

John Miller

07-7-7

August 9, 2007

Comments of John G. Miller, M.D. FACEP for Hearing on "Marine Vessel Emission Reduction Act of 2007"

Good Morning. I am Dr John G. Miller, an Emergency Physician. I live here in the Diesel Death Zone in San Pedro. I have practiced in various Emergency Departments in the South Coast Air Basin for more than 30 years. I am certified by the American Board of Emergency Medicine and I am a Lifetime Fellow of the American College of Emergency Physicians. I was originally trained in Radiation Oncology at USC Medical Center. (Medical School-Baylor College of Medicine, Houston TX, Prof. Societies: Society of Orange County Emergency Physicians, Society for Scientific Exploration, Board of Directors: Coalition for a Safe Environment, Wilmington, CA. I was the only medical doctor on Mayor Hahn's *No Net Increase Task Force*).

Thank you for this opportunity to testify.

I am speaking in support of this bill. I will give a clinician's perspective on why it should be enacted. The bill addresses the ship pollution problem in a way that is workable and provides a level playing field for all West Coast ports and shippers.

The bill addresses a serious problem we have here in Southern California. The twin ports (LA and Long Beach) have been identified as the single largest unregulated source of air pollution in the South Coast Air Basin. Port related activity (ships, trucks, trains and cargo handling equipment) contributes a total of roughly 25% of the mass of air pollutants in the South Coast Air Basin. Angelenos breathe the most unhealthy air in America. In a study done by the Port of Los Angeles, ship operations were shown to contribute 55% of port related air pollution. Thus ships are the largest source of port related air pollution. (From: Port Wide Baseline Air Emissions Inventory, Final Draft, page 26, June 2004, Port of Los Angeles, Starcrest Consulting Group)

Large foreign owned or flagged ships have had a free ride. They are allowed to use our air as their toxic dumping site. Yet local land based businesses have been heavily regulated to prevent this. International standards for pollution from ship engines, written mostly by the shipping industry, are so lax as to be meaningless.

Welcome to the "Diesel Death Zone". As demonstrated in the MATES II study, (Multiple Air Toxics Exposure Study II, March 2000, www.aqmd.gov) we have a broad swath of severe air pollution that extends from the ports inland across the Air Basin that adversely affects the lives and health of over 14 million citizens.). This area has come to be known as the Diesel Death Zone. (I show the map of cancer risks due to air pollution from MATES II. Darkest areas-near

the ports- show risks of cancer from breathing air of 5000 to 6000 cases per million (I show the map of cancer risks due to air pollution from MATES II. Darkest areas-near the ports- show risks of cancer from breathing air of 5000 to 6000 cases per million population. Federal Standard for this risk from one project should be less than 1 per million population, from all sources in an area should be less than 300 cases per million population.)

Attachments A: "Cancer Risks from Breathing Air-Mates II" a map of our region showing risk stratified areas. This was done by the Sierra Club from data supporting figure 5-3a page 5-10 in MATES II . This black and white figure (5-3a) is also attached but this figure merely shows the high risk areas as large black spots due to printer inadequacy. Note that risks of up to 5,800 cases per million are demonstrated.

Attachment B: "Heart Disease Deaths -1996 Communities in Los Angeles County" (Source L.A. County Dept of Health Services). This map illustrates areas with highest numbers of heart disease deaths in darker colors. It looks very similar to the Cancer risks map I just showed. I assert that some of these heart disease deaths are being caused by air pollution from the ports.

This ugly swath disproportionately affects lower income communities and people of color in places such as Wilmington, Compton ,Carson, South Central and East L.A. This map provides clear documentation of a serious environmental justice issue.

The medical literature on the effects of air pollution on human health is vast and growing. Many important studies were done at USC and UCLA Schools of Medicine. It would take longer than my 5 minutes to read through even a partial list of all the adverse effects related to diesel air pollution. Cancer, heart attacks, strokes, chronic obstructive pulmonary disease and asthma are major killers (Attachment C: "Health Effects of Diesel Exhaust Air Pollution", August 28, 2003, Port of Los Angeles Port Community Advisory Committee Air Quality Group, with references from the medical/scientific literature attached). These killers are related to air pollution in a largely simple, linear fashion with no known lower threshold of safe exposure. More pollution means more disease, death, and cost to our society. (Professor Avol will cover some children's health effects in his testimony).

Costs:

Industry spokespersons have asserted that the costs of this are "unknown and unknowable". However it is possible to estimate societal costs due to ship related air pollution. The Union of Concerned Scientists estimated that the cost of "Health Incidences from diesel exhaust in 2004 in the South Coast" was \$ 10.2 Billion ! This was for only the one year they studied. (Source: Sick of Soot, Reducing the Health Impacts of Diesel Pollution in California , Union of Concerned Scientists, June 2004. available at www.ucsusa.org) Knowing that the Ports contribute 25% of the total pollution causing this, we get the Ports total share of the cost as

\$2.55 Billion. ($0.25 \times \$10.2 \text{ Billion} = \2.55 Billion). Then, knowing from the Emissions Inventory that ships contribute 55% of the total Port related air pollution (DPM), we find that *the total health care cost from ship exhaust alone is \$ 1.4 Billion!* ($0.55 \times \$2.55 \text{ Billion} = \1.4 Billion)

That is \$1,400,000,000 in health care costs to be born by our citizens!

We further crunched these numbers, comparing total port related health costs and number of ship calls. We obtained the astonishing result that it appears that each large ship call at the Ports is generating a cost to society of \$315,000 to \$455,000! California is massively subsidizing this industry when externalized costs are considered.

.More on this can be found in Paying With Our Health, The Real Cost of Freight Transport in California. The Pacific Institute, June 2006 available at www.pacinst.org.

Another way to look at this is to use the US EPA's "value of one premature death in 2004 dollars". The value set by EPA was \$6 Million per avoidable premature death. Union of Concerned Scientists estimated 1400 premature deaths from air pollution in the South Coast Air Basin in 2004. The twin Port's share of these would be 246 deaths. (0.25 of total pollution \times 1400 deaths from pollution = 246 deaths) The value of these would be \$1,476,000,000. ($246 \text{ deaths} \times \$6\text{million per death} = \1.476 Billion!)

These are disturbing numbers. However my point is that real people are getting sick and dying. Yet, large often foreign owned corporations get to make maximum profits unhindered by concerns about the health of Americans. The medical costs are externalized and born by our citizens.

Often we cannot absolutely say that air pollution caused an individual heart attack, stroke, cancer case, sudden death etc. (The tobacco industry used this dodge for decades!) However the epidemiologists have shown, in aggregate, air pollution is responsible for a significant fraction of the total of these cases.

I have treated cases, seen fatalities that appear to be pollution related.

In my years as an Emergency Medicine physician I have of course seen hundreds of fatal or near fatal cases of the illnesses we associate with air pollution. Some stand out in my mind. In my brief time to testify, I can share only a few cases with you.

On a routine busy night in the ER we got a sudden call from the paramedics. They were bringing in a 14 year old boy in **full cardiopulmonary arrest** due to an asthma attack. Two

minutes away. We got as prepared as we could in 120 seconds and soon we were in the hand-to-hand struggle with death and destruction we often fight.

This child survived despite the severity of his condition.

But in many cases, the person does not survive. When that happens, *I am the person who must walk down the long hallway, sit down with the family and tell them their loved one didn't make it.* This is a very tough job. I would like not to have to do it so often. Enactment of this bill will prevent many needless premature deaths and enormous related costs in America.

More cases from my own experience:

At 1:30 one July morning three years ago, in the ER, I saw a 55 year old woman complaining of left chest pain. She feared she was having a heart attack. My initial evaluation ruled out a myocardial infarction (heart attack) but unfortunately I found something far more ominous than a "mere" heart attack. Her chest x-ray showed a large tumor mass in her left chest. I feared cancer, but this lady had no risk factors for cancer other than having breathed the air here all her life (no history of smoking, radon gas exposure, asbestos exposure, second hand smoke at work). Unfortunately, my fears were proven correct by further evaluation. It was lung cancer and it had spread to the area around her heart and her brain. She died 6 months later. In my opinion she died from air pollution.

Eighteen months ago, the 48 year old wife of one of my colleagues developed a nagging dry cough. Debbie was a fit nonsmoking, "no risk factor" person. Her workup revealed lung cancer. As 90-95% of lung cancer victims do, she died after a lot of suffering. It was my sad duty to prescribe morphine tablets when she ran out in her last week of life. Her funeral was attended by hundreds of mourners. I was one of them. She left behind a devastated family including one 12 year old child with special needs who still really needs his mother. Air pollution was the most likely cause of her death.

Her only risk factor was a lifetime in the Air Basin.

The point here is that we are not just talking about "numbers". Real people are sick and dying. Physicians are seeing increasing numbers of cases like these where the only risk factor seems to be living in the Diesel Death Zone.

"But enactment of this bill will send the freight to other ports and destroy many jobs here!" This is one standard response from industry to any proposals that would seek to limit their ability to burn the cheapest, dirtiest fuel in their ships.

The best response to this was actually provided by the Port of Los Angeles. In a recent Draft Environmental Impact Report for a major terminal expansion/increased throughput project, the

options of diversion of cargo to other West Coast ports inside and outside Southern California was considered and studied. The Port concluded that this is simply not possible because the facilities to do this simply do not exist and "are not being contemplated" by other major West Coast ports. In Southern California sufficient capacity outside Port of LA/Port of Long Beach "does not exist and cannot be constructed". According to POLA's own studies, *the freight must come through these 2 ports*. Put bluntly the shippers need to be able to use these two ports more than the ports need the freight from the shippers.

(See Attachment D: Sections 2.5.2.1 and 2.5.2.2 from "Berths 136-147 Container Terminal Draft Environmental Impact Statement (EIE) Environmental Impact Report EIR", June 2007. Prepared by Port of Los Angeles, US Army Corps of Engineers and SAIC)

"But it will cost way too much. Consumers costs will go way up!" We are indebted to the Maersk Corporation for proactively adopting the use of low Sulfur diesel fuel in ships serving their Pier 400 facility, demonstrating that the cost of this is not prohibitive. Additionally, Mr. Jesse Marquez with Coalition for a Safe Environment calculated that even if costs went up \$100 per container (an increase of \$200,000 in a 2000 container ship) the net increase in cost to consumers for, say a pair of sneakers, would be 0.25 cents!

Thus measures such as this legislation that may increase some costs to shippers but protect the health of Americans should be acceptable, enacted, and enforced.

Thank you for your kind attention to my testimony.

John S. Miller, M.D., FACEP

Maximum Value = 5300.21
Minimum Value = 184.64

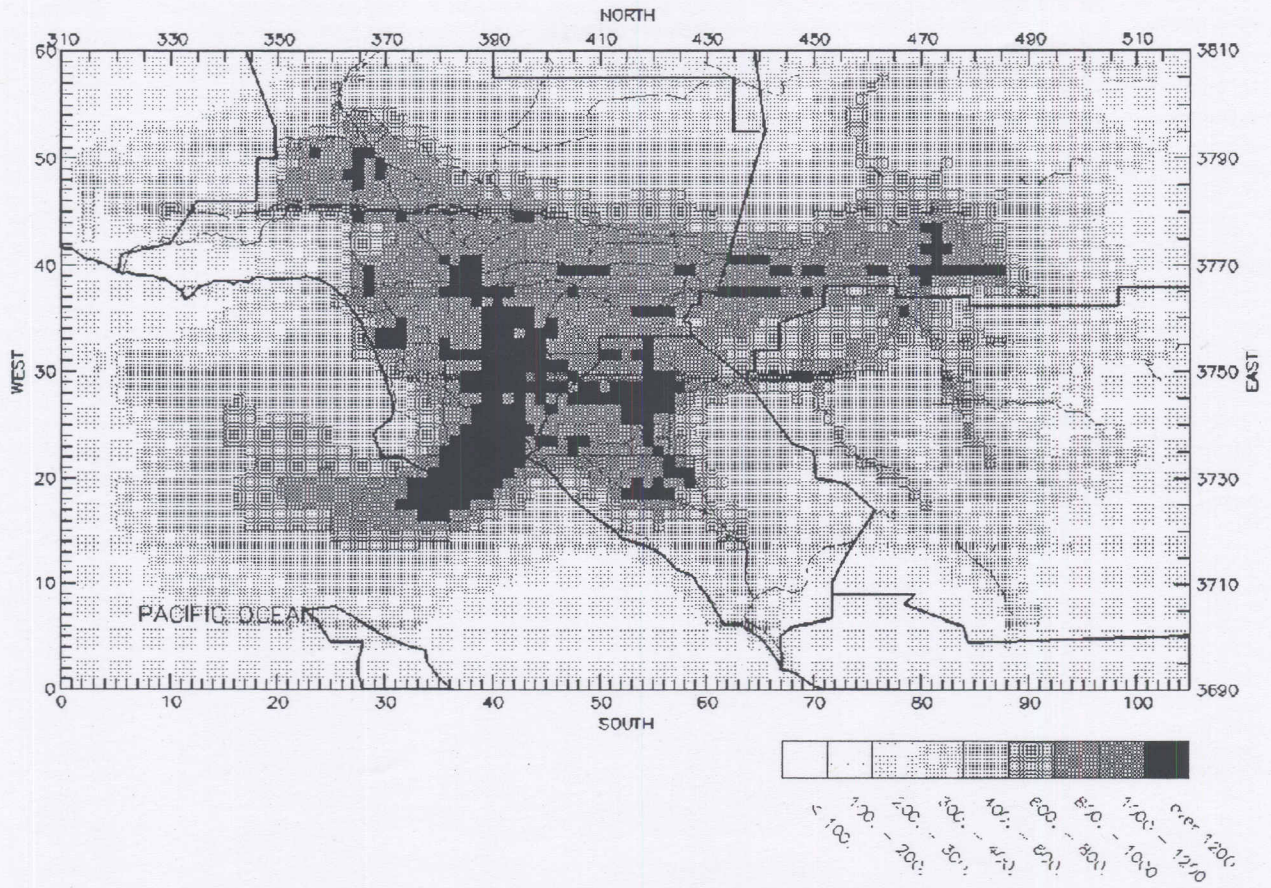


Figure 5-3a. Model estimated risk for the Basin
(Number in a million, all sources)

2.0 Project Description

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- 10. Harry Bridges Boulevard relocated to provide additional container storage area;
- 11. Development and operation of a smaller terminal; and
- 12. Alternative designs for the Harry Bridges Buffer Area.

2.5.2.1 Use of Other West Coast Ports Outside Southern California

In this alternative, the Port of Los Angeles would not expand and improve the Berths 136-147 Container Terminal, but would instead assume that the additional cargo would be handled by other West Coast ports outside Southern California (i.e., Oakland, Seattle, Tacoma, Portland, Vancouver, B.C.). It is important to note that the Port of Los Angeles has no authority to direct cargo to ports outside its jurisdictional boundaries; it could only refuse to provide the discretionary actions necessary to increase Port capacity within its own boundaries, thus providing shippers with an incentive to route cargo to other ports. Such a course is not consistent with the Tidelands Trust or Coastal Act.

To evaluate this alternative it is important to recognize the current and expected role of the Port of Los Angeles in U.S. foreign trade. Between 40% and 45% of the all containers handled by U.S. ports come through the Port of Los Angeles (Journal of Commerce 2007) and more than 75 percent of all containers shipped through West Coast ports flow through the Ports of Los Angeles, Long Beach, and Oakland because those ports have the specialized facilities and navigational channels of sufficient depth to safely accommodate the new generation of deep-draft ships (USACE and LAHD 2000). The value of goods handled by the Ports of Los Angeles and Long Beach was a combined \$240.5 billion in 2004, whereas the value of goods handled by the Ports of Oakland, Seattle, and Tacoma was a combined \$63.9 billion in the same year (MARAD 2005a). As described in Section 1.1.3, the large population base of the Southwestern U.S. and the strong transportation connections to the rest of the country make the two San Pedro Bay ports prime destinations for foreign trade.

Assuming that other ports could handle the large increases in cargo expected to come to Los Angeles would ignore the physical situation and expansion potential of those ports. An assumption of the cargo demand projections for the Ports of Los Angeles and Long Beach, assumed a portion of the cargo would be going to the other West Coast ports. A survey of West Coast ports prepared for the Deep Draft Navigation Improvements Project showed that other West Coast ports are not capable of absorbing additional cargo diverted from the Port of Los Angeles without constructing new facilities (USACE and LAHD 1992). The 1992 survey is still valid: a number of new studies on goods movement in California, such as the governor's *Goods Movement Action Plan* (CalEPA and the Business, Transportation, and Housing Agency 2005), have identified capacity constraints at other West Coast ports. Other major West Coast ports are already operating at or near current physical capacity, have recently expanded, or are undergoing expansion to accommodate their projected future throughput demand. Although small temporary diversions from the Port of Los Angeles can be accommodated, large permanent diversions would require further physical improvements at other major West Coast ports, improvements that are not being contemplated by those ports.

1 The improvements that would be necessary to allow the other West Coast ports to
2 accommodate additional cargo beyond their current forecasts would result in
3 environmental impacts similar to or more intensive than those of the proposed Project
4 (LAHD 1997a). The use of other ports would not meet the objectives of the proposed
5 Project to accommodate the projected growth in the volume of containerized cargo
6 through the Port in accordance with its legal mandates (see section 2.3.1). For that
7 reason, this alternative is considered infeasible.

8 **2.5.2.2 Expansion of Terminals Within Southern California but** 9 **Outside of the Los Angeles Harbor District**

10 In this alternative, new container terminal facilities would be constructed at other
11 Southern California ports (Long Beach, San Diego, Port Hueneme), or a new port
12 would be established, to accommodate future increases in cargo volumes that would
13 otherwise be handled by the proposed Project. As with the previous alternative, the
14 Port of Los Angeles has no authority to direct cargo to ports outside its jurisdictional
15 boundaries; it could only refuse to provide the discretionary actions necessary to
16 increase Port capacity within its own boundaries, which is not consistent with the
17 Tidelands Trust or Coastal Act.

18 The chief candidate among existing ports to accommodate Los Angeles' share of
19 cargo is the Port of Long Beach because that port is similar in size to the Port of Los
20 Angeles and has modern container terminals and deep water access. However, the
21 Port of Long Beach faces future increases in cargo volumes similar to those forecast
22 for Los Angeles (see section 1.1.3). To meet that demand, Long Beach has embarked
23 on its own program of modernization and expansion of container terminals.
24 Furthermore, even if the proposed additional 67 acres of container terminal could be
25 located in the Port of Long Beach, it would have very similar impacts to those of the
26 proposed Project at the Port of Los Angeles, given the proximity of the two ports.
27 Other existing ports in Southern California do not have the water depths, wharf
28 facilities, backland capacity, or transportation connections to accommodate a large
29 amount of container cargo (USACE and LAHD 1992).

30 The option of building a new port to accommodate additional cargo is infeasible
31 because the California Coastal Act does not allow the development of new
32 commercial ports outside the existing port districts. The standards for master plans,
33 contained in Chapter 8 of the Coastal Act, require environmental protection while
34 expressing a preference for port-dependent projects. The logic behind this policy is
35 that it is environmentally and economically preferable to concentrate commercial
36 shipping activities and other maritime industrial facilities in existing ports rather than
37 siting them up and down the coastline.

38 Using other Southern California ports to accommodate future Port of Los Angeles
39 cargo volumes is infeasible because sufficient capacity does not exist and cannot be
40 constructed. Therefore, this alternative was eliminated from further consideration in
41 this EIS/EIR.

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: Committee's 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.

Cancer Risk From Breathing Air - MATES-II

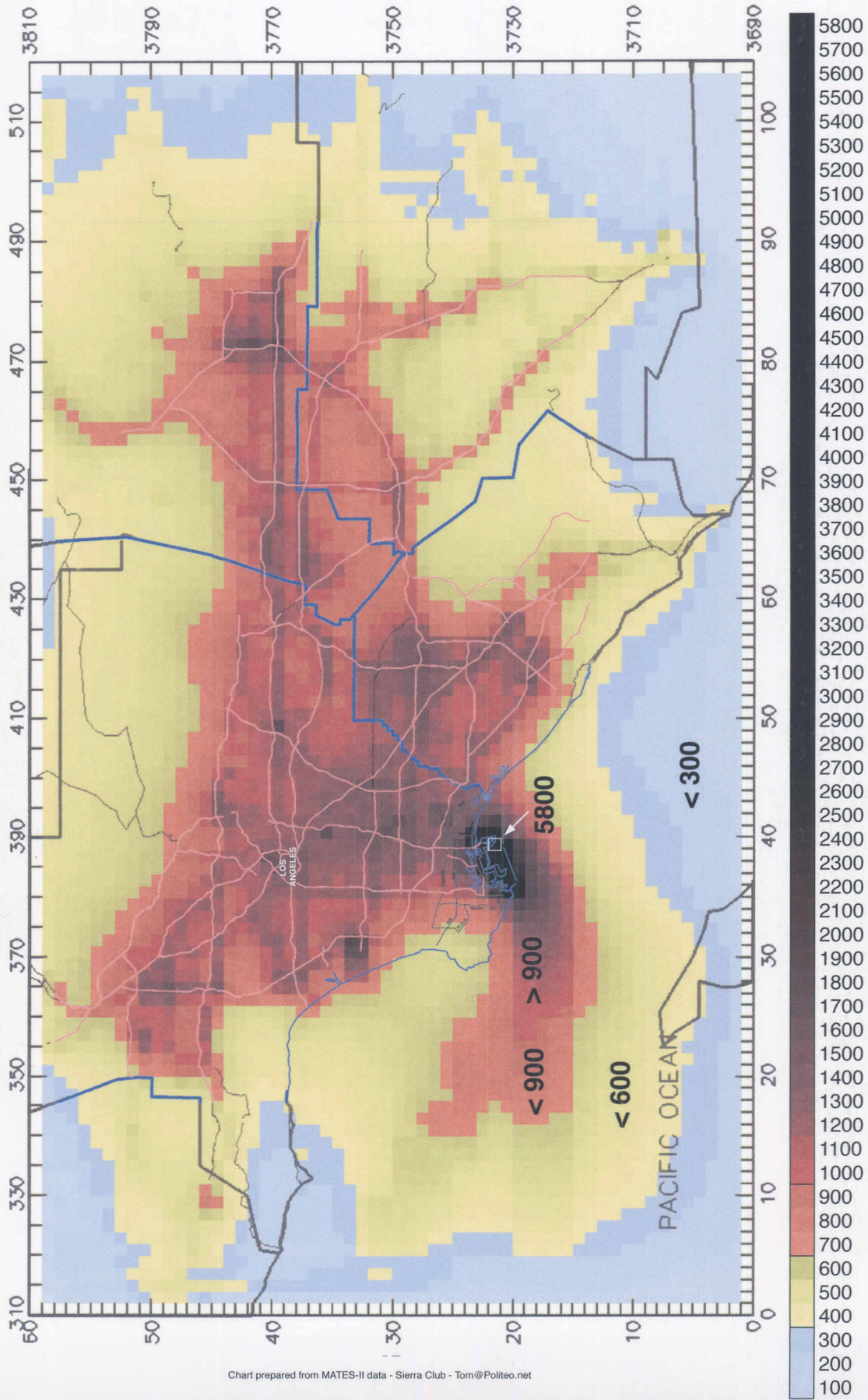


Chart of estimated risk up to indicated number of cases of cancer per million population in a 70 year lifetime.

Chart prepared from MATES-II data - Sierra Club - Tom@Politeo.net