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Safety and Health Topics:

Diesel Exhaust

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Topic:

Diesel exhaust is a pervasive airborne contaminant in workplaces where diesel-powered equipment is used. Due to expanding use of diesel equipment, more and more workers are exposed to diesel exhaust. More than one million workers are exposed to diesel exhaust and face the risk of adverse health effects, ranging from headaches and nausea to cancer and respiratory disease. Such workers include mine workers, bridge and tunnel workers, railroad workers, loading dock workers, truck drivers, material handling machine operators, farm workers, longshoring employees, and auto, truck and bus maintenance garage workers.

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In addition to occupational exposure, the wide use of diesel engines in transportation provides significant opportunity for environmental exposure to these emissions. Currently available control technology could significantly limit many diesel exhaust exposures, although additional information and research are needed on the methods to monitor diesel particulates and determine the level of risk such particulates cause.

Recognition

- Particulate Emissions from Diesel-Fueled Engines as a Toxic Air Contaminant. California Air Resources Board (1998, February). Identifies health hazards associated with diesel exhaust.
- Exhausted by Diesel: How America's Dependence on Diesel Engines Threatens our Health. Natural Resources Defense Council (1998, April).
- Proposed Rule to Protect Underground Metal and Nonmetal Miners from Diesel Particulate Matter. MSHA Fact Sheet (1998, October), 3 pages.
- Diesel Particulate Matter Exposure of Underground Metal and Nonmetal Miners; Proposed Rule. MSHA Federal Register Documents (1998, October 29), 5 MB PDF, 168 pages.
- Nonroad Engines and Air Pollution. EPA 420-F-94-003 (1995, November), 16.6 KB PDF. The 1990 Clean Air Act specifically directs the U.S. Environmental Protection Agency (EPA) to study, and regulate if warranted, the contribution of nonroad engines to urban air pollution. This short fact sheet discusses EPA's approach.
- Diesel Exhaust. American Federation of State, County and Municipal Employees, 3 pages. An excellent fact sheet on the hazards associated with diesel exhaust.

Evaluation

- Diesel fuel is a complex mixture of petroleum compounds. When combusted, this fuel produces thousands of chemical compounds that are released into the atmosphere as the exhaust. The major components are water, carbon dioxide, nitrogen, and carbon (soot). This link provides a [partial listing of chemicals found in diesel exhaust](#).
- [EPA Testing and Measuring Emissions page](#). EPA. (2002, August), 1 page. Test procedures relating to diesel engine emissions are listed at the bottom of this page, or follow the links below.
 - [Heavy Duty Diesel Engine Startup 752C](#). EPA (1995, November), 38 KB PDF, 18 pages.
 - [Heavy Duty Diesel Engine Break-in 753C](#). EPA (1995, November), 25 KB PDF, 12 pages.
 - [Heavy Duty Diesel Engine Set-up 751D](#). EPA (1995, November), 42 KB PDF, 20 pages.
 - [Heavy Duty Diesel Engine Mapping 754C](#). EPA (1995, November), 30 KB PDF, 15 pages.

These documents are directed toward engine testing, not occupational exposure.

Control

- [Practical Ways to Reduce Exposure to Diesel Exhaust in Mining — A Toolbox](#). MSHA (1997, March). Outgrowth of the information shared at workshops about practical methods to reduce exposure to diesel exhaust in mining. The material is organized as a Toolbox so it can be put to use directly by those working with diesel-powered equipment.
- [Emission Control Potential for Heavy-Duty Diesel Engines](#). EPA 420-F-97-015 (1997, May), 10 KB PDF, 2 pages. Discusses diesel engine operation and the effects of engine design and operation.

Compliance

■ OSHA Standards

- There are standards for the various chemical components of diesel exhaust. However, there are currently no standards for diesel exhaust as a unique hazard.
- [1910.1000, Air Contaminants](#).
 - [Table Z-1](#)
 - [Table Z-2](#)
- [1910.1200, Hazard Communication](#).
- [1915.1000, Air Contaminants](#).

■ OSHA Directives

- [CPL 2-2.38D, Inspection Procedures for the Hazard Communication Standard](#), 29 CFR 1910.1200, 1915.99, 1917.28, 1918.90, 1926.59,

1928.21 (1998, March 20).

■ **Review Commission and Administrative Law Judge Decisions**

The Occupational Safety and Health Review Commission (OSHRC) is an independent Federal agency created to decide contests of citations or penalties resulting from OSHA inspections of American work places. To locate decisions related to this topic, search for keywords at the [OSHRC site](#).

■ **Standard Interpretations and Compliance Letters**

- [Letter to Diesel Fuel Manufacturers](#), (1990, April 4). Hazards of diesel exhaust must be included as part of the MSDS for diesel fuel.
- [Applicability of the HCS to diesel exhaust emissions and diesel fuel](#), (1988, December 22). The hazards of diesel exhaust must be included as part of the MSDS for diesel fuel. If employees are exposed to diesel fuel in their work areas, the hazards, including those of diesel exhaust, must be incorporated in the training program.
- [Hazardous components of diesel engine emissions](#), (1985, November 8). Discusses some potential health effects of diesel exhaust exposure.

■ **MSHA Regulations**

- [Approval, Exhaust Gas Monitoring, and Safety Requirements for the Use of Diesel-Powered Equipment in Underground Coal Mines; Final Rule](#) (1996, October 25). Final Rule regarding the use of diesel engines in underground coal mines.
- [Information Regarding Diesel Regulations](#). Discusses final rule and its requirements.

■ **EPA Regulations**

- EPA is responsible for regulations relating to the Clean Air Act and Air Toxics, including diesel exhaust emissions. Though these are not directly related to occupational exposure, lowering emissions does lower potential occupational exposure.
- [Heavy Duty Highway Engines \(Truck and Bus Emissions\)](#). Office of Transportation and Air Quality. This link provides information on rules and actions relating to heavy duty engines.

Training

- Since the major mechanism for the control of diesel emissions is the proper operation of the engines, the training of maintenance personnel in their care and adjustment is a critical issue. All personnel involved in engine maintenance should thoroughly understand the maintenance procedures recommended by the engine manufacturer and should follow all preventative maintenance schedules.
- Equipment operators should be trained in the efficient use and care of the equipment.
 - Personnel who handle fuel and lubricating oils must be trained to

- prevent contamination from dust, water, or other sources.
- Operators should be trained in routine inspection and maintenance.
- Operators should be trained to avoid operating the engine at low RPM in high load situations ("lugging").
- Engines should not be idled excessively.

- Personnel working with diesel fuel in areas where diesel exhaust may be present must be advised of the potential hazards of exposure. See the Safety and Health Topics page for [Hazard Communications](#) for additional information.

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