

controls may be inadequate to continuously protect all miners from overexposure. This is most likely to occur in areas where high levels of quartz are encountered that may result in the setting of lowered standards on a MMU.

However, MSHA recognizes that, unlike other mining systems, longwall MMUs may have acute dust problems. These problems can be caused by the face-ventilation airstream carrying the shearer-generated dust over the miners working along the face downwind of the longwall shearer operator (occupation code 044). This makes it more difficult to control the work environment downwind of the longwall shearer operator on a consistent basis.

Improvements in dust control technology have not kept pace with increases in production technology associated with high-production longwall MMUs. Average longwall shift production reported during bimonthly sampling has increased more than six-fold since 1980, from approximately 890 tons per shift (tps) to 5,500 tps in 2002. In fact, 49 percent of the shifts sampled averaged 4,000 to 8,000 tps, while approximately 8 percent of the shifts exceeded 8,000 tps. A major milestone in mining production was achieved in 1997 when a single longwall mine produced more than 1 million tons of coal in a single month (Fiscor, 1998).

Unfortunately, as more coal is mined, greater quantities of respirable dust are generated. The increase in longwall production levels has resulted in the generation of far more dust which must be controlled (Webster, *et al.*, 1990; Haney, *et al.*, 1993; O'Green, 1994). According to published literature, several thousand milligrams of respirable dust per ton of coal cut can be formed and liberated during the cutting process (National Research Council, 1980). Of course, the quantity of respirable dust produced by the cutting process can vary greatly, depending on the type of coal, its moisture content, the amount of rock bands in the coal, sharpness of the cutting bits, the particular mining machine, and many other factors. Although a considerable amount of respirable dust is formed by the cutting operation, not all of it becomes airborne. Nevertheless, given the amount of dust that is produced per ton of coal mined, a larger quantity of respirable dust would be generated and released to the mine environment from cutting 8,000 tons of coal than from cutting 4,000 tons. Currently, an operator is not required to produce, on a sampled shift, more than 50 percent of the average production reported during the last

bimonthly sampling period. Therefore, dust concentrations on sampled shifts may be substantially lower than what is typical on nonsampled shifts.

While significant efforts have been made to implement available control technology, no significant new advancements in longwall dust control technology have been reported since 1989 (U.S. Bureau of Mines, undated). From 1989 to 2002 (Jan.-Sept.), the percentage of operators' longwall DO samples with concentrations of 2.1 mg/m³ or higher dropped from 22 percent to 14 percent, reflecting the impact of implementing the pre-1990 advances in longwall control technology. Although this represents a significant improvement, especially in view of the six-fold increase in average shift production, the 2002 data suggests that miners continue to be overexposed on a significant number of shifts.

Over the past ten years, MSHA and the former U.S. Bureau of Mines, now part of NIOSH, have made unsuccessful efforts to conduct a joint research program that would evaluate the effectiveness of available longwall dust control technology. The objective of such research would have been to quantify the effects of employing all state-of-the-art dust control technology available for a longwall operation. Unfortunately, the two agencies have been unsuccessful in finding an industry partner to participate.

MSHA has worked with mine operators on an individual basis to determine the effectiveness and feasibility of existing and additional respirable dust controls on a particular longwall. However, the design and goals of those studies were neither intended nor sufficient to meet MSHA's broader research objective. Rather, the scope of those studies was to evaluate the effectiveness of control technology that both MSHA and the mine operator agreed were applicable to that one particular longwall MMU. The objective of the cooperative research program that MSHA and the Bureau of Mines were attempting to conduct, was to establish the combined efficiency of the various control technologies that the Bureau of Mines had developed through their ongoing dust control research program.

However, even though no such study has been conducted, based on our experience, MSHA's position remains that feasible engineering or environmental controls exist for maintaining dust exposures at or below the applicable dust standard, for most, if not at all longwall operations. MSHA believes that the plan verification provision contained in this proposed rule will foster further improvements in

the design and quality of mine ventilation plans for longwall MMUs.

4. Respiratory Protection

While the Mine Act provides that operators "make available" approved respirators to miners during periods of noncompliance, when miners may be overexposed, the Act specifically prohibits using such devices as a substitute for environmental controls in the active workings of the mine. As previously discussed elsewhere in the preamble, this is because environmental or engineering controls are reliable, provide consistent levels of protection to large number of miners, allow for predictable performance levels, can be monitored continually and inexpensively, and can remove harmful levels of respirable coal mine dust from the workplace. MSHA recognizes that approved respirators, such as the powered air-purifying type (*e.g.*, Racal® Airstream helmet or air helmet),⁶ can be effectively used as an interim method of protecting miners from respirable dust hazards when properly selected, used, and maintained. Although a respirator may achieve satisfactory air quality in the miner's breathing zone when used in a good respirator program, their use will not achieve the intent of the Act, which is to control the level of respirable coal mine dust in the mine atmosphere in the active workings at or below specific limits. Accordingly, consistent with the intent of the Act and general industrial hygiene practice, it has been MSHA's long-established practice to rely on the strict adherence to a hierarchy of controls that prefers engineering controls over dependence on supplementary control measures (*e.g.*, respirators, work practices or both) to achieve compliance with the applicable dust standard.

Nevertheless, the mining industry has urged MSHA over the years to accept the use of powered air-purifying respirators (PAPRs) or air helmets as an alternative method of complying with the applicable dust standard when engineering controls did not adequately control respirable exposure or were not feasible. Most recently, Energy West Mining Company (Energy West) petitioned the Secretary of Labor: [t]o amend the mandatory health standards for underground coal mines contained in the Secretary's regulations at 30 CFR part 70 in order to allow the use of airstream helmets or other types of powered air-purifying respirators (PAPRs) approved by the National Institute for Occupational Safety and Health (NIOSH) as a supplemental means of

⁶References to specific equipment, trade names or manufacturers does not imply endorsement by MSHA.