FACT SHEET: Release of the *Health Assessment Document for Diesel Engine Exhaust*, September 2002

ACTION: The U.S. Environmental Protection Agency (EPA) has completed the *Health Assessment Document for Diesel Engine Exhaust.* This document is available to the public.

SUMMARY: The assessment states that long-term exposure to exhaust from diesel engines is likely to be a lung carcinogen hazard to humans, as well as have noncancer effects on the respiratory system. The assessment also states that evidence for exacerbation of existing allergies and asthma is emerging. These noncancer effects are similar to those seen with exposure to ambient particulate matter (PM), specifically $PM_{2.5}$. The assessment calculates a Reference Concentration (RfC) of 5 $\mu g/m^3$ of diesel particulate matter. The assessment does not provide a cancer potency value because the available data are insufficient to allow the development of a dose-response relationship. The assessment does, however, provide a "perspective" on the range of possible lung cancer risk from environmental exposure to diesel exhaust in order to illustrate and gauge the potential significance of the lung cancer hazard.

The RfC is an estimate of an air-level exposure of a particular contaminant to which humans may be exposed throughout their lifetime without experiencing adverse effects in the lung.

Further, the assessment concludes that short term (i.e., acute) exposure can cause irritation and inflammatory symptoms of a transient nature, these being highly variable across the population. None of these health hazards or current exposures are thought to be an imminent danger to the general population, though some in the population will be more susceptible than others to symptoms.

The assessment's conclusions are based on exposure to emissions from diesel engines built prior to the mid-1990s. Diesel exhaust exposure comes from both on-road and off-road uses of diesel engines. Having recently established regulations, effective in 2007 for heavy duty on-road engines, e.g., trucks and buses, EPA also plans to propose stringent regulations for off-road diesel engines and fuels. EPA is partnering with local agencies to implement programs to upgrade their engines, or retrofit older dirtier engines with advanced control technology. We expect significant environmental and public health benefits as the environmental performance of diesel engines and diesel fuels improve in response to EPA's regulatory controls and voluntary programs.

A major diesel exhaust constituent of concern is particulate matter and the composition of the particulate matter. The amount of particulate from on-road engines has been decreasing over the years due to EPA regulations and will decrease significantly with the introduction of advanced technologies applied to currently available engines as well as the next generation of engines and control technologies needed to meet the 2007 regulations. The composition of particulate matter from engines meeting the future standards will also change. The assessment's conclusions are based on exposure to exhaust from diesel engines built prior to the mid-1990s. As the newer and cleaner diesel engines replace a substantial number of today's existing engines, the applicability of the conclusions in this Health Assessment Document will need to be re-evaluated.

The diesel health assessment was subjected to extensive peer review by the EPA Science Advisory Board's Clean Air Scientific Advisory Committee (CASAC) on several occasions over the last three years. Both CASAC and public comments have been addressed, and modifications were made in the final assessment as a result.

BACKGROUND: The National Center for Environmental Assessment (NCEA), in EPA's Office of Research and Development (ORD), has completed a human health assessment that describes the potential health hazards associated with environmental exposures to diesel engine exhaust. This is a health science document focused on informing public health and regulatory officials of possible health hazards. It includes hazard identification and dose-response analysis that can be used to characterize the environmental risks associated with exposure to diesel engine exhaust. The assessment also provides background information about diesel engine emissions and exposure that is useful for putting the health information into context.

The assessment first evaluates the health effects literature to identify the most important chronic and acute exposure hazards to humans. Secondly, the assessment evaluates the exposure-response characteristics of the key health effects so that information is available for understanding the possible hazard impact on an exposed population. While summaries are provided that should be useful to the general public, the intended audience is the scientifically-oriented public health community.

Diesel exhaust is a mixture of gases and particles, and the particles become a ubiquitous part of ambient particulate matter. Diesel exhaust is the waste product from the combustion of fuel and lubricating oils in the diesel engine. The engines may be used in highway vehicles (e.g., cars, trucks and buses), installed in off-road movable equipment (e.g., railroad locomotives, farm tractors, construction equipment, ships), or be in stationary machinery (e.g., electricity generators).

EPA has recognized the potential public health benefit of reducing diesel exhaust emissions into the environment and in December 2000 announced a new generation of technology-based regulations that will greatly reduce the emissions of heavy duty highway diesel engines by 2007. A 2000 draft of this assessment was part of the scientific basis for EPA's regulations for heavy duty engines. EPA will continue to review the impact of diesel exhaust from other sources and consider further regulation, as appropriate, in the future.

DOCUMENT AVAILABILITY: The document is available electronically through NCEA's website (http://www.epa.gov/ncea) under the *What's New* and *Publications* menus. A limited number of CDs and paper copies are available from EPA's National Service Center for Environmental Publications (NSCEP). To obtain copies, please contact NSCEP by telephone (1-800-490-9198 or 513-489-8190), by facsimile (513-489-8695), or by mail (P.O. Box 42419, Cincinnati, OH 45242-0419). Please provide your name and mailing address and the title and EPA number of the *Health Assessment Document for Diesel Engine Exhaust* (EPA/600/8-90/057F, May 2002).

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