Health Impact

This SSHEG Submission outlines the Singleton Shire Health Concerns focusing upon

“The Reduction of the Health Impact on Residents Exposed to Air and Noise Pollution from Mining Operations, being Near Neighbours as Occupationally Exposed Persons under Federal and State Legislation”;

SSHEG calls for a Culture Change

“Minimisation NOT Time Averaging to Hide Air and Noise Pollution”

In view of the WHO Air and Noise Pollution Human Disease findings, SSHEG expects it's only a matter of time before a “Mining Industry Culture Change towards Minimising Air and Noise Pollution” occurs; moving away from the Industry Attitude; “**We operate within our limits**”.

Time Averaging currently allows Mines to “Control Operations so as not to exceed their Target Daily PM10 Limits” covering periods of some Hours well above even outdated NEPM standard PM10 Rates, for Example.

Dr Neville Hodkinson PhD

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Page 1

SSHEG Rixs Creek Mine Continuation Dec 2015

SSHEG concern for the Rixs Creek Mining Continuation Project is based on the need to restore a better balance of the “Health Risk for Residents” to compensate for the removal of the long standing practice of “Mine Buffer Zones” effectively separating Residents and Industrial Pollution; this approach establishes that “Near Neighbours, Farmers and Farmers Families and Villages and especially Children” are presently bearing the brunt of Mine Pollution on account of their proximity to Mines as illustrated below. Increased Production rates only amplify the Residents Concern.



AECOM

SENSITIVE RECEIVERS - SOUTH
Rixs Creek Continuation of Mining
Environmental Impact Statement

FIGURE 12-2

“Near Neighbour Singleton Shire Residents” experience a range of “15 Minute STEL Pollution Exposures” Air Pollution Exposures which are now associated with “Lung Cancer, Cardiovascular Diseases and Respiratory Diseases, Bladder Cancer, etc.

Significantly, WHO has refocused attention on Short Term (Minute and Latency Days) Particulate Matter as PM2.5 (Fine) and PM 2.5 -10 (Coarse) association with a range of Human Diseases, while Quantifying Long Term (Annual Average) PM10 Air Pollution Exposure Population Disease Impact.

Better targeted Future Community Health Surveys now muted in 2015 to repeat 2008 SSHEG Community Health Surveys are expected to better quantify impacts for Short (multiple 15 Minute Pollution Exposures), Medium (Daily Average Exposure) and Long Term (seasonal Exposure - 3 Months); compared to the current Epidemiology Cohort based Annual Average Pollution Exposure and NEPM Standard reference base.

In the Medium Term, SSHEG therefore in making this submission, considers that additional “Concurrent Real Time Air Pollution Monitoring” is long overdue (TSP, PM10, PM2.5 and PM1) with Gases and Particulates Matter Sampling for Microscopy and Chemical Analysis including Gases {Ozone, CO, CO₂, SO_x, NO_x, CH₄, formaldehyde, and VOC’s) located for example at Receptor 138 or selected from Resident’s Complaints History for Assessment Groups J, G & H in Figure 12.2 above.

SSHEG Rixs Creek Mine Continuation Dec 2015

In the Short Term, the Upper Hunter Air Quality Monitoring Network has confirmed the Valley Air Pollution Streamline Flow Drifting behaviour of PM10 and PM2.5. The WHO Disease significance now of Rixs Creek Mine Daily PM2.5 Emissions is coupled with the South Easterly Valley Air Drifting Flow Patterns towards Singleton Residents is illustrated in Figure 1 below. This combination establishes the requirement for Rixs Creek Mine along with other Hunter Valley Mines to strategically locate “Concurrent PM10, 2.5 TEOM Type Monitors”, which are then expected to provide the basis for PM2.5 Fine, PM2.5-10 Coarse, and PM10 Real Time Pollution Mitigation Controls to protect Residents.

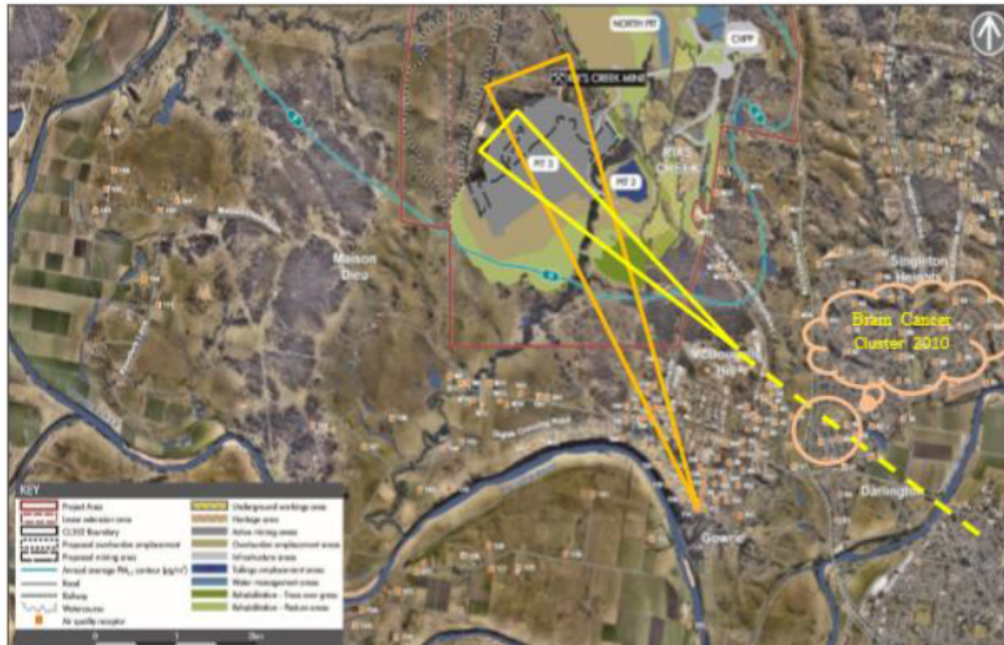


FIGURE 1 Illustration of Air Pollution Drifting Impact on Singleton Assessment Resident Groups

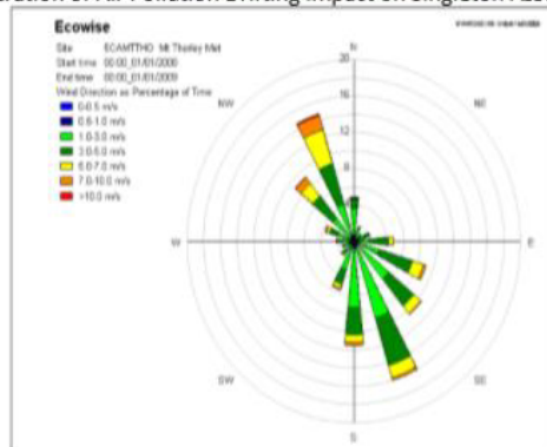


Figure 14: 2008 Annual Wind Rose

Time Averaging has also distorted the understanding of Air Drifting Flow Paths passing across Mines. In this case an Annual Average completely distorts and Hides the actual prevailing conditions, while the actual 15 Minute based Wind Direction Wind Rose would be much more scattered.

SSHEG Rixs Creek Mine Continuation Dec 2015

Note Meteorological Variability

If anything, there are more of the same methods and evaluations of the type that have attracted Community criticism by CCC Members over the years particularly regarding Air Pollution and Blast Plume Drifting Modelling, especially the Variability of Valley Meteorological Conditions, Year on Year, and the **“Time Averaging of Air Pollution Data that destroys its Disease Risk Intelligence”**.

SSHEG is critical of the somewhat selective Meteorological Conditions that are been used for both the Air Quality and Noise Modelling.

The Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (the EPA Approved Methods DEC2005) does however place the onus upon Rixs Creek Mine to make sure that “Data must be representative of the area in which emissions are Modelled”. Data used needs to represent the likely conditions across the 21 years of operation of Mining. This includes the Air Stream Flow Variability across Minutes.

Figure 1 also Illustrate the significant issues faced by Rixs Creek Mine to limit the Airborne Pollution Emissions during the Winter Months (which can extend from July through to late September) when South Easterly Flowing Valley Air is Drifting directly across the Mine Workings and then over close-by Singleton Residents as indicated. Of particular note is the added impact of the Rail line and New England Highway with the somewhat concentrated presence of Diesel Exhausts Pollution, in an area where previous Community concerns of a Cancer Cluster were investigated.

For the Rixs Creek Continuation Project, a significant change is required to strategically locate “Concurrent PM 10 & 2.5 Real Time Monitors (15 Minute based)” in each of the Assessment Group in Figure 12.2 above to protect these Singleton Shire Residents.

Such Monitors would provide the basis to **Mitigate Air Pollution by Minimisation** for example by the judicious use of favourable Air Drifting Patterns throughout the Day to avoid vulnerable Resident Groups. Alternatively, Rixs Creek could use a “Real Time PM Dispersion System” based on Mine equipment 15 minute activities and local measured Meteorological movements across the Mine Site.

Some indication of the issues to be balanced by Rixs Creek is the impact of the cluster of Mines in Figure 2-2, Ravensworth Mt Owen operations, and close by the development of Aston South, EL5291, Singleton Town spread 1989 -2013, with TSP Dust Gauge Isopleth patterns providing a guide to Air Pollution drifting Paths.

SSHEG Rixs Creek Mine Continuation Dec 2015

Elimination of Mine Blasting Plumes into the Atmosphere

The Rixs Creek Mine Air Pollution entrainment in South Easterly Drifting Flows is further complicated when Mine Blasting is examined.

SSHEG reviews in 2014 ([Attachment 1](#)) entitled “SSHEG Document March 2014 Mining Pollution Mitigation Priority Action” identified Two Compliance Licence Conditions;

- (1) *Elimination of Blasting Plumes into the Atmosphere.*
- (2) *Residents in the Maison Dieu, Singleton Heights, Retreat, Hamilton Hill – Gouldsville _ Long Point Rural Environs to be designated as “Occupational Exposure to Mining Status” concurrently as a Precinct with HVO , Ravensworth – Mt Owen, Integra Mining Operations cumulative “Air and Noise Pollution” requiring “Minimisation NOT Time Averaging to Hide Residents Pollution Exposure”.*

SSHEG concluded “The Elimination of Blast Plumes into the Atmosphere” would be the most significant step that the Mining Industry and Orica etc. could take towards reestablishing a better balance in the Hunter Valley. “*This can be achieved*”.

The Disease and Sickness Risk to Near Neighbours from Mine Blasting in the Hunter Valley, with Mines located amongst Rural Residents, depends entirely on Mining Blast Protocols and repeatable Meteorological Wind to dissipate Toxic Blast Plumes. The reality is that Wind Directions have been known to change direction unexpectedly just after Blasting. A repeat of the SE Qld “Gassing and Hospitalization of 21 Mine workers some Kms from the blast site remain a reality in the Hunter Valley.

We feel that for Open Cut Mining to continue Operating beside Residents in the absence of “Community Buffer Zones” in the Hunter Valley that it is essential that a way forward of Pollution Mitigation be added to existing Mitigation measures that not only reestablishes a better Balance but also is seen by the affected Residents and the Community as establishing that Balance.. However the risk of “Near Neighbour Gassings” demands action.

With the WHO 2013 Disease Risk knowledge that Air Pollution is now known to have “No Safe Threshold”, it is not surprising when Residents see HUGE Blast Dust and Toxic Plumes rising into the air and drifting towards their Homes and are alarmed that their and their Children’s Health may be affected. Should this Plume be bright orange, then it strikes panic and resentment in the vulnerable of the Community, and soon Community Complaints flood the Authorities and Health Warnings are issued. *Refer Photos.*

However the reverse is now also known to be true, where Blast Plume that are colourless and almost invisible are much more dangerous as no visible warning is present. Such an incident was recorded and briefly documented in 2013 as outlined in [Attachment 3](#).

Blast Management Plans have failed by focusing only on the Presence of Nitrogen Dioxide Orange Component in the Blast Plume claiming this is Best Practice Blasting, while the real Danger is from the colourless Gases, Vapours, Particulates and Aerosols as products of the Explosions and Flame emitted from the Blast Holes into the atmosphere resulting from inefficient and ineffective Stemming. “*Better Blast Hole Stemming is Needed*”

SSHEG Rixs Creek Mine Continuation Dec 2015

These “Mine Blast Gassings” have occurred elsewhere across the Hunter Valley and should have been red flags to Government Authorities and Mining Companies that action was required. The recent “Gassing” of BOC workers outside the MTW Lease area Blast on 20 September 2013 highlights ([Attachment 3](#)) that notification of Blast time is not sufficient, but rather evacuation of residents within a prescribed range of say 5 to 15 kms in the Predicted Blast Plume Drifting Pathway is a more realistic Mine procedure when Blasting of suspect Strays or during unexpected Water damaged Shots have to occur for Mine personnel safety reasons.

Rixs Creek has not escaped Blast Plumes Drifting off Site and returning to ground nearby, as illustrated



9	18/7/2013	Resident	Rix's Creek Lane	Complaint regarding the sound of shooting at the mine. Kangaroo culling being undertaken. Soil and calm noise must have enhanced noise so Rix's personnel and shooters relocated away from the location of concern.	X				
10	19/7/2013	Resident	Maison Dieu	Complaint regarding operational noise all week and especially night of the 18/7/2013. Weather conditions enhance noise during this time of the year. Mine currently modifying West Pit to minimise	X				
11*	30/7/2013	Resident	Singleton Heights	Inquiry regarding blast in West Pit @ 14:12 pm as to whether Rix's Creek did blast and blast was within its limits. Blast results provided to resident. Resident did not wish to complain.	X*				
12	13/8/2013	Resident	Maison Dieu	Operation noise has been loud in Maison Dieu area especially during winter. Rix's Creek aware of noise issues and has amended West Pit to minimise noise impacts, however, changes won't be completed until end of 2013.	X				
13	14/8/2013	Resident	Maison Dieu	Resident woken at 3am by mine machine noise. Dragline worked during night (usually shut down) due to EX3600 excavator being broken down. Rix's Creek lowering haul road in West Pit to minimise noise impacts which is likely to be completed end of 2013.					
14	21/8/2013	EPA Complaints Line regarding three complaints to EPA regarding a blast	Singleton and Singleton Heights	Complaints regarding dust emitted from blast as well as strong odour. Rix's Creek did conduct a blast with dust cloud remaining stagnant in air for long duration due to low wind speed. Zero flame from blast. Rix's Creek provided report to EPA.					
15	21/8/2013	Planning Compliance Singleton	Putty Road	Complaint regarding large dust cloud being emitted from Rix's Creek mine. Rix's Creek did conduct a blast with dust cloud remaining stagnant in air for long duration due to low wind speed. Zero flame from blast. Rix's Creek provided report to DP&E.	X	X			
16*	18/9/2013	Planning Compliance	Passing site on NEH	Inquiry to Marion JJC dragline dust in West Pit (surface level) whilst driving past site. Dragline was not			X*		

Blast Dust and Odour
14 & 15

2

Rixs Creek Blast Fume exposure in Maison Dieu Industrial Estate was the subject of SSHEG ([Attachment 2](#)) and Singleton Compliance Officers Investigation in 2014 which was inconclusive as some conjecture prevails as to the dissipation of the Blast and the Drifting Path or paths that occurred. SSHEG viewed Mobile Phone Video of a number of blasts with diary notes of respiratory and eye impact, but as proper Technical and detailed Reports were not produced or forthcoming, proper scrutiny and investigations has not occurred. However it is clear that Rixs Creek Mine Blasting does impact Near Neighbours and their Health Safety is only identified when a Complaint is Recorded.

It is therefore incumbent on the Government Authorities and Mines where they should be aware of the “potential Gassing Incidents” to immediately report these events to the Environmental Health and Health, Planning, EPA Ministers who are liable to administer the provisions “under the Act”.

SSHEG Rixs Creek Mine Continuation Dec 2015

Summarising, the Communities concern is the following extract from “*The Maitland Mercury* by Matthew Kelly Nov 4 2013” shortly after the WHO Air Pollution Announcements and Newcastle Air Quality Forum in September 2013. (Notations highlighted in Red relate directly to Rixs Creek Mine SSHEG Health Concerns).

“NSW Health investigated a **suspected brain cancer cluster in the Singleton area in 2010** following long-held community concerns about the health impacts of coal dust.

The investigation, which focused on five cases over a 35-year period, was unable to find a direct link and concluded the cases were a statistical anomaly. It did, however, **suggest the cases and their potential causes were worthy of further investigation.**

Professor Wayne Smith from NSW Health’s environmental health branch said the agency’s statement was accepted knowledge in the field of air pollution research.

“The ... **statement provides additional justification for the actions that the NSW government is taking to reduce the population’s exposure to air pollution**, including the actions being taken in the Upper Hunter,” he said.

NSW Health data, released at September’s air quality forum in Newcastle, estimated **fine particle pollution** resulted in 25 deaths in the greater Newcastle area each year. **Two deaths a year were attributed to exposure to fine particle pollution in Muswellbrook and Singleton.** Fine particle pollution causes 223 deaths in Sydney each year.

A NSW Minerals Council spokesman said the industry was committed to improving air quality. “Mining contributes to regional particulate matter, but we’re one of many contributors. Other sources include cars and other transport, sea spray, bushfires and wood smoke from homes,” he said.”

Two SSHEG Documents provide the background of our engagement with Government Authorities, Hunter Community, Mining and Power Stations over the last ten years.

[Attachment 4](#) is a Presentation of Community Health Concerns 2013

[Attachment 5](#) - SSHEG Review Summary May 2015

- incl Mining Dialogue Summary 2011 – 2014

- Appendix M7 SSHEG Review 2015 Presentation Pgs. 38–40.

SSHEG contend that the Environment in the Hunter Valley, especially with Poor Air Quality from Pollution Emissions of Gases, Particulates, Vapours, Fumes, Aerosols, Pollens, etc., requires better targeted Short Term Monitoring of the Composition, Toxicity, Exposure and related Health effects. By 2014 sees the challenges of the new World Health Organisation “Stochastic” Air Pollution Paradine, requiring better Mitigation steps to reduce these Health Risks for Residents.

But it is especially all children, Pre & Post Natal and Children under 8 years of age that are now being confirmed as one Population Group vulnerable to Air Pollution; confirming the Singleton Community Health Survey Reports. These SSHEG Health Surveys in 2008-9 and Community Reports by 2010 already identified that the Air Pollution of the Cluster of Mines in the Hunter Valley are often Hour by Hour impacting the Health of all Residents Groupings in Bulga-Broke Micro Valley area, Glenden Brook Valley, Mt Royal, Muswellbrook and Singleton Shire, for both Long and Short Term Exposures.

SSHEG Rixs Creek Mine Continuation Dec 2015

Dr Neville Hodkinson PhD

Singleton Shire Healthy Environment Group

- | | |
|---------------------|---|
| <i>Attachment 1</i> | SSHEG Document March 2014
- Mining Pollution Mitigation Priority Action
- Blasting Pages 1 -10. |
| <i>Attachment 2</i> | SSHEG “Elimination of Mine Blasting into the Air” April 2014 |
| <i>Attachment 3</i> | Report on MTW Blast 20 th Sept 2013 BOC Workers “Gassings” |
| <i>Attachment 4</i> | SSHEG Presentation of Community Health Concerns 2013 |
| <i>Attachment 5</i> | SSHEG Review Summary May 2015
- incl Mining Dialogue Summary 2011 – 2014
- Appendix M7 SSHEG Review 2015 Presentation Pgs. 38–40. |

Singleton Shire Healthy Environment Group

“Rixs Creek South Mod 10 - March 2019”



A community-based group looking to address Environmental issues affecting Singleton Shire residents

P.O. Box 626

Singleton NSW 2330

ssheg@hotmail.com

Author: Dr Neville Hodkinson PhD

We seek identification as to what is making our Children and Community Sick so they can be mitigated by OH&S Compliance Orders.

SSHEG Focus on Health

SSHEG is Not Anti Mining or Anti Power Stations

Department of Planning & Environment

GPO Box 39

Sydney NSW 2001

Email: Melissa.anderson@planning.nsw.gov.au

21 March 2019

“Rixs Creek South SSD MOD DA49/94 - Extension of time”

This SSHEG response is for conditional support for continuation of Mining at Rixs Creek Mine (RCS), as a means to maintain the employment balance while Mines Drifting Air Pollution and their Community Health impacts (as reported by medical Doctors) can be by “Mine Approval Conditions minimised” to acceptable WHO and National Standards; as a first step in NSW.

In 2008 two Singleton Medical Doctors were reporting to NSW Health that Open Cut mining and Coal fired Power Stations were Polluting the Hunter Valley Air to the extent that Residents and especially Children experienced Medical episodes the likes of which were previously unheard of, and medications were struggling to counter these Disease impacts.

Ten years of SSHEG Hunter Valley Air Pollution research and dialogue; three years with NSW Health; five years examination with the Upper Hunter Mining Dialogue has been unable to move Institutional Air Pollution practices. By Oct 2013 the World Health Organisation however emphatically declared the Disease associations and life shortening impact of all levels of Airborne Pollution.

Ten years later now in 2019, again as they did in 2008 Singleton Hunter Valley Doctors are; like our forefathers 100 years earlier, questioning Authorities regarding “Deaths and Sickness from Mining”. Refer Newcastle Herald headlines.

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SEPTEMBER 5 2018 - 11:00AM

Doctors invite NSW Government ministers for a coalfields stay to experience air pollution first-hand

Joanne McCarthy Local News

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 Doctors say government ministers should breathe Upper Hunter air before approving more coal mines.

HUNTER doctors have taken the unprecedented step of inviting government ministers to stay overnight near Upper Hunter coal fields and experience

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The NSW Health in their reviews and comment on NSW Government Department of Planning & Environment Major Projects Assessments in recent years have detailed their particular concerns relating to Air Quality and impacts on Residents, including having to restate their concerns previously raised regarding impacts on Air Quality.

Realistically, this application for Extension of time of the 1994 Development application DA49/94 coincides across the same Coal Resource with the Rixs Creek Continuation of Mining Project SSD (6300), where the Community Air Quality impacts on Residents has been detailed by NSW Health in “Agency Submissions” dated 3 Dec 2015, 8 Dec 2016 (29 June 2018 illustrated) and 21 Dec 2018. Thus Mod 10 is an application against SSD 6300.

The Health (Disease) summary for Air Quality is detailed on 3 dec 2015:-

“There is no evidence of a threshold below which exposure to particulate matter (PM) is not associated with health effects. Therefore, it is important that all reasonable and feasible measures are taken to minimise human exposure to PM, even where assessment criteria are met.


The 28th August 2018 IPC Report for Rixs Creek Continuation SSD 6300 demonstrates that NSW Health[#] is insisting upon “*Mitigation of impacts below traditional acquisition zones*“, while the mine to gain approval is simply trimming its Coal Mining Rate to fall below the already outdated Evaluation Modelling Guidelines and NEPM WHO 2005 based Standards.

SSHEG Community Healthy Living focuses upon Mine Pollution Disease Impacts on Residents - breath by breath; insisting that mines Mitigate Pollution by “*Minimising to World Health Organisation ongoing identified Guidelines*” over each 15 Minute period, of Cumulative Locality readings for PM10 and PM10-2.5 & PM2.5:

That is the Healthy Air we Breath criteria!

Thus, SSHEG calls for a Culture Change to “*Minimise Mine Air Pollution Emissions at their every source*”, and referencing 15 Minute PM10 and PM2.5 Real Time Monitoring at specific Resident Localities for Mitigation.

Hunter New England Local Health District
Hunter New England Population Health
Direct Contact Details
Phone: (02) 49246395 Fax: (02) 49246215
Email: david.durrheim@hnehealth.nsw.gov.au



Health
Hunter New England
Local Health District

#

29 June 2018

Ms Genevieve Seed
Senior Planning Officer
Resource Assessments | Planning Services
NSW Department of Planning and Environment
320 Pitt Street | GPO Box 39 | Sydney NSW 2001

Dear Genevieve

Re: RIX'S CREEK COAL MINE CONTINUATION OF MINING PROJECT SSD 6300 - RESPONSE TO REVISED RESPONSE TO SUBMISSIONS

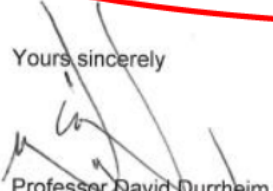
We understand that the Independent Planning Commission have sought further clarification as to whether NSW Health's concerns with regard to air quality have been addressed in the proponent's response to submissions and revised response to submissions.

Further review of Appendix H has revealed that the new NEPM air standard for annual average PM10 of 25 $\mu\text{g}/\text{m}^3$ is not predicted to be exceeded in the residential areas immediately north of Singleton are but at least one residence is predicted to reach 25 $\mu\text{g}/\text{m}^3$ and many other residences will be in the vicinity of the goal due to incremental emissions from Rix's Creek and existing air pollution from surrounding mines. Many private residences that are not in the acquisition zones within McDougall Hill and Singleton Heights will have significantly increased predicted daily PM10 impacts from the mine – many with an incremental average 24 hour PM10 impact of 20 to 30 $\mu\text{g}/\text{m}^3$ (Appendix H, Table 3). The cumulative impact at the Country Acres Caravan Park is predicted to exceed the NEPM average 24 hour PM10 goal of 50 $\mu\text{g}/\text{m}^3$ (Appendix H, Table 6, Figure 3 and 4 - noting that the tolerance of 5 days of exceedance of the goal per annum has been removed from the revised NEPM). There are also incremental impacts in mine owned residences and residences subject to acquisition.

While the EIS focuses on assessment criteria we note that there is no evidence of a threshold below which exposure to particulate matter (PM) is not associated with health effects. Therefore, it is important that all reasonable and feasible measures are taken to minimise human exposure to PM.

On review of the revised response to submissions we note that multiple residential areas will experience increased PM10 impacts. If the project is approved it will be important to consider the need for mitigation of impacts beyond traditional acquisition zones, the impact on residential expansion surrounding the mine and targeted interventions such as those promoted through the Dust Stop Program.

Yours sincerely


Professor David Durrheim

Its Community Healthy Living versus Mining Employment Balance!!

The extent of the Disease Concern is outlined in SSHEG Submission of Dec 2015 and the Response to Mine Response to Submissions (RTS) by NSW Health and EPA as illustrated below:-

L, however, we note these were difficult to identify in this document. Figure E26 in Appendix L provides the most detailed cumulative annual average PM_{10} predictions for the highest impact year of 2023 (below). The areas highlighted with orange lines indicate significant population areas predicted to lie between 20 and 30 $\mu g/m^3$ in Singleton Heights and McDougalls Hill and higher in Camberwell. This suggests the annual PM_{10} emissions will exceed the current NEPM of 25 $\mu g/m^3$. We acknowledge the response that health impacts are predominantly driven by $PM_{2.5}$ rather than PM_{10} effects, however, there is emerging evidence that the long term exposure to the coarse fraction ($PM_{2.5-10}$) can have respiratory impacts.

NSW Health Response to RTS 8 Dec 2016

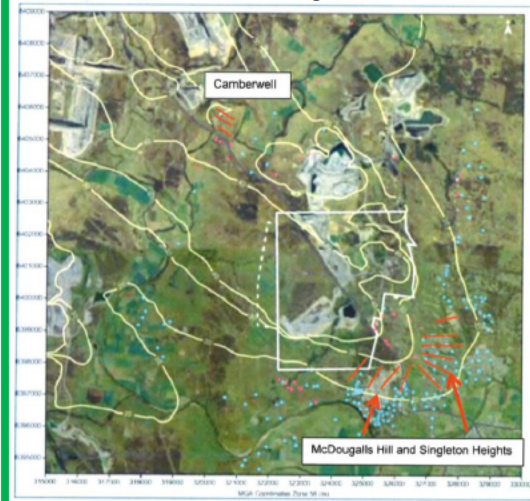


Figure E-26: Predicted annual average PM_{10} concentrations due to emissions from the Project and other sources in 2023

SSHEG Rixs Creek Mine Continuation Dec 2015

In the Short Term, the Upper Hunter Air Quality Monitoring Network has confirmed the Valley Air Pollution Streamline Flow Drifting behaviour of PM_{10} and $PM_{2.5}$. The WHO Disease significance now of Rixs Creek Mine Daily $PM_{2.5}$ Emissions is coupled with the South Easterly Valley Air Drifting Flow Patterns towards Singleton Residents is illustrated in Figure 1 below. This combination establishes the requirement for Rixs Creek Mine along with other Hunter Valley Mines to strategically locate “Concurrent PM_{10} , 2.5 TEOM Type Monitors”, which are then expected to provide the basis for $PM_{2.5}$ Fine, $PM_{2.5-10}$ Coarse, and PM_{10} Real Time Pollution Mitigation Controls to protect Residents.

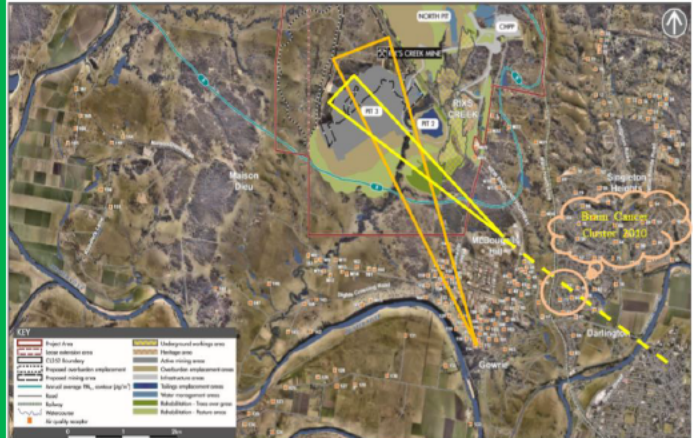


FIGURE 1 Illustration of Air Pollution Drifting Impact on Singleton Assessment Resident Groups

EPA Response to RTS Report 15 Nov 2016 ATTACHMENT A:

Environment Protection Authority's Air Quality Assessment Review RTS

The Environment Protection Authority (EPA) has undertaken a review of the Response to Submissions (RTS) report titled “Rixs Creek Mine – Continuation of mining project Environmental Impact Statement Response to Submissions”, dated 20 October 2016, in relation to the Rixs Creek Coal Mine Extension Project, SSD 8300. The EPA has also reviewed the documents titled “Air quality and greenhouse gas assessment, Rixs Creek continuation of mining project” by Todoroski dated 26 August 2015 (Todoroski 2015) and the Environmental Impact Statement dated 26 October 2015. The EPA provides the following comments in relation to air quality matters.

Estimated Impacts from the proposal

The assessment predicts exceedances of the air quality impact assessment criteria at non-mine receptors as summarised in the table below, taken from Todoroski 2015.

Impacts greater than criteria – non-mine receptors

Receptor ID	24-hr					Annual			
	PM_{10}					PM_{10}	$PM_{2.5}$	TSP	dust deposition
	50	cumulative # extra days				30	8	90	4
crit	year max	2017	2020	2023	2026	year max	year max	year max	year max
1	2020 71 2023 77	2	21	32	4	2020 34 2023 36			
19		1	1	3	1				
61		2	5	5	4				
140		3	2	4	1				
161		1	1	2	1				
163		3	3	1					
164		1	1	1	1				
170						2017 79 2020 100 2023 103 2026 99	2017 14 2020 16 2023 17 2026 16		2020 5.3 2023 5.4 2026 5.3
171						2017 41 2020 47 2023 46 2026 43	2017 9 2020 10 2023 10 2026 9	2020 101 2023 99 2026 95	
172						2017 43 2020 39 2023 39 2026 34	2017 9 2020 9 2023 9 2026 9	2017 92	
173						2017 37 2020 37 2023 36 2026 33	2017 9 2020 9 2023 9 2026 9		
174						2017 35 2020 36 2023 36 2026 39			
175						2017 38 2020 39 2023 38 2026 36	2017 9 2020 9 2023 9 2026 9		
176									

Rixs Creek planned 40yr Mine Life approval in 1995 included Air Quality Assessments for 22nd year 2018, only for Annual Average **Dust** Deposition & **Dust** Concentration levels; with 24 Hour TSP (<50um) HVAS sampling at Singleton Heights, Retreat and East of the Mine. Most common winds were NNW-SE or SSE, as now illustrated.

More Residents now live SE of Mine Pollution Plumes.

Mine Polluted Air Drifting SE Patterns impact Singleton Heights; as does the Diesel Exhausts of the New England Hwy & Coal Trains, & Power Stn Fly Ash Plume drifts.

RIXS CREEK MINE COMMUNITY CONSULTATIVE COMMITTEE MEETING MINUTES –27/05/2014

Rehabilitation has been designed to shield the operation from nearest residences / townships to move away aligned to production rates.



Red = 1989 Population area. Green = 2013 Population area.

In the Hunter Valley the “*Corridors of Mine Air Pollution*” are observed to generally Drift across the Valley floor on the NNW-SE and SSE Corridors, as well as into Microvalleys pockets adjoining the Escapements.

The 1995 Rixs Creek Mine Consent apparently recognised these impacts by limiting Mine operation when Air Drifting Wind Velocity was adjudged at the time to impact Camberwell, Maison Dieu and Singleton Heights. **Perhaps this continues today!**

AIR QUALITY	
23. (i)	The Applicant shall cease all mining operations at any time when the average hourly wind velocity from any direction exceeds 10 m/s.
(ii)	The Applicant shall cease all out-of-pit overburden dumping and shaping, topsoil stripping and emplacement and bund wall and earthworks construction at any time when the average hourly wind velocity exceeds 5.6 m/s from the segment due west clockwise through to the northeast.
(iii)	The Applicant shall cease all mining operations at any time when visibility is impaired on the New England Highway as a result of mining operations in accordance with the requirements of the Council.

DUST SUPPRESSION	
24. (i)	The Applicant shall provide a standby water cart for each operating water cart proposed in the EIS at each stage of mining.
(ii)	the Applicant shall install automatic water sprays on the coal stockpiles such that the stockpiles are sprayed when the wind speed from any direction exceeds 5.6 m/s.
Automatic water sprays have been installed on coal stockpiles in compliance with this condition. Refer to Section 3.8. As part of the future operations it is proposed that adequate road watering equipment will be available for the scale of the operation.	
ENVIRONMENTAL OFFICER	
25.	Prior to the commencement of any construction or operations in the coal lease application area the Applicant shall appoint an on-site environmental officer responsible directly to the mine manager whose qualifications are to the satisfaction of the Department.

Today, SSHEG calls for a Culture Change to “*Minimise Mine Air Pollution Emissions at their every source*”. **Our comprehensive 10 years Air Quality Health investigations outlined below are worthy of further consideration by all as a way forward.**

It is no wonder that NSW Health would not water down its objections to the guidelines to Mine Approvals, rightly reminding the Authorities, as is also the SSHEG opinion, that lower Mine Pollution well below the “Industry Status Quo” are now overdue.

That is “*Minimisation of Mine Pollution At all times*”.

Thanking you in anticipation of your acknowledgement.

Dr Neville Hodkinson PhD

Singleton Shire Healthy Environment Group

Singleton Shire Healthy Environment Group

“Singleton Air Pollution Health Concerns”



A community-based group looking to address Environmental issues affecting Singleton Shire residents

P.O. Box 626

Singleton NSW 2330

ssheg@hotmail.com

Author: Dr Neville Hodkinson PhD

We seek identification as to what is making our Children and Community Sick so they can be mitigated by OH&S Compliance Orders.

SSHEG Focus on Health

SSHEG is Not Anti Mining or Anti Power Stations

18 May 2019

Independent Planning Commission NSW

Level 3, 201 Elizabeth St.

Sydney NSW 2000

Email: ipcn@ipcn.nsw.gov.au

“Priority Community Hunter Valley Air Pollution Action needed”

SSHEG and Health Concerned Residents as “Near Neighbours to Open Cut Mines” are asking the Question: -

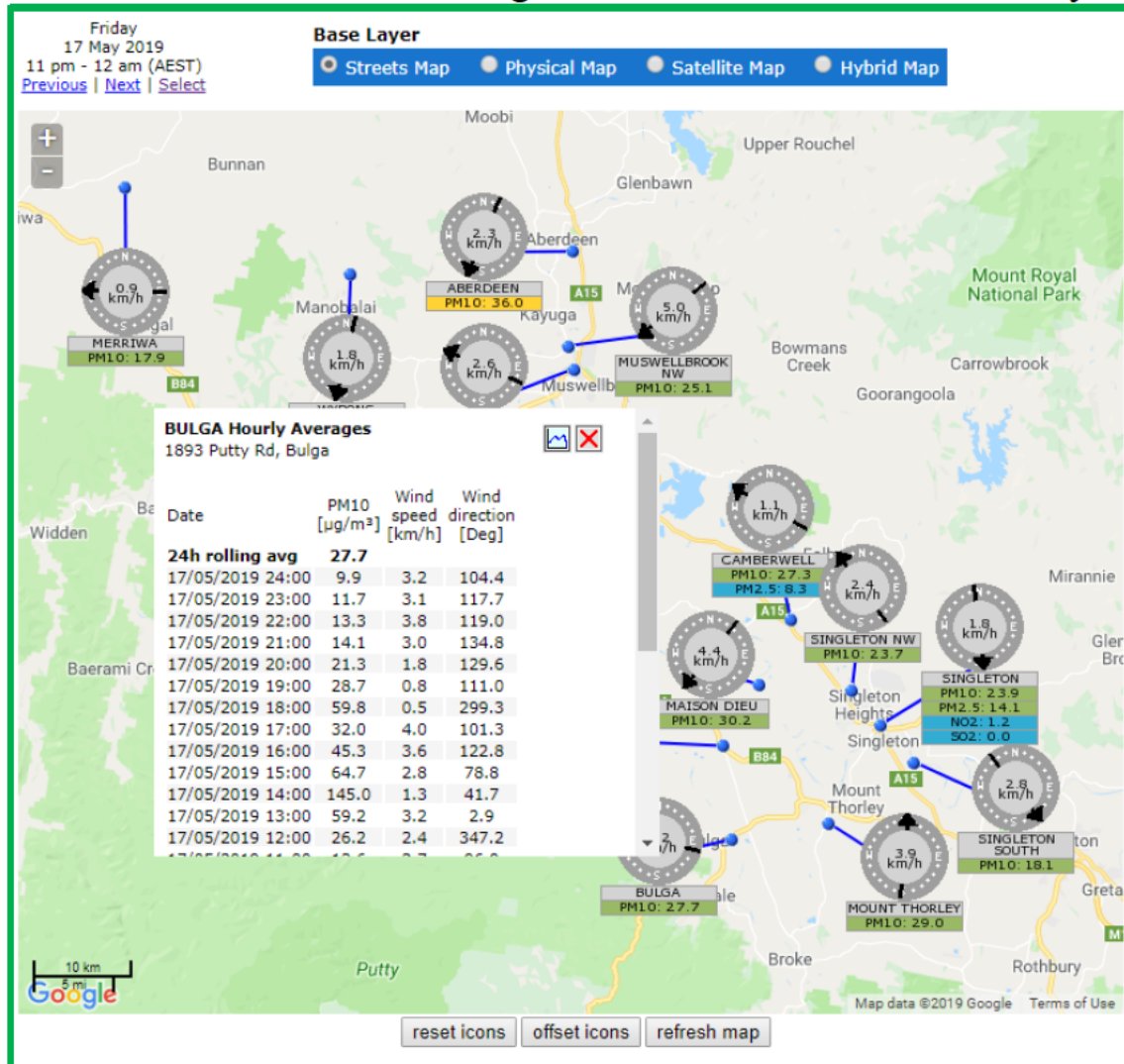
“Why after 10 years of Community detailing the observed Diseases impact of sudden exposure to Mine Air Pollution; three years NSW Health, CSIRO & ANSTO Research 2010 -2013; WHO Air Pollution & Disease Declarations Oct 2013; eight years Upper Hunter Mining Dialogue, Mines, EPA & OEHS initiatives 2011- 2017; after all this combined effort; why are Singleton GP’s again reporting worsening Pollution related Community Disease in 2019?”

The answer seems to lie in the **Mine focus to Minimise Dust** as detailed in **MD Video**, while the **World Health Organisation** Disease Impacts of 2013 were reporting on 40 years of Medical Research identifying Particulate Matter PM10, PM2.5 and PM1; **target to Minimise PM2.5 Fine and PM10-2.5 Coarse**. <https://youtu.be/q4TojwxKVRQ>

SSHEG concludes that Singleton Town and Near Neighbours to Rixs Creek Mine are being exposed to excessive levels of Valley Air Pollution Drifting Patterns and Blast Plumes that often return to Ground.

SSHEG considers that IPC should in the case of Rixs Creek Mine limit Operations so as to Minimise the Cumulative PM10 below the 1 Hr 50 ug/m3 at each and every identified locality by continuous monitoring as they exhibit the key Air Drifting Patterns; such as Singleton Heights, Gowie, Camberwell, Mc Dougalls Hill, Country Acres Caravan Park; and especially Komodes Rural on Rosella St the subject of numerous Rixs Creek Mine Blast Fume and Sickness reports to SSHEG.

Further, SSHEG 10year review concludes that Mines now operate to target not to exceed the **Daily 24 Hr Average PM10 at midnight of 50ug/m³**(Compliance). 10 years ago PM10 monitoring was at its infancy with the focus on Mine Deposition Dust, but now in 2019 rather than Minimising PM10 levels, Mines are “observing” PM10 monitors at resident locations to exceed 50ug/m3; and for several hours in daytime.



How does the WHO/IARC declaration that the **Rate of Rise of PM Fine and Coarse above background PM levels impacts the Human Disease susceptibility of especially certain groups, children, elderly, COPD, Asthma, Respiratory, etc ?**

The Rural areas of the Hunter Valley (those outside the major towns of Muswellbrook and Singleton) exhibit their PM10 Backgrounds that hovers around 5 ug/m³, and clearly rise as Mine Air Pollution Drifting Pattern impact these otherwise rural localities.

WHO Air Exposures Types relate to Rural Children going to Singleton Town Schools where the PM Human Disease Response Rises as the **1Hr Average PM10** levels rise from say their Rural Background of 5-10 ug/m³ to higher Singleton Town PM10 level often to 55 – 75+ug/m³ over several hours throughout the Day. These daily exposures with these Rate of Rise PM10 Impacts are known to contribute to Diseases of the type being reported by Singleton GP Dr Au.

HERALD News

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SEPTEMBER 5 2018 - 11:00AM

Doctors invite NSW Government ministers for a coalfields stay to experience air pollution first-hand

Joanne McCarthy Local News

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Doctors say government ministers should breathe Upper Hunter air before approving more coal mines.

HUNTER doctors have taken the unprecedented step of inviting government ministers to stay overnight near Upper Hunter coal fields and experience

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- SUPER FUND EXPERTS**
Self Managed Super Fund experts since 1976.
0249... Show Number
- Cosmetic Plastic Surgery - Dr John Newton**

Also, with Mines **Minimising Dust** rather than **Minimising PM10 and PM2.5 at Resident locations**, it is not surprising that our Singleton GP Doctor Au is repeating his call in 2019 that fell on deaf ears in 2008.

Perhaps then, it's also our Rural localities Residents, many as “Near Neighbours to Mining” that are exposed to the Mine Air Pollution Drifting Patterns of sudden and sustained Rises in Particulate Matter on multiple days and nights that explains the Disease Survey reports made to SSHEG in 2008.

Meanwhile, in recent years since 2016 Mines seem content to continue Operations as long as the Upper Hunter Air Quality Monitoring Network (UHAQMN) of PM10 Monitors are not, or likely in the next hour to report, a Community Mobile Phone SMS Air Quality Alert, eg “*Air Quality Alert, Maison Dieu levels exceeded national air quality standards day date & time*”.

However, the provisions of the “Air Pollution Act” calls for **“all reasonable measure and feasible measures are taken to minimise human exposure to PM”**,

and this is alongside the other Community Health issued detailed by NSW Health- Hunter New England (extract below) of Attachment 1 that should relate now to all Mine in the Hunter Valley and beyond.

Air Quality

There is no evidence of a threshold below which exposure to particulate matter (PM) is not associated with health effects. Therefore, it is important that all reasonable and feasible measures are taken to minimise human exposure to PM, even where assessment criteria are met.

On 15 December 2015, the National Environment Protection Council (NEPC) agreed to vary the National Environment Protection (Ambient Air Quality) Measure (NEPM). The amending instrument took effect on 4 February 2016. The new standards are as follows:

Pollutant	Averaging Period	Maximum concentration standard	Maximum allowable exceedances
Particles as PM ₁₀	1 day	50 µg/m ³	None
	1 year	25 µg/m ³	None
Particles as PM _{2.5}	1 day	25 µg/m ³	None
	1 year	8 µg/m ³	None

Reference: <https://www.legislation.gov.au/Details/F2016C00215>

The EIS explains that, at the time of preparation of the report, the Environment Protection Authority (EPA) had not yet prescribed changes to the air quality criteria for NSW following the amendment to the NEPM. However, it would be expected that the EPA will introduce the amended criteria within the foreseeable future, and the EIS should have taken this into account.

What the Community of Singleton Shire is asking of IPC and NSW Planning is that any Mine approvals be required at all times for Resident's PM10 not to exceed the NEPM 50ug/m3 limit, and that Mine further operate well below this upper limit to “*Minimise the PM10 and PM2.5 Rate of Rise frequency*” at Continuous Monitoring localities where Residents are being exposed to Mine Air Pollution Drifting Patterns.

SSHEG considers that Planning, IPC and EPA Approvals conditions need to require Mines to continuously trace their Air Pollution Drifting Patterns from their source, and understand the Air Pollution Drifting Patterns both entering and exiting their Mine leases, and especially cease operations where any Resident Localities impacted by these changing Air Pollution Drifting Patterns are exceeding NEPM guidelines.

Therefore, both PM10 and PM2.5 Monitoring of known Mine Blast Fume & Odour and Air Pollution locations now becomes mandatory for Community Disease Protection.

Five years on from the WHO/IARC 2013 declaration on “*Particulate Matter PM2.5 and Disease*” many overseas Countries lead the change to PM2.5 monitoring throughout the Community at Risk.

SSHEG Community Healthy Living focuses upon Mine Pollution Disease Impacts on Residents - breath by breath; insisting that mines Mitigate Pollution by “*Minimising to World Health Organisation ongoing identified Guidelines*” over each 15 Minute period, of Cumulative Locality readings for PM10 and PM10-2.5 & PM2.5: Health Studies are researching these issues today.

That is the Healthy Air we Breath criteria.

It is no wonder that NSW Health would not water down its objections to the guidelines to Mine Approvals, rightly reminding the Authorities, as is also the SSHEG opinion, that lower Mine Pollution well below the “Industry Status Quo” are now overdue.

That is “*Minimisation of Mine Pollution At all times*”.

It’s Mine Dust versus Resident’s Particulate Matter Disease Impacts!

Five years on from October 2013, when the World Health Organisation, International Agency for Research on Cancer, and Lancet Declarations of the Disease Impacts from Exposure to Particulate Matter in the Air we Breathe, ongoing and targeted Medical Research are further detailing the various Disease pathways and mechanisms that are now evident from short term exposure to Particulate Matter in the Air.

This compelling Human Disease associations of Air Pollution “with no known Disease Threshold” remains the reason that the WHO, NSW Health and SSHEG in Submissions are as one voice calling for “Minimisation of Mine Pollution”.

We highlight here for further consideration our previous SSHEG Submissions - Attachments 1 to 5, and we also provide further detailing of Mine Blasting Stemming in Attachment 5 to substantiate our repeated calls for Industry to recognise “Elimination of Mine Blasting into the Atmosphere by better Stemming”.

What we see as “ORICA Mine Blasting of Dust Plumes” is not Best Practice Blasting!

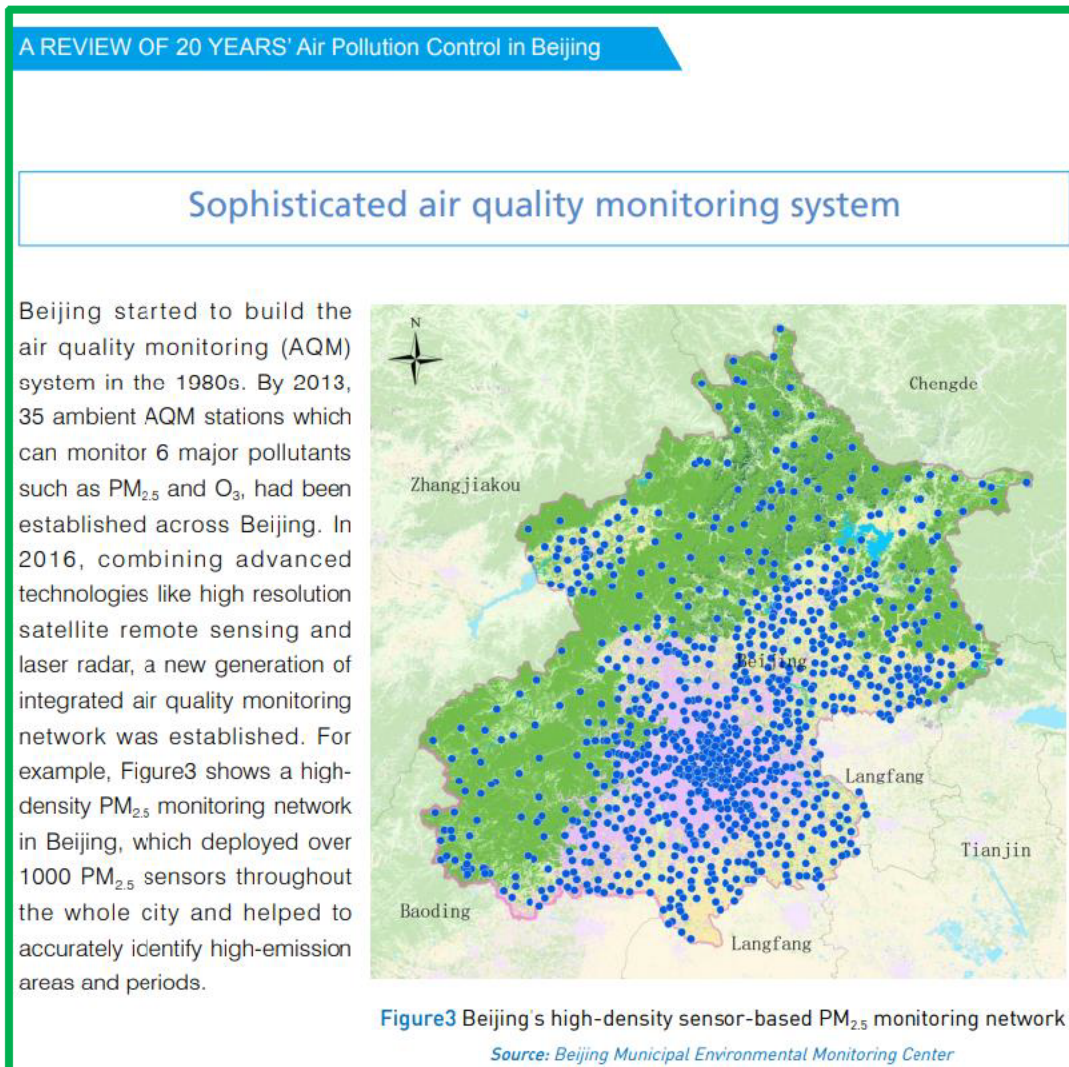
Attachment 5 details the technicalities involved in “Optimum Stemming” as follows:- “Stemming Ejection... Insufficient, inconsistent or ineffective stemming allows the blast energy to prematurely vent at the collar,...”

Thanking you in anticipation of your acknowledgement.

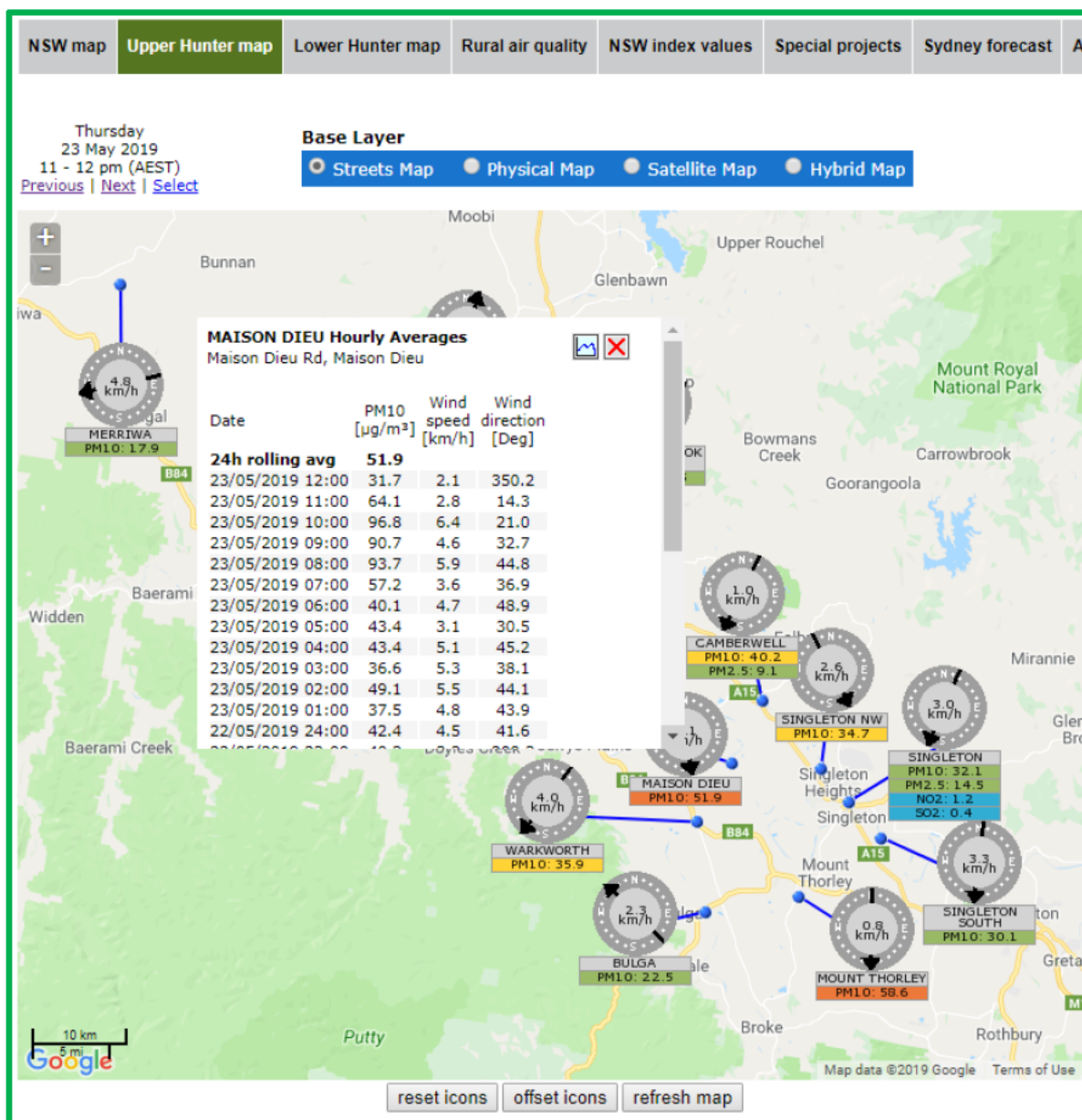
Dr Neville Hodkinson PhD

Singleton Shire Healthy Environment Group

- Attachment 1 NSW Health – Hunter New England Local Health District- Wambo Open Cut Mine 22 Sept 2016
- Attachment 2 SSHEG “Response to IPC Rixs Creek Report” Aug 2018
- Attachment 3 SSHEG Rixs Creek Mine Continuation Dec 2015
- Attachment 4 SSHEG Rixs Creek South Mod 10 – March 2019
- Attachment 5 ORESOME Better & Safer Blasting, p 1-13 By G. Tobin Sept 2013



“Singleton Residents Question the basis of Mine Air Pollution Mitigation Controls in 2019”



“Singleton Residents Question the basis of Mine Air Pollution Mitigation Controls in 2019”

Table 4 Controlled emissions from PKCT activities during the 2015/16 NPI reporting period

Activity		TSP Emissions (t/year)	PM ₁₀ Emissions (t/year)	PM _{2.5} Emissions (t/year)
Wind erosion	Coal stockpiles	51.1	25.5	3.8
	Bulk product stockpiles	12.7	6.3	0.5
	Exposed spillage areas	5.4	2.7	0.4
	Exposed cleared areas	1.4	0.7	0.1
Conveyors	Conveyors	14.3	5.2	1.0
Handling	Stacking	1.9	0.9	0.1
	Reclaiming	1.9	0.9	0.1
	Shiploading	1.2	0.6	0.1
	Transfer points	3.3	1.5	0.2
	Road receipt	0.7	0.3	0.1
	Rail receipt	0.4	0.2	0.0
	Bulk material handling	0.2	0.1	0.0
Vehicle movements	Unpaved areas	0.3	0.1	0.0
Total		94.7	45.1	6.5

Katestone Environmental Pty Ltd

D16067-5 Port Kembla Coal Terminal


Environmental Improvement Program – Particulate Matter Control Best Practice Study – Final

27 June 2017

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Table 2. Annual Particulate Matter Emissions given Partially Uncontrolled and Controlled 2011 Operations

Mine Activity Categories	Partially Uncontrolled			Current Controls		
	Annual Emissions (tonnes/year)			Annual Emissions (tonnes/year)		
	TSP	PM ₁₀	PM _{2.5}	TSP	PM ₁₀	PM _{2.5}
Wheel Generated Dust	25,389.00	7,781.56	778.16	6,347.25	1,945.39	194.54
Wind Erosion of Overburden	279.65	139.83	20.97	232.22	116.11	17.42
Loading/Dumping Overburden/Topsoil	1,123.82	619.01	72.72	853.34	464.84	55.68
Blasting	152.35	79.22	4.57	152.35	79.22	4.57
Bulldozing Coal	403.24	92.24	8.95	403.24	92.24	8.95
Bulldozing Rejects	60.75	11.65	1.34	42.52	8.16	0.94
Bulldozing Overburden/Topsoil	536.18	256.03	89.92	536.18	256.03	89.92
Wind Erosion of Exposed Areas	198.90	99.45	14.92	180.63	90.31	13.55
Wind Erosion of Coal Stockpiles	17.70	8.85	1.33	12.39	6.20	0.93
Material Transfer Rejects	2.11	0.45	0.04	2.11	0.45	0.04
Trucks unloading Coal (hopper)	302.60	43.52	5.75	302.60	43.52	5.75
Loading Coal Stockpiles	122.13	17.79	2.36	121.37	17.52	2.32
Graders	469.96	128.81	14.57	117.49	32.20	3.64
Drilling	48.44	25.19	1.45	14.53	7.56	0.44
Coal Crushing	254.77	101.91	38.22	38.22	15.29	5.73
Loading Coal to Trucks	151.30	41.34	5.75	151.30	41.34	5.75
Material Transfer of Coal	5.93	2.67	0.40	3.87	1.81	0.27
Train Loading	1.09	0.38	0.06	0.33	0.11	0.02
Other Crushing (waste rock)	1.43	0.57	0.22	1.43	0.57	0.22
TOTAL	29,521.34	9,450.47	1,061.68	9,513.36	3,218.88	410.66



ENVIRON

Appendix H Air Quality Peer Review Wilpinjong 15 July 2016

Table 2: Source specific particle size distribution

Emission Source Type	Percentage by Particle Size		
	TSP-PM ₁₀	PM ₁₀ -PM _{2.5}	<PM _{2.5}
Unpaved Roads	72.4%	24.8%	2.8%
Bulldozer on coal	82.5%	15.3%	2.2%
Bulldozer on overburden	77.9%	11.6%	10.5%
Overburden Handling	52.7%	40.1%	7.2%
Coal Handling	86.9%	11.2%	1.9%
Unpaved Roads	72.4%	24.8%	2.8%
Value used in AQIA for all sources	60.9%	34.4%	4.7%

Attachment references SSHEG Rixs Creek Mine Continuation Dec 2015

- Attachment 1** SSHEG Document March 2014
 - Mining Pollution Mitigation Priority Action
 - Blasting Pages 1 -10.
- Attachment 2** SSHEG “Elimination of Mine Blasting into the Air” April 2014
- Attachment 3** Report on MTW Blast 20th Sept 2013 BOC Workers “Gassings”
- Attachment 4** SSHEG Presentation of Community Health Concerns 2013
- Attachment 5** SSHEG Review Summary May 2015
 - incl Mining Dialogue Summary 2011 – 2014
 - Appendix M7 SSHEG Review 2015 Presentation Pgs. 38–40.

Singleton Shire Healthy Environment Group

“Rixs Creek South Continuation October 2019”



1 October 2019

Independent Planning Commission NSW
Level 3, 201 Elizabeth St.
Sydney NSW 2000
Email: ipcn@ipcn.nsw.gov.au

A community-based group looking to address Environmental issues affecting Singleton Shire residents

P.O. Box 626
Singleton NSW 2330
ssheg@hotmail.com

Author: Dr Neville Hodgkinson PhD

We seek identification as to what is making our Children and Community Sick so they can be mitigated by OH&S Compliance Orders.

SSHEG Focus on Health

SSHEG is Not Anti Mining or Anti Power Stations

“Rixs Creek South Continuation SSD6300 Air Quality Review”

SSHEG concurs with the ongoing NSW Health concerns, and respectively point out to the IPC Commissioners the fallacy of relying on the Good Nature of Mine Operators for Mines to “*Minimise Air Pollution downwind of these Rixs Creek Mines*” by relying upon wording in “*Conditions of Consent*” to safeguard Singleton Resident’s Health.

On behalf of the Singleton Community, we reaffirm our resolve for three Conditions to be affectively implemented: -

- 1) “Eliminate Visible Mine Blasting Plumes into the Atmosphere”, by
 - a) Smaller Blasts, and
 - b) Improved Blast Hole Stemming Material & Depth Use.
- 2) Control Mine Operations to WHO Guidelines using a “New Mine Surrounding PM2.5 Network” for each 45degree quadrant.
- 3) Mine to progressive Shutdown Operations as Valley Drifting Air Patterns Cumulative 15 Minute PM10 and PM2.5 Readings exceed NSW Health Guidelines.

The extent of our resolve is evidenced in the recent preparation of Upper Hunter Mining Dialogue Project Proposal entitles “*Coordinated Coal Mining Air Pollution Mitigation Controls, Options as WHO & NEPM Standards lower in the Hunter*”. (Attachment 1)

This Proposal is the result of the SSHEG 10year Holistic Technical Review including 7 years of UHAQMN information; concluding that the Mine Air Pollution Drifting Flows at Ground Level, as EIS evaluations, are not representative of the actual Air Quality Exposures responsible for Diseases being reported by Singleton GP's.

Much of the SSHEG details are contained in previous Rixs Creek submissions, and they are included here (Attachments 2 - 4) to highlight the ongoing Singleton Community concern that relates not only to the closest Mine but also the Cumulative Pollution Exposure Impact for Singleton Shire Residents from all Open Cut Mines and Power Stations throughout the Upper Hunter Valley.

Regarding Attachment 2 AQ Addendum Report - “*Air Quality Impact on Camberwell*” we note no specific provision to Minimise Air Pollution below the NEPM Standard PM2.5 @7ug/m3 in effect in 2025. Recognition of the Camberwell Resident's Disease Status or statistics are sadly lacking.

We question the Legal Weight of Attachment 1D – SOC 5Mar19 “*Statement of Commitment dated 5 March 2019*”, and consider the Rights of those Residents being affected by Mine Pollution be afforded equally by IPC the same rights that Mining provides the NSW Communities.

Thanking you in anticipation of your acknowledgement.

Dr Neville Hodgkinson PhD

Singleton Shire Healthy Environment Group

- Attachment 1 “*Coordinated Coal Mining Air Pollution Mitigation Controls, Options as WHO & NEPM Standards lower in the Hunter*” Upper Hunter Mining Dialogue Project Proposal for Emission and Health Group, Sept 2019
- Attachment 2 SSHEG “*Rixs Creek South Mod 10 March 2019*”
- Attachment 3 SSHEG “*Singleton Air Pollution Health Concerns, Priority Community Hunter Valley Air Pollution Action needed*” 18 May 2019”.
- Attachment 4 SSHEG “*Response to IPC Report Aug 2019*”