

APPENDIX E

HEALTH EFFECTS OF DIESEL EXHAUST AIR POLLUTION

HEALTH EFFECTS OF DIESEL EXHAUST AIR POLLUTION

August 28, 2003

Document prepared by the Environmental Subcommittee/Air Quality Group to be forwarded to the Board of Harbor Commissioners (BOHC) via PCAC

Subject: Committees Findings Regarding Health Effects of Diesel Exhaust Air Pollution; with Concern for Port Activity Related Sources

BACKGROUND: Since its inception the Environmental Subcommittee has been considering the issue of the multiple health effects that have been associated with diesel exhaust air pollution. Experts hired by the Committee, including Professor Avol, Mr. Howekamp, and experts from ARB and AQMD have frequently provided input. These experts also found data for the committee's review from sources they had available. Dr. John G. Miller, an Environmental Sub-committee member and PCAC member cited and provided multiple references from the medical, epidemiologic and scientific literature on this topic. Members of the public have expressed concerns at many committee meetings.

The committee has learned that the Health Risk Assessment Study (HRA) to be completed by consultants hired by the POLA, as one of the Seven Studies mandated by the BOHC, is not scheduled to begin until possibly January 2004, depending on when the (as yet incomplete) Air Emissions Inventory is finished. The completion date for the HRA is currently estimated to be late 2004/early 2005.

Environmental Sub-committee members have heard extensive input from the public requesting no further delay in conveying what it has found to date to the BOHC. This input came both at meetings and in the community. The committee finds no reason for further delay in revealing its findings to date.

The committee notes that Port-related activities, including those that occur off Port property but as a result of Port operations, have been identified by the South Coast AQMD as the largest single unregulated contributor to area-wide air pollution.

Port operations (shipping, loading/unloading, and transport of product) require the use of significant amounts of fuel. Currently most of the trucking, locomotive, and off-road yard operations in and supporting the Port use diesel fuel. The combustion of diesel fuel creates high concentrations of very small particles (numerically, over 90% are less than 1 micron in diameter) and nitrogen oxides. Regional air studies have demonstrated that Port-related emissions are transported widely in the air across the South Coast Air Basin, from the harbor area to Riverside/San Bernardino and beyond. These pollutants have been associated directly (through direct exposure by breathing these pollutants from the air) and indirectly (through participation in photochemical reactions in the air, and breathing the products of these reactions, such as ozone) with a number of health effects.

The Sub-committee has learned that some of these health effects occur even when concentrations of particulates are just one quarter of the Federal limit for outdoor air.

Summary of Health Effects that have been related to Diesel Exhaust Air Pollution as identified and brought to the committee's attention:

1. Prenatal and Perinatal effects
 - A. Intrauterine growth retardation
 - B. Elevated incidence of low birth weight infants
 - C. Increased incidence of spontaneous miscarriage
 - D. Increased incidence of respiratory cause of deaths in newborns
 - E. Elevated incidence of serious birth defects
 - F. Increases in sudden infant death syndrome (SIDS)

2. Childhood effects
 - A. Diminished lung growth in children (with unknown long term effects on the individual)
 - B. Development of asthma in children involved in active sports
 - C. Exacerbations of existing asthma
 - D. Elevation of incidence of asthma in children and teenagers. (an ongoing worldwide phenomenon)
 - E. Increases in incidence of bronchitic symptoms
 - F. Loss of days from school attendance due to respiratory symptoms
 - G. Potentiation (enhancement) of allergic effects of known allergens such as ragweed pollen when individual is exposed to diesel particles and the allergen concomitantly.

3. Adulthood
 - A. Elevated incidence of lung cancer in a linear relationship with progressive increases in fine particle (Pm 2.5) air pollution (The category Pm 2.5 includes the particles less than 1 micron in size.)
 - B. Elevated incidence of myocardial infarctions (heart attacks)
 - C. Elevated incidence of mortality from cardiovascular causes (heart attacks and strokes)
 - D. Triggering of myocardial infarctions associated with spikes in Pm 2.5
 - E. Elevation of cardiopulmonary deaths in a linear relationship with increases in Pm 2.5
 - F. Significant elevations in "all cause mortality" associated with increases in Pm2.5
 - G. Increased incidence of bronchitic symptoms
 - H. Chronic obstructive pulmonary disease (COPD): increased incidence, prevalence, and exacerbations of existing disease.
 - I. Fatal exacerbations of COPD
 - J. Exacerbations of asthma leading to time off work, emergency room visits and hospitalizations

K. Approximately 1.5 times elevation in the smoking adjusted incidence of lung cancer in workers occupationally exposed to diesel exhaust versus the smoking adjusted relative risk baseline incidence of lung cancer in similar non-exposed populations.

L. Chronic exposure to particulate pollution shortens lives by one to three years

M. Higher concentrations of particulate air pollution has been linked to low heart rate variability, a risk factor for heart attacks. Association is stronger for people with pre-existing cardiovascular conditions.

N. Mitochondrial damage in cells. (All age groups)

O. Airway inflammatory changes (all age groups)

P. Damage to and death of alveolar and airway macrophages,(all age groups)

This is a brief overview of an extensive and growing body of knowledge. These findings were developed through many avenues of research including but not limited to: epidemiologic studies, clinical studies-retrospective and prospective, autopsy studies, animal studies, cellular biology studies, and Government agency investigations. There has been worldwide scientific participation in research on the links between diesel exhaust air pollution and human health.

This body of knowledge is constantly evolving, with many new pieces of information having been published or brought to light since the inception of Environmental Committee Subcommittee/Air Quality Group. The committee notes that as this an evolving body of knowledge, in many areas further studies are needed.

The Committee finds sufficient evidence to warrant immediate aggressive action by POLA and its tenants to reduce the measurable levels of local and Air Basin wide diesel exhaust air pollution due to Port related activities.

Richard Havenick
Chairman, Air Quality Group

References Regarding the Health Effects of Diesel Exhaust Air Pollution
July 25, 2003

1. Health Assessment Document For Diesel Engine Exhaust (United States Environmental Protection Agency, EPA/600/8-90/057F, May 2002).
2. Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates. (State of California, California Environmental Protection Agency, Air Resources Board) Staff Report: Initial Statement of Reasons for Proposed Rule Making. Release Date: May 3, 2002.
3. Selected Key Studies on Particulate Matter in Health: 1997-2001 American Lung Association, Updated March 5, 2001.
4. Findings of the Scientific Review Panel on "THE REPORT ON DIESEL EXHAUST" as adopted at the Panel's April 22, 1998 Meeting.
5. "Lung Cancer, Cardiopulmonary Mortality, and Long Term Exposure to Particulate Fine Matter Air Pollution" Journal of the American Medical Association, March 6th, 2002, Volume 287, No. 9.
6. "Occupational Exposure to Diesel Exhaust and Lung Cancer: A Meta-Analysis" American Journal of Public Health, 1999; 89:1009-1017.
7. "The Concentration-Response Relation between PM_{2.5} and Daily Deaths" Environmental Health Perspectives, Volume 110, Number 10, October 2002. (Harvard School of Public Health).
8. "Increased Particulate Air Pollution and the Triggering of Myocardial Infarction." Circulation, June 12, 2001. (Harvard School of Public Health and the American Heart Association).
9. "The Effects of Air Pollution on Infant Mortality Appears Specific for Respiratory Causes in the Post neonatal Period." Epidemiology, November 1999, Volume 10, Number 6.
10. Editorial "Air Pollution Kills Babies..." Epidemiology, November 1999, Volume 10, number 6.
11. "Ambient Air Pollution and the Risks of Birth Defects in Southern California" American Journal of Epidemiology, Volume 155, Number 1, 2002. (Research done at UCLA).

12. "Association between Air Pollution and Intrauterine Mortality in Sao Paulo, Brazil" *Environmental Health Perspectives*, Volume 106, Number 6, June 1998.
13. "Respiratory Effects of Relocating to Areas of Differing Air Pollution Levels" *American Journal of Respiratory and Critical Care Medicine*, Volume 164, pp2067-2072, 2001. (Research done at USC)
14. "The Effects of Ambient Air Pollution on School Absenteeism due to Respiratory Illnesses" *Epidemiology*, January 2001, Volume 12, Number 1. (Research done at USC).
15. "Air Pollution and Infant Mortality in Mexico City" *Epidemiology*, March 1999, Volume 10, Number 2.
16. "Air Pollution and Bronchitic Symptoms in Southern California Children with Asthma" *Environmental Health Perspectives*, Volume 107, Number 9, September 1999.
17. "Association between Air Pollution and Lung Function Growth in Southern California Children" *American Journal of Respiratory and Critical Care Medicine*, Volume 162, 2000.
18. "Global Increases in Allergic Respiratory Disease: The Possible Role of Diesel Exhaust Particles" *Annals of Allergy, Asthma and Immunology*, Volume 77, October 1996. (Research done at UCLA).
19. "Association of very Low Birth Weight with Exposures to Environmental Sulfur Dioxide and Total Suspended Particulates" *American Journal of Epidemiology*, Volume 151, Number 6, 2000.
20. "From Asthma to AirBeat: Community driven monitoring of fine particulates and black carbon in Roxbury, Massachusetts." *Environmental Health Perspectives*, April 2002, Volume 110, Supplement 2: 297-301.
21. "Inhalation of Fine Particulate Air Pollution and Ozone causes Acute Arterial Vasoconstriction in Healthy Adults" *Circulation*, 2002, April 2; 105 (13): 1534-1536.
22. "A Three-Way Link may exist among Air Pollution, Allergy Sensitization and Reactivity, and Asthma" *Allergy* 1998; 53:335-45. (Cited in "Update in Allergy and Immunology", *Annals of Internal Medicine*, 1 February, 2000, Volume 132, Number 3.