Draft ARB Health Risk Assessments for the Stockton Railyards
Tonight’s Presentation

- Process
- Background
- Methods and Results
- Actions Taken to Reduce Health Risks
- Answer Questions, Discuss Next Steps
Meeting Purpose
Public Review Period
Process to Review Risk Assessment and Plan Next Steps

➢ Tonight’s Meeting has Several Purposes
  – Present our Analyses and Explain Results
  – Discuss Progress Being Made
  – Answer Your Questions
  – Initiate Process for Review and Comment

➢ After Tonight’s meeting There Will Be:
  – Opportunity for comments, both in writing and at second community meeting in 45 days
  – Consultation to obtain your ideas on possible future emission reduction actions by either the ARB or the railroads
# Health Risk Assessment Timelines

<table>
<thead>
<tr>
<th>Railyard</th>
<th>Company</th>
<th>Railyard</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commerce/Eastern</td>
<td>BNSF</td>
<td>Barstow</td>
<td>BNSF</td>
</tr>
<tr>
<td>Hobart</td>
<td>BNSF</td>
<td>San Bernardino</td>
<td>BNSF</td>
</tr>
<tr>
<td>Richmond</td>
<td>BNSF</td>
<td>San Diego</td>
<td>BNSF</td>
</tr>
<tr>
<td>Stockton</td>
<td>BNSF</td>
<td>Colton</td>
<td>UP</td>
</tr>
<tr>
<td>Wilmington (Watson)</td>
<td>BNSF</td>
<td>Dolores (ICTF)</td>
<td>UP</td>
</tr>
<tr>
<td>Commerce</td>
<td>UP</td>
<td>Industry</td>
<td>UP</td>
</tr>
<tr>
<td>LATC (Los Angeles)</td>
<td>UP</td>
<td>Oakland</td>
<td>UP</td>
</tr>
<tr>
<td>Mira Loma</td>
<td>UP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stockton</td>
<td>UP</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
BACKGROUND
Background

- This Effort is part of our commitment to address pollution impacts on communities
  - Implements the ARB Goods Movement Plan
  - Required by the ARB/UP/BNSF Railroad Agreement

- The State’s Goals are to:
  - Reduce exposure to toxic diesel PM as quickly as possible
  - Reduce risks by at least 85 percent by 2020
  - Obtain the emission reductions need to attain air quality standards
Purpose of the Assessments

- Identify pollution sources in the railyards
- Determine exposures to the public
- Estimate the health risks
- Put the railyard risks into perspective with other sources
- Provide information needed to reduce the risk
Scope of the Draft Assessments

- Two major parts:
  - Health risk assessment for the railyard
  - Health risk assessment for significant diesel sources surrounding the community

- Separate report for each railyard

- Combined report for the four Commerce railyards

- Focus on diesel PM; other toxic sources evaluated, but small relative to diesel PM
Methodology for Preparing the Draft Assessments
Railyard Risk Assessment Methodology

- Prepare the best possible emissions inventory
- Complete air dispersion modeling
- Provide estimates of health risks
- Determine other sources of risks
Area of Study
Two Stockton Railyards
Railyard Emissions

Diesel PM Emission Inventory

- Locomotives (line-hauls, switchers, & services)
- On-road trucks & vehicles
- Cargo handling equipment
- Off-road equipment
- Stationary Sources (point & area)
Estimating Emissions

- Fleet/Equipment population
- Operational activity
  - Hours of operation
  - Load factor
  - Vehicle miles traveled (VMT)
  - Hours per day
- Emission factors
- Fuel characteristics
  - Fuel usage
  - Sulfur content
Example - Locomotive Emissions

- Number of locomotives by class
- Time operating at each notch setting and in idle mode
- Emission factors by locomotive type and mode (notch setting/idling)
- Hours of operation in each mode
- Types and amount of fuel used
# Summary of Stockton Railyards Diesel PM Emissions

<table>
<thead>
<tr>
<th>RAILYARD SOURCES</th>
<th>UP Stockton</th>
<th>BNSF Stockton</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCOMOTIVES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line-haul</td>
<td>2.1</td>
<td>1.8</td>
<td>3.9</td>
</tr>
<tr>
<td>Switcher</td>
<td>3.6</td>
<td>1.6</td>
<td>5.2</td>
</tr>
<tr>
<td>Service</td>
<td>0.8</td>
<td>0.1</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6.5</strong></td>
<td><strong>3.5</strong></td>
<td><strong>10</strong></td>
</tr>
<tr>
<td>ON-ROAD TRUCKS</td>
<td>0.2</td>
<td>n/a</td>
<td>0.2</td>
</tr>
<tr>
<td>OTHERS</td>
<td>0.2</td>
<td>0.02</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>6.9</strong></td>
<td><strong>3.5</strong></td>
<td><strong>10.4</strong></td>
</tr>
<tr>
<td>% of Total</td>
<td>66%</td>
<td>34%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Prepare Non-Railyard Emission Inventories

- Focus on diesel PM sources
- Identify the population of trucks on roads
- Apply specific emission factors to the trucks
- Calculate emissions
## Summary of Nearby Non-Railyards Diesel PM Emission Inventory

<table>
<thead>
<tr>
<th>Sources</th>
<th>Tons per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile Sources</td>
<td>9.97</td>
</tr>
<tr>
<td>Stationary Sources</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>
## Comparison of Diesel PM Emissions
(tons per year in 2005)

<table>
<thead>
<tr>
<th>Sources</th>
<th>Locomotive</th>
<th>Cargo Handling Equipment</th>
<th>On-Road Trucks</th>
<th>Other (Refrigerator truck, Off-road, Trailers, etc)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Joaquin Valley Air Basin</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>4,000</td>
</tr>
<tr>
<td>Combined Stockton Yards</td>
<td>10</td>
<td>0</td>
<td>0.2</td>
<td>0.2</td>
<td>10.4</td>
</tr>
<tr>
<td><strong>UP Stockton</strong></td>
<td><strong>6.5</strong></td>
<td><strong>0</strong></td>
<td><strong>0.2</strong></td>
<td><strong>0.2</strong></td>
<td><strong>6.9</strong></td>
</tr>
<tr>
<td><strong>BNSF Stockton</strong></td>
<td><strong>3.5</strong></td>
<td><strong>0</strong></td>
<td><strong>0</strong></td>
<td><strong>&lt;0.1</strong></td>
<td><strong>3.5</strong></td>
</tr>
<tr>
<td>Nearby Roadways</td>
<td>--</td>
<td>--</td>
<td>10</td>
<td>--</td>
<td>10</td>
</tr>
</tbody>
</table>
Complete Air Dispersion Modeling

- Use air quality modeling to estimate the amount of diesel PM in the air surrounding a source.
- Express results as a “concentration” in units of micrograms per cubic meter of air.
- Use U.S. EPA-approved computer models.
- Major inputs to the model:
  - Emissions inventory
  - Meteorological data (wind speed/direction, temperature, etc.)
Estimate Health Risks

- Combine air dispersion modeling results with toxicity data to estimate health risks
- Determine risks for cancer and non-cancer effects
- Express results as chances per million for cancer and a “hazard index” for non-cancer impacts
- Use toxicity data provided by the California Office of Environmental Health Hazard Assessment
- No significant impacts on the communities identified for non-cancer effects
Results of the Draft Assessments
Two Stockton Railyards Estimated Potential Cancer Risks

<table>
<thead>
<tr>
<th>Locations Nearest to Railyard</th>
<th>Within 1-mile from Railyard</th>
<th>Cancer Risk (Chances Per Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Commerce Railyards</td>
<td></td>
<td>Added Risk: 5,000*</td>
</tr>
<tr>
<td>BNSF Richmond</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UP Stockton</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BNSF Stockton</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ports of Los Angeles and Long Beach</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Estimated Exposed Population:
- 10,000* for 4-Commerce Railyards
- 110,000* for BNSF Richmond
- 1,200 for UP Stockton
- 750 for BNSF Stockton
- 1,000 for Ports of Los Angeles and Long Beach
UP Stockton Railyard
Isopleths of Potential Cancer Risks
Two Stockton Railyards Isopleths of Potential Cancer Risks
Railyards and Non-Railyards
Isopleths of Potential Cancer Risks
Emission Reduction Measures
Approach to Reducing Emissions

- ARB regulations
  - Fuels
  - Cargo handling equipment
  - Transport refrigeration units
  - 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
2005-2007:
- CARB diesel fuel for intrastate locomotives
- 2005 railyard agreement

2005-2010:
- Measures above plus:
  - Spilled-over benefits from 1998 NOx locomotive fleet average agreement (South Coast)
  - ARB on-road heavy-duty truck regulation
  - ARB transport refrigeration unit regulation

\[ \approx 20-25\% \]
\[ \approx 25-35\% \]
## Progress Report - Existing Measures
### Diesel Fuel Standards

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Maximum Sulfur Level (ppmw)</th>
<th>Aromatics Maximum (% by volume)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prior</td>
<td>2006-2007</td>
</tr>
<tr>
<td>CARB Diesel</td>
<td>500</td>
<td>15</td>
</tr>
<tr>
<td>EPA On-Road Diesel</td>
<td>500</td>
<td>15</td>
</tr>
<tr>
<td>EPA Non-road Diesel</td>
<td>5,000</td>
<td>500*</td>
</tr>
</tbody>
</table>

* Lower to 15 ppmw in 2012.
Progress Report - Existing Measures
Average Diesel Fuel Sulfur Levels Consumed by Locomotives in California
Progress Report - Existing Measures
Two Stockton Railyards Diesel PM Emission Reductions:
Line-Haul Locomotives

* Based on 2 Stockton railyards line-haul locomotives emissions
Progress Report – Existing Measures
Two Stockton Railyards Diesel PM Emission Reductions: New On-Road Trucks

* Based on 2 Stockton railyards on-road truck emissions
Possible Additional Measures

- 2005-2020:
  - U.S. EPA locomotive rulemaking
  - California replacement of switch locomotives
  - ARB in-use truck measure

≈50-60%
Progress Report – Potential Measures
Stockton Railyards Diesel PM Emission Reductions: Switcher Locomotive Replacement by 2010

* Based on two Stockton railyards switcher locomotives emissions
Progress Report - Potential Measures
Stockton Railyards Diesel PM Emission Reductions:
In Use On-Road Trucks

* Based on 2 Stockton railyards on-road truck emissions

➤ In addition to the existing on-road heavy-duty truck regulation.
Progress Report - Potential Measures
Stockton Railyards Diesel PM Emission Reductions:
U.S. EPA Locomotive Rulemaking

- In addition to the existing Line-haul locomotive fleet average agreement.
Progress Report - Existing + Potential Measures
Total Benefits of the Emission Reductions Measures for Stockton Railyards

* Based on 2 Stockton railyards locomotives emissions
Next Step

- Public Comment Period.
- Next Community Meetings.
Next Steps

- Begin public comment period
- Review the draft assessments
- Submit written comments to ARB
- Hold next series of community meetings
- Meet with interested stakeholders
- Evaluate any additional feasible mitigation measures
ARB Railyard HRA Contacts

Manager
- Harold Holmes, Engineering Evaluation Section
  (916) 324-8029; hhholmes@arb.ca.gov

Lead Staff
- Jing Yuan, Ph.D.
  (916) 322-8875; jyuan@arb.ca.gov
- Eugene Yang, Ph.D., P.E.
  (916) 327-1510; eyang@arb.ca.gov

ARB Railyard HRA Website:
- http://www.arb.ca.gov/railyard/hra/hra.htm