Coal Services Pty Limited

Occupational Hygiene Monitoring of Mineworkers and the Emerging Issues?

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Historical Record - legislated

- Have been sampling Respirable dust fraction since 1947 – originally dust particle count.
- Post 1983 - moved to gravimetric analysis.
- Change of dust fraction cut-off 2004 – associated change of exposure standard.
- Inhalable dust fraction commenced Dec 2007
- Requirement for cement based products - stoppings

Historical Record - other

- Noise surveys commenced early 1980's
- Personal noise monitoring commenced 1988
- Sampling for PAH's, VOC's, Isocyanates associated with ground support and belt splicing chemicals commenced in 2004
- Diesel particulate sampling commenced 2004
- Vibration monitoring commenced in 2005

Monitoring of Worker's Health

- In conjunction with CS Health pre-employment and periodic medicals – there has been a significant improvement in both short-term and long-term health outcomes for mineworkers.
- Virtual elimination of Black Lung
- Studies suggest a lower cancer rate than general population.
- Some issues around skin sensitisation and dermatitis from chemical exposures.

- Thousands of new chemicals are introduced into the country each year
- Hundreds of these are introduced into the industry through new products including paints, polymers, oils, detergents, bonding agents etc.
- MSDS's supplied are generally by a provider (Infosafe, Chemalert) and often are out of date and contain errors.
- Always source an MSDS from original supplier.
- Undertake a proper risk assessment and review.

Recent and current issues

- Hexavalent chromium reading in concrete-based stopping products.
- Elevated silica results from same.
- Elevated dust results from poorly or incorrectly maintained pumps
- Phenols and formaldehyde readings from strata support products.
- Chemical cross sensitisation of contractors exposed to undiluted products.

Recent and current issues

- Increasing number of elevated DP results from monitoring.
- Increasing number of silica exceedences
- Increasing number of inhalable dust exceedences

Importance – due to carcinogenicity

- Sampling for many of the non-statutory exposures tends to be regional or corporation based – no consistency

Diesel Particulate Matter

- In 2005, 56% of all personal samples taken by CSPL in L/W change-outs, exceeded the recommended guideline exposure of 0.1 mg/m^3 of Elemental Carbon (MDG29).
- Issues centered around old engines, fuel quality, ventilation, equipment maintenance and lack of control measures.
- MDG 29 – 2008 - Guideline for the management of diesel engine pollutants in underground environments. Produced by Mine Safety Operations Division of the then NSW DPI.
- 8 Longwall change-outs were investigated in 2011; 2 in QLD, 3 in the West, 2 in the South and 1 in Newcastle areas.62 personal samples taken13 static or locational samples taken

How far have we come - DP

- Of the 62 personal sample taken 42 exceeded the recognised guideline of 0.1 mg/m^3 of EC. (68%)
- Of the 13 static samples taken 11 have exceeded the guideline value. (85%)
- Why?
- 30% of engines tested were tier 3, ULSD fuel the standard, filters in use for much equipment, diesel tag boards, better education and knowledge

What went wrong?

- Electric/Battery operated equipment almost non existent in change-outs – higher proportion in 2005.
- Tier 3 engines need to be operating at effective RPM to maintain burn efficiency. Only 30% in use in industry.
- Some machines not designed for effective used of DP filters; only 30% of machines in study using filters.
- Reliance on PPE - 60% of those tested were wearing PPE (only 14 of the correct type)

What can be done?

- The 3 main points for reducing workers exposure to airborne contaminants are always the same – follow the hierarchy of controls.

- Eliminate exposures by not using diesel equipment. (impractical due to limitations of alternatives eg mules etc; Tier 3 engines an option; use of DP exhaust filters)

What can be done?

- Isolate workers from exposure – operator positioning in relation to exposure source. Limit workers down wind/inbye of operations; Job rotation on known high reading tasks and machines; Limit machines relative to air quantities)
- Control by engineering methods – ventilation to reduce concentrations/dilution. Ventilation required by regulation may not be adequate to protect against DPM - only gases; Quality of air supplied; Quality of servicing of machines

Silica

- 2008 – 1.5% personal Silica exceedances.
- 2011 – 0.8% personal Silica exceedances.
- 40% increase in the number samples sent for silica analysis.

Inhalable Dust

- 2008 – 19% personal Inhalable dust exceedances.
- 2011 – 16% personal Inhalable dust exceedances.
- Results still appear skewed by region – Hunter and Newcastle have higher frequency of exceedences.
- Longwalls traditionally higher than development – few issues outbye and surface.

Improvements due to!

- Extensive history of improvement and focus on results.
- Greater awareness and education of workforce – operator positioning
- Improvement in focus on ventilation & ventilation standards and use and maintenance of dust suppression systems in place including surfactants.

Questions?