

Request for Information
Exposure of Underground Miners to Diesel Exhaust
(81 FR 36826)
Comment Summary

A. Non-Permissible, Light-Duty, Diesel-Powered Equipment in Underground Coal Mines

General comments on light-duty, diesel equipment:

- a) One commenter stated that MSHA's existing standards for light-duty equipment are out of date, specifically 30 CFR 72.502. This commenter further remarked that current diesel engine technology can reduce DPM emissions beyond what the existing standards require and that all non-road diesel engines produced today are required to meeting EPA Tier 4 standards. [[Comment](#)].
- b) A second commenter recommended that MSHA update 30 CFR part 7, Subpart E, Diesel Engines Intended for Use in Underground Coal Mines, as promised in the preamble to the 2001 final rule for Diesel Particulate Matter Exposure of Underground Metal and Nonmetal Miners. MSHA also indicated in the 2001 rule that it would adopt a more streamlined approach and rely heavily on the EPA's approval program for engines used in off-road applications. [[Comment](#)].
- c) This second commenter also submitted a study on the contribution of light duty vehicles to underground DPM exposure. [[Rubelli 2004](#)].

1. Is there evidence that non-permissible, light-duty, diesel-powered equipment currently being operated in underground mines emits 2.5 g/hr of DPM or less?

- a) Commenters stated that the National Diesel Inventory shows approximately 3400 pieces of light-duty equipment with only about 90 with engines listed as emitting less than the 2.5 g/hr standard. These commenters remarked that all light-duty equipment in PA, WV and OH emit less than 2.5 g/hr by state law not by MSHA regulation, and to limit a diesel engine to 2.5 g/hr is not a standard, it allows lower horsepower engines to emit more DPM than higher horsepower engines [[Comment](#)], [[Comment](#)]
- b) A second commenter said that MSHA's 2.5 g/hr DPM standard is not a viable standard for comparison because it does not take into account horsepower; and as horsepower increases so does the DPM concentrations. Tier 4 engines and most engines approved by MSHA for use in light-duty equipment can meet a 2.5 g/hr standard if a DPM filter is installed. [[Comment](#)]

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- c) A third commenter remarked that there is evidence some equipment being operated in underground mines emits 2.5 g/hr of DPM or less, but the evidence is mixed and not formally published. Commenter further stated that the National Diesel Inventory data indicate that at least 97% of permissible and 90% of non-permissible heavy-duty equipment emit less than 2.5 g/hr of DPM, and that at least 50% of non-permissible light-duty equipment (including generators and compressors) emit more than 5 g/hr of DPM. [[Comment](#)].
- d) A fourth commenter, a dealer for light-duty non-permissible mantrips sold under two brand names, stated that none of the mantrips currently manufactured by his company emit less than 2.5 g/hr DPM as delivered.

2. What administrative, engineering, and technological challenges would the coal mining industry face in meeting a 2.5 g/hr DPM emissions level for non-permissible, light-duty, diesel-powered equipment?

- a) Two commenters stated the equipment in PA, WV and OH have been built with an exhaust after-treatment system built by the original equipment manufacturer and there have been no problems retrofitting after-treatment systems into the equipment; and there should be no problem doing so in other states.
- b) A third commenter remarked adding DPM filters or purchasing Tier 4 engines is feasible for the mining industry, and all light-duty machines can be equipped with a DPM filter.
- c) A fourth commenter noted that low DPM emissions were achieved primarily by the retrofit-type diesel particulate filters and by filtration systems with disposal filter elements. Exhaust after-treatment could be an option for vehicles that have enough space for installation of such a system. The commenter further stated that replacement of existing engines with same-size engines that meet EPA Tier 4 final standards is one alternative solution, and cited studies discussing the challenges. [[Comment](#)].
- d) A fifth commenter stated that after-market DPF filters would be needed to bring emissions below 2.5 g/hr on his mantrips.

3. What costs would the coal mining industry incur to lower emissions of DPM to 2.5 g/hr or less on non-permissible, light-duty diesel-powered equipment? What are the advantages, disadvantages of requiring that light-duty diesel-powered equipment emit no more than 2.5 g/hr of DPM?

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- a) One commenter stated that most equipment can be fitted with an after-treatment system for a cost of \$12,000 to \$25,000 per equipment; while another commented the cost would be around \$20,000 per equipment.
- b) A second commenter said there would be a modest cost to mine operators to either add a DPM filter to a light-duty machine or to retrofit a machine with a Tier 4 engine, the benefit of doing either option is a reduction in DPM emissions by as much as 90 percent.
- c) A third commenter noted costs of \$7,500 to install a DPF to meet the 2.5 g/hr standard on a mantrip, not including costs to replace the disposable filters. This commenter noted an average fleet size of 50 mantrips, having an initial cost of \$375,000 for installation of a DPF system for the fleet, and annual filter replacement costs of \$225,000.

4. What percentage of non-permissible, light-duty, diesel-powered equipment operating underground does not meet the current EPA emissions standards?

- a) One commenter stated that the most current data is already available to MSHA in its National Diesel Engine Inventory data base, and requested MSHA provide the industry (mine operators and miners) with data on the percentage of non-permissible, light-duty, diesel-powered equipment operating in underground mines that does not meet the current EPA emissions standards.
- b) A second commenter stated that currently only engines in 6 out of 3,411 non-permissible, light-duty, diesel-powered equipment meet EPA Tier 4 final standards; and 99.8% of engines in the non-permissible, light-duty, diesel-powered equipment do not meet the current EPA emissions standard. [[Comment](#)].

5. What modifications could be applied to non-permissible, light-duty, diesel-powered equipment to meet current EPA emissions standards? What percentage of this equipment could not be modified to meet current EPA emissions standards? If these are specific types of equipment, list the manufacturers and model numbers.

- a) One commenter stated that DPM filters are feasible controls that can be installed on all types of light-duty equipment; and is currently being installed on light-duty equipment in PA, OH, and WV. By adding a DPM filter to any light-duty machine, DPM concentrations will be reduced to levels equivalent to EPA's Tier 4 DPM standard.

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- b) A second commenter remarked that oxidation catalyst, DPM filters, and exhaust emissions control and conditioning systems could be applied to non-permissible, light-duty equipment, and cited supporting studies. [[Comment](#)].
- c) A third commenter remarked that modifications in order to meet EPA Tier 4 final emissions standards would involve retrofitting existing engines with advanced integrated exhaust after-treatment systems to control PM, NMHC, CO, and NO_x emissions. The success of some retrofit programs is uncertain due to the technological challenges of integrating advanced exhaust after-treatment systems with existing engine systems.

6. What are the advantages, disadvantages, and costs associated with requiring all non-permissible, light-duty, diesel-powered equipment operating in underground coal mines to meet current EPA emissions standards?

- a) One commenter stated that the advantage of replacing currently used engines in the majority of currently used light-duty vehicles with those that meet EPA Tier 4 final emissions standards is that this change should result in substantially lower contributions of PM mass and NO_x concentrations in underground coal mines.
- b) Another commenter remarked that the disadvantage is that such a requirement would potentially result in the need to repower the majority of existing 25+ hp engines with power packages offered by original equipment manufacturers which meet the EPA Tier 4 final standards.

7. West Virginia, Pennsylvania, and Ohio limit diesel equipment in the outby areas of underground coal mines based on the air quantity approved on the highest ventilation plate. What are the advantages, disadvantages, and costs of MSHA adopting such an approach?

- a) One commenter stated increasing ventilation name plates for machines, especially for DPM control on light-duty equipment operating in outby areas, is problematic. It is not feasible to monitor the air, or even determine over a shift which air course a machine is operating. This commenter went on to say that since MSHA cannot measure concentrations of DPM in underground coal mines, increases in ventilation rates on a name plate for individual machines, is not feasible and as a result, miners' exposures to DPM cannot be evaluated to determine if an increase in ventilation is actually reducing DPM exposure.

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- b) A second commenter suggested this helps ensure that the DPM is being moved out of the mine atmosphere properly by not allowing too many machines to operate when there is not sufficient air in the area; and there are no disadvantages to this other than the operator not being able to have the flexibility to operate as many diesel machines as they would want on a single split of air.