Proposed Rule 2304
Indirect Source Rule for Commercial Marine Ports
Working Group Meeting #2

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June 14, 2022, 10:00 AM
Agenda

- Health Effects Discussion
- Rule Background
- Terminal Operations & Rule Structure Considerations
- Next Steps
- Discussion
Health Effects

Dr. Nichole Quick, MD, MPH
Criteria Pollutants

• Ozone, particulate matter (PM), carbon monoxide (CO), nitrogen dioxide (NOx), sulfur dioxide (SOx)

• Harmful to human health and the environment
Ozone

- Not emitted directly; created by chemical reactions between NOx and volatile organic compounds (VOC) in the presence of sunlight

- Pollutants emitted by heavy duty vehicles, ships, locomotives, cars, power plants, industrial boilers, refineries, chemical plants, and other sources

- Regional effect

Ozone forms in the atmosphere in the presence of sunlight

Modified from https://www.pca.state.mn.us/air/ozone
Key Health Effects of Ozone

• Inflames and damages the airways

• Coughing, sore throat

• Makes lungs more susceptible to infection

• Aggravates lung diseases such as asthma, emphysema, and chronic bronchitis

• Increases the frequency of asthma attacks
Particulate Matter (PM)

Sources of PM

➢ Emitted directly: construction sites, unpaved roads, smokestacks, fires, vehicle exhaust
  • *Directly emitted PM from diesel vehicles has a local effect*

➢ Most fine particles form in the atmosphere as a result of complex reactions of chemicals (SOx, NOx, etc.)
  • *PM formed in the atmosphere has a regional effect*
Health Effects of PM

• Premature death in people with heart or lung disease
• Heart attacks, irregular heartbeat
• Aggravated asthma, decreased lung function
• Increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing
• Ultrafine (<0.1 μm): not regulated but known health effects
• PM from diesel exhaust is a carcinogen

https://www.epa.gov/pm-pollution/particulate-matter-pm-basics
Diesel Exhaust

• Source of directly emitted PM
• Local effect
• Emission sources at ports:
  ✓ Ships (container, cruise, etc.)
  ✓ Harbor craft (like tugs, ferries, fishing vessels)
  ✓ Trucks
  ✓ Cargo Handling Equipment
  ✓ Locomotives

• Congestion at ports increases emissions of PM and resulting health effects
CalEnviroScreen

- Mapping tool that helps identify California communities that are most affected by many sources of pollution

- Uses environmental, health, and socioeconomic information to produce scores for every census tract in the state

- Scores are mapped so that different communities can be compared

- An area with a high score is one that experiences a much higher pollution burden than areas with low scores
• Population characteristics:
  • Asthma
    • Spatially modeled, age-adjusted rate of emergency department (ED) visits for asthma per 10,000 people averaged over 2015-2017
  • Cardiovascular disease
    • Spatially modeled, age-adjusted rate of ED visits for heart attacks (acute myocardial infarctions) per 10,000 people averaged over 2015-2017
  • Low birth weight
    • Percent low birth weight averaged over 2009-2015
Ports of LA and Long Beach
CalEnviroScreen (continued)

Diesel PM & Asthma Percentiles

Legend

Diesel PM Percentile
- > 90 - 100
- > 80 - 90
- > 70 - 80
- > 60 - 70
- > 50 - 60

Asthma Percentile
- > 90 - 100
- > 80 - 90
- > 70 - 80
- > 60 - 70
- > 50 - 60
South Coast AQMD MATES V

- MATES V includes a Health Risk Assessment of all emission sources throughout the region.

- Clear pattern of increased air toxics cancer risk in the community near the port complex.
2016 AQMP: Health Benefits

Public health benefits estimated to be $173 billion cumulatively for meeting air quality standards (2017-2031)

- ~2,500 fewer annual asthma-related emergency room visits
- ~700 fewer annual hospital admissions related to asthma, cardiovascular, or respiratory conditions
- >200,000 fewer annual person-days of work and school absences
- An annual average of 1,600 premature deaths avoided
# Types of Health Assessments

<table>
<thead>
<tr>
<th>Type</th>
<th>Scope</th>
<th>Air Quality Analysis</th>
<th>Health Effect Endpoints</th>
<th>Assessed Populations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Risk Assessment</td>
<td>Local</td>
<td>• Computer modeling of directly emitted pollutants</td>
<td>• Cancer risk</td>
<td>• Individuals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ground-level concentration predicted downwind of a source</td>
<td>• Non-cancer acute risk</td>
<td>• Residential</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Non-cancer chronic risk</td>
<td>• Worker</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• Sensitive receptors</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Community-wide</td>
</tr>
<tr>
<td>Health Benefits Analysis</td>
<td>Regional</td>
<td>• Transport and atmospheric chemistry modeling of criteria pollutants</td>
<td>• Premature death</td>
<td>Region-wide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Changes in atmospheric concentration predicted throughout the study region</td>
<td>• Hospitalization (asthma, heart attack)</td>
<td>• Age</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Emergency room visits</td>
<td>• Race</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Missed school/work days</td>
<td>• Sub-region</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Etc.</td>
<td>• Etc.</td>
</tr>
</tbody>
</table>
CARB Studies

- CARB is charged with protecting the public from the harmful effects of air pollution and developing programs and actions to fight climate change
- Two recent rulemakings provide examples of different types of air quality-related health studies
  - Health Risk Assessments and Health Benefits Analyses
    - Commercial Harbor Craft Regulation
    - At Berth Regulation
      - Emissions Impact of Recent Congestion at California Ports
CARB Commercial Harbor Craft Rulemaking Analysis

- Health Risk Assessment evaluated potential cancer risk from harbor craft emissions with and without the amended regulation
  - Amended regulation requires zero emissions for some types of harbor craft, and cleanest engines available for others
• Health Benefits Analysis evaluated non-cancer health endpoints
  • Analysis includes estimate of monetized benefit from avoided health outcomes

<table>
<thead>
<tr>
<th>Air Basin</th>
<th>Cardiopulmonary Mortality</th>
<th>Hospitalizations for Cardiovascular Illness</th>
<th>Hospitalizations for Respiratory Illness</th>
<th>Emergency Room Visits for Asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Coast</td>
<td>295 (230 - 360)</td>
<td>42 (0 - 82)</td>
<td>50 (12 - 88)</td>
<td>128 (81 - 176)</td>
</tr>
<tr>
<td>STATEWIDE</td>
<td>531 (415 - 651)</td>
<td>73 (0 - 144)</td>
<td>88 (21 - 155)</td>
<td>236 (149 - 323)</td>
</tr>
</tbody>
</table>

**Estimated Total Cumulative Reduction in Adverse Health Outcomes from 2023 to 2038 with Amended Regulation**

**Estimated Monetized Valuation from Avoided Adverse Health Outcomes from 2023 to 2038 with Amended Regulation**

<table>
<thead>
<tr>
<th>Avoided Health Outcome</th>
<th>Statewide Valuation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoided Premature Deaths</td>
<td>$5,242,800,000</td>
</tr>
<tr>
<td>Avoided Hospitalizations</td>
<td>$8,700,000</td>
</tr>
<tr>
<td>Avoided Emergency Room Visits</td>
<td>$197,000</td>
</tr>
<tr>
<td>Total Valuation</td>
<td>$5,251,697,000</td>
</tr>
</tbody>
</table>

($5.25 billion)
CARB At Berth Regulation

- Health Risk Assessment and Health Benefits Analysis conducted for amended At Berth Regulation
  - Regulation reduces diesel PM and NOx from ocean-going vessels’ auxiliary engines while they are docked at California ports

- At Berth rulemaking analysis scaled up to analyze port congestion impacts in 2021
Background - Staff Activities Since February

Working Group Meeting:

- March Mobile Source Committee Meeting
- Ongoing health effects discussions with Dr. Quick
- Continuation of rule concept development
- Stakeholder meetings with environmental & community groups
- Group stakeholder meeting with PMSA
- Terminal tours & site visits for information gathering
Background – Recent Key Activities at the Ports

• Ports began collecting truck fee on April 1
  • About $8 million collected in month of April
  • Ports have separate spending plans
  • Total revenue anticipated in Year 1 = $90 million
    • Spending plan aims to replace ~2% of trucks from Year 1 funding

• Port of Long Beach signed on to Port of LA/Shanghai Green Shipping Corridor
  • Goal is the first zero carbon trans-Pacific container ships by 2030
    • No specific goal yet for non-GHG pollutants
  • Reduce other supply chain emissions from participating ports (yet to be defined)
• Currently fleets that visit ports rely mostly on older conventional diesel technologies
  • Older diesel technology typically makes up >95% of fleets

• Transition to zero-emissions
  • Infrastructure hurdles
  • Timing / commercial availability of ZE technologies at scale
  • Remaining non-ZE fleets that haven’t turned over to ZE yet will still be old diesels absent other approaches
  • Cost

• Federal/State regulatory authority
Background - PR 2304 Rule Concept Considerations

Air Quality Impacts from Port Operations

State/Federal Regulations & Authority

Availability & Feasibility of Technology

Business Model of Industry / Terminal-Specific Operations

Recent staff focus

How are decisions made about deploying emission sources?
Terminal Types/ Terminal Operations

- It is important to understand facility operations for a successful rulemaking
Key Players in the Maritime Industry

Port Authority (PA)
• San Pedro Bay Ports act as a landlord port

Landlord Port
• The PA owns only the basic infrastructure, leasing it out to operators

Terminal Operator
• Entity operating the terminal – could be a stevedore, carrier, manufacturer, or other logistics provider

Beneficial Cargo Owner (BCO)
• The owner of the goods being shipped

Stevedore
• A person employed, or a contractor engaged, at a dock to load and unload cargo from ships

Carrier
• Provides transportation services and operates transportation equipment (e.g., truckers, rail, shipping lines, etc.)

Shipper
• Contracts with the carrier for transportation of goods

Labor Organization
• ILWU, IBEW, Teamsters, etc.
Many entities involved in port operations

- Port authority/landlord
  - POLA & POLB
- Terminal operator/tenant
  - Independent
  - Affiliated with carriers
    - e.g., container terminals
  - Affiliated with importers
    - e.g., tanker terminals
- Carriers: ships, rail, trucks
- Beneficial Cargo Owners (BCO)
- Intermediaries
From an emissions contribution perspective, the three predominant vessel types are:

1. Containerships
2. Tankers
3. Cruise ships
Not All Port Terminals Are Alike

Breakdown of the Count of Terminals by Terminal Type at POLA/POLB

- Containerized, 13
- Liquid Bulk, 13
- Break Bulk & RoRo, 13
- Dry Bulk, 11
- Other, 12

2020 Total OGV Departure Activities POLA

- Container: 62%
- Tanker: 12%
- Ocean Tugboat (ATB): 7%
- Cruise: 6%
- Auto Carrier: 5%
- Bulk: 4%
- General Cargo
- Reefer
- Miscellaneous
- RoRo
Potential PR 2304 Rule Structure Considerations

- One rule for all terminal types, or multiple rules for different terminal types?
- Timing/sequencing? Grouping? Compliance metrics?

Cargo Handling Equipment NOx Emissions
- Container
- Liquid
- Cruise
- Dry Bulk
- Auto
- Break-Bulk
- Other

610 tons in 2020

Ship NOx Emissions Within 40 nm of Ports
- Container
- Tanker
- Cruise
- Bulk
- Auto Carrier
- General Cargo
- Ocean Tugboats
- Miscellaneous

6,329 tons in 2020

Explore container terminals first
Container Terminals

**Container terminals** are facilities where cargo containers are transshipped between different transport vehicles, for onward transportation.

A container terminal relies on an array of cargo handling equipment (CHE) including cranes, trucks, and forklifts.

- The Ports of Los Angeles and Long Beach are the two busiest marine container ports in the nation:
  - A combined (13) major container terminals
  - *Container terminal may be (co-)owned/operated by ocean carrier*
Overview of Container Terminal Leases*

Typical agreement length with ports is 20 to 30 years
Longest agreement length is 50 years

Lease agreements provide opportunity for ports to include environmental mitigation on terminal

* A terminal lease may include option(s) to extend the term of lease beyond the year noted here. Some years noted here already reflect term extensions.
Simplified Terminal Business Models

- Next slides reflect staff’s current understanding after discussions with industry stakeholders

- Simplified relationships are presented considering how a potential indirect source rule may apply to various commercial marine port participants
  - Logistics industry is substantially more dynamic and complex than shown on following slides
  - Additional complexities of these business relationships will continue to be explored with stakeholders during rulemaking

- Current preliminary ISR regulatory concepts include potential requirements addressing cleaner CHEs and OGVs and onsite infrastructure
Various Types of Ownership Structure for Container Terminal Operators/Tenants*

**EXAMPLE 1:**
Exclusively owned by a shipping line/parent company:

![MSC](image1)

![Total Terminals International, LLC](image2)

*Terminal operator and tenant may or may not be the same entity.*

**EXAMPLE 2:**
Co-ownership by a shipping line:

![MSC](image1)

![COSCO Shipping](image3)

Pacific Container Terminal

**EXAMPLE 3:**
No shipping lines are involved in operations

![MACQUARIE](image4)

![Long Beach Container Terminal](image5)
<table>
<thead>
<tr>
<th>Container Terminal</th>
<th>Ownership of Terminal Tenant/Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>APM Terminals Pacific</td>
<td>Maersk</td>
</tr>
<tr>
<td>EverPort Terminal Services</td>
<td>Evergreen</td>
</tr>
<tr>
<td>Fenix Marine Services</td>
<td>CMA CGM, EQT Infrastructure</td>
</tr>
<tr>
<td>International Transportation Service (ITS)</td>
<td>Macquarie Infrastructure Partners, Ports America</td>
</tr>
<tr>
<td>Long Beach Container Terminal</td>
<td>Macquarie Infrastructure Partners</td>
</tr>
<tr>
<td>Pacific Container Terminal</td>
<td>COSCO, SSA, CMA CGM</td>
</tr>
<tr>
<td>SSA Terminals (Pier A)</td>
<td>SSA, Terminal Investment Ltd. (MSC)</td>
</tr>
<tr>
<td>SSA Terminals (Pier C)</td>
<td>Matson, SSA</td>
</tr>
<tr>
<td>Total Terminals International</td>
<td>Terminal Investment Ltd. (MSC), HMM</td>
</tr>
<tr>
<td>TraPac</td>
<td>MOL, Brookfield Asset Management</td>
</tr>
<tr>
<td>WBCT - China Shipping (Holding) NA</td>
<td>China Shipping (COSCO)/COSCO, Yang Ming, Ports America</td>
</tr>
<tr>
<td>WBCT - Everglades Company Terminal</td>
<td>Terminal Investment Ltd. (MSC)/COSCO, Yang Ming, Ports America</td>
</tr>
<tr>
<td>Yusen Terminals</td>
<td>NYK, Macquarie Infrastructure Partners</td>
</tr>
</tbody>
</table>
Consolidation in Shipping Industry

The top ten container shipping lines by size control >85% of the share of trans-Pacific traffic.

Major shipping lines have an ownership stake in 11 of the 13 container terminals at POLA/POLB.
Shipping Line Relationships

❖ Some terminals owned or partially owned by a specific shipping line, but also service other shipping lines

Examples:
- COSCO Shipping
  - 7 Terminals serviced

❖ Some shipping lines are integrated with other logistic services

Ocean Transportation Intermediaries (OTIs) are either Ocean Freight Forwarders or Non-Vessel-Operating Common Carriers and are regulated by the Federal Maritime Commission pursuant to the Shipping Act of 1984.

Examples:
- MAERSK
- COSCO Shipping
Potential Rule Applicability

- Business operations as they relate to applicability
  - Who coordinates with carriers of ships, trucks, and trains
  - Ability to phase in cleaner equipment
  - Infrastructure planning needs & utility demand

ISR Applicability TBD
Next Steps

• Working group meetings every 2-3 months
  • Continue to meet regularly with stakeholders in between WG meetings

• Committee update in August

- Release Draft Rule Language
- Conduct Community Meeting & Public Workshop
- Public Hearing

- June 2022
- 1st/2nd quarter 2023
- 2nd Quarter 2023
- 3rd Quarter 2023

- 2nd Quarter 2023
## Staff Contacts

### Proposed Rule 2304

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</thead>
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Sign up for the mailing list at: [https://www.aqmd.gov/sign-up](https://www.aqmd.gov/sign-up) (select “Proposed Rule 2304”)

Email us at: PortsISR@aqmd.gov.

For more information, visit: [www.aqmd.gov/fbmsm](http://www.aqmd.gov/fbmsm) (click into “Commercial Marine Ports”)
