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**CITY OF MORENO VALLEY
Planning Division**

SAN GORGONIO CHAPTER

Mark Gross
City of Moreno Valley
14177 Frederick Street
Moreno Valley, CA 92553

Dear Mr. Gross:

April 8, 2013

Re: Draft EIR for the World Logistic Center (WLC)

The Sierra Club appreciates this opportunity to comment on the World Logistic Center's (WLC) Draft EIR. We have several concerns and questions we want addressed in the Final Environmental Impact Report (FEIR) which we believe were not fully addresses in the Draft EIR. We were disappointed that we did not find the answers we were looking for in the DEIR and therefore are resubmitting much of our Notice Of Preparation (NOP) comments as part of these DEIR comments. These concerns can be read below and we expect this project to do everything possible to eliminate and mitigate these problems in our non-attainment area.

During attendance at the NOP meeting, the Sierra Club noticed that more needed to be done. The Skechers NOP meeting also had more than 30 in attendance, and this project is just as divisive. You had less than a dozen NOP handouts. When you were notified that significantly more were needed, they were not forthcoming. Therefore, at least 80% of those in attendance did not have what little information you provided during the meeting. Arriving early, I was able to obtain one of the few documents, and on the backside of the cover page, it reads "at this meeting, agencies, organizations, and members of the public will be provided a brief presentation on the project and will be able to review the proposed project ..." Most people were not able to review the project, and I would be surprised if all had access to a computer or even know the NOP document was available somewhere online.

Environmental justice requires informed "public participation." What is described above does not qualify. Moreno Valley's population is more than 54% persons of Latino/Hispanic origin, according to the 2010 census. How can you truly have public participation without all documents related to the World Logistic Center (WLC) available in both English and Spanish? The same is true for all meetings. There must be enough headsets and interpreters for everyone to know what is said at all meetings related to the WLC by everyone else. In the Kettleman City case, the California Superior Court ruled, "meaningful involvement in the CEQA process was effectively precluded by the absence of Spanish translations."

1st of 117 pages

The Sierra Club strongly recommends that you begin the NOP process anew because the City's failure to translate crucial documents and meetings has effectively excluded many residents from exercising their statutory right to participate in the decision-making process. The Sierra Club also expects all documents related to the WLC to avoid highly technical language and to make them comprehensible to the average Moreno Valley resident. The Draft EIR was also only in English and most people would have needed a computer to have a viable chance to read it after working all day. How could you have made it more accessible to our population? Since the Sierra Club believes the WLC's DEIR is inadequate and needs to be revised and reissued, maybe you will have a chance to do right by those who would like to comment, but have been excluded by past practices.

The DEIR mentions many road segments that will need noise mitigation as a result of the WLC. As mentioned later in this letter the need for six foot sound walls are recommended for some homes which are some distance away from the project site such as along Moreno Beach Drive north of Ironwood Ave. In some cases they have to tear down existing walls and replace them. All of these residents impacted by significant noise levels caused by the WLC needed to be mailed notices of the Draft EIR and told of the comment period. This points out another reason why the NOP and DEIR both need to be properly noticed and recirculated.

The Sierra Club also believes the NOP document provided to the public did not have enough information and was misleading. The information did not "provide sufficient information describing the project and the potential environmental effects to enable responsible agencies to make a meaningful response. At a minimum, the information shall include: (c) Probable environmental effects of the project" (CA Code of Regulation EIR Process Section 15082). The project description was also misleading and inadequate.

The NOP the City provided did not address potential environmental impacts or even easily understood location and number of homes that will be impacted. Your map of open space is misleading. The maps on Pages 5 and 6, as well as Page 7, give the impression that existing Department of Fish and Game (DFG) lands, as well as those of San Diego Gas & Electric, are part of the project and, therefore, the project description is not accurate for NOP commenters. Those DFG lands are part of the San Jacinto Wildlife Area (SJWA), which is a cornerstone of the Riverside County Multi-Species Plan, and the NOP failed to mention any potential environmental impacts to these significant lands for the NOP commenters. Potential impacts to our two-lane SR 60 should have been mentioned, similar to the concerns expressed by the executive director of the Southern California Association of Governments: " 'You are talking about a huge amount of warehousing, and you don't have the infrastructure to support that,' Ikhtrata said." (Press-Enterprise, 3-10-2012) The FEIR needs to address these comments by Mr Ikhtrata.

For all of the above reasons, the Sierra Club strongly believes that the WLC NOP process needs to be improved, then recirculated to all agencies and organizations, as well as to members of the public. We also believe that for such a large and regionally significant project that all interested parties need more than 30 days. Since you failed to do this, the entire process is now flawed. As stated earlier the Sierra Club believes the DEIR needs to be reissued, after resolving its

inadequacies, and therefore believes the project should begin from the beginning with a proper NOP.

The WLC is displacing – not replacing – 7,700 housing units that were part of the 20-year-old unbuilt Moreno Highlands project and are still shown on the Moreno Valley General Plan as part of our fair share of the region's housing stock. The DEIR and any General Plan amendments for the project must show the alternative placement for these houses in Moreno Valley. The DEIR must include these displaced units in the air quality and traffic analysis as well as all other impacts analyzed, or the document will be inadequate. In the DEIR you indicate that this is not true because you have revised the housing plan several years ago. You indicate the concerns raised in this paragraph “was largely addressed in the updated (2011) Housing Element”. (p 4.13-5) The Final EIR must explain why it was only “largely” addressed and not “totally” addressed. That which was not addressed needs to be added to the impacts caused by the WLC as mentioned above. The fact that this revision was completed prior to the end of the Moreno Highland's Development Agreement brings up the issue of predetermined outcome for the WLC. You cannot just say that you just did not think the Moreno Highlands project was going to be built. The Moreno Highland Project was not only for 7,700 homes, but also for 21,000 permanent jobs, which also included the right to build many millions of square feet of warehousing. The City bought into the vision of the WLC developer when he talked about the “Logistic Modified General Plan” well before the updated (2011) Housing Element and helped him by removing obstacles that could make it more difficult getting the development approved.

The DEIR must have a traffic analysis of Moreno Valley's city streets and, probably at a minimum, those of neighboring cities where there is a blockage on SR 60 at any point between the Santa Ana River and the city of Banning. The traffic analysis needs to show what happens at each off-ramp/city streets between these two points where a semi-truck caused a freeway-closing accident, or the DEIR will be inadequate. Gilman Springs Road is a two-lane death trap. What improvements will be made to this road to make it safer? Will the improvements be made all the way to highway 79 or to Bridge Street? When will those improvements be made? Redlands Blvd and the San Timoteo Canyon roads are no better. Since these dangerous roadways are the alternative routes when SR 60 is closed in the badlands, what will be done to more safely allow the many thousands of trucks the WLC will attract to use these winding two lane roads that are popular with commuters. Figure 4.15.2 (Study Intersection Locations) has those intersections, limited to those which you studied, “at which the proposed project would add 50 or more peak hour trips.” Since it is only at least 50 one does not know if perhaps it is 500 or more peak hour trips. The FEIR will be inadequate if it does not explain how the roadways between all the intersections indicated with a bullet point in Figure 4.15.2 will be improved to handle the increased traffic generated by the WLC and the responsibility of the project towards those improvements. For example how will you mitigate the many intersection the WLC impacts in the City of Perris? The FEIR needs to name each of those intersections and what will be done with each and how will the WLC help with the ultimate improvements. What will be the LOS at those Perris indicated intersections before and after the improvements with the addition of the WLC as well as cumulative traffic? This needs to be done at all intersections and road segments between them indicated on Figure 4.15.2 for the FEIR to provide the level of information needed/required for both the decision makers and the public or the document will be inadequate. The Figure also indicates several intersections on the south side of the City of Redlands will be

impacted, but does not explain how the traffic is dispersed in the City or travels through the City to get to the indicated intersection. This must be done in the FEIR for not only the City of Redlands, but also for the Cities of Perris, Riverside, San Jacinto, Beaumont and of course the City of Moreno Valley. You cannot just say you pay your fair share of fees and be done with it.

Immediately below are two sections copied from the noise section of the WLC's DEIR that proves trucks are planning to use Moreno Beach to Reche Canyon Road and/or visa/versa. The section of Reche Canyon Road between Moreno Beach and Reche Vista Drive is mainly a narrow dirt road. Even the section of Reche Canyon Road between Reche Vista Drive and I-215 or I-10 is mainly several miles of narrow, winding two-lane road with many driveways and smaller roads intersecting it. The Sierra Club is concerned that the WLC is using this unimproved and inappropriate route to make it appear that SR-60 will not have to handle these trucks. While the Riverside County Transportation Commission would like to make this a major roadway as indicated on their maps, there is no proof that such will ever happen. I do not see guarantees for these improvements written anywhere. The WLC's FEIR must assume the Reche Canyon Road connection between Moreno Beach and Reche Vista Drive will never be made to handle any traffic and especially diesel trucks. Is the WLC going to make the necessary improvements to the Reche Canyon Road or just pay the normal developer transportation impact fees that can be used in many different places? The Traffic Impact Analysis in the FEIR must show the traffic projected for the Moreno Beach/Reche Canyon Road directed elsewhere or the document would be inadequate.

Locust Avenue between Moreno Beach Drive and Smiley Boulevard (54). Only the 2035 case results in a significant noise increase for this area. In 2035 the project will result in a 3.5 dB increase raising the noise level up to 68.9 CNEL. There are three single-family homes along this roadway and they front onto the roadway. As discussed above, homes that front onto a street cannot be effectively mitigated with a soundwall. *Therefore, this potentially significant impact feasibly cannot be mitigated.*

Moreno Beach Drive between Locust Avenue and Ironwood Avenue (56). Only the 2035 case results in a significant noise increase for this area. In 2035 the project will result in a 3.3 dB increase raising the noise level up to 66.6 CNEL. There are 18 single-family homes along this roadway. Some homes front onto the roadway, but most backup to the roadway. Currently there are no soundwalls along these homes. The walls would need to be 6 feet tall with respect to the rear yard. Roughly 2,000 feet of six-foot tall barrier would need to be provided for mitigation for 15 of the 18 impacted homes (Exhibit 18). With the retrofit the noise levels would drop at least 5 dB, with the resultant noise levels around 62 CNEL in rear yard areas. Approximately 3 homes would remain unmitigated, because these homes front onto Moreno Beach.

Pages 34-70 of Appendix K on noise analysis list more than 35 road segments that will experience significant noise impacts as a result of the WLC warehouse project's mainly truck traffic. There is discussion of mitigating the noise with six foot sound walls as is done in the above two paragraphs. There is, however, no discussion of mitigating the toxic diesel pollution that will easily make its way over any six-foot sound walls and into the yards and homes and lungs of nearby residents. The Final EIR will be inadequate unless it produces data showing all

the ways –physical and mental-- these residents health will be impacted by living on one of these road segments which will be carrying WLC truck traffic. The FEIR must show what will be done to mitigate this toxic diesel pollution along these road segments and produce the data to prove its effectiveness. Requiring 2010 trucks is not going to be good enough when you consider that Moreno Valley is approving so many warehouse projects that we are inviting almost 30,000 into our community. The most current and best technology must be required on all trucks used within the WLC Specific Plan.

The noise impacts to residents show traffic patterns and roadway usage. These roads will suffer significant damage from trucks and our City does very little to repair roads. Will the WLC Center do more than pay property taxes beyond their build out years to repair these roadways? If not then the damage done to resident's cars and repair costs need to be factored into the economic analysis.

The same is true for those homes that were put into the WLC's Specific Plan Area against their wishes and will suffer significant diesel, noise, vibration, light and possible drainage pollution as a result. The FEIR must show what physical and mental impact these residents will potentially suffer as a result of the build out and operation of the WLC. What will protect them from the dust, noise and vibration during the grading of the project site? The FEIR needs to fully explain how you can subject these people to significant health impacts—physical and mental-- in order to allow a developer to make money. Some of these people have lived in their home for more than 30 years and have now retired with the hope of spending their remaining years in the home in which they raised their family. . The residents of the seven homes who were forced into the Specific Plan must be given more than the knowledge that nothing can or will be done to protect them from all the health impacts of the WLC. This also includes the aesthetics of having to live near 41,600,000 sq ft of warehousing. What protection will be provided to those who live near D Street? What health and noise impacts can those who live in the old section of town called Moreno expect from the traffic of the WLC? In the attachments to this letter are several articles on the health impact of diesel and some with the recommendation that sensitive receptors must be 500 meters or 1,600 feet away from a project like the WLC or roadways with significant diesel truck activity. The FEIR needs to explain everything being done to protect these families when you are not providing a 500-meter buffer. Will the developer and/or the City buy them out at the highest residential or industrial usage of their home? Which would be higher? Will their homes decrease in value as a residential home if the WLC is approved? If this happens, who is responsible for making up the loss value? Why has the new uses available to these seven residents for there lands been restricted by the city when compared to the same zoning elsewhere in our city? Does the City consider this a takings and if not why not?

What proof is in the environmental documents to prove that these sound walls are effective for people taller than six feet like myself? The Sierra Club expects to see data in the in the FEIR that shows the six-foot sound walls will significantly lower the decibels for people who are above 6 foot 3 inches the same as those who are 5 foot 9 inches. If this cannot be done, then more needs to be done to reduce sound levels and relying on future improvements is not satisfactory. Data needs to be given for the effectiveness of any improved noise reduction solutions that will be implemented. All of these noise impacted neighborhoods need to have

several noise monitoring equipments installed and kept in operating conditions for the life of the project. The results need to be part of the public record and read by the City. What will the WLC or their successors in interest do if it is shown that these noises and other health related impacts are damaging the lives of those inflicted? The WLC will be the largest contributor of these impacts that impair the health of our residents.

“Noise generated by SCG blow down events has the potential to cause permanent hearing loss in persons in the developed area of the project” (page 16 SDG&E and SCG Mestre Greve Associates in appendices). I did not see the analysis and numbers for single event noise caused by these blow-downs. The FEIR must include this analysis. These blow downs can happen any time and last for 90 minutes. This noise would impact almost half of the Specific Plan including the support facility. The referenced impact analysis was done “to ensure worker safety” and “all mitigations measures imposed in the analysis are the responsibility of future developers and not the Gas Company.” (Page 1) Since infrastructure work will probably be put in place prior to the building of warehousing, the FEIR needs to show how these infrastructure workers hearing will be protected from these unpredictable blow downs if future warehousing is going to pay for all mitigation measures. The recommended silencer system for mitigation was only paper researched. The Industrial Acoustic Company literature “determined that a silencer system installed on the blow-down equipment could reduce noise levels by 40 dB.” The word is “could” and not “will”. The System must be required to be installed and tested several times before any work is done within the southern half of the WLC. Noise monitoring equipment needs to be installed at several locations to make sure the equipment continues to work as intended throughout the life of the project with the City reading the data. Figure 4.12.2 shows a need to have more monitoring locations to protect existing residents and ones that will remain in place well beyond build out of the WLC with the data available to the public. Since many warehouse workers, grounds maintenance, security and truckers work outside the walls of the warehouses, how will they be protected from these unpredictable blow-down events which could damage their hearing?

The FEIR must have a Health Impact Report to cover all aspects of this projects negative impact on residents and workers in and around Moreno Valley. This Health Impact Report must be one the project produces specifically about the WLC and not something borrowed from other sources. Many of the pages following my signature will have articles about the health impacts of diesel. The Sierra Club will expect those article printed in the Final EIR along with this letter. The decision makers and the public have a right to read them prior to any future public hearings.

“Is growth of the logistics industry worth the cost? We are not able to truly answer this question, because it is possible that the increased economic output could exceed the health costs associated with the expansion. We know, though, that major reasons logistic industry growth has been welcomed to bring jobs to the eastern Inland Empire. These jobs on average pay \$36,000 per year, but we find out that local health costs per year per job are likely to be at least half that value. Perhaps more to the point, it should be asked whether the logistics industry itself would be willing to pay full external costs of it actions. For example, would each facility be willing to pay a charge of \$5 to \$9 million per year to cover heath costs it is estimated to impose on the community? We are not in a position to say yea or nay, but economic efficiency dictates that mechanisms should be put in place so those enjoying the benefits of logistics industry growth

also pay the full costs – including external health costs – of their actions.” (Page 16 of this link and attached

http://www.pdx.edu/sites/www.pdx.edu.econ/files/bluff_warehouses_and_trucks.pdf

Warehouses, Trucks and PM2.5: Human Health and Logistics Industry Growth in the Eastern Inland Empire)

When you revise your economic analysis of the WLC you must address the health cost issues found in the above paragraph or it will not be valid. How will the warehouse projects within the WLC pay for their fair share of the area’s health costs – especially of their workers?

Since the majority of warehouses have peak times during the year—such as getting ready for school opening and the holiday season—the traffic analysis as well as all others such Air Quality/ Greenhouse Gas must be done to show the worst case scenario possible. Your DEIR traffic analysis does not do justice to the peak times of most warehouses such as before the opening of school and the winter holidays. This problem must be rectified in the FEIR and also the updating of all the traffic information from that of 2011 to 2013 or it will be inadequate.

Moreno Valley's proposed 41,600,000 sq ft World Logistic Center (WLC) warehouse project will have significant impacts to not only our City but also throughout the Inland Empire. Two figures point out the increase in health risks and also some of the traffic patterns.

They are the "No Project Cancer Risk" and "With Project Cancer Risk". They can be found in the Draft EIR as Figures 4.3.9 and 4.3.10. They are also found below, but the numbers would be a little clearer if you read them from the documents themselves.

Please put the two below figures side by side and begin comparing.

For example in the first, the Moreno Valley area around Lake Perris is not impacted, but the second encompasses much of that area and the lake as well as much of the San Jacinto Wildlife Area. In the first, I-10 west of San Bernardino is not impacted but in the second it is as is highway 79. The second figure shows significant impacts caused by WLC truck pollution to areas north, south, east and west of the City of San Bernardino as well as north, south, east, and west of the City of Riverside. Increase impacts all along SR 91 to Corona can be seen and north through Riverside. Increase in cancer

pollution impacts and therefore truck increases on the I-215 from the south in Menifee to north of the I-210 can be seen as a result of the WLC build out. Impact to SR-60 shown on the second figure seem to be artificially cut off and would indicate that the impacts extend further both to the west and to the east. At the very least the impact would extend to Chino on SR-60 but should extend to at least Diamond bar if the cancer pollution analysis was not arbitrarily cut off. The impacts along SR-60/I-10 heading east to the Palm Springs area is again artificially cut off. The traffic impacts along this entire stretch of SR-60/I-10 need to be studied because the pollution from the trucks shows that the WLC is impacting all of these roadways. In fact highways 79, 111, and 62 are impacted by the WLC truck pollution and need to be added to the traffic analysis. Again the cancer pollution shading and contours are artificially cut off as you move west along the I-10 and the City of Pomona should be included which means the WLC traffic impact need to be studied along the I-10 route to the project site. The same is true for SR-91 beyond Corona. Since these cancer risk pollution figures show the far-reaching impacts of the traffic generated by the building of the WLC throughout and beyond the Inland Empire, it is imperative that the FEIR analyze these traffic impacts along all these highways that are shown to be impacted by the WLC or the FEIR will be inadequate.

I noticed that the following cities as well as others are now included in the second (With Project Cancer Risk) and/or have the blue area extended further into their borders as well as having the contour cancer numbers increase. This is because the highways near these cities have trucks going to or leaving the WLC. Without the WLC the residents in these cities would have a much healthier environment in which to live. What will be done during the more than 20-year build out of the WLC to protect the residents in and around these cities?

Banning

Beaumont
Loma Linda
Redlands
Moreno Valley
Riverside
Jurupa Valley
Grand Terrace
Chino
Ontario
Pomona
Montclair
Meniffee
Corona
Fontana
Rialto
San Bernardino
Perris

I am sure there are other cities that are impacted With the Project that I did not list or some like Sun City and Cucamonga which may just be on the edge one way or the other. All of these cities and their residents have the right to know that the World Logistic Center will impact their lives. *According to the California Air Resources Board Soot pollution causes almost 5,000 premature deaths in southern California each year and in the Inland Empire the main contributor to soot is diesel pollution.* There are many other health problems related to diesel pollution like asthma and heart problems as well as depression. While they do not have Figures for other health problems, it makes sense that if an area is in a cancer zone, then other health problems related to soot are also going to increase as a result of the WLC. While some WLC proponents may make fun of the low numbers of cancer victims, they will have difficulty

disputing the wide impact of the 41,600,000 sq ft World Logistic Center's pollution in our non-attainment area with its related health impacts. Since health impacts do not seem to concern some decision makers, maybe the prospect of *losing billions of dollars of highway funding* will when we can not meet EPA's new soot standards because of projects like the WLC and this will cause problems well beyond the borders on Moreno Valley. The FEIR must show how the WLC will help our area meet the new EPA soot standards. If the WLC is detrimental to the area meeting the new EPA standards for soot, then that needs to be shown and how bad it will impact the efforts to eventually meet the standards – in ten years and again in 20 years from the projects possible approval.

While the area needs jobs, please look at the cancer numbers of the two figures where the WLC will be built, and realize that maybe we should be going after healthy jobs. It is very evident from the two figures that warehouse workers breath in toxic diesel pollution throughout their workday.

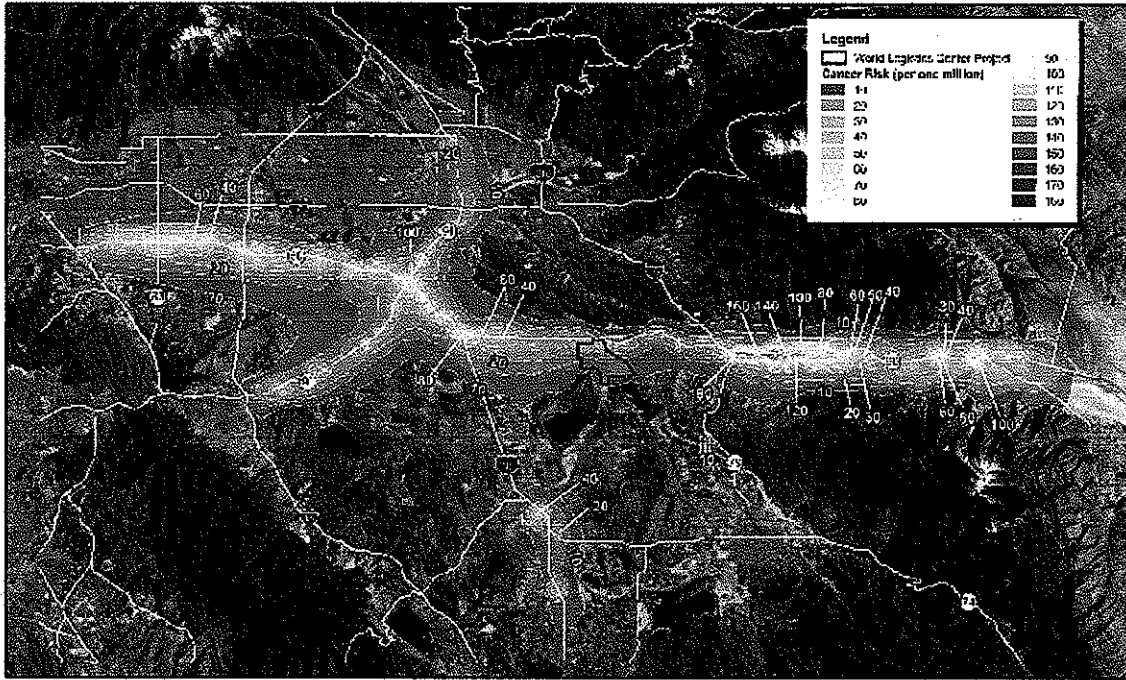


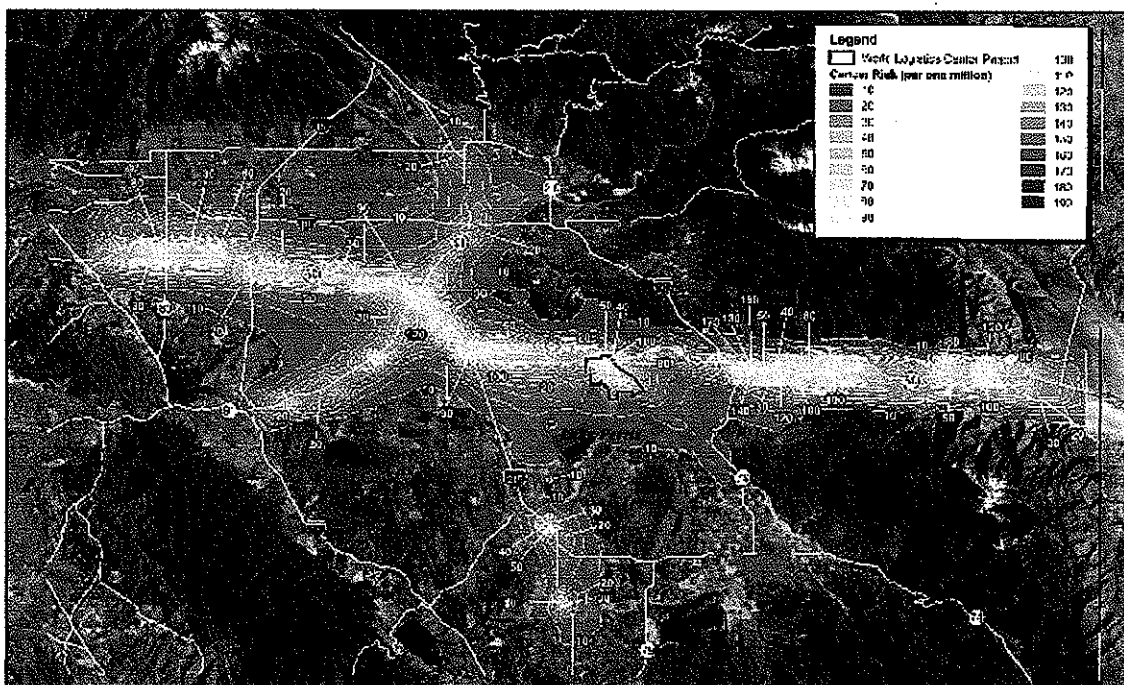
FIGURE 4.3.9

LSA



Feet
 SRS, RC3, Company of Microsoft, 2011, USR, World Imagery, 2010, Metacat Database, ArcGIS, World Logistics Center Site Plan, 2012
 L.H.V.1201 Report EIR 5-4-19, No Project Cancer Risk (1.56.2011)

World Logistics Center Project
 Environmental Impact Report
 No Project Cancer Risk



LSA

FIGURE 4.3.10



FEET
MSR, RC: Copy of Base Map 2011, DSM World Imagery 2010, Metacat/Headline Associates, World Logistics Center Specific Plan, 2012
 1: BIV1001 Exp-to-FTR Sp-4-3-10 With Project Cancer Risk V11.mxd: 5/2/2013

*World Logistics Center Project
 Environmental Impact Report
 With Project Cancer Risks*

The DEIR must include those projects that will add to the cumulative impacts of the WLC. This must include not only the projects approved but not built, but also those that are in the pipeline but not yet approved. These projects cannot be limited to ones within Moreno Valley but must include all those in neighboring communities/lands that will impact the same roads systems and air quality that the WLC will impact, or the DEIR will be inadequate. Under my signature will be five pages of Riverside County General Plan Amendments (GPA) (October 2003 – February 2012). The area abbreviations are spelled out on the fifth page. You must include those GPA in your cumulative impacts for areas that are impacted by the WLC cancer causing pollution. Those GPA's with abbreviations that must be included in the cumulative impact analysis are MVAP, PAP, RCBAP, SCMAP, SJVAP and even TCAP because it appears you have arbitrarily cut of the cancer plume just as it reaches Corona. The Mott Lakeview Ranch project on the north side of the Ramona Expressway must be included as it is redoing its DEIR for the County. In speaking with Leon Swails of the Lewis Operating Corp. a few days ago they have a revised plan for the Villages of Lakeview that he wanted to share and which he said would be coming out later this year from the County. Both of these County projects must remain part of the cumulative impacts analysis.

The WLC will have significant impacts to the San Jacinto Wildlife Area (SJWA) and all of its wonderful resources. The DEIR must show what type of buffer the WLC will provide to protect the SJWA's resources. You cannot just say a setback of a certain number of feet for buildings.

The FEIR must show all planned uses within what you consider a buffer. Will there be streets or access roads or lights of any kind? What will be allowed in the detention basins and what uses as well as hardscape will be allowed. Will there be parking lots within the buffer? These and other uses must be described in the FEIR for all buffers next to the SJWA, open space and homes or the document will be inadequate. In fact the FEIR should have drawings depicting each buffer area and explain what is contained within each. The SJWA is a California Department of Fish and Wildlife managed area where several types of hunting are allowed as well as where protecting threatened/endangered species is very important. The rules of land use next to areas designated for hunting must be observed. How will you observe those restrictions without impacting the uses of the SJWA? There are several threatened/endangered species at the SJWA, as well as others that fall under the protection of Western Riverside County's Multi-Species Habitat Conservation Plan (MSHCP) – both plants and animals. The toxic diesel emissions will float above the SJWA and settle on the habitat, plants, animals and ponds. The FEIR will be inadequate if it does not explain the impacts of these toxic emissions on the habitat, plants, animals and water resources of the SJWA, private hunting clubs, and the Lake Perris SRA over the 20 year build out of the WLC and for at least ten years past that point. Because environmental stresses impact each species in a different way, the FEIR must explain how toxic diesel emissions and other environmental stressors such as light and noise impact each of the species covered by the MSHCP as well as the Stephens Kangaroo Rat on the SJWA, private hunting club lands, and the Lake Perris SRA over the life of the build out and at least a ten-year beyond. How will the toxic diesel emissions, run-off, lights and noise impact the public and private hunting resources? The Sierra Club needs proof to your responses to these concerns and questions.

The FEIR must show all county and city trails within five miles of the WLC and how the project will facilitate their interconnection as well as where it will cause a breakage in the trail system. The de Anza National Historic Trail need to be further explained and highlighted within the project. How will the WLC educate the public about the de Anza National Historic Trail? How will the project accommodate public transit and make sure the proper decision makers provide it for this area of the city? This is a major requirement to gain points under LEED certification and the WLC must make sure that the workers have easy access to this form of transportation. Bike trails also need to be totally integrated into the WLC's Specific Plan. They should be Class 1 bike paths to protect the riders from the 18-wheelers. They should also be integrated into any regional plans as well as a slowly improving City plan.

Since building near sensitive receptors is considered unacceptable because of the toxic diesel emissions, the FEIR must analyze the health impacts on the well-being of warehouse workers within the WLC Specific Plan – especially those working outside.

The FEIR needs to show how building all warehouses to each level of LEED certification (certified through Platinum) reduces both the short term and long term environmental impacts of the project. The FEIR also needs to give a definition of "modern high-cube logistics facilities" to be used throughout the Specific Plan. Since you will allow both high-cubed and regular warehousing how are you doing the analysis of the project---all areas--- when the project could have an unknown percentage of each type? When you explain or show the number of acres set aside for jobs on behalf of Moreno Valley residents you must include our fair share of the March

Inland Port acres or your data will not be valid. Any economic analysis must include the efforts, which "are underway to establish mega-warehouse complexes off Interstate 15 in the Adelanto and Barstow areas in San Bernardino County." (Press-Enterprise 3-10-12) The cost of improving the infrastructure to at least a Level of Service D needs to be factored into the same economic analysis. "A new railroad spur might have to be built, or Highway 60 could need a new lane in each direction on the 17-mile stretch between Interstate 215 in Riverside and the I-10 in Beaumont, Ikhata said" (Press-Enterprise 3-10-12) The viability of the WLC being built needs to be analyzed in light of the Panama Canal being widened to allow the shipping of goods directly to the eastern portions of the United States. To combat this most West Coast ports have banded together with Western railroads to eliminate thousands of trucks from the local goods movement. The Jobs 1st Alliance fears that the ports of Los Angeles and Long Beach could lose as many as 100,000 jobs when the Panama Canal overhaul allows much larger ships to bypass California. "Worst case, there could be a 25% diversion from the Los Angeles-Long Beach," said Paul Bingham, the group's chief economist. "That's upwards of 3 million cargo containers. That's a lot of dockworkers who don't get work, truckers with less to haul and trains that don't run." (Los Angeles Times 12-28-2011) The economic analysis must address the above concerns and how they could easily impact the short term as well as long-term viability of this project. The Sierra Club will also expect to hear these real concerns addressed during presentations on the WLC.

What are your plans for the homes the WLC has decided to include within their Specific Plan. The Sierra Club believes better transitional uses than shown in the DEIR need to be near these and other nearby homes. If your plan does not show these transitional uses, are we to assume that the City will use eminent domain to acquire lands from unwilling sellers? Will the City use eminent domain in connection with the WLC.

With 45-50 million square feet of warehousing in the immediate area, will there be a truck stop planned within the WLC Specific Plan? The social and environmental impacts of a potential truck stop must be analyzed in this FEIR and not later as some planned after thought. Calling it a Service Center with room to expand later to a truck stop still makes it a truck stop and needs to be analyzed as such.

The FEIR must show how toxic runoff from the project will be handled. The document must first identify what toxic runoff will be expected from 41,600,000 square feet of warehouses and quantify it. How will you protect the San Jacinto Wildlife Area (SJWA) and its resources from the toxic runoff? Are there presently waters entering the SJWA from the project site that the SJWA relies on for its mission? How will you maintain that water continuing to enter the SJWA? The project's lands divide the flow of water with some heading eastward and other lands within the Specific Plan heading westward. The FEIR needs to explain the problems presented by this as well as the solution. The project needs to show how it plans to deal with the significant flooding in the area and what will happen to those waters. There are places where the ground water is quite shallow and the FEIR needs to show how these large buildings will deal with this problem. The reliance of our area on ground water is becoming more and more evident. What will the project do to avoid decreasing the amount of ground water these acres within the Specific Plan area presently provide? The FEIR needs to explain the net decrease of ground water as a result of the WLC. The Sierra Club expects you to have proof that there will

be at least a 20-year supply of water—after build out—without impacting the San Jacinto Wildlife Area. More needs to be explained about the lift station in the FEIR.

Your NOP/DEIR should have mentioned that the consumption of electricity by all these warehouses “would generate air pollutant emissions.” During the “Forum” the word “green” was used again and again to describe the WLC. The Sierra Club expects all buildings WLC buildings to match or exceed the Gold LEED certification recently agreed to by the Alessandro Business Center warehouse in the City of Riverside and the Skechers in Moreno Valley. Through the installation of solar panels and other LEED ideas you could avoid generating air pollutants with the electricity you consume. Why are you limiting the coverage of the warehouse roofs with solar? Why isn't the entire roof covered with solar – except the area needed for skylights? The FEIR must also explain what other aspects of the project will be “green” and if they are going to be required or just included to the “greatest extent possible,” which mean very little. Agreeing to require at least 90% of your off road construction equipment meet Tier III standards and by 2015 Tier IV would also significantly help our non-attainment city and county. Continuing to pave over Prime Agricultural lands as well as those of Local and State Importance must be mitigated. Having locally grown products also cuts down on the Climate Change problems mentioned above and below. The elimination of locally grown products needs to be factored into your Air Quality and GHG analysis. As you know, recently a developer donated \$100,000 to the Riverside Land Conservancy to help mitigate for the loss of Ag Lands. Please consider how your project will seriously mitigate its impacts to Agriculture and raptor foraging. This valley is world renowned for having more than 20 species of raptors. You should also make sure your parking provides ample reserved spaces for several form of cars using alternative fuels. Their parking lot also needs to be made of porous material to help with ground water recharge and to lessen run off.

Since some of Moreno Valley's designated truck routes pass by schools and their playgrounds, the Sierra Club expects the FEIR to explain what requirements will be placed on the tenants to avoid this very toxic situation as well as the truckers who will deliver/pickup products for your warehouse. How will the WLC increase the toxic level of any school within 1,500 feet of designated truck routes within our City? Explain why trucks will be allowed to leave the I-215 and head towards the WLC and visa versa on City streets instead of using SR-60. You are to use all means of reducing the projects impacts on residents. Using Cactus Ave or Alessandro Blvd or JFK instead of SR-60 to head east or west shows you are not doing so. The signals and stop signs more than offsets the pollution you might save by going a little shorter distance. The projects distance from homes needs to be easily understood as well as all the paths trucks could take to the warehouse. Using east/west surface streets significantly increases the toxic diesel pollution as well as the noise pollution and vibrations people will have to suffer. The WLC's traffic analysis needs to have the truck traffic using Moreno Valley surface streets using SR-60 to move east and west. Only then can the WLC state that it is doing more to reduce the diesel and noise pollution impacts on Moreno Valley residents. The FEIR must also show how much money the City will save on road improvements if the trucks are using SR-60 instead of the east/west surface streets. The WLC's trucks must also be restricted from using all roads that pass schools such as those on Heacock Street. How will you protect the workers from breathing toxic diesel emissions throughout their workday? What equipment will you make sure is electric instead of diesel or gasoline in order to lessen pollution and better protect the workers--this

includes gardening equipment? The DEIR needs to explain how noise barriers used during construction and use of the warehouse could lessen impacts identified in the Initial Study. Impacts to our local streets as well as our very crowded freeways need to be explained so the average citizen will understand. The FEIR-not just appendices- needs to show the length of trips the diesel trucks will be taking when driving to and from the warehouse as well as their routes. We need to know the maximum number of trucks that will use these warehouses each workday and not just after the first year, but when the warehouse is being used to its maximum capacity at peak times of the year.

The FEIR must show all off site infrastructures on single map/figure to allow the public to easily understand. These include but are not limited to sewer, debris basins, and the Theodore Interchange improvements. This includes all such needed improvements on both sides of Gilman Springs Road. The public needs to know who owns these lands needed for these off site improvements and what it will cost to build them as well as who will pay those costs. It also must include any additional interchanges and widening over crossings as well as widening of SR-60 to meet the demands of the WLC. The recent decrease of Development Impact Fees for High-cubed warehousing makes many needed improvements underfunded. What will the WLC do to compensate for this? All of these off site improvements need to be part of the economic analysis. Your economic analysis must give proof of its viability for at least 20 years after build out. It is in this time period that Proposition 13 tax increase restriction will have significant impacts on the WLC's income to the City of Moreno Valley and will probably become a drain on the well being of the City.

The land should not be disked for at least six months prior to doing the Burrowing Owl survey. Otherwise many will believe you are just making it difficult on this special animal as well as making it more likely it will be listed as endangered. Figure 4.4.5 shows excellent Burrowing Owl habitat in the within the drainage areas of the WLC. What will happen to those animals during the life of the project and what else can be done to protect them? Will all drainage channels be soft bottom and if not why not? The Sierra Club believes the FEIR will be inadequate unless our concerns and issues found throughout this letter are thoroughly addressed within the DEIR document. The Sierra club does not accept your limited Open Space dedication as adequate and you should be ashamed of continuing to give the impression that the existing San Jacinto Wildlife (SJWA) area lands are being given as part of the WLC project. Figure 4.4.3 shows criteria cells along Gilman Springs Road. What is being proposed with those lands?

How will you modify power poles to protect raptors from being electrocuted as they land or spread their wings? The Sierra Club expects such modifications on all new and existing electrical poles within at least a half-mile of the WLC project. The placement of power poles near the San Jacinto Wildlife Area may prove dangerous when people are hunting. In addition they are ugly and should be placed as far away as possible from the open space of the SJWA. Make sure all existing as well as proposed underground pipelines are shown on maps/figures and what is transported within them. What proof do you have that your drainage plan will protect the SJWA and all its resources – especially threatened and endangered species?

The FEIR must explain the area proposed for annexation. When will the application for annexation be submitted and what happens when it is denied? Since this is part of the process

for the getting the project approved, the Sierra Club believes that everyone who requested all documents and notices of all meetings related to the WLC needs to be sent the annexation application and timely notices of those meetings.

Why wasn't the Development Agreement in the Draft EIR and will it be made available in the Final EIR? When future warehouses are proposed for development what must they do to get approval? Will they need to do their own EIR or will they be able to rely on the WLC's certified EIR? Will this be the case for the entire build out of the WLC? There will be many changes between now and 2035 and those changes should be dealt with in new environmental documents.

THE EIR MUST ADDRESS THE IMPACT GLOBAL WARMING WILL HAVE ON THE PROJECT

California's temperatures are expected to rise "dramatically" over the course of this century (Cayan 2007). These factors will impact the planned project, as well as exacerbate its own environmental impacts.

The rise in temperatures resulting from global warming will create a more conducive environment for air pollution formation (Cayan 2007). This will intensify the adverse effects the proposed project will already have on air quality in the project area and threaten residents' health (Cayan 2007).

Significantly for the state, as well as the project area, is global warming's impact on water supply. The IPCC specifically identified the American West as vulnerable, warning, "Projected warming in the western mountains by the mid-21st century is very likely to cause large decreases in snowpack, earlier snow melt, more winter rain events, increased peak winter flows and flooding, and reduced summer flows" (IPCC 2007b). Recently, researches found that an increase in atmospheric greenhouse gases has contributed to a "coming crisis in water supply for the western United States" (Barnett 2008). Using several climate models and comparing the results, the researches found that "warmer temperatures accompany" decreases in snow pack and precipitation and the timing of runoff, impacting river flow and water levels (Barnett 2008). These researchers concluded with high confidence that up to 60 percent of the "climate related trends of river flow, winter air temperature and snow pack between 1950-1999" are human-induced.

(Barnett 2008). This, the researchers wrote, is "not good news for those living in the western United States" (Barnett 2008).

The California Center on Climate Change has also recognized the problem global warming presents to the state's water supply and predicts that if greenhouse gas emissions continue under the business-as-usual scenario, this snowpack could decline up to 70-90 percent, affecting winter recreation, water supply and natural ecosystems (Cayan 2007). Global warming will affect snowpack and precipitation levels, and California will face significant impacts, as its ecosystems depend upon relatively constant precipitation levels and water resources are already under strain (Cayan 2007). The decrease in snowpack in the Sierra Nevada will lead to a decrease in California's already "over-stretched" water supplies (Cayan 2007). It could also potentially reduce hydropower and lead to the loss of winter recreation (Cayan 2007). All of this means "major changes" in water management and allocation will have to be made (Cayan 2007). Thus, global warming may directly affect the City's ability to supply clean, affordable water to the residents, or force the City to change how it will utilize water, and it may also impact other activities outside the project area, such as agriculture.

Scientists indicate that climate change will also exacerbate the problem of flooding by increasing the frequency and magnitude of large storms, which in turn will cause an increase in the size and frequency of flood events (NRDC 2007). The increasing cost of flood damages and potential loss of life will put more pressure on water managers to provide greater flood protection (NRDC 2007). At the same time, changing climate conditions (decreased snowpack, earlier runoff, larger peak events, etc.) will make predicting and maximizing water supply more difficult (NRDC 2007). These changes in hazard risk and water supply availability must be considered during environmental review.

Water quality, in addition to water quantity and timing, will also be impacted. Changes in precipitation, flow, and temperature associated with climate change will likely exacerbate water quality problems (NRDC 2007). Changes in precipitation affect water quantity, flow rates, and flow timing (Gleick 2000). Shifting weather patterns are also jeopardizing water quality and quantity in many countries, where groundwater systems are overdrawn (Epstein 2005). Decreased flows can exacerbate the effect of temperature increases, raise the concentration of pollutants, increase residence time of pollutants, and heighten salinity levels in arid regions (Schindler 1997).

These are only examples of how global warming will impact the proposed project and intensify the environmental impacts the project will already have. It is not an exhaustive list. Thus, when assessing the impact of the Project on air quality, water supply, flood hazards, and biological resources, the EIR must take into account global warming. To ignore the impact of global warming on the Project and the resources impacted by the Project would significantly understate Project impacts.

, a universally adopted methodology is *not* necessary to

THE EIR MUST ANALYZE AND ADOPT ALL FEASIBLE MITIGATION MEASURES TO REDUCE THE PROJECT'S GREENHOUSE GAS EMISSIONS

In addition to thoroughly evaluating project alternatives, because it is clear that the project's greenhouse gas emissions will cumulatively contribute to global warming, "the EIR must propose and describe mitigation measures that will minimize the significant environmental effects that the EIR has identified." *Napa Citizens for Honest Gov't v. Napa County Bd. of Supervisors*, 91 Cal.App.4th 342, 360 (2001). CEQA requires that agencies "mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so." Pub. Res. Code § 21002.1(b). Mitigation of a project's significant impacts is one of the "most important" functions of CEQA. *Sierra Club v. Gilroy City Council*, 222 Cal.App.3d 30, 41 (1990). Therefore, it is the "policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures which will avoid or substantially lessen the significant environmental effects of such projects." Pub. Res. Code § 21002. Importantly, mitigation measures must be "fully enforceable through permit conditions, agreements, or other measures" so "that feasible mitigation measures will actually be implemented as a condition of development." *Federation of Hillside & Canyon Ass'ns v. City of Los Angeles*, 83 Cal.App.4th 1252, 1261 (2000).

To the extent that the project moves forward as planned, there are many mitigation measures the City can consider, as described below. This is not an exhaustive list and the EIR should explore these and all other feasible mitigation measures that will reduce the project's greenhouse gas emissions (CAPCOA 2008; California Office of the Attorney General 2008).

ii. Land Use and Energy

Using green building techniques, however, can substantially reduce buildings' influence in increasing greenhouse gas emissions. Green buildings help reduce the amount of energy used to light, heat, cool and operate buildings and substitute carbon-based energy sources with alternatives that do not result in greenhouse gas emissions (Commission for Environmental Cooperation 2008). Currently green buildings can reduce energy by 30 percent or more and carbon emissions by 35 percent. (Commission for Environmental Cooperation 2008). The technologies available for green building are already in wide-use and include "passive solar design, high-efficiency lighting and appliances, highly efficient ventilation and cooling systems, solar water heaters, insulation materials and techniques, high-reflectivity building materials and multiple glazing (IPCC 2007c). Additionally, the U.S. Green Building Council (USGBC), a private, nonprofit corporation, has established a nationwide green building rating system, called Leadership in Energy and Environmental Design ("LEED"). The LEED standard supports and certifies successful green building design, construction and operations. It is one of the most widely used and recognized systems, and to obtain LEED certification from the USGBC, project architects must verify in writing that design elements meet established LEED goals.

Specific mitigation for the greenhouse gas emissions generated by the Project's energy consumption include, but are not limited to:

- Analyzing and incorporating the U.S. Green Building Council's LEED (Leadership in Energy and Environmental Design) or comparable standards for energy efficient building during pre-design, design, construction, operations and management. All buildings within the World Logistic Center must be required to obtain a least Gold LEED certification.
- Designing buildings for passive heating and cooling, and natural light, including building orientation, proper orientation and placement of windows, overhangs, skylights, etc.;
- Designing buildings for maximum energy efficiency including the maximum possible insulation, use of compact florescent or other low-energy lighting, use of energy efficient appliances, etc.
- Reducing the use of pavement and impermeable surfaces;
- Requiring water re-use systems;
- Installing light emitting diodes (LEDs) for traffic, street and other outdoor lighting
- Limiting the hours of operation of outdoor lighting
- Maximizing water conservation measures in buildings and landscaping, using drought tolerant plants in lieu of turf, planting shade trees;
- Ensure that the Project is fully served by full recycling and composting services;
- Ensure that the Project's wastewater and solid waste will be treated in facilities where greenhouse gas emissions are minimized and captured.
- Installing the maximum possible photovoltaic array on the building roofs and/or on the project site to generate all of the electricity required by the Project, and utilizing wind energy to the extent necessary and feasible;
- Installing solar water heating systems to generate all of the Project's hot water requirements;
- Installing solar or wind powered electric vehicle and plug-in hybrid vehicle charging stations to reduce emissions from vehicle trips.

iii. Mitigation Related to Project Construction

- Utilize recycled, low-carbon, and otherwise climate-friendly building materials such as salvaged and recycled-content materials for building, hard surfaces, and non-plant landscaping materials;
- Minimize, reuse, and recycle construction-related waste;
- Minimize grading, earth-moving, and other energy-intensive construction practices;
- Landscape to preserve natural vegetation and maintain watershed integrity;
- Utilize alternative fuels in construction equipment and require construction equipment to utilize the best available technology to reduce emissions.

iv. Transportation Mitigation Measures

- Encourage and promote ride sharing programs through such methods as a specific percentage of parking spaces for ride sharing vehicles;
- Create a car sharing program within the planned community;
- Create a light vehicle network, such as a neighborhood electric vehicle (NEV) system;
- Provide necessary facilities and infrastructure to encourage residents to use low or zero-emission vehicles, for example, by developing electric vehicle charging facilities and conveniently located alternative fueling stations;
- Provide a shuttle service to public transit within and beyond the planned community;
- Incorporate bicycle lanes and routes into the planned community's street systems.

THE EIR MUST CONSIDER A REASONABLE RANGE OF ALTERNATIVES

The EIR must consider a meaningful analysis of reasonable alternatives to the Project in order to lessen or avoid the Project's significant impacts. CEQA mandates that significant environmental damage be avoided or substantially lessened where feasible. Pub. Res. Code § 21002; Guidelines §§ 15002(a)(3), 15021(a)(2), 15126(d). A rigorous analysis of reasonable alternatives to the project must be provided to comply with this strict mandate. "Without meaningful analysis of alternatives in the EIR, neither courts nor the public can fulfill their proper roles in the CEQA process." *Laurel Heights Improvement Ass'n v. Regents of University of California*, 47 Cal.3d 376, 404 (1988). Moreover, "[a] potential alternative should not be excluded from consideration merely because it 'would impede to some degree the attainment of the project objectives, or would be more costly' even when that alternative includes Project development on an alternative site. *Save Round Valley Alliance v. County of Inyo*, 157 Cal. App. 4th 1437, 1456-57 (2007) (quotations omitted).

An analysis of alternatives should also quantify the estimated greenhouse gas emissions, quantified impacts to biological resources, water resources-including water quality and water availability, as well as traffic resulting from each proposed alternative. Selecting an alternative site closer to rail availability would be ideal and closer to I-10 or some other major freeway instead of our SR-60 which is only two lanes in from of the project. These places do exist.

CONCLUSION

Thank you for your attention to these comments. The Sierra Club expects all growth inducing as well as cumulative direct and indirect impact to be fully addressed in the FEIR. We look forward to working with the City to assure that the EIR conforms to the requirements of CEQA to assure that all significant impacts to the environment are fully analyzed, mitigated or avoided. The

Sierra Club wishes to be placed on the mailing list for all future notices and documents regarding this project. Please mail all notices to Sierra Club, San Gorgonio Chapter, Moreno Valley Group, 26711 Ironwood Ave, Moreno Valley, CA. 92555.

Thank you,

A handwritten signature in cursive script, appearing to read "George Hague".

George Hague
Conservation Chair
Moreno Valley Group
San Gorgonio Chapter
Sierra Club



General Plan Amendments Summary

October 2003 – February 2012

2003 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
<u>2003-544</u>	MVAP: 680	<u>12/23/03 BOS Proceedings Item 16.1</u> Land Use Designation Amendment: GPA 680 Text Amendments: GPA680 – MVAP Page 2, 9, 15-16, 36-37, 43, 48

2004 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
<u>2004-290</u>	HVAP: 617 ELAP: 671	<u>09/28/04 BOS Proceedings Item 3.47</u> Land Use Designation Amendment: 671 Specific Plan Associated: GPA 617 (SP 293 Amendment No. 2)
<u>2004-530</u>	ELAP: 585 SWAP: 676 ECVAP: 687 SCMAP: 696 LMWAP: 572	<u>12/21/04 BOS Proceedings Item 3.41a</u> Land Use Designation Amendments: GPA 585, 676, 687, 696 Text Amendments: GPA 572 – LMWAP page 29 Specific Plan Associated: GPA 572 (SP 325)

2005 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
<u>2005-156</u>	ELAP: 658 WCVAP: 683 SCMAP/TCAP: 717 Various Area Plans: 716	<u>05/03/05 BOS Proceedings Item 3.44a</u> Land Use Designation Amendments: GPA 716, 716(Rescinded), GPA 717 Text Amendments: GPA 716 – Land Use Element: pages LU-66, LU-70, GPA 683 – WCVAP: page 31, GPA 717 – SCMAP: pages 28-29, 36-38, 51 Specific Plan Associated: GPA 658 (SP 152 Amendment No. 3), 683 (SP 225 Amendment No. 2)
<u>2005-393</u>	WCVAP: 677 ELAP: 698	<u>08/23/05 BOS Proceedings Item 3.92</u> Land Use Designation Amendments: GPA 677, 698
<u>2005-430</u>	HOUSING: 733	<u>10/04/05 BOS Proceedings Item 3.21</u> Housing Element: GPA 733
<u>2005-445</u>	JURAP: 679	<u>10/04/05 BOS Proceedings Item 3.22a</u> Text Amendments: GPA 679 – JUAP page 30 Specific Plan Associated: GPA 679 (SP337)
<u>2005-501</u>	ELAP: 672 SCMAP: 693 WCVAP: 746	<u>12/20/05 BOS Proceedings Item 3.36</u> Land Use Designation Amendments: GPA 672, 693, 746

2006 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
<u>2006-075</u>	SCMAP: 744	<u>02/28/06 BOS Proceedings Item 3.58</u> Circulation Element Amendment: SCMVAP
<u>2006-141</u>	WCVAP: 707 ECVAP: 714, 719 SCMAP: 749 JURAP: 750 SWAP: 760	<u>05/16/06 BOS Proceedings Item 3.27</u> Land Use Designation Amendment: 714, 719, 749, 750 Text Amendments: GPA 707 – WCVAP page 30, GPA760 – SWAP page 24-25 Specific Plan Associated: GPA 707 (SP343)
<u>2006-432</u>	SWAP: 503 HVAP: 689	<u>12/19/06 BOS Proceedings Item 3.59</u> Land Use Designation Amendments:



General Plan Amendments Summary October 2003 – February 2012

	SCMAP: 701, 702, 740 ECVAP: 712, 767 ELAP: 728 SJVAP: 730 HAP: 742 EAP: 761 JURAP: 768, 794 WCVAP: 782	GPA 503, 689, 701, 702, 712, 728, 730, 740, 742, 761, 767, 768, 782, 794
<u>2006-462</u>	TCAP/ELAP: 825	<u>12/19/06 BOS Proceedings Item 3.44</u> Text Amendments: GPA 825 – TCAP page 31, ELAP page 28 Specific Plan Associated: GPA 825 (SP 327)

2007 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
<u>2007-306</u>	SCMAP: 729	<u>07/31/07 BOS Proceedings Item 3.102</u> Area Plan Level Circulation Element Amendment: SCMVAP
<u>2007-400</u>	WCVAP: 811	<u>09/04/07 BOS Proceedings Item 3.52a</u> Land Use Designation Amendment: GPA 811
<u>2007-080</u>	SCMAP: 655, 726, 797, 800 ELAP: 722 HAP: 741 ECVAP: 772, 786 WCVAP: 776, 809 SWAP: 758 SJVAP: 792, 812 EAP: 817 PAP: 820 JURAP: 836, 842, 688	<u>10/02/07 BOS Proceedings Item 3.65a</u> Land Use Designation Amendments: 655(GPA 729 for Circulation Element Amendment), 722, 726, 741, 772, 776, 786, 758, 792, 797, 800, 809, 817, 820, 836, 842, 688 Text Amendments: GPA 776 – WCVAP page 31 Specific Plan Associated: GPA 776 (SP338) Area Plan Level Circulation Element Amendment: GPA 812
<u>2007-446</u>	WCVAP: 864	<u>10/16/07 BOS Proceedings Item 15.2</u> Land Use Designation Amendments: GPA 864 Text Amendments: GPA 864 – WCVAP: Page <u>43-44</u> Signage
<u>2007-494</u>	ELAP: 704, 738, 754 ECVAP: 787 PVAP: 838 JURAP: 850 ECVAP: 863 LNAP: 775	<u>12/18/07 BOS Proceedings Item 3.74</u> Land Use Designation Amendments: GPA 738, 754, 787, 838, 850, 863, 704, 775 Text Amendments: GPA 754 – ELAP page 28 Specific Plan Associated: GPA 754 (SP340)

2008 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
<u>2008-094</u>	ELAP: 884	<u>01/29/08 BOS Proceedings Item 3.49</u> Land Use Designation Amendments: GPA 884 Text Amendments: ELAP page 33-35 Area Plan Level Circulation Element Amendments: 884-3a, 884-3b, 884-3c and Trails Amendments: 884-4a, 884-4b, 884-4c
<u>2008-173</u>	JURAP: 844 EAP: 834 SWAP: 821	<u>04/29/08 BOS Proceedings Item 3.27b</u> Land Use Designation Amendments: GPA 821, 834, 844



General Plan Amendments Summary October 2003 – February 2012

<u>2008-410</u>	SCMAP: 890	<u>09/16/08 BOS Proceedings Item 3.49</u> Land Use Designation Amendment: GPA 890 (Affordable Housing Development)
<u>2008-412</u>	SJVAP: 747 ECVAP: 764, 795, 880 WCVAP: 831, 853	<u>10/21/08 BOS Proceedings Item 3.55</u> Land Use Designation Amendments: GPA 747, 764, 795, 880, 831, 853
<u>2008-500</u>	ECVAP: 860 WCVAP: 885	<u>12/23/08 BOS Proceedings Item 3.33</u> Land Use Designation Amendment: GPA 860 Text Amendments: GPA 885 – WCVAP Page 29 (Establishes the Cahuilla Hills Policy Area), Area Plan Policy Boundary Exhibit 9

2009 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
<u>2009-118</u>	JURAP: 912 EAP: 971 SWAP: 1047 ECVAP: 826 WCVAP: 876, 881 COUNTY WIDE: 883, 1073	<u>06/09/09 BOS Proceedings Item 3.48a</u> Land Use Designation Amendment: GPA 876, 912, 971, 1047 Text Amendments: GPA 883 (Child Care, Chapter 2-Vision & Chapter Land Use Element), 1073(Public Facilities, Chapter 3 Land Use Element) Specific Plan Associated: GPA 826(SP362), 881 (SP360)
<u>2009-162</u>	EAP:807 JURAP:882 SWAP:1048, 1056, 1055 SJVAP:1053, ECVAP:905 PVAP:1051	<u>10/20/2009 BOS Proceedings Item 3.61</u> Land Use Designation Amendment: GPA 807, 882, 1048, 1053, 1055, 905, 1051 Text Amendments: GPA 1056-SWAP Specific Plan Associated:
<u>2009-358</u>	TCAP:774 EAP: 887, 827 (Removed) REMAP: 878 HVWAP: 1061 ECVAP: 784 WCVAP: 1072	<u>12/22/09 BOS Proceedings Item 3.57f</u> Land Use Designation Amendment: GPA 774, 887, 878, 1061, 1072, 784 Text Amendments: Specific Plan Associated: GPA1061 (SP293 Amendment No.5)

2010 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
<u>2010-89</u>	LNAP: 720, (Land Use) & 721(Circulation)	<u>03/23/2010 BOS Proceedings Item 3.37</u> Land Use Designation Amendment: GPA 720 Text Amendment: GPA 720- LNAP (add SP342 to SP table) Specific Plan Associated: GPA720&721(SP342)
<u>2010-138</u>	LMWAP: 662 HVWAP: 727 EAP: 827 JURAP: 859	<u>05/25/2010 BOS Proceedings Item 3.53</u> Land Use Designation Amendment: GPA 662, 727, 827, 859 Text Amendments: GPA 827- EAP (add SP 358 "The Ranch at Eastvale") Specific Plan Associated: GPA827 (SP358)
<u>2010-253</u>	TCAP: 815 EAP: 918 JURAP:1095	<u>09/28/10 BOS Proceedings Item 3.74</u> Land Use Designation Amendment: GPA815, GPA918, GPA1095 Text Amendments: GPA 815-TCAP (add SP353 "Serrano Commerce Center").



General Plan Amendments Summary

October 2003 – February 2012

		Specific Plan Associated: GPA 815 (SP353)
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2011 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
<u>2011-176</u>	HAP: 1105	<u>07/12/11 BOS Proceedings Item 16.6</u> Land Use Designation Amendment: GPA 1105
<u>2011-156</u>	COUNTY WIDE: 1075, 1088, 1083, 1096	<u>10/18/11 BOS Proceedings Item 3.34</u> Text Amendments: GPA 1075- Entitlement/amendment DCAP, ECVAP, ELAP, PAP, MVAP, REMAP, SJVAP, SWAP, WCAP, Chapter: Introduction, Chapter 3: Land Use Element, Chapter 10: Administration Element; Appendix B: General Planning Principles. GPA 1083, 1088: Chapter 3: Land Use Element; (Cultural and Indian Fee) GPA 1096: Chapter 1: Introduction, Chapter 2: Vision, NEW Chapter 10 Healthy Communities Element, Appendix M: Health Indicators
<u>2011-273</u>	COUNTY WIDE: 1080	<u>11/08/11 BOS Proceedings Item 16.2</u> GPA 1080: Chapter 3: Land Use Element (Solar)

2012 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
<u>2012-018</u>	ECVAP: 846, 889 LMWAP: 897 SWAP: 1107	<u>01/10/12 BOS Proceedings Item 3.55</u> Land Use Designation Amendment: GPA <u>846</u> , <u>897</u> , <u>1107</u> Circulation: GPA 889 Specific Plan Associated: GPA846 (SP369)
<u>2012-036</u>	ECVAP: 910	<u>02/07/12 BOS Proceedings Item 3.27</u> Land Use Designation Amendment: GPA 910 Specific Plan Associated: GPA 910 (SP 375-Travertine Point)
<u>2012-038</u>	WCVAP: 1101	<u>02/28/12 BOS Proceedings Item 16.01</u> Land Use Designation Amendment: GPA 1101

Acronyms:

BOS	Board of Supervisors
EAP	Eastvale Area Plan
ECVAP	Eastern Coachella Valley Area Plan
ELAP	Elsinore Area Plan
GPA	General Plan Amendment
HVWAP	Harvest Valley/Winchester Area Plan
HAP	Highgrove Area Plan
JURAP	Jurupa Area Plan
LMWAP	Lake Mathews/Woodcrest Area Plan
LNAP	Lakeview/Nuevo Area Plan

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General Plan Amendments Summary October 2003 – February 2012

MVAP	Mead Valley Area Plan
PVAP	Palo Verde Valley Area Plan
PAP	The Pass Area Plan
RCBAP	Reche Canyon/Badlands Area Plan
REMAP	Riverside Extended Mountain Area Plan
SCMAP	Sun City/Meniffee Area Plan
SJVAP	San Jacinto Valley Area Plan
SWAP	Southwest Area Plan
TCAP	Temescal Canyon Area Plan
WCVAP	Western Coachella Valley Area Plan

Center for Community Action and Environmental Justice

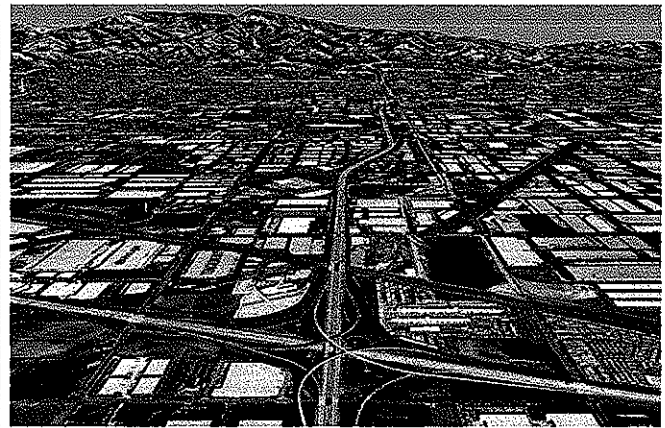
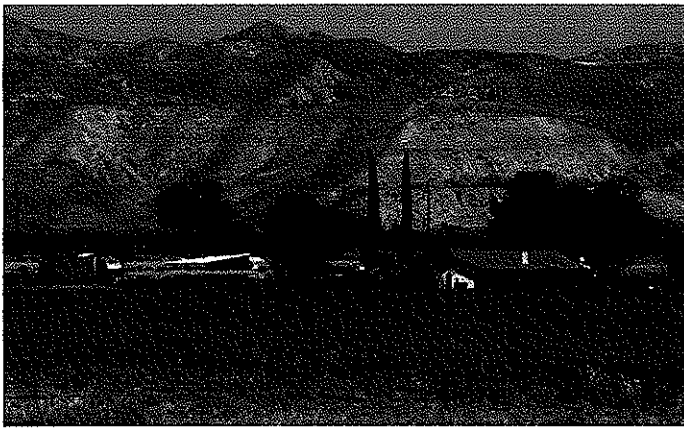
Truth and Consequences

Moreno Valley's Future

This ?

or

This?



Moreno Valley is at the crossroads—it can choose to follow its General Plan that calls for high-end homes, shopping centers, businesses and services, or — it can become a massive warehouse district with

the horrendous truck traffic, deadly diesel pollution, and loss of health and quality of life.

You don't have to guess what the impacts will be — just go to Mira Loma.

The decision lies with YOU!

If left to Iddo Benzeevi and his followers on the City Council your future will be set. Speak up! Demand that your voices be heard.!

WLC—Moreno Valley's Worst Nightmare

“As someone that lives near the world’s largest warehouse district in Mira Loma, we know what the impacts are”, said Penny Newman, Executive Director of the Center for Community Action and Environmental Justice. That knowledge comes the hard way. Not from someone paint-

ing a rosy picture and making empty promises of jobs but from actually living in it.” said Newman.

The impacts are real. They are severe. And they change the community’s quality of life forever. “Once the warehouses take over in there’s no turning

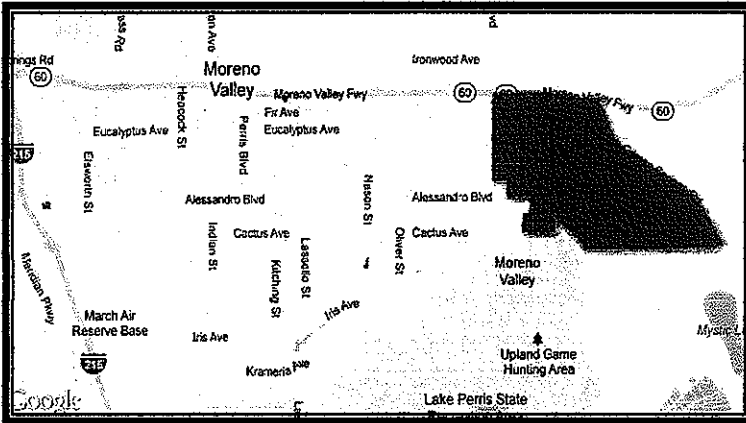
back.”

We’ve seen trucks in our residential streets that get stuck, drive up over our curbs and into our yards where are children play. This is not the type of development Moreno Valley families want or need.

Right: Daily occurrence for Mira Loma residents as big rig trucks get stuck in rural residential streets just feet from



Moreno Valley or "Mo-Iddo" Valley?



A few years ago when warehousing became popular in the Riverside County, some could claim ignorance to the health impacts. But not any more. With all we know about the disastrous affects of diesel pollution why would anyone bring a major diesel source into your backyards?

The plan for the World Logistics Center calls for more than 41 million square-foot of industrial buildings—equivalent to more than 700 regulation football fields.

While touting the use of the highest "environmental standards" like green buildings with

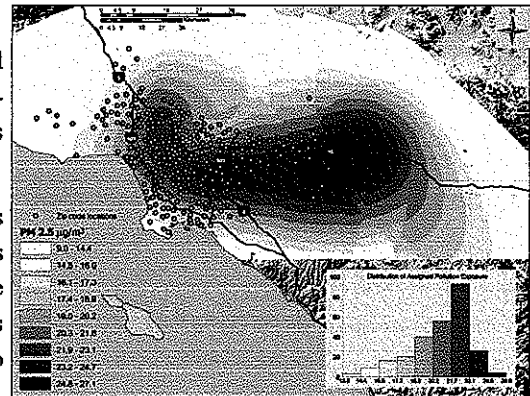
LEED certification, he bypasses the severe impacts. It's not the buildings that pose the problems—but the thousands of diesel spewing trucks each of those buildings attract. One truck produces more pollution that 200 cars. The estimates in the Environmental Impact Report says more than 14,682 truck trips per day. Some estimates have placed the number as high as 24,000 per day. Everyone knows how bad the traffic is along Highway 60 now. What do you think it will be with these additional heavy duty trucks?

We know the jobs are few and low paying; we know the public costs for wear and tear on our streets and roads are very high; we know the city's financial payback is low so why push this horrendous project. Clearly, Iddo Benzeevi must be making money but do we seriously make public decisions based on the whims and greed of one man?

Pollution in the Inland Valleys

Southern California is known for its sunny hot days and cool coastal breezes. The Inland Valleys are known for its majestic mountains surrounding the vast heavily populated valleys. The combination of the two creates unique conditions that are disastrous for residents of the Inland Valley.

As the on shore coastal breezes bring cooled air onto land it blows easterly bringing whatever pollutants it encounters with it. The pollutants created by the industrial operations of refineries, manufacturing and at the ports of Los Angeles and Long Beach are blown east into the Inland Valleys and are trapped by the mountain ranges—compounding the pollution levels to horrendous levels.



When these compounds reach the Inland areas they are trapped by the bowl created by the mountains. Local sources from railyards, intermodal facilities, and diesel spewing trucks delivering to massive warehouses and distribution centers in the area compound the deadly situation even more. The result is a heavy burden of pollution smothering the area, especially those at the fence line of these operations.

Another characteristic of particulate pollution is that health risk is determined by proximity to the source. The closer one is to the diesel source the greater the health risk. In the South Coast Air Basin mobile sources like trucks and trains cause 90% of cancer risk to residents, 70% of which is from diesel exhaust.

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What Iddo isn't telling you

Dirty Deadly Diesel

The draft Environmental Impact Report (DEIR) for the WLC acknowledges "significant cancer risk increases from diesel exhaust associated directly with the project. Up to 100 cases per million ADDITIONAL cancer cases just from this project. That is on top of the already high cancer risk we face in the Inland Valleys. The excessive cancer risk extends along Highway 60 as far as Interstate 15. But cancer isn't the only concern from diesel.

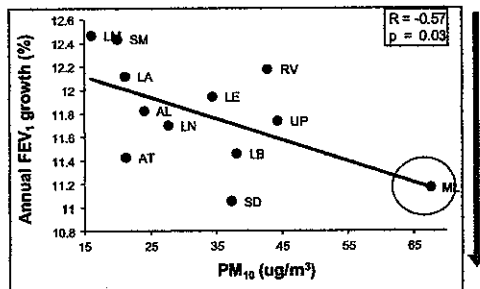
Diesel engines emit a complex mixture of air pollutants, composed of gaseous and solid material. The visible emissions in diesel exhaust are known as particulate matter or PM.

Diesel engines also contribute to California's fine particulate matter (PM_{2.5}) air quality problems. Those most vulnerable are children whose lungs are still developing and the elderly who may have other serious health problems. A 2010 report written by Calif. Air Resources Board (CARB) and peer reviewed by the EPA, estimated that fine particulate pollution (PM_{2.5}) causes 9,200 premature deaths in California each year.



Particulate pollution is categorized into three main sizes. PM₁₀ measure up to 10 microns in diameter and appears as black dust or soot. PM_{2.5} measure 2.5 microns or smaller in diameter and PM_{0.1} (ultra fines) make up more than 90% of diesel particulates. The smaller the size the greater the health risk. Ultra fine particles are not regulated by law and are not considered in the EIR being conducted by WLC.

Breathing diesel exhaust isn't just unpleasant – it is hazardous to your health. In fact, health research indicates that the portion of the exhaust you can't see maybe the most dangerous of all. Asthma attacks, respiratory disease, cardiovascular disease, neurological illness, and even premature death –all of these are among the most serious public health problems linked to emissions from the nation's fleet of diesel vehicles. Diesel exhaust has been found to cause and exacerbate the effects of asthma, lead to premature death due to effects on the heart and cardiovascular systems, and cause birth defects, including increased heart defects, low birth weight, and preterm babies. Children are more likely than adults to be affected by outdoor air pollution because they tend to spend more time outdoors and have higher respiration rates.



The USC's Children's Health Study, a long-term study of more than 3,000 children in 12 Southern California communities, found that children in Mira Loma have the slowest lung growth and the weakest lung capacity of all children studied in Southern California. It also found that traffic-related pollutants, contribute to the onset of asthma. The study found that children playing three or more team sports in high pollution areas have an increased risk of developing asthma. Since many of the warehouses and truck routes are located next to homes and schools, children and families are at high risk.

PO Box 33124
Jurupa Valley, CA 92519

Phone: 951-360-8451
Fax: 951-360-5950
E-mail: penny.n@ccaej.org



bringing people together to improve our
social and natural environment

The Center for Community Action and Environmental Justice is a non profit environmental education and advocacy organization with a 35 year history of assisting communities fight back for clean healthy communities. Since 1997, CCAEJ has been at the forefront in educating residents on the impacts of diesel pollution and community impacts of the Goods Movement Industry. Our work led to the California Air Resources Board's Land Use Guidelines recommending a 1000 foot buffer between diesel sources and sensitive receptors and the development of Riverside County's Good Neighbor Guidelines for Warehouses and Distribution Centers. CCAEJ sits on the Steering Committee of the Moving Forward Nationwide Network of communities impacted by logistics and has worked with and presented before the White House Interagency Working Group on Inland Ports and Global Trade. CCAEJ recently won a major settlement in Mira Loma in partnership with California Attorney General Kamala Harris. The Attorney General stated, it's "model for local governments, developers and communities" trying to balance the need for industrial development with residents' right to breathe clean air."

We're on the Web!
www.ccaej.org

The Promise of Jobs

Warehousing has been sold to decision makers of the Inland Valley as the "door to upward mobility", bringing good paying jobs to unskilled and uneducated populations. That promise has proven to be more wishful thinking than reality.

Jobs in warehousing and distribution centers have proven to produce remarkably few jobs per square feet of land consumed - 1/4,000 sq ft. The recently built Sketchers Warehouse promised 2500 new jobs to the community of Moreno Valley but produced only 500 which were employees transferred from their old Ontario facility. Only 1 new job employing a Moreno Valley resident was created.

Even with the few jobs created they are not "good" jobs. Under the drive to lower costs, increase speed of delivery and increase profits, warehouse jobs have become the new sweatshops. Workers in Mira Loma report working up to 72 hour shifts and only getting paid when they are loading or unloading but not for any other work they perform.

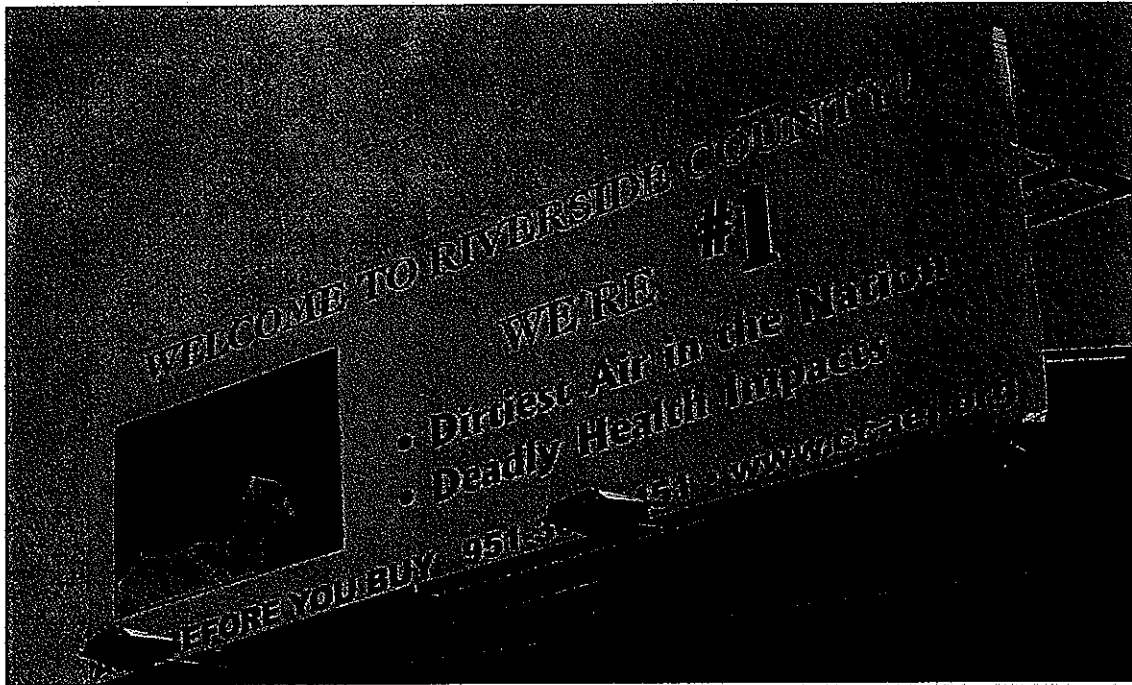
Warehouse jobs are outsourced to temp agencies paid at minimum wage levels, creating massive wage violations, dangerous working conditions, and exploitive management practices. They include:

- confusing "piece rate" pay schemes where workers are only paid for unloading and loading containers,

not for other work performed;

- for working lengthy hours with no overtime pay;
- for illegal and falsified pay records;
- and for hazardous workplace conditions (especially excessive heat, pressure for speed, and unstable storage stacking).





Global Trade, Goods Movement and the Resulting Health Crisis in the Inland Valleys

Center for Community Action and Environmental Justice

Centro de Acción Comunitaria y Justicia Ambiental

PO Box 33124

Jurupa Valley, CA 92519

951-360-8451

www.ccae.org

The View from Our Window

Local Impacts from Global Trade: Mira Loma as a Case Study

Mira Loma has the highest levels of particulate pollution in the nation.¹

Mira Loma has the 4th worst particulate pollution in the world only after Jakarta, Indonesia; Calcutta, India; and Bangkok, Thailand²

Mira Loma children have the weakest lung capacity and slowest lung growth of all children studied in southern California.³

These alarming statistics are the reality for the poor, Latino residents of the unincorporated communities of Mira Loma and Glen Avon in Riverside County. The continuing exploitation of these communities and an ever expanding number of communities affected throughout Riverside and San Bernardino Counties has prompted Southern California Association of Governments (SCAG) and South Coast Air Quality Management District (SCAQMD) to call upon Governor Arnold Schwarzenegger and President George Bush to issue a State of Emergency for the area.

CCA EJ holds Environmental Justice tours to provide an opportunity to introduce public officials, media representatives and interested people with the ramifications of the Goods Movement as it moves east from the ports of Los Angeles and Long Beach; provide a history of events that have created the problem and how the communities have responded and explore policy remedies that curtail the impacts upon our communities. Understanding of the situation is the first step to solving the problems. If we don't act now it will simply be too late for these residents.

The rapid growth and convenient location to freeways, airports or rail lines coupled with the thousands of acres of open, agricultural lands make Riverside County a prime location for industrial facilities, warehouses and distribution centers, Intermodal facilities and truck and rail yards. The industrialization of the area is conducted with total disregard to the incompatibility with existing homes, schools and the resulting health risks. Planning strategies and the drive for economic growth have led local agencies to ignore existing problems such as air pollution, traffic congestion, and safety; or to consider the rural culture and life styles of existing neighborhoods affected by their decisions. The outcome of poor public policies and lack of appropriate planning

¹ South Coast Air Quality Management District, "Multiple Air Toxics Exposure Study in the South Coast Air Basin" (MATES II Study), March 2000.

² World Health Organization, as cited by California Public Interest Research Group, CalPIRG, Citizens' Agenda, Vo. 13, No. 3; pg 4, Fall 1997. (The industrialization of China has now created many communities with high levels of PM pollution. While our levels have not gone down, levels in a number of communities in China have risen.

³ "Association Between Air Pollution and Lung Function Growth in Southern California Children", American Journal of Respiratory and Critical Care Medicine; Gauderman, W. James; McConnell Rob; et al, Department of Preventive Medicine, University of Southern California School of Medicine, Los Angeles.

has created a situation where homes are next to polluting industries; where diesel trucks crowd residential streets; where neighbors are deprived the use of their backyards due to the overwhelming noise, fumes and industrial lighting. The concentration of truck activity has resulted in the area being designated as a diesel "hot spot" by the South Coast Air Quality Management District (SCAQMD) with a cancer risk of over 1500 in a million, dramatically affecting the health and lives of local residents.

While the science is clear; the documentation of pollution levels is substantial; and suggested solutions have been proposed—the County of Riverside has continued to place industrial warehouses, truck terminals and railyards next to the homes, schools and parks of these communities ignoring the severe health impacts those decisions inflict upon the families in the area. The anticipated three-to five fold increase in the movement of goods through the Ports of Los Angeles will create further adverse health outcomes. The ultimate result is an overall deterioration of the air, and quality of life for local residents and a true public health crisis. The message to residents from County authorities is equally clear— the health and well being of our families does not count; our communities are expendable.

Since 1997, local residents through our community based organization, Center for Community Action and Environmental Justice (CCA EJ), have fought to stop development that places our families at risk—to no avail. CCA EJ has filed more than 6 CEQA lawsuits resulting in successfully saving more than 700 acres from being developed into industrial warehouses. While we have been successful in stopping some projects using public pressure and the California Environmental Quality Act (CEQA), we have been unable to respond to all the proposals. We address 10 percent while 90 percent go through. Clearly and new strategy is in order.

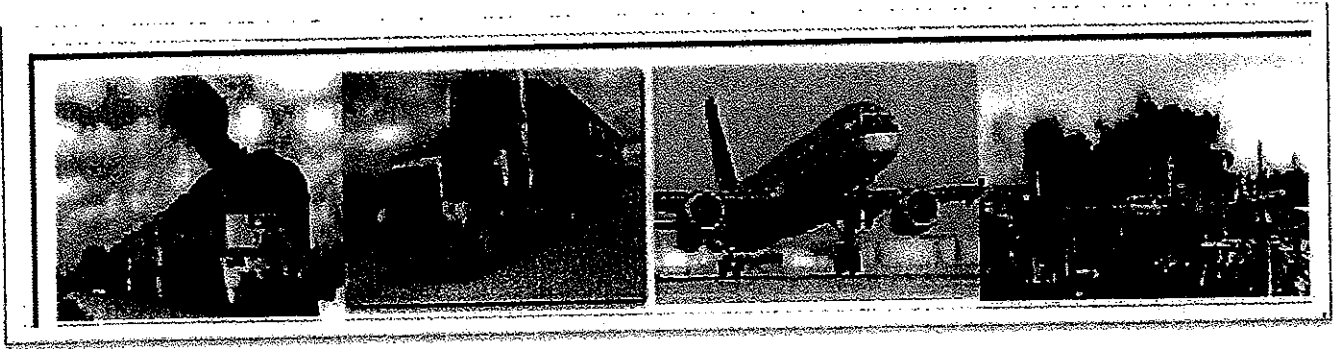
The situation has reached a point that demands intervention now, if these communities are to survive. Since Riverside County covers thousands of square acres of land ripe for repeating this scenario, we believe that if we can dramatically confront the County here, in a thoughtful, strategic manner that will impact the way the County officials move forward in the rest of the County.

We thank you for adding your support to our fight for justice and recognizing that when one community is harmed we are all harmed.

In Solidarity,

Penny J. Newman

Penny J. Newman
Executive Director



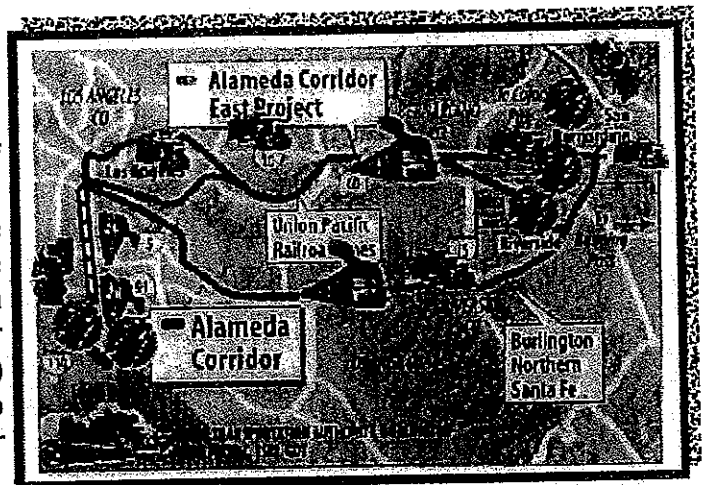
From Ports to Playgrounds

The communities of southern California are increasingly concerned that the financial goals of the international trade and logistics industry are taking priority over the distressing health and quality of life impacts upon our families. Global and domestic corporations are demanding more ports to bring in more imported goods, which must have some way of getting from Long Beach to any one of thousands of destinations. More goods mean expanding the logistics industry with added marine terminals, wider freeways, more truck-only lanes, more rail yards, and more warehouses for cargo.

The expansion of global trade is having devastating effects from the goods movement corridors (rail lines, truck routes,) and facilities (ports, railyards, intermodal facilities, truck yards and distribution centers) in communities from the ports such as Wilmington Long Beach and San Pedro; through communities in Riverside and San Bernardino Counties. More than one-third of all cargo imported into the U.S. by ship now enters through the Los Angeles and Long Beach Ports making them the most active load centers in the world, having handled more than 13 million TEUs (twenty foot equivalent units). Together, they comprise the largest port complex in the United States and the third largest port in the world, only after Hong Kong and Singapore.

This is without even considering the heavy emissions from the hundreds of diesel-powered locomotives and thousands of diesel-spewing trucks transporting imported freight containers. The need to move the huge volume of imports draws increased numbers of diesel spewing locomotives and trucks. For example, there are more than 47,000 truck trips per day out of the ports of Los Angeles and the number is estimated to skyrocket to 100,000 trips per day by 2025.

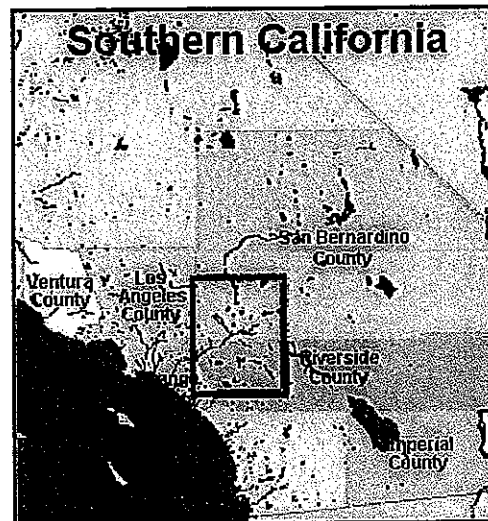
More than 35,000 trains—many of them longer than a mile, pulled by four diesel powered locomotives—course through the region every year. In Colton alone, more than 160 trains roll through the city each day. The number of locomotives (with their heavy polluting high-sulfur content diesel) moving throughout the region is expected to increase by three times the current number by 2020.



The composition of U.S. trade has been shifting toward lighter goods that are more likely to be shipped by air, creating opportunities for new and expanded air cargo ports. Two are proposed for the Inland Valleys at Norton Air Base and March GlobalPort. It has been described that one plane taking off produces the same amount of pollution as a gas station on fire. Forecasters estimate that 9.5 million tons of air cargo will be handled by the region's cargo-capable airports in the year 2025. That amounts to a 265% increase in volume.

Introduction to the Inland Valley

Riverside and San Bernardino Counties cover nearly 30,000 square miles in the inland portion of southern California. The climate and terrain vary widely. There are the cool, snow covered ski resort areas located in the San Bernardino and San Jacinto mountains. At the other extreme is the hot, arid lands of the high deserts in San Bernardino (home of Death Valley); and the resort areas of the Palm Springs area where temperatures can reach as high as 120 degrees in the summer months.



While 90% of **San Bernardino County** is comprised of desert land, the population according to the 2000 Census data reached 1,709,434. The ethnic and racial composition of San Bernardino's population is 1,006,960 Caucasian; 155,348 African American; 19,915 Native American; 80,217 Asian; and 669,387 Hispanic.⁴

Riverside County is the 4th largest county in the state, stretching 200 miles across—from within 14 miles of the Pacific Ocean to the Colorado River; and comprising 7,200 square miles of river valleys, low deserts, and mountains. Recent years have brought dramatic population growth to the county. Between 1980 and 1990, the number of residents grew by over 76%—making Riverside the fastest growing County in California. Riverside County's population now reaches 1,545,387...more than the entire population of 13 states, among them Maine, Nevada, Hawaii, and New Hampshire. The ethnic/racial makeup consists of 51% Caucasian (not of Hispanic/Latino origin); 6.2% Black or African American; 1.2% Native American; 3.7% Asian; and 36.2% Hispanic or Latino.⁵

Crossing county lines, the centers of population of the two counties are concentrated in the western end with the four biggest cities—Riverside, Ontario, San Bernardino and Moreno Valley—within a 50-mile radius.

The population of the western end of the unincorporated, rural area of Riverside County is approximately 80,000 people. The Mira Loma/Glen Avon area is generally bounded by Interstate 15 on the West, the Riverside/San Bernardino county line to the North; the Santa Ana River on the South and Valley Way on the East.

⁴ U.S. Census Bureau, 2000 Census Data. www.census.gov/index.html

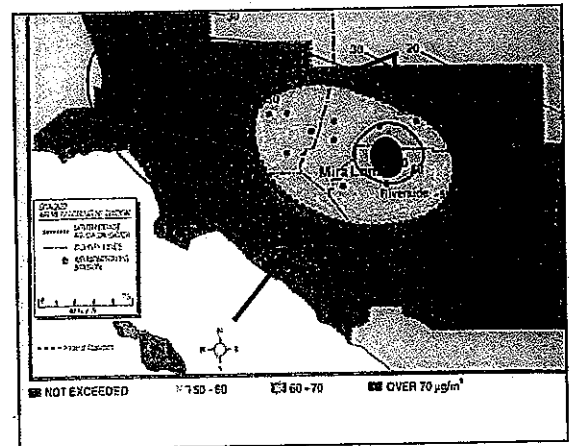
⁵ U.S. Census Bureau, 2000 Census Data. www.census.gov/index.html

The population for this defined area is approximately 46,000 people. According to data from Aide to Families with Dependent Children (AFDC) 64% of the elementary school children in the two communities of Mira Loma, and Glen Avon are from low-income families, with two schools reporting levels as high as 95% low income. The ethnic makeup of this area, Averages 65% Hispanic or Latino; 39.5% White (not Hispanic Origin); 18% African American; 7% Asian/Pacific Islander.

More than 845,255 people in Riverside County face a cancer risk more than 100 times the standards set by the Clean Air Act.⁶ One study conducted by Kaiser Foundation Hospitals, and sponsored by AQMD, linked airborne fine particle concentrations to increased hospital admissions in our area for respiratory disease, chronic obstructive lung disease, pneumonia, heart disease and death.⁷

Pollution History

The Mira Loma community has also long been known as a trap for particulate pollution in the form of PM10. The on shore winds blow the pollutants from Los Angeles and Orange Counties toward the Inland Valleys. As they pass the Chino area the ammonia from the vast dairy lands increases the production of particles in the air. The peculiar geographic and meteorologic conditions of the area concentrate and trap the particles creating very high readings.



Adding to the problem is the unpaved roads, high traffic freeways to the west and north of the communities.

The result is **Mira Loma has**

- **the highest levels of particulate pollution in the nation;**
- **4th highest in the world, only after**

**Jakarta, Indonesia;
Calcutta, India; and
Bangkok, Thailand.**

Research by scientists at USC Children's Health Study found **children in this community to have the slowest lung growth and weakest lung capacity of all children in southern California due to particulate pollution.** To add insult to injury, the funds raised by placing these polluting facilities in the community are not being used in those communities but

⁶ EDF Scorecard "About your Community"; www.scorecard.org

⁷ Van Den Eeden, Stephen; et al. "Impact on Physician Visits and Hospital Admissions", Kaiser Permanente Hospital, presentation at Air Pollution Health Impacts: Recent Findings, Implications, Dieselization, and Policy Initiatives, November 20, 1997

are providing projects to the higher income area of Indians Hills and the Rubidoux community. Glen Avon and Mira Loma have received little benefit—just more risk.

Exemplary of environmental justice concerns is the targeting of a low-income area with a large populations of color and pre-existing pollution from other sources, that local government selects to receive concentrated levels of diesel exhaust—the most deadly of all particulate pollutions.

Diesel Exhaust – the latest assault

It is in this setting that the decisions to site mega-warehouses and rail yard expansions occurs. Under the guise of satisfying market demands local officials courted developers of warehousing to come to the area. In total disregard for the community's health and well-being, subsidies, tax breaks and waivers from county requirements lured the big boxes to our area. Local residents were unaware of the incoming proposals since negative declarations in environmental reviews (no possibility of environmental impacts) and a fast track process (45 days from application to hearing) were used to expedite the planning process. Only after CCAEJ filed 4 lawsuits and the community's public outcry were Environmental Impact Reports (EIRs) required.

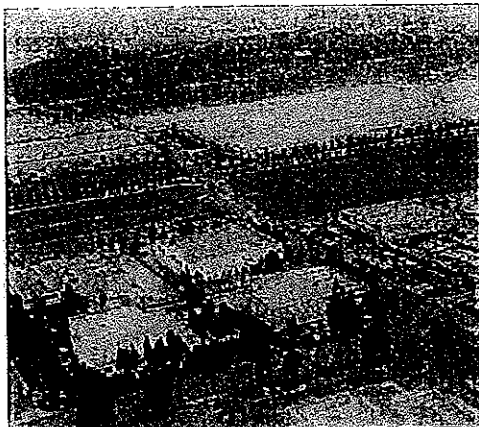
As the first EIR came under review, a workshop on air quality was held featuring researchers from USC, UCR, a presentation on the Specific Air Quality Study by AQMD, and a presentation by CCAEJ on community concerns. The Planning Commission UNANIMOUSLY voted against the warehouse adding comments such as...

"We need to err on the side of caution." "There clearly is a health risk." "For every additional truck, the risk is increased." "The overwhelming evidence is that diesel exhaust endangers the public." "If we do anything further to exacerbate Mira Loma air pollution problems, we are sending the wrong message."

Despite the overwhelming evidence, a few months later the Board of Supervisors found "overriding considerations" and approved two more warehouse projects.

Current Activities Threatening Public Health

Economic development strategies and local land use decisions influence the levels of pollution to which specific communities are exposed, too often resulting in disproportionate levels of risk for low-income neighborhoods and Communities of Color. Increases in community exposure can lead to increased rates of disease and negative impacts on public health. More than 45 studies conducted by various investigators between 1967 and 1993 examined the role of race and income level in exposure to environmental hazards, and found disparate impacts in the



great majority of cases studied (87 percent and 74 percent, respectively).

Proposed plans for expansion of the ports, train lines, rail yards and intermodal facilities (where cargo is moved between trucks

and trains) and the siting of these facilities in or near residential areas, raise community concerns regarding the increase of health impacts to neighborhood residents and the loss of families' quality of life.

The rapid growth and convenient location to freeways, airports or rail lines make the Inland Valleys of Riverside and San Bernardino Counties prime locations for manufacturing and industrial facilities, warehouses and distribution centers-- without regard to the incompatibility with, or health threat posed to existing communities and close proximity to homes, schools and other sensitive receptors. Planning strategies and the drive for economic growth have led local agencies to disregard existing problems such as air pollution, traffic congestion, water contamination or consideration of the rural nature or life styles of existing neighborhoods affected by their decisions. The outcome of poor public policies and lack of appropriate planning has created a situation where homes are next to polluting industries; where diesel trucks crowd residential streets; where neighbors can't use their backyards because of overwhelming noise or odors. The result is an overall deterioration of the air, water, and quality of life—leading to an increase in health problems.

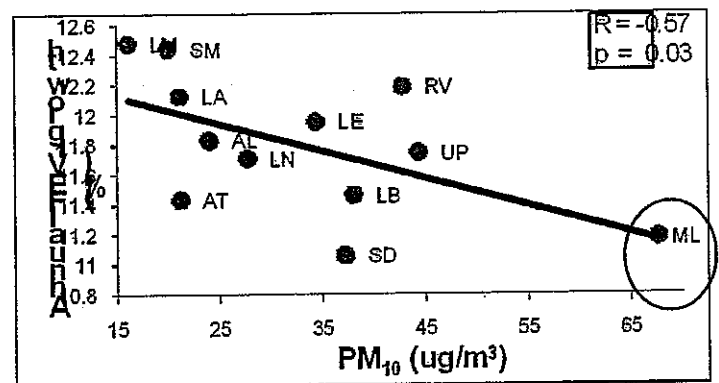
The concentration of truck activity has resulted in the area being designated as a diesel "hot spot" by the South Coast Air Quality Management District (SCAQMD) dramatically affecting the health and safety of local residents.

In recent years, environmental health researchers have firmly established the linkage between air pollution exposure and a range of negative health outcomes, including slowed lung growth rates in children (Gauderman et al Cohort C, Cohort D papers), exacerbation of existing respiratory disease (McConnell et al EHP bronchitis/asthmatic paper), increased absences from school due to respiratory illness (Gilliland et al CHS absences paper), and increased mortality. Both gaseous and particulate pollutants have been implicated in health investigations, with increasing attention being focused recently on the toxicity of particulate each year due to air pollution in the South Coast Air Basin.. To put this in context, that is more people that die from respiratory illnesses caused or exacerbated by particulate air pollution each year than are killed in car accidents, murders, and AIDS—COMBINED!

The impact of air pollution on children's respiratory health, in particular asthma, is a significant problem in Southern California. A recent survey in California found that nearly 700,000 children ages 6-17 suffer from asthma symptoms; one in five African-American children in California has been diagnosed with asthma. (CHIS) That same survey finds that in Southern California, the highest asthma symptom prevalence in children ages 0-17 is found in San Bernardino County (13.9%), (CHIS). Air pollution is a significant problem for the target communities of the Inland Valley.

Health Implications for Mira Loma Children.

The findings from the USC Children's Health Study demonstrating the affects of air pollution upon lung function are particularly frightening for our area. The Study found *that Mira Loma children had the weakest lung function and slowest lung growth of all children studied in southern California.*



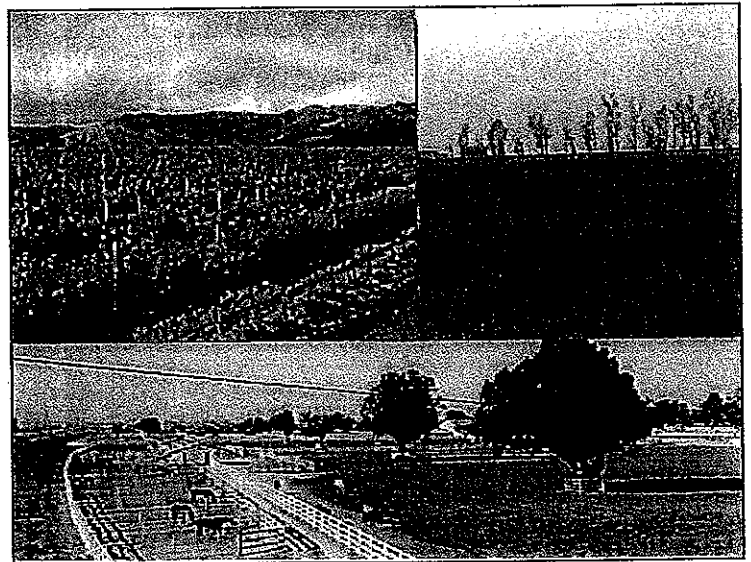
Another analysis that drew upon data from the same USC Children's Health Study, ranked children living in Mira Loma as the most likely to develop asthma, other respiratory diseases and have stunted lung growth. The study found that children living within 500 meters of a freeway (approximately a third of a mile) have substantial deficits in lung function by the time they reach age 18. Of all children studied throughout southern California, children in Mira Loma and Riverside had the poorest lung function, and as a result the greatest risk for developing respiratory and cardiovascular diseases later in life.

But disease risk caused by particulate matter pollution is not limited to children. A recent study by the University of Washington found that women over the age of 50 living in highly polluted areas around the United States (including Mira Loma and Riverside) have more than double the chance of developing heart disease and dying from it, compared with women living in cleaner air regions. Again, the study found a strong correlation between particulate pollution and heart disease.

The Role of Land Use in Environmental Health and Justice

Glen Avon/Mira Loma are unincorporated communities in the western most portion of Riverside County. The area has traditionally been an agricultural area with vast acreage of vineyards, dairies, thoroughbred ranches and small farms. Most residential areas are 1/2 acre or more where families own and raise horses, cows, chickens and goats. The vast open land has been cherished by local families who sought a lifestyle linked to nature and outdoor activities

Since 1999 there has been a constant assault on the communities as industries from the Los Angeles and Orange Counties sought new territory in which to expand or relocate.



The vast open spaces of our communities became prime targets. To accommodate the market need and to enhance local government profits, the open spaces and rural communities were classified as "blighted" and put into redevelopment zones.

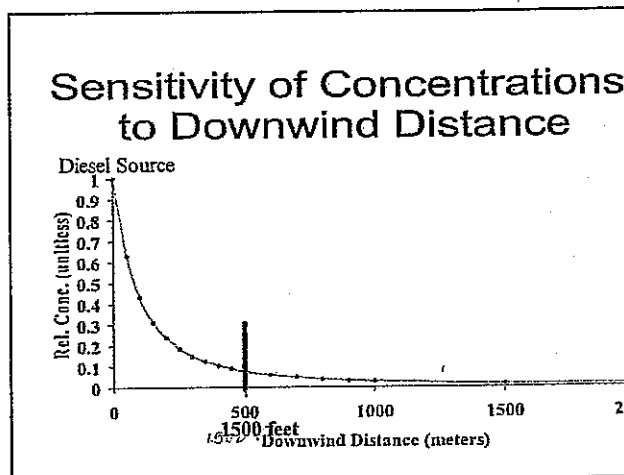
As "agricultural -preserve" land (which paid no property tax) was developed, a huge tax increment increase resulted putting millions into the redevelopment fund to be used on special projects. The most productive land use—from the standpoint of the local

government—were the massive 1 million square foot warehouses. The new massive buildings provided an instant and huge funding source from property tax increases. The temptation to solve the local government funding shortage through warehouse development became too great to turn down—even at the expense of the health of the low-income residents of the affected communities from the concentration of diesel truck exhaust drawn to the area by the warehousing.

Proximity to the diesel source is important.

The South Coast AQMD's Mira Loma Specific Air Quality Study found that the closer one is to the diesel source the greater the health risk. AQMD recommended that "if we re to bring diesel sources into the community there should be a 500 meter (1500 feet) buffer zone between diesel sources and where people live."

The study also concluded that even if all trucks coming into the area were new and used the least polluting alternative fuels the pollution levels would remain dangerously high— the mere increase in the number of trucks would keep the pollution levels elevated.



While ignorance could be claimed in the beginning, the emerging scientific information brought forth by the South Coast AQMD, researchers at USC and UCLA and the hundreds of other scientific studies generated on diesel, clearly show the horrific health impacts from constant, high levels of diesel exhaust. As recently as April of this year, another mega-warehouse was permitted for the area in close proximity to the Jurupa Valley High School—the "hot-spot" for diesel pollution.

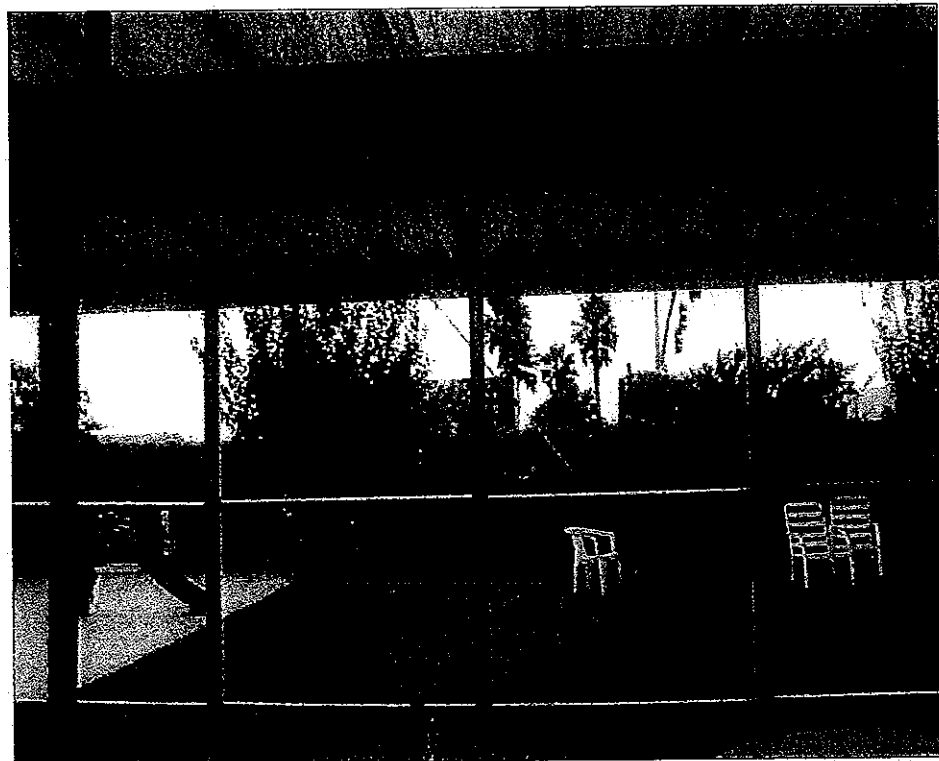
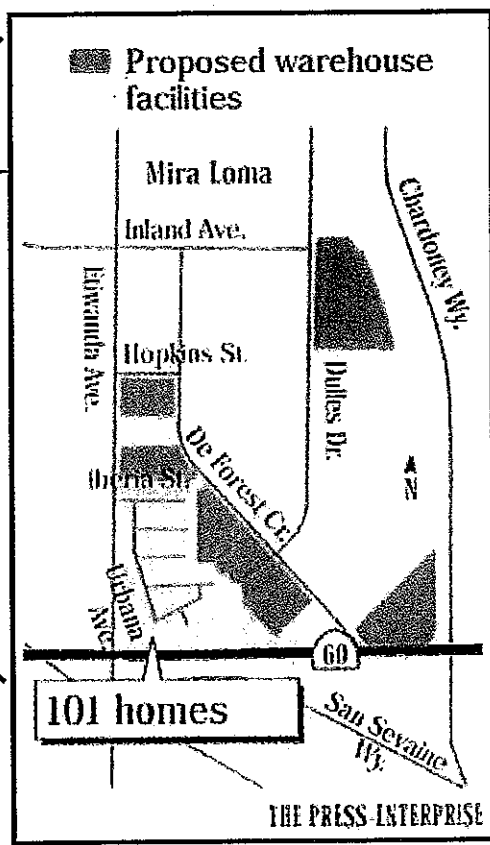
Based on the overwhelming and ever increasing scientific evidence, CCAEJ has demanded simple prudent and reasonable measures to minimize the impacts from the industrial development taking place. Simply keep diesel sources separated from homes, schools, and parks. That can be accomplished through several mechanisms such as buffer zones; designated truck routes that keep trucks out of residential areas; and not building homes near freeways and busy roads.

Current Proposed Projects

While we were able to stop warehouses from being sited near homes on approximately 700 acres, the same developers now propose to place a residential development up to the area of existing warehouses and the truck route for vehicles exiting a new off ramp from the I-15. This plan will place in harms way hundreds of unsuspecting new homeowners directly adjacent to a major pollution source.



Mira Loma Village is a neighborhood of 101 overwhelmingly Spanish speaking. 6 Mega warehouse are proposed up to fence lines of these homes. Next to these homes is Etiwanda Ave. where more than 800 trucks pass by per hour.



REGION: Inland air quality remains among worst in nation

BY JANET ZIMMERMAN

STAFF WRITER

jzimmerman@pe.com

Published: 25 April 2012 02:01 AM

San Bernardino and Riverside counties ranked among the worst in the nation for ozone pollution — again — in the American Lung Association's annual State of the Air report.

The Inland region also had some of the country's highest levels of fine-particle pollution, the tiny particles from diesel soot, wood smoke and chemical compounds from factory and vehicle emissions that work their way deep into the lungs and bloodstream.

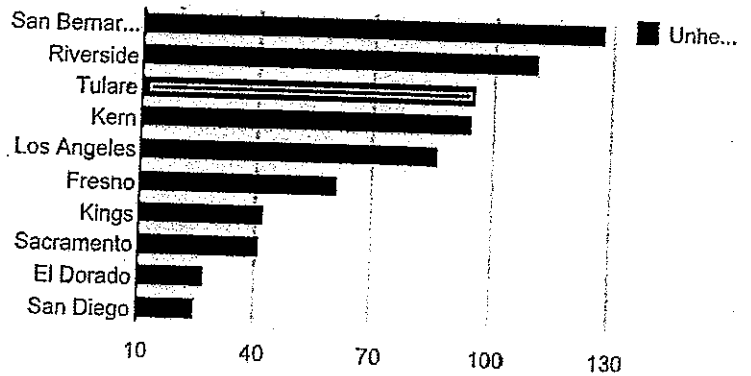
But experts said Tuesday that the South Coast air basin, which includes the Inland region, had made great strides since the first report 13 years ago. Progress includes a 33 percent reduction in ozone since the 2000 report and some of the best air quality in that time period, said Bonnie Holmes-Gen, executive director of the American Lung Association in California.

Still, the state is the No. 1 most polluted in the country from ozone and particle pollution for the measurement period, 2008 to 2010. Nearly three-fourths of the California counties received failing grades for not meeting federal clean air standards.

"While we do have the worst pollution in the country, we need to take heart — progress has been made," Holmes-Gen said.

In Riverside County, ozone days have dropped 30 percent since the 2000 report, from 159.7 unhealthful days to 111.3. The number of unhealthful days for fine-particle pollution has declined 53 percent, from 81.5 to 28.8, since the 2007 report. And the county's annual-average particulate levels dropped 41 percent over six years.

Most ozone polluted counties in the U.S.



Source: American Lung Association

In San Bernardino County, there was a 33 percent reduction in unhealthy ozone days since the 2000 report, from 189.5 to 127.8. Days of unhealthy fine-particle pollution have dropped 64 percent since 2007, from 24.3 to 6.3. And the annual fine-particle levels for the county decreased 40 percent from 2004 and earned a passing grade this year for the first time.

Pollution causes asthma, stunted lung development in children, respiratory infections, heart attack, strokes and premature death.

A panel of experts from the American Lung Association recommended that individuals insist on continuing the federal Clean Air Act, despite attempts in Congress to repeal it. The public also can drive less, choose low-emission vehicles and avoid burning wood in fireplaces, they said.

For more information, see the report at www.lung.org

L.A./Long Beach and Riverside Most Polluted in USA Says Lung Association

State of the Air 2012 report does shows progress despite challenges

LOS ANGELES – The American Lung Association released the State of the Air 2012 today, an annual report on air quality which lists both the cleanest and most polluted areas in the country.

This year's report shows although the greater Los Angeles region still has some of the worst air in the nation, continuous progress in reducing ozone and particulate pollution has resulted in the region's air quality at its cleanest since the Lung Association's annual report began 13 years ago.

The City of Jurupa Valley and Riverside County are included in the LA region report.

The findings reinforce the effectiveness of California's progressive clean air laws and investments and importance of the Clean Air Act. "This report shows air pollution remains a serious health threat to too many Californians," said Janie Warner, President and CEO of the American Lung Association in California. "State of the Air 2012 shows that we're making real and steady progress in the fight for clean air, but unhealthy levels of air pollution still exist, putting the health of millions Californians at risk. Much still needs to be done, and now is not the time to stop progress."

Despite having the lowest levels of ozone pollution this year, the metropolitan area of Los Angeles, Long Beach, and Riverside is still rated as the most ozone polluted area in the U.S.

The area also is ranked in the top five for short-term particle pollution and is 2nd in the nation for annual particle pollution.

Despite these challenges, the trend is toward cleaner air in the region.

Overall, California cities once again dominate lists for the top 10 most polluted areas in the U.S. for ozone (smog) and short-term and annual particle pollution.

That means more people are at risk for asthma attacks, heart attacks, and premature death. Specifically, of the top 10 cities with the worst air pollution.

Despite these poor rankings, many California cities continue to show improvements, including reductions in unhealthy ozone and particulate pollution.

The Los Angeles/Riverside region shows particularly noteworthy success in reducing particle pollution over the years of the State of the Air report.

Annual levels of particle pollution have dropped by over 40% throughout the region and the number of days for short-term particle pollution has dropped by over 50% since the State of the Air report began collecting this data, with some annual fluctuations.

California's groundbreaking air quality policies such as the advanced pollution standards on cars and fuels and diesel emissions regulations implemented by the California Air Resources Board (CARB) have been responsible for tremendous progress in reducing the ozone pollution and

diesel soot harming California residents.

Air pollution problems not only originate within urbanized areas but are also transported to other areas of the state.

For example, in the San Luis Obispo area, air pollution transported from nearby areas is a primary culprit for poor air quality grades, demonstrating that air pollution is a regional problem.

California's pollution problems are primarily caused by emissions from mobile sources like cars, diesel trucks and buses, locomotives, ships, agricultural and construction equipment, and other transportation sources.

Oil refineries, manufacturing plants, and residential wood burning also are key sources of emissions.

In addition, California's warm climate promotes the formation of ozone pollution, and valleys and mountains in the central and eastern portions of the state trap pollution where it can linger for days and put residents at risk for the onset or exacerbation of lung disease.

"Ozone and particle pollution contribute to thousands of hospitalizations, emergency room visits, and deaths every year," said David Warburton, MD, Professor of Pediatrics at the Saban Research Institute, Childrens Hospital Los Angeles and volunteer physician for the American Lung Association in California. "Air pollution can stunt the lung development of children, and cause health

emergencies, especially for people suffering from chronic lung disease including asthma, chronic bronchitis, and emphysema.

"Both long-term and short-term exposures can result in serious health impacts.

"Cleaner air can save lives and can lead to better lives for our children."

Even though the lives of many people are at risk due to air pollution, some members of Congress continue to propose changes to the Clean Air Act that would interfere with efforts to reduce air pollution and protect public health.

The Environmental Protection Agency estimates that cutting air pollution through the Clean Air Act will prevent at least 230,000 deaths and save \$2 trillion annually by 2020.

The Lung Association is fighting Congressional attacks that would undermine the Clean Air Act and strip California of its authority to adopt stronger regulations.

"California must continue to demonstrate leadership by stepping up efforts to achieve clean and healthy air for all residents," said Warner. "This can be done by supporting implementation of state clean car, clean fuel and diesel regulations, redesigning our communities to reduce vehicle trips, and bringing more renewable energy to the state such as solar and wind power. We also urge all Californians to show strong support for the Clean Air Act and to make an effort to reduce air pollution in their communities by driving less, using cleaner transportation options like hybrid and electric vehicles, recycling, avoiding wood burning, and using energy efficient appliances."

USC studies a few years ago declared Mira Loma as having the worst air pollution in America.

STATE OF THE

AIR 2012

AMERICAN LUNG ASSOCIATION

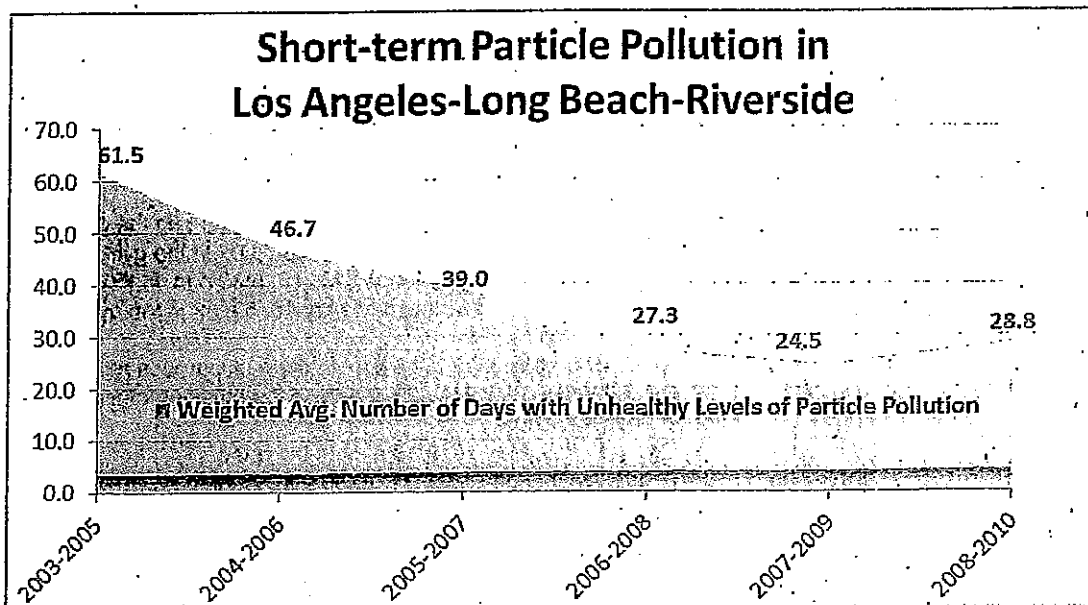
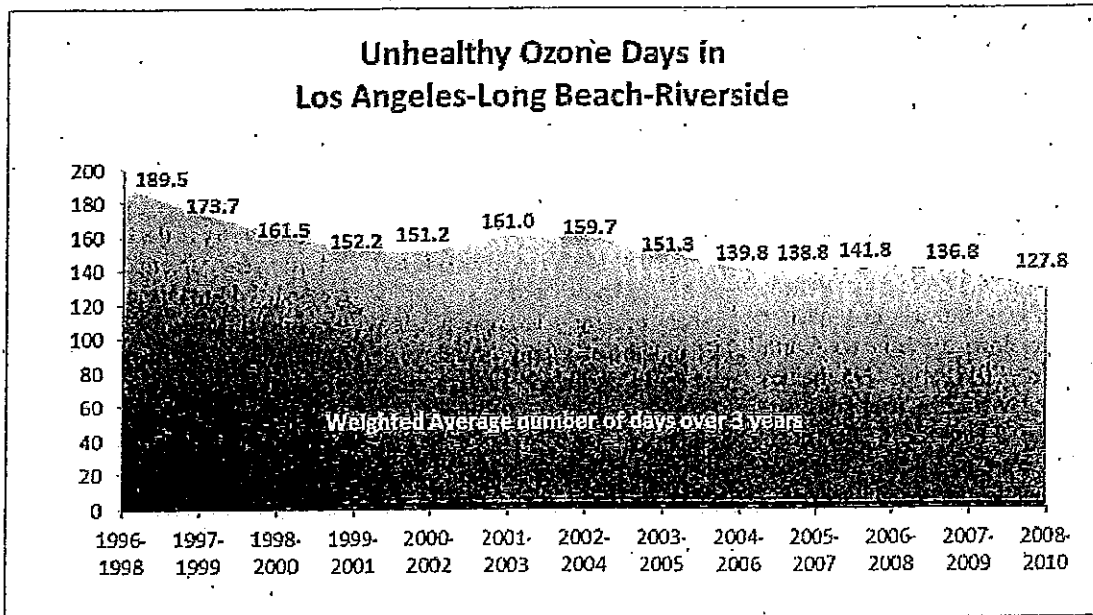
Grades						
County	Ozone Days	Ozone Grade	PM Days	PM Grade	Annual PM Value	Annual PM Grade
Los Angeles	86.2	F	20.3	F	14.4	Pass
Orange	10.7	F	6.2	F	11.9	Pass
Riverside	111.3	F	28.8	F	17.0	Fail
San Bernardino	127.8	F	6.3	F	14.5	Pass

Number of Days reported equals the weighted annual average of unhealthy days recorded over the three-year period of 2008-2010.

- Key Pollution Sources**
- Mobile sources, including on- and off-road diesel fueled-vehicles, cars, trucks buses and locomotives, ships and aircraft contribute approximately 90 percent of pollution in the region
 - Ports and goods movement (contributes to regional pollution and generates significant toxic diesel particulate matter hot spots near the Ports of Los Angeles and Long Beach)
 - Stationary sources including oil refineries and power plants
 - Area sources, including residential wood burning

Trend Charts

- Unhealthy air days shown in charts below represent a 3-year weighted average number of days recorded from 2008-2010. Days above the red line (3.3 annual average) earn the location an F grade.

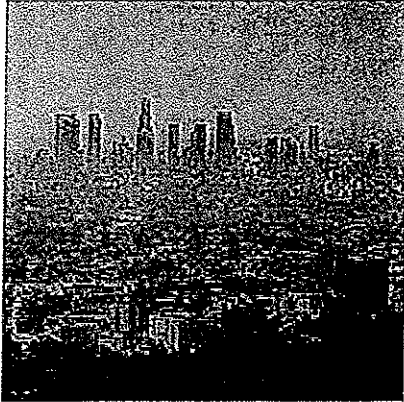


Smog May Cause Lifelong Lung Deficits

09/08/04

A long-term USC study following the pulmonary health of children in polluted L.A. areas signals likely health problems in adulthood.

By Alicia Di Rado



By age 18, the lungs of many children who grow up in smoggy areas are underdeveloped and will likely never recover, according to a study in this week's issue of the New England Journal of Medicine.

The research is part of the Children's Health Study, the longest investigation ever into air pollution and kids' health.

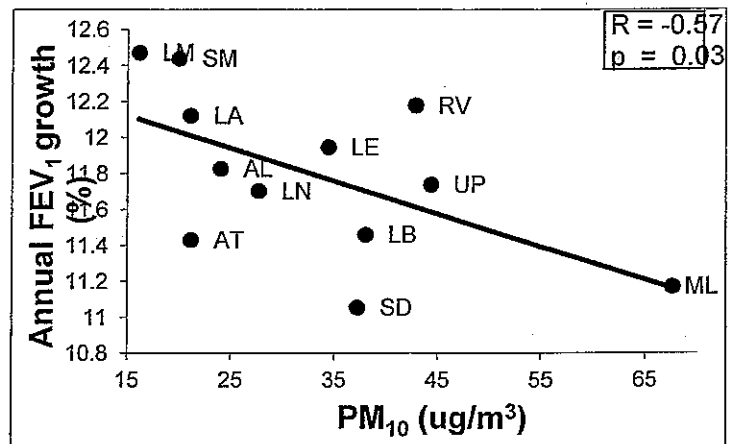
Between 1993 and 2001, study scientists from the Keck School of Medicine of USC tracked levels of major pollutants in 12 Southern California communities while following the pulmonary health of 1,759 children as they progressed from 4th

grade to 12th grade.

The 12 communities included some of the most polluted areas in the greater Los Angeles basin, as well as several low-pollution sites outside the area.

Keck School researchers previously found that children who were exposed to more air pollution scored more poorly on respiratory tests. In this latest study, researchers analyzed the same children's respiratory health at age 18, when lungs are almost completely mature.

"Teenagers in smoggy communities were nearly five times as likely to have clinically low lung function, compared to teens living in low-pollution communities," said W. James Gauderman, associate professor of preventive medicine at the Keck School and lead author of the study.



People with clinically low lung function have less than 80 percent of the lung function expected for their age – a significant deficit that would raise concerns during a doctor's exam.

"When we began the study 10 years ago, we had no idea we would find effects on the lung this serious," said John Peters, Hastings Professor of Preventive Medicine in the Keck School, director of the Southern California Environmental Health Sciences Center and senior author of the study.

Study technicians traveled to participating schools every year and tested children's lung function,

a measure of how well their lungs work. As an example, someone with sub par lung function cannot exhale and blow up a balloon as quickly or as big as someone with good lung function.

Researchers correlated the students' lung health measurements with levels of air pollutants monitored in the communities during the same time period.

They found greater deficits in lung development in teenagers who lived in communities with higher average levels of nitrogen dioxide, acid vapor, particulate matter with a diameter of less than 2.5 micrometers (about a tenth the diameter of a human hair) and elemental carbon.

"These are pollutants that all derive from vehicle emissions and the combustion of fossil fuels," Gauderman said.

Deficits in lung function have both short- and long-term effects.

"If a child or young adult with low lung function were to have a cold, they might have more severe lung symptoms, or wheezing," Gauderman said. "They may have a longer disease course, while a child with better lung function may weather it much better."

Potential long-term effects are more alarming. "Low lung function has been shown to be second only to smoking as a risk factor for all-cause mortality," Gauderman said.

Lung function grows steadily as children grow up, peaking at about age 18 in women and sometime in the early 20s in men. Lung function stays steady for a short time and then declines by 1 percent a year throughout adulthood.

As lung function decreases to low levels in later adulthood, the risk of respiratory diseases and heart attacks increases.

Researchers are unsure how air pollution may retard lung development.

Gauderman believes chronic inflammation may play a role, with air pollutants irritating small airways on a daily basis. Scientists also suspect that pollutants might dampen the growth of alveoli – tiny air sacs in the lungs.

The research team will continue to follow the study participants into their early 20s, when their lungs will mature and stop developing entirely. The team seeks to find out if the participants begin to experience respiratory symptoms and if those who moved away from a polluted environment show benefits.

The California Air Resources Board, National Institute of Environmental Health Sciences and Hastings Foundation supported the research.

Public release date: 4-Nov-2009

Contact: Meghan Lewit
lewit@usc.edu
323-442-3941
University of Southern California

USC study finds big air pollution impacts on local communities

Traffic corridors in Long Beach and Riverside are a major contributor to illness from childhood asthma

Heavy traffic corridors in the cities of Long Beach and Riverside are responsible for a significant proportion of preventable childhood asthma, and the true impact of air pollution and ship emissions on the disease has likely been underestimated, according to researchers at the University of Southern California (USC).

The study, which appears in an online edition of the *American Journal of Public Health*, estimated that nine percent of all childhood asthma cases in Long Beach and six percent in Riverside were attributable to traffic proximity.

The study also found that ship emissions from the Los Angeles-Long Beach port complex contributed to the exacerbation of asthma. For example, approximately 1,400 yearly episodes of asthma-related bronchitis episodes in Long Beach (21 percent of the total) were caused by the contribution of ship emissions to nitrogen dioxide levels in the city.

Although there has been extensive research on the effects of traffic proximity on asthma risk, this study is one of the few that has estimated the number of cases—or "burden of disease"—associated with traffic in specific high risk communities, says principal investigator Rob McConnell, M.D., professor of preventive medicine at the Keck School of Medicine of USC and deputy director of the Children's Environmental Health Center at USC.

"The traditional approach to estimating the burden of air pollution-related disease has markedly underestimated the true effect," McConnell says. "Our results indicate that there is a substantial proportion of childhood asthma that may be caused by living within 75 meters (81 yards) of a major road in Long Beach and Riverside. This results in a much larger impact of air pollution on asthma symptoms and health care use than previously appreciated. This is also one of the first studies to quantify the contribution of ship emissions to the childhood asthma burden."

Such specific data about the local health burden of air pollution is useful for evaluating proposals to expand port facilities or transportation infrastructure in the L.A. area, McConnell noted. Both Long Beach and Riverside already have heavy automobile traffic corridors as well as truck traffic and regional pollution originating in the port complex, which is the largest in the United States.

The study drew upon data from the Children's Health Study (CHS), a longitudinal study of respiratory health among children in 12 Southern California communities, including Riverside and Long Beach. Researchers estimated the number of asthma cases and related complications that occurred because of air pollution, using information from epidemiological studies that they then applied to current exposure to air pollution and traffic in Southern California. The results showed that approximately 1,600 cases of childhood asthma in Long Beach and 690 in Riverside could be linked to living within 81 yards of a major road.

"The impact of roadway proximity on the overall burden of asthma-related illness is remarkable," McConnell says. "Air pollution is a more important contributor to the burden of childhood asthma than is generally recognized, especially to more severe episodes requiring visits to a clinic or emergency room."

Unlike regional air pollutants, the local traffic-related pollutants around homes and their effects are not currently regulated, he notes.

"This is a challenge to communities, to regulatory agencies and to public health," McConnell says. "Traffic-related health effects should have a central role on the transportation planning agenda."

###

The study, an international collaboration between USC, the Center for Research in Environmental Epidemiology (CREAL) in Spain and the University of Basel in Switzerland, was supported by the National Institute of Environmental Health Sciences, the U.S. Environmental Protection Agency, the South Coast Air Quality Management District, the Hastings Foundation, the Center for Research in Environmental Epidemiology (Switzerland) and the Fundacion Insitut Municipal d'Investigacio Medica (Barcelona). The authors acknowledge the insights of the staff and members of the Long Beach Alliance for Children with Asthma and the Center for Community Action and Environmental Justice.

Laura Perez, Nino Kuenzli, Ed Avol, Andrea M. Hricko, Fred Lurmann, Elise Nicholas, Frank Gilliland, John Peters, Rob McConnell. "Global Goods Movement and the Local Burden of Childhood Asthma in Southern California." *American Journal of Public Health*. Doi: 10.2105/AJPH.2008.154955

This story comes courtesy of California Watch.

By Susanne Rust

It's well established that dirty, sooty air is no good for your lungs and probably not great for your skin. But new research indicates it can damage your brain, too.

A study in the journal of the Archives of Internal Medicine shows that air pollution accelerates cognitive decline in women.

And with a new federal report showing Southern Californians are at the highest risk of death due to air pollution, this study adds to the growing body of grim evidence showing air pollution and healthy bodies don't mix.

"We keep learning about more adverse effects (from pollution) than we thought possible," said Jean Ospital, health effects officer with the South Coast Air Quality Management District, who was not involved with the current research.

"I'm not sure I find these results surprising," he said, "but I'm also not sure I would have expected them if you'd asked me 10 years ago."

The new research, conducted by a team of researchers from Chicago, Boston, Baltimore and Philadelphia, looked at the effect of coarse particulate matter in the air on the cognitive health of older women.

"We, as a society, are on the verge of dealing with an unprecedented number of people having dementia," said Jennifer Weuve, lead author of the study and a researcher at Chicago's Rush University Medical Center. "We know relatively little about how to prevent dementia, but we do know cognitive decline is related to dementia."

Weuve pointed to research showing a link between air pollution and cardiovascular disease.

"It turns out that cardiovascular disease may play a role in cognitive decline," said Weuve, who is a researcher at Rush's Institute for Healthy Aging. "So if we understand how to prevent or delay these cognitive increments, maybe we can prevent or delay dementia."

And not just at an individual level, she said.

"What's interesting about air pollution," Weuve said, is that "other factors that may cause dementia are generally found at the more individual level – diet, weight, smoking. And we can help to try to prevent them at that level. But in this case, we're looking at something that we can do to intervene at a broad scale, with society at large."

"It's a whole new way to think about prevention for dementia and cognitive decline," she said.

Weuve and her team turned to one of the largest epidemiological datasets and cohorts in medical research, the Nurses' Health Study, to begin looking for links between pollution and cognitive health.

The Nurses' Health Study, which researchers began in 1976, is a dataset based on information collected over time from 121,700 female registered nurses between the ages of 30 and 55 living in 11 different states.

Between 1995 and 2001, Weuve and her colleagues invited participants of the Nurses' Health Study to participate in a study of cognition. The team was able to get data from nearly 20,000 women.

To establish pollutant exposure, the team collected air pollution exposure data from the Environmental Protection Agency, which they correlated with the location of each woman's home and place of employment. Then they called each woman six times on the phone, over six years, and tested their cognitive abilities.

They found that higher levels of long-term exposure to air pollution particles was associated with significantly faster cognitive decline.

She said more research needs to be done. For instance, is the cognitive decline they observed due to cardiovascular issues, or are pollutants having a direct effect on the brain?

She said more research also will be needed to confirm her work.

"The bottom line," said Sam Atwood, a spokesman for the South Coast Air Quality Management District, "is that in Southern California, we have some of the highest levels of particulate matter in the country, and we are working as quickly as possible at reducing those levels."

Susanne Rust is an investigative reporter for California Watch and the Center for Investigative Reporting focused on the environment.

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ORIGINAL ARTICLE

A Correction Has Been Published ▸

The Effect of Air Pollution on Lung Development from 10 to 18 Years of Age

W. James Gauderman, Ph.D., Edward Avol, M.S., Frank Gilliland, M.D., Ph.D., Hita Vora, M.S., Duncan Thomas, Ph.D., Kiros Berhane, Ph.D., Rob McConnell, M.D., Nino Kuenzli, M.D., Fred Lurmann, M.S., Edward Rappaport, M.S., Helene Margolis, Ph.D., David Bates, M.D., and John Peters, M.D.
 N Engl J Med 2004; 351:1057-1067 | September 9, 2004

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BACKGROUND

Whether exposure to air pollution adversely affects the growth of lung function during the period of rapid lung development that occurs between the ages of 10 and 18 years is unknown.

[Full Text of Background...](#)

METHODS

In this prospective study, we recruited 1759 children (average age, 10 years) from schools in 12 southern California communities and measured lung function annually for eight years. The rate of attrition was approximately 10 percent per year. The communities represented a wide range of ambient exposures to ozone, acid vapor, nitrogen dioxide, and particulate matter. Linear regression was used to examine the relationship of air pollution to the forced expiratory volume in one second (FEV₁) and other spirometric measures.

[Full Text of Methods...](#)

RESULTS

Over the eight-year period, deficits in the growth of FEV₁ were associated with exposure to nitrogen dioxide (P=0.005), acid vapor (P=0.004), particulate matter with an aerodynamic diameter of less

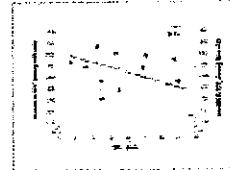
MEDIA IN THIS ARTICLE

FIGURE 1



Mean (+SD) Annual Average Levels of Pollutants from 1994 through 2000 in the 12 Study Communities in Southern California.

FIGURE 2



Community-Specific Average Growth in FEV₁ among Girls and Boys During the Eight-Year Period from 1993 to 2001 Plotted against Average Nitrogen Dioxide (NO₂) Levels from 1994 through 2000.

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than 2.5 μm ($\text{PM}_{2.5}$) ($P=0.04$), and elemental carbon ($P=0.007$), even after adjustment for several potential confounders and effect modifiers. Associations were also observed for other spirometric measures. Exposure to pollutants was associated with clinically and statistically significant deficits in the FEV_1 attained at the age of 18 years. For example, the estimated proportion of 18-year-old subjects with a low FEV_1 (defined as a ratio of observed to expected FEV_1 of less than 80 percent) was 4.9 times as great at the highest level of exposure to $\text{PM}_{2.5}$ as at the lowest level of exposure (7.9 percent vs. 1.6 percent, $P=0.002$).

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CONCLUSIONS

The results of this study indicate that current levels of air pollution have chronic, adverse effects on lung development in children from the age of 10 to 18 years, leading to clinically significant deficits in attained FEV_1 as children reach adulthood.

Full Text of Discussion...

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54

Ultrafine particles in air pollution may heighten allergic inflammation in asthma

UCLA-led study has implications for traffic-related asthma flares

A new academic study led by UCLA scientists has found that even brief exposure to ultrafine pollution particles near a Los Angeles freeway is potent enough to boost the allergic inflammation that exacerbates asthma.

Published online in the *American Journal of Physiology—Lung Cellular and Molecular Physiology* in June, the study shows that the tiniest air pollutant particles — those measuring less than 180 nanometers, or about one-thousandth the width of a human hair — incited inflammation deep in the lungs. The researchers used a "real-time" testing method in an animal model to isolate the effects of vehicular emission particles on the immune response in the lung.

Since these ultrafine particles are primarily derived from vehicular emissions and are found in highest concentrations on freeways, the results have particular significance for the study of the impact of traffic-related emissions on asthma flares in urban areas.

The findings also point to the importance of understanding the role air-pollution particles play in asthma flares in order to develop new approaches for asthma therapy.

"The immune processes involved in asthma, and current treatments, are traditionally thought to be dominated by a specific initial immune response, but our study shows that ultrafine pollution particles may play an important role in triggering additional pathways of inflammation that heighten the disease," said the study's principal investigator, Dr. Andre E. Nel, professor of medicine and chief of nanomedicine at the David Geffen School of Medicine at UCLA.

Pollution particles emitted by vehicles and other combustion sources are coated with a layer of organic chemicals that can be released into the lungs. These chemicals generate free oxygen radicals, which excite the immune system in the lung through a cell- and tissue-damaging process known as oxidation. Oxidation contributes to allergic inflammation in the lungs of people with asthma.

Although other studies have shown that larger air-pollution particles can cause an oxidative response in asthma, this is the first study to show that real-time breathing of collected ultrafine

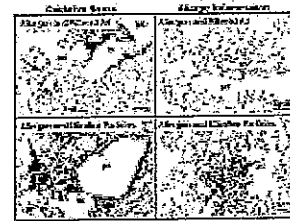


IMAGE: Exposure to ultrafine particles generated significantly stronger oxidative stress (lower left panel) and allergic inflammation (lower right panel) deep in the lung.

pollutant particles triggers the same reaction and may even be more damaging, due to the particles' tiny size, the researchers noted.

Because of their size and large surface area, ultrafine particles have the capacity to carry and deposit a rich load of active organic chemicals deep in the lung. The chemicals coming off the particles in the small airways in the lung promote oxidative stress at those sites.

In the study, researchers initially gave mice a surrogate allergen, similar to exposing humans to an allergen such as pollen. After further sensitization, half the mice received ultrafine pollutants, taken in real time near a freeway in downtown Los Angeles, while the other half breathed filtered air.

The study utilized sophisticated exposure technologies developed by Dr. Costas Sioutas, the Fred Champion Professor of Civil and Environmental Engineering at the University of Southern California and co-director of the Southern California Particle Center. The multicampus team also included researchers from Michigan State University and the University of California, Irvine. The research at the Southern California Particle Center and the UCLA Asthma and Allergic Disease Center was funded by the U.S. Environmental Protection Agency and the National Institutes of Health.

Researchers found that exposure to air containing ultrafine particles for a few hours a day over five days significantly enhanced allergic airway inflammation, which correlated to the changes found in the immune system and genes expressed. Scientists discovered that the most profound effects of the allergic inflammation were observed deep in the lung.

"We found that even small exposure amounts to the ultrafine particles could boost the pro-inflammatory effects," said first author Ning Li, an assistant researcher in the UCLA Division of Nanomedicine.

The level of ultrafine particle exposure in the study was two to five times higher than levels commuters are subject to while traveling in their vehicles on Los Angeles freeways.

Researchers noted that the development of asthma may be more complicated than originally thought, with mounting evidence pointing to the involvement of additional pathways of immune activity associated with the effects of oxidative stress.

"A number of new therapies are now targeting the role of oxidative stress in asthma exacerbation," Nel said. "One possible strategy may be the use of antioxidants that may interfere with development of oxidative stress."

In addition to new considerations for asthma treatment, the study findings may also help epidemiologists further establish the link between surges of pollutants near freeways and asthma flares and to pinpoint the amount of ultrafine particle concentrations involved.

The next stage of research will help identify the chemical components responsible for boosting the effect of particulate pollutants on the allergic inflammation found in asthma and will explore the immunological mechanisms behind it at the molecular level.

Asthma, which affects 15 to 20 million people in the United States, is a chronic inflammatory disease of the small airways in the lung and can trigger acute episodes of airway tightening and wheezing.

ORIGINAL ARTICLE

The Effect of Air Pollution on Lung Development from 10 to 18 Years of Age

W. James Gauderman, Ph.D., Edward Avol, M.S., Frank Gilliland, M.D., Ph.D., Hita Vora, M.S., Duncan Thomas, Ph.D., Kiros Berhane, Ph.D., Rob McConnell, M.D., Nino Kuenzli, M.D., Fred Lurmann, M.S., Edward Rappaport, M.S., Helene Margolis, Ph.D., David Bates, M.D., and John Peters, M.D.

N Engl J Med 2004; 351:1057-1067 September 9, 2004

BACKGROUND

Whether exposure to air pollution adversely affects the growth of lung function during the period of rapid lung development that occurs between the ages of 10 and 18 years is unknown.

METHODS

In this prospective study, we recruited 1759 children (average age, 10 years) from schools in 12 southern California communities and measured lung function annually for eight years. The rate of attrition was approximately 10 percent per year. The communities represented a wide range of ambient exposures to ozone, acid vapor, nitrogen dioxide, and particulate matter. Linear regression was used to examine the relationship of air pollution to the forced expiratory volume in one second (FEV₁) and other spirometric measures.

RESULTS

Over the eight-year period, deficits in the growth of FEV₁ were associated with exposure to nitrogen dioxide (P=0.005), acid vapor (P=0.004), particulate matter with an aerodynamic diameter of less than 2.5 μm (PM_{2.5}) (P=0.04), and elemental carbon (P=0.007), even after adjustment for several potential confounders and effect modifiers. Associations were also observed for other spirometric measures. Exposure to pollutants was associated with clinically and statistically significant deficits in the FEV₁ attained at the age of 18 years. For example, the estimated proportion of 18-year-old subjects with a low FEV₁ (defined as a ratio of observed to expected FEV₁ of less than 80 percent) was 4.9 times as great at the highest level of exposure to PM_{2.5} as at the lowest level of exposure (7.9 percent vs. 1.6 percent, P=0.002).

CONCLUSIONS

The results of this study indicate that current levels of air pollution have chronic, adverse effects on lung development in children from the age of 10 to 18 years, leading to clinically significant deficits in attained FEV₁ as children reach adulthood.



For Immediate Release

Contact: Meghan Lewit
(323) 442-3941
lewit@usc.edu

USC Study Finds Air Pollution Exposure at Schools Linked to Childhood Asthma Development

Effects of exposure at school are similar to the risks of living near a highway

Los Angeles, Calif., April 6, 2010—Living near major highways has been linked to childhood asthma, but a new study led by researchers at the Keck School of Medicine of the University of Southern California (USC) suggests that traffic-related pollution near schools is also contributing to the development of asthma in kids.

The researchers found that the risk of developing asthma due to exposure at school was comparable to that of children whose exposure occurred primarily at home, even though time spent at school only accounted for about one third of waking hours. Children in schools located in high-traffic environments had a 45 percent increased risk of developing asthma. The study appears in the journal *Environmental Health Perspectives* and is now available online.

Asthma is the most common chronic childhood illness in developed countries and has been linked to environmental factors such as traffic-related air pollution.

“While residential traffic-related pollution has been associated with asthma, there has been little study of the effects of traffic exposure at school on new onset asthma,” said lead author Rob McConnell, M.D., professor of preventive medicine at the Keck School of Medicine of USC. “Exposure to pollution at locations other than home, especially where children spend a large portion of their day and may engage in physical activity, appears to influence asthma risk as well.”

The study drew upon data from the Children’s Health Study (CHS), a longitudinal study of children in Southern California communities that was designed to investigate the chronic effects of air pollution on respiratory health. Using a cohort of 2,497 kindergarten and first grade children who were asthma-free when they entered the CHS, researchers examined the relationship of local traffic around schools and homes to diagnosis of new onset asthma that occurred during three years of follow-up.

Traffic-related pollution exposure was assessed based on a model that took into account traffic volume, distance to major roadways from home and school and local weather conditions. Regional ambient ozone, nitrogen dioxide and particulate matter were measured continuously at one central site in each of the 13 study communities. The

design allowed investigators to examine the joint effects of local traffic-related pollution exposure at school and at home and of regional pollution exposure affecting the entire community.

Researchers found 120 cases of new asthma. The risk associated with traffic-related pollution exposure at schools was almost as high as for residential exposure, and combined exposure accounting for time spent at home and at school had a slightly larger effect.

Although children spend less time at school than at home, physical education and other activities that take place at school may increase ventilation rates and the dose of pollutants getting into the lungs, McConnell noted. Traffic-related pollutant levels may also be higher during the morning hours when children are arriving at school.

Despite a state law that prohibits school districts from building campuses within 500 feet of a freeway, many Southern California schools are located near high-traffic areas, including busy surface streets.

"It's important to understand how these micro-environments where children spent a lot of their time outside of the home are impacting their health," McConnell said. "Policies that reduce exposure to high-traffic environments may help to prevent this disease."

The study was funded by grants from the National Institute of Environmental Health Sciences, the U.S. Environmental Protection Agency, the South Coast Air Quality Management District and the Hastings Foundation.

###

Rob McConnell, Talat Islam, Ketan Shankardass, Michael Jerrett, Fred Lurmann, Frank Gilliland, Jim Gauderman, Ed Avol, Nino Kuenzli, Ling Yao, John Peters, Kiros Berhane. "Childhood Incident Asthma and Traffic-Related Air Pollution In A Longitudinal Cohort Study." *Environmental Health Perspectives*.

A study in the Czech Republic has found a link between exposure to certain air pollutants and an increase in DNA damage for people exposed to high levels of the pollution.

They found that breathing small quantities of a polycyclic aromatic hydrocarbon (PAH), called benzo[a]pyrene (B[a]P), caused an increase in the number of certain 'biomarkers' in DNA associated with a higher risk of diseases, including cancer.

Air pollution is a major problem around the world, particularly in urban areas. In attempt to control regional air pollution levels, the EU has introduced legal limits for exposure to a variety of different airborne pollutants. For B[a]P, the EU air quality standard is 1 nanogram per metre³ (ng/m³) as an annual average that has to be attained where possible throughout the EU.

To measure the risk of DNA damage and risk to health caused by exposure to chemicals, such as PAHs, researchers sometimes use 'biomarkers' – these are biological features that can provide an indicative picture of risk and disease.

Previous studies have suggested that 'DNA adducts' can be used as biomarkers to measure exposure to PAHs. These are, in effect, small molecules, such as PAHs, bound to the DNA. Similarly, 'chromosomal aberrations' - structural changes to a stretch of DNA - can be used as biomarkers to demonstrate the effect of some pollutants on DNA.

To test whether there was a possible link between exposure to PAHs and the frequency of DNA adducts and chromosomal aberrations, the researchers, supported by the EU EnviRisk and INTARESE projects, examined DNA from 950 police officers and bus drivers in Prague.

The participants, drawn from three separate studies conducted over a five-year period, all worked outdoors for more than eight hours a day. Each carried a device to measure their personal exposure to PAHs and DNA was extracted from the participants' white blood cells.

The researchers also tested a new technique for identifying chromosomal aberrations called 'fluorescence in-situ hybridisation', or FISH, which is much more sensitive than previous techniques.

The results revealed, for the first time, a significant relationship between exposure to PAHs, the number of DNA adducts and the number of chromosomal aberrations detected using FISH. In particular, PAH levels and the occurrence of the two biomarkers were higher in winter than in summer.

In one of the studies, average personal exposure to B[a]P and PAHs in January was measured as 1.58 ng/m³ and 9.07 ng/m³, respectively. In June, this dropped to 0.18 ng/m³ and 1.92 ng/m³.

The number of B[a]P-like DNA adducts and chromosomal aberrations were correspondingly much higher in January than in June. In fact, the number of DNA adducts strongly mirrored exposure to PAHs in the past 30 days.

These findings are of concern because exposure to more than 1 ng/m³ of B[a]P has been found to put people at higher risk of developing cancer later in life.

Previous studies have shown that DNA adducts can be an indicator for cancer several years after exposure and the findings of this study indicate that DNA adduct biomarkers and chromosomal aberrations measured using FISH could help health authorities identify individuals at higher risk of disease.

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CALIFORNIA WATCH

Southern Californians at risk of death from air pollution, EPA says

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California Watch-1 day ago

Southern Californians are among those at highest risk of death due to air pollution, according to recent U.S. Environmental Protection Agency research published in the journal Risk Analysis.

The study, published last month, was conducted to "provide insight to the size and location of public health risks associated with recent levels of fine particles and ozone, allowing decision-makers to better target air quality policies," the federal agency said in a statement responding to California Watch inquiries.

"While overall levels of fine particles and ozone have declined significantly in the past two decades, these two pollutants still pose a burden to public health," the EPA statement said.

The study examined air pollution exposure based on 2005 air quality levels and projected there could be between 130,000 and 360,000 premature deaths among adults in coming years. The 2005 data was the best available for analyzing fine particulates and ozone, the EPA said. Among vulnerable populations like children, the EPA also estimates that fine particulate matter and ozone results in millions of cases of respiratory symptoms, asthma and school absences, as well as hundreds of thousands of cases of acute bronchitis and emergency room visits.

The analysis also found that Southern Californians and residents of the industrial Midwest experience the highest exposure to fine particulate matter, which has been found to exacerbate respiratory illnesses and increase heart attacks, according to the Centers for Disease Control and Prevention.

Among the most populated areas of the country, Los Angeles had the highest estimated rate of deaths attributable to air pollution, at nearly 10 percent; San Jose had the lowest at 3.5 percent.

See a county-by-county breakdown of premature death risk caused by these air pollutants here:

The Bay Area Air Quality Management District conducted a similar risk assessment last year and found that about 1,700 premature deaths can be attributed to fine particulate matter in the Bay Area each year, which is about 3.8 percent of all deaths.

Particulate matter is made up of extremely small particles and liquid droplets that are 2.5 micrometers in diameter or smaller - which means they have a width 30 times smaller than a human hair. Common sources of fine particulate matter, often referred to as PM 2.5, are forest fires and emissions from power plants, industrial sources and cars. Unhealthy forms of ozone are created when nitrogen oxides (NOx) and volatile organic compounds (VOCs) react in the presence of sunlight; ozone is typically linked to byproducts from industrial facilities and electric utilities, car exhaust, gas vapors and chemical solvents.

Local air districts in Southern California and the Bay Area have attempted to limit fine particulate matter and ozone emissions through Spare the Air days by regulating wood burning and offering financial incentives to businesses to phase out the use of diesel engines.

Public health advocates say that the EPA study illustrates the importance of improving air quality and that these types of studies on the risks of air pollution have been used to determine federal regulations and inform local clean air plans.

"One of the hardest things to explain to the public is that while the air is cleaner, we continue to find that we have underestimated the health effects of breathing in air pollution," said Joe Lyou, president and CEO of the Coalition for Clean Air and a governing board member of the South Coast Air Quality Management District. "Yes, we have made significant accomplishments, but we still have a long way to go. The public needs to understand that this is a life-and-death situation."

The EPA's research on air pollution and mortality have, however, been the subject of political and scientific debate.

James Enstrom, a researcher with UCLA's School of Public Health, argues that while there is a connection between air quality and health effects, the EPA study fails to acknowledge regional nuances when it comes to the real risks of premature deaths.

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"The question is whether there is enough epidemiological evidence to conclude that air pollution kills people," Enstrom said. "Every piece of evidence for the state of California as a whole shows that there's no effect (on mortality). There's some effect in the Los Angeles basin, but that's not a fair representation of absolute risk."

Enstrom, who in the past has received research funding from industries opposed to stricter air quality regulations, said the costs of these regulations are "only justified if it's killing people." "The other morbidities associated with (air pollution) are lung problems, hospitalizations, asthma, and those don't amount to enough to affect the cost-benefit ratios," he said.

In a November letter to the Office of Management and Budget, U.S. Reps. Andy Harris, R-Md., and Paul Broun, R-Ga., both physicians, also challenged the agency's "troubling scientific and economic accounting practices" that "appear designed to provide political cover for a more stringent regulatory agenda rather than to objectively inform policy decisions."

But Dan Farber, a UC Berkeley law professor and co-director of the university's Center for Law, Energy & the Environment, said the debates over the EPA's air quality findings are ultimately political.

"There is strong industry opposition to these regulations and strong opposition from groups who are ideologically opposed to regulation in general," Farber wrote in an e-mail. "EPA's most important role in terms of economic impact and public health relates to air pollution. So it's not surprising that this is the area where EPA is being attacked."

This article originally appeared in California Watch

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Hearts and air pollution: Five deadly air pollutants on five continents

Around the world, breathing a variety of air pollutants – in some cases for a single day – increases the chance that people will suffer heart attacks, according to a new analysis published Tuesday. For the first time, scientists analyzed previous studies from five continents to verify and quantify the links between air pollution and heart health. They found that short-term exposure – less than seven days – to all major air pollutants except ozone was associated with an increase in heart attacks. The team from France and the U.S. reported in the *Journal of the American Medical Assn.* that the magnitude of the risk “is relatively small” compared to other factors, such as smoking, high blood pressure and diabetes. But they stressed that so many people worldwide are breathing fine particulates, carbon monoxide and other pollutants that the numbers of people at risk are substantial. Dr. Jesus Araujo of UCLA said there is now “more than enough evidence” that air pollution kills. “We don’t have to be exposed for weeks or months or years,” Araujo said.

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By Marla Cone
Editor in Chief
Environmental Health News

Feb. 15, 2012

Around the world, breathing a variety of air pollutants – in some cases for a single day – increases the chance that people will suffer heart attacks, according to a new analysis published Tuesday.

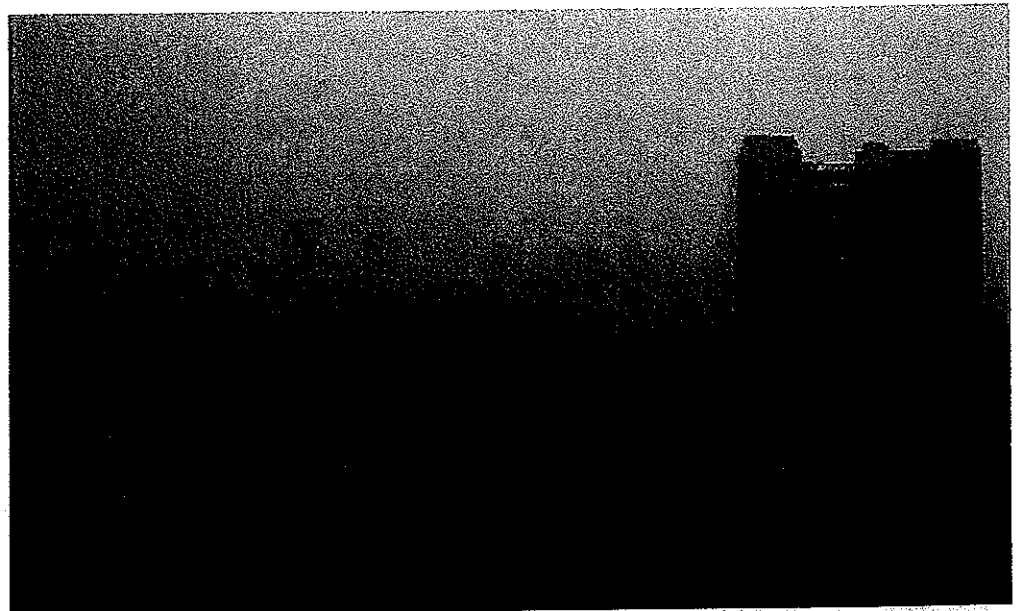
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The team reported in the *Journal of the American Medical Assn.* that the magnitude of the risk “is relatively small” compared to other factors, such as smoking, high blood pressure and diabetes. But they stressed that so many people worldwide are breathing fine particulates and other pollutants that the numbers of people at risk are substantial.

Thus an improvement in air quality could have a significant effect on public health,” wrote the authors, led by Dr. Hazrije Mustafic of the Paris Cardiovascular Research Center at University Paris Descartes.

Published on Valentine’s Day, the new study shows that the human heart is perhaps the most vulnerable part of the body when it comes to air pollution.

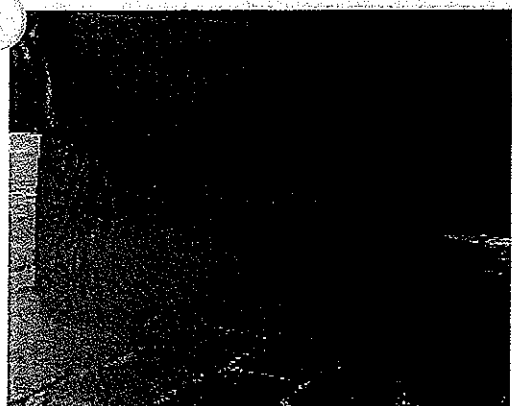


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Delhi skyline.

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Dr. Jesus Araujo, an assistant professor of medicine and director of environmental cardiology at UCLA, said there is now "more than enough evidence" from human, animal and cellular studies that air pollution kills.



Ruben de Rijcke/flickr

One of the most important findings of the new research is that it confirms that heart attacks increase even when exposures to worsening air quality are short in duration.

"We don't have to be exposed for weeks or months or years," Araujo said.

Air in most urban areas is made up of an array of contaminants, some gases, some microscopic particles, all containing a variety of chemical ingredients. In recent years, most of the attention has focused on fine particulates – microscopic pieces of soot from diesel engines and other sources. Studies conducted in numerous cities have shown that whenever fine particles increase, deaths and hospitalizations from cardiovascular and respiratory diseases increase, too.

In the new analysis, the researchers examined more than 100 studies from around the world and included 34 that met certain standards, then combined them to calculate the risk of heart attacks associated with fine particles, coarse particles, ozone, nitrogen dioxide, carbon monoxide and sulfur dioxide. Most are pollutants related to the combustion of fossil fuels, emitted by vehicles or industry.

"One strength of our study is the comprehensive nature of our search that spanned multiple databases and was not restricted to particular publication language or a single pollutant," wrote the authors, who are from several institutions in France as well as the Mayo Clinic in Minnesota.

Araujo said it is "quite significant" that the authors combined the results of several dozen studies and found that heart attacks increased with all of the air pollutants except ozone.

"What this study is showing us is that the gaseous pollutants are important, too. It shows that not only particulate pollution is associated with deaths but also the other major gaseous pollutants," said Araujo, who did not participate in the new study.

Jean Ospital, health officer of the agency responsible for cleaning up the Los Angeles basin's air, said Tuesday that although the link between air pollution and heart attacks has been documented by individual studies for years, the new analysis is global and gives it "more statistical power and a larger sample size."

Although the link between air pollution and heart attacks has been documented by individual studies for years, the new analysis is global, with more statistical power and a larger sample size.

"The studies are overall consistent," said Ospital, who has been health officer at the South Coast Air Quality Management District since 2000. "There are a number of investigators looking at alternative explanations, but it always seems to come out that air pollutants are associated with premature deaths. And as the testing becomes more sophisticated, we find more effects at lower levels."

The risk of each pollutant was calculated. For fine particle pollution, heart attacks increased 2.5 percent for every incremental increase of pollution in the air.

That means if fine particles in one city reached a concentration of 10 micrograms per cubic meter while in a nearby city, it reached 20 micrograms, heart attacks in that second city would be 2.5 percent higher.

Such variations in pollution levels are commonplace, even in the same city from day to day. Miraloma, a city in Southern California's Riverside County that has some of the nation's worst particulate pollution, measured at about 55 micrograms per cubic meter on a day in early January 2010, and then dropped three days later to about 7 micrograms, according to data from the California Air Resources Board. That would raise the heart

attack risk sharply on that earlier day.

“The good news is that air pollutants have been going down here in Southern California. Particles, for example, are down 20 to 25 percent over the past decade,” Ospital said. “I think [the new study] tells you that probably the current levels may not be where we want them to be, but we are making progress toward attaining our air quality standards.”

In most U.S. cities, levels of all six of the pollutants studied have declined over the past few decades as cars, trucks, industries and consumer products have been forced to get cleaner. But many cities still have a long way to go. More than 30 metropolitan areas exceed the federal government’s health standard for fine particles, according to the U.S. Environmental



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Los Angeles skyline circa 1965.

Protection Agency. Nine areas violate the sulfur dioxide standard, 43 violate the carbon monoxide standard and 45 exceed the coarse particles standard.

Areas with excessive levels of one or more of the five pollutants include the Los Angeles basin, California’s San Joaquin Valley, the Salt Lake City area, Phoenix, New York City and Philadelphia.

The analysis included several studies from each populated continent, except Africa, where pollution is largely unstudied.

Araujo said the risk is not just among people who are sick with pre-existing heart conditions. Some people are more at risk than others, including those who are obese or have hypertension, “but that is not to say that somebody who doesn’t have these conditions is at no risk of having a cardiovascular event” brought on by air pollution, he said.

Some people are more at risk than others, including those who are obese or have hypertension. One way to minimize exposure is to avoid exercising in congested areas near busy roads and freeways.

He suggested that people avoid exercising in highly congested areas near busy roads and freeways, particularly during rush hours.

“A very small percentage of patients are aware of this problem,” he said. “It’s a relatively low increase for heart attacks but the population at stake is larger than it is for the other risk factors.” For example, all 17 million residents of the Los Angeles basin are exposed to air pollution while only a small fraction of them

are smokers, obese or have diabetes.

Scientists are uncertain how air pollution triggers heart attacks. One major theory is it causes inflammation. Another is that it disrupts heart rate variability, which is how the heart responds to stress. Still another is that it increases the viscosity of blood, leading to more clots or hardening of the arteries.

The authors do not know why no association was found between heart attacks and ozone,

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View of Shanghai looking down from the world's tallest observation platform.
products.

which was somewhat surprising. The main ingredient of smog, it is formed when the sun reacts with hydrocarbons and nitrogen oxides from vehicles, industries and consumer

One reason may be that heart attacks decline on hot summer days, when ozone is the worst, so it may have been difficult to find a link.

“Either there is no true association or the association is more difficult to reveal,” Araujo said.

Some previous studies have found a link between ozone and heart attacks, while others have not. It is more clear that when ozone levels rise, deaths from asthma and other respiratory problems seem to increase.

For about 50 years, scientists have tried to unravel the human health impacts of air pollution. For most of those years, the focus has been on the lungs.

“We know now that the mortality is mostly from cardiovascular causes,” Araujo said. “That’s something that has become more clear over the last seven years or so.”

Still, there are many more questions to address.

What happens when people are exposed to multiple pollutants at the same time? How do particles and gases interact? What exactly does each pollutant do to the heart? Which sources pose the most risk? Is it mostly size of particles that matters or the ingredients?

And perhaps the most critical question of all: How much cleaner does the air need to be?

“The more scientists look, the more they find effects at lower exposures,” Ospital said. “This is a question that always comes up, how low do we need to go to protect public health? It seems to be a moving target in terms of where the health effects are, where we really need to go to have health protection.”

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15 February **Hearts and air pollution: Five deadly air pollutants on five continents.** Around the world, breathing a variety of air pollutants – in some cases for a single day – increases the chance that people will suffer heart attacks, according to a new analysis published Tuesday. For the first time, scientists analyzed previous studies from five continents to verify and quantify the links between air pollution and heart health. They found that short-term exposure – less than seven days – to all major air pollutants except ozone was associated with an increase in heart attacks.
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Big Air Pollution Impacts on Local Communities: Traffic Corridors Major Contributors to Illness from Childhood Asthma

Science Daily (Nov. 5, 2009) — Heavy traffic corridors in the cities of Long Beach and Riverside are responsible for a significant proportion of preventable childhood asthma, and the true impact of air pollution and ship emissions on the disease has likely been underestimated, according to researchers at the University of Southern California (USC).

The study, which appears in an online edition of the *American Journal of Public Health*, estimated that nine percent of all childhood asthma cases in Long Beach and six percent in Riverside were attributable to traffic proximity.

The study also found that ship emissions from the Los Angeles-Long Beach port complex contributed to the exacerbation of asthma. For example, approximately 1,400 yearly episodes of asthma-related bronchitis episodes in Long Beach (21 percent of the total) were caused by the contribution of ship emissions to nitrogen dioxide levels in the city.

Although there has been extensive research on the effects of traffic proximity on asthma risk, this study is one of the few that has estimated the number of cases -- or "burden of disease" -- associated with traffic in specific high risk communities, says principal investigator Rob McConnell, M.D., professor of preventive medicine at the Keck School of Medicine of USC and deputy director of the Children's Environmental Health Center at USC.

The traditional approach to estimating the burden of air pollution-related disease has markedly underestimated the true effect," McConnell says. "Our results indicate that there is a substantial proportion of childhood asthma that may be caused by living within 75 meters (81 yards) of a major road in Long Beach and Riverside. This results in a much larger impact of air pollution on asthma symptoms and health care use than previously appreciated. This is also one of the first studies to quantify the contribution of ship emissions to the childhood asthma burden."

Such specific data about the local health burden of air pollution is useful for evaluating proposals to expand port facilities or transportation infrastructure in the L.A. area, McConnell noted. Both Long Beach and Riverside already have heavy automobile traffic corridors as well as truck traffic and regional pollution originating in the port complex, which is the largest in the United States.

The study drew upon data from the Children's Health Study (CHS), a longitudinal study of respiratory health among children in 12 Southern California communities, including Riverside and Long Beach. Researchers estimated the number of asthma cases and related complications that occurred because of air pollution, using information from epidemiological studies that they then applied to current exposure to air pollution and traffic in Southern California. The results showed that approximately 1,600 cases of childhood asthma in Long Beach and 690 in Riverside could be linked to living within 81 yards of a major road.

"The impact of roadway proximity on the overall burden of asthma-related illness is remarkable," McConnell says. "Air pollution is a more important contributor to the burden of childhood asthma than is generally recognized, especially to more severe episodes requiring visits to a clinic or emergency room."

Unlike regional air pollutants, the local traffic-related pollutants around homes and their effects are not currently regulated, he notes.

"This is a challenge to communities, to regulatory agencies and to public health," McConnell says. "Traffic-related health effects should have a central role on the transportation planning agenda."

The study, an international collaboration between USC, the Center for Research in Environmental Epidemiology (CREAL) in Spain and the University of Basel in Switzerland, was supported by the National Institute of Environmental Health Sciences, the U.S. Environmental Protection Agency, the South Coast Air Quality Management District, the Hastings Foundation, the Center for Research in Environmental Epidemiology (Switzerland) and the Fundació Instituto Municipal d'Investigació Mèdica (Barcelona). The authors acknowledge the insights of the staff and members of the Long Beach Alliance for Children with Asthma and the Center for Community Action and Environmental Justice.

Story Source:

Adapted from materials provided by [University of Southern California](#), via [EurekAlert!](#), a service of AAAS.

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By EarthTalk
Feb 4, 2012 - 10:58:09 AM



(HealthNewsDigest.com) - Latinos are indeed among the U.S. ethnic groups hardest hit by air pollution. A recent report from the National Latino Coalition on Climate Change (NLCCC), Center for American Progress, National Resources Defense Council and National Wildlife Federation found that Latinos face a disproportionately large air pollution risk than even other minority groups. According to the report, "U.S. Latinos and Air Pollution: A Call to Action," Latinos face increased health care costs, more lost days at school and work, and a shorter life expectancy due to increased exposure to air pollution.

According to the U.S. Centers for Disease Control and Prevention, some 26.6 percent of U.S. Hispanics live in counties that violate the federal government's 24-hour standards for fine particulate matter, the greatest percentage of any ethnic group. Meanwhile, 48.4 percent of Hispanics live in counties that frequently violated eight-hour ground-level ozone standards.

According to the National Coalition of Hispanic Health & Human Services Organizations (COSSMHO), 80 percent of U.S. Latinos (compared with 65 percent of non-Hispanic U.S. blacks and 57 percent of non-Hispanic U.S. whites) live in so-called "non-attainment" areas where ambient air quality is worse than what the federal government considers safe. "Although Hispanics in general live as long as or longer than non-Hispanic whites, what morbidity data are available reveal that the quality of that life is severely impaired by a variety of chronic conditions, such as asthma," adds the coalition.

Meanwhile, another recent report from the League of United Latin American Citizens (LULAC) found that seven out of 10 Hispanic Americans face air pollution threats some 16 percent greater overall than the overall U.S. population. "The increased exposure to air pollution makes Latino families more vulnerable to health problems associated with air pollutants such as low birth weight and asthma attacks," stated the report. "Factors such as poverty, language barriers and lack of access to health care increase the danger."

In June 2011, 14 Latino groups from California, Texas and other states joined together to urge President Obama to bring permissible levels of ground-level ozone—a key component in the formation of smog—down to below 70 parts per billion. Under George W. Bush, the limit was lowered from 85 to 75 parts per billion, but environmentalists maintain that the limit must be

even lower to reduce respiratory and related illnesses in densely populated, largely minority urban areas already hardest hit by pollution.

But in September 2011 the Obama administration cited economic concerns in announcing that it would leave the ozone standard as is for now. Lowering it further at this point, the White House argued, would cost American businesses and the federal government billions to upgrade or retrofit industrial facilities with pollution scrubbing equipment and other technologies. The administration hinted it would revisit the topic once the economy improves, but in the meantime those living in urban areas with unsafe amounts of air pollution should check daily air quality forecasts before going outside for extended periods. The federal government's Airnow.gov website offers daily air quality reports across 300+ urban areas from coast-to-coast, and also provides links to more detailed state and local air quality information sources.

CONTACTS: NLCCC, www.latinocoalitiononclimatechange.org; COSSMHO, www.clnet.ucla.edu/community/cossmho.html; LULAC, www.lulac.org; Airnow, www.airnow.gov.

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Pollution During Pregnancy Linked To Lower IQ

Posted on: Monday, 20 July 2009, 11:25 CDT



Air pollution during prenatal development may be partially to blame for a child's lower IQ, researchers reported on Monday.

Writing in the journal *Pediatrics*, researchers from the Columbia Center for Children's Environmental Health (CCCEH) at the Mailman School of Public Health found that exposure to air pollutants, called polycyclic aromatic hydrocarbons, or PAHs, can result in a child's lower intelligence quotient (IQ).

PAHs can come from burning substances such as coal, diesel, oil and gas, or tobacco.

Researchers studied 249 children born to New York City women, aged 18-35. The women were asked to wear air quality monitors attached to backpacks for 48 hours during the last months of pregnancy.

Each of the children was followed until age 5. They were given an intelligence test called the Wechsler Preschool and Primary Scale of the Intelligence. The researchers developed models to calculate the associations between prenatal PAH exposure and IQ.

They found that children who had been exposed to higher levels of PAH – defined as more than 2.26 nanograms per cubic meter – during prenatal development had full scale and verbal IQ scores that were 4.31 and 4.67 points lower, respectively than those of less exposed children.

"These findings are of concern because these decreases in IQ could be educationally meaningful in terms of school performance," said lead author Frederica Perera, DrPH, professor of Environmental Health Sciences and director of the CCCEH at Columbia University Mailman School of Public Health.

"The good news is that we have seen a decline in air pollution exposure in our cohort since 1998, testifying to the importance of policies to reduce traffic congestion and other sources of fossil fuel combustion byproducts."

"The decrease in full-scale IQ score among the more exposed children is similar to that seen with low-level lead exposure," she added.

"This finding is of concern because IQ is an important predictor of future academic performance, and PAHs are widespread in urban environments and throughout the world. Fortunately, airborne PAH concentrations can be reduced through currently available controls, alternative energy sources and policy interventions."

The study was funded by the National Institute of Environmental Health Sciences (NIEHS), a component of the National Institutes of Health, the U.S. Environmental Protection Agency and several private foundations.

- Columbia Center for Children's Environmental Health
- Pediatrics

Source: redOrbit Staff & Wire Reports

Public release date: 6-Oct-2011

Contact: Dr. Hilary Glover
hilary.glover@biomedcentral.com
44-203-192-2370
BioMed Central

Pregnant mothers at risk from air pollution

A Californian-based study has looked in detail at air quality and the impact of traffic-related air pollution on premature birth. Published in BioMed Central's open access journal *Environmental Health*, results from this study show that traffic-related air pollution, especially polycyclic aromatic hydrocarbons (PAH), is associated with up to a 30% increase in premature births, and that seasonal changes and vicinity to the coast affected concentration of toxic pollutants in the air.

The study, based at the University of California, looked at 100,000 births, within a five mile radius of air quality monitoring stations. The study evaluated births spanning a 22 month period from June 2004, and used information provided by the California Department of Health about the births and the mothers, in addition to air pollution information from monitoring stations which measure concentrations of airborne toxic pollutants.

The researchers were able to analyse and compare exposures using three different information sources: government "criteria pollutant" monitoring stations (including carbon monoxide, nitrogen dioxide, ozone, and fine particulate matter), a traffic pollution model (Land Use Regression), and data about toxic chemicals collected by the South Coast Air Quality Management District. Once integrated, these data provided a new level of detail about the concentrations and location of individual pollutants. All statistical models were adjusted for maternal age, race/ethnicity, education and parity.

Some pollutants were area specific, relating to industry and urbanization. However, overall exposure to critical pollutants such as PAH resulted in up to a 30% increase in the risk of premature birth. Other toxic substances, such as benzene and fine particulate matter from diesel fumes were associated with a 10% increase, while ammonium nitrate fine particles were associated with a 21% increase in premature birth. Concentrations of these pollutants were higher in winter and lower in coastal areas, indicating that local weather patterns played an important part in the dispersal of pollutants.

Dr Beate Ritz said, "Air pollution is known to be associated with low birth weight and premature birth. Our results show that traffic-related PAH are of special concern as pollutants, and that PAH sources besides traffic contributed to premature birth. The increase in premature birth risk due to ammonium nitrate particles suggests secondary pollutants are also negatively impacting

the health of unborn babies. To reduce the effects of these pollutants on public health, it is important that accurate modeling of local and regional spatial and temporal air pollution be incorporated into pollution policies."

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Notes to Editors

1. Traffic-related air toxics and preterm birth: a population-based case-control study in Los Angeles County, California

Michelle Wilhelm, Jo Kay Ghosh, Jason Su, Myles Cockburn, Michael Jerrett and Beate Ritz
Environmental Health (in press)

Please name the journal in any story you write. If you are writing for the web, please link to the article. All articles are available free of charge, according to BioMed Central's open access policy.

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Final report prepared for the California Air Resources Board
and the California Environmental Protection Agency

**Determination of Elemental Carbon and Organic Carbon
Concentrations During the Southern California
Children's Health Study, 1999-2001**

Contract Number 01-309

Lynn G. Salmon, Paul R. Mayo, and Glen R. Cass[†]
Environmental Science and Engineering

John H. Seinfeld
Chemical Engineering

California Institute of Technology
Pasadena, CA 91125

March, 2004

[†]Deceased

Abstract

Since 1994, a network of air monitoring sites have been operating as part of the Southern California Children's Health Study, a large epidemiological investigation of the long-term effects of air pollutant exposure on respiratory disease within a population of more than 5600 California school children. We previously reported the results of chemical analysis of particulate organic carbon (OC) and elemental carbon (EC) samples taken at twelve air monitoring sites in the southern half of the state of California over the 5-year period 1994-1998. Samples for the Children's Health Study continue to be collected over consecutive two week averaging times with sample collection scheduled to end in June, 2004 marking completion of the 10 year study. This report presents the particulate organic carbon (OC) and elemental carbon (EC) concentrations measured during the intermediate three years of this monitoring program (1999-2001). Annual average PM₁₀-equivalent elemental (black) carbon particle concentrations range from 0.05 - 1.74 $\mu\text{g m}^{-3}$ over the communities and years studied while annual average organic carbon concentrations are in the range 1.50 - 17.51 $\mu\text{g m}^{-3}$. The overall fine particle concentrations show a coherent spatial pattern with very low mass concentrations (circa 5-9 $\mu\text{g m}^{-3}$) and aerosol carbon concentrations at the northern and southern-most monitoring sites. The highest annual average mass concentrations were found at Mira Loma, Riverside, and Upland, downwind of the Los Angeles-Long Beach urban complex ranging from 18.5 to 27.8 $\mu\text{g m}^{-3}$ from 1999-2001. Carbonaceous aerosols account for 24 to 62 percent of fine particle concentrations between the sites studied.

Executive Summary

0.1 Background

Particulate organic carbon (OC) and elemental carbon (EC) concentrations are measured at twelve air monitoring sites in the southern half of the state of California over the 10-year period 1994-2004. These air monitoring sites are part of the network that supports the Southern California Children's Health Study, a large epidemiological investigation of the effects of air pollutant exposure on respiratory disease within a population of more than 5600 California school children. Other pollutants measured are ozone, nitrogen dioxide, PM₁₀ mass, PM_{2.5} mass and ions (nitrate, sulfate, ammonium) and gas-phase acids (hydrochloric, nitric, formic, acetic). The communities studied range from mountainous (Alpine, Lake Arrowhead) to desert (Lancaster) to rural near-coastal areas (Lompoc, Santa Maria) to sites such as Long Beach, Glendora and San Dimas within the Los Angeles County urban area plus Mira Loma and Riverside in the urban plume downwind of the Los Angeles-Long Beach area. Data through the end of year 2001 is incorporated in this report.

0.2 Methods

Organic and elemental carbon particle samples were collected on quartz fiber filters through which ambient air was drawn for two weeks. After each two week interval, new quartz fiber filters were installed at each sampling location in the Children's Health Study sampling network. The quartz fiber filters were analyzed for OC and EC content by thermal evolution and combustion. The primary carbon particle cassette used during the study did not have a defined size cut, but was determined to have a broad cut-point of approximately 10 μm after comparison with reference samplers having known size cuts (Salmon et al., 2001). A separate carbon particle cassette with a $\text{PM}_{2.2}$ size cut was introduced in late 2000 and operated side-by-side with the primary carbon particle cassette in use since the inception of the study. Linear regression analysis was performed on the carbon data obtained during the portion of the study when both type cassettes were operating side-by-side in order to determine correction factors that are used to estimate the fine particle concentrations of the primary Two-Week Sampler data.

0.3 Results

Annual average PM_{10} -equivalent elemental (black) carbon particle concentrations range from 0.05 - 1.74 $\mu\text{g m}^{-3}$ over the communities and years studied while annual average organic carbon concentrations are in the range 1.50 - 17.51 $\mu\text{g m}^{-3}$. The coastal sites generally show winter season EC and OC concentration peaks while the mountainous and some inland sites show summer seasonal peaks; both conditions are consistent with seasonal changes in wind direction and mixing depth. Carbonaceous aerosols account for 24 to 62 percent of fine particle concentrations between the sites studied. The overall fine particle concentrations show a coherent spatial pattern with very low mass concentrations (circa 5-9 $\mu\text{g m}^{-3}$) and aerosol carbon concentrations at the northern and southern-most monitoring sites, reaching the highest annual average concentration of 35.8 $\mu\text{g m}^{-3}$ fine particulate mass including 6.7 $\mu\text{g m}^{-3}$ estimated organic compound mass in 1995 at Mira Loma downwind of the Los Angeles-Long Beach urban complex. The nearby, Upland site had the highest annual average concentration of organic compound mass with 8.1 $\mu\text{g m}^{-3}$ estimated for 1995. There was a decrease in annual average fine particle mass and carbonaceous aerosol concentrations at the urban sites from 1994-1998, followed by increased concentrations at the sites during the period 1999-2001. The relative chemical composition of the aerosol did not change appreciably over that same period of time. Since all aerosol components are affected about equally, the most likely reason for the decline was milder weather with lower mean temperatures in the late 1990s. Warmer temperatures returned to Southern California during 1999-2001 and with higher temperatures and bright sunlight comes photochemical smog. Organic compounds are one of the main primary pollutants found in photochemical smog.

0.4 Conclusions

Yearly maximum EC concentrations were found at the Long Beach site during 6 of the 8 years studied, however the highest annual average EC concentrations were found inland at Mira Loma since 1996. Upland and Riverside were also among the communities with high EC levels. EC is produced in combustion processes and strongly influenced by diesel engine exhaust which is prevalent in all of these communities. Long Beach is close to the heavy industry and traffic in the Los Angeles/Long Beach harbor area while Mira Loma, Upland and Riverside are home to numerous warehouse distribution centers serviced by thousands of diesel trucks each day. Newer diesel engines and improved diesel fuels have been introduced into the vehicle fleet over the last 10 years which should have reduced EC levels. However, EC concentrations for 1999-2001 have shown a gradual increase in EC concentrations and at most sites, 2001 levels are equal or greater to what they had been in 1994 suggesting that these measures alone are not sufficient to substantially reduce EC levels.

EC concentrations are of utmost concern since diesel soot is a major contributor to cancer risk, and health studies suggest children living in Mira Loma, which has the highest particulate levels in Southern California, are more likely to suffer respiratory problems because their lungs develop more slowly than do those of children elsewhere. New regulations on diesel emissions standards have been approved in California that should dramatically cut pollution from big-rigs, trash trucks and delivery vans in the near future. The new rules will require diesel engines to be equipped with tailpipe controls. The controls will be phased in beginning with the 2007 model year, and by 2010, they are supposed to eliminate 90 percent of the smog-forming nitrogen oxide and particulate emissions from diesel vehicles.

In general, both OC and EC concentrations were highest at the Los Angeles Basin sites and lowest at the sites in the outlying areas (San Luis Obispo, Santa Barbara, and San Diego Counties), the mountain site at Lake Arrowhead, and the desert site at Lancaster. There were also decreasing elemental carbon to total carbon ($TC = EC + OC$) ratios moving from west to east across the Los Angeles Basin. This can be attributed to the fact that as an air mass moves across the basin the organic fraction can be enhanced by the formation of secondary organic aerosol as a result of condensation from the gas phase. Elemental carbon, conversely, is introduced to the atmosphere solely via the direct or primary emission of particles.

OC annual average concentrations dropped with time over the 1994 through 1998 period, but concentrations at all sites increased in 1999 and annual average concentrations at the end of 2001 remain higher than in 1998, which had the lowest OC concentrations of the years studied. The most likely reason for the OC decline was likely milder weather with lower mean temperatures in the late 1990s. Warmer temperatures returned to Southern California during 1999-2001 and with higher temperatures and bright sunlight comes photochemical smog. Organic compounds are one of the main primary pollutants found in photochemical smog.

Studies have found associations between outdoor air pollution exposure and prevalence of respiratory diseases as well associations between mortality rates and particulate

air pollution in metropolitan areas in the United States (Pope, 2000). There is increasing epidemiological evidence pointing toward health risks from particulate air pollution, especially fine particulate matter. However, organic and elemental carbon measurements with a fine particle size cut were not taken as part of the Children's Health Study until the introduction of the Leg D cassettes near the end of year 2000. Preliminary comparisons of EC concentrations taken side-by-side with Leg C and Leg D cassettes show problems with lower than expected EC concentrations as measured with the Leg D cassettes. It is strongly suggested that additional testing be done to determine the cause of the EC reduction on the Leg D cassettes, since obtaining reliable fine particle PM_{2.5} data is of vital importance.

The organic and elemental carbon particle data show seasonal and annual variations as well as spatial ranges in carbon particle concentrations across the southern half of California. With carbonaceous aerosols accounting for 24 to 62 percent of fine particle concentrations, it is clear that measurement of carbon species should be included in multi-year, multi-location studies of particulate concentrations.

4 Summary and Conclusions

A network of air monitoring sites have been operating as part of the Southern California Children's Health Study since 1994. This is a large epidemiological investigation of the long-term effects of air pollutant exposure on respiratory disease within a population of more than 5600 California school children. Among the sites studied are mountain (Alpine, Lake Arrowhead, Lake Elsinore), desert (Lancaster), and other rural locations (Lompoc, Santa Maria, Atascadero) as well as Long Beach, Glendora and San Dimas within the Los Angeles County urban area plus Upland, Mira Loma, and Riverside in the urban plume downwind of the Los Angeles-Long Beach area. These sites represent exposure extremes for one or more pollutants and cover a large enough geographical area and a long enough time period to document spatial and temporal variations (Peters et al., 1999). Data through the end of year 2001 has been presented in this report. Samples for the Children's Health Study continue to be collected over consecutive two week averaging times.

Particulate organic carbon (OC) and elemental carbon (EC) samples were collected on quartz fiber filters through which ambient air was drawn for two weeks. After each two week interval, new quartz fiber filters were installed at each sampling location in the Children's Health Study sampling network. The quartz fiber filters were analyzed for OC and EC content by thermal evolution and combustion. The primary carbon particle cassette (Leg C) used during the study did not have a defined size cut, but was determined to have a broad cut-point of approximately $10 \mu\text{m}$ after comparison with reference samplers having known size cuts (Salmon et al., 2001). A separate carbon particle cassette (Leg D) with a $\text{PM}_{2.2}$ size cut was introduced in late 2000 and operated side-by-side with the primary carbon particle cassette in use since the inception of the study. In addition to carbon species, concentrations of PM_{10} and fine particle ($\text{PM}_{2.5}$) mass, nitrate, sulfate, and ammonium ion concentrations, as well as gas-phase ozone, nitrogen dioxide, formic acid, acetic acid, and nitric acid have been measured continuously since 1994.

From 1994 through 2001, annual average PM_{10} -equivalent elemental (black) carbon particle concentrations ranged from 0.05 to $1.74 \mu\text{g m}^{-3}$ at the communities studied. The lowest EC concentrations during all years were consistently measured at the rural, coastal Lompoc site. Yearly maximum EC concentrations were found at the Long Beach site during 6 of the 8 years studied, however the highest annual average EC concentrations were found inland at Mira Loma since 1996. Upland and Riverside were also among the communities with high EC levels. EC is produced in combustion processes and strongly influenced by diesel engine exhaust which is prevalent in all of these communities. Long Beach is close to the heavy industry and traffic in the Los Angeles/Long Beach harbor area while Mira Loma, Upland and Riverside are home to numerous warehouse distribution centers serviced by thousands of diesel trucks each day. Newer diesel engines and improved diesel fuels have been introduced into the vehicle fleet over the last 10 years which should have reduced EC levels. However, EC concentrations for 1999-2001 have shown a gradual increase in EC concentrations and at most sites, 2001 levels are equal or greater to what they had been in 1994 suggesting that these measures alone are not sufficient to address the problem, especially in communities like those in Riverside county that are experiencing increased truck traffic with the building of more and more giant distribution centers.

EC concentrations are of utmost concern since diesel soot is a major contributor to cancer risk, and health studies suggest children living in Mira Loma, which has the highest particulate levels in Southern California, are more likely to suffer respiratory problems because their lungs develop more slowly than do those of children elsewhere. New regulations on diesel emissions standards have been approved in California that should dramatically cut pollution from big-rigs, trash trucks and delivery vans in the near future. The new rules will require diesel engines to be equipped with tailpipe controls. The controls will be phased in beginning with the 2007 model year, and by 2010, they are supposed to eliminate 90 percent of the smog-forming nitrogen oxide and particulate emissions from diesel vehicles.

Annual average PM₁₀-equivalent particulate organic carbon concentrations were in the range 1.5 to 17.5 $\mu\text{g m}^{-3}$ during 1994 through 2001. The maximum 2-week OC concentration of 31.5 $\mu\text{g m}^{-3}$ was measured at Mira Loma in 1996 and Mira Loma had the highest organic carbon concentrations of any site in this study. The lowest annual average OC concentrations were consistently found at Lompoc. In general, both OC and EC concentrations were highest at the Los Angeles Basin sites and lowest at the sites in the outlying areas (San Luis Obispo, Santa Barbara, and San Diego Counties), the mountain site at Lake Arrowhead, and the desert site at Lancaster. There were also decreasing elemental carbon to total carbon (TC = EC + OC) ratios moving from west to east across the Los Angeles Basin. This can be attributed to the fact that as an air mass moves across the basin the organic fraction can be enhanced by the formation of secondary organic aerosol as a result of condensation from the gas phase. Elemental carbon, conversely, is introduced to the atmosphere solely via the direct or primary emission of particles.

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Studies have found associations between outdoor air pollution exposure and prevalence of respiratory diseases as well associations between mortality rates and particulate air pollution in metropolitan areas in the United States (Pope, 2000). There is increasing epidemiological evidence pointing toward health risks from particulate air pollution, especially fine particulate matter. However, organic and elemental carbon measurements with a fine particle size cut were not taken as part of the Children's Health Study until the introduction of the Leg D cassettes near the end of year 2000. Preliminary comparisons of EC concentrations taken side-by-side with Leg C and Leg D cassettes show problems with lower than expected EC concentrations as measured with the Leg D cassettes. It is strongly suggested that additional testing be done to determine the cause of the EC reduction on the Leg D cassettes, since obtaining reliable fine particle PM_{2.5} data is of vital importance.

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as well as spatial ranges in carbon particle concentrations across the southern half of California. With carbonaceous aerosols accounting for 24 to 62 percent of fine particle concentrations, it is clear that measurement of carbon species should be included in multi-year, multi-location studies of particulate concentrations.

Inland air hard to swallow for youth

By **L.C. GREENE**
STAFF WRITER

LOS ANGELES — Children in Upland, San Dimas, Mira Loma and other smoggy inland cities are more likely to grow up with impaired lungs that may never recover, according to the findings of a long-term study published today in the New England Journal of Medicine.

The USC School of Medicine's decade-long Children's Health Study found a higher percentage of San Bernardino County, Riverside County and eastern Los Angeles County teenagers with low lung functions, putting them at higher risk for heart disease, emphysema and other pulmonary diseases later in life.

"This is a very credible and very significant body of research that unequivocally tells us we've got to do more to protect our children's health," said Sam Atwood, South Coast Air Quality Management District spokesman, of the study's findings.

This investigation, the longest of its type, began in 1993, tracking more than 1,700 fourth graders from 12 Southern California cities and following the children from ages 10 to 18.

The communities studied included San Dimas, Upland, Mira Loma, Riverside and

Lake Arrowhead in the east, Long Beach to the south, Santa Monica in the west, and as far north as Lancaster, Lompoc and Atascadero.

As the children were tested on an annual basis, air monitoring stations recorded pollution levels in each community.

Upland, a city with high levels of nitrous dioxide, acid vapor and elemental carbon largely from motor vehicle and truck exhausts, showed the highest percentage of 18-year-olds with impaired breathing. About 10 percent of the Upland teens followed exhibited lung functions of less than 80 percent of what is considered normal for their age.

From 4 to 6 percent of the children from Mira Loma — which is particularly high in fine particulates from diesel and car emissions — showed clinically depressed lung functions. Teens from San Dimas, Riverside and Long Beach had similar results.

Though Upland teens appeared worse off, the four in-

ONLINE EXTRA

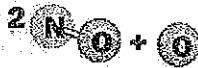
dailybulletin.com
Interactives on
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in children

Cycle of smog

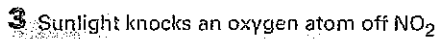
Molecules of pollutants generated in the morning engage in a daylong dance as oxygen atoms join up with other compounds, get knocked loose by the sun, and hook up with some of the same chemicals that started the process.



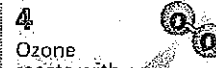
Nitrogen oxide along with hydrocarbons and volatile organic compounds are emitted from tailpipes of cars, trucks, ships and trains.



Nitrogen oxide picks up a single oxygen atom from the air and becomes nitrogen dioxide.



Lonely oxygen atom latches onto regular oxygen molecule, which is made up of two oxygen atoms. The new three-atom oxygen molecule is ozone.



Ozone reacts with other chemicals, including nitrogen oxide, and an oxygen atom breaks off and rejoins the NO to form NO₂ again.

5 As the day goes on, hydrocarbons build up and grab other nitrogen oxide molecules, meaning there are fewer available to break the ozone apart, allowing ozone to build up.



Smog and children

Children are much more likely than adults to develop smog-related lung damage. This occurs for several reasons:

- For their body size, children inhale several times more air than adults, and they breathe faster, particularly during strenuous physical activity.
- Children spend more time outdoors.
- When children exercise, they breathe through the mouth. Mouth-breathing bypasses the natural filtering of air pollutants by the nose and allows large volumes of polluted air to affect the sensitive areas of children's lungs that are developing.

Particulate matter

Particulate matter is too small to be seen by the naked eye.

- Motor vehicles, burning wood and industrial activity are major sources of particulates.
- Particulates in the respiratory tract may produce injury or act with gases to increase the damaging effect on the body.
- The elderly, those suffering from respiratory illness, and young children are especially prone to the harmful effects of particulates.
- Particles 2.5 micrometers or smaller may be a more serious health danger because these particles can penetrate deeper into lung tissue.

Source: Air Quality Management District

Staff graphic by CHRIS MARICH

land cities and Long Beach were considered statistically even, said the study's lead author W. James Gauderman, a Keck School of Medicine preventive medicine professor.

Growing up in these smoggy

towns was roughly the equivalent of living with a smoker, he said.

Teens from Lake Arrowhead, despite the mountain community's high ozone levels, showed relatively low levels of lung im-

pairment. Eighteen-year-olds from Lompoc, Atascadero, Lancaster and Santa Monica also were better off than their inland counterparts.

Jurupa Valley environmentalist Penny Newman, who has

battled Riverside County planners over warehouse development in Mira Loma and its accompanying diesel truck traffic, called the study's findings alarming.

"If this doesn't wake people

up and make them angry, I don't know what will," she said.

Pat Kudel, executive director for the American Lung Association of the Inland Counties, said the study's conclusions were not unexpected, but should encourage government regulators to take stronger steps in reducing vehicle emissions.

"I hope it would communicate with those on the federal and state levels," he said.

Local regulators, such as the AQMD, already get the message, Kudel said.

To Gauderman, the study's author, however, the future does not look bright.

Southern California's population continues to grow, and truck, train and port traffic is expected to double by 2025. Also, the Bush administration may soon open the borders to unregulated Mexican trucks.

"It doesn't bode well for air quality around here," Gauderman said.

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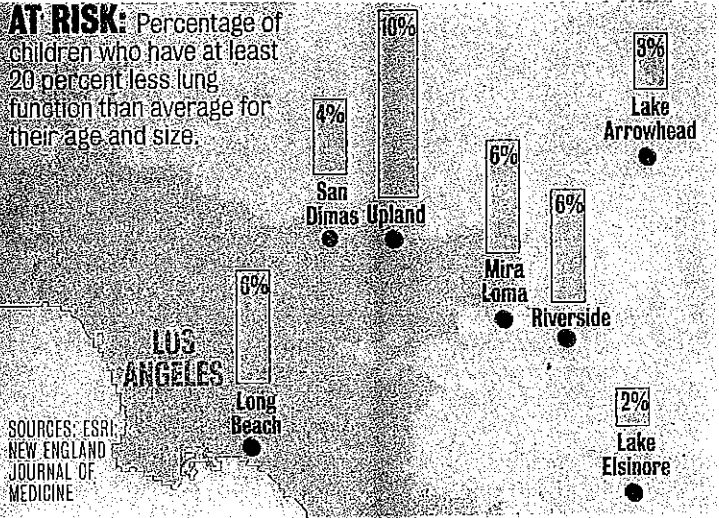
L.C. Greene can be reached by e-mail at l_greene@dailybulletin.com or by phone at (909) 483-9337.

12/12

Region's smog stunts

Young lungs

AT RISK: Percentage of children who have at least 20 percent less lung function than average for their age and size.



THE PRESS-ENTERPRISE AND THE ASSOCIATED PRESS

HEALTH: Many youths face lives of increased vulnerability to serious illnesses, a study says.

BY DAVID DANELSKI
THE PRESS-ENTERPRISE

Growing up in smoggy Inland valleys leaves young adults with weaker lungs and a higher risk of serious respiratory consequences later in life, USC researchers report today.

Their study also dashed hopes that children growing up in polluted communities might regain lost lung function during adolescence.

Scientists with USC's medical school followed 1,759 children in 12 California communities for eight years, part of a larger examination of how smog affects children's health. State officials said it was the most comprehensive study ever of children and air pollution.

The children were 10 when researchers regularly began measuring their lung strength. At 16, some had the lungs of a 50-year-old, one official said.

The findings — published today in the New England Journal of Medicine — showed that

18-year-olds in heavily polluted Southern California communities such as Upland, Mira Loma, Riverside, Long Beach and San Dimas were the most likely to have weak lungs. As adults, they likely will be less able to fight off life-threatening illnesses, experts said.

"The results demonstrate long-term health consequences for children who are breathing the current levels of air pollution," said James Gauderman, the study's lead author. "If we can reduce air pollution, we can improve the level of children's respiratory health."

Early in the study, it was clear that children in smoggy communities were more likely to lag behind other children in lung development — measured in how much air they were able to expel and how quickly.

Researchers had thought those children might regain normal lung function during the adolescent growth spurt. That turned out not to be the case.

"The effect we showed earlier didn't get better and in fact may get worse," Gauderman said.

Communities with the highest levels of nitrogen dioxide, fine particles, soot and acid

vapors — byproducts largely of trucks, cars and other vehicles — had the greatest percentage of 18-year-olds starting adulthood with "clinically significant" lung function deficit. Those teens had 80 percent or less the lung strength expected for people their age and size.

In Upland, where nitrogen dioxide and acid vapor pollution were the worst of the communities studied, 10 percent of the test subjects were in that "clinically significant" group. Researchers said their lung function was similar to that of teens whose mothers smoked.

Such teens had the lung strength expected in healthy 50-year-olds, said Jerry Martin, a spokesman for California Air Resources Board, which provided \$18 million toward USC's array of studies.

'SOMETHING WE LIVE WITH'

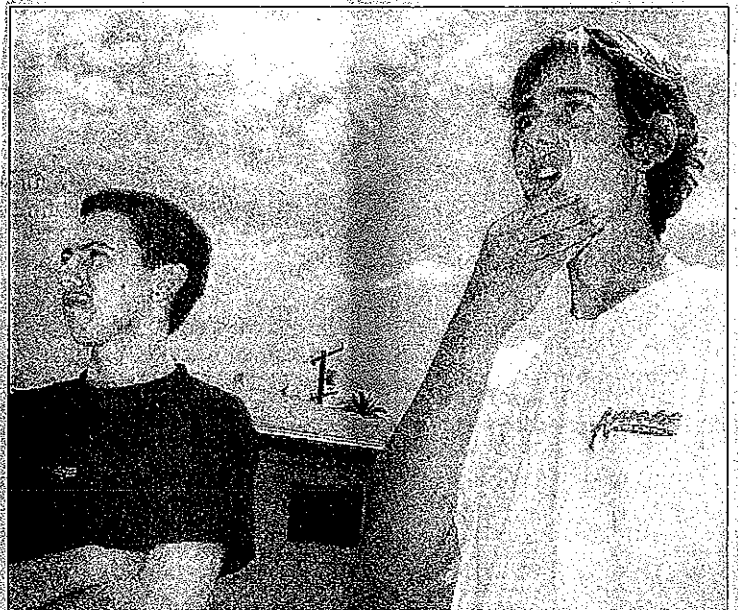
"It doesn't surprise me," Upland resident Andrea Vargas said of the findings as she waited Wednesday to pick up her daughters from school. "I know we have the worst air quality in the Inland Empire."

Vargas said her daughters, 7 and 9, have never suffered respiratory problems.

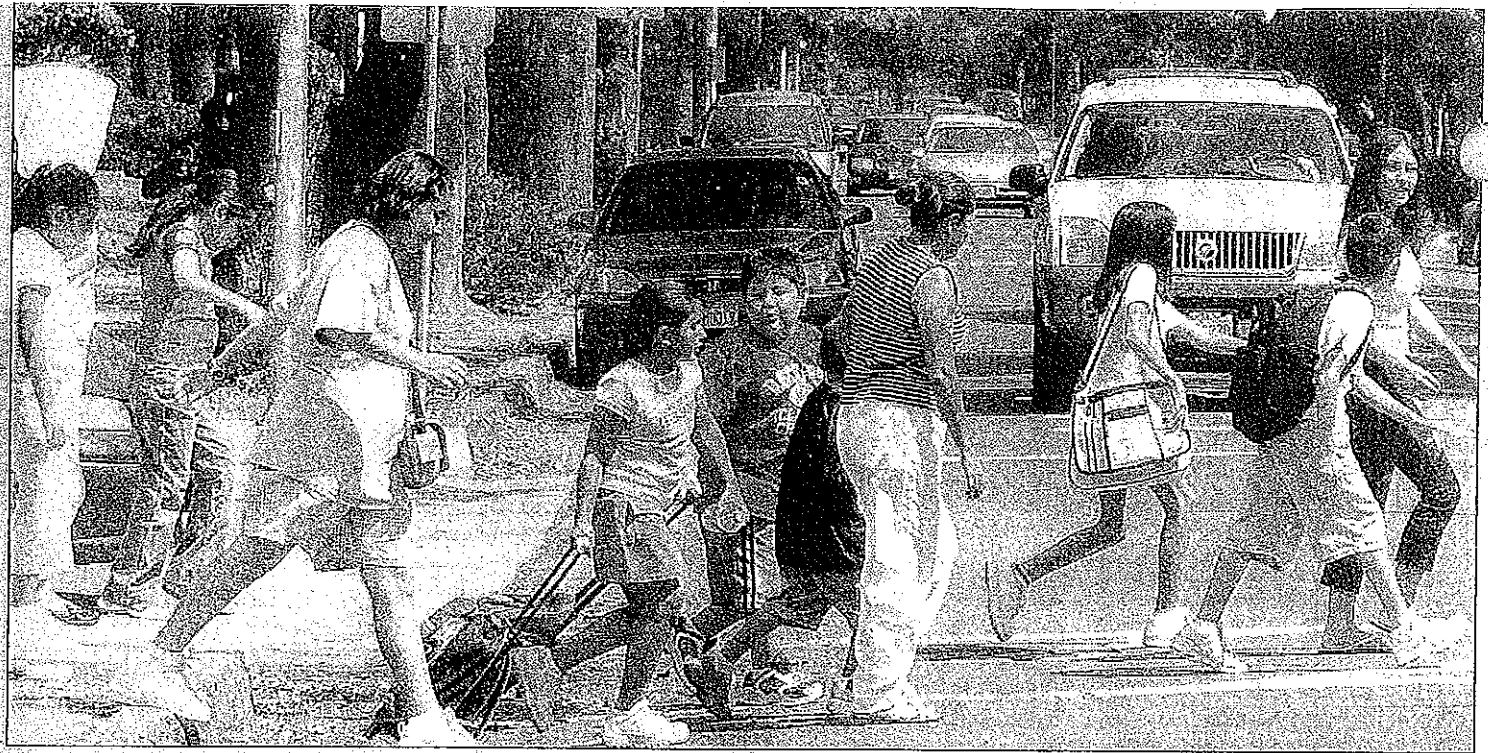
"It's something we live with here in Southern California," she said, adding that her family would not move to escape the smog.

Jason Vest of Ontario said he sometimes finds himself gasping for breath during exercise.

"It feels like asthma, like your throat closed up," said Vest. "Sometimes, when I'm running or riding my bike, I have to sit



Jason Vest, 15, of Ontario, right, a Chaffey High School student, says he often has difficulty breathing in the Ontario/Upland area. "Sometimes, when I'm running or riding my bike, I have to sit down and just wait," he said. At left is his friend, Scott Armbruster, 16.



DAVID BAUMANN/THE PRESS-ENTERPRISE

Upland Elementary School students and parents cross Arrow Highway at Fifth Avenue on Wednesday afternoon. A USC study says that children who grow up in the area have a greater risk of having diminished lung capacity by age 18 because of poor air quality.

"This is pretty compelling, when you are talking about 10 percent of the kids in Upland with a 20 percent reduction when they are doing nothing but being kids. It focuses the public on real-life consequences."

JERRY MARTIN, A SPOKESMAN CALIFORNIA AIR RESOURCES BOARD, WHICH PROVIDED \$18 MILLION TOWARD USC'S STUDIES

down and just wait."

In Riverside, Mira Loma and Long Beach, 6 percent of the teens studied had significantly reduced lung function, researchers found.

"Everyone I know has problems breathing," said Nicholas Hartman13, a Jurupa Valley High School ninth-grader and lifetime Mira Loma resident.

Hartman said he's troubled by the many trucks he sees rumbling by when he's at football practice. "They need to limit the trucks coming in and out of the community."

HEALTH TOLL

Stunted lung development is a serious health matter, said Joe Corless, pediatric allergy division chief at Arrowhead Regional Medical Center in Colton.

Lung strength peaks in early adulthood and then diminishes

with age. People with reduced lung capacity will have more difficulty with asthma and other respiratory conditions, Corless said by telephone.

Such people are more likely to die if they have heart attacks, lung cancer, pneumonia or severe asthma attacks, Corless and Gauderman said.

"If you have any underlying problem, you are starting with less lung capacity to deal with the problem, such as a person who had part of a lung removed because of lung cancer or a person who develops asthma," Corless said.

Upland is situated on a pollution path driven by sea breezes, contributing to its smog problem, said Sam Atwood, South Coast Air Quality Management Agency spokesman.

Gauderman said he would expect to find comparable

health problems in nearby communities that have similarly poor air quality. "It's an implication of the Los Angeles basin," he said.

The region has the worst urban air quality in the nation, air quality district officials say.

Earlier results showed that children who moved to clean-air communities before adulthood saw improvement in lung strength.

But Gauderman said he is doubtful that the lungs of 18-year-olds will ever improve. Lungs are pretty much done growing by that age, he said. Still, the research team plans to track about 1,100 of the study participants to measure their lung strength as they age.

Several observers said the USC findings will put pressure on regulatory agencies.

'A GREAT URGENCY'

"The result will create a great urgency in the public to force us to adopt new regulations," said Martin of the state air board.

"This is pretty compelling, when you are talking about 10 percent of the kids in Upland with a 20 percent reduction when they are doing nothing but being kids.

"It focuses the public on real-

life consequences."

In 2006, the state is expected to require low-sulfur diesel fuels and upgraded diesel engines, Martin said.

The U.S. Environmental Protection Agency also is planning new regulations in the coming years to cut pollution from diesel trucks.

But officials with the South Coast Air Quality Management District and environmental groups this year have criticized the Bush administration for easing factory emission regulations, extending clean-air deadlines, and planning to give higher-polluting Mexican trucks access to U.S. freeways.

The district has little authority over the vehicles that produce most of the pollution.

"The results of studies like this show we need to do more to improve our air quality, and we need to move quickly," said Jean Opsital, the district's health effects officer.

"But our authority is not broad enough to tackle the whole problem."

Staff writers Michael Fisher and Sandra Stokley contributed to this report.

Reach David Danelski at (951) 368-9471 or ddanelski@pe.com

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WAREHOUSES, TRUCKS AND PM_{2.5}: HUMAN HEALTH AND LOGISTICS INDUSTRY GROWTH IN THE EASTERN INLAND EMPIRE

By RANDALL A. BLUFFSTONE and BRAD OUDERKIRK*

Keywords: air pollution, Southern California, logistics industry

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Abstract

The eastern Inland Empire of Southern California has experienced dramatic growth of the logistics industry since 2000. This paper analyzes the air pollution implications of that expansion. It is found that truck traffic will generate significant air pollution, especially PM_{2.5}. The estimated excess mortality associated is 32 to 64 cases per year, with a combined excess mortality and morbidity value of \$247 to \$455 million per year. This represents 44% to 81% of the estimated wages generated by industry growth and \$5 million to \$9 million per distribution facility. These estimates suggest policies should be developed to internalize those costs.

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I. INTRODUCTION

The logistics industry organizes, stores and then transports consumer and other goods throughout the United States. It is composed primarily of warehousing and distribution facilities that now typically exceed 500,000 square feet, supported by fleets of trucks that move goods between facilities and other transportation modes. Most of the physical infrastructure of the logistics industry is made up of warehouses and other buildings. Proximity to seaports, air, rail, and road networks are key foundations of the logistics industry and ready access to all forms of transport is increasingly essential. It is also a space intensive industry, making cost of land an important additional location factor.

The valley regions of San Bernardino and Riverside counties in Southern California east of Los Angeles comprise what is known as the Inland Empire. Lying along some of the most extensive road and rail networks in the United States, from an industry perspective the Inland Empire is perhaps an ideal hub for logistics. The region also hosts three air cargo terminals and is proximate to the ports of Los Angeles and Long Beach, which handle approximately 13 million containers per year or one quarter of all imports to the United States. Half of those containers travel via the Inland Empire, which means 34,000 trucks and 100 trains pass through the region each day from the ports (Eventov, 2003; Eventov, 2004c). Volume grew 11.6% in 2004 and is projected to almost double by 2020 (LAEDC, 2003).

This paper analyzes the health effects from fine particles emitted into the atmosphere by heavy-duty diesel trucks that are an important part of the logistics industry expansion in the eastern Inland Empire. Modern warehouses are typically serviced by 300 to 1000 heavy truck trips per day. The sector therefore has the potential to dramatically increase truck traffic, particularly on freeways, and have major effects on air quality because of emissions associated

with diesel fuel combustion. The paper is organized as follows. The next section discusses the environmental effects of diesel emissions from heavy trucks as well as the environmental backdrop against which the truck traffic expansion is occurring. Section 3 presents estimates of the increased truck traffic and fine particle pollution from logistics industry growth. Section 4 incorporates key results from the epidemiological literature on mortality and morbidity consequences of increased particulate exposures, as well as the relevant environmental valuation literature. Section 5 presents our estimated economic costs and Section 6 concludes.

FIGURE 1 ABOUT HERE

Logistics industry growth in the Inland Empire and particularly east of I-15, which is the focus of this paper and highlighted in Figure 1, is a relatively new phenomenon. Prior to the 1990s the Inland Empire was home to only nine logistics centers and all would be considered small by contemporary standards (McLaughlin, 2003). In 2004 there were 43 large (over 500,000 square feet) warehouses and distribution centers and 18 more were planned. During the period 2000-2003, at least 26 were built (Eventov, 2004d) and approximately fifteen more completed construction or were announced by 2004. Allowing for reasonable growth during 2005 and an incomplete inventory, we can say with confidence that during the period 2000 to 2005 forty-five major warehouse and distribution centers were built in the eastern Inland Empire. Most are twenty-four-hour cross-docking facilities used to organize import shipments for distribution nationally (Eventov, 2004b; Herrera, 2005a).¹ In 2004 one-sixth of the commercial development in the nation, or over 10 million square feet, was taking place within the Inland Empire. In early 2005 the industrial vacancy rate was only 2.2%, largely due to demand from the logistics industry. As Tapie Rohm, director of the Inland Empire Center for

Entrepreneurship at the California State University, San Bernardino put it, "Logistics is totally reshaping the Inland Empire" (Eventov, 2003a).

More than 40% of the value of world trade is moved by air and over 70% of all goods purchased via the internet are shipped using expedited air services. But up until 2000 the only commercial airport in the Inland Empire was in Ontario in the western part of the region and virtually all logistics industry growth away from the Southern California coast occurred there. This all changed, however, with the development of the former Norton Air Force Base and March Air Reserve Base for commercial purposes. These facilities made possible air transport and spurred development of several major logistics facilities in the eastern part of the valley.

The eastern Inland Empire also presents an attractive location for companies requiring rail links. BNSF and Union Pacific have rail lines running through the Inland Empire. In 2003 over 495,000 containers were handled by area rail yards and the Southern California Association of Governments predicts that cargo delivered by rail will increase by 160% during 2002 - 2020 (Silva, 2002; SCAG 2003a; 2003b).

Logistics is having important labor market effects in a region hungry for local jobs. It is a relatively labor using industry, with one to four jobs per 10,000 square feet of warehouse space, paying an average of \$36,000 per year (Eventov, 2004d; Herrera, 2005b; 2005c; Kirshner, 2002). Approximately 44,000 Inland Empire residents are employed by the logistics industry, with an estimated \$300 million annual payroll (Sieroty, 2004). This is expected to increase, which would make the industry the most important employer in the region.

II. THE ENVIRONMENTAL ISSUES

Diesel exhaust is made up of gas and particulates. Gases include hydrocarbons, carbon dioxide, carbon monoxide, nitrogen oxides and sulfur oxides, but particulates are of special concern

because they are associated with a variety of cancers and cardiopulmonary problems that have been shown to increase the risk of mortality. Relative to gasoline engines, heavy-duty diesel trucks, such as those used in the logistics industry, typically emit at least 24 times more fine particulate matter per mile traveled (Kirchstetter *et al*, 1999). Health effects associated with these particles fall disproportionately on vulnerable populations, such as the young, elderly, and those who already have compromised respiratory systems.

Recently the toxic and especially carcinogenic effects of diesel particulate matter (DPM), much of which comes from trucks, have been highlighted. The State of California and the U.S. Environmental Protection Agency (USEPA) have identified more than 40 toxic pollutants in diesel emissions and in 1998 the California Air Resources Board (CARB) named it a toxic air contaminant (Lippmann *et al*, 2003; CARB 2000; Ostro and Chestnut, 1998; Hubbell *et al*, 2001; SCAQMD, 2003).

Particulates are classified according to their diameters. Those less than 2.5 microns ($PM_{2.5}$) pose the greatest threat to human health, because smaller size allows deeper penetration into lung tissues as well as longer float times (as much as several days under dry conditions) and therefore wider deposition. DPM is particularly light, with a mean particle diameter of 0.2 microns, but as much as 20% of DPM can be less than 0.05 microns, which floats longer and penetrates deeper than larger particles. DPM also has a large surface area, making it an ideal carrier for a variety of toxic compounds. DPM typically makes up 10 - 30% of total $PM_{2.5}$ concentrations. The federal limit for $PM_{2.5}$ is $15 \mu\text{g}/\text{m}^3$ average annual concentration and $65 \mu\text{g}/\text{m}^3$ maximum concentration during any 24 hour period. California has a stricter annual average concentration standard of $12 \mu\text{g}/\text{m}^3$. DPM-specific standards do not exist.

The eastern Inland Empire and particularly the I-215, I-10 and I-15 freeway corridors have very high particulate concentrations. In 2003 Riverside and San Bernardino Counties ranked first and second in the nation for total particulate pollution (CARB/American Lung Association, 2004). For example, at the Rubidoux monitoring station in Riverside, during the period 2000 – 2002 the average annual $PM_{2.5}$ concentration was $28.9 \mu g/m^3$, which is about 1.75 times the federal limit and more than twice the state standard. Maximum $PM_{2.5}$ concentrations at monitoring stations have been $80 - 100 \mu g/m^3$, which are about 1.5 times the federal limit (CARB, 2003). Such concentrations are very common throughout the Inland Empire and have been constant since the late 1990s. USEPA (2002) citing work in Riverside in 1996 by Kleeman *et al* (2000) notes the Inland Empire had an average DPM concentration of $4.4 \mu g/m^3$, which was double the national average ($2.1 \mu g/m^3$) and much higher than the Southern California average of $2.5 \mu g/m^3$ (USEPA, 2002 p. 2-104;2-118 to 2-121; CARB, 2003).

TABLE 1 ABOUT HERE

Part of the reason for these high fine particle concentrations is that the eastern Inland Empire experiences the highest truck traffic in Southern California. Table 1 presents California Department of Transportation truck counts at key mileposts for 1998, which we consider prior to the logistics industry explosion in the eastern Inland Empire, and in 2002. Along I-10 east of the I-15, the California Department of Transportation estimates that in 2002 an average of 15,000 to 25,000 trucks traveled each day. This means that trucks pass each point every 3 to 4 seconds. I-215 was used by 5000 to 9000 trucks and I-91 by 10,000 to 15,000 trucks per day (California DOT, 2004). In total in 2002 98,584 trucks passed checkpoints. To estimate a counterfactual, we used 1992 – 2002 data to run milepost-specific AR (1) trend regressions and used those

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equations to develop baseline truck traffic estimates for 2005. These estimates are presented in the final column of Table 1. Growth is estimated to be strongest on the eastern part of the I-10.

III. ADDITIONAL TRUCK TRAFFIC AND PARTICULATE EMISSIONS FROM LOGISTICS INDUSTRY GROWTH

We now present estimates of the additional traffic resulting from the logistics industry boom in the eastern Inland Empire and augment those estimates with information from the literature to estimate the contribution toward increased PM_{2.5} concentrations. Estimating truck trips per day per facility is difficult, because of the proprietary nature of information and substantial variability in estimates. Newer facilities in the region were contacted, but none were willing to provide traffic estimates and such data are not published. We therefore base our estimates on secondary sources, including State of New York (2002), which presents a standard development profile for distribution centers locating in New York. For a 500,000 square foot facility on 50 acres, the State of New York estimates 350 truck trips per day. This figure is proportionate to estimates for an AMB Property Corporation center in Redlands (1000 truck trips for a 1.3 million square-foot structure), Wal-Mart distribution centers in Pueblo, Colorado (700 truck trips per day for an 880,000 square foot facility), Connecticut and Delaware (both 1000 truck trips per day for 1.2 million square foot structures) and a grocery distribution center in New York (Hernandez, 2005; Gasiewski, 2004; Pueblo Chieftain, 2004; Boas, 2003; Sholl, 2004).

Given that distribution centers in the eastern Inland Empire tend to be larger than the development profile prepared by the State of New York, truck traffic should be higher. If truck traffic were proportionate to facility size as appears to be the case, a facility of 800,000 square feet would imply an average of 560 truck trips per day per facility. We use this figure as our main estimate, but also present analysis with the actual State of New York (2002) figure of 350 truck trips per day. The forty-five newest warehouse/distribution centers are therefore estimated

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to increase truck traffic in the eastern Inland Empire by 15,750 to 25,200 truck trips per day. These truck trips are expected to be uniformly distributed throughout the day, because distribution centers typically operate 24 hours.

TABLE 2 ABOUT HERE

We know these additional truck trips will be almost completely on freeways rather than streets, but the distribution of the additional traffic flow must be assumed. Column 3 of Table 2 presents our assumptions regarding the distribution of new truck trips generated by logistics facilities established in the eastern Inland Empire since 2000. The new logistics facilities are relatively uniformly scattered around the Inland Empire. We therefore model the additional truck trips as being uniformly distributed across our truck count points. Because total additional truck trips are 24.12% of the 2005 baseline, each truck count point is assumed to experience the same increase. The 2005 baseline distribution of truck counts therefore fully determines the distribution of additional truck trips across count points. Based on this distribution, mean and low estimates of additional truck traffic are presented in columns 4 and 7. A second implication is that effects of each truck trip are limited to one truck count point. This is conservative, because trucks could pass more than one count point as they move from logistics center to national destination. The assumption also, however, avoids the need for assuming *ad hoc* truck routes for which we may have limited theoretical basis.

These 15,750 to 25,200 additional truck trips per day will produce a variety of pollutants, but we focus only on PM_{2.5} because the health effects are known to be especially important. We also ignore effects of truck traffic outside the heavily populated part of the eastern Inland Empire. These simplifications, of course, bias our health effects estimates downward.

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To estimate health effects, we need to model changes in $PM_{2.5}$ concentrations at points of emissions, $PM_{2.5}$ dispersion and damages.ⁱⁱ $PM_{2.5}$ concentrations at monitoring stations in the region averaged 25.3 to 28.9 $\mu\text{g}/\text{m}^3$ during 2000 – 2002. The question is what portion of these concentrations was due to DPM, and for what portion of DPM concentrations are logistics industry trucks responsible? To avoid omitted variable bias it is necessary to adjust for background factors contributing to $PM_{2.5}$ concentrations that are unrelated to truck traffic. Such factors would likely include automobiles, non-vehicle dust and light particles originating from other sources. We do not, however, have a sufficiently comprehensive data set to include those variables in an econometric model. We therefore use our available data combined with research results from the environmental engineering literature.

We begin by dividing the 2000 – 2002 average $PM_{2.5}$ concentration at the monitoring stations closest to each truck count point by the number of trucks per day. This gives the unadjusted $PM_{2.5}$ concentration per truck trip, which at the median is 0.00176 $\mu\text{g}/\text{m}^3$. This estimate is similar to that of Lena *et al* (2002) in their study of Hunts Point, New York that in 1999 had an average measured $PM_{2.5}$ concentration of 25 $\mu\text{g}/\text{m}^3$, which is very similar to our study area. Using a univariate linear regression they find an additional truck trip per day increases concentrations by 0.0013 $\mu\text{g}/\text{m}^3$. That our unadjusted value is somewhat higher is not surprising, because their work focused on urban areas rather than freeways with some of the highest truck traffic in the country. It is notable, though, they do not make any adjustments for other factors that could affect $PM_{2.5}$ concentrations. They then conclude large trucks were responsible for between 26% and 50% of $PM_{2.5}$ concentrations.

We take 0.00176 $\mu\text{g}/\text{m}^3$ as the starting point for analyzing the relationship between concentrations and increased truck traffic, but we adjust this value using the environmental

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engineering literature. In particular, we take account of (a) the percentage of $PM_{2.5}$ concentrations made up by DPM and (b) the percentage of DPM generated by large trucks. DPM is typically between 23% and 53% of $PM_{2.5}$ concentrations in metropolitan areas (USEPA, 2002; p. 2-120; 9-3) and Fujita (2004) estimates that DPM makes up 35% of $PM_{2.5}$ emissions in the South Coast Air Basin. We therefore take 35% as our percentage of $PM_{2.5}$ concentrations made up by DPM. Fujita (2004) also estimates that in the South Coast Air Basin 67% of the elemental carbon (a key indicator of DPM) comes from large trucks. We therefore take this estimate as our value for the portion of DPM that comes from large trucks. Combining this value with the assumption that DPM makes up 35% of $PM_{2.5}$ emissions implies that large trucks are responsible for 21% of $PM_{2.5}$ concentrations. This value is below the range estimated by Lena *et al* (2002), which may suggest our estimates are conservative, but more likely simply takes advantage of more recent engineering literature.

The three values, (1) $PM_{2.5}$ concentrations per truck trip, (2) percentage of $PM_{2.5}$ concentrations from DPM and (3) percentage of DPM concentrations coming from large trucks are multiplied to obtain a coefficient of 0.000416, which we use to convert increases in truck traffic into changes in concentrations. In addition, we suppose that due to on-going technological change, monitored $PM_{2.5}$ concentrations would have remained at 2000-2002 average levels without logistics industry growth.

TABLE 3 ABOUT HERE

With these and the previous assumptions related to the spatial distribution of additional truck traffic presented in Table 2, we estimate that with an average of 560 truck trips per facility per day the new centers increase concentrations by 4.2% to 10% compared with the 2000-2002 average concentration, with a mean of 6.6% or $1.75 \mu g/m^3$. The largest increases are predicted to

occur on I-10 east of the I-215 Freeway. If we instead assume 350 trucks per facility per day, PM_{2.5} concentrations are estimated to increase between 2.6% and 6.3% compared with the 2000-2002 average concentration. This implies a mean increase of 1.09 $\mu\text{g}/\text{m}^3$ or 4.2%.

IV. 4. HEALTH COSTS OF DIESEL PARTICULATE MATTER AND THE VALUE OF A STATISTICAL LIFE

The health effects of diesel exhaust have been investigated at length in recent years and as was already discussed results show increases in both morbidity and mortality. Though scientific uncertainty exists, the evidence leads most organizations, including the USEPA, World Health Organization and the National Institute for Occupational Safety and Health to link diesel exhaust with human mortality (USEPA, 2002; SCAQMD, 2003; Kagawa, 2002). There are also immediate morbidity effects like chronic cough and bronchitis (Braun-Fahrlander, 1997).

Cancer is an especially important health risk associated with exposure to DPM. In their diesel risk reduction plan of 2000, the California Air Resources Board concluded that exposures to DPM of 1 $\mu\text{g}/\text{m}^3$ (about one-quarter of the concentration in the Eastern Inland Empire) cause excess cancer cases in the range of 130 to 2400 per million. A review by a scientific panel recommended a unit risk for DPM of 300 excess cancers per million people per 1 $\mu\text{g}/\text{m}^3$ increase in PM_{2.5}. The Los Angeles air basin cancer risk is double the California average of 500 per million and DPM is believed to account for 71% of the risk from air pollution (California Air Resources Board, 2000; SCAQMD, 2000; Figdor, 2002).

Long-term cohort studies are currently underway to fully assess the effects on children, but as a result of studies conducted in Southern California by Peters *et al* (1999a; 1999b) and Gauderman *et al* (2000; 2002), it is known that children experience a decrease in respiratory function and lung capacity when chronically exposed to particulate matter. The unknown remains the lasting effect this exposure will have into adulthood. Recent studies have looked

deeper into effects on pregnancy, birth and infant mortality. Research suggests that exposure to particulate matter may trigger pre-term birth (Ritz *et al*, 2002), reduce birth weight (Bobak and Leon, 1999) and increase infant mortality (Schwartz, 2004).

The work by Dockery *et al* (1993) and Pope *et al* (1995) are key epidemiological references and were used to set the national long-term PM_{2.5} standards that were adopted in 1997. Krewski, *et al* (2000) refined both those estimates. Dockery *et al* (1993) analyzed cross-section data from approximately 8000 adults in six cities in the 1970s and found that a 1.0 µg/m³ increase in PM_{2.5} increased overall mortality by 1.40%. The reanalysis by Krewski *et al* (2000) changed this result relatively little, increasing it to 1.51%. Pope *et al* (1995) analyzed a panel of data for over half a million adults in 50 metropolitan areas during the period 1982-89. They found a 1.0 µg/m³ increase in PM_{2.5} increased overall mortality by 0.69%. Hubbell *et al* (2001) used the Krewski *et al* (2000) reanalysis of those data for their work on heavy-duty vehicles.

Subsequently, Pope *et al* (2002) utilized data that expanded the follow-up time used in Pope *et al* (1995) and took advantage of better PM_{2.5} measurement and statistical techniques. They find that at the mean total mortality increases by 0.4% for a 1.0 µg/m³ increase in PM_{2.5} for the period 1979 – 83. Using data from 1999-2000 the effect was a stronger 0.6% per 1.0 µg/m³ increase in PM_{2.5}. Ostro and Chestnut (1998) use a 0.35% increase in mortality for a 1.0 µg/m³ increase in PM_{2.5} and SCAQMD (2003) uses a 0.4% figure.

Because the techniques and data set used by Pope *et al* (2002) are better than previous efforts, we take our marginal (and average) mortality risk from that source. We utilize a figure of 0.5% for a 1.0 µg/m³ increase in PM_{2.5}, which is the mean of their two sets of estimates. Because more recent data suggest stronger effects, we consider this estimate conservative. This figure is then applied to the California baseline mortality rate of 75.78 per 1000 population

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(Census Department, 2004). A particularly important aspect of conservatism is the assumption of constant marginal mortality risk. A standard damage model would suggest that as concentrations rise marginal damages should also increase (Kolstad, 2000). As Riverside and San Bernardino are the two counties with the highest PM_{2.5} concentrations in the US, it is likely that marginal risks would be higher than in the variety of cities analyzed by Pope *et al* (2002).

The value of reducing mortality risk has been the focus of study for more than thirty years and is hotly debated. In the USEPA's estimate of the benefits from the 2000 Clean Air Act reauthorization, a value of \$4.8 million in 1990 dollars was used, which is approximately \$7 million in 2005 dollars (USEPA, 1999). Meta-analysis by Viscusi and Aldy (2003) put the best estimate at \$6.7 million. Alberini *et al* (2004) evaluate whether willingness to pay to avoid the risk of dying declines with age and health status. They find those with cardiovascular and respiratory illness and cancer typically place higher values on their lives than healthier individuals. They also find limited support for the hypothesis that value decreases with age, but only among those over 70 years and the results were statistically significant only when data from Canada and the U.S. were pooled. These results indicate willingness to pay about 25% lower than for those below age 70. Analysis of U.S. data did not yield significant effects.

Given this literature, we utilize a value of a statistical life (VOSL) of \$6.7 million from Viscusi and Aldy (2003), but apply a 25% reduced value (i.e. \$5.0 million) to those over age 70 as suggested by Alberini *et al* (2004) and Ostro and Chestnut (1998). Inland Empire Economic Partnership (2006) and Public Policy Institute of California (2002) estimate that 10.5% of the Inland Empire population is over age 65 and Census Bureau (2002) estimates that nationally about 9.0% of the population is over the age of 70. As we do not have Inland Empire-specific estimates of the over 70 population and there is only a small difference with the over 65 year old

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population estimate, we use Census Bureau (2002) and suppose 9.0% of the total mortality is valued at \$5.0 million and the remainder at \$6.7 million. No increases to our baseline VOSL are made for younger people, because there is no literature to support such a step.

This VOSL is almost certainly conservative. The studies summarized in Viscusi and Aldy (2003) are largely based on risks of sudden death. We know that DPM exposure has a variety of cardiopulmonary and carcinogenic risks, but few could be labeled as sudden death. More accurately, risks would be described as lingering illness and death, which is almost certainly valued more highly than sudden death. At the present time, though, no literature on the value of avoiding such a risk profile exists. ⁱⁱⁱ

In valuation studies that combine morbidity and mortality, increased mortality generally makes up 90% to 95% of overall health damages (USEPA, 1999; Hubbell *et al*, 2001; Ostro and Chestnut, 1998). For example, 92% of the estimated Clean Air Act health benefits were due to decreased mortality (USEPA, 1999; H-30). Utilizing these results, we assume morbidity is 8.7% of estimated mortality, which corresponds to 8% of overall value. This estimate is also conservative, because the total value and weight of morbidity would likely be higher if valuation literature existed for damage and risk profiles similar to those associated with PM_{2.5} exposure.

To estimate damages from the concentration increases in Table 3, we must know the populations affected and the levels of effects experienced, which depend on the spatial distribution of populations and the dispersion of fine particles. We know from the literature that fine particles disperse in the atmosphere and are diluted as they move away from pollution sources. Concentrations are therefore declining functions of distance from sources. The literature also suggests that effects reach zero at approximately one kilometer from sources (Fraser, 2004; Nazemi, 2002; D. Cocker private communication). There is no consensus,

however, regarding the functional relationship between $PM_{2.5}$ concentrations and distances from sources, so we consider two possibilities, with both assuming effects are negligible beyond $\frac{1}{2}$ kilometer on each side of freeways.^{iv}

FIGURE 2 ABOUT HERE

The first case assumes $PM_{2.5}$ exposures are linear decile functions of distance from pollution sources, with 10% of the population experiencing full exposure, 10% experiencing 90% of full exposure, etc. The second case is more conservative and supposes exposures take a logarithmic functional form, with the most exposed population decile experiencing only 90% of full exposure. As shown in Figure 2, with logarithmic decay exposures decline more rapidly as distance from pollution sources increase.

TABLE 4 HERE

The eastern Inland Empire populations exposed to the increased $PM_{2.5}$ concentrations from logistics industry growth are shown as polygons along freeways in Figure 1. As shown in Table 4, in total there are over 175,000 people living within $\frac{1}{2}$ kilometer of Eastern Inland Empire freeways. Based on the 2000 census the area immediately adjacent to I-10 is home to 45,046 people, near the 91 Freeway are 57,889 persons, by the 60 Freeway live 39,148 people, within $\frac{1}{2}$ km of I-215 are 29,209 and 4222 persons live along I-15. We do not have information on the population distributions within each polygon and therefore assume a uniform distribution within $\frac{1}{2}$ -kilometer bands on each side of freeways.

V. RESULTS

TABLE 5 ABOUT HERE

TABLE 6 ABOUT HERE

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Tables 5 and 6 summarize our results. We find the health implications of the logistics industry expansion in the eastern Inland Empire are likely to be significant. Assuming 560 truck trips per facility per day, depending on the pattern of dispersion, industry growth is expected to cause premature mortality of 32 to 64 persons per year. The value of this premature mortality is estimated to be \$209 to \$419 million, with morbidity worth approximately \$18 to \$36 million. With 350 truck trips per facility per day, predicted excess mortality is 20 to 40 persons per year. Total health costs are estimated to be \$143 to \$285 million.

We estimate that on average each of the 45 facilities will generate about 320 jobs. A total of approximately 14,400 jobs should be created by the expansion. Assuming 560 truck trips per facility per day, the health costs per job created are therefore in the range of \$16,000 to \$29,000, which is 44% to 81% of the average annual salary of workers in the logistics industry. Health costs per distribution facility are estimated to be \$5.0 to \$9.3 million.

VI. CONCLUSION

This paper combined data on logistics industry expansion and traffic volumes with information from the environmental engineering, epidemiology and valuation literatures to estimate the mortality and morbidity effects of industry growth. A number of assumptions were needed to make the necessary inferences, but this is peculiar neither to this paper nor the context analyzed. Fortunately, a variety of quantitative literature is available, but it is also recognized that estimates derived from other settings transfer imperfectly to the eastern Inland Empire. As discussed in the previous sections, at every juncture we have therefore chosen conservative assumptions to avoid overstating costs.

We find that considering only localized effects, as a result of the logistics industry boom PM_{2.5} concentrations will rise by between 1.1 and 2.59 $\mu\text{g}/\text{m}^3$ or 4.2% to 10.0% compared with

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the 2000-2002 average annual concentrations. We then utilize the best available measures from the literature to estimate mortality effects. Assuming constant marginal health damages (perhaps our most conservative assumption), we conclude that the logistics industry expansion will cause 32 to 64 cases of excess mortality and morbidity valued at \$247 to \$455 million per year.

These estimates are so significant because of the confluence of a variety of factors. First, the logistics industry expansion in the Eastern Inland Empire is very large – effects in this case are not marginal. Second, there are over 175,000 people living very close to area freeways, implying high levels of exposure. Finally, though per-unit costs are likely to be higher than the literature suggests due to higher morbidity, pain and suffering, even using conservative values each premature death has a very high value in the US. These facts combine to generate local health costs that may approach \$0.5 billion per year.

Is growth of the logistics industry worth the cost? We are not able to truly answer this question, because it is possible that the increased economic output could exceed the health costs associated with the expansion. We know, though, that a major reason logistics industry growth has been welcomed is to bring jobs to the eastern Inland Empire. These jobs on average pay \$36,000 per year, but we find that local health costs per year per job are likely to be at least half that value. Perhaps more to the point, it should be asked whether the logistics industry itself would be willing to pay the full external costs of its actions. For example, would each facility be willing to pay a charge of \$5 to \$9 million per year to cover the health costs it is estimated to impose on the community? We are not in a position to say yea or nay, but economic efficiency dictates that mechanisms should be put in place so those enjoying the benefits of logistics industry growth also pay the full costs – including external health costs – of their actions.

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There are several potential limitations to our analysis. We were unable to econometrically adjust for non-truck $PM_{2.5}$ sources and therefore estimated increased concentrations using research from the environmental engineering literature. Second, the generation of local jobs could *ceteris paribus* reduce air pollution from automobiles as per-person commute distances decline, perhaps even reducing total emissions. This outcome is possible, but unlikely because heavy-duty diesel trucks emit so much more $PM_{2.5}$ per mile traveled than cars. People may also move away as they notice pollution concentrations rising near freeways, which would reduce damages. We have not taken the possibility of this averting behavior into account. Finally, in the long-run housing prices and rents should reflect increased air pollution along freeways. People living in such zones will therefore trade off health risks against lower housing costs. If information is imperfect (as is likely), the efficiency of such adjustments will, of course, be reduced. This is especially true for those who are poor and non-English speakers, who are most likely to live close to freeways.

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**Table 1 Daily Truck Counts at Key Mileposts on Eastern Inland Empire Freeways and AR
(1) Baseline Estimates for 2005**

		1998			2002			2005 (estimated baseline)
Freeway	Vehicle Count Point	Post mile	Vehicle Total	Total Trucks	Vehicle Total	Total Trucks	Trucks as % of all Trucks counted	Total Trucks
10	ETIWANDA AVENUE	11.13	182000	23478	231,000	20882	21%	22014
10	MOUNTAIN VIEW AVENUE	27.30	150000	19800	184000	24288	25%	25824
10	YUCAIPA BOULEVARD	35.50	65000	10400	118000	15340	16%	17082
215	RIVERSIDE, SPRUCE STREET	42.84	171000	12483	171000	12483	13%	13225
215	IOWA AVENUE	0.40	142000	10082	147000	10437	11%	10857
91	RIVERSIDE, LA SIERRA AVENUE	11.99	165000	16500	178000	15094	15%	15459
	Total Vehicles Passing Count Points		875000	92743	1029000	98524	100%	104461

Source: author estimate based on California Department of Transportation, www.dot.ca.gov/hq/trafops/saferesr/trafdata/index.htm

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Table 2 Additional Logistics Industry Truck Traffic in 2005 Assuming Average Traffic of 560 and 350 Truck Trips/day/facility

Freeway	Vehicle Count Point	Assumed % of additional Truck Trips Passing Indicated Milepost	Mean Estimate (560 trips/facility/day)		Low Estimate	
			Extra Trips by end of 2005 assuming 560 trips/Facility /day	Additional Trips by end of 2005 as a % of 1998 and baseline 2005	Extra Trips by end of 2005 assuming 350 trips/Facility/day	
				1998 Count	2005 Baseline	
10	ETIWANDA AVE.	21%	5311	22.62%	24.12%	3319
10	MOUNTAIN VIEW AVE.	25%	6230	31.46%	24.12%	3894
10	YUCAIPA BOULEVARD	16%	4121	39.62%	24.12%	2576
215	RIVERSIDE, SPRUCE ST.	13%	3190	25.56%	24.12%	1994
215	IOWA AVE.	10%	2619	25.98%	24.12%	1637
91	RIVERSIDE, LA SIERRA AVE.	15%	3729	22.60%	24.12%	2331
	Regional Average	16.67%	4200	27.97%	24.12%	2625

Author calculations based on California Department of Transportation, www.dot.ca.gov/hq/trafops/saferest/trafdata/index.htm

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Table 3 Estimated Logistics Industry Shares of PM_{2.5} Concentrations in December 2005 at Key Mileposts Assuming 560 and 350 Truck Trips/Facility/Day

Freeway	Vehicle Count Point	Average PM _{2.5} Concentration 2000 - 2002 at nearest monitoring station (µg/m ³)	Assuming 560 Truck Trips/Facility/Day		Assuming 350 Truck Trips/Facility/Day	
			Estimated % Of 2000-2002 Average Concentration	Estimated Increased Concentrations Due to Logistics Industry Growth (µg/m ³)	Estimated % Of baseline 2005 Concentration Due to Logistics Growth	Estimated Increased Concentrations Due to Logistics Industry Growth (µg/m ³)
10	ETIWANDA AVENUE	25.3	8.74%	2.21	5.46%	1.38
10	MOUNTAIN VIEW AVENUE	25.9	10.02%	2.59	6.26%	1.62
10	YUCAIPA BOULEVARD	25.9	6.62%	1.72	4.14%	1.07
215	RIVERSIDE, SPRUCE STREET	28.9	4.60%	1.33	2.87%	0.83
215	IOWA AVENUE	25.9	4.21%	1.09	2.63%	0.68
91	RIVERSIDE, LA SIERRA AVENUE	26.8	5.79%	1.55	3.62%	0.97
	Regional Average	26.5	6.66%	1.75	4.16%	1.09

Author calculations using Fujita (2004), USEPA (2002) and California Department of Transportation, www.dot.ca.gov/hq/trafops/saferestr/trafdata/index.htm

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Table 4 Populations Subject to Increased PM_{2.5} Concentrations

Freeway	Vehicle Count Point	Increased PM _{2.5} w/ 560 Trucks/Day (µg/m ³)	Population Affected by Additional Trucks Passing Count Point (000s)	Portion of Figure 1 Population Polygon Assumed to be Affected by Increased Concentration
10	ETIWANDA AVE.	2.21	38.01	100% of I-15 75% of I-10
10	MOUNTAIN VIEW AVE.	2.59	5.63	12.5% of I-10
10	YUCAIPA BLVD.	1.72	5.63	12.5% of I-10
215	SPRUCE ST.	1.33	39.14	100% of I-60
215	IOWA AVE.	1.09	29.21	100% of I-215
91	LA SIERRA AVE.	1.55	57.89	100% of I-91

Source: Author estimates. Population polygons developed by Pei-Yi Lee of University of California, Riverside

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Table 5 Estimated Annual Health Costs of Logistics Industry Expansion in the Eastern Inland Empire – Linear PM_{2.5} Exposure Decay

			Costs in \$ Millions			
			560 Truck Trips/Facility/Day		350 Truck Trips/Facility/Day	
Freeway	Vehicle Count Point	Population Affected	Mortality Cost (No. People)	Morbidity Cost	Mortality Cost (No. People)	Morbidity Cost
10	ETIWANDA AVENUE	38,007	114.70 (17.51)	9.98	71.68 (10.95)	6.24
10	MOUNTAIN VIEW AVENUE	5631	19.93 (3.04)	1.73	12.46 (1.90)	1.08
10	YUCAIPA BOULEVARD	5631	13.19 (2.01)	1.15	8.24 (1.26)	0.72
215	RIVERSIDE, SPRUCE STREET	39,148	70.97 (10.84)	6.17	44.36 (6.77)	3.86
215	IOWA AVENUE	29,209	43.47 (6.64)	3.78	27.17 (4.15)	2.36
91	RIVERSIDE, LA SIERRA AVENUE	57,889	122.68 (18.73)	10.67	76.67 (11.71)	6.67
	Totals	175,515	\$384.94 (58.78)	\$33.49	\$240.59 (36.74)	\$20.93
Based on Average Concentration Increase Across 6 Points		175,515	\$418.90 (63.96)	\$36.44	\$261.81 (39.98)	\$22.78

Author calculations using references cited in text

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Table 6 Estimated Annual Health Costs of Logistics Industry Expansion in the Eastern Inland Empire – Logarithmic PM_{2.5} Exposure Decay

			Costs in \$ Millions			
			560 Truck Trips/Facility/Day		350 Truck Trips/Facility/Day	
Free way	Vehicle Count Point	Population Affected	Mortality Cost (No. People)	Morbidity Cost	Mortality Cost (No. People)	Morbidity Cost
10	ETIWANDA AVENUE	38,007	62.25 (9.50)	5.42	38.91 (5.94)	3.38
10	MOUNTAIN VIEW AVENUE	5,631	10.82 (1.65)	0.94	6.76 (1.03)	0.59
10	YUCAIPA BOULEVARD	5,631	7.16 (1.09)	0.62	4.47 (0.68)	0.39
215	RIVERSIDE, SPRUCE STREET	39,148	38.52 (5.88)	3.35	24.07 (3.68)	2.09
215	IOWA AVENUE	29,209	23.59 (3.60)	2.05	14.75 (2.25)	1.28
91	RIVERSIDE, LA SIERRA AVENUE	57,889	66.58 (10.17)	5.79	41.61 (6.35)	3.62
	Totals	175,515	\$208.92 (31.90)	\$18.18	\$130.57 (19.73)	\$11.36
	Based on regional average	175,515	\$227.35 (34.71)	\$19.78	\$142.09 (21.70)	\$12.36

Author calculations using references cited in text

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Bluffstone: Associate Professor of Economics, Portland State University, Portland, Oregon. E-mail bluffsto@pdx.edu

Ouderkirk: Ecos Consulting, Portland, Oregon. E-mail bradouderkirk@msn.com

ⁱ Facilities in the High Desert are omitted from this total.

ⁱⁱ It is notable that a recent environmental health literature focuses on DPM as a distinct carcinogenic pollutant. We examine the relationship between overall PM_{2.5}, of which DPM is one part, and health outcomes, because of serious scientific uncertainty and because focusing exclusively on cancer risk could omit potentially important health outcomes (CARB, 1998; 2000 and USEPA, 2002; 2-125).

ⁱⁱⁱ The authors would like to thank Trudy Cameron of the University of Oregon for this insight.

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Abbreviations

CARB: California Air Resources Board

DPM: Diesel Particulate Matter

USEPA: United States Environmental Protection Agency

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