Update:
ARB Health Risk Assessment of the BNSF Richmond Railyard

Dr. Phil Martien
Bay Area Air Quality Management District
CARE Task Force Meeting
December 12, 2007
Background

• Richmond BNSF Railyard HRA part of ARB/BNSF/UP Railroad Agreement (2005 MOU)

• District working with ARB to review results and discuss with community

• ARB presented findings of Richmond HRA at 3 community meetings (6/13, 7/11, 12/6/2007)

• Emissions estimates (year 2005) and preliminary health risk estimates available for railyard and nearby sources

• Discussions on mitigation strategies and future year emissions begun
Summary

• Diesel PM emissions from Richmond BNSF railyard: 4.5 tons/day

• Diesel PM emissions from 1-mile radius around railyard: 20 tons/day
  – Diesel trucks (~12 tons/day)
  – Diesel-fueled pumps at Chevron refinery (~8 tons/day)

• Cancer risk contours about 100/million around BSNF railyard (railyard emissions)

• Cancer risk contours about 250/million southwest of railyard (surrounding emissions)
On-site & Off-site Emission Boundaries
Approach to Reducing Emissions

- ARB regulations
  - Fuels
  - Cargo handling equipment (CHE)
  - Transport refrigeration units (TRUs)
  - Heavy-duty diesel on-road trucks and off-road vehicles
- U.S. EPA regulation
  - Locomotives
- Voluntary agreements
  - 1998 South Coast/2005 Statewide
- Railroad yard locomotive replacement program
- Funding programs
  - Carl Moyer Incentives
- District mitigation programs
Richmond Yard: DPM Emissions by Source
Years 2005-2020, assuming 4% annual activity growth rate
Carl Moyer Grant Program: New Switcher Locomotives

• Year 7 Carl Moyer Grant from Air District to fund $3.9M of $6.6M project to replace six switcher locomotives at BNSF Richmond
• Each locomotive has three Tier 3 off-road engines
• Results in 80% reduction in emissions from switcher locomotives

December 12, 2007
Richmond Yard: DPM Emissions by Source
Years 2005-2020, assuming 4% annual activity growth rate

Tons/year DPM; with new GenSet switching locomotives

- Other
- On-Road Diesel Trucks
- Cargo Handling Equipment
- Locomotive Switcher
- Locomotive Arrive/Depart
- Locomotive Maintenance

50% 52% 66%

2005 2010 2015 2020
Next Steps

• Another community meeting to discuss
  – mitigation measures
  – best estimate of growth at Richmond BNSF

• Revised estimates of non-cancer health effects using OEHHA methodology expected in spring 2008

• Community again requested a more comprehensive risk analysis for Richmond, including ports and refineries
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ARB Railyard HRA Website:

- http://www.arb.ca.gov/railyard/hra/hra.htm
## Summary of Diesel PM Emissions at the BNSF Richmond Railyard

<table>
<thead>
<tr>
<th>Diesel PM Emission Sources</th>
<th>Richmond Railyard</th>
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<tbody>
<tr>
<td></td>
<td>tons/year</td>
<td>percentage</td>
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<tr>
<td><strong>Locomotives</strong></td>
<td>3.3</td>
<td>70 %</td>
</tr>
<tr>
<td>Line Haul Locomotives</td>
<td>1.54</td>
<td>33%</td>
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<tr>
<td>Switch Locomotives</td>
<td>1.16</td>
<td>25%</td>
</tr>
<tr>
<td>Service/Maintenance</td>
<td>0.55</td>
<td>12%</td>
</tr>
<tr>
<td><strong>Off-road Vehicles and Equipment</strong></td>
<td>0.6</td>
<td>12 %</td>
</tr>
<tr>
<td><strong>On-road Trucks and Vehicles</strong></td>
<td>0.5</td>
<td>11 %</td>
</tr>
<tr>
<td><strong>Cargo Handling Equipment</strong></td>
<td>0.3</td>
<td>6 %</td>
</tr>
<tr>
<td><strong>Stationary Sources</strong></td>
<td>&lt; 0.01</td>
<td>&lt; 1 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4.6</td>
<td>100 %</td>
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## Summary of Off-Site Non-Railyards Diesel PM Emission Inventory

<table>
<thead>
<tr>
<th>Sources</th>
<th>tons/year</th>
<th>percentage</th>
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</thead>
<tbody>
<tr>
<td>Mobile Sources</td>
<td>11.7</td>
<td>60%</td>
</tr>
<tr>
<td>Stationary Sources</td>
<td>8.1</td>
<td>40%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
<td><strong>100%</strong></td>
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</table>
Estimated Potential Cancer Risks Associated with the BNSF Richmond Railyard Diesel PM Emissions (chances per million exposed population)
Estimated Potential Cancer Risks from Off-Site Diesel PM Emissions
(chances per million exposed population)