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Exposure of Underground Miners to Diesel Exhaust

Comment On: MSHA-2014-0031-0047
Exposure of Underground Miners to Diesel Exhaust , Extension of Comment Period

Document: MSHA-2014-0031-0060
Comment from Dr. B BELLE (Aus and S Africa), NA

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General Comment

The comments herein are provided with a hope that it would enhance the quality of the DPM rule, as well as provide technical clarification on existing or any amendments to the rule.

The use of diesel engine locomotives in South African mines can be traced to Van Dyk Consolidated Mines Ltd on the Witwatersrand gold mines in 1928 as a replacement for battery locomotives (Belle, 2008). The advantages and disadvantages were recognized in those days, and surprisingly, there are no significant additions to this list, but only refinements. In the absence of any Occupational Exposure Limit (OEL) for Diesel Particulate Matter (DPM) in SA and most of the mining world, the Mine Safety and Health Administration (USA) rule is currently being used as a benchmark for the ventilation engineering designs.

Various countries (Australia and South Africa) have embarked on their respective journey in establishing the DPM measurements and developing exposure data for ventilation planning and regulatory purposes. The currently accepted DPM limits are based upon the belief that they are economically and technically feasible for the mines to reach and to some extent health based findings. What is known from the South African studies is that for underground platinum mines, a median TC/EC ratio of 1.8 with a range of 1.2 to 5.8 was observed. For South African coal mines, a median TC/EC ratio of 1.44 with a range of 1.25 to 2.13 was observed. While it is common practice in the USA to use the ratio of TC/EC for metal mines to be 1.3, the ratio found in local platinum mines is 2.2 and for coal mines, the ratio was 1.53 which is lower than Australian studies, i.e., 1.96. This Australian coal mine DPM TC/EC ratio of 1.96 do not hold

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true based on the latest statistics.

In this context, it is valuable if the proposed MSHA DPM rule addresses the following:

1. Can the rule makers share or provide the latest USA DPM statistics on TC/EC ratios? Also, provide reasons for any deviation from the historic TC/EC ratio of 1.3 if such is the case?

2. While, the current US studies have developed appropriate error factors (currently 1.14 for TC and 1.2 for EC) for
compliance determination, with an historic TC/EC ratio of 1.3, a table of error factors for different practical TC/EC ratios as obtained from the latest US DPM data would be beneficial.

3. While the DPM personal exposure measurements are carried out diligently in metal/non-metal mines, why the coal mines in USA do not carry out personal DPM exposure measurements? Can the rule makers provide at least the justifications for not carrying out personal DPM exposures in coal mines? How would establish DPM dose-response curves in future?

4. Can the latest rule also provide the technical information on deposition area standard used in the calculation of DPM concentration as in NOSH 5040 method, i.e., is the deposition area 8.55 cm2 or 8.40 cm2 or 8.04 cm2? This would assist in international harmonization of comparing the DPM results as well as establishing ventilation dilution factors in current and new mine ventilation system designs globally.

5. As in the use of PDM3700 CPDM for dust exposure measurement, what pathways MSHA/NIOSH is pursuing the TEOM technology for use in personal DPM measurement? It is important that the rule maker maintains a regular interest on the CPDM in order to ensure that the manufacturer/supplier provides the necessary quality and continued user support for improvement opportunities with a shared aim of worker protection.

Attachments

070-Nevada Paper

10IMVC-DPM-SA-USA-Aus