

Health Effects of Surface Goods Movement Symposium UCLA

February 12-13, 2007

This document summarizes the discussions and presentations at the HEALTH EFFECTS OF SURFACE GOODS MOVEMENT SYMPOSIUM, which was held at UCLA in February, 2007. The summary was prepared by the UCLA organizers based upon and notes from the presentations and written summaries provided by the speakers. Speakers also contributed to the preparation and review of this summary.

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Scope of Health Effects of Surface Goods Movement Symposium

Philip Harber, MD MPH

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In the past, much attention was focused upon "whether the port related activities create adverse effect". Despite the implementation of relevant regulations, many industries have argued that such effects were not actually present, and community groups often demanded immediate changes that in themselves might be inadequately considered or have adverse indirect effects.

To address these concerns and provide a forum for discussions, UCLA sponsored a multiday day conference on "Health Effects of Surface Goods Movement", focusing upon port related to issues. The emphasis was not on "whether there are effects", but rather on "how can adequate control best be achieved without undue serious adverse effects". A strongly multidisciplinary group was assembled to address these issues in an open forum.

At this conference, short presentations were complemented by discussions. The conference encouraged viewing both problems and potential solutions from multiple perspectives. The multidisciplinary planning committee help develop the variety of approaches. At the conference, participants were encouraged to look at issues from the perspectives of others perspective (i.e., take a "transdisciplinary approach").

This paper summarizes and synthesizes the discussions. Overall, a great deal of information is available about the nature of health effects and about potential solutions. Overall, most felt that it is feasible to balance control of adverse health effects with maintenance of the economic activity. While feasible, this requires innovative approaches.

Many different approaches are used for assessing the compact plaques potential solutions. Domains of expertise represented include the following:

- Toxicology: The study of adverse health impact is the in who experimental models or in humans
- Epidemiology: Population based studies examining the frequency of disease of in communities and the statistical relationship with exposure
- Industrial organization: worker and employer representatives others dealing with the organization of work.
- Occupational health: the specialties looking at a worker health, examining exposures and working conditions.
- Economics: Determinants of the lung large-scale the economic drivers as well as in the impact upon individuals. This included both microeconomics (such as factors affecting the choices of an individual) and macroeconomics (broad, society level economic)
- Regulation: Role of government in implementing and enforcing policies.
- Engineering: Design and testing of equipment to minimize exposures.
- Community: Representatives of the affected communities and academic experts in community organization and communication.

Table 1 summarizes the organizational structure of the meeting, representing the perspectives involved.

HEALTH EFFECTS

Diesel: What are specific agents and health effects from surface goods movement related to particulate matter?

Jean Ospital, DrPH

Health Effects Officer
South Coast Air Quality Management District

Dr. Jean Ospital of the South Coast Air Quality Management District presented a summary of the health concerns regarding diesel exhaust.

Sources

The District includes four counties and 16 million people; the district also includes over 11 million gasoline vehicles with more than a quarter million diesel vehicles.

It has had significant air pollution problems for decades, and has and the worst air quality in the country. As a result, the District began controlling air quality in the 1950s, well before attention in the rest of the U.S. Following this efforts, air pollution has quite significantly improved over the last 50 years. Peak ozone declined from 0.68 to 0.18 ppm despite the addition of 2.3 million new vehicles since the 1950s. However, both ozone and particulate matter remain above federal standards; before all other criteria air pollutants have reached attainment, however.

The eastern portion of the district, including San Bernardino and Riverside counties, has particularly high levels of ozone. Particulate matter and SO_x create substantial problems there, as well. Airflow patterns contribute to significantly higher pollutant levels in the eastern portion of the District, as the eastward airflow leads to pollutant transport and subsequent trapping in the eastern part of the LA Basin. Exhaust and other pollutants generated in Los Angeles County are trapped there.

In addition to the overall lung pollutant levels across the LA Basin, there are more local effects. In particular, the areas of heavy transport activity along the 710 Freeway have the greatest concentration of particulate matter because of the extensive diesel traffic. (Although the levels are unfortunately high, they have been declining over time, due to improved environmental policy and increased enforcement.)

Good movement is a major contributor to the overall pollutants including diesel exhaust particulates, nitrogen oxide's, and sulfur oxides. The particulate components include multiple metals.

There are several sources of particulate matter, but data show that diesel exhaust constitutes 70% of particulate material. This is a particular problem adjacent to the 710 Freeway, which transports 25% of the diesel traffic in the region.

Air pollutants are created by both mobile and stationary sources. Most of the stationary source pollutants are in the western half of the Basin, but mobile sources account for the majority in the eastern half. Mobile sources related to account for a high proportion of the total air pollutant release. For diesel particulates, they represent 70% of the total; and for sulfur oxides, they constitute 30 percent. Thirty percent of the mobile source emissions come from NO_x (nitrogen oxides), and 5% from reactive organic species.

There are several distinct sources of this type of particulate matter. Trucking constitutes the largest source, but ships, trains, harbor craft, and cargo handling equipment in the port are also significant contributors. Currently, trucks or the major contributor to diesel exhaust, but in the future as trucks are better controlled,

ships will account for a higher proportion of the diesel particulate. For nitrogen oxides, trucks or the major contributor and will remain so; locomotives also were significant sources. Conversely, in Southern California region, sulfur oxides related to good movement or largely from ships and are projected to continued to be predominately from ships. Smaller contributions of come from trucks them locomotives currently, but this is projected to decrease over time.

Particulates

Particulate matter is a major source of concern as it has been linked to several types of health effects: these include death, cancer, and cardiovascular disorders. Over 8000 deaths and 1.4 million lost workdays occur annually due to fine particulate matter. The impact is considerably greater than car accidents (3200) and murder (2000 annually).

Studies have suggested that diesel emissions may cause premature mortality from cancer and respiratory disease. In addition, studies summarized by the American Heart Association and others show that particulate matter contributes to cardiovascular mortality. Further, in addition to mortality, particulate matter worsens respiratory disease.

The risk is not homogeneous; susceptible population segments include the young and the old.

A great deal of information has been learned from the University of Southern California Children's Health Study. This is a large, long-term study of the respiratory health of children from areas with different pollution loads. The study has shown that children in areas with high PM₁₀, PM_{2.5}, nitrogen dioxide, and acid vapors have lower lung function and reduced lung development. The longitudinal study has also shown that by the age of 18, the children in these locations have permanently lowered lung function and are unlikely to ever recover fully from these effects.

The prevalence of lung function abnormality varies according to the area of residence. For example, the proportion of children with FEV1 < 80 percent of predicted is only 0.2 percent in low pollution communities, but 6% in high exposure communities. Further evidence of an air pollutant effect is seen in children who move from one community to another. Those who move from high to low pollutant communities have shown a partial recovery of lung function.

Cardiovascular effects were also seen; for example the carotid artery wall thickness was increased where PM 2.5 (small size particulates) were particularly high. A large study from the University of Washington demonstrated that cardiovascular events in women were increased but in association with living in higher small particulate areas.

While much research has been done with particles < 2.5 microns, increased scientific concerns now relate to even smaller particles. These carry metals and organic contaminants on their surfaces and have greater effect than do the 2.5 micron sized particles. The ultrafine particles or much more elevated adjacent to freeways that in other areas.

The combined Los Angeles and Long Beach ports contribute significantly to estimate cancer risks according to CARB calculations. Over 2 million people have risks elevated by 10 or more chances per million, and over 50,000 people may have the lifetime risk elevated by over 500 chances per million. High traffic roads increase the risk of diesel related malignancy by 300-1700 per million.

Physical location is extremely important. The levels of exposure to elemental carbon (a marker for diesel exposure) is much greater in proximity to freeways and other point sources than at a distance. For that reason, and careful planning for optimal land use is necessary. Large operations such as railyards and distribution centers can create significant local burdens that exceed levels produced across the region. In summary, Dr. Ospital presented the magnitude of the air pollution problems in the South Coast District and emphasized the importance of particulate matter in creating these problems. He also noted a broad array of health risks as the consequences of such exposure. Trucking represents the leading source of

these mobile emissions, and much of this is directly related to port operations. This not only impacts the areas adjacent to the port but also those areas surrounding the freeways which serve as a direct route from the port to distribution centers throughout the LA Basin. These areas have the highest particulate exposure, especially particulates that are directly related to diesel exhaust.

Non-particulates: What are specific agents and health effects from surface goods movement related to gas phase pollutants?

John Balmes, MD

Professor of Medicine, UCSF
Chief, Division of Occupational and Environmental Medicine
San Francisco General Hospital (SFGH)
Director, Center for Occupational & Environmental Health – Northern California

Dr. Balmes, Professor of Medicine at UC San Francisco and Professor of Public Health UC Berkeley discussed exposures to non-particulate materials. He helped identify the health effects and describe which agents are of the most concern.

In addition to particulate matter, diesel exhaust contains many vapor, gas, and other non-particulate materials. The local distribution centers, where goods are transferred, represent major sources of non-particulate exposure.

There are several categories of information about the health effects of non-particulates, such as vapors and aerosols. These include human chamber studies, animal studies, and epidemiologic studies.

Chamber studies are performed with human exposure to controlled levels of pollutants. Chamber studies allow delineating of the effects of specific agents, but are limited to short-term exposures and short-term outcome measurements.

Chamber Studies of Asthmatics:

Studies were performed by exposing asthmatics to nitrogen oxides. This method has shown results generally similar to those known to have been caused by diesel exhaust particulates. In addition to the (limited) direct effects of exposure, the studies also demonstrate the interaction with allergens. Individuals have shown enhanced allergy-related, asthmatic allergic reactions when exposed to nitrogen dioxide concomitantly with an allergen. The reaction to simultaneous allergen and nitrogen oxide is much greater than with asthmatics who have been exposed to filtered air alone or even with allergen alone.

The Influence upon individuals with asthma has a large public health effect. Approximately 10 % of the United States population has allergy-related asthma. In addition, 30% of the population has allergic rhinitis, and hence, any pollutant impact affects many people.

Sulfur Dioxide

In addition to the chamber studies, health service utilization is also affected by nitrogen dioxide exposure. Exposure leads to the increased frequency of both emergency room visits and hospitalizations for allergic asthma.

SO₂ studies have also addressed sulfur dioxide. The impact on California from exposure to sulfur dioxide is less than on the East Coast. Nevertheless, the levels of sulfur dioxide released from diesel exhaust are significant. Among asthmatics, exposure can also induce acute bronchospasm at low concentrations with only a brief duration of exposure (e.g., 2-5 minutes). Longer-term epidemiologic studies have demonstrated a clear association between such exposures and lower levels of lung function.

Volatile Organic Compounds

Volatile Organic Compounds (VOCs) are also present in the outside air. Vehicle exhaust constitutes the major source of such materials. The Los Angeles Children's Health Study, a longitudinal epidemiologic

study of children in various local communities, has demonstrated an association between lower lung function and exposure to VOCs, such as benzene, ethyl benzene, and formaldehyde.

Geographic considerations may be significant. Living near a freeway is associated with reduced lung function. For example, comparing children living 500 versus 1500 meters from a freeway showed significant differences in lung function. The California Air Resources Board recommends living at least 500 meters from a freeway.

The exposures are not uniformly distributed; rather, those of lower socioeconomic status are particularly affected. Geographic considerations are also relevant to other settings. For example, living near the port, the yards associated with ports, distribution centers, and freeways produces higher concentrations of pollutants.

Proximity to mobile sources: a largely unrecognized cause of disease**Rob McConnell, MD MPH**

Professor of Preventive Medicine
Deputy Director, Children's Environmental Health Center
University of Southern California Keck School of Medicine

Professor McConnell discussed the results of the very large Children's Health Study of the University of Southern California. The study comprehensively examined the lung function over time in a large cohort of children, and it was accompanied by extensive exposure measurements included particulates, nitrogen dioxide, acid vapor, and ozone. The study began in 1994. The Study examined 11,000 children from 10 centers with different pollution burdens and followed them prospectively until they graduated from high school. The study examined multiple health outcomes including asthma, respiratory symptoms, lung development, and impact upon school attendance.

Measurements included particulate matter, nitrogen oxide acid vapors, and ozone. In addition to measurements of pollutants, they determined each study participant's distance from a major roadway and estimated exposure based upon traffic density.

Findings from the studies were very extensive and described in a large series of research publications and other reports.

They reported that asthma, respiratory symptoms, school absences, and lung function development were all adversely impacted by air pollutant exposures. In addition to exposure related effects, personal activities modified the risk: Children with outdoor activities in areas with high ozone levels had a threefold increase in asthma, presumably due to the greater exposure due to their outdoor activities.

They also studied lung growth over time. Particulate matter (PM_{2.5}) exposure was one factor predicting the prevalence of reduced lung function (FEV₁ < 80% of predicted). Interestingly, while particulates, nitrogen dioxide and acid vapors showed effects, ozone was not closely associated with this measure of lung function.

Genetic factors such as tumor necrosis factor alpha variants modify the risk of individuals; this was modification was not homogeneous, but was most notable in the lower exposure areas.

Notably, they found a relationship between the residential location and the likelihood adverse lung function impact. Specifically, distance from a freeway, presumably a surrogate of exposure, was a major determinant of the frequency of asthma. Exposure measurements in this study showed that the amount of particulate exposure fell off as distance from a freeway increased. In addition to ozone, nitrogen dioxide affected the likelihood of asthma. Exposure studies showed a direct relationship between distance to freeway and level of NO₂.

Both the level of local exposure (i.e., distance from freeway) and the regional (across the community) exposures had effects upon growth of lung function in children. Dr. McConnell noted that they had similar magnitudes and that some communities may be particularly affected by both regional exposure levels and by local sources.

The Children's Health Study has made major contributions to understanding the multiple effects of air pollutants. An important component of the study was the focus upon local variation in exposure. In addition to the overall pollutant burden to Southern California or of communities, the Children's Health study was able to assess how much personal exposure was related to proximity to specific sources such as freeways. This has significant relevance to community planning.

CONTROL TECHNOLOGY AND PROCESSES

Is "Clean Diesel" the answer? (Is it both 'clean' and 'practically feasible'?)

Alberto Ayala, PhD

Manager of Climate Change Mitigation and Emissions Research
California EPA-Air Resources Board

Jorn D. Herner, PhD

Air Resources Engineer Climate Change Mitigation and Emissions Research
Division of Research

Tao Huai, PhD

California EPA-Air Resources Board

Dr Huai presented on behalf of himself, Dr. Alberto Ayala, and Dr Jorn Herner of the ARB. Dr. Huai reported that the Air Resources Board has an extensive research program addressing the programs in engine technology and exhaust capture methods.

They noted that diesel has very significant impacts both in terms of gases (nitrogen oxide and reactive ozone) as well as particulates. He noted that his agency has estimated that 2900 deaths per year in California are due to diesel exhaust, comparable to the number of accidental deaths (3700) or homicides (2000).

Particulates were identified as a toxic air contaminant in California; this mandates development of a mitigation plan. A great deal of diesel equipment is currently used in California. The Air Resources Board (ARB) estimates that there are 620,000 trucks and buses, 500,000 pieces of off-road equipment, and 60,000 stationary and portable equipment sources. Overall, the proportional contribution of the several sources differs according to the pollutants of interest. For example, off-road vehicles contribute 75% of the diesel particulate matter but only 17% of the nitrogen oxides.

Engineering control approaches have the potential to reduce emissions. The ARB is using a multifaceted strategy to reduce particulate matter 75 percent by the year 2010 and 85 percent by 2020. His attention is focused both on off-road and on road engines; as better controls are implemented for on road engines, off-road sources have become proportionally more important.

Several strategies will be employed for reduction purposes:

- Establishment and enforcement of new standards for on-road and off-road vehicles.
- A significant reduction in the maximum allowable amount of sulfur in diesel fuel (reducing sulfur content from 500 to 15 ppm).
- The establishment of new Air Resources Board and EPA standards for compliance testing of heavy-duty diesel engines. This will be the responsibility of manufacturers.

- Retrofitting of existing diesel vehicles, including transit buses, refuse haulers, public utility fleets, transportation and refrigeration units; this is reinforced by regulatory standards. To be extended to include off-road fleets and private on road fleets.
- The creation of a multifaceted strategy for applying technology controls. Several methods may be used: (1) retrofitting of existing vehicles such as use of particulate filters, special fuels, etc; (2) repowering replacing older engines with newer ones but retaining the vehicle itself; (3) retiring- taking old diesel vehicles out of service; (4) replacement- purchasing of new vehicles.

The ARB recognizes that technology alone is not the solution. Rather, the state must implement a method for enforcement as well as of facilitating the replacement of older diesel vehicles and equipment, by retiring older vehicles and purchasing new ones. In the limitations in enforcement for heavy-duty diesel engines are currently significant, but both California and EPA are initiating compliance programs requiring manufacturers to establish in use testing (i.e., to help assure that engines remained clean). However, this is likely to impose a significant financial burden on many people in California.

To lessen the financial impact, the state has developed a grant program, Carl Moyer Program. The Carl Moyer Program is implemented by a partnership of ARB and local air districts, that funds the incremental cost of cleaner-than-required engines, equipment, and other sources of pollution. Carl Moyer Program grants provide early or extra emission reductions. It can also accelerate the development and commercialization of advanced emission control technology, accelerate the turnover rate of old equipment to newer and cleaner equipment, and help reduce costs to the regulated community. Projects to reduce emissions from on-road heavy-duty vehicles, idle reduction technologies, off-road diesel equipment, transportation refrigeration units, off road spark-ignition equipment, marine vessels, locomotives, and agricultural engines have been eligible for grants. Legislative changes enacted in 2004 made projects to reduce emissions from other agricultural sources, light-duty vehicles, and on-road fleet modernization eligible for Carl Moyer Program funding as well. In its first six years, the Carl Moyer Program has provided \$154 million in funding to clean up almost 7,000 engines statewide. The Carl Moyer Program has reduced about 18 tons per day of nitrogen oxides (NOx, a smog-forming pollutant), and 1 ton per day of diesel particulate matter

The Air Resources Board has a very active research program to develop and test better technology controls. Their laboratories are conducting research engineering programs to reduce emissions and common equally importantly, efficient methods for measuring particulate matter. There is great research interest to investigate the differences between the measurements in laboratory settings and actual on road conditions. The ARB is proud of its work with dealing with particle sizing measurements. In addition to their own work on ARB collaborates internationally and provide significant funding for university based research.

In summary, Dr.Tao Huai carefully discussed the various technological approaches to emission controls as well as how ARB will combine new regulations with existing methods and research.

Locomotives: Current diesel electric locomotive emissions controls and performance – options and constraints for future controls

David Ducharme

Manager, Global Product Safety & Regulatory Compliance
General Electric Transportation

Mr Ducharme presented an overview of whether locomotive control technology to reduce emissions to acceptable levels engines is feasible. He emphasized the role of General Electric, but he also presented overviews of the entire field of locomotive technology.

Some of the methods applicable to trucks may not be applicable to locomotives. For example, exhaust capture / treatment methods involving combination with urea may be very difficult to apply to locomotives because of space constraints. Most of the space required in locomotives is already used for other purposes, and adding urea tanks would potentially obscure the vision of the locomotive operators. In addition, extensive refueling needs would be presented.

Furthermore, the high exhaust temperatures, > 350 degrees, would potentially create problems. Finally, adding the extra weight for the types and contents were inherently decreased fuel economy of the trains.

Trucks: What are point source controls (now and future)?**William Bunn, MD JD MPH**

Chief Medical Officer and Vice President
Health, Safety, Security and Productivity
International Truck and Engine Corporation

Thomas Hesterberg, PhD

Director of Product Stewardship, Health, Safety, and Productivity
International Truck and Engine Corp

Drs Bunn and Hesterberg presented information about the remarkable advances in methods to control emissions from diesel trucks. With the dramatic reductions in emissions achieved over the last decade, diesel engines now provide an economical means to improve air quality and lessen mobile source impacts on climate change. To comply with increasingly stringent US EPA emission regulations, diesel emissions of particulate matter (PM) and nitrogen oxides (NO_x) have been reduced by more than 90% over the last decade (USEPA 2002). These reductions were accomplished with changes in engine design, lube oils, and fuels (Majewski and Khair 2006). By 2007, emissions of PM were reduced by another 90%, and by 2010, NO_x will be reduced by another 90%. These PM reductions came about mainly from catalyzed diesel particulate filters (DPF) in conjunction with ultra low sulfur diesel fuel. To reach the required NO_x reductions, several technologies, including engine design changes and various exhaust-after-treatment systems (possibly lean NO_x catalysts, lean NO_x traps, or selective catalytic reduction) will be employed.

The new diesel technology employing DPFs has demonstrated 95-99% reductions in PM emissions from school buses, transit buses, and heavy duty trucks (Ullman 2003, Hesterberg 2007, Lev-On 2002). There are additional emission reduction benefits with DPFs. Other regulated emissions, carbon monoxide, hydrocarbons, and non-methane hydrocarbons, are reduced 90-100%. In addition to PM mass, the concentrations of ultra -fine particles in DPF equipped diesel exhaust are lower than levels found in typical urban air (Hill 2005). Amazingly, from a particle stand point, the air leaving a DPF equipped diesel is cleaner than the air entering the engine. Additionally, diesel engines equipped with DPFs provide substantial emission reductions of compounds of toxicological interest including benzene, toluene, ethylene, propylene, formaldehyde, acetaldehyde, polycyclic aromatic hydrocarbons, and chemically related compounds (Ullman 2003, Hesterberg 2007, Lev-On 2002). Emission reductions of these compounds typically range from 50 to 100%. In transit buses, DPF equipped diesels have comparable or better emissions than currently available alternative fueled vehicles such as those using compressed natural gas (CNG) (Hesterberg 2007). Regulated emissions from a DPF diesel are comparable to the best CNG technology with the exception of NO_x and NO₂ which are lower in CNG vehicles. This difference is expected to disappear when both diesel and CNG fueled vehicles have to meet the stringent US EPA NO_x emission requirements in 2010. The emissions of most compounds of toxicological interest are similar between DPF equipped diesels and best CNG technology vehicles. However, Dr Hesterberg noted that CNG vehicles tend to have significantly higher emission levels of formaldehyde and acetaldehyde (Hesterberg 2008).

To assure that new diesel technology emission reductions provide health benefits, an Advances Collaborative Emissions Study (ACES) was launched with the support of industry, government, and environmental organizations (Bailey 2007, Mauderly 2007). The ACES program is investigating potential health effects and emissions from 2007 production engines. ACES will focus on potential health effects, including lung cancer, respiratory tract diseases, and cardiovascular effects. Preliminary data suggests that the emissions from new diesel technology engines will be significantly less irritating and will interfere far less with the lung's natural defense mechanisms against infections (McDonald 2004).

Global warming is becoming a universal concern (IPCC 2007). Various climate models predict potential impacts of higher air temperatures, rising sea levels, and altered rain patterns. The use of transportation fuels is the third largest contributor (14%) of the greenhouse gases after power stations (21%) and industrial processes (17%). Diesel exhaust is associated with components that increase (carbon dioxide, black carbon particles, ozone, hydrocarbons) and decrease (sulfate and nitrate particles) global warming. Diesel engines are more fuel efficient than gasoline engines producing less carbon dioxide emissions per mile driven. The use of biodiesel, a renewable energy source, will reduce the overall greenhouse gas emissions associated diesel engines. Additionally, new technology diesel engines will contribute fewer ozone precursors (hydrocarbons, carbon monoxide, and NO_x) and much less black carbon to the atmosphere. Black carbon increases global warming and when deposited on polar ice caps increases the rate of melting. Both new technology diesel engines and older diesel engines retrofitted with DPFs emit negligible amounts of black carbon. In summary, new technologies have been developed to reduce regulated and non-regulated emissions from diesel engines. Drs Bunn and Hesterberg reported that these emission reductions range from 50-100% and are comparable to or better than alternative fueled engines such as CNG. An ambitious testing program, ACES, is underway to assure that new diesel technology produces no unintended health consequences. Preliminary testing suggests that this new technology will have even less potential health impacts than older diesel technologies. Finally, new diesel technology will help reduce greenhouse gases and black carbon emissions from the transportation sector which will have a positive impact on global warming.

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Railroads: reducing emissions and planning for growth**Mark Stehly, PE**

Assistant Vice President
Environmental & Research and Development
Burlington Northern Santa Fe Railroad

Mark Stehly gave a presentation on "Railroads and Air Quality." The main sub topics discussed included emissions inventories for nitrogen oxides and particulate matter; sources such as locomotives, cargo handling equipment, drayage tractors; and the new technologies proposed for Southern California International Gateway.

The ozone non-attainment areas across the US were reviewed. Many regions are in California as well as major metropolitan areas along the eastern Seaboard, in Texas, and the Midwest are non-attainment. Mr. Stehly stated that mobile source NOx emissions data (SCAQMD) were highlighted showing the relative contribution of trucks (at 21%) and the lower contribution by Trains (2%). PM 2.5 Inventories (SCAQMD) showed a range from highest being Off-road equipment at 7.9% to the lowest (aircraft) at 0.4%. Trains were noted to contribute 0.7%.

The efficiencies of rail vs. truck were examined. One double stack train equals the volume of up to 280 trucks. In addition, trains are 3 to 4 times more fuel efficient than trucks on a ton-mile basis. In terms of NOx emissions, trains are 2-3 times more efficient than trucks on a ton-mile basis.

Looking ahead as new, cleaner trucks and diesel locomotives are phased in, NOx emissions in the South Coast Air Basin for both sources will continue to decrease rapidly on a ton-mile basis.. By 2010, Nox Emissions from locomotives are expected to decrease by 67% from 2005 levels through participation by the railroads in the CARB South Coast Fleet Average Program. The 1998 Memorandum of Understanding (MOU) between the railroads and the CARB have driven significant emission improvements for nitrogen oxides ahead of what would be expected through compliance with EPA regulations.

The MOU signed between CARB and the BNSF and Union Pacific railroads in 2005 has reduced the particulate matter emissions from locomotives and will continue to do so over the next 5 years. Mr. Stehly also alluded to new rules related to locomotives emissions that will be issued by the EPA in the future.

He then discussed some of the specific new technology that is coming on line to further reduce emissions from locomotives. Technologies discussed include LNG and Gen Set switching locos, road locomotive hybrid models which regain momentum energy generated through braking, particulate filters for existing locos, and selective catalytic technology which will greatly lessen NOx emissions on new and retrofitted locos, both switching and long haul.

Mark Stehly then discussed BNSF's proposed new intermodal facility called the Southern California International Gateway (SCIG) which has been designed to take a significant amount of truck traffic off of the I710 by being within 4 miles of the San Pedro ports. SCIG is planned to be one of the greenest facilities of its kind anywhere in the world. As planned, it will incorporate systems such as state of the art (a). electric rail mounted gantry cranes which will eliminate emissions and reduce noise and light. (b). liquefied natural gas yard hostler tractors, which are extremely clean burning. (c). LNG or multi engine hybrid switch engines, which reduce emissions up to 95%. Purchase of 15 ppm sulfur fuel and installing idle control devices on locomotives will also reduce emissions. The facility's close proximity to the Alameda corridor better utilizes the existing RR infrastructure speeding freight through the system. Specially designed traffic flow patterns will keep drayage trucks out of the local neighborhood surrounding the facility.

In summary, Mr. Stehly commented that technology will continue to dramatically reduce emissions from railroad operations. He specifically mentioned new technologies including truck-like diesel engines found in "Gen-Set" yard locomotives which can reduce emissions of NO_x and PM 2.5 by up to 95%. He also mentioned that not all truck engine technologies will be appropriate for all kind of locomotive power needs, but the pollution control technology for all locomotive types is advancing rapidly and will have a great impact in the coming years.

He then commented again on the value of the MOU agreements for environmental control which have allowed for the rail industry to voluntary reduce emissions to achieve results more rapidly and economically. With respect to Federal interstate commerce regulations which regulate railroad the operations and emissions, he made the point that there is a significant difference between regulating stationary and mobile sources, and felt tothat the approaches used for stationary sources would not work with mobile sources.

He concluded by stating that BNSF has already achieved significant emission reductions and will continue to do so working with local regulatory agencies on a time table faster than that of the EPA to maximize the positive impact in Southern California as soon as is practicable.

Differences among rail yards - will one solution fix all?**Harold Holmes**

Manager
Engineering Evaluation Section
California EPA-Air Resources Board

The ARB presentation focused on California's locomotive and railyard emissions. There have been significant developments in California recently to reduce locomotive and railyard diesel particulate matter (PM) and oxides of nitrogen (NOx) emissions. These developments are part of California's integrated approach of federal regulation, statewide agreements and regulations, and the ARB's Goods Movement Emission Reduction Plan and State Implementation Plans to reduce locomotive and railyard NOx and PM emissions by up to 90 percent by 2020.

Some of the key California measures include the 1998 NOx Fleet Average Agreement for the South Coast Air Basin which will reduce locomotive NOx by 65 percent and PM by 50% in the South Coast beginning in 2010, and provide a spill over benefit of about 15 percent for NOx to a number of other areas of the state. The 2005 Statewide Railyard Agreement will provide about a 15 percent reduction in diesel PM emissions in and around railyards by June 2008. The ARB also has a Cargo Handling Equipment regulation which went into effect in 2007 which will reduce diesel particulate matter emissions by up to 80 percent by 2020. ARB has also commented on the need to strengthen the proposed U.S. EPA locomotive rulemaking. ARB also has specific provisions in the State Implementation Plan to accelerate the introduction of Tier 4 locomotives into California, earlier than proposed by the federal rulemaking

Port Trucking: limiting exposure to toxics while accommodating economic growth**Rafael Pizarro**

Senior Campaign Associate
Coalition for Clean Air

Mr. Pizarro put the port operations in a regional perspective. He noted that the LA and Long Beach ports, combined, create the 3rd largest port in the world. Although the port is important for national commerce, a high proportion of goods (about 40%) that come through the LA/LB ports stay in Los Angeles.

Trucking has a central role in the port operations and the community impact, both in terms of health effect and for social/ economic consequences. Understanding the power structure related to good movement is relevant to impact upon health. Major components include:

- industry: shipping companies, retailers, and businesses
- goods movement components
- government : including elected officials, regulatory agencies and port governmental agencies
- public: this includes the general public, environmental activists, labor unions, and local communities

Industry uses several methods to influence the goods movement systems- Financially, they hold power because they have lobbyists and can threaten to remove their business. They also use the for their benefit, using both litigation and lobbying for adjustment of regulations. Industry also establishes relationships with politicians, local business groups, and port officers.

Conversely, the public also has power. While there are large numbers of affected individuals (both the 15,000 drivers who visit the port every day and the large number of pollution affected community members), several factors weaken their position. The drivers, despite their numbers, and or not organized and are viewed as independent contractors.

The ports, trucks, and trains are the cause of 30-40% of the pollution in San Pedro. 15,000 trucks come through the ports each day. Truck drivers earn about \$25,000 a year. The drivers work under adverse organizational conditions. Truck drivers are classified as independent contractors. They compete with each other and do not have the benefits of organized action. They are therefore in a very vulnerable position. The low pay and difficult conditions lead to very high turnover (136% turnover of truck drivers annually by some estimates).

In addition to truckers, the entire logistics workforce is poorly paid and inadequately organized. The workers include many warehouse workers, who are usually underpaid. Many fear active organization. They are located throughout the southern CA region.

Mr. Pizarro should put the port operations-in a larger context, considering the overall logistics industry in Southern California. He noted that improvement of the working conditions of all logistic workers would benefit the entire economy as well as themselves.

REGIONAL PERSPECTIVES***The Financial, Decision-Making and Political Dimensions of Financing and Locating Goods Movement Transportation Facilities in Southern California*****Norm King**

Director - Leonard University Transportation Center
California State University, San Bernardino

Former Executive Director
San Bernardino Associated Governments and Transportation Commission (SANBAG)

Norm King viewed the port and related logistics operations from a macro level. While the port operations are local and regional, they have national impact. Ultimately, the end-user of goods movement is needed a shipping company nor the rail road or trucker; rather, the end user is the consumer who receives the item that has come into the port. Similarly, those affected by goods movement economic activities to extend well beyond the truckers, railroaders, and maritime industries.

Goods movement is subject to many externalities. These are factors that are significant but are only indirectly related. Major externalities include the costs not paid for by end-user but by others. For example, these include the impacts of Air pollution, the cost of highway maintenance, etc.

The externalities increase as the extent of consumer consumption increases. Governmental efforts to remediate the adverse externalities are generally more expensive than efforts to prevent the problems initially.

The ultimate beneficiary of goods movement activities-consumers receiving the products-have very little motivation to change because they have no direct responsibility. Technology further is the separation of the ultimate consumer from those involved in the movement of goods. In actuality, very few people watching eight TV sets in midwest think much about the community associated with the port.

The benefits of goods movement are not distributed comparably to the costs, particularly the indirect costs. (I.e., while the direct cost of shipping a television from Asia to Kansas is borne by the purchaser, the cost of externalities such as air pollution related disease is not passed on to the consumer). The poor consume a disproportionately lower amount of goods and have finite resources; however, they disproportionately suffer costs of externalities (e.g. air pollution).

Port related goods movement is a major economic force in Southern California. However, it has more than regional impact- 43% of goods leave area directly by train. In addition to creating local jobs for local delivery, transportation outside the area also creates some local jobs.

Many of the jobs are related to " Deconsolidation"- removing individual items from the large shipping containers and repackaging them for subsequent shipment, often outside the area by truck or train. It is estimated that 35% of train loading involves deconsolidation. Many shippers prefer this approach to despite the added labor and effort. The deconsolidation permits shippers defer until to 3 days prior to docking to decide where they are going to ship their goods; this contrast with 25-40 days of advanced decision for directly ship items.

Freight may be considered both "good" and " bad". Good freight confers many economic benefits and provides jobs. One in 12 Southern California jobs is related to transportation. Conversely, "Bad freight" has both negative health and economic effects. In addition to the health effect, there are many adverse regional

transportation impacts. For example, port trucks and trains slow traffic by 30-40%. CA residents pay for new transportation facilities, road maintenance, etc. through sales tax - truckers and trucking companies do not pay the sales tax that supports their infrastructure. Large trucks produce significant impact upon roadways- one truck has the same road impact as 10,000 cars.

From the perspective of a large-scale economic viewpoint, which considers the overall benefits and costs on a large-scale, there are several potential solutions. In particular, solutions should recognize the true externalities and costs and allocate them appropriately. Several approaches might include separated truck lanes from the general traffic; this could help off-set external costs and allow more corporately identifying the trucking specific costs. Recognizing the many indirect costs that might be appropriately transferred, charging container fees (i.e. user fees) would facilitate more explicitly charging for and paying for the externalities. Improved infrastructure to improve the flow of goods and relieve traffic congestion and would be of benefit to the general public, and the reducing the impact of the indirect costs of goods movement.

From both an economic and a governmental policy standpoint, Mr. King emphasized the importance of a progressive outlook. In very significant financial investments are necessary to improved infrastructure, protect against health effects, and facilitate regional national economic functioning. They concluded that the current governmental approach, in which government directly pays for most of the necessary services and facilities is unlikely to be successful. Government has inadequate resources and lacks the organizational drive to truly solve the problems. A completely rational approach, in which the end-user pays the cost of mitigating /preventing adverse effects, is necessary. Such an approach requires a identifying the externalities and developing the means to charge them to the ultimate beneficiaries of port related logistics.

(A detailed report prepared by Mr. King is included in the appendices and the online documents).

What are the regional social and economic implications of port-related transportation activities?**Goetz Wolff, MA**

Lecturer
Department of Urban Planning
UCLA

Executive Director
Harry Bridges Institute
Head of Global Logistics Project

Quality of Life vs. Economic Development:

There are several classes of considerations and Mr. Wolff's presentation presented an overview of the broad context in which the transportation occurs. What is more important for a community: Clean air, economic development, worker health, an abundance of good jobs? (What makes a "good" job?) How do communities create a balance between strong economic growth and the health and welfare of their residents and local workers? What does the future hold for communities along the surface goods movement route, where container traffic is continuously increasing?

Trends in Employment in the Logistics Industry:

Port operations and port related transportation are only part of logistics industry. The number of containers through the port has been steadily increasing, which has created a need for more workers. Subsequently, there has been an increase in port-related trucking/employment. Mr. Wolff noted that warehouse operations employ many workers.

There has also been a 25% increase in employment for warehouse and storage workers (between 1995 and 2005). In direct opposition to these trends, there has been a decline in the number of people working on the railroads (between 1984 and 2001).

There is a wide disparity of pay between surface goods movement workers. Longshoremen can make up to \$30 an hour, while non-union warehouse workers make only \$8.50 an hour. "Economic Apartheid": With the current conversion to inland ports, there has been a further decline in wages, thanks to the changes in location and jurisdiction of jobs. Relative to other segments, the warehouse workers are particularly poorly paid.

Inland Ports:

"Inland Ports" are areas that conduct large amounts of goods transfer, but are not physically located on water. The NAFTA superhighway has been created to bring goods north from ports in Mexico into the United States. Kansas City, Missouri is slated to become a major inland port along the superhighway. Along with the aforementioned decline in wages, the conversion to inland ports has other impacts on the local environment and economy. There is an ongoing escalation of traffic congestion and sprawl along the truck routes, as well as an increase in the amount of air pollution that goes hand-in-hand with such heavy vehicle traffic. There is also the potential for mega-retailers to buy their own ports and shipping lines.

What policies (both financial and personnel) will improve trucking equipment and working conditions?

Kristen Monaco, PhD

Professor
Department of Economics
California State University, Long Beach

The Organizational Structure of Port Drayage:

There are hundreds of firms involved in port drayage. They include everything from the ocean carriers that ship foreign goods from other countries for delivery to the ports of LA and Long Beach, individual truck drivers who move goods throughout the Los Angeles Basin, railroads, dock operators, etc. Another very important part of the Southern California ports' system are the harbor drayage companies that serve as brokers between the carrier companies and the port truck drivers. Unfortunately for many workers, port drayage is not a competitive market as far as wages are concerned. Unionized workers (such as longshoremen and port clerks) make a competitive wage, while non-union workers (such as the short-haul port truck drivers) earn little money.

Short-Haul Truck Drivers Stats:

Most of the drivers involved in port drayage are individual owner/operators. The bulk of them are also recent immigrants, without the ability to unionize and fight for higher wages. Because of the low margins and sub-par wages, increasing costs of diesel, truck maintenance, and environmental retrofitting programs hit the drivers especially hard.

Driver Demographics:

Two select surveys of drivers provide useful demographic information. Selected results are summarized below:

2004	2006
Hispanics = 92%	Hispanics = 91.2%
US Citizen = 57%	US Citizen = 56%
Education : High School Diploma	Educ. : Less than H.S. Dip.
Mean Age = 40	Mean Age = 39
Mean years as driver = 8.5	Mean years as driver = 8.7

2004	2006
# own their trucks = 81%	# own their trucks = 83%
Days worked = 5	Days worked = 5
Daily hours = 11.2	Daily hours = 13.25
Hourly gross = \$19	Hourly gross = \$25
Mean annual net income = \$29,903	Mean annual net = \$34,749

2006	Mean
Truck expenses = \$450/wk	\$500/wk
Insurance = \$600/mo.	\$606/mo.

Maintenance = \$5,000	\$7,044
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Truck Retrofit Program:

Most of the trucks owned by the short-haul owner/operators were built in 1998 or earlier (75%), and 25% were from 1994 or earlier. The average age of trucks at time of purchase was 7 years.

For financing, many of the truckers opted to pay cash (24%). Another 17% borrowed money from family members, with trucking companies owning 11% of the vehicles. However, the highest proportion of the truckers purchased their vehicles with bank loans (47%). Truck loan repayment averages approximately \$892 per month.

Recently, a truck retrofit program has been adopted as an environmental protection measure against gross polluters. These diesel particulate matter filters are very effective in reducing emission created by the large diesel engines, but they also come at a cost: \$16,000 per filter. For many owner/operators whose margins are extremely low, the cost is too high for many truckers.

Truck Replacement Program:

At some point in the near future, owner/operators will be required to get rid of their vehicles entirely, and replace them with more environmentally friendly trucks. A new truck comes at an even higher price - \$100,000.

There is currently a program in place to assist truckers in purchasing new vehicles: the Carl Mayer Grant Program. Unfortunately, it covers only 80% of the cost to purchase a new truck. Owner/operators are then responsible for the remaining \$20,000, compromising tax, license, and registration.

A survey of port truckers' opinions about several possible purchase programs showed that most still prefer direct ownership:

	Grant	Lease	Subsidized Interest rate	Traditional
1	48.8%	8.4%	34.5%	9.1%
2	15.5%	16.8%	45.2%	22.9%
3	16.1%	32.9%	32.9%	36.1%
4	19.6%	41.9%	41.9%	32%

With virtually no market power and increasing emphasis upon reducing impact upon the environment as a priority, many owner/operators worry about their future in the industry. With low margins, they cannot afford to either replace or retrofit their trucks. Although the grant program promises to cover much of the cost to replace these diesel vehicles, and subsidized interest rates may help by spreading the increased costs over time, major concerns remain. The financial future does not look bright for the non-union, independent contractors who are central to the current port drayage system.

DRIVING FORCES FOR CHANGE

What do the county and city governments want and need?

Honorable Tonia Reyes Uranga

City of Long Beach Councilmember, 7th District (Long Beach)
 South Coast Air Quality Management District Governing Board Member
 Port of Long Beach Harbor Commission Member

Introduced by:

Fred Dominguez, MD, MPH

Assistant Professor
 Department of Family Medicine
 Charles R. Drew University of Medicine & Science

Long Beach 7th District:

Tonia Reyes-Uranga is a long-time member of the Long Beach City Council, representing the 7th District, located in the western part of the city. Ms. Uranga spoke about the needs of the city and county governments, about air pollution, focusing on the areas surrounding the Ports of Los Angeles and Long Beach.

Ms. Uranga's 7th District has many sources of pollution. It is bordered by oil refineries, the Terminal Island Freeway, and rail yards on the western edge; the 405 freeway on the eastern edge; the 710 to the north; and the port to the south.

Health Impacts:

Surrounded by multiple highly visible polluters, the residents of the 7th District are extremely concerned about how air quality is affecting their health. They believe there has been documentation of cancer clusters, increases in asthmatic incidents, and a large number of school absences due to respiratory illness in the area.

The local community looks to its city representatives for answers regarding air pollution, but the city government is limited in its capability. It mainly works as a liaison between the port-affiliated businesses and the community, and has limited authority over local industry, including the ports, trains, trucks, etc.

There are multiple overlapping jurisdictions. The ports of LA and Long Beach have responsibility for the facility itself. The state (via Caltrans) has control of the freeways, including the Terminal Island Freeway, which transports between 600 and 800 trucks per hour. The California Air Resources Board (CARB) and the EPA have authority over mobile sources. Hence, while her constituents expect rapid and visible solutions from the city council, the city's ability to respond is actually quite limited.

Green Industry the Goal in Long Beach:

The City of Long Beach wants cooperation and coordination between the city government and local industry. Long Beach would like to see green industry and growth, and wants proof that industry is making a real move towards that goal. With 710 Freeway traffic expected to triple by the year 2020, and large ships coming into port that create more pollution than a million cars, the city and its residents are deeply concerned about local pollution – especially in light of the fact that there are 2,400 local deaths a year due to air pollution.

Perceptions:

The community members feel they are suffering from numerous effects and are particularly subject to high exposures. At the same time, they do not believe that the agencies responsible for protecting their health

are acting quickly enough. The city council has very limited ability in itself to control the polluters. In particular, Ms. Uranga emphasized the urgency for the multiple agencies to present a clear plan for fixing the problems. Even if full implementation will take several years, clearly communicating such a plan will help assuage many concerns that nothing is being done.

Strengths and limitations of Regulation and Enforcement?**Paul Jacobs**

Chief, Mobile Source Enforcement
California EPA-Air Resources Board

Mr. Paul Jacobs discussed the regulatory compliance approaches. Simply developing regulation does not in itself reduce exposures. Enforcement is challenging, particularly for mobile sources. ARB uses a multifaceted approach to reduce diesel emission, combining regulation, compliance enforcement with financial penalties, and incentives to comply. The diesel risk reduction plan calls for an 85 percent reduction by 2020.

Equipment Certification, will be implemented soon: 2007-2010 fuel standards with reduced sulfur were implemented in 2006.

In use programs will help assure compliance. Operational controls, affecting how diesel trucks and other could operate include reducing idle time to five minutes.

Vehicle inspection will identify those with excessive visible smoke and those with evidence of any tampering with control equipment.

Funds acquired from the findings will be applied to improve diesel reduction programs.

In addition to compliance activities of the regulators themselves, large fleet owners will have major responsibility for performing inspections on their own fleets.

*San Pedro Bay Clean Air Action Plan***Ralph Appy, PhD**

Director, Environmental Management
Port of Los Angeles

Dr. Appy reviewed the history of the ports. The port began in 1899 and was annexed to LA in 1907/09 and became a proprietary dept. of LA City at that time. The port Los Angeles has grown enormously since then there it is now includes 43 mi. waterfront, and receives over 2500 vessels annually. The port operation has great financial significance, including \$369 million of operating revenue based upon \$190 billion of cargo value. The port creates 16,000 local jobs as well as being responsible for over a quarter million regional positions. The activity of the ports expected to grow considerably (e.g., from 13.6 in 2005 to 35.3 TEU's in 2020).

There are several Regulatory authorities with responsibility for the port area. These include the International Maritime Org., US EPA (ships, locomotives, trucks), the California Air Resources Board (trucks, yard equipment, harbor craft), regional pollution control agencies such as the Southtrust Air Quality Management, and the port authorities themselves.

Many parts of the port operations contribute to their pollution burden. For example, there are several sources of diesel particulates, which of an estimated to be attributed as follows: 59 percent from ocean vessels, heavy-duty vehicles-10%, locomotives-6%, cargo handling-14%, and small craft -- 11%. Conversely, and emissions of sulfur oxides are largely from ocean going the vessels, which are responsible for 90%. The port related operations account for a significant (12%) of the diesel particulate matter released in the region.

To address the concerns about port related solutions, the ports of Long Beach M. Los Angeles have combined efforts to create a Clean Air Action Plan (CAAP) following an initial summit in 2006. The Plan was approved in November, 2006. The CAAP and combine exposure control for minimization of health risks with permitting further port development. The CAAP is particularly significant because it represents one of the first major collaborative efforts of the ports of Los Angeles and Long Beach.

The plan includes three distinct levels of standards: One were for specifically to be San Pedro Bay area, another applies to approving individual projects, and the third deals with source specific standards for individual pieces of equipment. Major component of the plan will be implemented over a 5 year commitments time.

Major efforts will be made to reduce pollution from port related trucking. This includes replacement or retrofitting and providing the infrastructure for use of alternative fuels. Funding will include an estimated \$206 million. The second major component is the requirements that ocean during vessels comply with reduced sulfur fuels, powering using short based power while at the dock, establishment nitrogen oxide and particular controls on vessels, and speed reduction for the vessels. According to plan, rail roads must also comply with the standards for both line haul and switcher locomotives; the rail roads must also meet more stringent standards for New and existing yards. Old areas from proven include better cargo handling equipment, improved efficiency, and new source testing.

Trucking will mandate meeting EPA standards and subsequently using a significant proportion of non diesel vehicles (such as liquefied natural gas powered). Bro roads will need to replace the switcher engines with the tear to engines including diesel particulate filters. By 2011, switchers must in and roof nitrogen oxide and particulate controls, carefully limit widely in time, and switcher fuels.

By 2014, class one locomotives must meet more stringent standards for performance and operation procedures.

The proposed plan would reduce particulate matter from trucks by 782 tons per year, from ships by 331 tons per year, and from switchers by two tons per year. The plan should, if successful, not only avoid more pollution from projected growth, but would also bring emissions below the 2001 levels. If mitigation systems or put in place as plan, be mitigated project will have less than a 10 in one million excess cancer risk. Currently, ships annexed dock or responsible for approximately 60% of the cancer risk, but with mitigation, this will account for only 10% to be significantly reduced risk. The proportion of risk for trucks will remain about the same (13%-15%).

The CAAP is not a completed in single time effort; it will be modified incrementally as necessary. In addition, implementation will require changes in tariffs, changes in lease agreements, and financial incentives.

In summary, the Clean Air Action Plan is a comprehensive plan to control all aspects of pollution emissions from the port operations while allowing continued to gross in capacity.

How can dialogue best be facilitated among scientists, community members, rail/truck workers, community clinicians, and policymakers?

Andrea M. Hricko, MPH

Associate Professor of Preventive Medicine
Keck School of Medicine, USC
Director, Community Outreach and Education
Southern California Environmental Health Sciences Center & Children's Environmental Health Center

Ms Hricko commented based upon her extensive experience with environmental issues and her role in the University Of Southern California Environmental Health Sciences Center. She emphasized the importance of legitimate communication. Government, universities and large non-profit organizations should facilitate open and honest dialogue. These institutions may have particular capabilities to facilitate this.

The concerns about transportation related health effects are not solely a local issue - trucks and trains travel throughout the country. Nevertheless, there are unique issues affecting many groups in Southern California. Local communities adjacent to the port as well as local communities adjacent to major transportation routes have particular impact, but the entire region is also affected by air pollution.

In the past, the ports have not been fully forthright with the surrounding communities, and it is particularly important to establish trust. Several steps are needed to facilitate meaningful dialogue.

First, established scientific evidence should be acknowledged. There are good data showing that air pollution is a health risk. Studies include epidemiologic studies, cancer maps (showing greater local concentration of oral-pharyngeal cancers near a freeway leading from the port), studies of lung development, and cardiovascular risk investigations. Rather than denying health effects, all should accept the scientific evidence and move forward.

Second, public participation is critical. Both outreach to communicate information and efforts to obtain public input is necessary. This should be done with respect for all involved. Failure to do so can be adverse. For example, outreach concerning the freeway 710 expansion was mishandled. There was outreach to ports and the Automobile Association but not to local residents who would be most impacted.

Third, scientists can learn from community residents if they listen to their concerns.

Fourth, land use guidelines that were developed for the protection of public health should not be ignored. Any changes should consider the added burden, particularly for neighborhoods that already have extensive transportation pollutant related burdens. (e.g., a new dock rail yard near a neighborhood that is close to the 710 freeway).

Fifth, empirical data, particularly community monitoring results, should be considered. There are good data showing that temporary cessation of port operations reduced local pollution levels.

Sixth, establishing trust requires relying upon available evidence and not simply "recycling" old arguments. There is a long history of claims that improving/enlarging infrastructure for goods movement will reduce pollution or congestion. In actuality, increasing capacity has led to increase utilization. Thus, arguments that bigger freeways, larger bridges, and more local rail yard will improve efficiency and thereby reduce movement throughout Southern California must be considered questionable. History suggests that such construction projects will simply lead to higher utilization without any net reduction in congestion or emissions. For example, improvements in the 710 freeway in the 1990s simply led to greater volume of traffic.

Finally, the presentation concluded that similar issues are relevant outside Southern California as well. Specifically, both Arizona and Kansas are facing questions about logistics related construction.

DISCUSSION SECTIONS

In addition to the formal presentations, there was very extensive discussion among at the participants. The discussions were forthright and conducted with professional demeanor.

Major themes of these unstructured discussions included:

- There was discussion about interpretation of the schoolbus emissions study presented as part the trucking technology controls. In particular, the relative benefits of alternative fuels was somewhat moot. Some presenters and audience members felt that there was a clear rationale for such alternative fuels, others felt that there were inadequate data to inform policy, and yet others noted that some alternative fuels may actually worsen the pollutant load.
- The impact of diesel exhaust on lung cancer risk received extensive discussion. Some discussants emphasized the currently existing studies as being adequate for standard setting. Conversely, others raised questions about significant residual uncertainties (e.g., accuracy of exposure assessment, adjustment for confounders) and wondered whether the data are sufficient to estimate a risk slope factor within a precision to be meaningful. Some advocated for rapid change, and others considered the need for caution to avoid decisions based upon incomplete information as there will be more studies in the future.
- Another theme related to planning and communication. While some emphasized the progress being made in implementing policy and controls, others noted there were extensive delays in the past. Questions of intent were raised. There was much discussion concerning the site related risk assessment process; some felt it was inadequate, and others noted that the irritative process of risk assessment and design modification is effective.
- The organization of the work force was extensively considered. Some noted that there was a need to focus on the truckers directly involved in entering the port area, whereas others felt that labor issues must be considered more broadly as part of the Southern California region. In addition, there was discussion about the role of the trucking industry and its organizational structure.

Overall, the discussions were lively and facilitated understanding across different perspectives.

Wrap-Up-Synthesis and Steps Forward

Philip Harber, MD MPH

While air pollution in Los Angeles has markedly improved over the past two decades, challenges remain in the largest single sector leading to uncontrolled air pollution. Two adjacent ports -Long Beach and Los Angeles.- ports are the largest in United States and fourth largest in the world. They constitute a major economic driver for CA and represent the major US link to Asian trade.

The port operations are extremely complex and have been difficult to control. Significant problems are related to the size of the operations and to their complexity. While they are physically limited to a specific geographic location, the operations have widespread implications for the region, nationally, and internationally. About half of the freight brought into the port remains in CA, and the remainder is distributed throughout the United States. Further, the combined ports account for significant U.S. exports to Asia and elsewhere. Economically, the ports account for an estimated 10 percent of the regional employment, largely through indirect activities such as surface logistics.

In addition to the role as economic factor, the pollutants related to the port affect the entire geographical region to a significant degree. They are particularly difficult to control because of regulatory overlap.

Geographic Determinants

The presentation emphasized the results of the Childrens Health Study. The size of the study population and the length of follow-up permitted clear demonstration that significant health effects occur even at current regulatory levels. In addition, children represent a particularly sensitive population; the effects of exposures during their period of lung growth will persist.

Several important studies emphasized the need to consider geographic location- both at a regional scale and on a more local level. Personal risk is very clearly driven by location of residents. In addition to large-scale geographic determinants of exposure effects, smaller scale variations have impact- for example, proximity to a freeway very significantly affects the likelihood of impact on lung function.

On a more regional scale, the eastern areas, such as Riverside and San Bernardino Counties, receive transported pollutants generated elsewhere because of prevailing winds.

Health Effects

Multiple distinct health effects have been shown. These include effects upon the lung growth, development of asthma, and respiratory symptoms, and malignancies. These effects have been shown in relation to multiple pollutants. Because of the associations (correlations) among exposures, there is still some ambiguity about linking specific exposures to specific outcomes.

Communication at multiple levels is necessary

Several speakers addressed communication needs. City Council member Urega underscored the complexity of communication needs. While an elected official of a major city, she reported frustration dealing with the many levels of government involved. Many of the pollution control policies are established at the statewide level, with little coordination at the local level. In addition, even a "regional" air pollution control district (South Coast) does not interface closely with the City Council or its environmental committee.

The community "expects answers", but they have received few. While the regulatory process requires discussion and periodic hearings and has a long time horizon, constituents report "seeing no change" while they continue to be exposed to air pollution.

Time for Implementation

The time frame of change is a significant problem: The different groups have markedly different perspectives on the time course. Community members expect rapid changes and improvement they can discern. They respond to the immediacy of the perceived children's illnesses and the visible presence of overtly polluting trucks and trains. Conversely, regulators require a time-consuming process of proposal, review, modification, and public hearings.

Both financial and social factors affect the time frame. Change at the level of work organization takes years, and purchasing new mobile equipment (i.e., trucks and locomotives) also must be implemented over a period of many years. (The Clean Air Action Plan Proposal to eliminate older, more polluting trucks has an aggressive time frame of five years). Replacement of locomotives may require even more time since the typical life span of the locomotives is so much greater. Finally, major relocation of facilities may take decades.

The community has been often told that the problem will be improved, but they have seen little action. Elected officials must have a clear plan they can deliver to their constituents. Even if a plan may require many years to be fully implemented, elected officials have a clear need to deliver something that their community members can well understand. Their need for immediacy contrasts with the need for process of regulatory agencies and the strategic capitalization needs of the industries.

Community Needs

"Community" represents both those who work in the ports and those who are affected by its adverse effects. The perspectives of these community elements may differ significantly.

Effective minimization of exposure requires collaboration with the affected community groups. Credibility issues can limit achievement of effective implementation. Some speakers emphasized the importance of the port's history in relation to its community: Although the port authority is now aggressively developing and implementing control measures, historically, the port was strongly in favor of development. of their work, balance between health risk minimization and economic development was not prominent among the port authority plans of the past. There have also been concerns about the credibility of several of the regulatory agencies involved. Some questioned whether they have effectively sought resolution of problems quickly enough.

Complexity of relationships:

Implicit in the meeting is the description of the numerous agencies involved. Regulatory agencies should carefully define the authority and responsibilities of each entity. Understanding of the interrelationships is complex, and many of the impacted community members do not fully understand the limitations of each agency. Furthermore, the agencies themselves have had relational problems. For example, the Clean Air Action is a one of the first efforts successfully carried out jointly by the adjacent two port authorities, even though they are closely associated geographically. Statewide agencies (e.g, CARB) and regional agencies (eg, SCAQMD) must consider that their actions have wider scope than just the port,

Economic drivers:

Several persons addressed economic drivers. Dr. Monaco, Mr. Pizzaro, and Mr. Wolff provided insight into the economic structure of the truckers involved, whereas other speakers took a much greater "macro" view and discussed the large-scale externalities. Mr King emphasized that the port operations must be viewed in relation to regional, national, international needs. When considering the costs, one might wish to allocate them appropriately among these levels. (For example, the cost impact of health effect on a resident in the neighborhood surrounding the port should be borne partly by the purchaser of an imported TV in the Midwest).

Control Approaches:

Trucking represents the most significant source of uncontrolled emissions; it also is the logistic element for which the most feasible technological control is available. Nevertheless, "Clean diesel" trucks or alternative fuel for trucking is the most difficult problem to solve because of the economic and social structure

At the current time, 16,000 to truck calls are made daily into the ports Los Angeles and Long Beach. Those operating truckers are largely self-employed, small operators. They have limited capitalization and therefore cannot easily purchase the more modern equipment. Thus, the critical element for analysis in the control of trucking emissions depends upon the economic organization rather than upon technology development or toxicology studies.

Work Organization

In addition to the need to replace older equipment, organization of work the must be considered. In the current situation, truckers queue (lineup) for many hours prior to entering the port to receive a load. During the queuing time, the diesel engines are operating in idle for many hours. Several hours of emissions occur for every hour of actual load carriage. Furthermore, because they are paid for a load, this inefficiency leads to reduced income and reduced ability to pay for equipment retrofit or new equipment. Nevertheless, because the industry is structured to include very large number the independent operators competing with each other, there is little capability of remediating the situation unless the fundamental industry structure is changed. The costs of pollution are offset by the lower costs of items delivered and the low income and poor health benefits of the truckers..

Railroads

Unlike trucking, there is controversy about whether technology control engineering development can be adequate for controlling locomotive admissions. There were several speakers from the railroad industry. One locomotive manufacturer felt that technology control would be difficult to achieve. Railroaders (both equipment manufacturers and railroad operators) felt that there is no immediately available major step forward in control technology. The railroad representative indicated that despite very significant capital investment, technology has not inadequate. Use of hybrid and more efficient engines nevertheless, can make incremental gains. Rather, they suggested that incremental approaches may be effective. However, other railroad speakers noted that alternative power systems may contribute to controls. In addition, careful control of idling will reduce emissions.

Unlike trucking, railroads are well capitalized, few in number, and pay employees well.

Conclusions:

The conference concluded that problems can be solved by a combination of incremental change, policy changes, and scientific and engineering efforts. No single approach alone will be adequate.

Biographies of Speakers**Philip Harber, MD MPH**

Professor & Chief
Division of Occupational & Environmental Medicine
Department of Family Medicine, UCLA

Dr. Harber holds a bachelor's degree from Muhlenberg College and an MD from the University of Pennsylvania. He subsequently trained in Internal Medicine, Pulmonary Critical Care, and Occupational & Environmental Medicine at Johns Hopkins University. Dr. Harber has been on several Center for Disease Control & Prevention (CDC) and National Institute of Occupational Safety Health (NIOSH) committees overseeing occupational, environmental and pulmonary diseases. Dr. Harber's research interests include pulmonary effects of several toxicants, including asbestos and beryllium.

Jean Ospital, DrPH

Health Effects Officer
South Coast Air Quality Management District

Dr. Ospital received his bachelor's degree in Chemistry from UC Santa Barbara and an MPH and PhD from UCLA. He has been on the faculty at UCLA where his area of expertise centered on the pulmonary health effects of air pollutants. He has also served as a consultant to the Environmental Affairs and Research & Development divisions of Southern California Edison. Dr. Ospital has been the Health Effects Officer for the South Coast Air Quality Management District since May 2000.

John Balmes, MD

Professor of Medicine, UCSF
Chief, Division of Occupational and Environmental Medicine
San Francisco General Hospital (SFGH)
Director, Center for Occupational & Environmental Health (COEH) of Northern CA

Dr. Balmes earned his medical degree and trained in Internal Medicine at Mount Sinai School of Medicine in New York City. He subsequently completed a fellowship in Pulmonary and Occupational Medicine training at Yale. Dr. Balmes has a long history of investigating air pollutants and its inflammatory and pulmonary health effects.

Alberto Ayala, PhD

Manager of Climate Change Mitigation and Emissions Research
Division of Research
California EPA-Air Resources Board

Dr. Ayala received a Ph.D. in Mechanical Engineering from the University of California, Davis. He was an Assistant Professor of Mechanical and Aerospace Engineering at West Virginia University, and is currently the Manager of Climate Change Mitigation and Emissions Research at the California EPA-Air Resources Board where he conducts research on emission control technologies for mobile and stationary sources.

Jorn D. Herner, PhD

Air Resources Engineer
Climate Change Mitigation and Emissions Research
Division of Research
California EPA-Air Resources Board

Dr. Herner received a Ph.D. in Civil and Environmental Engineering from the University of California, Davis. He is currently an Air Resources Engineer in the Climate Change Mitigation and Emissions Research

Section of the Research Division at the California EPA-Air Resources Board. Dr. Herner is part of a research group that is the chief unit at CARB leading mobile source emissions research, with emphasis on the characterization of ultrafine particles.

David Ducharme

Manager, Global Product Safety & Regulatory Compliance
GE Transportation

Mr. Ducharme is currently the Emissions and Product Safety Compliance manager for General Electric's Transportation business in Erie, Pennsylvania. He has a Bachelors of Science Degree in Electrical Engineering from Texas Tech University and has 25 years of systems engineering design and engineering management experience in technology areas ranging from space based radar to new locomotive design and development. Mr. Ducharme was directly involved with the development of General Electric Transportation's Evolution Locomotive which was designed to meet the most stringent US EPA locomotive emissions standards.

William Bunn, MD JD MPH

Chief Medical Officer and Vice President
Health, Safety, Security and Productivity
International Truck and Engine Corporation

Dr. Bunn received a BA, MD and JD from Duke University. He subsequently completed a residency in Internal Medicine and a fellowship in Occupational and Environmental Medicine also at Duke. Dr. Bunn has been on the faculty at Duke University, Yale, Northwestern, and the University of Cincinnati College of Medicine. He is coauthor/editor of 5 books and has authored more than 100 scientific publications. Dr. Bunn is also on the editorial boards of several scientific journals, including Occupational Medicine and The Journal of Health & Productivity Management.

Mark Stehly, MS PE (Professional Engineer)

Assistant Vice President
Environmental & Research and Development
Burlington Northern Santa Fe Railway Company

Mr. Stehly earned his BS in Civil Engineering and a BS in Forestry. He also holds an MS in Water Resources from State University of New York at Syracuse University. Mr. Stehly has thirty-four years of railroad environmental engineering and hazardous materials experience. He manages the environmental and hazardous materials team for Burlington Northern Santa Fe (BNSF) Railway Company. This includes the railroad environmental compliance programs concerning air, noise, water pollution, groundwater contamination, and hazardous waste for the safety of the employees and the public. He manages the environmental remediation efforts of the company. He is responsible for the hazardous materials and community right-to-know compliance programs. He coordinates the railroad's program for hazardous materials emergency response including issues related to security and anti-terrorism. In addition, he also is responsible for their technical research and development efforts. This includes research on fuel consumption, track strength and life, track-train dynamics, train control systems, and investigation of derailments. Mr. Stehly has written several papers on train resistance published in American Society of Mechanical Engineering Proceedings. Other articles include treatment and disposal of wastewater sludges and groundwater contamination at railroad facilities. He contributed to the Association of American Railroads' Hazardous Materials Symposium on Handling Distressed Tank Cars and AAR's First Hazardous Materials Seminar. He authored a paper entitled "Energy and Environment: The Railroad Perspective" for the National Research Council's Transportation Research Board. He is BNSF Railway Company's primary representative for the railroad industry effort on locomotive emission regulations.

Harold Holmes

Manager of Engineering Evaluation Section
California EPA-Air Resources Board

Mr. Holmes holds a BA in Social Science/History from California State University, Sacramento. He has over twenty-five years of experience with the California Air Resources Board (ARB). He currently serves as Manager of the ARB's Engineering Evaluation Section (EES) which develops and implements the ARB's railroad agreements and regulations. These efforts include implementation of the 1998 Locomotive Oxides of Nitrogen (NOx) Emissions Fleet Average Agreement (standard must be met by 2010) and the 2005 Railyard Diesel Particulate Matter Agreement (currently being implemented). Both of these Agreements were entered into between the ARB and Union Pacific Railroad (UP) and BNSF Railway (BNSF). As part of the 2005 Agreement, EES staff are preparing health risk assessments for 16 major railyards by the end of 2007. To support both Agreements, EES staff also provides emissions verifications for advanced technology locomotives and hosts semiannual locomotive technology symposiums.

EES staff is also responsible to implement the regulation that extends the use of CARB diesel fuel to intrastate locomotives, a regulation which became effective on January 1, 2007. As required by AB 1222 (Jones-2005), EES staff currently supports implementation of the Locomotive Remote Sensing Pilot Program to evaluate the feasibility and cost-effectiveness of using remote sensing devices with locomotives. EES staff also provides technical support related to locomotives and railroads for other ARB efforts such as development of comments and measures for: 1) U.S. EPA's locomotive rulemakings, 2) ARB's Goods Movement Emission Reduction Plan, 3) ARB's Carl Moyer and Air Quality Bond programs, 4) ARB's locomotive and railyard emission inventories, and 5) the State Implementation Plans.

Prior to his current position, Mr. Holmes has also worked on the development and implementation of New Source Review and Indirect Source Review statewide guidance, California's Phase 2 and Phase 3 reformulated gasoline regulations, and the Statewide Portable Equipment Registration Program (PERP).

Rafael Pizarro

Senior Campaign Associate
Coalition for Clean Air

Mr. Pizarro recently joined the Coalition for Clean Air staff as a Senior Campaign Associate based in Los Angeles. He is a veteran of community and labor struggles in New York, where he was born and raised, and in Los Angeles, where he has lived with his wife Carolina for eleven years.

Rafael began organizing with Local 1199, SEIU, New York's health care and human services union. He led the successful fight to save Boriken Health Center, a vital health provider in East Harlem, and was the lead organizer for the largest rally in the U.S. to date in support of universal health care (40,000 participants).

In Los Angeles, he has worked for various labor union locals, began working on behalf of environmental and community causes and also developed a writing career. He created and led the A+ Coalition to convert the Ambassador Hotel into a school site, secured free media supporting the successful passage of Proposition O for Clean Beaches and Water, and worked as Communications Director for the newly formed LA Neighborhood Land Trust. He has published news and creative pieces in various publications and edited the Union Street News, the magazine of LA's public workers union. In 2000, he was awarded an Emerging Voices Fellowship from PEN USA.

Norm King

Professor & Director, Leonard University Transportation Center
California State University, San Bernardino

Mr. King became the first Director of the Leonard University Transportation Center at California State University, San Bernardino in January, 2006. The center is a newly established "Tier II Center" promoting research and outreach on transportation issues of the Inland Empire. Mr. King served as Executive Director of San Bernardino Associated Governments (SANBAG)/San Bernardino County Transportation Commission and the three additional SANBAG related authorities from August, 1996 to his retirement in December, 2005. He was a City Manager for 20 years serving the Cities of Claremont, Palm Springs and Moreno Valley. His articles on the management and economics of local government have appeared in several professional journals and books. He is considered a leading proponent of "demand management" and "market-based" public policies.

Goetz Wolff, MA

Lecturer
Department of Urban Planning, UCLA
Executive Director, Harry Bridges Institute

Mr. Wolff earned a M.Phil in Political Science from Yale and an ABD from UCLA in Urban Planning. He is currently a Lecturer in the Urban Planning Department at UCLA where his research and teaching interests center on equity and economic development issues--in particular the reciprocal roles of industries and regions in shaping each other. His current work identifies and promotes economic development policies that address the consequences of economic restructuring in the Southern California region. He is also currently the Executive Director of the Harry Bridges Institute in San Pedro.

As a consultant, he has worked extensively with several union and organizations and been involved in several projects, including: developing a research program on Global Logistics (the new international web of production, transportation, distribution and sales that is reshaping the role and status of workers and communities) for the International Longshore and Warehouse Union (ILWU), co-founded the Los Angeles Manufacturing Action Project (LAMAP - a multi-union effort to assist in the organizing of low-wage, largely immigrant Latino workers in the industrial core of Los Angeles, developed tools to support alternative economic development strategies for minority and disadvantaged communities in Los Angeles through the MultiCultural Collaborative (MCC), and developed the Apparel Industry Roundtable, and supporting sub-regional economic development cooperation among cities, agencies, and the private sector in a period of industrial restructuring for Southern California Edison (SCE). From 1999-2005 he served as the Research Director of the Los Angeles County Federation of Labor, AFL-CIO and Director of the Center for Regional Employment Strategies (CRES).

Kristen Monaco, PhD

Professor
Department of Economics
California State University, Long Beach

Dr. Monaco received a BA from Michigan State University and MA & PhD from the University of Wisconsin, Milwaukee. She is currently a Professor of Economics at the California State University, Long Beach, where her research interests include the socioeconomics of trucking.

Mary Nichols, JD

Professor & Director
Institute of the Environment
UCLA

Professor Nichols received a BA from Cornell University and JD from Yale Law School. She has a long history of environmental protection, including positions as: Secretary of Environmental Affairs and the Chair of the Air Resources Board (1974-78), Assistant Administrator of Air and Radiation for the U.S. Environmental Protection Agency (1993-97), Executive Director of the Environment Now Foundation, and serving as the California Secretary for Resources (1979-2003).

Honorable Tonia Reyes-Uranga

Governing Board Member, South Coast Air Quality Management District
City of Long Beach Councilmember, 7th District

Councilwoman Reyes-Uranga earned her BA from UCLA. She has represented the Seventh District on the Long Beach City Council since June 2002. Ms. Reyes-Uranga is Chair of the Long Beach City Council's I-710 Oversight Committee and the Transportation and Infrastructure Committee. She is a Governing Board Member of the South Coast Air Quality Management District as well as a member of the Harbor

Commission of the Port of Long Beach. Ms. Reyes-Uranga has been a resident of Long Beach for over 30 years.

Fred Dominguez, MD

Assistant Professor

Department of Family Medicine

Charles R. Drew University of Medicine & Science

Dr. Dominguez received his bachelor of science from California State University, at Long Beach, his medical degree from Metropolitan University in Mexico City, Mexico, and his masters in public health from the University of California at Los Angeles. He is Assistant Professor of Family Medicine at Charles R. Drew University and Academic Scholar in the division of Occupational and Environmental Medicine at UCLA. He is also working at Los Angeles County Department of Public Health developing and implementing community disaster preparedness programs.

Rob McConnell, MD

Professor of Preventive Medicine

Deputy Director of the Children's Environmental Health Center

University of Southern California

Dr. McConnell's research interests include effects of air pollution on the development and exacerbation of asthma, and he is the principal investigator of a large prospective cohort study in the Children's USC Health Study to investigate these relationships. His work examining the associations between ozone and fresh traffic emissions with the development of asthma has contributed to the current policy debate on proper regulation of these exposures. Dr. McConnell is also interested in the effects of psychosocial stress and other social characteristics on asthma and on the application of new biomarkers of exposure to air pollutants in population based studies. He teaches the survey course on environmental health in the USC Masters of Public Health program.

Paul E. Jacobs

Chief, Mobile Source Enforcement

California EPA-Air Resources Board

Mr. Jacobs attended the University of California, Berkeley, where he received a BS degree in Environmental Sciences/Natural Resources, and the University of the Pacific, McGeorge School of Law. Mr. Jacobs also completed management training at Harvard University's John F. Kennedy School of Government. He has authored and published numerous technical and policy papers and reports on motor vehicle emissions and their controls. Mr. Jacobs has also completed extensive training in automotive and diesel engine technology and holds a certificate in Diesel Engine Technology from the Society of Automotive Engineers.

Mr. Jacobs has 24 plus years of experience in the air pollution control field, and has served in several different positions and committees, including: the Society of Automotive Engineers (SAE) In-Use Standards Committee (J1667 Committee), Governor Pete Wilson's Diesel Fuel Task Force, the California Reformulated Gasoline Advisory Committee, chair of the Senate Bill 1997 Heavy-Duty Vehicle Ad Hoc Advisory Committee, boardmember of the California Council on Diesel Education and Technology (CCDET), and served on the Senate Bill 501 Accelerated Light Duty Vehicle Retirement (Scrap) Program, Technical Advisory Committee.

Mr. Jacobs currently serves as the Chief of Mobile Source Enforcement for the Air Resources Board (ARB), California Environmental Protection Agency (Cal/EPA). He is responsible for directing the ARB's on and off-road mobile sources enforcement programs. These programs require manufacturer, dealer, distributor, and, in many cases, end user compliance with applicable air pollution control laws.

Ralph Appy, PhD

Director of Environmental Management

Port of Los Angeles

Dr. Ralph Appy is Environmental Manager for the Port of Los Angeles. Under Dr. Appy's leadership, the Port of Los Angeles is widely acknowledged as having the most innovative, comprehensive environmental program of any port in the United States.

The Port of Los Angeles' Environmental Initiatives Program include implementation of far-reaching air quality programs; monitoring and management of water, storm water and sediment resources; soil and groundwater restoration; habitat management, and environmental compliance. Dr. Appy oversees critical air quality improvement programs including the recent release of the San Pedro Bay Clean Air Action Plan. Under the Port's Alternative Maritime Power (AMP) program, cargo vessels plug into electric power while at berth, the only port in the world with this capacity.

He received his bachelor's and master's degrees in marine biology from California State University, Long Beach, and a Ph.D. in zoology from the University of New Brunswick in Canada. A former adjunct professor at California State University, Long Beach, he has also served as an environmental consultant. He was a postdoctoral fellow and research associate at the University Guelph in Ontario, Canada. He is a board member and past president of the Southern California Academy of Sciences, and is Secretary of the Harbors, Navigation and Environment Committee of the American Association of Port Authorities and also chairs the air quality working group. Dr. Appy is currently first vice president of the Harbor Association of Industry and Commerce.

Andrea M. Hricko, MPH

Associate Professor & Director
Southern California Environmental Health Sciences Center
University of Southern California

Ms. Hricko is a leader in the efforts to make health a priority in the Los Angeles/Long Beach ports expansion debate. She serves on the Governor's task force on the ports and goods movement and is nationally known for her work in this area. Her interests include translating research findings into public health and policy initiatives; developing community-university partnerships; providing advice and information to policymakers and the public about the effects of air pollution and other environmental exposures on human health; and empowering community-based organizations to educate their communities and local policymakers about these issues. Ms. Hricko is an Associate Professor of Clinical Preventive Medicine at USC and Director of Community Outreach and Education for the NIEHS-supported Southern California Environmental Health Sciences Center and of the Community Outreach and Translation Core in the Children's Environmental Health Center.

PROGRAM

Health Effects

Diesel: What are specific agents and health effects from surface goods movement?

Jean Ospital, DrPH
Health Effects Officer
South Coast Air Quality Management District

Non-particulates: What are specific agents and health effects from surface goods movement?

John Balmes, MD
Professor of Medicine, UCSF
Chief, Division of Occupational and Environmental Medicine
San Francisco General Hospital (SFGH)
Director, Center for Occupational & Environmental Health – Northern California

Control Technology & Processes

Is "Clean Diesel" the answer? (Is it both 'clean' and 'practically feasible'?)

Alberto Ayala, PhD
Manager of Climate Change Mitigation and Emissions Research
California EPA-Air Resources Board

Locomotives: What are point source controls (now and future)?

David Ducharme
Manager, Global Product Safety & Regulatory Compliance
GE Transportation

Trucks: What are point source controls (now and future)?

William Bunn, MD JD MPH
Chief Medical Officer and Vice President
Health, Safety, Security and Productivity
International Truck and Engine Corporation

Railroads: Reducing Emissions And Planning For Growth

Mark Stehly, MS PE (Professional Engineer)
Assistant Vice President
Environmental & Research and Development
Burlington Northern Santa Fe Railway Company

Differences among rail yards-will one solution fix all?

Harold Holmes

Manager of Engineering Evaluation Section
California EPA-Air Resources Board

Trucking: How can port related operations be modified to limit exposures?

Rafael Pizarro
Senior Campaign Associate
Coalition for Clean Air

Regional Perspectives

What are the options for locating new transportation facilities?

Norm King
Professor & Director, Leonard University Transportation Center
California State University, San Bernardino

What are the regional social and economic implications of port-related transportation activities?

Goetz Wolff, MA
Lecturer
Department of Urban Planning, UCLA
Executive Director, Harry Bridges Institute

What policies (both financial and personnel) will improve trucking equipment and working conditions?

Kristen Monaco, PhD
Professor
Department of Economics
California State University, Long Beach

Driving Forces for Change

What drives change, and can financial incentives/ disincentives alone succeed?

Mary Nichols, JD
Professor & Director
Institute of the Environment
UCLA

What do the county and city governments want and need?

Honorable Tonia
Governing Board Member, South Coast Air Quality Management District

Reyes-Uranga

City of Long Beach Councilmember, 7th District

Proximity to mobile sources: a largely unrecognized cause of disease

Rob McConnell, MD
Professor of Preventive Medicine
Deputy Director of the Children's Environmental Health Center
University of Southern California

What are strengths and limitations of Regulation and Enforcement?

Paul E. Jacobs
Chief, Mobile Source Enforcement
California EPA-Air Resources Board

The Clean Air Action Plan: Is it both adequate and feasible?

Ralph Appy, PhD
Director of Environmental Management
Port of Los Angeles

How can dialogue best be facilitated among scientists, community members, rail/truck workers, community clinicians, and policymakers?

Andrea M. Hricko, MPH
Associate Professor & Director
Southern California Environmental Health Sciences Center
University of Southern California

What are the major research needs in each domain (health effect, control methods, regional level policy, social equity)?

Philip Harber, MD MPH
Professor & Chief
Division of Occupational & Environmental Medicine
Department of Family Medicine, UCLA

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