# REVIEW of Hunter Valley Mining Dialogue 2011 to 2014

SSHEG

SINGLETON SHIRE

HEALTHY ENVIRONMENT GROUP


# SSHEG DOCUMENT MAY 2015

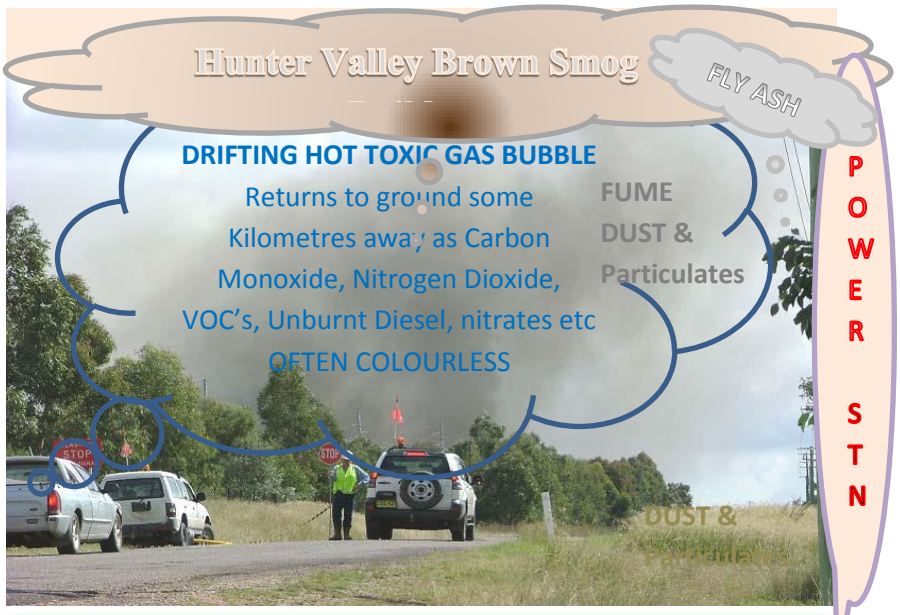
## *Mining Pollution Mitigation Priority Action*

Following four(4) years of NSW Government Authorities investigations into Air Pollution in the Upper Hunter Valley, it took the World Health Organisation (WHO) announcement in October 2013 to confirm the connection between Air Pollution and Human Cancers. – " A GAME CHANGER"

Document prepared to identify the SSHEG expectations and the Pollution areas in which investigations were expected to have been reported upon.

# SSHEG Visualisation of Air Quality Issues

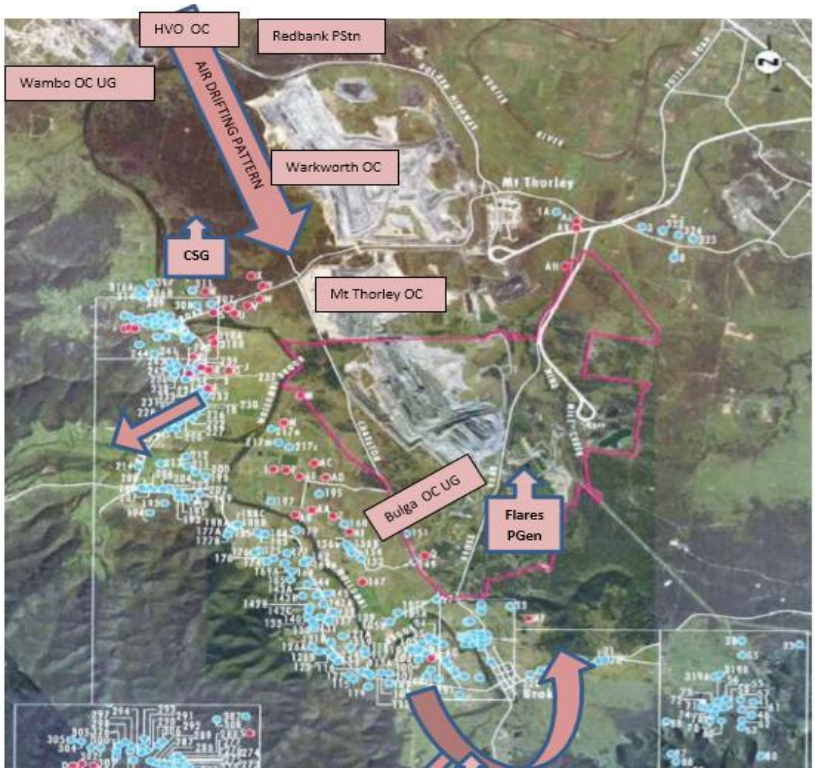
## Mine Blasting Dust & Drifting Plumes




**AIR POLLUTION in the BULGA BROKE MICRO VALLEY**

**Micro Valley Study of Mining coexisting with Residents, Farming, Vineyards and Horse Studs in the Hunter Valley of NSW Australia**

NOISE DUST

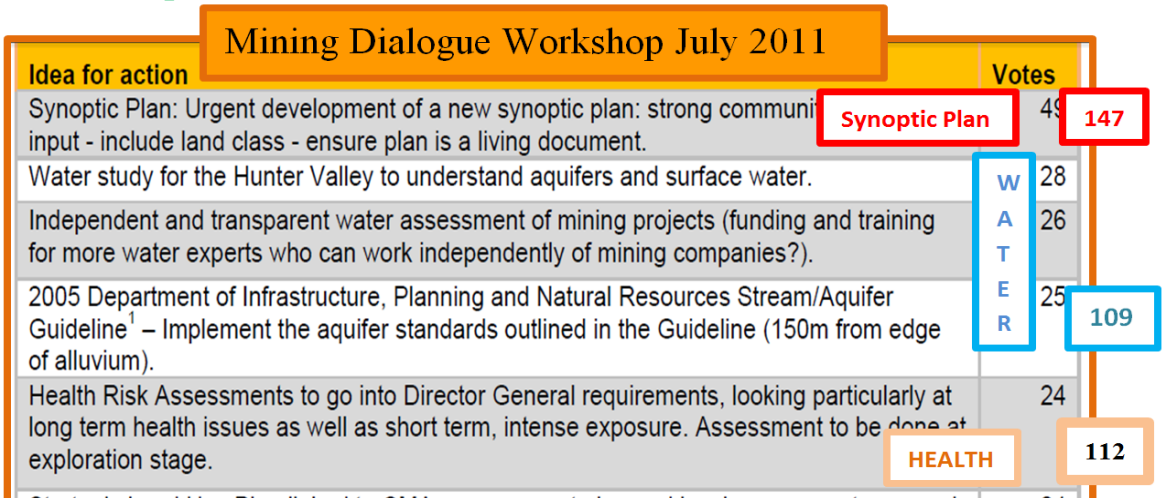



## Coexistence : Fact or Fiction

## SYNOPSIS

The last four years for the Hunter Valley Mining Dialogue has focused on many of the "*Ideas for Action*" identified at the July 2011 Mining Dialogue (MD) Workshop.

The SSHEG Review examines against **Appendix M1** the degree to which the four years of the MD have addressed SSHEG concerns, and specifically aims to identify where a renewed focus is warranted given the developments and findings of the four individual MD Joint Working Groups; Synoptic Plan, Water, Emissions & Health and Social Impact.




"*Stakeholder Workshop Report, Upper Hunter Mining Dialogue, 2011 Report*" extract

Clearly as the Primary SSHEG "***Focus is on Health***", it is evident that the Highest Priority "*Idea for Action*" in the Emissions and Health Working Group, namely "**Health Risk Assessments**" has made little progress and now needs Urgent progress. This view is further reinforced by the Health Risk Theme contained in the SSHEG 2009 submission detailed below.

**SSHEG Submission to NSW Government 11 Nov 2009 is an urgent call for an Independent Scientific Study for Singleton Shire Residents; to:-**

1. ***ascertain the health status of the residents of Singleton Shire relative to State averages and other relevant comparators;***
2. ***identify and quantify health risks associated with air and rural rainwater quality;***
3. ***provide real-time, independent monitoring of industrial emissions in the air of Singleton Shire, with composite analysis, and easy public access to the information it generates, and a transparent mechanism for redressing any risks that are identified;***
4. ***investigate the relationship between industrial emissions in the Singleton Shire and the health of the residents;***
5. ***monitor and report pollutant loads in water tanks, especially in rural areas of the Shire that are dependent on rainwater for all purposes.***

By December 2010 SSHEG outlined issues of concern in a Community Reporting Presentation; "*What do we expect of the Expert Advisory Panel*" ( ***Appendix M8***)

Now five years later in 2015 a better understanding of the Hunter Valley Air Quality Metrics and Pollution Emission Sources has emerged including how they can interact with "Near Neighbour's and the Singleton Shire Communities Health and Disease.

Human Disease Risk from Air Pollution has been confirmed by WHO Oct 2013 Air Pollution Carcinogen announcements (**H 22**), having taken 30 to 40 years of Epidemiology Cohort Studies to achieve this.

Further detailing of ***Appendix M8*** concerns are now summarised in the SSHEG 2014 Health Study Progress Report ( ***Appendix M9***)

All things being considered, eight key issues are couched during this review to better target and refine the Pollution – Human Disease Short Term(15 Minute) Exposure understanding with a view to further enhancing Pollution Emission Mitigation Controls recently developed in the Hunter Valley.

**The SSHEG Review 2015 "Focus on Health" Priorities are summarised as follows:-**

1. **Health Risk Assessments**
2. **Cumulative Health Impacts – Air Quality & Noise**
3. **New Health Research Methods need to be developed for Health Study approaches for small Community Localities.**
4. **"Near Neighbours are Occupationally Exposed Persons to Mining" , and especially from Returning to Ground Mine Blast Plumes.**
5. **24Hr continuous Particulate Matter PM10 Realtime Monitors at around 76 locations are mostly under utalised for reducing Dust and Pollution Emissions.**
6. **"Data Averaging" distorts the Pollution Emission reporting; while at the same time they equate "Average Values as though they are indicative of Resident's Minute to Minute Pollution" Exposures and Disease Risks.**
7. **Holistic Technical Investigation using Particulate Real Time Monitors (PM10, PM2.5 & PM1) and the collection of Airborne Particulates on special Filter Media and their Composite Analysis and Source Identification.**
8. **Definitive Air Composition and Speciation Analysis, from which the Health Risk considerations may be evaluated for Short Term (15 Minute Exposures) leading to better targeted Pollution Mitigation Controls to safeguard the Health of the Community.**

***Refer Appendix M7 for SSHEG MD Review Tabular Comparison Presentation with Comments.***

# 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 utalised 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.**

# Context of the SSHEG MD Review

It was the Respiratory Health especially of School Children and unusual Community Diseases that caused alarm for Singleton's local General Practitioner Dr Au around 2005. After little recognition and although Alerted to this, the NSW Health Authorities initially failed to act regarding the reported Community perceived association between Resident's Disease prevalence and the quickening pace of Open Cut Mining and Coal Fired Power Stations Pollution Emissions.

Earlier in 2000 the location of "*Sydney's Super Waste Disposal Dump in Mine Voids*" (**H2 p99**) began to identify the Pollution impact on "*Near Neighbours to Mining and Power Stations in the Hunter Valley*"; with effective "*Real Time Monitoring and Analysis*" being needed to understand the Scope of the Disease Threat to the Rural Communities.

**Placing Mine Pollution Emission Sources in and amongst Farming Families without "*Buffer Protection Zones*" is the "*Heart of the Human Disease Risk*".**

The enclosed nature of the Hunter Valley and the concentrated presence of Coal Reserves located beneath Rich Agricultural Land, and with Open Cut Coal Mines digging it out beside Farmers ploughing their land, all exasperate the rapid deterioration in Air Quality particularly for these "Near Neighbours".(**H2 p 35 Map 9**)

The Response came in 2010 when the NSW Government Authorities and Agencies; initially with Dr Au, Singleton Shire Healthy Environment Members and NSW Department of Health; and then over four years together with Major Hunter Valley Industries; and later with a broadening range of dedicated Community members including as an Open *"Mining Dialogue"* with Industry and Planning Leaders focused to Mitigate and Validate Community Health, Environmental, Planning and Social Impact Concerns.

The Mining Dialogue Mission Statements reads like this:-

***" The Upper Hunter Mining Dialogue is a new way for the Community, Government, and the Mining Industry to work together in the Upper Hunter to address the Cumulative Impacts of the Industry and the Growth of the Region".***

This SSHEG Review covers the period from the first Mining Dialogue (MD) Workshops in July 2011 and the three subsequent Workshops in 2012, 2013 and 2014. Overall between 50 to 90 Participants directly contributed throughout this period.

This Tabular Review Summary below examines the degree to which the four years of the Mining Dialogue have addressed SSHEG concerns.( **Appendix M1** SSHEG Mitigation Priority Actions List)

**Focus is on Mining Pollution Mitigation Priority Action**

**SSHEG PRIORITIES v/s MINING DIALOGUE PRIORITIES**

| No | SSHEG 2013 Review Top 10 Priority List | Mining Dialogue 2011 Workshop Emission & Health |
|---|---|---|
| 1 | **"Independent Health Study"**<br>Nov 2009 SSHEG Submission - NSW Gov.<br><br>2011 **Nelson# Speciation & Morphology** | 2011 **Health Risk Assessment@ location** & during Exploration Assessments (Held 2011)<br>2010 **NSW Planning Compliance Officers & Experts**<br>2013 NSW Environmental Health Reports released<br>2013 Mine Health Impact Consultancy (Gloucester) |
| | Oct 2013 **WHO** Carcinogen Classifications Air Pollution, Particulates, Diesel Exhausts | 2013 Particle Characterisation Study PM2.5 Air Quality Speciation (Held 2012) |
| 2 | 2009 **"Elimination of Mine Blasting Plumes into atmosphere"**<br>Dust, Fumes, Drifting Toxic Hot Gas Bubbles returning to Ground | 2011 NSW Health Expert Panel confirmed Toxicity (21 SE Qld Miners Hospitalised Kms away)<br>2012 NSW Planning **Best Practice (Colour) Blasting**<br>2015 NSW EPA Blast Fume Licence additions |
| 3 | 2012 **"Near Neighbours as Mine Occupationally Exposed"**<br>Underground Mine Air Quality Standards | 2011 UHAQMN & DUST STOP Programs & Audits<br>2013 **MD Weather Forecasting**<br>2015 NSW EPA Bad Days Analysis KPI's |
| 4 | 2014 **"Diesel Exhaust Pathways"**<br>Isodose Zones around Mines | 2014 Mining Dialog Train Wagon Pollution Review<br>2014 NSW EPA Newcastle Train Wagon Dust Study |
| 5 | 2010 Biological Asthma Susceptibility &<br>. **"Allergen Calendar"** | |
| 6 | 2009 **"Coal Fired Power Stations Stack Plume Gases targeting Toxic Fly Ash"** | 2012 **NO2 & SO2 Monitoring added to UHAQMN**<br>2014 **Rainwater Lead in Tanks MD Study** |
| 7 | 2009 **"Mining Noise Health Implications"**<br>Residents Night Sleep Disturbance | 2014 "CAR" Epidemiology Noise Disease Identified relates to Sleep Disturbances |
| 8 | 2009 **Air Quality Human Disease Risk Guidance( Averaging Issue)** | 1998 NEPM PM10 Standards @> 25,000 Population<br>2015 Draft NEPM PM10 & PM2.5 |
| 9 | 2009 **Hunter River Irrigation Water** | 1995 Salinity Trading Scheme<br>2012 **MD Water Accounting Framework Studies** |
| 10 | 2009 **Surface Land Rights against Mining** | 2011 **MD Synoptic Land Use Plan**<br>2015 NSW Planning Coexistance Debate<br>Refer Appendix 1 SSHEG Priority List 2014 |

Green NSW EPA & DPE Actions: RED Mining Dialogue Action: BLUE NSW Health:

This Review examines the degree to which the four years of the Mining Dialogue have addressed SSHEG concerns, and specifically aims to identify where a renewed focus is warranted given the developments and findings of the four individual MD Joint Working Groups; Synoptic Plan, Water, Health and Social Impact.

Each of the MD Joint Working Group's "Ideas for Action" are detailed in **Appendix M2** entitled "*Stakeholder Workshop Report, Upper Hunter Mining Dialogue, 2011 Report*"

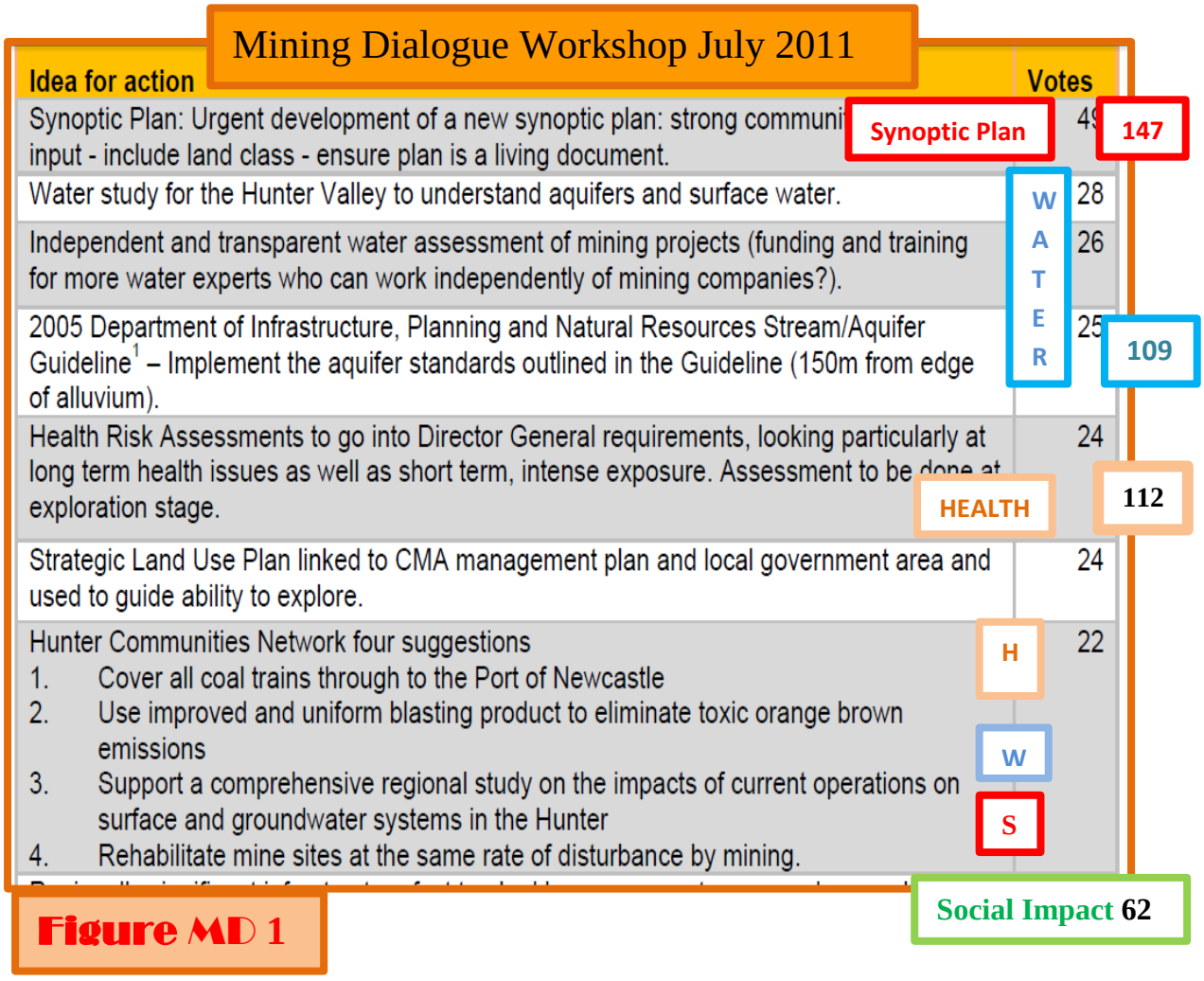



**Figure MD 1**

The MD 2011 Workshop identified and prioritised the competing Issues from the broad range of participants; establishing Four Joint Working Catagories as illustrated; namely

(1) **Water** - 19 participant Groups
(2) **Synoptic Plan** - 25 Land Management
(3) **Social Impacts** - 9 Housing Research
(4) **Emissions & Health** - 18 Air Quality, Dust, Noise

# Stakeholders Top 10 Priorities in 2010

The NSW Minerals Council also in 2010 sought guidance from ACCSR: Australian Centre for Corporate Social Responsibility to gauge the Hunter Valley Stakeholders Priorities based on methodologies that address Sustainability Risk Management.

The ACCSR Mission Statement for Corporate Social Responsibility reads like this:-

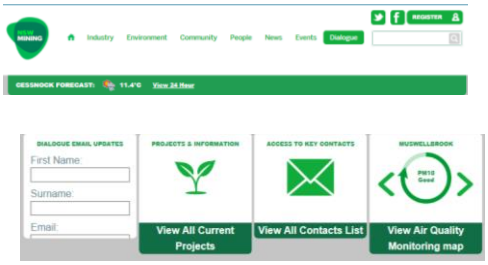
***" Social Responsibility is the responsibility of an Organisation for the Impacts of its Decisions and Activities on Social and the Environment, through Transparent and Ethical Behaviour That;***

- ***Contributes to sustainable development, including the Health and the Welfare of Society***
- ***Takes into account the expectations of stakeholders***
- ***Is in compliance with applicable law and consistent with international norms of behaviour, and***
- ***Is integrated throughout the organization and practised in its relationships."***

#"*The Australian Centre for Corporate Social Responsibility (ACCSR) was commissioned to undertake a community survey so that the depth and nature of concerns could be better understood. The survey was conducted by ACCSR between October and November 2010. A total of 93 organisations and individual opinion leaders participated. The results are important for the industry, providing us with a clear indication that there is a high degree of concern that we need to thoroughly understand and respond to".*

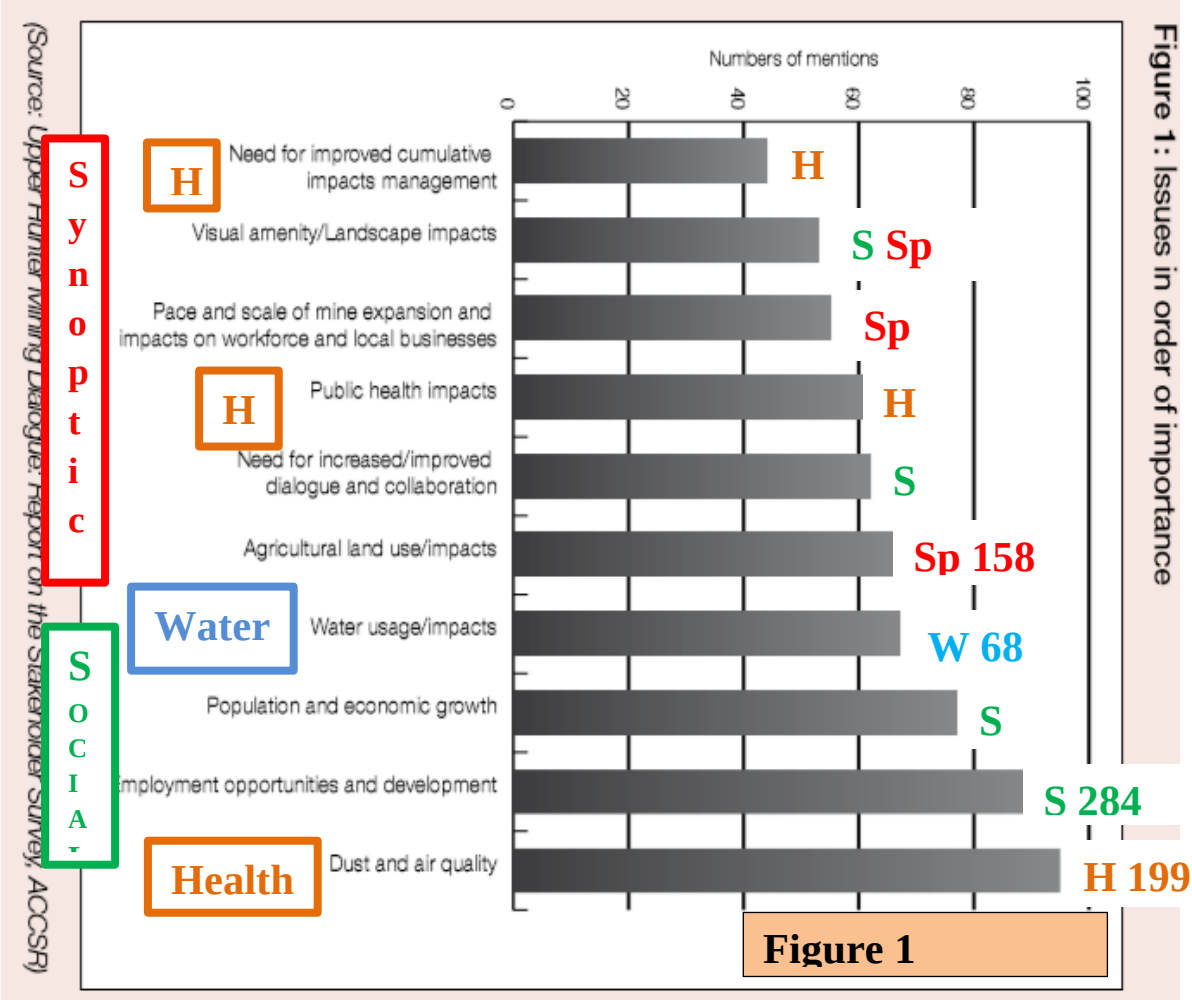
#( refer ACCSR Upper Hunter Mining Dialogue Report on the Stakeholder Survey for the NSW Minerals Council April 2011)

www.nswmining.com.au/dialogue/home




Mining Dialogue Web Site reference

# ACCSR Stakeholders Top 10 Priorities




The above Top 10 Stakeholder Priorities Figure 1 (with SSHEG annotations) come from six High Level Categories of Topics, and when these outcomes are directly compared to MD Workshop 2011 **Figure MD1** outcomes; they both reinforce how the "*Perceived Community Disease association with Mining*" and the SSHEG mission "*Focus on Health*" warrants better understanding and a higher priority MD action directed to mandate "**Health Risk Assessments**"; renewing the SSHEG and Dr Au's 2008 focus calling for an "**Independent Health Study**".

The ACCSR Report in many ways is more representative of the "*Community disquiet regarding Open Cut Mining in the Hunter Valley*" than the MD Workshop 2011 "*Ideas for Action*" approach due to the broader scope of the interview and scoring process that "*Reflects the fact that people often talked about issues in a number of ways, and often returned to an issue multiple times over the course of the interview*".

The Prime Health significance detailed in ACCSR **Figure 1** above, are compared to the MD Workshop 2011 **Figure MD1** "Ideas for Action" , and further detailed in ACCSR Figure 8 "*Environment, Health and Safety*", and Figure 9 *Economy, employment and income topics*", (**Appendix M2**) mostly dominating the response densities.

Each Figure (8 -11) identifies 74 Topics mentioned against the nine interest based Stakeholder Groupings. "*The larger the bubble, the more times the issue has been mentioned by a group indicating that this is a priority issue for this particular group. This reflects the fact that people often talked about issues in a number of ways, and often returned to an issue multiple times over the course of the interview*".

In particular the Community Health surveys reported by SSHEG in 2008-9 are in line with outcomes shown in Figure 8 with the concentration of bubbles on "*Dust and Air Quality*" and "*Public Health Impacts*".

Again in the MD Workshop 2011 **Figure MD1** the Highest Health Issue for Action is "*Health Risk Assessments …*"; and as below "*Air Quality Monitoring to go beyond Best Practice and tying this to Particle Identification and Speciation Analysis of Samples* " may provide the missing understanding to quantify these interrelationships. Subsequent Disease Risk emerged, in October 2013 as WHO carcinogen announcements regarding Air Pollution, Particulate Matter & Diesel Exhausts; and this was not known at the time of Priority setting.

| | | |
|---|---|---|
| **Dust, Air Quality, Noise and Health** | Health Risk Assessments to go into Director General requirements, looking particularly at long term health issues as well as short term intense exposure. The assessments to be done at exploration stage. | 24 |
| | Air quality monitoring to go beyond best practice (i.e. speciation analysis of samples, 2.5µm monitoring and 1.0µm monitoring). | 16 |
| | Industry to continuously improve dust suppression. | 14 |
| | All 'Air Quality Network' monitors should measure – 2.5 Micron (PM 2.5). | 9 |
| | Particle identification (speciation) along with particle size. | 9 |
| | Increase number of Department of Planning and Infrastructure/Department of Mineral Resources compliance officers for 24/7 coverage. | 8 |
| | Government to make experts available for community forums for information and Q&A. | 5 |
| | Have experts available (e.g. Chris Eiser from the Office of Environment and Heritage) to meet with the community to discuss and questions on dust monitoring and dust reduction. Mining industry to take on 'best to managing community (i.e. logging commitments | 5 |
| | Industry t ment best practice for fume management (blast fume | 5 |

HEALTH MD 2011

Mining Dialogue Workshop July 2011

# ACCSR Figures 8 & 9

Figure 8 represents the environment, health and safety issues mentioned by survey participants. The nine groups are listed on the left axis and the 13 issues identified are listed on the horizontal axis.

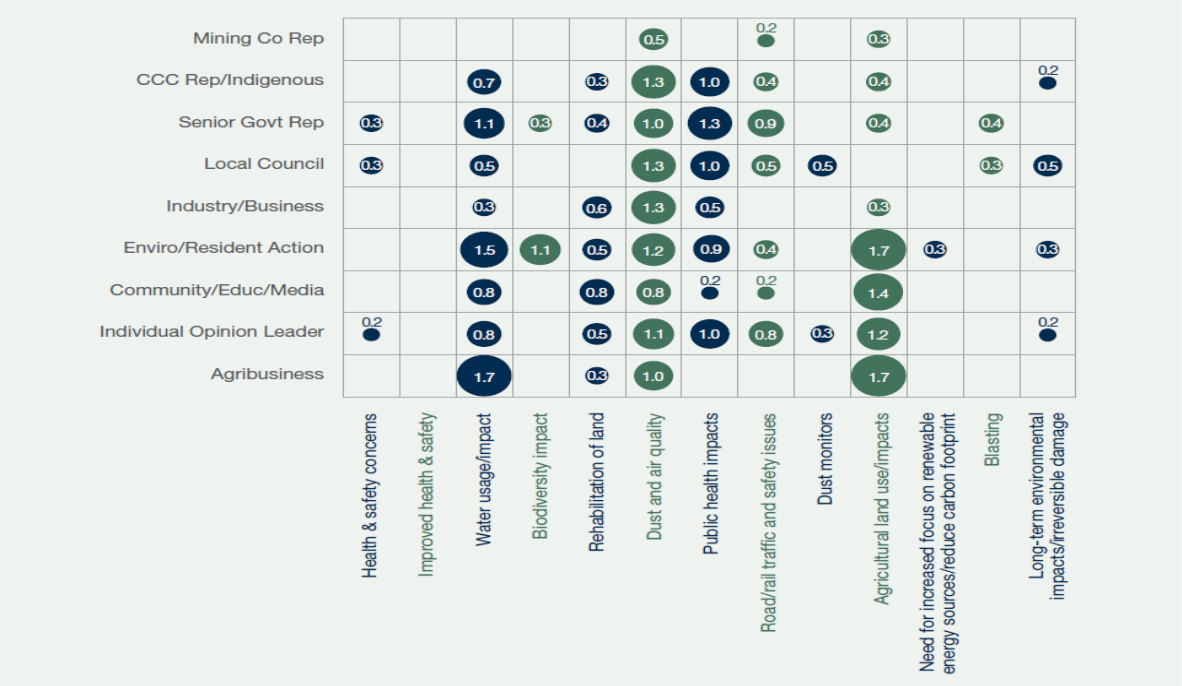



Figure 8: Environment, health and safety topics

Figure 9 represents the 14 economy, employment and income issues mentioned by participants.

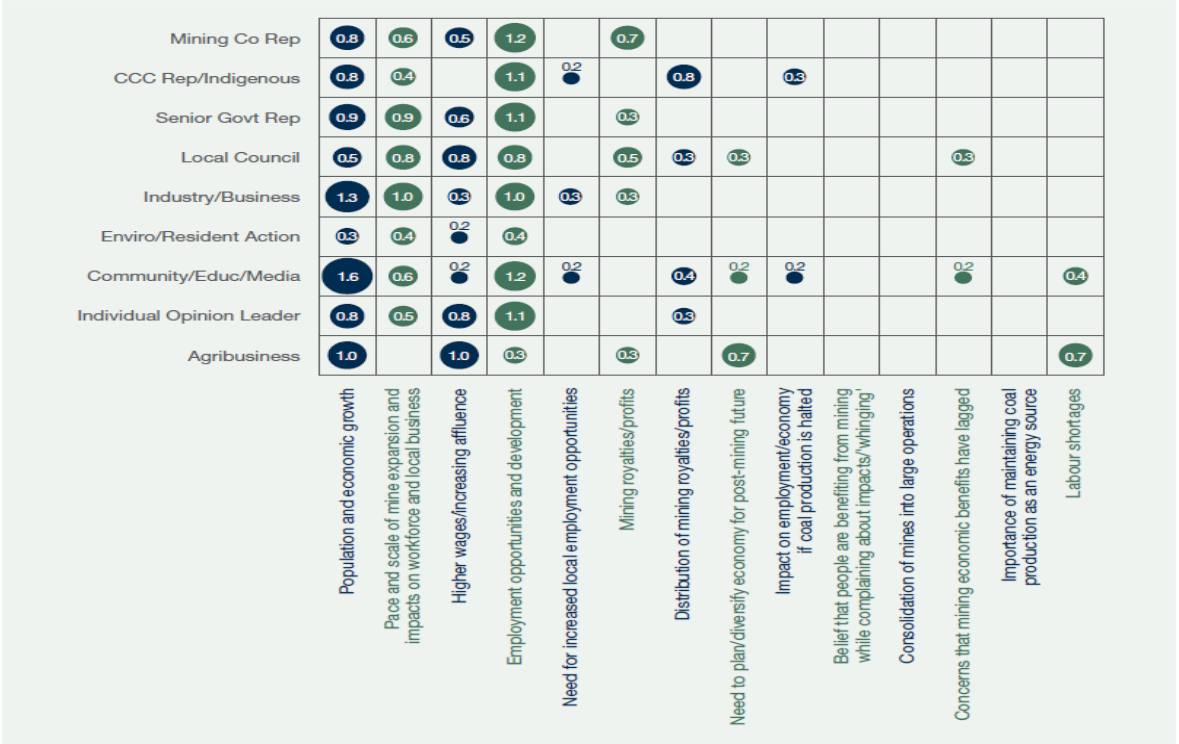



Figure 9: Economy, employment and income topics

UPPER HUNTER MINING DIALOGUE REPORT on the Stakeholder Survey for the NSW Minerals Council

# SSHEG Health Documents 2008 -2015

## A Prologue

The Legacy of Community Diseases perceived by Residents and Dr AU to be associated with the quickening pace of Open Cut Coal Mining in the Hunter Valley led to the formation of the "**S**ingleton **S**hire **H**ealthy **E**nvironment **G**roup" at a Public Meeting in 2008; then by Community Health Survey 2008-2009, and "*SSHEG submission* (**H1**) *to NSW Government 11 Nov 2009* ".

SSHEG Concerns are generally contained in the 202 Page document prepared for NSW Chief Health Officer and the Expert Advisory Committee (**EAC**) appointed by NSW Government in March 2010 entitled *"SSHEG Document (**H2**) 2010 Independent Health Study for Singleton Shire including **27 Attachments** Illustrating the individual Community Concerns"*.

Three Community Environmental Historians (**Attm 7, H 2**)**,** along with Shire Councils contributed in Community Consultative Committees on Power Stations and Coal Mining developments over 20 years. However by 2000 NSW Planning Authorities stopped heeding the Rural Community concerns, with the removal of Buffer Zones for Resident's Protection" and thus began the removal by "Near Neighbours of the Social Licence for mines to Operate".

By Feb 2013 SSHEG member's viewpoints are summarised in submission (**H3**) No 28 Senate Enquiry on *"Impacts on Health of Air Quality in Australia"* and **S1-S22 attachments**; and Supplementary Submission (**H4**) Diesel & Composite Particulates and **S26–S29.**

Also Reference should be made to SSHEG supporting documents which more fully detail the various aspects on the five year Health Study investigations on behalf of the Singleton Shire concerned Residents, They are.-

SSHEG Submission (**H5, H5a**) "*Air Quality Australian Standards Oct 2014"* and Attachments **A1-A6, with 2012 PM10 exceedances**, No 82 NEPM Standards.

SSHEG submission,(**H6**) "*National Clean Air Agreement April 2015"*.

***This SSHEG May 2015 Review of four years of Mining Dialogue collaboration(H21) provides a better focused understanding of the competing Health Priorities across "Hunter Valley Stakeholders; and the lack of "Near Neighbour Health Study Research" options***.

# B Community Concerns Detailed

In December 2010 a series of Questions relating to Mining and Power Station Air Pollution were posed to Health and EPA representatives at a Public Forum Presentation for the Singleton Community entitled "*What do we expect of the Expert Advisory Committee* "(**H7** as **Appendix M8** of this May 2015 SSHEG Review).

The Legacy of Community Diseases (**Attm 6**, **H2**) perceived by Residents and Dr AU appear from "Valley Brown Haze, Dust Storms and Rain Squalls (**H8**), Blast Plumes returning to ground (**H2 p 9-12**)- **Gassings**" (**H2 p9-12**, **H9**), Polluted Rainwater Tanks Drinking and Cooking Water ( **OGM identified**), **Asthma** particularly in Children (**Dr Au Tests** (**H3 p 9**, **H8 a**), **Camberwell Cough** (**H2 p 43**), Noise and Ground Vibration Disturbance (**H2 p 14)**, all daily Health concerns reported particularly by Camberwell Residents (**H2 attm 3**).

The SSHEG Review (**H10a**) in March 2014 resulted in SSHEG Document (**H10**) March 2014 *"Mining Pollution Mitigation Priority Action"* focusing on "Near Neighbours" being impacted by Mining.

SSHEG submission (**H11**) to NSW Planning April 2015 calls for "*Elimination of Mine Blasting into the Air - Residents as Occupationally Exposed*" and **Attm 1-4. (Note ##)**

## MTW Mine Blast "Gassing" on 20th September 2013 in Broke Bulga Micro Valley (**H12, H12a**) establishes that Blast Colour Best Practice Management Mine Plans does not Protect "Near Neighbours".

Hunter Valley Brown Smog entrapment (**H2 p 23-38**) Air Drifting Pattern observations are outlined in the 2010 Terrain 1 "Bulga Mountain Range to Broke Smog concentration Pocket (**H2 p 28).**

The SSHEG Submission (**H13**) *"Bulga Mine Optimisation 2014"* further details the Broke-Bulga Micro Valley Air Drifting Patterns, and the Pollution Monitoring warranted to safeguard for children at Broke School.

**Following the four years of Community Health and Mining investigations in Hunter Valley the Rocky Hill Mine Gloucester SSHEG Submission(H14) provides a clear insight of the Social delemia posed in a Micro Valley with Mining , CSG and Residential Estates and Homes all apparently competing for the same Land. In reality "Near Neighbours", inch by inch are affected until only "Mine Voids" remain.**

# C Independent Health Study Status 2015

The Community's submission Dec 2001 (**Attm 8**, **H2**) regarding the revamped "Ravensworth Waste Dump " proposed by Thiess called for "*balanced scientific evaluation and Risk assessment regards Community Health concerns as reflected in Disease Statistics*".

SSHEG Submission to NSW Government 11 Nov 2009 (**H1**) Calls for an "*Independent Health Study*", with specific Community Health concerns from 2008-2009 surveys subsequently detailed to **EAC** in **Attm 6** (**H2**).

Four approaches so far have been identified, namely:-

1. **EAC conclusions after three years of Investigation, EAC Review and Debate, the weight of Best Medical Opinion is as follows:-**

   **"With regard the feasibility of conducting a study to assess the relationship between Mining and Health; The Chief Health Officer's Expert Advisory Committee (NSW - EAC) which includes Internationally renowned Epidemiologists concluded that, even when the Air Pollutants under investigation are known to cause illness, a Health Study in NSW was unlikely to show a statistically significant Health effect because the impacted Population is too small".**

   **"Instead, given that the Health effects of Mine-associated Air pollution are well understood, a better approach is to improve our knowledge of the Sources and distribution of Air Pollution in Mining Regions[NOTE 1]. This knowledge will support the development of effective management strategies to protect the Health of the Community". ( extracts from *Attachment S14* (*H3*))**

   **Note 1 SSHEG (H 3a) " Epidemiology 2013 Air Pollution & Human Health".**

2. SSHEG expected Health Study Methodology would match the Real Time Exposure of Residents to Environmental Pollution in their Daily lives, using observed Source Hourly concentrated Drifting Patterns, such as outlined by SSHEG (**H15**) based on Industry OH&S Hazardous Risk Analysis.

3. **Dr Craig Dalton "A submission (*H16)* to the Senate enquiry (No105) into Air Pollution and Health 2013, "*How to investigate the impact of coal Mining on Community Health*", and based on the "***Contribution of toxicological and epidemiological data to understand cause and effect" from Adami.[4] (*H17*)***

   Hans-Olov Adami, Colin L. Berry, Charles B. Breckenridge, et al. Toxicology and Epidemiology: Improving the Science with a Framework for Combining Toxicological and Epidemiological Evidence to Establish Causal Inference. TOXICOLOGICAL SCIENCES 122(2), 223–234 (2011)

4. **Centre for Air Quality and Health Research and evaluation (CAR )(H18)** Semimar proceedings Monash Centre Melbourne 2nd April 2015 " Toxicology Workshop". Understanding Dose, Exposure, Health Guidelines & Exposure Limits, etc. Also Epidemiology CAR Seminars Sydney & Newcastle Sept 2013 SSHEG (**H19**).

# NSW Government view of Coexistance so far

Camberwell Village in 2000 with a Church and Community Hall of around 350 Residents and 47 Rural living Homes, by 2010 was reduced to "One Mining Lord- Aston Mine" and two or three "Quarantined Sick Families".

**This is Coexistance 2015 NSW style.**

*(15)* *What is wrong with this photo? Camberwell Village is too close!*


SSHEG NTH 27/10/2010 Page 3

**In good faith , the 2002 Warkworth (MTW) Mining approval process established an acceptable balance between exising Rural Homes and the extensive Coal Resource of the area. (C1)**

The Myth of Coexistance **emerged when MTW which operates as an Open Cut Mine on the same Strata Coal Resources as Bulga and Wambo Mines on either side (both Open Cut and Underground), decided to forgo its "Social Licence" and use questionable practices to alter NSW Planning Protocols and challenge the community; including Aboriginal Elders of these lands.**

**Community Disease provides a Coexistance Metric for a Healthy Mining Industry.**

**Clearly Underground Mining allows Coexistance.**

SINGLETON SHIRE HEALTHY ENVIRONMENT GROUP

**"The impact on Health of Air Quality in Australia"**

*A community-based group looking to address environmental issues affecting Singleton Shire residents*
PO BOX 626
Singleton NSW 2330

Author: Dr Neville Hodkinson PhD

SSHEG is Not Anti Mining or Anti Power Stations, we seek identification of What is making our Children and Community Sick so they can be mitigated by OH&S Compliance Orders.

SSHEG Focus On Health

Senate Committee Submission March 2013

**Submission Summary**

**"The Impact on Health of Air Quality in Australia"**

Singleton Shire Healthy Environment Group (SSHEG) arose in 2008 out of Singleton's Doctor Au's Hunter Valley Air Quality concerns were unheeded by Authorities, and posed the question "What is making our Children and Community Sick?" Especially, Respiratory Illnesses and Asthma.

Subsequently, from Community Surveys SSHEG advised NSW Health of 45 Health issues in (*Attachment S1*) that are prominent in Singleton Shire Towns, Rural Villages, Hamlets and Farming Communities.

This Senate Submission generally relies upon SSHEG documents prepared since 2008 that capture the extent of the Pollution Issues unearthed by the Singleton Shire Community. Eight Topic areas are outlined below together with the SSHEG Member contribution and the List of Reference Documents which form part of this submission. *Separate to this Senate Submission, individual SSHEG members are expected to also further detail Air Quality Community Health issues.*

The SSHEG Community Health Survey and Pollution Investigations 2008-9 identified Coal Mining and Coal Fired Power Stations and related Industries as the Major Pollution Emitters, and this led to our Submission to NSW Government on 7th November 2009 (*Attachment S2 where 37 Pollutants were identified*) calling for "An Independent Health Study in the Hunter Valley".



Three SSHEG "Historians" have from these early days highlighting to Government Departments, EPA and Health Authorities the Coal Industries Impact in the Hunter Valley (*Attachment S3*); where the Prime Agricultural area of the 1960's was transformed with Coal Fired Power Stations near Muswellbrook supplying cheap Electricity for two Aluminium Smelters (Kurri Kurri and Tomago); and now the somewhat out of control Open Cut Coal Mining "Moonscape" between Singleton and Muswellbrook as just the beginning.

In the process 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, encircled Villages and "plundered Communities and Prime Agricultural Land".

**What then has SSHEG identified what is Needed ?**

(1) Independent to Government Accumulative Health Risk Assessments on all Non Agricultural Industrial Developments based on the heightened Health changes to "Near Neighbours" and Resident's in weekly assessments, from one hour (1Hr running Average) Accumulative Environment Pollution Emission Exposures.
(2) SSHEG calling in 2009 for Independent Health Study to identify Accumulative Air Quality Pollutants Impact on Hunter Valley Residents, with a view to Mitigation or Cessation at the Pollution Emission Sources.
(3) OH&S Act Protection of "Near Neighbours" as "Occupationally Exposed" incorporated in Mining and Power Station Industries.
(4) Power Stations to cease acting as "High temperature Incinerators" for Solid and Liquid Toxic Waste substances.
(5) Realtime Gaseous and Particulate 24hr Monitoring, Staged Alarming and Pollution Reduction Control of all Industrial Process Pollution Emissions to Atmosphere, especially Combustion related Processes.
(6) Establish Particulate Matter (PM) Measurement ( ug/m3) for Pollution Reduction Control to be based upon One Hour Running Averages, for PM10 and PM2.5, with PM4 for Near Neighbours and Residents, PM1, and PM0.1 for Medical Research Health Assessment purposes.
(7) 6 Monthly Routine Testing and Accreditation of Rainwater Tanks used for Drinking and Residents Cooking, due to the heavy overnight Aerosol fallout on Rural Homes that fall within the "Designated Near Neighbours Industry Buffer Zone; and undertaken at Industry cost.
(8) Establish Locality based Medical Record Profiles noting Community Pollution Events exposures in preceding days based on 1Hr Rolling Average PM Pollution criteria.
(9) Fifteen Interim Health related Actions are outlined in letter to Chief health Officer dated 4th Nov 2010 in *Attachment S10* Page1-4.



**What the Community Demands**

(1) EPA continuous 24 Hour monitoring of existing Airborne and Water outflows emissions from all sources in the Hunter Valley.

(2) EPA controlled 24 hour monitoring of Community Townships and designated Homes for Airborne outflows contamination of all gaseous and particulate matter, with a specific focus on short, medium, and long term Health concerns. (Refer attached Extracts)

(5) EPA Website for direct access for Real Time 24 hour Monitoring of Water and Air Quality throughout the Hunter Valley.

(6) Hunter Valley Community demands a balanced scientific evaluation and Risk assessment with regards Community Health concerns as reflected in disease statistics.

(7) The fact that both Water Quality of the Hunter River and Air Quality of the Hunter Valley are not freely available for scrutiny by the Community is indicative of the concerns that little or no Contamination/Pollution controls are in place, or are effectively monitored.

(8) State Infrastructure Development Proposals require Government controlled Environmental Impact Studies with the various persuasions represented leading to identification of the areas of consensus agreement and the areas of disagreements quantified.

Singleton Community Submission 2001 (**H2 p101**)

Thiess Ravensworth Sydney Super Dump Extract

# APPENDIX M1

# SSHEG Mitigation Priority Action List



## SSHEG AIR POLLUTION HEALTH STUDY REVIEW 2014

**Focus on Community Health & Air Pollution Mitigation Issues**

(1) **"Elimination of Mine Blasting into the Atmosphere" by use of Plastic Blast Hole Stemming Plugs to stop "Community Gassings".**

(2) **"Near Neighbours and Farming Families" to be "Occupationally Exposed Persons to Open Cut Mining Operations"**
with EPA Compliance Orders, as Pseudo Underground Mine Ventilation Standards.
Dust Storms characteristics, eg 500 ug/m$^3$ for 40 minutes.

(3) **Diesel Exhaust Pathways and Isodose Zones**
Exposure Criteria based on Underground Mines at < 0.1 mg/m3 or 100ug/m3

(4) **Biological Asthma Susceptibility & Allergen Calendar**
Real Time Methodology & Valley Drifting Patterns.

(5) **Coal Power Stations - Stack Plumes Gases with Toxic Fly Ash.**
Real Time 24hr Stack Gases, fumes and Fly Ash concentrations.
Cofuels, Waste Oil firing, with Fuel rate & Mix in 5 minute intervals.

(6) **Mining Noise Health Implications**
Coal Washery Low Frequency & Ground Vibrations – body sensitivity
Night Sleep deprivation from "clanging" as "dozing off" Risk. (Bulga)

(7) **Air Quality Human Disease Risk Guidelines(Air Profile Guide)**
Asthma Allergen Guide Number Spores / m$^3$
Mining Operations Diesel & Fugitive Emissions Zones xx ug/m$^3$
Toxicity Risk of Rainwater Tanks from Air Pollution Fallout
PM release from Haul Roads & Mine Water Vapourisation Fans
Health Risk Assessments of Development proposals by NSW Health

(8) **Hunter River Irrigation Water Pollution**
Real Time Water Quality Monitoring of Creeks & along Rivers
Irrigation Water Toxicity, soil retention & Farmers crops impact.

(9) **Owner Residents "Home is my Castle" Rights**
Reinstate Buffer Zones between Industry and Resident
Privy Council test case & Injunctions precedents on Mining access

(10) **Singleton Shire "Near Neighbours" Preventive Medical Costs**
GP, Medicines, Work sickies, travel costs related to Air Pollution events.
Mining Pollution initiated Disease Syndrome hours impacted.

# APPENDIX M2 extracts with SSHEG annotations

# Mining Dialogue 2011 Workshop Report

# STAKEHOLDER WORKSHOP REPORT

## UPPER HUNTER MINING DIALOGUE

## 2011 REPORT

TABLE OF CONTENTS

## Mining Dialogue Workshop July 2011

| Idea for action | Votes |
|---|---|
| Synoptic Plan: Urgent development of a new synoptic plan: strong community input - include land class - ensure plan is a living document. | 49 |
| Water study for the Hunter Valley to understand aquifers and surface water. | 28 |
| Independent and transparent water assessment of mining projects (funding and training for more water experts who can work independently of mining companies?). | 26 |
| 2005 Department of Infrastructure, Planning and Natural Resources Stream/Aquifer Guideline[1] – Implement the aquifer standards outlined in the Guideline (150m from edge of alluvium). | 25 |
| Health Risk Assessments to go into Director General requirements, looking particularly at long term health issues as well as short term, intense exposure. Assessment to be done at exploration stage. | 24 |
| Strategic Land Use Plan linked to CMA management plan and local government area and used to guide ability to explore. | 24 |
| Hunter Communities Network four suggestions<br>1. Cover all coal trains through to the Port of Newcastle<br>2. Use improved and uniform blasting product to eliminate toxic orange brown emissions<br>3. Support a comprehensive regional study on the impacts of current operations on surface and groundwater systems in the Hunter<br>4. Rehabilitate mine sites at the same rate of disturbance by mining. | 22 |

Synoptic Plan 147

WATER 109

HEALTH 112

H W S

Social Impact 62

The following table records all 'ideas for action' created by stakeholders on the day:

| Theme | Idea for action | Votes |
|---|---|---|
| Water | Water study of the Hunter Valley to understand aquifers and surface water. | 28 |
| | Independent and transparent water assessment of mining projects (funding and training for more water experts who can work independently of mining companies?). | 26 |
| | 2005 Department of Infrastructure, Planning and Natural Resources Stream/Aquifer Guideline – Implement the aquifer standards outlined in the Guideline (150m from edge of alluvium). | 25 |
| | Ensure voids are back-filled to avoid saline and heavy metal water build up. | 7 |
| | Cumulative impacts study of existing mining operations (on water). | 6 |
| | Stop the diversion of rivers. | 5 |
| | 2005 Department of Infrastructure, Planning and Natural Resources Stream/Aquifer Guideline to be adopted as minimum standard. | 2 |
| | Audit existing operations to ensure they are compliant and have capacity to store water onsite in flood conditions. | 0 |
| | Better opportunities/ assistance for the community to review environmental assessments. | 0 |
| | Industry to participate in and support the National Water Initiative | 0 |

WATER

| | | | |
|---|---|---|---|
| **Rehabilitation and Land Management** | Synoptic plan (combined ideas):<br>▪ Urgent development of a new synoptic plan:<br>– strong community and industry input<br>– Include land classes<br>– Ensure plan is a living document.<br>▪ Stakeholders and industry to advocate to government to revise the synoptic plan for the Hunter Valley.<br>Synoptic Plan – should link to site closure plans and rehabilitation completion criteria reviewed regularly. | 49<br>(28)<br>(6)<br>(15) | SYNOPTIC ... PLAN |
| | Information, data and tours of rehabilitation should be accessible to the public:<br>▪ Offsets: should be an industry-wide approach – coordinated credits/ landbank system to give management flexibility and strategic outcomes. Should include conservation organisations in management<br>▪ Industry-wide coordination to work towards rate of rehabilitation equalling rate of disturbance on industry basis. | 14 | |
| | Rehabilitation with community:<br>1. Mine life planning with community involvement and agreement<br>2. Final void – community participation and partnership<br>3. Establish a jointly funded research centre for Hunter Valley – with public access to industry and government database of | 7 | |
| **Land Use** | Industry (with local community) to meet and advocate to Government for mining free zones. | 18 | SYNOPTIC PLAN |
| | Stakeholders and industry to advocate to Government to have one plan for how land is used in a region. | 16 | |
| | Stakeholders on the Ministerial Reference Group for the Strategic Regional Land Use Plans advocate to Government for a full, broad consultation with the community on the draft plans. | 3 | |
| | The minerals industry to advocate for consistency between strategic regional land use plans and local environment plans. | 0 | |
| | Strategic Land Use Plan should be linked to Catchment Management Authority Management Plan and local government area, and used to guide ability to explore. | 24 | |
| **Social Impacts** | Regionally significant infrastructure must be fast tracked by Government. There needs to be more advocacy by NSWMC, local government and Regional Development Australia – Hunter to get the funding for priority Hunter projects including Muswellbrook bypass, Scone overpass, Singleton bypass. | 21 | SOCIAL |
| | Local employment must be the focus for contractors and mining companies. There needs to be a focus on training local people for jobs and apprenticeships for local people. | 18 | |
| | Aboriginal and European heritage must be better considered (e.g. heritage homes must be preserved). | 12 | |

| | | | |
|---|---|---|---|
| **Dust, Air Quality, Noise and Health** | Health Risk Assessments to go into Director General requirements looking particularly at long term health issues as well as short term intense exposure. The assessments to be done at exploration stage. | 24 | HEALTH |
| | Air quality monitoring to go beyond best practice (i.e. speciation analysis of samples, 2.5µm monitoring and 1.0µm monitoring). | 16 | |
| | Industry to continuously improve dust suppression. | 14 | |
| | All 'Air Quality Network' monitors should measure – 2.5 Micron (PM 2.5). | 9 | |
| | Particle identification (speciation) along with particle size. | 9 | |
| | Increase number of Department of Planning and Infrastructure/Department of Mineral Resources compliance officers for 24/7 coverage. | 8 | |
| | Government to make experts available for community forums for information and Q&A. | 5 | |
| | Have experts available (e.g. Chris Eiser from the Office of Environment and Heritage) to meet with the community to discuss and answer questions on dust monitoring and dust reduction programs.<br>Mining industry to take on 'best practice' response process to managing community complaints and concerns (i.e. logging commitments and promises). | 5 | |
| | Industry to develop and implement best practice for fume management (blast fume). | 5 | |

| | | | |
|---|---|---|---|
| **Hunter Communities Network**<br><br>At the end of the session, Hunter Communities Network proposed four ideas that spanned a number of topic issues. Participants were able to use one vote to vote for all four ideas. | 1. Cover all coal trains through to the Port of Newcastle<br>2. Use improved and uniform blasting product to eliminate toxic orange brown emissions<br>3. Support a comprehensive regional study on the impacts of current operations on surface and groundwater systems in the Hunter<br>4. Rehabilitate mine sites at the same rate of disturbance by mining. | 22 | H<br>W<br>S |

# APPENDIX M3

# Mining Dialogue 2011 Stakeholder Survey

NSW MINERALS COUNCIL

## UPPER HUNTER MINING DIALOGUE

**RESPONSE TO THE ACCSR REPORT ON THE STAKEHOLDER SURVEY**

### WHAT IS THE MINING INDUSTRY DOING IN RESPONSE TO THE REPORT?

We have learned that one of the most important things the industry needs to do is work better together toward minimising impacts, using our resources more effectively and making it easier for the community to work with us. As a first step, we have set up an Upper Hunter Mining Dialogue Steering Committee with senior members from all of the region's coal producers to oversee and drive our efforts to work more effectively together as an industry. The steering group will oversee three industry working groups which are dedicated to finding ways to address the priority issues identified by the community in the survey:

- Environmental Working Group – to look at ways to better address dust, air quality and water issues.
- Rehabilitation and Land Management Working Group – to find ways of working more strategically on rehabilitation planning and land management.
- Community Working Group – to bring together the mining industry and community groups to share research and resources on issues such as social infrastructure and other social issues.

Members of these groups will be environment and community practitioners with relevant specialist skills. The working groups will be reaching out to stakeholder groups, including agricultural

## APPENDIX: List of Organisations

| Organisation | Participants | Observers |
|---|---|---|
| Anglo American | 2 | 1 |
| Ashton Coal Resources | 2 | |
| Association of Mining Related Councils | 1 | |
| AusIMM - Hunter Branch | 1 | |
| BHP Billiton Mt Arthur Coal | 2 | |
| Bloomfield Collieries | 1 | |
| Bylong Valley Protection Alliance | 2 | |
| CFMEU | 1 | |
| Coal & Allied | 2 | |
| Conservation Volunteers Australia | 1 | |
| Greening Australia | 1 | |
| Hunter Environment Lobby | 1 | |
| Hunter Region BEC | 1 | |
| Hunter Valley Protection Alliance | 2 | |
| Hunter Valley Thoroughbred Breeders Association | 1 | |
| Hunter Valley Water Users Association | 1 | |
| Hunter-Central Rivers Catchment Management Authority (CMA) | 1 | |
| Mangoola CCC | 1 | |
| Mt Thorley Warkworth CCC | 2 | |
| Muscle Creek Landcare | 1 | |
| Muswellbrook Chamber of Commerce | 1 | |
| Muswellbrook Coal Company | 2 | |
| NSW Farmers Association | 3 | |
| NSW Health and Hunter New England Population Health | 1 | |
| NSW Mine Watch | 1 | |
| NSW Minerals Council | 4 | |
| Office of Environment and Heritage | 2 | |
| Peabody Energy | 2 | 1 |
| Regional Development Australia Hunter | 1 | |
| Rivers SOS | 1 | |
| Singleton Argus | 1 | 1 |
| Singleton Chamber of Commerce | 1 | |
| Singleton Healthy Environment Group | 2 | |
| Singleton Shire Council | 1 | |
| Upper Hunter Shire Council | 2 | |
| Vale Australia | 3 | |
| Wambo CCC | 1 | |
| Wonnarua Nation Aboriginal Corporation | 1 | |
| Wybong Action Group | 6 | |
| Xstrata Coal | 2 | |
| Individuals | 4 | |

# WHAT ISSUES MATTER THE MOST?

Participants were asked questions to understand the issues of most importance to them in relation to coal mining in the Upper Hunter.

# INDUSTRY'S SOCIAL LICENCE TO OPERATE

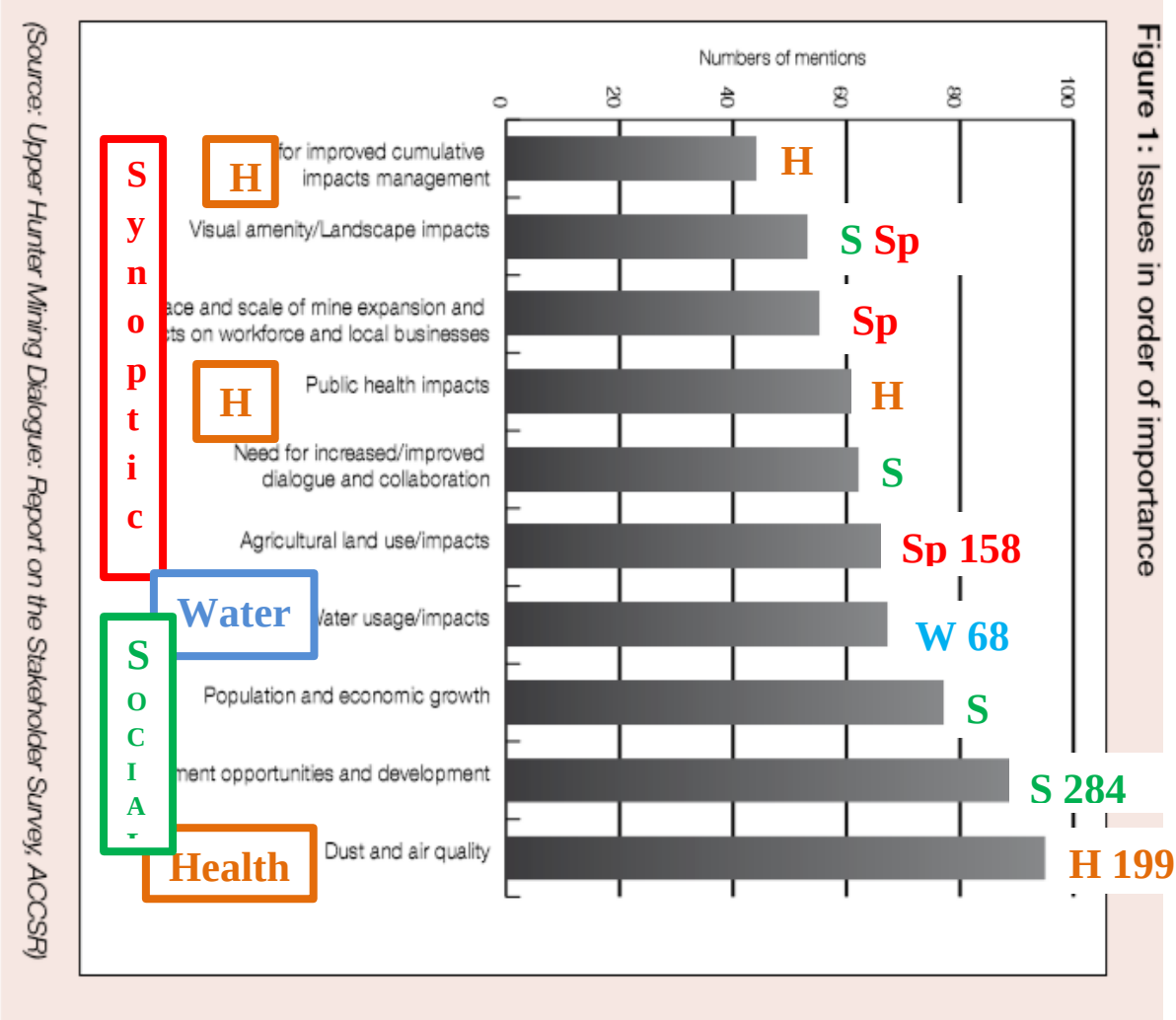
A social license to operate is an overall measure of the community's sentiment towards a project, company or industry. It is an intangible measure of acceptance that can change over time. Figure 2 below ranks the social licence to operate of the mining industry in the Upper Hunter in four categories. It shows which groups of stakeholders provide which level of social licence to operate.

Individual stakeholders have been grouped into broader stakeholder categories. You can see which stakeholders are in each category on the last page of this document.

Most groups continue to provide the industry with a social licence to operate, but it is at a low level.

**Figure 2:** Social licence to operate

# Stakeholders Top 10 Priorities in 2011




| Summarised Mentions (estimated) | | |
|---|---|---|
| | Synoptic Plan | 158 |
| | Water | 68 |
| | Health | 199 |
| | Social Impact | 284 |

# APPENDIX M4 Health related Issues

## Mining Dialogue Meeting SSHEG Notes

## 7 & 8 May 2015

**1: Social Impacts and Infrastructure**

**ication of issues**

Impact of shift work on quality of life and mental health.
Impacts of shift work on individuals and families (physical and mental).
Community e.g. volunteers/sports/social fabric. Waste management.

- Voluntary Planning Agreements (VPAs) misaligned with social impact assessment and opportunities (SIAOs).

**Ideas for consideration by working groups and/or industry**

| Recommended idea | Priority | Why is the priority set this way? | Dialogue action or advocacy | Who should be involved? |
|---|---|---|---|---|
| **Share information gathered regarding shift work and its impacts** | Low | Has already been undertaken | Action | NSWMC / Social Impacts and Infrastructure Working Group |
| **NSWMC VPA Working Group to consider if misalignment of VPA money and SIAO's is an issue to be considered in VPA reform** | Low | State-wide issue, not an Upper Hunter issue | Action | NSWMC |
| **Invite waste divisions at councils to speak with Environmental Managers at mine sites to identify and resolve any issues** | Low | Perception issue | Action | NSWMC |

A. Report on Shift Work - What has been done

- Do the workforce and Families know the signs and what support services does Industry provide?

**Community issue - Impact of Night Mining Noise disturbing sleep plus next day hazard**

**Green** - Community Comments are Highest Priority Health Related Issues

## 2: Industry Government Partnership

**Ideas for consideration by working groups and/or industry**

| Recommended idea | Priority | Why is the priority set this way? | Dialogue action or advocacy | Who should be involved? |
|---|---|---|---|---|
| **Collective advocacy on agreed priority government initiatives and programs (committed)** | High | Certainty for investment, community, infrastructure development | Advocacy (½ yearly meeting with Minister for Hunter) | - Industry, Council, Community Business leaders<br>- Minister for the Hunter |
| **Government endorsement of their own decisions to grant Exploration Licences** | Medium | Could be part of the 1st action and maybe something that can be achieved through goal allocation | Advocacy | - Industry, Council, Community Business leaders<br>- Minister for the Resources |
| **Proper royalties for regions (long term) program (a more equitable share)** | High | Because Resources for Regions not equitable | Advocacy | - Industry and Council<br>- Deputy Premier DTIRIS |

B. Certainty for Investment - High Priority

- Too many competing interests
- as many as 6 Interest Groups to be represented

**Community issue**

- **Buffer Zones between Farmers & Mines**
- **Air Quality incl "Pollen Calander"**
- **Night Mine Noise disturbing sleep**
- **Aboriginal linkage to country**
- **Animal Health – Equine Industry**
- **Flora & Fauna – Tainted Olive Industry**

## 3: Diversification – During and Post Mining

| Recommended idea | Priority | Why is the priority set this way? | Dialogue action or advocacy | Who should be involved? |
|---|---|---|---|---|
| **Recognise the resources**<br>• **Natural**<br>• **Human and skills sets**<br>• **Infrastructure**<br>**(Asset register)** | High | Smarter use of resources to retain broad skill sets in this area. | Advocacy for regulations to allow for changes in final mine plan | Bureau of statistics<br><br>Councils |
| **Think tank for ideas. Invitees:**<br>• **Community**<br>• **Viticulture**<br>• **Agriculture**<br>• **Equine**<br>• **Tourism**<br>• **Mining**<br>• **University**<br>• **Hunter Research Foundation**<br>• **CSIRO**<br>• **Commonwealth Industry Growth Centres Programme (Mining Equipment, Technology and Services)**<br>• **Newcastle Institute for Energy and Resources**<br>• **State forest**<br>• **Councils** | High | Bring new skill sets<br><br>Insurance against fluctuations<br><br>Better end result<br><br>Co-existence is critical | Dialogue action and Advocate for Regional Economic Diversity plan<br><br>Write a project plan for funding by Resources for Regions (for think tank) | Business chambers<br><br>Dr Ernesto Sirollii<br><br>UHMD |

C. Recognise the Resources - High Priority

- Too many competing interests
- as many as 14 Interest Groups to be represented

**Community issue** - **Aboriginal lineage to country**

- **Generations of Family investments under threat from Governments, Mining & CSG**
- **Natural Landscape destruction & Amenity**

## 4: Community Engagement strategy for Dialogue as a whole

| Recommended idea | Priority | Why is the priority set this way? | Dialogue action or advocacy | Who should be involved? |
|---|---|---|---|---|
| **Interactive mining exhibit "tourism"** | Low - Medium | To provide positive mining information to the community | Action | Muswellbrook / Singleton Councils Mine Representatives NSWMC Representatives |
| **Stakeholder engagement strategy** | Medium - High | To engage the community effectively UHMD | Action | UHMD |
| **Road show, Hunter Coal Show** | Low - Medium | To better inform the community regarding UHMD achievements and better understanding of what they want | Action | Representatives from UHMD |
| **Mine tours to demonstrate UHMD topics i.e.** • **Rehabilitation** • **Water management** • **Noise management** • **Dust management** | Medium - High | To better engage regarding UHMD issues | Action | UHMD representatives |
| **UHMD to continue engaging with stakeholders during downturn** | High | Issues continue and economic situation will change | Advocacy | UHMD representatives |

D. Mine Tours to demonstrate - Medium - High Priority

- School Project excursions
- Showcase on local TV (Quarterly)
- Focus on Workplace Health & Safety

**Community issue - Air Quality, Noise, Rehabilitation, Water**

**- Correct Perceptions and Misconceptions**

# 5: Emissions and health

**Ideas for consideration by working groups and/or industry**

| Recommended idea | Priority | Why is the priority set this way? | Dialogue action or advocacy | Who should be involved? |
|---|---|---|---|---|
| **Dust off (pun intended) 2011 study on depositional dust/drinking water (publish on the UHMD website)** | | Address concern and lapse of knowledge | Action | NSWMC |
| **Public Access to Upper Hunter Air Quality forecast** | High | Existing priority project | Advocacy | NSWMC |
| **Health risk assessments** | | Community desire to see health risk info | Action / Advocacy | Emissions and Health JWG |
| **Characterisation study. What next? Holistic approach to air pollutant management** | | Increase knowledge base among community | Action / Advocacy | Emissions and Health JWG |
| **Lobby power generation industry for UHMD Involvement** | | Significant emission source | Advocacy | NSWMC |

E. Study on Deposition Dust/

Drinking Water - **SET** Priority

- Technical Study of Deposition Dust
- Normal & Drought Comparison
- Test NSW Health advisory Treatment

**Community issue - Contaminated Rural Drinking & Cooking**

**- Discolouration of Glass**

**- Slime in base of Rainwater Tanks**

F. Lobby Power Stations - **SET HIGH** Priority

- Technical Study of Stack Emissions
- SOx & NOx Stack Exit Concentrations
- Fly Ash Stack Emissions

**Community issue - Stacks Exit Plume Toxicity**

**- Asthma association with P/Stn Plumes**

**- Stack Plumes Drifting Patterns**

# 6: Land management

**Ideas for consideration by working groups and/or industry**

| Recommended idea | Priority | Why is the priority set this way? | Dialogue action or advocacy | Who should be involved? |
|---|---|---|---|---|
| **Collation of existing baseline approvals – Geographic Information Systems (GIS)** | High | Hasn't been done. Needed for future approvals and rehabilitation outcomes | Advocacy | Assist Division of Resources and Energy (DRE) |
| **Gain agreement on presentation of spatial data** | High | Hasn't been done. Needed for future approvals and rehabilitation outcomes | Advocacy | Role for UHMD |
| **Prospective areas for future mining - offsets** | | Hasn't been done. Needed for future approvals and rehabilitation outcomes | Both | Mining companies, DRE |
| **Rehabilitation policies guidelines models** | Medium | Can use info from grazing trial etc. | Dialogue can be sounding board | DRE, Department of Primary Industries (DPI) and Dialogue |
| **Feed into vision for what region looks like** | | | Both | Broader community, Department of Planning and Environment (DPE), Dialogue, broader industry |

G. Synoptic Plan - **SET HIGH** Priority

- Resource Confidentiality issues
- 30 year Plan Start trigger
- Final Landscape & Land use Plan

**Community issue**

- **Surface Area Mining Exposed along Valley Air Drifting Pattern accentuates Cumulative Airborne Dust and Fumes.**
- **Backlog - Rehabilitation & Aerial Seeding**
- **Dust Storms & Rain Squalls**

# APPENDIX M5 & M6

# SSHEG NEPM Standards Submission

# SSHEG National Clean Air Agreement

**Singleton Shire Healthy Environment Group**

**"Air Quality Australian Standards Oct 2014"**

*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

EXTRACTS ONLY

Without Prejudice

**Singleton Shire Healthy Environment Group**

**"Air Quality Australian Standards** **Apr 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

National Clean Air Agreement
C/o Department of the Environment
GPO Box 787
Canberra ACT 2601
Email: Airquality@environment.gov.au

# SSHEG Submission - National Clean Air Agreement

In response to the March 2015 Discussion Paper entitled "Working towards a National Clean Air Agreement" the Hunter Valley Singleton Community and local Medical General Practitioners support a Federal Government Bipartisan approach that recognises and Protects the Health of our Rural Residents from Airborne Pollutants, now confirmed since October 2013 that Short and Long Term Human Disease associations are along the lines that SSHEG had reported to NSW Health in 2008-9; they are indeed the result of day to day Hunter Valley Pollution Exposure.

Fundamentally, SSHEG experience with existing National Environmental Pollution Measures (NEPM) including the long awaited March 2014 PM2.5 additions, primarily continues the adage *"That we only Protect 90% of the People 90% of the Time"*. Rather than encouraging Industries to minimise their Pollution Emissions, NEPM Standards provide a limit to which Industry targets its Pollution Limits to avoid EPA Legal action, and hence limits the Capital Expenditure they spend on Pollution Abatement Systems.

Clearly, from 2014 onwards a "*New International Paradigm for Air Quality" is emerging out of the 30 years Epidemiological Medical Research* leading to the October 2013 WHO confirmation that *"There is No threshold from Exposure of Air Pollution, Particulate Mattter, and Diesel Exhausts with regards Human Disease"*; all during Short and Long Term Human Expose.

**Thus, it is the *"Incremental Rise in Toxic Pollutants above Background"* that will determine the Human Disease Risk, not only the Pollution Exceedances above Threshold Limits(the basis of Australian NEPM Standards) previously understood.**

## Seven ideas are canvased for consideration in this SSHEG Submission

1. Three Tiered System for Air Quality: i National Improvement Goals that *keep pace with Pollution/Disease WHO Research Findings,*

   ii State Capitals Urban *Fingerprints based,*

   iii Regional Environs *Fingerprints based.*

2. Impact of International Paradigm for Air Quality (*"Incremental Rise in Toxic Pollutants above Background" )* and Life Shortening.

3. National Asthma *"Pollen Calendar"* of seasonal factors

4. NEPM Standard 90% for 90% of time; correct this City/Rural discrimination

5. Hunter Valley Regional Environs 2009-2015 *Model Example in Rural Region*

6. Coexistence, Industry/ Residents as *Occupationally Exposed Near Neighbours"* Fact or Fiction

7. Holistic approach to Environmental Health Study

Reference should be made to SSHEG supporting documents which more fully detail the various aspects on the five year Health Study investigations on behalf of the Singleton Shire concerned Residents, They are.-

1. SSHEG Submission to NSW Government 11 Nov 2009

2. SSHEG Submission and attachments No 28 Senate Enquiry on *"Impacts on Health of Air Quality in Australia"* Mar 2013

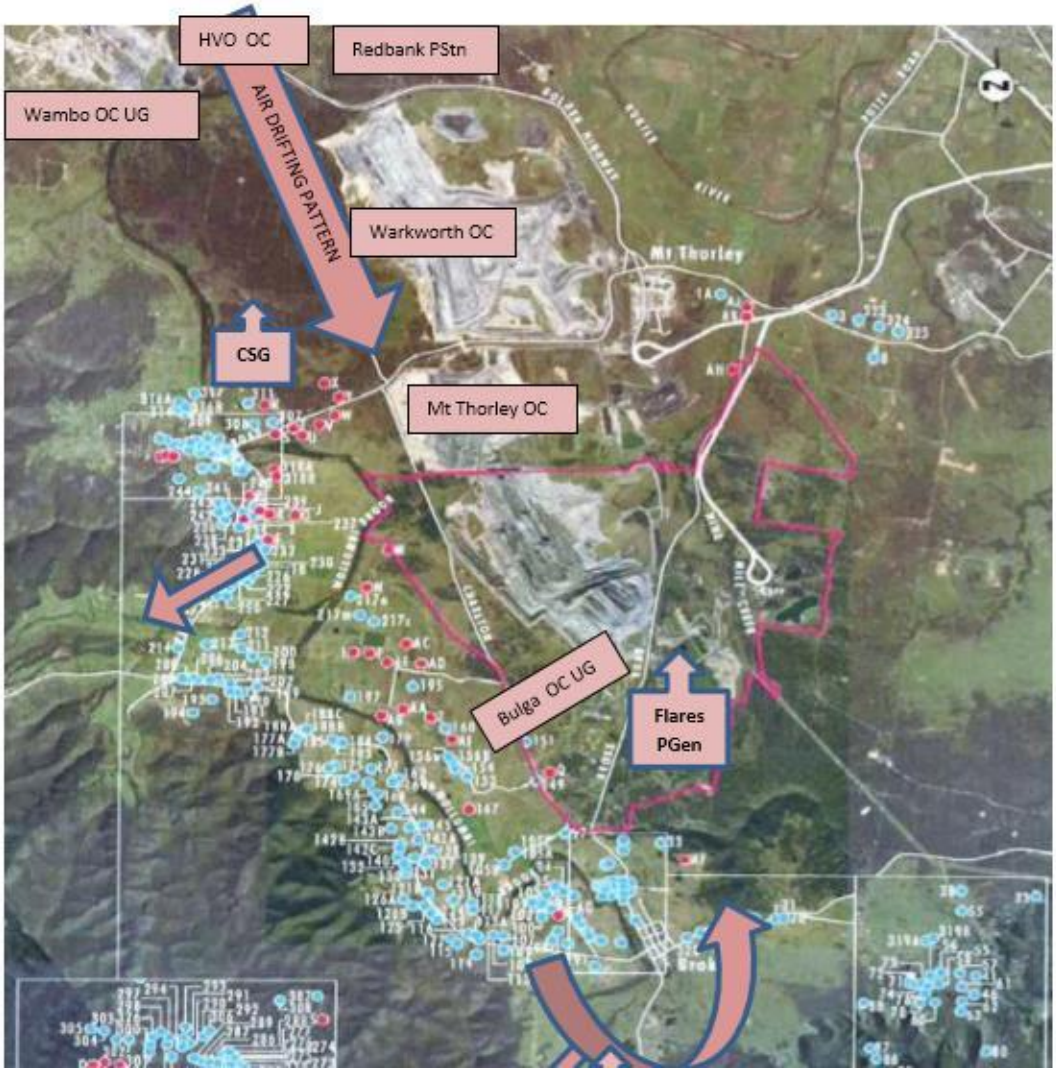
3. SSHEG Submission and Attachments No 82 NEPM Standards Oct 2014 *"2014 Review of Ambient Air Quality Impact Statement"*

# 6. Coexistence, Industry/ Residents as *Occupationally Exposed Near Neighbours"* Fact or Fiction

## AIR POLLUTION in the BULGA BROKE MICRO VALLEY

**Micro Valley Study of Mining coexisting with Residents, Farming, Vineyards and Horse Studs in the Hunter Valley of NSW Australia**

"The Cockfighter Brook" flows between the Pokolbin and Wollomi Forest s along the Bulge Mountain into the Hunter River as a picturesque Rural Valley with the Villages of Broke, Fordwich, Milbrodale and Bulga, Vineyards and Horse Studs. ( Figure 1)




**Note Blue Dots are the Individual Community residences**

Clearly, just like Asbestosis Disease affects, if Governments do not speed up the process of setting more appropriate "Hour by Hour" Air Pollution, Particulate Matter, and Diesel Exhaust Standards, then Companies like "James Hardy" will be asked to fit the ongoing Medical bills and financial compensation for Pollution related Diseases and "Life Shortening" as a result. Already SSHEG is recording a "Near Neighbour with Dusting on the Lungs" from being exposed as a Farmer besides Hunter Valley Mines; at a time when Mining Unions brag that none of their mine workers are so affected.

## HISTORICAL

**Human Health** effects in Industralised Topographical Valley locations have been reported as early as 1948 in the Science and Technology Journal;

*"In Donora, Pennsylvania, a stable layer of air that persisted from October 26 to October 31, in 1948 affected about 6,000 out of the population of 14,000. Symptoms included coughs, eye irritation, nausea and diarrhea.*

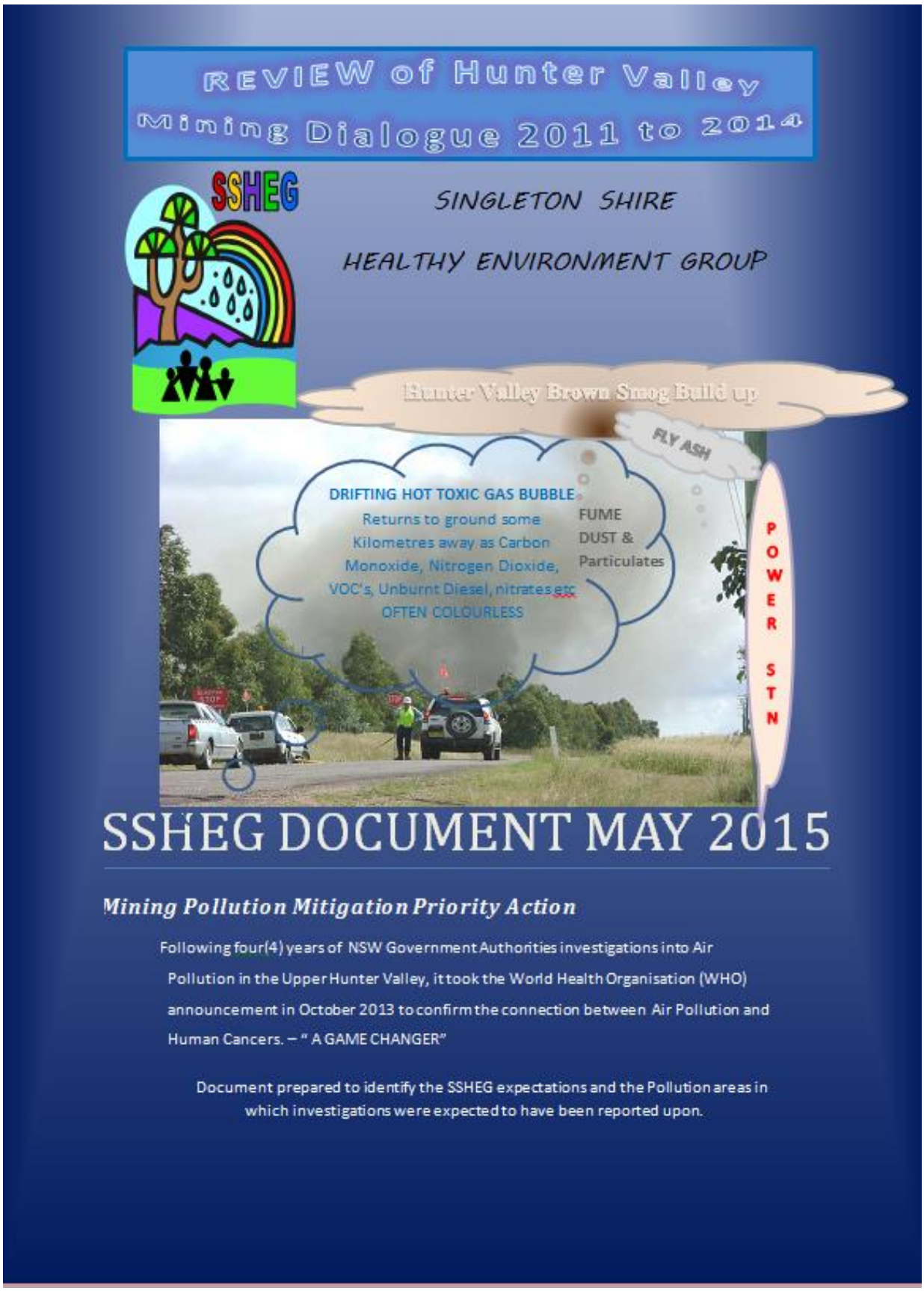
*Of the 20 persons who died during the period (elderly and those with history of Lung and Cardiac diseases) 17 died on 29th October."*

*Donora experienced Pollutants accumulating for 3 Days leading up to 29th October 1948 when the majority of deaths occurred:-*

*Five Days accumulating Pollutants in the Valley in stagnant air*
*40 % of the Population were Health affected; as 6000 in14000*

*After 3 days 17 deaths occur or 1.2 deaths per 1000*
*800 animals died with 15 % of dogs dying.*

# Appendix M7 SSHEG Review 2015 Presentation



This SSHEG Review covers the period from the first Mining Dialogue (MD) Workshops in July 2011 and the three subsequent Workshops in 2012, 2013 and 2014. Overall between 50 to 90 Participants contributed throughout this period.

This Tabular Review Summary examines the degree to which the four years of the Mining Dialogue have addressed SSHEG concerns.(Refer Appendix 1 SSHEG as outlined below.

**Focus is on Mining Pollution Mitigation Priority Action**

**SSHEG PRIORITIES v/s MINING DIALOGUE PRIORITIES**

| No | SSHEG 2013 Review Top 10 Priority List | Mining Dialogue 2011 Workshop Emission & Health |
|---|---|---|
| 1 | "Independent Health Study" Nov 2009 SSHEG Submission - NSW Gov. | 2011 **Health Risk Assessment@ location** & during Exploration Assessments (Held 2011)<br>2010 **NSW Planning Compliance Officers & Experts**<br>2013 NSW Environmental Health Reports released<br>2013 Mine Health Impact Consultancy (Gloucester) |
| | Oct 2013 **WHO** Carcinogen Classifications Air Pollution, Particulates, Diesel Exhausts | 2013 Particle Characterisation Study PM2.5 Air Quality Speciation (Held 2012) |
| 2 | 2009 "Elimination of Mine Blasting Plumes into atmosphere" Dust, Fumes, Drifting Toxic Hot Gas Bubbles returning to Ground | 2011 NSW Health Expert Panel confirmed Toxicity (21 SE Qld Miners Hospitalised Kms away)<br>2012 NSW Planning **Best Practice (Colour) Blasting**<br>2015 NSW EPA Blast Fume Licence additions |
| 3 | 2012 "Near Neighbours as Mine Occupationally Exposed" Underground Mine Air Quality Standards | 2012 Upper Hunter Air Quality Monitoring Network<br>2013 MD **Weather Forecasting**<br>2015 NSW EPA Bad Days Analysis KPI's |
| 4 | 2014 "Diesel Exhaust Pathways" Isodose Zones around Mines | 2014 MD Train Wagon Pollution Review<br>2014 NSW EPA Newcastle Train Wagon Dust Study |
| 5 | 2010 Biological Asthma Susceptibility & . "Allergen Calendar" | |
| 6 | 2009 "Coal Fired Power Stations Stack Plume Gases targeting Toxic Fly Ash" | 2012 **NO2 & SO2 Monitoring added to UHAQMN**<br>2014 MD **Study Lead in Rainwater Tanks** |
| 7 | 2009 "Mining Noise Health Implications" Residents Night Sleep Disturbance | 2014 "CAR" Epidemiology Noise Disease Identified relates to Sleep Disturbances<br>2012 NSW Planning Studies & INP Drafts |
| 8 | 2009 **Air Quality Human Disease Risk Guidance( Averaging Issue)** | 1998 NEPM PM10 Standards @> 25,000 Population<br>2015 Draft NEPM PM10 & PM2.5 |
| 9 | 2009 **Hunter River Irrigation Water** | 1995 Salinity Trading Scheme<br>2012 MD **Water Accounting Framework Studies** |
| 10 | 2009 **Surface Land Rights against Mining** | 2011 MD **Synoptic Land Use Plan**<br>2015 NSW Planning Coexistance Debate # |
| | | Refer Appendix 1 SSHEG Priority List 2014 |

Green NSW EPA & DPE Actions: RED Mining Dialogue Action: BLUE NSW Health:

# SSHEG MD Review Comments as follows:-

1. **Health Risk Assessments – New Health Research Methods need to be developed for Health Study approaches for small Community Localities. Held 2012**

   **Cumulative Health Impacts – Air Quality Speciation Study Held 2012**

   **_ Holistic Technical Investigation using Particulate Real Time Monitors (PM10, PM2.5 & PM1) and the collection of Airborne Particulates on special Filter Media.**

   **_ Definitive Air Composition and Speciation Analysis, from which the Health Risk considerations may be evaluated for Short Term (15 Minute Exposures) leading to better targeted Pollution Mitigation Controls to safeguard the Health of the Community.**

2. **Blast Plumes to cease _ NSW EPA Blast Licence additions regarding Fume**

   **_ Best Practice to recognise "No Colour Health Risk"**

3. **"Near Neighbours" _ MD Weather Forecasting Impacting Dust & Operations**

   **_ NSW EPA Bad Days Analysis KPI's**

   **_ NSW EPA DUST STOP Program & Audits**

4. **"Diesel Exhaust Pathways" – Progress relies upon Air Drifting Patterns (& CCTV Studies) and Speciation Studies**

   **_ DPE Audits of MTW Trains**

5. **Allergen and Air Pollution _ Seasonal Asthma Calendar & Air Drifting**

6. **Power Station Stack Plumes – Drifting Patterns of Stack Plumes (Thermoview)**

   **_ Fly Ash in Hunter Valley Brown Smog**

   **_ Rainwater Tanks Fly Ash & OGM Impact**

7. **Mining Noise Health Risk _ Residents Night Sleep Disturbance @ dB**

   **_ Complaining Residents Mitigation Action**

   **_ Mine Night Noise Roving Patrols**

8. **Air Quality Averaging Issue _ 24 Hr Avg Met data hides Morning still Air**

   **_ 15 min Trigger for Mine Mitigation Action**

   **_ "Data Averaging" distorts the Pollution Emission reporting; while at the same time "equating this" to Resident's Minute to Minute Pollution Exposures and Disease Risks.**

   **_ 24Hr continuous Particulate Matter PM10 Realtime Monitors at around 76 locations are mostly under utalised for reducing Dust and Pollution Emissions,**

9. **Water _ Agricultural Use, Pokolbin Water System**

10. **Land Rights _ Quarantining of Near Neighbours and Village Properties leads to "One Mine Owner" with Leased Properties by stealth. Flawed Statistical Assessments for Acquisition Policy Financially Traps Rural Residents.**

_

# Health outcomes

**Table 2.1 Effects of noise on health and wellbeing with sufficient evidence**

| Effect | Dimension | Acoustic indicator * | Threshold ** | Time domain |
|---|---|---|---|---|
| Annoyance disturbance | Psychosocial, quality of life | $L_{den}$ | 42 | Chronic |
| Self-reported sleep disturbance | Quality of life, somatic health | $L_{night}$ | 42 | Chronic |
| Learning, memory | Performance | $L_{eq}$ | 50 | Acute, chronic |
| Stress hormones | Stress Indicator | $L_{max}$ $L_{eq}$ | NA | Acute, chronic |
| Sleep (polysomnographic) | Arousal, motility, sleep quality | $L_{max, indoors}$ | 32 | Acute chronic |
| Reported awakening | Sleep | $SEL_{indoors}$ | 53 | Acute |
| Reported health | Wellbeing clinical health | $L_{den}$ | 50 | Chronic |
| Hypertension | Physiology somatic health | $L_{den}$ | 50 | Chronic |
| Ischaemic heart diseases | Clinical health | $L_{den}$ | 60 | Chronic |

European environment agency technical report 11/2010

NSW GOVERNMENT Health

# APPENDIX M8

# SSHEG Community Briefing Dec 2010

**A** WHAT DO WE EXPECT OF THE EXPERT ADVISORY PANEL ?

- 1 year ago SSHEG Submission 11 th Nov 2009
- Calling for Independent Health Study

INVESTIGATE (a) Mine and Power Station Pollutants
(b) Toxicity of Pollutants
(c) Concentration of Pollutants in the Valley
(D) SHORT, MEDIUM & LONG TERM MITIGATION PLAN

**B** HUNTER VALLEY POLLUTED TO CAPACITY ?

*Then 1980 to 1990*
- 3 POWER STATIONS IN VALLEY
2 ALUMINIUM SMELTERS
- 3 POWER STATIONS ON COAST AND WITH SE WINDS SENDING PLUME DRIFTING UP THE VALLEY.
- SMALL NUMBER OF OPEN CUT MINES

*Now 2000 to 2010*
- MORE COAL TRAINS & MORE SHIPS AND
- MORE POLLUTION FROM MINING
- POWER STN AS HIGH TEMP. INCINERATOR
- TIPS THE BALANCE TO UNACEPTABLE LEVELS

Page 1

NTH 9/11/2010

**C** WHAT HAS BEEN OVERLOOKED BY THE AUTHORITIES ?

- socalled experts say " NO CONVINCING EVIDENCE"
- AUTHORITIES CONCENTRATE ON DUST LEVELS MINE GAUGES AND PM10 REAL TIME MONITORS & NOW DECCW 14 DUST MONITOR NETWORK
- Community says – the sickness indicators are;-
"VALLEY ASTHMA SYNDROME"
" CAMBERWELL COUGH"
& UNUSUAL EXOTIC DISEASES
- EPA & AUTHORITIES HAVE LET THE COMMUNITY DOWN
- SSHEG calls for Combustion Process Investigations

Page 2

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**D** WHATS SPECIAL ABOUT COMBUSTION

Combustion in Air – Coal in Power Stations

Toxins in Fuels Diesel in Mine Explosives
Diesel in Trains, Engines
Cigarette Tobacco

Combustion Plumes – Mostly Gases CO, NOx
More complex Gases
Fine Particles & Ash

In Plumes - Toxic compounds are concentrated by a Factor of 10 times

Whats in the Hunter Valley Air ????

- Fine Particles of Toxic Fly Ash
- Complex Chemicals as Gases & Particles
- Aerosols as Brown Toxic Smog

Page 3

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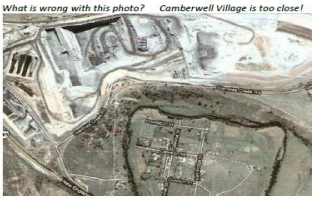
**E** CAN THE EXPERT PANEL FIX THIS ?

- Camberwell Mine Blasting Plumes




WOULD YOU BREATH THIS BLAST PLUME ???

Page 4

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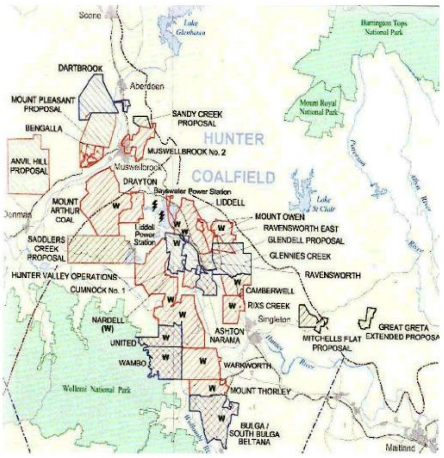
## CAN THE EXPERT PANEL FIX THIS ?

- Mining madness in the Hunter Valley
- What Pollution Mitigation is Proposed ?




MINES BETWEEN SINGLETON AND MUSWELLBROOK

WHERE SHOULD THE COMMUNITY LIVE ??????



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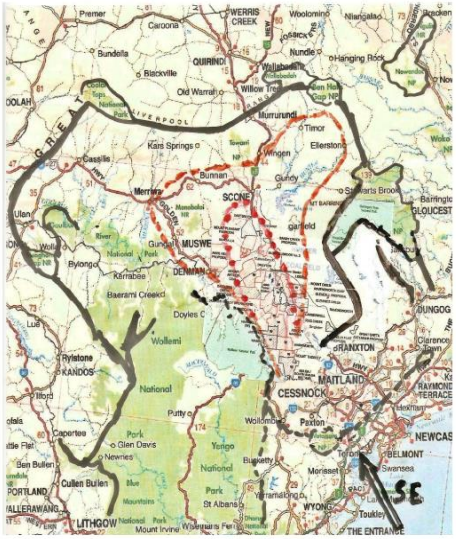
## CAN THE EXPERT PANEL FIX THIS ???

- Mine Blasting and Brown Smog Patterns




PREDOMINANT SOUTH EASTERLY BREEZE



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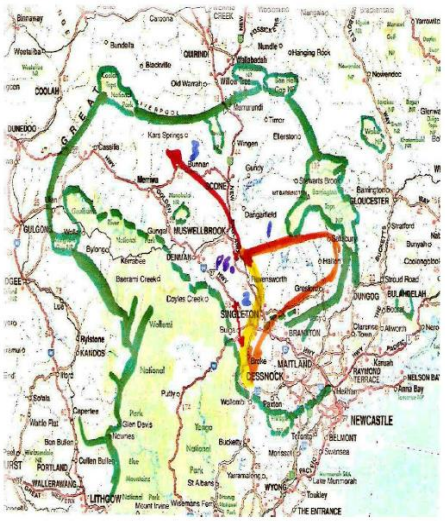
## POWER STATIONS PLUME DRIFTING PATTERNS




COMMUNITY REPORTED PROBLEM DRIFTING PATTERNS



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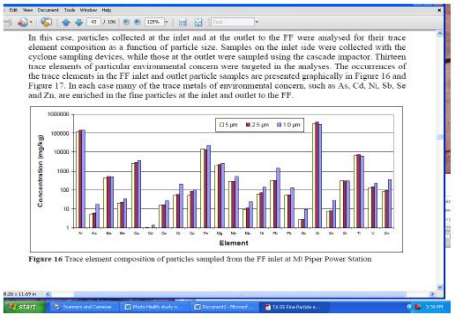
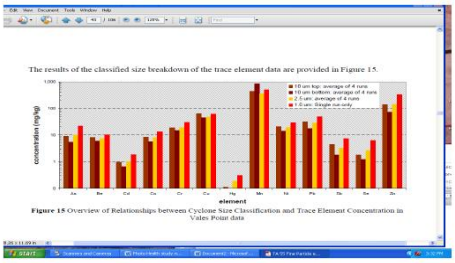
## POWER STATION TOXIC EMISSIONS AS FINE FLY ASH



In this case, particles collected at the inlet and at the outlet to the FF were analysed for their trace element composition as a function of particle size. Samples on the inlet side were collected with the cyclone sampling devices, while those at the outlet were sampled using the cascade impactor. Thirteen trace elements of particular environmental concern were targeted in the analyses. The occurrences of the trace elements in the FF inlet and outlet particle samples are presented graphically in Figure 16 and Figure 17. In each case many of the trace metals of environmental concern, such as As, Cd, Ni, Sb, Se and Zn, are enriched in the fine particles at the inlet and outlet to the FF.



**Figure 16** Trace element composition of particles sampled from the FF inlet at Mt Piper Power Station



The results of the classified size breakdown of the trace element data are provided in Figure 15.



**Figure 15** Overview of Relationships between Cyclone Size Classification and Trace Element Concentration in Vales Point data

TOXIC TRACE ELEMENTS SUCH AS ARSENIC, CHROMIUM, SELENIUM, LEAD, ZINC



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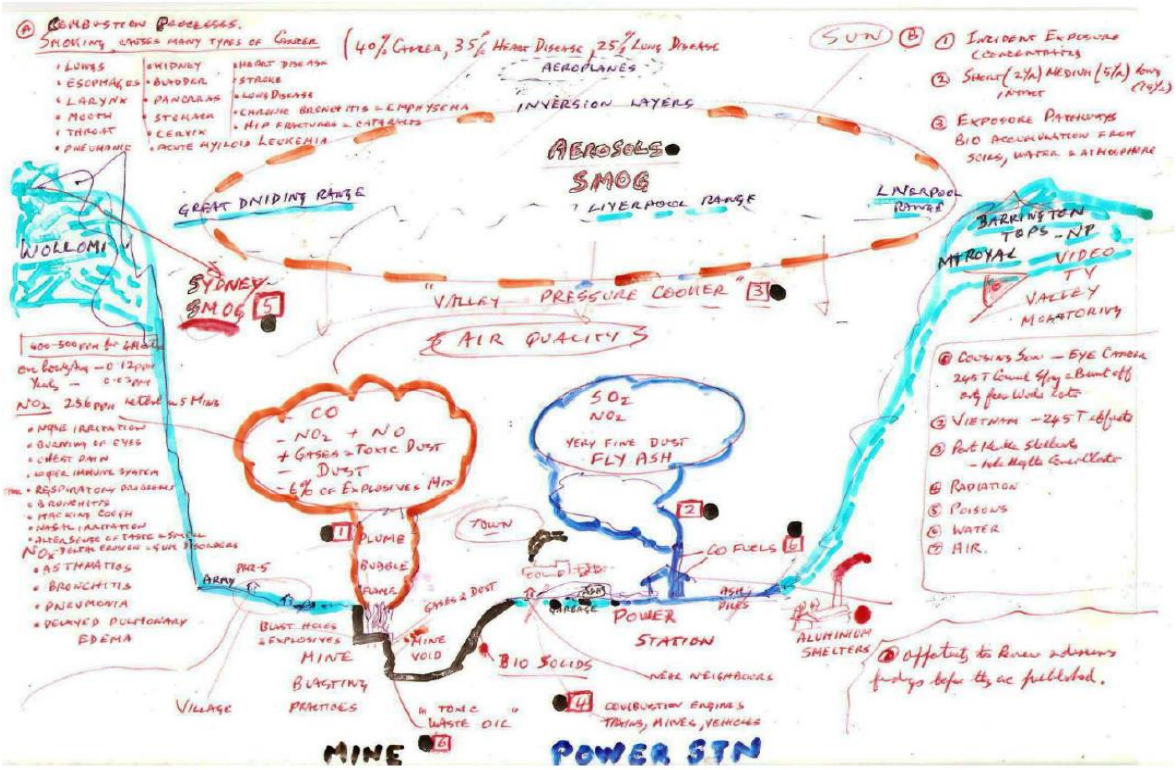
F HEALTH SYNERGY –

CIGARETTES VERSUS AIR POLLUTION ?

- Passive Smoking is recognised Cancer trigger
- Both are Combustion of "vegetation" as Plume Gases and Fine Particles, & with 10 times Concentrated **Toxic** Trace Elements
- Toxicity Synergy of individual Chemicals
- Consider Air Pollution Exposure Risk as % of established Passive Smoking International recognised Public Health Guideline Values ?

Page 9

NTH 9/11/2010




Map 9 The cross sectional view of the Valley

**Air Pollution Visualisation prepared for Expert Advisory Panel May 2010**

(Refer SSHEG Document 2010 ***(H2 p 35)****"Independent Health Study")*

# APPENDIX M9

# SSHEG Health Study Issues Dec 2014

SSHEG is Not Anti Mining or Anti Power Stations

**Singleton Shire Healthy Environment Group – Focus on Health**

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

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

**In 2008 SSHEG called for an Independent Holistic Health Study in the Hunter Valley.**

"*The Community perception was that the increased pace of Industrial development in the somewhat enclosed Hunter Valley is accentuating Human Disease and Sickness, particularly of our Children*".

SSHEG focused on Pollution Sources from Power Stations and Open Cut Mining Operations with their close proximity to Farming Families and Villages in Rural areas; where ostensively a variety of Diseases were reported by "Near Neighbours": now considered as "Occupationally Exposed Persons".

Dr Au, our Singleton General Practioner, alerted Health Authorities that School children were over represented with Respiratory Deficiency, observing an apparent association between Poor Air Quality and Community Diseases, particularly Asthma.

SSHEG is Not Anti Mining or Anti Power Stations

## 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**

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## What's in the Air we Breath ? - Cocktail of 53 NPI Pollutants identified by SSHEG

Power Stations with Fly Ash -- Arsenic, Chromium, Lead, Cadmium, Mercury.
Coal Mining Open Cut/Underground --- Radon, Mine Blast Plumes, Diesel Exhaust
Agriculture, Homes, Roads, Forests ----- Pollen, Spores, Fungi, Vapours, Soil, Heaters
Hunter Valley Brown Haze --- Aerosols as Sulphate & Nitrates, adhere to PM's

**Identify** -Composition and Toxicity of Gases, Vapours, Aerosols, Dust, Particle Matter

**2012 Singleton Particle Characterisation Study $PM_{2.5}$** Woodsmoke in Winter

INDUSTRY

31 DAY RUNNING VALUES

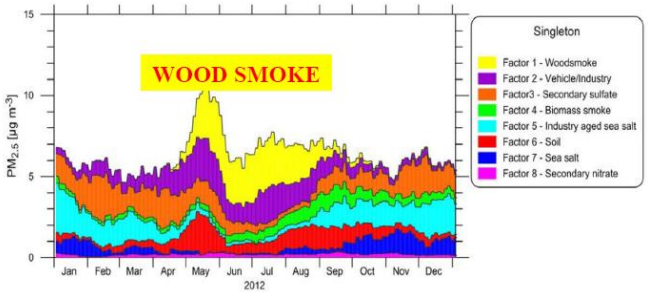


Figure 48. Time series (smoothed with 31-day running window) of the contribution of each factor to the total $PM_{2.5}$ in Singleton.

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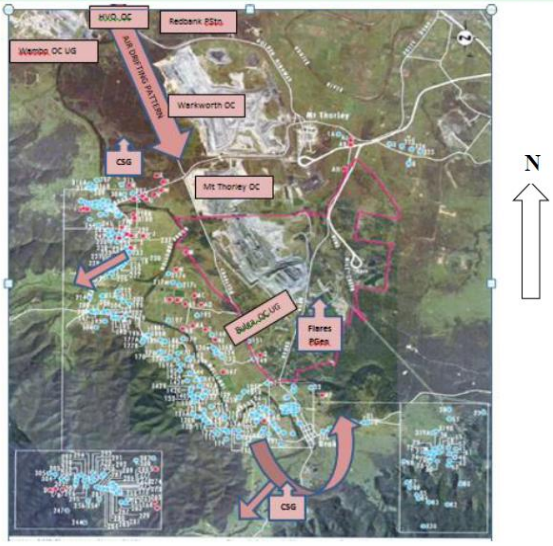
## Micro Valley Study of Mining coexisting with Residents, Farming, Vineyards and Horse Studs in the Hunter Valley of NSW Australia

A Picturesque Rural Valley with the Villages of Broke, Fordwich, Milbrodale and Bulga, Vineyards and Horse Studs.

**Broke School Health Study & MicroValley Cancer Survey**

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## What has Epidemiology Cohort Research identified 2010 - 2014 ?

**By 2014**

(a) "*Air Pollution, Particulate Matter & Diesel Exhausts as Group 1 Carcinogens same as Arsenic, Mustard Gas and Radioactivity*".

(b) "*No Threshold Exposure*" of Disease Impact of Pollution.

(c) Disease impact more related to "*Pollution Rise above Background*" rather than absolute Pollution Exposure value.

(d) "*Life Shortening*" Impact of Air Pollution.

(e) Diesel in Underground Mines Lung Cancer Risk @ *>0.05mg/m3.*

(f) Mining Diesel Exhausts @ $6x10^6$ *pa low sulphur <10ppm fuel used.*

(g) Three Particulate Matter Classes, *PM10-2.5 Coarse, PM2.5 Fine, PM10*.

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USEPA Dec 2009

**Table 2-6. Summary of PM causal determinations by exposure duration and health outcome.**

| Size Fraction | Exposure | Outcome | Causality Determination |
|---|---|---|---|
| PM FINE $PM_{2.5}$ | Short-term | Cardiovascular Effects | Causal |
| | | Respiratory Effects | Likely to be causal |
| | | Central Nervous System | Inadequate |
| | | Mortality | Causal |
| | Long-term | Cardiovascular Effects | Causal |
| | | Respiratory Effects | Likely to be Causal |
| | | Mortality | Causal |
| | | Reproductive and Developmental | Suggestive |
| | | Cancer, Mutagenicity, Genotoxicity | Suggestive |
| PM COARSE $PM_{10-2.5}$ | Short-term | Cardiovascular Effects | Suggestive |
| | | Respiratory Effects | Suggestive |
| | | Central Nervous System | Inadequate |
| | | Mortality | Suggestive |
| | Long-term | Cardiovascular Effects | Inadequate |
| | | Respiratory Effects | Inadequate |
| | | Mortality | Inadequate |
| | | Reproductive and Developmental | Inadequate |
| | | Cancer, Mutagenicity, Genotoxicity | Inadequate |
| PM ULTRA FINE UFPs | Short-term | Cardiovascular Effects | Suggestive |
| | | Respiratory Effects | Suggestive |
| | | Central Nervous System | Inadequate |
| | | Mortality | Inadequate |
| | Long-term | Cardiovascular Effects | Inadequate |
| | | Respiratory Effects | Inadequate |

Particle Characterisation

MINING

DIESEL

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## What's in the Air we Breath ? Mine Diesel $10^6$ litres pa in Hunter

**DPM, NOx, THC, NMHC- Soluble (Volatile) Organic Fraction condense on Particle Matter**

Diesel particle – a cocktail of substances…

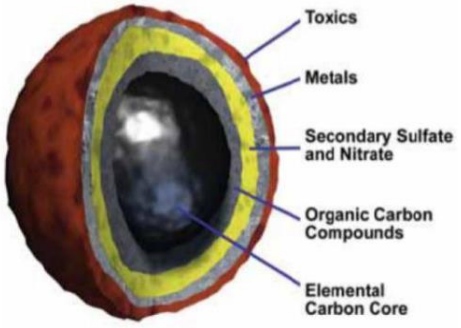
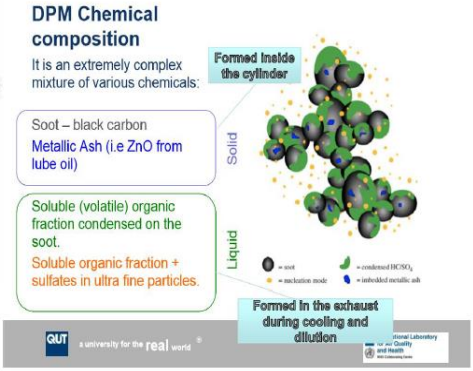



Figure S1 Illustration of Diesel Particle PM 1-2.5 which is dramatically different from the common perception of black diesel Exhaust fumes being like charcoal or soot.

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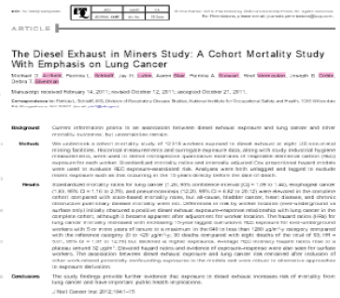
## What's in the Air we Breath ?

### Diesel Exhaust in Miners Study

**How:** Evaluated the risk of death associated with diesel exhaust exposure, particularly as it may relate to lung cancer.
2,315 workers at eight non-metal mining facilities.


ARTICLE

The Diesel Exhaust in Miners Study: A Cohort Mortality Study With Emphasis on Lung Cancer

**Main findings:**

1. increased risk for lung cancer death with increasing levels of exposure to diesel exhaust.
2. Risks among heavily exposed workers were about **three times greater** than risk among workers with low exposure to diesel exhaust.
3. Non-smokers with the high levels of diesel exposure were **seven times more** likely to die from lung cancer than non-smokers in the lowest exposure category.

QUT a university for the real world ® International Laboratory for Air Quality and Health WHO Collaborating Centre

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# Residents Gassed by Mine Blasting –

## If this was a Chimney EPA controls would apply

*Camberwell Gassing Incident 2004 Lethridge St. area viewing North*





# What's in the Air we Breath ?

## Mine Blast Plumes ANFO & Diesel, COx, NOx, VOC's, SOx

The data in Table 1 are not all from the same site but are useful in illustrating the typical characteristics of gases whose origins are different. Each source will be discussed separately.

| Gas | Air | Blasting – Borehole | Backfill 1 with Limestone | Backfill 2 | Landfill | Abandoned Mine | Residence |
|---|---|---|---|---|---|---|---|
| $N_2$ | 78.09% | 89.29% | 81.09% | 78.00% | 3.70% | 87.77% | 80.35% |
| $O_2$ | 20.95% | 5.78% | 7.29% | 19.30% | 0.8% | 0.30% | 9.82% |
| Ar | 0.93% | 1.07% | 0.96% | 0.93% | | 1.05% | 0.96% |
| $CO_2$ | 0.03% | 3.86% | 10.65% | 1.43% | 47.0% | 8.96% | 8.86% |
| CO | 0% | 0.0023% | | | 0.1% | 0% | |
| $CH_4$ | 0% | 0.0003% | 0.013% | 0.0087% | 47.4% | 1.88% | 0.15% |

**Table 1.** Gas samples from various sources.

**Blasting Gases:** As discussed earlier, blasting generates elemental nitrogen, $CO_2$, and water. If the detonation is not ideal, the blast emits CO and nitrogen oxides. If $N_2$, $CO_2$, and CO components of the samples are elevated, the gases may be linked to blasting. Without elevated levels of all three, the gases are unlikely to be related to blasting.

**Source of Carbon Based Gases from Blasting**

All explosives create an amount of CO and $CO_2$. Depending on the oxygen balance of the formulation, some explosives produce more CO than others. The commonly used explosives contain an organic carbon. For simplicity, ammonium nitrate and fuel oil (ANFO) will be given as an example.

The byproducts of the detonation of ANFO are primarily water ($H_2O$), nitrogen ($N_2$) and carbon dioxide ($CO_2$), all nontoxic to people. In an ideal reaction[1]:

$$3NH_4NO_3 + CH_2 \Rightarrow 7H_20 + CO_2 + 3N_2$$

Noxious fumes are generated when the fuel oil portion is incorrect, water is introduced into the ANFO, or optimum detonation velocities are not attained due to inadequate priming. Generally, whenever the reaction becomes less efficient, toxic gases (fumes or "smoke") are produced. These secondary byproducts are CO and nitrogen oxides ($NO_x$).

The source of carbon in both CO and $CO_2$ is the fuel oil ($CH_2$). It is thermogenic in origin, derived from an organic source that was formed millions of years ago. This will play an important role when trying to determine the source as discussed later in this paper.

K.K. Eltschlager, Pittsgurgh, PA USA "Fugitive Carbon based gases Blasting related or Not".

**Blast Plumes with Airbourne Emissions**
As reported to the Hunter Valley Operations Coal & Allied Community Consultative Committee 2005

*"My alarm bells rang from the first time I saw the High Speed view of Flames that are emitted from Blast Holes around five years ago. Being a Combustion Engineer involved in Industrial Pollution Instrumentation and Controls I was alarmed that the High Temperature Products of Combustion were emitted directly into the Atmosphere in large Volumes along with the dust, rather than being contained below the surface.*

*The presence of Diesel Fuel reacting at High Speed and Temperature is itself a questionable practice in terms of the potential for Airbourne Pollution to be released and with the associated Community Health concerns. Theoretically, all the fuel should be instantly consumed within the Blast Hole and without release, however the reality is that high levels of Hydrocarbon Airhourne releases exist with current Blasting practices used in the Hunter Valley.*

*Blasting can be done with little or no Atmospheric release.*

*Since then I have raised this issue at the Community Consultative Committee meetings at the Mines so that the potential risk of these Blast Plume Emissions is fully investigated and the Risks understood.*

*The question is, if this was a chimney it would have EPA limits on these emissions based upon comprehensive sampling and analysis.*

*Two aspects are key to improving this situation;-*

*(1) Effective Cap the Blast Holes to limit, if not to eliminate these Atmospheric Emissions.*

*(2) Sample and Analyse Blast Emission Particles and Gases and collate their concentrations for the various Blast Hole Strata compositions.*

*For Example, perhaps then the importance of high temperature reactions that would take place between the walls of the Blast Holes*





**Dust Storms & Rain Squalls & Rainwater Tanks**

PSR® Physicians for Social Responsibility
United States Affiliate of International Physicians for the Prevention of Nuclear War
1985 NOBEL PEACE PRIZE

**Coal Ash: Hazardous to Human Health**

**Why is it dangerous?** Depending on where the coal was mined, coal ash typically contains heavy metals including arsenic, lead, mercury, cadmium, chromium and selenium, as well as aluminum, antimony, barium, beryllium, boron, chlorine, cobalt, manganese, molybdenum, nickel, thallium, vanadium, and zinc.[i] If eaten, drunk or inhaled, these toxicants can cause cancer and nervous system impacts such as cognitive deficits, developmental delays and behavioral problems. They can also cause heart damage, lung disease, respiratory distress, kidney disease, reproductive problems, gastrointestinal illness, birth defects, and impaired bone growth in children.

**How dangerous is coal ash to humans?** The Environmental Protection Agency (EPA) has found that living next to a coal ash disposal site can increase your risk of cancer or other diseases. If you live near an unlined wet ash pond (surface impoundment) and you get your drinking water from a well, ***you may have as much as a 1 in 50 chance of getting cancer*** from drinking arsenic-contaminated water.[ii] Arsenic is one of the most common, and most dangerous, pollutants from coal ash. The EPA also found that living near ash ponds increases the risk of damage from cadmium, lead, and other toxic metals.

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## What's in the Air we Breath ?

### Power Stations Plumes with Fly Ash --Arsenic, Beryllium Chromium, Rainwater Tanks for Rural Homes Lead, Cadmium, Mercury, Zinc

The results of the classified size breakdown of the trace element data are provided in Figure 15.

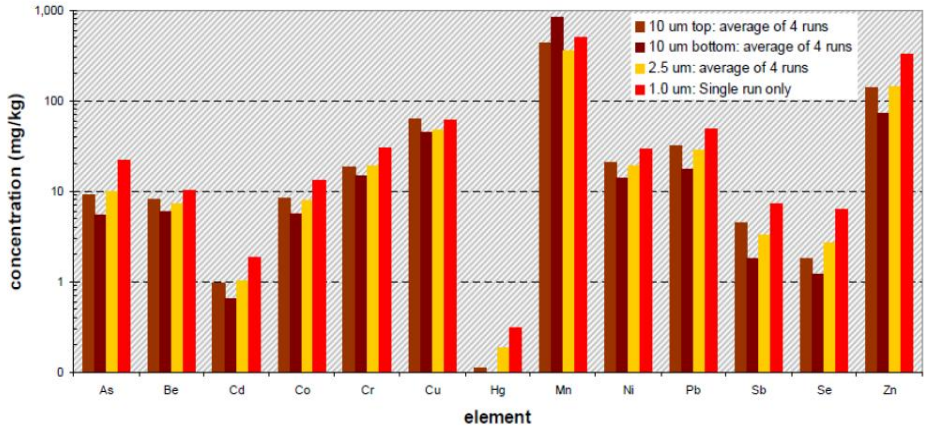


**Figure 15** Overview of Relationships between Cyclone Size Classification and Trace Element Concentration in Vales Point data



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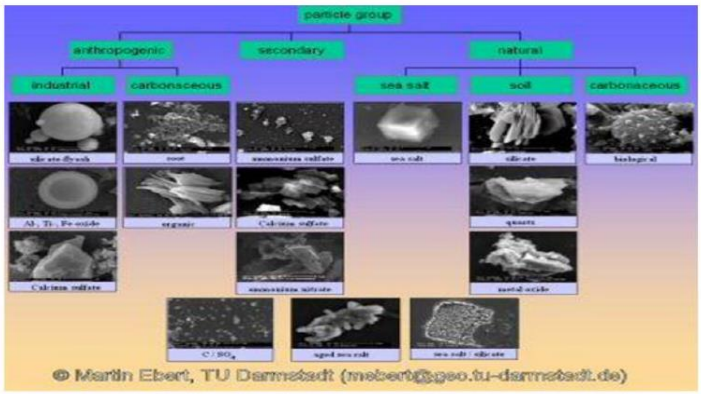
## What's in the Air we Breath ?

### Hunter Valley Brown Haze ---Aerosols as Sulphate & Nitrates, adhere to PM'

**Attachment S31 Hunter Valley Aerosol Cocktail Smog**

**Electron Microscopy Images serve to identify the type of aerosol Particulates that would be expected to be present in the Hunter Valley Brown Smog.**




Environmental Scanning Electron Microscopy (ESEM
...www.geo.tu-darmstadt.de - 400 × 322 - More sizes

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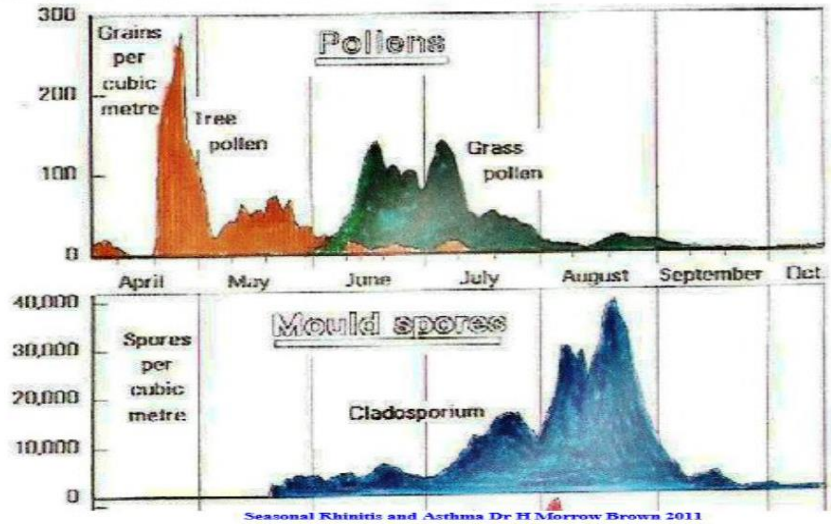
## What's in the Air we Breath ?

Agriculture, Homes, Roads, Forests ----- Pollen, Spores, Fungi, Vapours, Soil, Heaters

## (a) Biological & Particle Characterisation Calendar(NZ example)

Simplified Pollen Calendar is Illustrated.




Dr Neville Hodkinson PhD Email:- ssheg@hotmail.com Page 11

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**Table 6: Estimates of $PM_{2.5}$ and $PM_{10}$ attributable annual mortality and hospitalisation due to *current exposure* and *scenario exposures* in Sydney, Melbourne, Brisbane and Perth, averaged over the period 2006 to 2010**

| Health outcome | Pollutant | Time period | Scenario | Number of attributable cases (% increase / decrease compared to current) | Proportion of attributable cases (95% confidence interval) |
|---|---|---|---|---|---|
| ASTHMA STUDY | | | | | |
| Asthma hospital emergency department attendance 1–14 years | $PM_{2.5}$ | Short-term exposure | Current | 124 cases | 0.6% (0.4% to 0.8%) |
| | | | Scenario 1: 25 µg/m$^3$ | -34 (-27%) | |
| | | | Scenario 2: 20 µg/m$^3$ | -54 (-43%) | |
| | | | Scenario 3: 15 µg/m$^3$ | -74 (-59%) | |
| Respiratory hospital admissions 0–14 years | $PM_{10}$ | Short-term exposure | Current | 1130 cases | 2.2% (0.2% to 4.3%) |
| | | | Scenario 1: 50 µg/m$^3$ | -373 (-33%) | |
| | | | Scenario 2: 40 µg/m$^3$ | -588 (-49%) | |
| | | | Scenario 3: 30 µg/m$^3$ | -733 (-65%) | |

Power Stations Diesel Exhaust

Coal Mining DUST

25

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Eur Respir J 2005; 26: 309
DOI: 10.1183/09031936.05.
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**Short Term Coarse PM Mining Dust effects ASTHMA & Cardiovascular Diseases**

REVIEW

# Epidemiological evidence of effects of coarse airborne particles on health

B. Brunekreef* and B. Forsberg#

**ABSTRACT: Studies on health effects of airborne particulate matter (PM) have traditionally focused on particles <10 μm in diameter ($PM_{10}$) or particles <2.5 μm in diameter ($PM_{2.5}$). The coarse fraction of $PM_{10}$, particles >2.5 μm, has only been studied recently. These particles have different sources and composition compared with $PM_{2.5}$. This paper is based on a systematic review of studies that have analysed fine and coarse PM jointly and examines the epidemiological evidence for effects of coarse particles on health.**

**Time series studies relating ambient PM to mortality have in some places provided evidence of an independent effect of coarse PM on daily mortality, but in most urban areas, the evidence is stronger for fine particles. The few long-term studies of effects of coarse PM on survival do not provide any evidence of association.**

**In studies of chronic obstructive pulmonary disease, asthma and respiratory admissions, coarse PM has a stronger or as strong short-term effect as fine PM, suggesting that coarse PM may lead to adverse responses in the lungs triggering processes leading to hospital admissions. There is also support for an association between coarse PM and cardiovascular admissions.**

**It is concluded that special consideration should be given to studying and regulating coarse particles separately from fine particles.**

**KEYWORDS: Air pollution, coarse particles, epidemiology, morbidity, mortality**

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**Table 4. Wood smoke emissions**

| Pollutant | Physical state | Emissions (g/kg wood) |
|---|---|---|
| Carbon monoxide | Volatile | 80-370 |
| Methane | ,, | 14-25 |
| Volatile organic compounds | ,, | 7-27 |
| Benzene | ,, | 0.6-4.0 |
| Toluene | ,, | 0.15 -1.0 |
| Phenol (and derivatives) | Volatile/Particulate | 0.2-0.8 |
| Nitrogen oxides (NO, $NO_2$) | Volatile | 0.2-0.9 |
| Sulfur dioxide | ,, | 0.16-0.24 |
| Total particle mass | Particulate | 7-30 |
| Particulate organic carbon | ,, | 2-20 |
| Particulate elemental carbon | ,, | 0.3 - 5 |
| Oxygenated PAHs | Volatile/Particulate | 0.15-1 |
| Benzo(a)anthracene | ,, | $4 \times 10^{-4}$- $2 \times 10^{-3}$ |
| Benzo(a)pyrene | ,, | $3 \times 10^{-4}$- $5 \times 10^{-3}$ |
| Dibenzo(a,h) anthracene | ,, | $2 \times 10^{-5}$- $2 \times 10^{-3}$ |
| Iron | Particulate | $3 \times 10^{-6}$- $5 \times 10^{-3}$ |

*Source: US EPA December 1993*

A kilogram of wood when burnt in a typical wood-fired stove can produce significantly harmful levels of gases, particles and other harmful compounds. The concentrations of the emitted pollutants are compared to the respective standard levels in Table 5.

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# APPENDIX M10

# SSHEG Health Study References

"*SSHEG submission* (**H1**) *to NSW Government 11 Nov 2009* "

*"SSHEG Document (**H2**) 2010 Independent Health Study for Singleton Shire including **27 Attachments** Illustrating the individual Community Concerns".*

SSHEG submission (**H3**) No 28 Senate Enquiry on *"Impacts on Health of Air Quality in Australia"* and **S1-S22 attachments**; and Supplementary Submission (**H4**) Diesel & Composite Particulates and **S26–S29.**

SSHEG Submission (**H5**) "*Air Quality Australian Standards Oct 2014"* and Attachments (**H5a**, **A1-A6**, No 82 NEPM Standards.

SSHEG submission,(**H6**) "*National Clean Air Agreement April 2015".*

Public Forum Presentation for the Singleton Community entitled "*What do we expect of the Expert Advisory Committee* "(**H7** as **Appendix M8** of this May 2015 SSHEG Review).

Dust Storms and Rain Squalls (**H8**); Is Air Quality Adversely Affecting the Health of Singleton Shire Residents? (**H8a**)

**Gassings**" (**H2 p 9-12, H9**),

SSHEG Document (**H10**) March 2014 *"Mining Pollution Mitigation Priority Action"* focusing on "Near Neighbours" being impacted by Mining.

SSHEG Air Pollution Health Study Review 2014 (**H10a**).

SSHEG submission (**H11**) to NSW Planning April 2015 calls for "*Elimination of Mine Blasting into the Air - Residents as Occupationally Exposed*" and **Attm 1-4. (Note ##)**

## MTW Mine Blast "Gassing" on 20th September 2013 in Broke Bulga Micro Valley (**H12**) establishes that Blast Colour Best Practice Management Mine Plans does not Protect "Near Neighbours".

SSHEG Submission (**H13**) *"Bulga Mine Optimisation 2014"* further details the Broke-Bulga Micro Valley Air Drifting Patterns, and the Pollution Monitoring warranted to safeguard for children at Broke School.

Rocky Hill Mine Gloucester SSHEG Submission**(H14)**

SSHEG expected Health Study Methodology **H15**) based on Industry OH&S Hazardous Risk Analysis.

**Dr Craig Dalton "A submission (*H16)* "*How to investigate the impact of coal Mining on Community Health*", and based on the "***Contribution of toxicological and epidemiological data to understand cause and effect"*** *from Adami.*[4]

(**H17**) Hans-Olov Adami, Colin L. Berry, Charles B. Breckenridge, et al. Toxicology and Epidemiology: Improving the Science with a Framework for Combining Toxicological and Epidemiological Evidence to Establish Causal Inference. TOXICOLOGICAL SCIENCES 122(2), 223–234 (2011)

**Centre for Air Quality and Health Research and evaluation (CAR )(H18)** Semimar proceedings Monash Centre Melbourne 2nd April 2015 " Toxicology Workshop".
Also Epidemiology CAR Seminars Sydney & Newcastle Sept 2013 SSHEG Outline (**H19**).

**Nelson et al - June 2011 (H20) QUANTIFICATION, SPECIATION AND MORPHOLOGY OF RESPIRABLE SILICA IN THE VICINITY OF OPEN-CUT COAL MINES IN THE HUNTER VALLEY, NSW. ACARP PROJECT C18026 FINAL REPORT**
**Anthony L. Morrison and Peter F. Nelson** Graduate School of the Environment Macquarie University

**( H21) SSHEG Poster Presentation Mining Dialogue Dec 2014**

(**H22**) SSHEG Appraisal "*Epidemiology 2013 Air Pollution and Human Health*".

# SSHEG May 2015 Review Appendices

| | |
|---|---|
| APPENDIX M1 | SSHEG Mitigation Priority Action List |
| APPENDIX M2 | Mining Dialogue 2011 Workshop Report |
| APPENDIX M3 | Mining Dialogue 2011 Stakeholder Survey |
| APPENDIX M4 | Mining Dialogue Meeting SSHEG Notes 2015 |
| APPENDIX M5 | SSHEG NEPM Standards Submission |
| APPENDIX M6 | SSHEG National Clean Air Agreement |
| APPENDIX M7 | SSHEG Review 2015 Presentation |
| APPENDIX M8 | SSHEG Community Briefing Dec 2010 |
| APPENDIX M9 | SSHEG Health Study Issues Dec 2014 |
| APPENDIX M10 | SSHEG Health Study References |