Report to the Queensland Government Coal Workers Pneumoconiosis Select Committee

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Executive Summary

The incidence of Coal workers Pneumoconiosis in Qld and NSW brings into question the current practices, legislative framework, technologies for dust measurement and analysis, and the medical screening for coal workers. It is the view of this report that the practices of operators are sound and legislative framework in relation to the running of mining operations with respect to respirable dust is adequate. Frequency of monitoring may be an area of further investigation, however there is no requirement that prohibits mines from conducting more frequent monitoring. Further, it supports the view that significant improvement can be made in the medical examinations and the supervision of these as per the Monash report would greatly assist in the early detection of cases of potential CWP

Current technology is not able to immediately detect the presence of respirable silica, the most advanced can only provide a 30min average of respirable dust. As such it severely limits the ability of any operator to control exposure to this dust. Reliance must still rest on Personal Protective Equipment.

The presence of other agents such as reactive pyrite, may have some significance in these incidences, however as no studies in this area have been taken in Australia, this is raised as an area for further research.

Introduction

It is within the expertise of the author to comment on several of the terms of reference of the inquiry into Coal Workers Pneumoconiosis (CWP). Those terms pertaining to medical practices falls outside of the expertise, other than being a recipient of the screening process in NSW, and therefore this submission will be limited in those areas. Each Section in this report will have a key to the Terms of Reference(ToR) to which it relates. E.g. (ToR a,b,c,d,e,f)

There are a number of questions that these cases of CWP have raised;

Were there pre-existing conditions and exposures that have caused the damage, and it is now showing up in their present employment?

Was the exposure a long term one or was it a chronic exposure or a combination of these types of exposure?

Is there some other agent in the Qld underground coal environment that in combination with a coal dust exposure has accelerated the effects of exposure to dust in the coal mine?

Are the practices of mines and the regulatory arrangements deficient in preventing CWP?

In the area of prevention, is the ability of the available technology able to prevent exposure?

To assist the Inquiry, an attempt will be made to answer these questions within the framework of the stated “Terms of Reference”

The presence of respirable dust that is invisible >10microns, the amount that is present, the nature of those dust particles, the chemistry of the dust particles and the duration that a person is exposed contribute to the rate at which a person may develop lung damage.

The control of the environment to eliminate or prevent CWP involves;

- the detection of the presence of the dust,
- providing sufficient ventilation air to dilute and remove the dust from the workplace,
- procedural controls specifying the location of workers to be operating in such places as of lower dust levels,
- operational controls to minimise dust production,
- monitoring of the workplace to measure the exposure,
- heath checks to identify loss or damage to lung function at the earlies stages,
- and
- lastly, the use of personal protective equipment(PPE) as a physical barrier between the worker and the dust.

The feedback in this process is the results of monitoring and the early detection of incidence of CWP in gauging the effectiveness of the measures.

The current technologies to measure respirable dust in the atmosphere, do not allow for the immediate detection of dust in the atmosphere, with the best of these technologies working on a 30min average and in some cases the exposure is measured over a working shift. None of these technologies are able to measure the presence of silica in this dust. This function is performed by a laboratory analysis and the results may not be known for several days up to a week.

This puts a reliance on medical examinations as a measure of the effectiveness of controls.

Skills (ToR a,b,e,f)

In order for the management of underground coal mines to be effective in mitigating the exposure to respirable dust, people with the requisite skills, authority and responsibility should have charge of each aspect of this process. To this end the current arrangements for the requirement of a Ventilation Officer is appropriate and provided the arrangement as stated in the Warden's Inquiry into Moura No. 2 is correctly implemented.

This Statutory Position has provided several significant improvements in the way that underground coal mines control and mitigate a mine worker's exposure to respirable dust.

The Moura No. 2 underground mine accident report of the Warden's inquiry. It states;-

"It is recommended that a position of ventilation officer be established as a statutory position at all underground coal mines. The ventilation officer appointed must have demonstrated competencies appropriate to the duties and responsibilities of the position and would be directly responsible to the mine manager for the planning, design and implementation of the mine ventilation system and for the establishment of effective standards of ventilation for the mine, methods for its control and protection, monitoring of performance, reporting procedures, maintenance of ventilation records and plans, and emergency action plans. The mine manager may be the appointed ventilation officer. Otherwise, if the ventilation officer has other duties at the mine, they would be subordinate to those of ventilation officer."

This recommendation was implemented in both New South Wales and Queensland. The competencies for this statutory position have been clearly defined and Ventilation Officers in both NSW and Qld underground coal mines have assembled evidence to show that they met that standard.

This legislative arrangement provides the requisite skills, and gives authority and responsibility to the Ventilation Officer to control these matters. In terms of the skills, this is provided by a number of providers in Qld and UNSW in NSW and Qld. It would be imprudent to comment on the other providers, however, all have assessed to the Competency Standard that is in force.

From the time of implementation, the standard of knowledge and the levels of skill that a Ventilation Officer has at his/ her disposal have greatly improved. The School of Mining Engineering, UNSW, has assisted the Industry in the providing training and assessment. This is provided through two programmes, The Graduate Diploma in Mine Ventilation and the Statutory Ventilation Officer's Course.

Additionally, the materials developed for this course have been rolled out into the graduate programmes at University of NSW, University of Queensland, University of Adelaide, West Australian School of Mines, and under licence to University of British Colombia and on online resource Edumine. However, it was the opinion of the course authors, that any ventilation course as part of the degree program was inadequate for the purposes of meeting the requirements of the Ventilation Officer as a graduate could pass the subject at 50%.

By contrast, for a Ventilation Officer, the new course would require an overall pass mark of 70% with a pass mark of 100% in those matters that pertained to the Competency Standard.

Background to the UNSW courses: (ToR a,b)

The School of Mining Engineering was invited by the then Chief Inspector of Mines (NSW) Mr. Bruce McKensey, to put together a training course in ventilation to improve the skills of Ventilation Officers in NSW. The Authors of this course are, Professor J. Galvin, Dr Roy Moreby, Mr Duncan Chalmers, Dr David Cliff and Mr Paul MacKenzie- Wood.

The new course was developed that was far more comprehensive and was implemented in August 1998. The course was offered in Queensland at Capricorn Coal Training Facility, Middlemount, Qld in 2000. To ensure this course and the assessments for it complied with Qld Requirements, a mapping exercise was undertaken, presented to Mines Inspector Mr G.Rowan Snr Mines Inspector. His revised document, dated 14th July 2000, demonstrated that the UNSW course was mapped against the then Competency MNC.U.109.A. Manage, Operate and Maintain the Ventilation System.

Since the commencement of this programme in 1998, approximately 500 candidates have presented themselves for training and assessment and approximately 80% of those have been deemed to have met the competency standard. A significant component of this has been focused on the measurement, monitoring and control of environmental contaminants. This includes respirable dust, diesel particulate matter, blast fumes and mine gases.

Controls (ToR a,b,c,d)

The legislative and other regulatory arrangements in QLD support the control of the underground mine environment to mitigate the exposure of persons to respirable dust. As Identified by the study into CWP undertaken by Monash University highlight there appears to be deficiencies in the health check process that has led to a false sense of control within the mining operations.

The controls in place in Qld do not reflect best practice in terms of the limits applied to respirable coal dust 3mg/m3 as opposed to 2.5mg/m3 in NSW and Safe Work Australia. However the modification of the Qld limit on a time weighted average should be retained.

Otherwise the collection and analysis regime outlined in “Notice – Airborne Dust Limits, Collection and Analysis” NSW Gazette 10480, 21 December 2007 should also be considered, supporting Recommendation 2 (Fifth Interim Report)

However the Recommendation contained in paragraph 4.13 relating to “whether the exposure level should be measured as a dust load of milligrams per tonne of coal cut, as distinct from time weighted averages for exposure.” should be examined with extreme caution. While the amount of dust that is produced will increase with the tonnage of coal there are several additional parameters that will affect the generation of respirable dust. Simply relating the level of dust to tonnage without taking into effect these additional factors would not necessarily limit exposure and potential harm. An example of this is that the generation of finer dust is a function of the sharpness of the cutting picks. This sharpness will vary dependant on the hardness of the coal, the rotational speed of the cutters and the abrasive nature of the inclusions within the coal.

The dust load of milligrams per cubic metre of ventilating air is far more effective as it relates to the quality of the air to which the workers are exposed. It by very nature of the mining operation will increase with the rate of production as this air also has the function of removing other airborne contaminants (gases), the rate of gas release is proportional to tonnes mined.

Monitoring (ToR c,d)

Health

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Mine site (ToR a,b,c,e)

Sections 89 and 89A “Coal Mining Safety and Health Regulation 2001” are clear on the obligations of Coal Mines with regard to managing and controlling Dust.
The efficacy of any process, arrangement depends entirely on what is measureable.

With respect to legislative framework, the measures are compliance with the legislation to the required standard or demonstration that a higher standard exists.
In terms of respirable dust, this would mean auditing each Coalmine's safety and health management plan.
The collection of samples as per Sections 89 & 89A and the subsequent analysis, reporting, appear to be adequate.
However, all sampling is done on a gravimetric basis, which has limitations due to available technology. It is possible for a person to receive less than the prescribed limit for coal dust and be exposed to a higher concentration of silica.
For example a worker could be exposed to 1.6 mg/m3 respirable silica for a period of 20 minutes. And little to no exposure for the rest of the eight hour shift could return a reading of 0.067mg/m^3 silica which would be compliant with the 0.1mg/m^3 prescribed limit. Also 3.2mg/m^3 for 10 minutes could also bring about the same average reading.
Thus this exposure would not trigger a report.
Lung damage does show in X-ray and the provision of medical examinations on a regular basis would provide coal mines with the necessary feedback on how effective their plans have been.
If the mines are not informed of any incidences of CWP, then the inference from that is that the controls are effective.

Other Factors (ToR e,f)

There has been reported an inferred relationship between Pyrite and CWP. Studies conducted in the US. By Cohn et al 2006 and Huang et al. 2005 point to a plausible link between the presence of pyrite (a group of sulphide minerals) in a range of US coals and cases of CWP. Work done by Beamish and Thieler, 2017 demonstrate that there are several reactive pyrite minerals that oxidise at an appreciable rate and could provide significant quantities of bioavailable iron and other airborne species that could have a detrimental effect on lung tissue, (Beamish, 2017).

Mine Ventilation Society of Australia Submission. (ToR f)

A submission has been made to the CWP Select Committee that contains some generalisations and is misleading in several ways. This submission has been made without due consultation of members and as such presents a biased view towards South African technical qualifications and West Australian Legislation.

Discussions have been carried out between AusIMM and the MVSA regarding possible affiliation, however, this has not developed into a formal agreement. There are several inhibitors to any formal affiliation of which one is the level of qualification that an AusIMM member has to have and the levels of qualification held by the members of the MVSA.

It is true that the MSVA is involved in the Australian Mine Ventilation Conference that is co-hosted by UNSW and the AusIMM. Also both organisations value the support that the MVSA brings to that conference, the University would not accept that this is an affiliation nor would the AusIMM.

The Executive Summary *"urges that the committee accept that the re-emergence of black lung in Queensland coal mine workers is one symptom of the wider issue of poor ventilation practices, policy and regulation in Queensland mines."* This view is not shared, by the members that have been canvased and are practicing in Qld Coal mines. It is contradicted in the next statement that suggests that the appointment of ventilation Officers be extended to all mines. And yet the submission has suggested that they are practicing their duties poorly. Additionally, the awareness of the current

incidences of CWP has highlighted variability in the analysis undertaken during the medical screening process, not the ventilation practices that were active in the mines where these people worked.

"The risk to workers and to the community from poisonous atmosphere or from explosions caused by the ignition of gas or dust is extreme." The Qld practice of risk management it thorough and provides the mechanisms to bring the level of risk to as low as reasonably practical. The last explosion in a Qld mine occurred in 1994, at Moura No. 2 and considerable changes in the legislative framework, management of operations and training of personnel have contributed to the rise in the levels of safety provided to coal mines in Australia.
Prudent risk management techniques require the evaluation of each operation to assess the principal hazards present in that operation rather than singling one out as being more important. The report suggests that coal mines only regard coal dust for its explosive risk and that methane is the biggest hazard. There is no basis in fact for this statement, considerable work has been done to maintain the standards of ventilation, regular monitoring of airborne dust and controlling all hazards present in underground mines including spontaneous combustion and Diesel Particulate Matter. The size of diesel fleets in hard rock mines is far larger than that of coal mines and as such DPM is of far greater concern in Hard rock. However to suggest that coal mines have ignored this is *"Little is done"* suggests an ignorance on the part of the author(s) of the MVSA submission.
The appointment of suitable, qualified personnel to manage the ventilation on any underground mine is a view that this author supports. UNSW provides a post graduate course in mine ventilation that is separate from the Graduate Diploma in Mine Ventilation and The VO Course that provides a graduate engineer the opportunity to improve their skills and knowledge in mine ventilation.

The MVSA Submission suggests that the position of ventilation should relate to open cut mines. This again shows that there is a lack of understanding of the author(s) of this report of mining operations. While there would be complete agreement that an open cut mine would be producing respirable dust and generating fumes. The use of ventilation as a control for either or both of these hazards is not possible. The management of the risks from these hazards requires a separate and skill set with some overlap, in that there some monitoring processes that would be used by both mining environments. However, the appointment of a person that has responsibility of the atmospheric conditions within an open cut mine should be considered independently of underground mines.

"*The WA standard of a Diploma or Degree in mining Engineering where Mine Ventilation is a substantial part of the curriculum*" is lower than the Qualification accepted in NSW and Qld for underground coal mines. The degree program at WASM contains the same ventilation course as is provided in UNSW, UQ and UoA. None of these degree programmes, although of a high standard, assess candidates against the competency standards.
"South African Ventilation Officers need to complete six years of study and experience to meet the South African Ventilation Standards" The author(s) do not state what is the mix between experience and study over the 6 year period, nor does their submission state that their qualification is not considered sufficient to qualify as an engineering degree. The RSA course is well recognised as being comprehensive in the field of ventilation, especially in the area of cooling and heat management, it is hard to see any evidence that suggests that it is of a higher standard to that set in QLD or NSW coal mines.

The Organising Committee of the MVSA, mostly consists of persons from the Hard Rock Sector with little to no coalmining experience, especially that in Australia. To provide the Select Committee with a submission that has had no input from those with specialist coal mining experience and coal ventilation qualifications mars the reputation of the MVSA with Coal operators and Ventilation practitioners in the Coal sector.

References

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