Staff Recommendations to Provide Further Locomotive and Railyard Emission Reductions

BNSF Hobart – Intermodal Railyard

Public Workshop – City of Commerce
September 15, 2009
California Environmental Protection Agency

Air Resources Board
BACKGROUND

- 18 railyard health risk assessments
- 18 railyard mitigation plans
- Board directed staff to develop a plan
- ARB technical report with 37 options
- ARB recommendations report
  - Released report on September 9, 2009
Railyard Health Risk Assessments and Mitigation Plans

FINDINGS

UP Roseville
Classification Railyard
Distribution of Railyard Diesel PM Emissions

Intermodal vs. Classification
by Source Category

8 Intermodal Railyards DPM Emission Inventory (2005)

- Locomotives: 39%
- HDD Trucks: 26%
- Cargo Handling Equipment: 22%
- TRUs: 11%
- Other: 2%

10 Classification Railyards DPM Emission Inventory (2005)

- Locomotives: 96%

Total 18 Railyard Diesel PM Emissions (2005) = 210 tons per year
18 Major Railyards

Total Diesel PM Emissions

- **Total Diesel PM Emissions**
  - 2005: 250 tons per year
  - 2010: 180 tons per year
  - 2015: 120 tons per year
  - 2020: 90 tons per year

- **Estimated Emissions Reductions:**
  - Locomotives: 85% of remaining railyard diesel PM emissions
  - 2005: 37 percent
  - 2010: 55 percent
  - 2015: 66 percent
18 Major Railyards

Locomotive Diesel PM Emissions

Total Locomotive
Line Haul
Switcher
Service and Testing

(tons per year)

Estimated Emissions Reductions:
2005: 25 percent
2010: 40 percent
2015: 55 percent
2020: 55 percent
Air Quality Impacts at Railyards

- Significant diesel PM risks at most railyards
- Existing measures will significantly reduce railyard diesel PM emissions
  - 50 percent or more by 2015
  - 65 percent or more by 2020
- Further locomotive and railyard emissions and risks reductions needed
Technical Options Document

- Identify options that provide further locomotive and railyard emissions reductions
- Technical assessment of 37 options
- Draft report released in December 2008
  - Solicited public comments
  - Incorporated modifications, updated information
- Revised report released in August 2009
Criteria to Evaluate 37 Options

- Potential emissions reductions
  - Per unit, railyard, regional, statewide
- Technical and operational feasibility
- Costs
  - Capital
- Cost-effectiveness
  - Carl Moyer Program methodology
Categories of Options

- **Locomotives**
- **Non-locomotives**
  - Trucks, CHE, and TRUs
- **Advanced systems**
  - Hood technology
  - Rail electrification
- **Individual railyard measures**
  - Trees and walls
  - Indoor air filters
  - Monitoring stations
General Findings

Measures identified as high priority based on:

- Technical feasibility near to mid-term
- Cost-effectiveness, in spite of high capital costs
- Significant local emissions and risk reductions
  - Assist with SIP commitments
STAFF RECOMMENDATIONS
Staff Recommendations

- Based on Technical Options Report
- Implementation mechanisms evaluated:
  - Incentive funding
  - Regulatory measures
  - Enforceable agreements
  - Voluntary actions
- Released report on September 9, 2009
Five Locomotive Measures

- Switch locomotive repowers
- Switch locomotive retrofits
- MHP locomotive repowers
- MHP locomotive retrofits
- Accelerate replacement with Tier 4 interstate line-haul locomotives
South Coast Air Basin
NOx and PM Emissions Reductions by 2014
(tons per day)

- Up to 300 switch and MHP locomotives
- NOx: 11.6 * PM: 0.7
- Total estimated capital costs:
  - ~$350 million
- Carl Moyer cost-effectiveness range:
  - $1 to $5 per pound.

* Does not include passenger locomotive SCR reductions of 3.0 tpd identified in the 2007 South Coast SIP
Statewide

NOx and PM Emissions Reductions by 2014
(tons per day)

- Up to 650 switch and MHP locomotives
- NOx: 35 * PM: 1.8
- Total estimated capital costs:
  - ~$900 million
- Carl Moyer cost-effectiveness range:
  - $1 to $5 per pound.

* Does not include passenger locomotive SCR reductions of 3.0 tpd identified in the 2007 South Coast SIP
Additional Statewide
NOx and PM Emissions Reductions by 2025
(tons per day)

- Up to 1,200 interstate line locomotives
  - Operate in California on any given day
- NOx: 29 * PM: 0.3
- Total estimated capital costs:
  - ~$15 billion (Up to 5,000 Tier 4 units needed nationally)
  - California’s Fair Share (20%): $3 billion
- Carl Moyer cost-effectiveness:
  - <$9 per pound.

* Does not include passenger locomotive SCR reductions of 3.0 tpd in the 2007 South Coast SIP
Estimated Statewide Locomotive NOx Emissions

Five Locomotive Measures

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Estimated Statewide Locomotive PM Emissions

Five Locomotive Measures

Tons Per Day

2010 2015 2020 2025
Estimated South Coast Locomotive NOx Emissions

Five Locomotive Measures

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Estimated South Coast Locomotive PM Emissions

Five Locomotive Measures

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18 Railyards: PM Emissions Reductions

Five Locomotive Measures

Reductions from Measures

- 2005: 130 tons per year
- 2010: 124 tons per year (2% reduction)
- 2015: 77% reduction
- 2020: 77% reduction

(tons per year)
Maximum Individual Cancer Risks
at 18 Major Railyards

MICRs in 2005 - excess cancer risk in a million:

- Two railyards between 40 and 70
- Eight railyards between 100 and 250
- Seven railyards between 450 and 800
- One railyard at 2,500
Maximum Individual Cancer Risks at 18 Major Railyards

MICRs in 2015 - excess cancer risk in a million:

- 15 railyards between 20 and 150
- Two railyards between 250 and 300
- One railyard at 800

MICRs in 2020 - excess cancer risk in a million:

- 11 railyards between 5 and 30
- Five railyards between 50 to 150
- One railyard at 300
ADDITIONAL RECOMMENDATIONS
Implement Specific Railyard Measures

Examples of measures already implemented:

- Manual locomotive shutdowns
  - Before 15 minute shutdown required with idle devices
- Move truck gate entrances further from residences to reduce health risks
- Move service operations further from residences to reduce health risks
- Idle devices on cargo handling equipment
- Railyard system efficiencies (e.g., autogate system)
ARB and Other States Legal Authority

- **U.S. EPA locomotive regulations apply to:**
  - “New” and “remanufactured” locomotives
  - Each “remanufacture” re-starts a new “useful life”
    - “Useful life” - which is about ten years.

- **States regulatory authority limited to:**
  - Locomotives exceeding “useful life”
  - Control to U.S. EPA Tier 0 emission levels

- **Interstate Commerce Commission Termination Act (ICCTA)**
  - States must also harmonize locomotive regulations with ICCTA
Additional Recommendations
(continued)

- Eliminate federal locomotive preemptions
- Change U.S. EPA locomotive regulations
  - Require at remanufacture: NOx reduction of 50 percent
  - Require remanufacture done every seven years
  - Accelerate Tier 4 interstate line haul locomotives
- Evaluate more Cargo Handling Equipment regulations
- Develop ARB Goods Movement Efficiency Measure
Additional Recommendations
(continued)

- Support ports Clean Air Act Plan update
- Participate in CEQA new railyard projects
- Evaluate rail electrification
- Improve locomotive and railyard emission inventories
- Continue locomotive research programs
SUMMARY

- Further locomotive and railyard emissions and risks reductions are still needed

- **Switch and MHP locomotive are priority options**
  - Technically feasible and cost-effective
  - High capital costs, but cost-effective

- **Staff believes incentive funding is critical**
  - ARB and other state agencies need to coordinate and prioritize funding for this effort
  - A state coalition needs to seek both greater authority and funding from the federal government
Contact and Reference Information

- **Recommendations and Technical Options**
  - Documents: [http://www.arb.ca.gov/railyard/ted/ted.htm](http://www.arb.ca.gov/railyard/ted/ted.htm)

- **Public Comments for ARB Board Meeting:**

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