

MSHA acknowledges that depending upon the circumstances in a particular underground mine, some mine operators may face feasibility challenges implementing current DPM control methods. These operators should contact the MSHA district manager for compliance assistance.

Several commenters expressed the view that ventilation system upgrades, though potentially effective in principle, would be infeasible to implement for many mines. Specific problems that could prevent mines from increasing ventilation system capacity include inherent mine design geometry and configurations (drift size and shape), space limitations, and other external prohibitions, as well as economic considerations.

MSHA acknowledges that ventilation system upgrades may not be the most cost effective DPM control for many mines, and for others, ventilation upgrades may be entirely impractical. However, at many other mines, perhaps the majority of mines affected by this rule, ventilation improvements would be an attractive DPM control option, either implemented by themselves or in combination with other types of controls.

At many high-back room-and-pillar stone mines, MSHA has observed ventilation systems that are characterized by (1) Inadequate main fan capacity (or no main fan at all); (2) ventilation control structures (air walls, stoppings, curtains, regulators, air doors, and brattices, etc.) that are poorly positioned, in poor condition, or altogether absent; (3) free standing booster fans that are too few in number, of too small a capacity, and located inappropriately; and, (4) no auxiliary ventilation for development ends (working faces). At some mines, the "piston effect" of trucks traveling along haul roads underground provides the primary driving force to move air.

Often, the result of these deficiencies is a ventilation system that provides insufficient dilution of airborne contaminants, short circuiting, and airflow direction and volume controlled only by natural ventilation. These systems are barely adequate (and sometimes inadequate) for maintaining acceptable air quality with respect to gaseous pollutants (CO, CO₂, NO, NO₂, SO₂, etc.), and are totally inadequate as stand-alone controls for maintaining acceptable DPM levels.

Mines experiencing these problems could benefit greatly from upgrading main, booster, and/or auxiliary fans, along with the construction and maintenance of effective ventilation control structures. During DPM

compliance assistance visits to several stone mines, MSHA has observed mine operators beginning to implement limited ventilation system upgrades, such as the addition of booster fans, brattice lines, and auxiliary ventilation in development ends, along with replacing older, high-polluting engines with newer, low-polluting models. MSHA believes that such ventilation upgrades, along with the replacement of as few as one to three engines may be sufficient for many stone mines to achieve compliance with the interim DPM limit.

Deep multi-level metal mines have entirely different geometries and configurations from high-back room-and-pillar stone mines. They typically require highly complex ventilation systems to support mine development and production. These systems are professionally designed, they require large capital investments in shafts, raises, control structures, fans, and duct work, and they are costly to maintain and operate. At these mines, ventilation system costs provide a major economic incentive to operators to optimize system design and performance, and therefore, there are typically few if any feasible upgrades to main ventilation system elements that these mines have not implemented already.

Despite these built-in incentives, however, MSHA has observed aspects of ventilation system operation at those types of mines that can be improved, usually relating to auxiliary ventilation in stopes. Auxiliary fans are sometimes sized inappropriately for a given application, being either too small (not enough air flow) or incorrectly placed (causing recirculation). Auxiliary fans that are poorly positioned draw a mixture of fresh and recirculated air into a stope. Auxiliary fans are sometimes connected to multiple branching ventilation ducts, so that the air volume reaching a particular stope face may be considerable less than the fan is capable of delivering. Perhaps most often, the ventilation duct is in poor repair, was installed improperly, or has been damaged by blasting or passing equipment to the extent that the volume of air reaching the face is only a tiny fraction of that supplied by the fan. MSHA believes that these, and similar problems, exist at many mines, even if the main ventilation system is well designed and efficiently operated.

Optimized auxiliary ventilation system performance alone, as one commenter noted, will not necessarily insure compliance with the DPM interim limit. Auxiliary ventilation systems simply direct air to a stope face so that the DPM generated within the

stope can be diluted and carried back to the main ventilation air course. If air is already heavily contaminated with DPM when it is drawn into a stope by the auxiliary system, as could happen at mines employing series or cascading ventilation, the auxiliary system's ability to dilute newly-generated DPM is diminished.

In these situations, the intake to the auxiliary system must be sufficiently free of DPM to achieve the desired amount of dilution, requiring implementation of effective DPM controls upstream of the auxiliary system intake. Such upstream controls might include a variety of approaches, such as DPM filters, low-polluting engines, alternative fuels, and various work practice controls, as well as main ventilation system upgrades at the few mines where they might be feasible. Toward the return end of a series or cascading ventilation system, if the DPM concentration of the auxiliary system intake is still excessive, other engineering control options would include enclosed cabs with filtered breathing air on the equipment that operates within the stope, or remote control operation of the equipment in the stope to remove the operator from the stope altogether. Some commenters stated that feasibility was extensively reviewed in the existing rulemaking. These commenters noted that MSHA already determined that feasibility established for the existing rule must be presumed feasible until proven otherwise. In response to these commenters, MSHA emphasizes that since the agency is engaged in rulemaking that involves changing the surrogate, the DPM limit, as well as the hierarchy of controls, the Agency must review its existing position on feasibility of compliance for the mining industry. MSHA has done so in this preamble. Other commenters stated that mine operators have attempted to purchase and install DPM controls and they are either unavailable or, are neither technically and economically feasible. One issue raised by the commenters was the availability of filters for engines below 50 hp. Filter manufacturers supply filters for all horsepower sizes. MSHA is not aware of any gaps in filter availability. As stated at the recent workshops, most filter vendors stated that they have experience installing DPM filters on all horsepower size engines. However, normally with smaller engines, it would be expected that these systems would have to be regenerated with an active system. Again, MSHA is not aware of any problems with an active system for