

Summary of Traffic and Exposure Assessment Studies Conducted near the Union Pacific ICTF



Environmental Public Health
Community Assessment Brief #1 (Draft)

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Introduction

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More than 30 studies now show that living or going to school near busy roads and freeways...is related to a variety of adverse health outcomes.
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This Community Assessment Brief was developed at the request of several community and environmental and organizations, West Long Beach residents, and the Green L.A. Port Work Group. The Community Assessment Brief details results of traffic counting and air monitoring conducted in the vicinity of the Union Pacific (UP) Intermodal Container Transfer Facility (ICTF). The ICTF is located in Carson, adjacent to Wilmington and West Long Beach, on land owned by the Port of Los Angeles. In addition, the brief describes the results of the Health Risk Assessment of the UP ICTF completed by the California Air Resources Board (ARB). Finally, results are included on the South Coast Air Quality Management District (AQMD) monitoring at Hudson

School in comparison to other sites in Wilmington, Long Beach and Los Angeles.

The data below should be viewed with an understanding that a large body of scientific evidence demonstrates that air pollution is linked to a variety of adverse health effects. In addition, more than 30 studies now show that living or going to school near busy roads and freeways (where there are concentrated sources of exhaust) is related to a variety of adverse health outcomes. The evidence includes epidemiologic research findings by investigators at the Southern California Environmental Health Sciences Center, which is based at Keck School of Medicine, University of Southern California, toxicologic work on ultrafine particles by scientists at the Southern

California Particle Center, based at UCLA, and studies by scientists at other research universities in the U.S. and abroad.^{1 2 3 4 5 6 7 8 9 10 11 12 13 14 15}

Among other effects, these studies show that children who live in communities with higher levels of particulate matter and elemental carbon (a marker for diesel) are more likely to have reduced lung function. Children who live in close proximity to busy roads and freeways are more likely to have reduced lung function or asthma than children who live further away. In addition, babies whose mothers lived near busy freeways while pregnant are more likely to be born premature or have low birth weight. The research results show that exposure to traffic increases the risk of heart attack. One recent study in London had

adults with asthma exercise in an area with high levels of diesel exhaust and in another with no diesel exhaust and compare the results of various lung tests. After exercising in an area with high diesel emissions, the tests showed signs of lung inflammation and reduced lung function, which took several hours to return to normal. Fine particle exposure (PM_{2.5}) has been regulated for a number of years because of its link to increases in cardiovascular disease and mortality, including heart attacks and atherosclerosis.¹⁶ Evidence and concerns about the health effects of fine particulate matter continue to grow.¹⁷ Studies on diesel exhaust exposure demonstrate that diesel particulate is a carcinogen, based on more than 40 studies of workers exposed on the job to

diesel exhaust.¹⁸ For that reason, diesel particulate is regulated as a Toxic Air Contaminant in California. The California Air Resource Board Health Risk Assessment on the UP ICTF makes it clear that the facility's impact has a wide geographic reach. In fact, the ICTF impacts nearly 600,000 residents with an excess cancer risk greater than 10 chances in a million. The risks from the UP ICTF do not fall below 10 in a million until one is more than "5 miles upwind and 8 miles downwind from the railyard boundary."¹⁹

History of the Union

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The UP ICTF handles only cargo that comes into the Ports from overseas and is destined for out-of-state consumers...
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According to historical Los Angeles Times accounts, building the ICTF was considered in the early 1980s because of a recognition that other ports had an advantage over Los Angeles and Long Beach; that advantage was “on-dock rail.” The local newspaper stated that “In Seattle, for example, the port’s rail yard is a few hundred feet from the shipping docks.”²⁰ The executive director of the Port of Long Beach was quoted, however, as concluding that “no land was available adjacent to the Long Beach or Los Angeles Port for a railyard,” so the decision was made to build the ICTF 4-5 miles away.²¹

Residents of Windward Village went on record in the environmental review process for the UP ICTF as being worried about air quality, and the City of

Long Beach Planning Division asked if the air would get worse.²² But when the environmental review of the UP ICTF was completed in 1982, the conclusion in the Environmental Impact Report was optimistic:

*"The air quality impacts upon the adjacent residential areas due to truck and rail emissions are anticipated to be minimal."*²³

The ICTF, sited on Port of Los Angeles land, opened in 1986. The ICTF borders Sepulveda Boulevard on the South, Alameda Street on the West, and a Southern California Edison right-of-way, homes and schools on the East.

The ICTF handles 40-foot containers trucked to it from the

Pacific ICTF

Ports of L.A. and Long Beach. All containers at the ICTF are placed onto trains that leave the ICTF for the Alameda Corridor, with all trains heading east of the Rockies. That means that the UP ICTF handles only cargo that comes into the Ports from overseas and is destined for out-of-state consumers.

The current capacity of the ICTF is 723,000 containers per year. Union Pacific has submitted a proposal to the Joint Powers Authority (which has four members, two from each port) requesting that UP be allowed to more than double the ICTF's capacity to 1.5 million containers a year. The proposal is currently under consideration by the Joint Powers Authority.²⁴

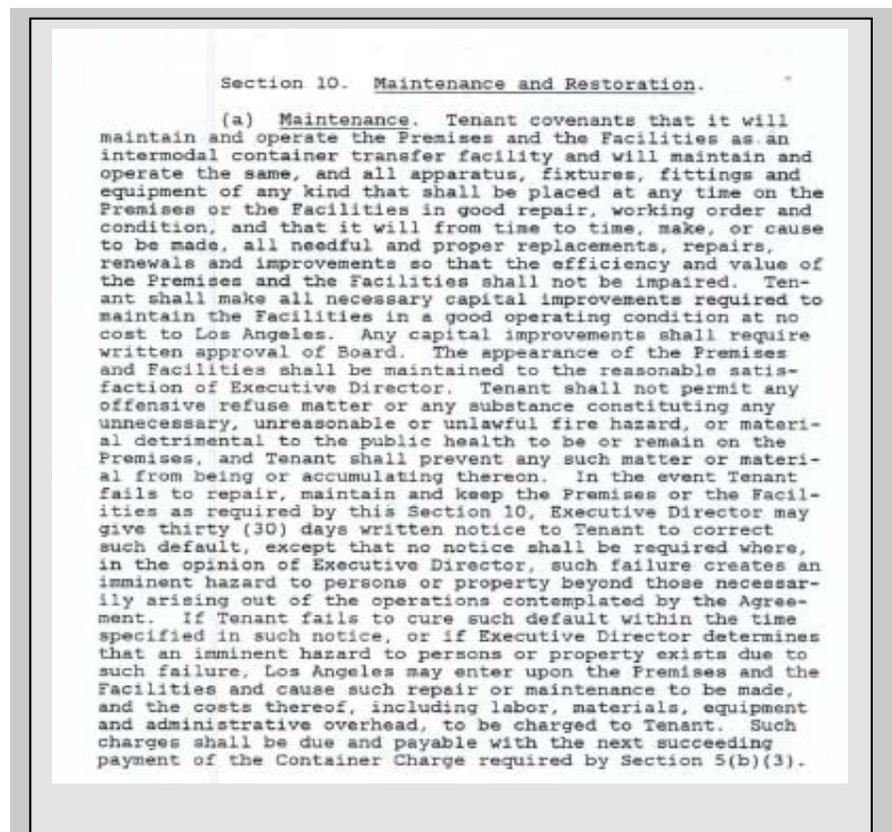


Photo by Andrea Hricko

School children running around on the playground of Hudson School in West Long Beach, adjacent to big rig trucks traveling on the Terminal Island Freeway.

Clean-up Under the ICTF Permit

In 1984, the Port of L.A. and Union Pacific signed a 50-year permit to operate the ICTF. The permit does not specifically mention requirements that Union Pacific control air pollution emitted at the railyard. It does, however, contain a clause concerning the accumulation of “materials detrimental to the public health.” The City Attorney, at the direction of the UP-ICTF Joint Powers Authority, is reviewing the language of the permit/lease and sublease to determine if the City has authority to take action to reduce diesel pollution to safer levels at the UP ICTF under the following provision:





Container trucks from the Ports line the Terminal Island Freeway, next to West Long Beach Schools.

Community Concerns

This section provides a brief background on the community concerns that prompted traffic counting and air pollution monitoring studies. Nearby residents have long complained about noise and pollution from the ICTF. Dozens of representatives submitted written or verbal comments at Port of L.A. hearings in 2005 designed to consider construction of another railyard adjacent to the UP ICTF (the BNSF SCIG project).²⁵ Residents have also been concerned about nearby refineries, as well as a petroleum facility blowing coke dust during the late 1990s. Initiated by residents' concerns about the coke dust problem, the South

Coast Air Quality Management District has been conducting monitoring at Hudson School on Webster Avenue in West Long Beach since 1998.²⁶ The problem with coke dust was resolved around the year 2000 and it was fully mitigated by 2002, according to AQMD reports. The monitoring is ongoing, providing an excellent set of data to show comparisons of Hudson School, which is adjacent to the Terminal Island Freeway on which trucks travel to get to the ICTF from the Ports. Streets south and southeast of the ICTF have a constant stream of big-rig trucks carrying containers between the ICTF and the Ports. Most of the trucks go up the Terminal Island Freeway and turn

left on Sepulveda to reach the ICTF. In fact, the Terminal Island Freeway, (also called State Road 103) essentially functions as a truck expressway for the UP railyard. Due to high volume of trucks and the fact that the TI Freeway is adjacent to Hudson and other schools, several groups have conducted traffic counting in that area. In addition, the residents' complaints about pollution from the railyard, coupled with observations of high truck traffic volumes, have led other scientific investigators to select the area of the ICTF as a "hot spot" for monitoring.



Members of the LBACA Neighborhood Assessment Team (“A” Team) count traffic at the edge of the Terminal Island Freeway in the park between Hudson and Cabrillo Schools, West Long Beach, July 2005

Studies on Traffic and Air Pollution

1. Traffic Counting

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The LBACA “A” Team counted 510 trucks per hour passing by Hudson and Cabrillo Schools.
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Volunteers from the Long Beach Alliance for Children with Asthma were trained by the outreach program staff of the USC/UCLA Children’s Environmental Health Center to count traffic, as part of a community-based participatory research program which developed a “Neighborhood Assessment Team” or “A” Team. On July 15, 2005, from 2:00-3:00 PM, the LBACA “A” Team counted 510 trucks per hour passing by Hudson and Cabrillo Schools on the Terminal Island Freeway. On August 3, 2007, the

“A” Team counted 536 trucks passing by the same location during a one-hour period. In February 2008, the “A” Team again counted more than 500 trucks in one hour, this time 512.²⁷ These counts are consistent with soon to be published data collected by researchers from UCLA in which they videotaped and counted traffic near the intersection of Willow and the Terminal Island Freeway in West Long Beach (see next paragraph).

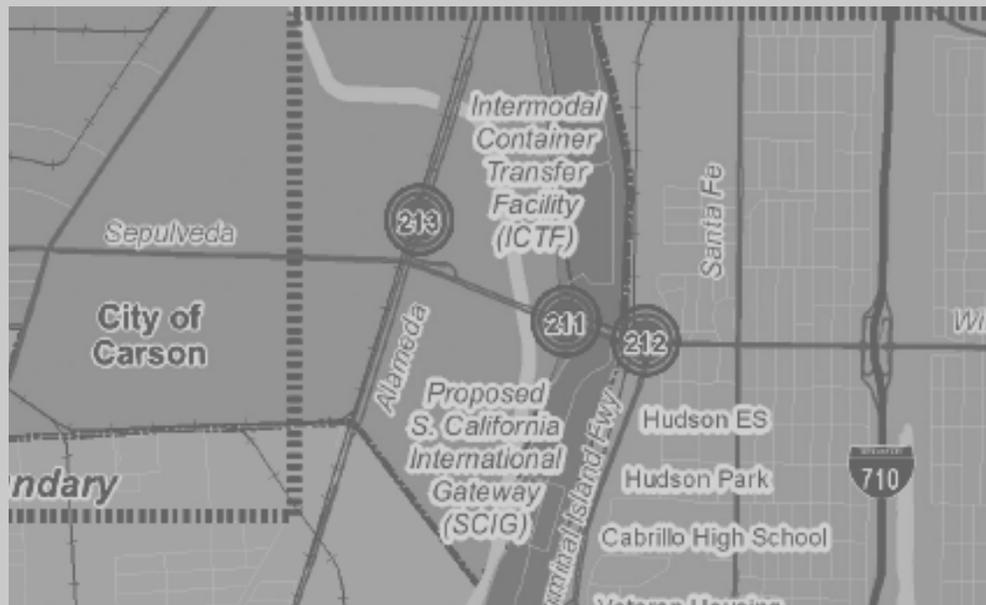
A team of investigators from UCLA School of Public Health and the Lewis Center for Regional Policy Studies conducted a study in 2007 using direct video measurements of surface street traffic at eleven intersections and line segments in harbor communities of Los Angeles and Long Beach to document port-related truck traffic.²⁸ The group’s measurement location “Site 212” (see map below) serves as the north-south linkage between Terminal Island in the port complex and the entrance to Union Pacific’s ICTF intermodal facility west of Site 212 on Sepulveda. During the UCLA team’s two days of monitoring at

Site 212, the port-related vehicles constituted about 27% of the traffic. The author’s manuscript states: “The average number of port-related diesels passing through Site 212 in a 30-minute period on the first standard weekday of monitoring was 202, with a maximum of 307. This maximum level was sustained for the entire 14:00-15:00 monitoring period, resulting in a maximum total hourly port trucks of 600/hour.” The authors concluded:

“Our findings document that 300-600 port-related heavy duty diesel trucks pass just across a chain link fence from sensitive land uses for much of the day and into the night, raising serious health concerns.”²⁹

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Our findings document that 300-600 port-related heavy duty diesel trucks pass just across a chain link fence from sensitive land uses for much of the day and into the night, raising serious health concerns

Map of Carson, Wilmington and West Long Beach with notations for UCLA traffic counting sites #211, 212, 213³⁰



2. Health Risk Assessment

The California Air Resources Board (ARB) completed a Health Risk Assessment (HRA) to estimate cancer risk from air pollution related to the Union Pacific ICTF. This is one of 18 Health Risk Assessments completed under the Memorandum of Understanding agreement that the ARB and the railroads signed in 2005.³¹ Table I below compares diesel PM emissions (tons per year) from four major source categories within 18 railyards in California.³² Emissions from the UP ICTF are highlighted. The HRA estimated that 24 tons of diesel PM emissions a year are emitted from the UP ICTF, including 10 tons from locomotives and 7.5 tons from trucks.

Near the railyard property the average potential cancer risk was estimated at 700 chances per million. The HRA concluded that the facility impacts close to 600,000 residents with an estimated cancer risk greater than 10 chances in a million.³³ The HRA states: “The estimated average potential cancer risk is about 700 chances per million near the railyard property boundaries, assuming a 70-year exposure duration. The risks further decrease to 100 in a million within a one-mile distance from the railyard, then to 25 in a million within another two-mile distance. About 5 miles upwind and 8 miles downwind from the railyard boundary, the estimated cancer risks are at 10 in a million or lower.”³⁴

“The estimated average potential cancer risk is about 700 chances per million near the rail yard property boundaries, assuming a 70 year exposure duration. The risks further decrease to 100 in a million within a one-mile distance from the rail yard then to 25 in a million within another two-mile distance. About 5 miles upwind and 8 miles downwind from the railyard boundary, the estimated cancer risks are at 10 in a million or lower.”

Table II-1: Comparison of Diesel PM Emissions (tons per year) from Four Major Source Categories within Eighteen Railyards.

Railyard	Locomotive	Cargo Handling Equipment	On-Road Trucks	Others (Off-Road Equipment, TRUs, Stationary Sources, etc.)	Total*
BNSF Barstow	27.1	0.03	0.04	0.75	27.9
BNSF San Bernardino	10.6	3.7	4.4	3.4	22.0
BNSF San Diego	1.6	N/A	0.007	0.04	1.7
UP ICTF/Dolores	9.8	4.4	7.5	2.0	23.7
UP Colton	16.3	N/A	0.2	0.05	16.5
UP Oakland	3.9	2.0	1.9	3.4	11.2
UP City of Industry	5.9	2.8	2.0	0.3	10.9
UP Roseville*	25.1	N/A	N/A	N/A	25.1
BNSF Hobart	5.9	4.2	10.1	3.7	23.9
UP Commerce	4.9	4.8	2.0	0.4	12.1
UP LATC	3.2	2.7	1.0	0.5	7.3
UP Stockton	6.5	N/A	0.2	0.2	6.9
UP Mira Loma	4.4	N/A	0.2	0.2	4.9
BNSF Richmond	3.3	0.3	0.5	0.6	4.7
BNSF Stockton	3.6	N/A	N/A	0.02	3.6
BNSF Commerce Eastern	0.6	0.4	1.1	1.0	3.1
BNSF Sheila	2.2	N/A	N/A	0.4	2.7
BNSF Watson	1.9	N/A	<0.01	0.04	1.9

* The UP Roseville Health Risk Assessment (ARB, 2004a) was based on 1999-2000 emission estimate, only locomotive diesel PM emissions were reported in that study. The actual emissions were estimated at a range of 22.1 to 25.1 tons per year.

N/A = Not applicable.

* Numbers do not add precisely due to rounding.

Comparison of Diesel PM Emissions
(tons per year) from four Major Source
Categories at the 18 largest railyards in California³⁵

3. Harbor Community Monitoring Studies



Figure 2
Harbor Community Monitoring
Study Sites Near the UP ICTF
and Terminal Island Freeway

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Desert Research Institute study: With funding from ARB and AQMD, Desert Research Institute (DRI) has conducted extensive monitoring of air pollution in the Harbor area. In a draft presentation delivered at a community meeting in Wilmington in April 2008,³⁶ Dr. Eric Fujita of DRI reported that

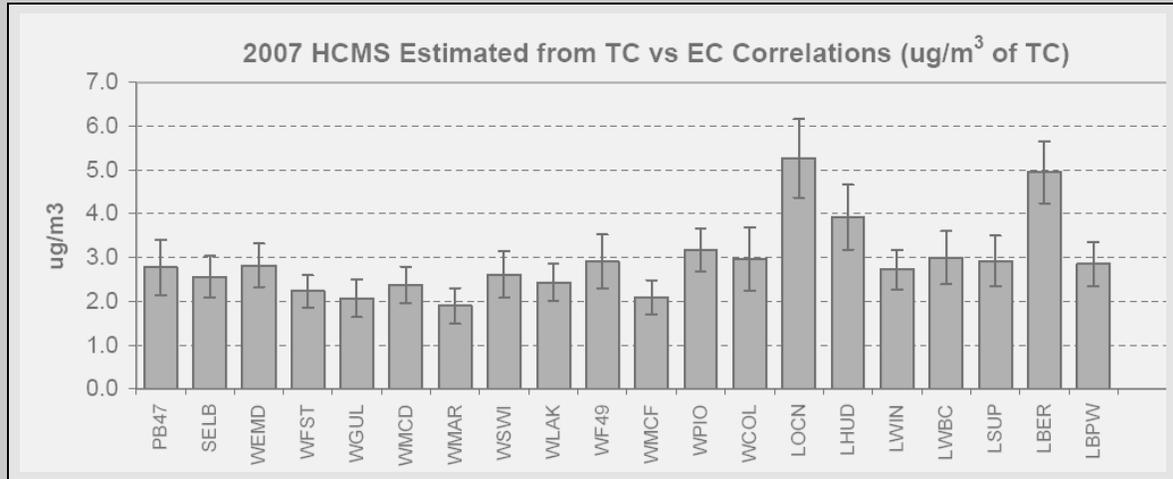
of 20 sites monitored in the area, the site northwest of the intersection of the Terminal Island Freeway and Sepulveda (immediately southeast of the UP ICTF) [“LOCN” in Figure 2] had the highest annual average levels of diesel particulate matter emissions.

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The Desert Research Institute has conducted extensive monitoring of air pollution in the Harbor area.

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Annual Average Diesel PM Concentrations



Annual Average Diesel PM Concentrations at Harbor Community Monitoring Study Sites, as Estimated from Total Carbon (TC) versus Elemental Carbon (EC) Correlations (in micrograms per cubic meter of Total Carbon)

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Diesel PM concentrations were found to be more than twice as high at the UP ICTF location than at 7 other sites in the Hudson area.

The chart above shows the annual average diesel PM concentrations found in DRI's portion of the Harbor Community Monitoring Study. Diesel PM is primarily composed of elemental carbon and organic carbon, and Dr. Fujita used a formula involving Total Carbon and EC to estimate diesel PM exposure. In the DRI study, of the 20 sites monitored, the highest levels of Diesel PM, in descending order, were found at:

1. **LOCN**, Northwest of the Terminal Island Freeway; Southeast of the UP ICTF.
2. **LBER**, adjacent to the I-710 Freeway
3. **LHUD**, at Hudson School

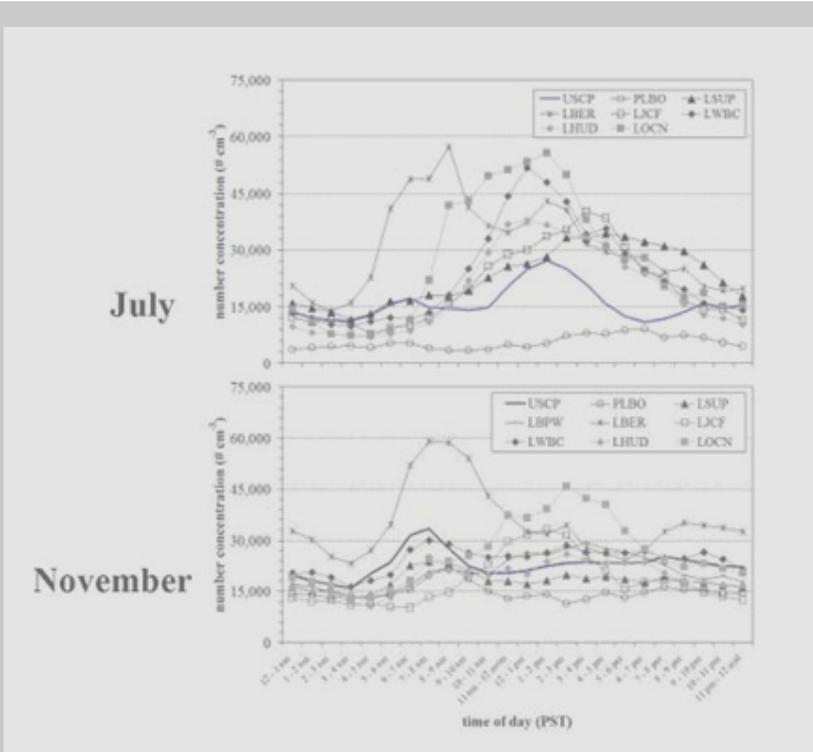
Diesel PM concentrations were found to be more than twice as high at the UP ICTF location than at 7 other sites measured in the study (see below). (Please see reference #21 for a map showing all the locations)



Map of Harbor Community Monitoring Study
Sampling Locations,
as Identified by USC Investigators

USC Study: USC staff from the USC Department of Engineering monitored ultrafine particles in numerous locations in the Harbor area. The study was funded by ARB and AQMD. See results below, as reported by Dr. Katharine Moore of USC at a community presentation in Wilmington in 2008.³⁷

The plotted monitoring results from Long Beach (shown below) were taken from Slide 9 “West Long Beach Cluster” in Dr. Moore’s presentation. Several important notations on the figures to the left and right are LOCN, LBER, and LHUD. Ultrafine particle number concentrations measured in November 2007 were highest at the I-710 Freeway (LBER), followed by the LOCN site on Sepulveda Boulevard northeast of the Terminal Island Freeway and southeast of the UP ICTF



Ultrafine particle sampling results
(particle number concentration per cubic centimeter)
during two sampling periods in the West Long Beach “cluster” of sites

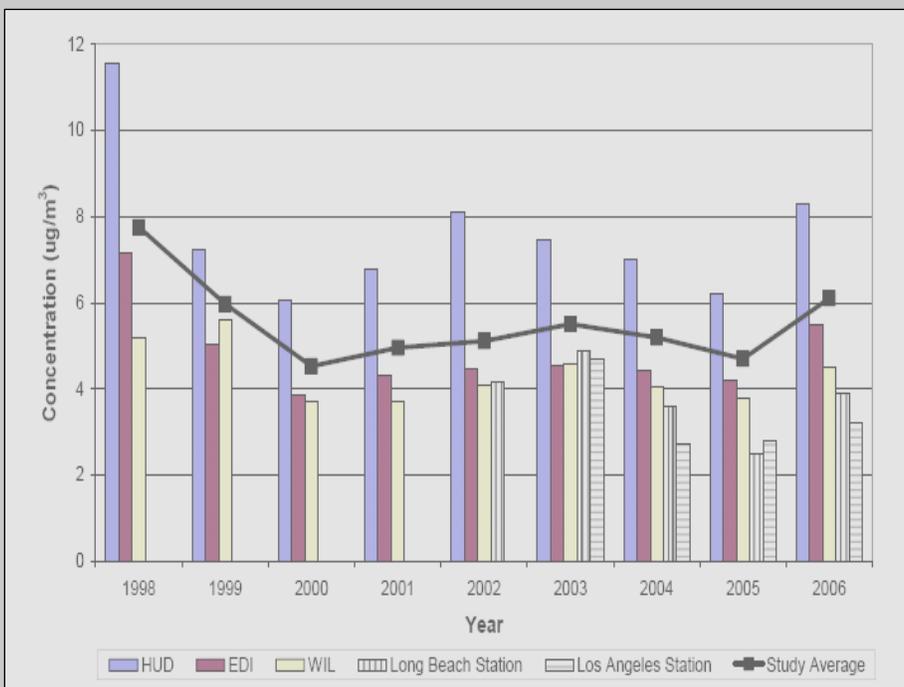


4. AQMD Monitoring at Hudson School

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Hudson School is adjacent to the Terminal Island Freeway, which serves as a truck expressway for trucks draying containers between the Ports and the UP ICTF
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The Air Quality Management District gathers data on elemental carbon from a monitoring station at Hudson School. This monitoring began due to Rule 1158, which requires air monitoring near coal and coke storage facilities. The AQMD has been monitoring selected air pollutants at Hudson and several other schools in Wilmington and Long Beach since 1999, initially due to concern about high elemental carbon levels from coke pile dust that was blowing into the neighborhood. According to the AQMD, by 2000 the coke piles were in compliance with mitigation measures and were enclosed.³⁸ Therefore, subsequent elevated levels of elemental carbon measured at the Hudson School are due to sources other than the coke piles. In addition to coke dust, sources of elemental carbon or “soot” include diesel exhaust. Hudson School is adjacent to the Terminal Island Freeway, which serves as a truck expressway for trucks draying

containers between the Ports and the UP ICTF. An interesting change in the data occurred in 2002: due to the Port lockout, no container trucks were traveling on the Terminal Island Freeway between the UP ICTF and the Ports. During this time, the levels of elemental carbon at Hudson School went down dramatically.³⁹ Elemental carbon is contained in diesel exhaust, making it a good surrogate for estimating diesel PM. The graph below shows the comparison between Hudson School’s measured elemental carbon levels and those of other schools and monitoring stations in the area. In 2006, the levels of elemental carbon near Hudson School were measured at more than twice those of the North Long Beach air monitoring station.



Fall/Winter Average Elemental Carbon (in micrograms per cubic meter) by sampling site

Note that the tall purple bars in Figure 6 are the levels of elemental carbon at Hudson School since 1998. Andrea Hricko and the Community Outreach and Education Program submitted an analysis of the AQMD monitoring results at Hudson School to the Port of Los Angeles in comments related to the Port's NOP proceedings on the BNSF SCIG Project, October 2005.⁴⁰ These results show the serious impacts that residents in West Long Beach and other nearby communities were already suffering relating to diesel emissions from the UP ICTF railyard and related diesel truck traffic. Since 2005, at hearings of the Port of L.A., ARB, and Joint Powers Authority, public health concerns about diesel risks related to the UP ICTF railyard have been raised repeatedly by community, public health, and environmental groups, as well as by several hundred West Long Beach residents.⁴¹

Summary

A large body of scientific evidence demonstrates that living or going to school near busy roads, freeways, or other concentrated sources of vehicle exhaust (in this case, heavy duty diesel trucks, locomotives, and yard equipment) is related to a variety of adverse health outcomes. The research findings show that exposure to traffic exhaust and diesel emissions is related to respiratory diseases, cardiovascular disease, cancer, and premature death. Many homes, schools, daycare centers and other sensitive population groups are located close to the Terminal Island Freeway and the UP ICTF. Traffic counting studies show that between 300-600 port drayage trucks an hour regularly travel on the Terminal Island Freeway on their way to and from the UP ICTF, raising serious public health concerns about nearby residents and students. Studies of Hudson School, adjacent to the Terminal Island Freeway,

show significantly elevated levels of elemental carbon at Hudson School compared to other schools and air monitoring sites.

Harbor Community Monitoring Studies sponsored by ARB and AQMD show elevated levels of ultrafine particles and diesel PM emissions at a location immediately northwest of the Terminal Island Freeway and immediately southwest of the UP ICTF.

A Health Risk Assessment by the California Air Resources Board shows that more than 600,000 residents are at elevated cancer risk (above ten in one million) from diesel emissions related to the UP ICTF and its traffic. The ARB's HRA concludes that the risk does not fall below 10 in one million until 5 miles upwind or 8 miles downwind from the railyard boundary.

Conclusion

In conclusion, exposure to diesel PM emissions related to current operation of the UP ICTF creates a serious public health risk to nearby residents and school children, especially those in West Long Beach who live or go to school in close proximity to the Terminal Island Freeway and the ICTF. This conclusion is based on epidemiologic research findings on the health effects of air pollution, as well as monitoring in this specific location. Residents have been exposed to diesel emissions from the ICTF for more than 30 years, with an increasingly large number of trucks and locomotives handling the growing volume of containers coming from the ports. Mitigation measures to reduce the health risks should be undertaken immediately to protect the nearby populations.

Acknowledgements

Thanks to the Long Beach Alliance for Children with Asthma “Neighborhood Assessment Team” members for their truck counting. Thanks also to Dr. Arthur Winer and Douglas Houston of UCLA for allowing me to incorporate traffic counting data from a paper of theirs which is currently in press. Thanks to the South Coast AQMD and the California Air Resources Board for funding studies of air pollution monitoring in the

Harbor area, as well as for completing Health Risk Assessments of 18 California railyards, including the UP ICTF. With appreciation to the investigators at USC, UCLA and elsewhere who conduct exposure assessment studies, epidemiologic studies on the health effects of air pollution, and toxicologic studies on ultrafine particles. Thanks to Carla Truax, Brittany Eckersley, Tamanna Rahman and Ana Fadich of our

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Glossary

AQMD: South Coast Air Quality
Management District

ARB: California Air Resources Board

Coke: A petroleum byproduct in solid dust
form

HRA: Health Risk Assessment

ICTF: Intermodal Container Transfer
Facility

PM: Particulate Matter

UCLA: University of California, Los
Angeles

UP: Union Pacific

USC: University of Southern California

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- ²² Final Environmental Impact Report UP ICTF. Certified October, 8, 1982.
- ²³ Ibid.
- ²⁴ Documents are available at www.ictf-jpa.org
- ²⁵ http://www.portoflosangeles.org/NOP/SCIG/Scoping_Meeting_SCIG_101305.pdf
<http://www.portoflosangeles.org/NOP/SCIG/NOPCommentLettersPart2of5.pdf>
- ²⁶ Reports #1-12 are available from the Public Affairs Office at the AQMD.
- ²⁷ See description of A Team and photos of them counting traffic along the Terminal Island Freeway at:
http://www.pediatricasthma.org/community_coalitions/long_beach_ca
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- ³¹ All HRAs can be found at: <http://www.arb.ca.gov/railyard/hra/hra.htm>
- ³² Chart is from the BNSF Railway San Bernardino Railyard HRA at:
http://www.arb.ca.gov/railyard/hra/bnsf_sb_final.pdf
- ³³ UP ICTF HRA, page 18, found at http://www.arb.ca.gov/railyard/hra/up_ictf_hra.pdf
- ³⁴ UP ICTR HRA, page 14, found at http://www.arb.ca.gov/railyard/hra/up_ictf_hra.pdf
- ³⁵ BNSF Railway San Bernardino Railyard HRA at: http://www.arb.ca.gov/railyard/hra/bnsf_sb_final.pdf
- ³⁶ See http://www.arb.ca.gov/research/mobile/hcm/presentations_april17_2008/dri_saturation_study.pdf
- ³⁷ http://www.arb.ca.gov/research/mobile/hcm/presentations_april17_2008/usc_particle_count_study.pdf
- ³⁸ See, e.g., South Coast Air Quality Management District. Rule 1158, Follow-up Study #12. Sampling Conducted during November 12, 2005 – February 1, 2006 and December 1, 2006 – March 1, 2007. Program Monitoring Conducted By RES Environmental, Inc.
- ³⁹ See South Coast AQMD Rule 1158 report with 2002 sampling results.
- ⁴⁰ See, Andrea Hricko, USC Keck School of Medicine comments on the NOP for the BNSF SCIG project at <http://portoflosangeles.org/NOP/SCIG/NOPCommentLettersPart2of5.pdf> as well as Report #11 by the AQMD that was also submitted for the record, which can be found at this location:
<http://portoflosangeles.org/NOP/SCIG/NOPCommentLettersPart4of5.pdf>.
- ⁴¹ See, for example, letters to the Port of Los Angeles regarding the Port's NOP for the BNSF SCIG project, which prompted residents of West Long Beach and elsewhere to talk about their experience with the UP ICTF and health concerns about exposure to diesel pollution from trucks, locomotives and yard equipment.
http://www.portoflosangeles.org/NOP/SCIG/Scoping_Meeting_SCIG_101305.pdf
<http://www.portoflosangeles.org/NOP/SCIG/NOPCommentLettersPart2of5.pdf>
<http://www.portoflosangeles.org/NOP/SCIG/NOPCommentLettersPart3of5.pdf>