



Submission:

## Coal Workers' Pneumoconiosis Select Committee

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Re-identification of coal workers' pneumoconiosis amongst coal mine workers in Queensland

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# 1 Executive Summary

GCG acknowledges the hard work put into the CWPSC's inquiry into the re-emergence of coal workers' pneumoconiosis amongst coal mine workers in Queensland.

GCG wishes to put forward this submission to contribute its expertise and knowledge into aspects of the inquiry that relate to its service offering as the largest provider of respirable coal dust sampling to the Queensland coal mining industry.

In summary, this submission makes the following key points for the CWPSC's consideration:

## **Retention of Queensland's risk-based approach**

GCG strongly believes the current risk-based regulatory approach in Queensland should be retained in favour of moving towards a more prescriptive model of regulating sampling, as it is the optimal way for industry to manage risk to workers' health.

Although the industry has known about the causal factors for CWP, and associated monitoring techniques have existed for decades, GCG has observed that a mature risk-based approach has only fully developed across the industry in the last 10 years. This approach has taken time to fully mature, as it initially involves a 12 to 24 month sampling program to establish baseline data, and then ongoing risk-based monitoring once a baseline has been set and the risk profile understood. We understand that all underground and most open cut mines are now at the stage of having adopted this process, and we have provided support and guidance to assist operators in implementing such systems.

During the period of this process being adopted across the industry, we have seen the volume of respirable coal dust sampling increase significantly. The availability of more valid data has allowed operators to gain a better understanding of where the exposure is coming from, what controls are effective and what needs to be reviewed. It is also allowing operators to understand and respond to their changing risk profile as mining techniques and plant change over time. GCG believes this approach is the best way to manage the risk of exposure to workers' health in the future.

GCG is aware of more prescriptive regulatory approaches applied in New South Wales and Western Australia (historically) and works in both of those jurisdictions. However, GCG is concerned that adopting a more prescriptive approach in Queensland could result in industry taking a minimalistic approach to sampling as seen in other jurisdictions (i.e. just completing the minimum regulated sampling, without establishing and acting upon a clear site risk profile) which would undermine the significant efforts that have been invested over the last decade to understand baseline data and adopt a mature continuous improvement approach to managing risk through appropriate sampling and risk analysis.

The Western Australian (WA) regulatory framework moved to a risk based model in 2015 from a "quota system". The risk based approach in WA involves the development and implementation of a Risk Based Hygiene Management Plan. The process has been implemented to deliver a risk based monitoring program and a focus on control planning and reporting to the Department of Mines and Petroleum.

Now that the Queensland model has had the opportunity to mature, GCG believes the current approach should be retained, including the continued use of current AS2985 Workplace atmospheres - Method for sampling and gravimetric determination of respirable dust standards for personal sampling and maintaining the NATA laboratory testing regime. but supports amendments aimed at improving the current risk-based model, including for example, the appropriate use of real-time monitoring in conjunction with conventional personal sampling.

## **Real-time monitoring**


Section 4 of this submission discusses GCG's role in the sampling process and monitoring techniques, including both the conventional (personal sampling) and real-time monitoring methods.

GCG strongly advocates the use of real-time monitoring as a means of gathering real-time information to:

- allow the identification of particular tasks and locations that contribute to worker exposure, which then feeds into detailed overall assessments of potential worker exposure; and
- validate the potential effectiveness of controls.

However, GCG submits that real-time monitoring should be used in conjunction with, and should not replace, the current conventional personal sampling methods. GCG believes that these methods used together can achieve the best outcomes for workers' health.

GCG strongly support the use and further development of realtime meters for use in Australian conditions. We believe that an ANZex certified realtime device would be a valuable tool to compliment the current exposure assessment process and assist industry to control sources of airborne dust. We eagerly await the results of an ANZex certification assessment for the AM520




(reportedly due April 2017) and will continue to reinforce with Thermo Pacific to develop an ANZex compatible PDM3700 device.

GCG would be supportive of an amendment to the current Regulations and *Standard 14 – Monitoring Respirable Coal Dust in Coal Mines* to specify that realtime monitoring be performed for any 'resample' of single point exceedances. Current requirements are for this to be done to AS2985, where partnering it with realtime monitoring would be powerful in clarifying control effectiveness.

### **Collaboration**

Finally, the maturation of the risk-based model through acting upon valid data sets has also been supplemented by a collaborative approach at the workplace level that has successfully facilitated the gathering of information from workers who are undertaking tasks to feed into the understanding and management of exposures and risks to workers' health. .

This is an important component of the model, as there are various stakeholders within the industry and it is important that everyone has a voice. We have seen improved collaboration under the current arrangements as industry in Queensland has moved towards a more mature risk based management approach and, accordingly, we strongly support the retention of the current regulatory approach to consultation.





## 2 Introduction


In the context of the current inquiry, we would like to contribute our expertise and knowledge into aspects of the inquiry that relate to our service offering to the coal mining industry.

GCG are a privately owned WHS consultancy, specialising in Occupational Hygiene. Founded in 2005, we have over 50 personnel operating out of 3 main offices (Brisbane, Perth and Townsville) as well as satellite offices in Emerald, Moranbah, Singleton, Hobart and Busselton. Our clients are primarily national and international companies in the resources, services, construction, government, aerospace, water infrastructure and energy industries.

GCG is the largest provider of respirable coal dust sampling to the Queensland Coal Mining sector. Our estimate is that GCG service in excess of 70% of Queensland Coal Mines.

Our people are trained in best sampling practice and Australian Standard requirements for monitoring airborne dusts. This is achieved through the guidance of our experienced occupational hygiene practitioners, including any one of our four (4) Certified Occupational Hygienists (COH)<sup>®</sup> - the highest level of grading offered by the Australian Institute of Occupational Hygienists (AIOH). Our accredited processes demand competency assessments to maintain consistency and validity in our approach, which is third party externally audited by the National Association of Testing Authorities, Australia (NATA) to ISO17025 (General Requirements for the Competence of Testing and Calibration Laboratories).

GCG's respirable dust sampling equipment is calibrated to ISO17025 requirements for volume measurement, and supported by market leading internal systems. We have maintained our NATA accreditation for sampling and analysis to best ensure our quality system is industry best practice.



# 3 Queensland's Risk-Based Approach

## Maturation of the Industry

In light of the re-emergence of CWP in the last couple of years, GCG recognises that the historical management of the risk of exposure to respirable coal dust by stakeholders has not been sufficient to prevent ill health to workers. However, throughout GCG's involvement with the Queensland coal mining industry over the past 11 years we have seen the approach to identifying, evaluating and controlling worker exposures vastly improve.

GCG has long collaborated with the coal mining industry and the Regulator to support an industry standard approach for occupational hygiene risk management. This is based on the early work of professionals in Australia, and around the world, who recognised there was a lack of rigour in the process for determining and managing the risk. Arguably, an established industry standard for the management of occupational hygiene risks in the coal mining industry was not in place until this century. Although CWP was known about and monitoring techniques had existed for decades, a mature risk based approach to respirable coal dust monitoring and management has been a relatively recent addition to the industry.

The Queensland coal mining sector was an active part of the development and eventual adoption of a suitable risk management approach. The AIOH subsequently provided guidance in 2006 with a proposed risk based model for occupational hygiene, the author of which was an Occupational Hygienist from the Queensland coal mining sector. This is set out a Figure 1.

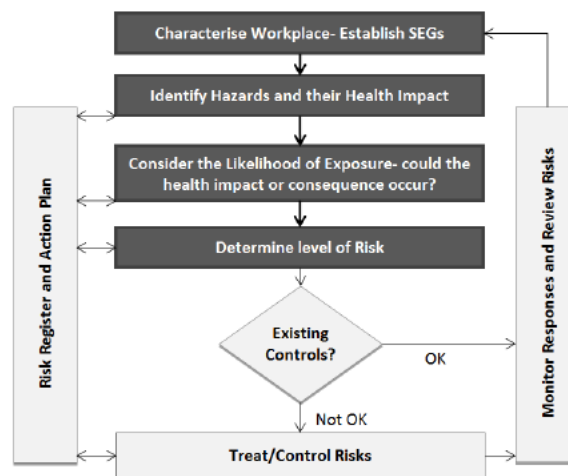



Figure 1 – Occupational Hygiene Risk Based Model: AIOH “Simplified Occupational Risk Management Strategies”<sup>1</sup>

The resulting industry approach drove a robust process for understanding the potential risk to workers health from respirable coal dust. This ‘contemporary risk-based approach’ is underpinned by a formal hazard identification and assessment completed by an Occupational Hygienist, followed by a ‘baseline’ program of data collection that results in the formation of an ongoing risk-based monitoring program. The baseline is a defined 12-24 month sampling program that enables statistical analysis of sampling data to assess the potential risk to worker health. Ongoing monitoring is then based on the risk levels assessed and calculated. For chronic hazards such as respirable coal dust, detailed statistical analysis in accordance with an approved method is a critical tool due to the pooling and assessment of data by roles performed within the organisation or site (referred to as similar exposure groups or SEGs).

GCG has been a strong advocate of this approach, and have been providing guidance and support to industry in order to encourage adoption of this process. Each operator GCG worked with has chosen to adopt this model over the last 10 years, with all underground and most open cut coal mines in Queensland currently able to demonstrate the application of this general process.

During the period of this process being adopted across the industry, we have seen the volume of respirable coal dust sampling increase significantly. The number of personal respirable dust samples that GCG has conducted has increased from

<sup>1</sup> Australian Institute of Occupational Hygienists; *Simplified Occupational Hygiene Risk Management Strategies*, 2006.



approximately 1350 in 2011 to approximately 7750 in 2016. While GCG's client base increased over that time, our review of the data shows that the increase is also attributable to operators increasing the amount of sampling.

With the availability of more data, the majority of operators in the coal industry have experienced a vast growth in knowledge over the past decade regarding the risk profile of their organisation, site and the everyday jobs undertaken by their workers. During that same time, the mining techniques and plant used in the industry have also undergone significant change which brings with it a changing risk profile and a need to continue to assess and re-assess the potential risk. This therefore supports the need for a regulatory approach that is capable of adapting to changes and innovation.

As part of its terms of reference, the CWPSC is considering practices in other jurisdictions with similar coal mining industries. GCG is aware of more prescriptive regulatory approaches in New South Wales and Western Australia (historically). GCG works in both these jurisdictions, and is concerned that a more prescriptive approach could result in industry taking a minimalistic approach to sampling as seen in other jurisdictions (i.e. just completing the minimum regulated sampling, without establishing and acting upon a clear site risk profile). This would undermine the significant efforts that have been invested over the last decade to understand baseline data and adopt a mature continuous improvement approach to managing risk through appropriate sampling and risk analysis. This concern is supported if one compares the estimated total annual respirable coal dust sample numbers between jurisdictions. For 2015, New South Wales reported less than 3,000 respirable coal dust samples according to the Annual Report 2016 produced by Coal Services. Based on our data and our understanding of our market share at the time, GCG estimates that more than 7,000 respirable coal dust samples were conducted in Queensland for the same period. GCG believes the current approach in Queensland should be retained but supports amendments that are aimed at improving the current risk-based model, for example the appropriate use of real-time monitoring which is discussed in section 4 of this submission.


The Western Australian (WA) regulatory framework moved to a risk based model in 2015 from a "quota system". The risk based approach in WA involves the development and implementation of a Risk Based Hygiene Management Plan. The process has been implemented to deliver a risk based monitoring program and a focus on control planning and reporting to the Department of Mines and Petroleum. The published system procedure from WA is largely based on the model above as it is considered best practice in risk identification and reduction in worker exposures in Australia.

### **Collaboration**

In GCG's experience, collaboration at all levels of the business, including the representative Union, can deliver the best results in reducing the potential risk of occupational disease.

GCG believe that an increased focus on collaboration at the workplace level has contributed to the maturation of the risk-based model.

This is an important component of the model, as there are various stakeholders within the industry and it is important that everyone has a voice. We have seen improved collaboration under the current arrangements as industry in Queensland has moved towards a more mature risk based management approach and, accordingly, we strongly support the retention of the current regulatory approach to consultation.





# 4 Current Assessment and Monitoring Methods

## 4.1 Respirable Coal Dust Sampling

For sampling performed by GCG for Queensland coal mines, samplers who have been deemed competent under GCG's NATA accreditation are able to execute sampling to a validated risk based sampling plan. For the vast majority of personal samples, workers wear the sampling device for the entire working shift (i.e. 12 hours). A record of tasks performed while wearing the sampling device, as well as a sampling record sheet produced by GCG, are collated for each sample and delivered to GCG's NATA accredited laboratory for analysis, review and record keeping.

In addition to the analysis, the actual process of sampling of workers for respirable dust is also included in GCG's NATA scope of accreditation to AS2985. Any sample taken that does not meet the strict requirements of our NATA accredited procedures are classified as 'invalid'. In reviewing 16,643 respirable coal dust samples taken by GCG between 2013 and 2016, 92.2% of samples were deemed valid against AS2985. The five (5) most common reasons for invalidation of samples taken by GCG were:

1. Change to the sampling device during sampling (1.13%). This is commonly due to sampling equipment being damaged, or the hose being dislodged from the device during work activities being undertaken.
2. Flow fault (1.11%). This occurs when the sampling pump has been inadvertently turned off, commonly due to kinking of the sampling hose which automatically stops the pump.
3. Sampling equipment removed during sampling by the worker (0.87%). This generally happens when the worker goes home sick, or where there has been unauthorised removal of the sampling device.
4. Flow rate variance greater than allowable limits (0.86%). This occurs when the sampling device does not meet pre and post sampling tolerances (as specified in AS2985), which could potentially be due to equipment malfunction and/or the site conditions at the time.
5. Voiding at the NATA laboratory (0.85%). Common reasons for this include where the filter media has been damaged, where there is water on the sample, or where there are particles larger than the maximum allowable under AS2985.

Once sampling is complete, the sample is delivered to GCG's NATA laboratory along with supporting documentation for quality control (chain of custody). At receipt of the samples, they are left to equilibrate for a minimum of 24 hours as per AS2985. Dedicated laboratory technicians handle the samples, and analyse them as per the GCG NATA accredited documented methods. Should any potential anomalies be identified (i.e. filter damage, evidence of tampering, oversize material etc.), a Senior Occupational Hygienist scrutinises the sample, and determines if the sample is valid against AS2985 - as per GCG's NATA sampling and analysis method.

Laboratory turnaround times for respirable coal dust analysis at a GCG lab are generally 3 to 7 business days from completion of sampling, allowing for typical timings of:

- 1 to 2 days sample transport to the laboratory;
- 1 day equilibration at the laboratory as required under AS2985; and
- 1-5 days analysis, quality control & NATA report issuing.

In the interest of reporting in a timely manner, GCG are able to issue an interim NATA report while the silica analysis results are outstanding, as silica analysis requires a different analysis technique. GCG has a documented laboratory turnaround target of <5 days. There were zero (0) documented sample reporting outside of that timeframe for 7,655 respirable coal dust samples analysed by GCG in 2016.

Any results exceeding the exposure standard are reported to the mine operator within 24 hours. GCG's responsibility is to then issue sampling results to the mine operator in a relevant and agreed format. GCG may be called upon by the operator for technical input and/or review of the sample, including any relevant records held by GCG regarding activities undertaken during the sample period, review of operational conditions in their local area of work and whether Personal Protective Equipment (PPE) was worn during the shift.

Communication of exposure monitoring data to the workforce is important to ensure transparency, and to maintain worker confidence in the monitoring program. GCG are avid supporters of this and advocate a continuation of regular communication.



## 4.2 Real time monitoring

GCG recognise that all sampling methods currently available have limitations, including both conventional personal sampling methods (to AS2985) and real-time monitors.

The existing method for respirable dust monitoring used across all jurisdictions in Australia is *AS2985 - Workplace atmospheres - method for sampling and gravimetric determination of respirable dust*. The current regulatory workplace exposure standard (WES) has been determined by this method, and as such, it is an extremely well established method that provides an accurate representation of a person's average exposure to respirable coal dust. This method also enables determination of the levels of exposure to other airborne hazards that may be present in the work environment (eg crystalline silica dust). However, the laboratory processes involved means that there is a delay between the collection of the sample and the reporting of the result. Any delay in obtaining the result can impact on the mine operator's ability to effectively investigate results that exceed specified limits.

In contrast, real time dust monitoring devices can provide an instantaneous indication of the potential respirable dust levels that a worker may be potentially exposed to. This is valuable for use as a feedback mechanism to the workers, and also enables the identification of tasks/locations that may contribute to potential worker exposures.

It must be noted that while instantaneous dust levels are valuable in identifying potential sources of exposure, brief or infrequent instances of exposure at or about the WES level do not necessarily indicate an increased risk of CWP, particularly where the long term average exposure for that worker/work group is low.

There is a number of different portable real-time dust monitoring devices currently available in Australia. These devices use different detection technologies (tapered element oscillating microbalance (TEOM) vs light scattering) that have varying levels of accuracy. Realtime dust monitoring devices are currently available in Australia and are commonly used for information gathering purposes. The most commonly used units in the Queensland coal mining sector are:

- Thermo Fisher PDM3700 (TEOM) – a personal device worn by the worker.
- TSI AM510/AM520 (light scattering) – a personal device worn by the worker, or as a hand held survey tool.
- Hund TM Data II (light scattering)- a handheld device used as a survey tool.

Real time dust monitoring devices are currently not able to measure the actual composition of dusts, including crystalline silica which is a known carcinogen. If that is a potential risk at a mine, this would then have to be further measured and analysed by conventional personal sampling methods with laboratory analysis.

While there is currently no restriction on the use of real-time monitoring devices for *surface* coal mining and other coal related operations, Regulation requires that any electrical equipment that is to be used in an *underground* coal mine in Queensland must meet strict certification requirements to ensure there is no risk of explosion underground.

This is done through the Australian Program for the Certification of Equipment for Explosive Atmospheres (ANZEx scheme). No real-time monitoring devices currently meet the certification requirements, and as such, mine operators electing to use the devices must put in place additional controls to manage the risk of explosion (i.e. continuous gas monitoring in the vicinity and a retreat/restriction procedure in areas of elevated gas levels). With this in mind, GCG has been made aware that the AM520i unit is expected to be granted certification in April 2017, allowing unrestricted use in underground coal mines. It has been communicated to GCG that the PDM3700 is not expected to meet ANZex requirements within the next 12 months, however this information will need to be confirmed with the manufacturer and/or the certification agency.

GCG believes that realtime monitoring is a critical tool in:

1. Performing detailed assessments of worker exposure.
2. Validating the effectiveness of controls.
3. Assessing worker exposure in conjunction with AS2985 compliant personal sampling devices.

GCG have been historically using real time devices for this purpose in Queensland coal mines, and regularly advise operators on how to best select and use devices. The use of real time devices are expected to increase substantially if the AM520i becomes ANZex certified this year. GCG strongly advocates the use of the instrument as a tool as detailed above, however, GCG do not advocate use of this device to *replace* the current conventional (AS2985) sampling. Reasons for this include:

- a. No current real time monitoring devices are compliant to AS2985, which is currently the required method for calculation of respirable dust exposures under Regulation 89 of the *Coal Mining Safety and Health Regulation 2001* (Qld).
- b. AS2985 is the basis upon which the current WESs for respirable dust and crystalline silica have been developed.
- c. Although realtime monitoring for respirable dust has been long established, its use in a mature risk based and/or regulatory capacity is in its infancy.

*Note: The USA has recently regulated the use of the PDM3700, although GCG are not yet aware of any formal review of the program post implementation and steady state use. GCG are also aware that numerous South African*

*coal mines are voluntarily using realtime monitoring devices, where we understand that one operator has started using the PDM3700 in 2016.*

- d. GCG is of the opinion that mandating the use of real-time monitors to meet compliance requirements may potentially lead to an actual *increase* in average exposures to coal dust. An early indication from the USA scheme is that workers are generally managing their exposure marginally below 100% of the compliance level, in order to pursue higher production outputs. While this information is not yet validated and available in literature, GCG is concerned that this would also potentially be a foreseeable outcome in Australia. Workplace exposure standards do not represent a 'no effect' level, as such, any successful regulatory approach should promote a risk based approach and ultimately as low as reasonably practicable (ALARP). The issue is that this approach essentially shifts the role of decision-maker on dust exposure down to the worker, which is not consistent with Australia's regulatory scheme and will not assist in ultimately managing the risk in a prudent and systematic manner.

GCG strongly support the use and further development of real-time meters for use in Australian conditions in conjunction with the current conventional sampling methods. We believe that having an ANZex realtime device will be a valuable tool to assist the current exposure assessment process and assist industry to control sources of exposure. We eagerly await the results of the ANZex certification assessment for the AM520 which is reportedly due in April 2017 and will continue to encourage Thermo Pacific to develop an ANZex compatible PDM3700 device.

GCG would be supportive of an amendment to the Recognised Standard 14 – Monitoring respirable dust in coal mines which would require that real-time monitoring be performed for any 'resample' of single point exceedances. As currently drafted, re-testing of single point exceedances must be performed using AS2985, where partnering it with realtime monitoring would be powerful in confirming control effectiveness.

## 5 Closing

The appropriate approach to the management of risks to workers' health in the coal mining industry is of paramount importance and GCG is appreciative of the opportunity to contribute our views on the best approach to sampling and risk management for consideration by the Committee. In GCG's view, it is critical that the industry does not take a backward step by moving towards a regulatory approach that may see less of a focus on appropriate levels of sampling to enable informed decision making by operators in managing risk to workers' health.

There is of course a need for all stakeholders in the industry to maintain a focus on continuous improvement and GCG supports appropriate changes to the current risk based model of sampling and health management including, through the use of real time monitoring techniques to supplement the current approach.

GCG would be happy to answer any queries the Committee may have in relation to this submission.