

instrument capable of accurately measuring the concentration of respirable dust on a continuous basis during an entire shift and displaying in real-time the measured dust exposure information. To meet the definition of "approved device," the Secretary must demonstrate that the respirable dust concentration measured by such an instrument can be converted to a concentration measurement equivalent to that obtained by a device approved under 30 CFR part 74 of this title. Comments are solicited on the practice of tying the performance of new sampler designs to the currently approved sampling device.

The PCDM must be capable of displaying (1) the cumulative average dust exposure during the shift; (2) the current exposure level based on entire shift duration (projected end-of-shift exposure); and (3) the time-weighted average concentration (total mass of dust collect divided by the length of time the unit was operated) within 15 minutes after the end-of-shift. The entire unit must comply with MSHA intrinsic safety regulations and pass tests for electromagnetic interference for emissions using ANSI C95.1-1982 and 47 CFR part 15 and for immunity/susceptibility using IEC 61000-4. Since work shifts longer than 8 hours are common in mining, the PCDM must have sufficient battery capacity to operate continuously for up to 12 hours. To ensure that air monitoring results are sufficiently accurate across the relevant range of exposure levels, the PCDM must meet an accuracy criterion of  $\pm 25\%$  of a reference value determined using the currently approved sampling device (P/N 45243) with 95% confidence.

The Agency solicits comments on how continuous dust monitors could be applied to limit exposure of coal miners to respirable coal mine dust. Specifically, comments are solicited on the proposed performance, accuracy, and approval requirements for personal continuous dust monitoring devices, and whether less stringent requirements should be imposed on devices designed for surveillance and not for compliance purposes. What would be an acceptable level of accuracy of such a device if used for surveillance purposes (*i.e.*, identifying dust-generating sources and magnitude of dust concentrations), for compliance determinations, or for control enhancement purposes (*i.e.*, provide a means to take corrective measures in response to instrument readings by adjusting specific controls)? Comments are also solicited on the performance requirements for continuous dust monitors used

primarily for surveillance purposes to prevent an individual miner from being overexposed on a particular shift and whether such devices need to be first approved by MSHA for use in underground mines.

#### Powered Air-Purifying Respirator (PAPR)

"Powered air-purifying respirator" (PAPR) would mean a type of air-purifying respirator that uses a blower to force ambient air through air-purifying elements to the inlet covering (a visor), which provides a partial seal with the face, to deliver filtered air to the miner's breathing area. This category of respirator must be approved by the National Institute for Occupational Safety and Health under 42 CFR part 84 and by MSHA under 30 CFR part 18; and, offer head and face protection in compliance with 30 CFR 75.1720(a) and (d) of this title. The reasons for excluding other types of approved respirators are discussed in section III.D.4. of the preamble.

#### Protection Factor

"Protection factor" (PF) would be a measure of the expected degree of workplace respiratory protection that would be provided to the wearer by a properly functioning PAPR when correctly worn and used. The PF expresses PAPR performance as the ratio of the respirable dust concentration outside the respirator facepiece to the concentration inside the facepiece. It reflects the effectiveness of a respirator used in conjunction with a good respirator protection program. For example, a PF of 4 means that the respirator is expected to reduce the concentration of respirable dust actually breathed to one fourth of the concentration outside the respirator.

Factors such as air velocity at the working face and raising of the visor during the shift significantly impact the effectiveness of a PAPR. Therefore, such factors should be taken into account when estimating the degree of respiratory protection a PAPR provides in the workplace. Although NIOSH has recommended that loose-fitting hood or helmet PAPRs should be assigned a PF of 25, the environmental conditions observed in the studies used in NIOSH's estimation of an assigned protection factor (APF) are not consistent with those found in underground coal mines, where high air velocities for methane and dust control are common.

Under this proposal, the PF that would be assigned to PAPRs authorized for a particular MMU depends on the air velocity that will be maintained at the working face. The applicable PF would

be included in a written PAPR protection program, which must be approved by the district manager before it can be implemented. Based on the available technical information and sound engineering judgement, MSHA would permit a PF ranging from 2 to a maximum of 4 to be assigned to a particular MMU, depending on air velocity.

If, according to the ventilation plan, the minimum air velocity to be maintained in the headgate of a longwall MMU ventilated head-to-tail is less than 400 feet per minute (fpm), then PAPRs used in the MMU would be assigned a PF equal to 4. If the minimum air velocity to be maintained in the location specified in the plan exceeds 800 fpm, then the assigned PF would be 2. If the minimum air velocity specified in the plan falls between 400 fpm and 800 fpm, then PAPRs used in the MMU would be assigned a corresponding PF falling between 2 and 4.

Because there is a lack of data on the performance of PAPRs under actual air-velocity conditions ranging between 400 and 800 fpm, MSHA is proposing an interpolation formula [ $2 \times (800/\text{air velocity})$ ] for determining the PF to be assigned to a MMU when the specified air velocity to be maintained falls in that range. For example, if the minimum air velocity to be maintained in the headgate is 550 fpm, then the assigned PF would be calculated as:  $2 \times (800\text{fpm}/550\text{fpm}) = 2.9$ . A reasonable alternative interpolation formula,  $6 - (\text{air velocity}/200)$ , would yield somewhat higher protection factors for velocities between 400 fpm and 800 fpm. However, given the absence of supporting data, MSHA selected the proposed interpolation formula because it yields a more conservative PF.

Comments are invited on the proposed method of establishing the applicable PF and on the interpolation formula proposed for specified air velocities ranging between 400 fpm and 800 fpm. Data are requested in support of any recommendations that different protection factors should be assigned to MMUs authorized to use PAPRs.

#### Quartz

The existing definition would be modified by specifying the analytical method that MSHA has been using since 1983 to determine the quartz content of respirable dust samples. The reason for this modification is to standardize the analytical procedure, thereby enabling other certified laboratories to produce quartz determinations compared to those made by MSHA. Also, to accommodate the adoption of improved