West Oakland
Health Risk Assessment
Preliminary Summary of Results

March 19, 2008

Air Resources Board
California Environmental Protection Agency

Preliminary Summary of Results

Why not wait for final study?
• Results unlikely to significantly change
• Important to get information out now
  • Bond funding applications due soon
  • Port of Oakland MAQIP process
  • BAAQMD Green Ports Initiative
  • Community request

When will final report be done?
• June timeframe

What information will be in final report?
• Additional technical information on modeling
• Additional risk and non cancer health impacts analysis
• Final report in June is not end of process; BAAQMD has committed to updating HRA results, as necessary
What is a Health Risk Assessment?

Evaluation of the *potential* for a chemical to cause cancer or other illness

- Uses mathematical / computer models to estimate exposure and risk
- Risk expressed as chance of potential cancer in a population of a million over a 70-year lifetime

Example: “10 in a million risk”
Risk Assessments – Estimate Potential Health Impacts

Do:
• Provide an estimate of the amount of a pollutant in the air
• Predict or estimate the lifetime cancer risk and other health impacts – in this case for diesel PM

Don’t:
• Actually measure amount of diesel PM in the air
• Gather / use health data on local residents

Overview of West Oakland Risk Assessment

• Assessment focuses on diesel PM emissions
• Based on emissions in 2005
• 3 complementary parts
  • Part I: Maritime Port of Oakland
  • Part II: Union Pacific Rail Yard
  • Part III: Sources in [adjacent to] West Oakland
• Estimates the potential lifetime cancer risk and other health impacts based on modeled estimates of diesel PM
Sources of Diesel PM Evaluated in the HRA

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
<th>Emission Sources Inventoried</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part I</td>
<td>Maritime Port of Oakland</td>
<td>ocean-going vessels, commercial harbor craft, cargo handling equipment, port drayage trucks, on-port locomotives</td>
</tr>
<tr>
<td>Part II</td>
<td>Union Pacific Railyard</td>
<td>locomotives, cargo handling equipment, truck refrigeration units and reefer cars, drayage trucks</td>
</tr>
<tr>
<td>Part III</td>
<td>Areas in and adjacent to the West Oakland Community</td>
<td>on-road trucks, ocean-going vessels, commercial harbor craft, cargo handling equipment, locomotives, Amtrak Maintenance facility, major construction projects, stationary point sources, truck-based businesses and distribution centers</td>
</tr>
</tbody>
</table>

Where the Emissions Are Located (Domain) Land Sources
Where the Emissions Are Located (Domain)
Water Sources

Port of Oakland bound marine vessel emissions in Part I
All other marine vessel emissions in Part III

Regional Modeling Domain
100 km x 100 km
West Oakland Modeling Domain

10 km x 10 km

Location of Meteorological Stations Providing Data for the HRA

30 inland surface stations
3 ocean buoys, and
1 upper air station
Emissions Inventory Used in Modeling
Year 2005* - tons per year (tpy)

*Does not include businesses or emission sources established after 2005

Part I - Port of Oakland 265 tpy
Part II - UP Rail Yard 11 tpy
Part III - Other West Oakland 568 tpy
(Total Sources in and adjacent to)

TOTAL 845 tpy

Predicting Health Effects

Cancer Effects

\[
\text{Estimated Excess Lifetime Cancer Risk} = \text{Predicted Diesel PM Level} \times \text{Cancer Potency}
\]

Non-Cancer Effects

\[
\text{Estimated Cases Per Year} = \text{Number of People} \times \text{Health Studies}
\]
Preliminary Summary of Results and Key Findings

Key Findings

• The West Oakland community is exposed to diesel PM concentrations that are almost three times the estimated background diesel PM concentrations in the BAAQMD.
• The estimated lifetime potential cancer risk for residents of West Oakland from exposure to diesel PM emissions is about 1,200 excess cancers per million.
  • Port operations: 200 excess cancers per million
  • UP Rail Yard: 40 excess cancers per million.
  • Non-Port and non-UP sources: about 950 excess cancers per million
Key Findings

• On-road heavy-duty trucks result in the largest contribution to the overall potential cancer risks levels in the West Oakland community, followed by ships, harbor craft, locomotives, and cargo handling equipment.

Estimated Diesel PM Cancer Risk from All Emissions Sources for West Oakland Community
**Potential Cancer Impacts on West Oakland**

Population-weighted or Average Potential Cancer Risks in West Oakland Community by Part and by Source Category

<table>
<thead>
<tr>
<th>Source Category</th>
<th>Part-I - Port</th>
<th>Part-II - UP</th>
<th>Part-III - All Other</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trucks</td>
<td>42</td>
<td>7</td>
<td>795</td>
<td>844</td>
</tr>
<tr>
<td>Harbor Craft</td>
<td>15</td>
<td>0</td>
<td>78</td>
<td>93</td>
</tr>
<tr>
<td>Ships Transiting, Maneuvering, &amp; Anchoring</td>
<td>57</td>
<td>0</td>
<td>23</td>
<td>81</td>
</tr>
<tr>
<td>Ships at Berth</td>
<td>57</td>
<td>0</td>
<td>10</td>
<td>67</td>
</tr>
<tr>
<td>Locomotives</td>
<td>4</td>
<td>15</td>
<td>37</td>
<td>56</td>
</tr>
<tr>
<td>Cargo Handling Equip.</td>
<td>16</td>
<td>21</td>
<td>7</td>
<td>43</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>192 (16%)</td>
<td>43 (4%)</td>
<td>951 (80%)</td>
<td>1186 (100%)</td>
</tr>
</tbody>
</table>

**Relative Change in Potential Cancer Risk per Ton of Diesel PM Emissions Reduced (2005)**

<table>
<thead>
<tr>
<th>Source Category</th>
<th>Part I (Port)</th>
<th>Part II (UP)</th>
<th>Part III (Non-Port/Non-UP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship Transiting</td>
<td>0.4</td>
<td>--</td>
<td>0.1</td>
</tr>
<tr>
<td>Ships at Berth</td>
<td>0.9</td>
<td>--</td>
<td>0.3</td>
</tr>
<tr>
<td>Harbor Craft</td>
<td>1.1</td>
<td>--</td>
<td>0.3</td>
</tr>
<tr>
<td>Trucks</td>
<td>2.1</td>
<td>3.8</td>
<td>8.8</td>
</tr>
<tr>
<td>Cargo Handling Equip.</td>
<td>0.7</td>
<td>3.9</td>
<td>1.6</td>
</tr>
<tr>
<td>Locomotives</td>
<td>2.0</td>
<td>3.9</td>
<td>7.9</td>
</tr>
<tr>
<td>Others</td>
<td>-</td>
<td>3.9</td>
<td>0.1</td>
</tr>
</tbody>
</table>
Estimated Potential Cancer Risk in the Regional Domain from Port (Part I) Emissions Sources

- Average potential cancer risk over the region from Port (part I) diesel PM emissions is 27 per million
- Regional impact primarily due to ships (transiting and at berth)
- Added to background risk of 480 from diesel PM

Estimated Non-cancer Health Impacts Resulting from Port Operation 2005 Diesel PM Emissions

<table>
<thead>
<tr>
<th>Endpoint</th>
<th># of Cases per Year (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premature Death</td>
<td>18</td>
</tr>
<tr>
<td>Hospital Admission (Respiratory and Cardiovascular)</td>
<td>8</td>
</tr>
<tr>
<td>Asthma-Related and Lower Respiratory Symptoms</td>
<td>290</td>
</tr>
<tr>
<td>Acute Bronchitis</td>
<td>24</td>
</tr>
<tr>
<td>Work Loss Day</td>
<td>2,600</td>
</tr>
<tr>
<td>Minor Restricted Activity Days</td>
<td>15,000</td>
</tr>
</tbody>
</table>
Key Findings

- Predicted diesel PM emissions and risks will be reduced by 80% in 2015 but remaining risk levels are still high – over 200 in a million
- Additional actions in near-term necessary to bring risk levels down more quickly and to help off-set growth in future years

Diesel PM Measures

- Cleaner diesel fuel
- Fleet rule for transit buses
- Stationary engines
- Portable engines
- Agricultural engines
- Refuse trucks
- Transport refrigeration units (TRUs)
- Incentives – Prop 1B
  - Carl Moyer
- Auxiliary engines for ships
- Cargo handling equipment
- Truck idling
- Off-road private fleets
- Harbor craft
- Port Drayage Trucks
- Shore side Power
- Ship Main Engines (2008)
- On-Road Private Trucks (2008)
Projected Future Emissions

Projected Risk Levels 2010, 2015, and 2020 (with ARB regulations and growth)
Recommendations

& Next Steps

Recommendations

- Maximize emissions and risk reduction as quickly and early as possible
- Build and leverage funding sources to ease transition to clean technologies
- Ensure successful implementation of ARB regulations
- Continue to study trucking operations at the Port and in West Oakland
Next Steps

- Status report to our Board in April
  - April 24th, 9 AM
  - Caltrans Bldg, 111 Grand Ave, Oakland
- Finalize report
  - June timeframe
  - Additional technical information on modeling
  - Provide additional risk analysis
  - Come back to community with final updates
  - Final report in June is not end of process; BAAQMD has committed to updating HRA results, as necessary
- ARB consideration of private fleet rule and OGV main engine fuel requirement in 2008

 Contacts

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Comments

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Where to Find More Information

Air Resources Board:
West Oakland Health Risk Assessment Study
http://www.arb.ca.gov/ch/communities/ra/westoakland/westoakland.htm

Port of Oakland :
Seaport Emissions Inventory and Port Construction Inventory Documents
http://www.portofoakland.com/environm/airEmissions.asp

Bay Area Air Quality Management District :
STI Report – Truck Related Businesses and Construction in West Oakland
http://www.baaqmd.gov/CARE/care_documents.htm