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

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? If so, please provide this evidence.

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?

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?

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

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, please list the manufacturers and model numbers.

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? Please be specific and include the rationale for your response.

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?

B. Maintenance of Diesel-Powered Equipment in Underground Coal Mines and Recordkeeping Requirements

8. What would be the advantages, disadvantages, safety and health benefits, and costs of testing non-permissible, light-duty, underground diesel-powered equipment on a weekly basis for carbon monoxide as required for permissible diesel-powered equipment and non-permissible, heavy-duty, diesel-powered equipment?

9. Reducing the emissions of nitric oxide (NO) and nitrogen dioxide (NO_2) is one way that engine manufacturers can control particulate production indirectly. What are the advantages, disadvantages, and costs of expanding exhaust emissions tests to include NO and NO_2 to determine the effectiveness of emissions controls in underground coal mines? Please provide data and comments that support your response.

10. Should MSHA require that diagnostics system tests include engine speed (testing the engine at full throttle against the brakes with loaded hydraulics), operating hour meter, total intake restriction, total exhaust back pressure, cooled exhaust gas temperature, coolant temperature, engine oil pressure, and engine oil temperature, as required by some states? Why or why not?

11. What would be the advantages, disadvantages, and costs associated with requiring additional records to document the testing and maintenance of diesel-powered equipment in underground coal mines, such as the testing described above? Please be specific and include the rationale for your response.

12. If your mine is in West Virginia, Pennsylvania, or Ohio, what is your experience with the resources expended to keep testing records? How have these records been used, e.g., have you analyzed the records for trends? Have you made any changes in the use of the diesel-powered equipment, emissions controls, or mine ventilation based on the records of emissions testing? If so, please provide examples.

13. Please provide information related to additional training requirements for persons who operate and maintain diesel equipment. Please be specific on the types of training required, time associated with training, and additional safety and health benefits provided.

C. Exhaust After-Treatment and Engine Technologies

14. What exhaust after-treatment technologies are currently used on diesel-powered equipment? What are the costs associated with acquiring and maintaining these after-treatment technologies and by how much did they reduce DPM emissions? How durable and reliable are after-treatment technologies and how often should these technologies be replaced? Please be specific and include examples and the rationale for your response.

15. What are the advantages, disadvantages, and relative costs of using DPM filters capable of reducing DPM concentrations by at least 75 percent or by an average of 95 percent or to a level that does not exceed an average concentration of 0.12 milligrams per cubic meter (mg/m^3) of air when diluted by 100 percent of the MSHA Part 7 approved ventilation rate for that diesel engine? How often do the filters need to be replaced?

16. What sensors (e.g. ammonia, nitrogen oxide (NO), nitrogen dioxide (NO_2)) are built into the after-treatment devices used on the diesel-powered equipment?

17. Are integrated engine and exhaust after-treatment systems used to control DPM and gaseous emissions in the mining industry? If so, please describe the costs associated with acquiring and maintaining integrated systems, and the reduction in DPM emissions produced.

18. What are the advantages, disadvantages, and relative costs of requiring that all light-duty diesel-powered equipment be equipped with high-efficiency DPM filters?

19. In the mining industry, are operators replacing the engines on existing equipment with Tier 4i (interim) or Tier 4 engines? If so, please specify the type

of equipment (make and model) and engine size and tier. Please indicate how much it costs to replace the engine (parts and labor).

20. What types of diesel equipment purchased new for use in the mining industry is powered by Tier 4i or Tier 4 engines? What types of diesel-powered equipment, purchased used for use in the mining industry, are powered by Tier 3, Tier 4i or Tier 4 engines?

21. Are Tier 4i or Tier 4 engines used in underground mines equipped with diesel particulate filter (DPF) systems (e.g., advanced diesel engines with integrated after-treatment systems)? Please provide specific examples.

22. How long have Tier 4i or Tier 4 engines been in use in the mining industry and what additional cost is associated with maintaining equipment equipped with these engines?

23. What percentage of underground coal mines' total diesel equipment inventory is equipped with Tier 4i or Tier 4 engines?

D. ***Monitoring MNM Miners' Exposures to DPM***

24. MSHA requests information on alternative surrogates, other than TC, to estimate a miner's DPM exposure. What is the surrogate's limit of detection and what are potential interferences in a mine environment?

25. What are the advantages, disadvantages, and relative costs for using the alternative surrogate to determine a MNM miner's exposure to DPM? Please be specific and include the rationale for your response.

26. MSHA requests information on advances in sampling and analytical technology and other methods for measuring a MNM miner's DPM exposure that may allow for a reduced exposure limit.

E. MNM Miners' Personal Exposure Limit (PEL)

27. What existing controls were most effective in reducing exposures since 2006? Are these controls available and applicable to all MNM mines?

28. Based on MSHA's data, MNM miners' average exposures are well below the existing standard of 160_{TC} $\mu g/m^3$. What are the technological challenges and relative costs of reducing the DPM exposure limit?