



## HEALTH HAZARD ALERT

### Underground Coal Mines Increased Nitrogen Dioxide (NO<sub>2</sub>) Emissions

Some underground coal mine operators have experienced excessive Nitrogen Dioxide (NO<sub>2</sub>) emissions on several nonpermissible heavy-duty diesel powered locomotives and light-duty service machines while trying to meet the requirements of 30 CFR Part 72 Subpart D entitled, "Diesel Particulate Matter-Underground Areas of Underground Coal Mines." MSHA field investigation/evaluation has determined that oversized platinum-based diesel particulate filters (DPFs) were installed on the heavy-duty equipment. The light-duty equipment which did not have a DPF, but did have a Diesel Oxidation Catalyst (DOC), was determined to have engine operational problems. Symptoms of overexposure to NO<sub>2</sub> include irritation to the eyes, nose and throat, cough, chronic bronchitis, breathing difficulty, chest pain, pulmonary edema, and rapid heartbeat.

MSHA previously issued Program Information Bulletin (PIB), P11-38, (<http://www.msha.gov/regs/complian/PIB/2011/pib11-38.pdf>) entitled, "Potential Health Hazard Caused by Platinum-Based Catalyzed Diesel Particulate Matter Exhaust Filters". This bulletin identified platinum-based particulate filters as a source for generation of increased concentrations of NO<sub>2</sub>. The oversized DPFs installed on these locomotives have lower percentages of platinum than those addressed in the bulletin, but they have a similar problem of generating increased NO<sub>2</sub> concentrations due to their physical (larger) size. An oversized DPF was selected to avoid excessive backpressure on the MSHA approved engine. The locomotive's exhaust system was long and included several 90 degree bends which created backpressure near the maximum allowable limit without the DPF installed.

To determine whether the catalyzed filter, a DOC, or engine operational settings are causing an increase in NO<sub>2</sub> that may exceed the NO<sub>2</sub> Threshold Limit Value (TLV) of 5 ppm (parts per million), the following evaluation should be performed:

1. Operate the machine in an entry that provides at least the engine's name plate air quantity but not more than an additional 20%.
2. Operate the machine under load.
3. Remotely monitor NO<sub>2</sub> levels in the diluted exhaust stream to prevent possible overexposure to NO<sub>2</sub>.

The NO<sub>2</sub> concentration should not exceed 5 ppm when tested in order to demonstrate compliance with the engine approval. MSHA representatives are available to assist mine operators with setting up this test. Mine operators should contact the equipment manufacturer and/or DPF manufacturer for assistance in the selection of an appropriate size DPF. The equipment manufacturer should be contacted to aid in diagnosing engine operating parameters that may produce excessive NO<sub>2</sub>.

Mine operators are encouraged to contact the local District Manager with instances of increased NO<sub>2</sub> emissions found from diesel equipment.