2022 State Strategy for the State Implementation Plan

November 10, 2021
Agenda

• Background and Purpose
• Potential Measures
• Public Measure Suggestions
• Federal Measures and Actions
• Moving Forward
Background and Purpose
70 ppb 8-hour Ozone Standard

- EPA revised the 8-hour ozone standard to 70 ppb in 2015
- 19 areas in California are designated nonattainment
- State Implementation Plan (SIP) revisions required are dependent on classification
Attainment Plans and 2022 State SIP Strategy

CARB Controls/ Emissions Reductions (2022 SSS) + District Controls/ Emissions Reductions = Attainment Plan (SIP)
Potential SIP Measures can Reduce Emissions in Priority Communities

- Near-Road Communities
- Near-Port Communities
- Communities Near Industrial Facilities & Warehouses
Co-Benefits Help Reduce Criteria Pollutants

- Criteria Pollutants
- Toxics
- Community Risk Reduction
- Greenhouse Gases
- Scoping Plan

State Implementation Plans

CARB
# CARB Actions on Previous SIP Commitments

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<thead>
<tr>
<th>2020</th>
<th>2021 and 2022</th>
<th>Ongoing</th>
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<tbody>
<tr>
<td>Heavy-Duty Omnibus Regulation</td>
<td>Advanced Clean Cars II</td>
<td>Incentivized Turnover Vehicles and Equipment</td>
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<td>Advanced Clean Trucks Regulation</td>
<td>Heavy-Duty Inspection and Maintenance Program</td>
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<td>Ocean-Going Vessels At-Berth Regulation</td>
<td>Small Off-Road Engines</td>
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<td>Zero-Emission TRU (Part I)</td>
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<td>Zero-Emission Forklifts</td>
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<td>Consumer Products</td>
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Potential Measures
On-Road Mobile Sources
Advanced Clean Fleets (ACF)

- CARB adopted Advanced Clean Trucks (ACT) regulation June 2020, sets M/HD ZEV sales requirement for manufacturers
- Potential Advanced Clean Fleets regulation
  - Public fleets - ZEV purchases begin at 50% in 2024 and 100% in 2027
  - Drayage Trucks (Seaports and railyards) - Transition to 100% ZEV drayage fleet by 2035
  - High priority and federal fleets - Phase-in ZEVs as a percentage of the fleet 2025-2042
  - 100% ZEV sales by 2040 for all vehicles

https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets
Phase 3 GHG Standards

• Build on Phase 1 and 2 GHG Standards (adopted 2011-2018)
• Staff anticipates the Phase 3 stringency would be set assuming significant penetration of zero-emission vehicles nationally
• Upon U.S. EPA adoption of national Phase 3 GHG standards, CARB staff would propose CARB adopt as well to align California’s standards with the national standards and enable CARB to enforce them for California-certified vehicles
On-Road Motorcycles
New Emissions Standards

• CARB first adopted emissions standards for ONMC in 1975
  • Standards have not been updated since 1998
  • ONMCs currently emit ~20 tpd ROG+NOx Statewide

• Potential new standards
  • Align with stringent “Euro 5” regulations (HC+NOx standards reduced by 80%), with more stringent testing requirements, starting with MY 2024
  • Potential requirements beyond Euro 5 (Additional OBD monitors, Improved evaporative emission controls, Zero emissions motorcycle sales targets and credit program) to phase in starting with MY 2028

https://ww2.arb.ca.gov/our-work/programs/on-road-motorcycles
Clean Miles Standard

• Senate Bill 1014 – Clean Miles Standard to reduce greenhouse gas emissions from transportation network companies (TNCs)
• Reduces greenhouse gas emissions, primarily through electrification and encourages reduction of VMT relative to passenger miles traveled
• Provides co-benefit criteria pollutant reductions
• Board adopted in May 2021

https://ww2.arb.ca.gov/our-work/programs/clean-miles-standard
Potential Measures

Off-Road Vehicles & Equipment
Tier 5 Off-Road New Compression-Ignition Engine Standard

• Tier 4 Final Exhaust Emission Standards in place after 2014 Model Year

• Potential Tier 5 standards (amendment of off-road diesel reg):
  • NOx standard ~90% more stringent than current Tier 4
  • PM standard ~75% more stringent than current Tier 4
  • CO₂ standards to reduce engine GHG emissions from 5 to 10% below current levels

• Additional elements could include: addressing low-load and low-temp NOx emissions, extending useful life and warranty provisions, work-based in-use compliance procedures, & first-time off-road diesel OBD requirements
In-Use Off-Road Diesel-Fueled Fleets Regulation Amendments

• Existing regulation originally adopted in June 2007, significant amendments in 2010 (meet declining fleet average target through turnover, repower, or retrofits)

• Potential amendments:
  • Operational Backstop on Old Equipment
  • Extension of Adding Vehicles Provision
  • Simplify the Low-Use Exemption
  • Renewable Diesel Requirement
  • Requirements for Contractors and Public Works Awarding Bodies

Airborne Toxic Control Measure for Transport Refrigeration Units (TRU)

• Adopted in 2004 (amended in 2010/11)
• Requires all TRUs operating in California to meet in-use PM standard 7 years after the engine model year (85 percent PM reduction)
• TRU Part 1 (measure in 2016 State SIP Strategy)
  • Zero-emission truck TRUs, PM emission standard for newly-manufactured non-truck TRU engines
• TRU Part 2 (potential measure in 2022 State SIP Strategy)
  • Zero-emission requirements for non-truck TRUs (California- and out-of-state-based)

https://www.arb.ca.gov/newTRU
Amendments to the Commercial Harbor Craft (CHC) Regulation

• CHC regulation adopted in 2008, (amended 2010), accelerated turnover to Tier 2 and Tier 3 between 2009-2022
• Applies to diesel-powered commercial craft that do not meet recreational or OGV definitions
• Proposed amendments:
  • Zero-emission: ZE capable new-build excursion vessels, full ZE for all short-run ferries, shore power required for electrical auxiliary power on all vessels when at dock for more than 15 minutes
  • Cleaner combustion: Phase in more Tier 4* + DPF standards for all vessels except commercial fishing, commercial fishing required to meet Tier 2 or newer standard by 2032

https://ww2.arb.ca.gov/our-work/programs/commercial-harbor-craft
Zero-Emission Cargo Handling Equipment (CHE) Regulation

- Equipment used at seaports and rail yards to move containers and freight
- Regulation for Mobile CHE was adopted in 2005 (amended 2011), and established requirements for in-use and newly purchased diesel-powered equipment at ports and intermodal rail yards (fully implemented in 2017)
- Potential Regulatory Concepts
  - Transition to full ZE operations by 2030 – 2037, phase-in beginning with yard tractors & forklifts, followed by rubber tired gantry cranes, then other CHE
  - Extended compliance deadlines for early adoption of hybrid CHE operations to provide certainty for early adopters of advanced technology
Off-Road Zero-Emission Targeted Manufacturer Rule

• Would apply to manufacturers of off-road equipment including construction, industrial, landscaping, & airport GSE

• Potential regulatory concepts:
  • Require manufacturers to produce zero-emission equipment and/or powertrains as a percentage of their annual statewide sales volume
  • Sales/production mandate levels based projected feasibility of zero-emission technology
Clean Off-Road Fleet Recognition Program

- Off-road vehicles are subject to in-use off-road fleet regulation with declining fleet average target
- Potential recognition program:
  - Standardized criteria or rating system
  - Focus on zero-emission technology
  - Scalable to reflect increasing market penetration
  - Voluntary participation
  - Achieve policy goals across multiple tiers
Clean Off-Road Equipment Voucher Incentive Program – Construction (CORE –CON)

• CORE is for commercialized off-road vehicles, beyond the demonstration phase
• CORE-CON would provide incentive funding for zero-emission construction equipment
• Would work like previous CORE projects
  • First come, first serve
  • Companies select from CORE eligible equipment catalog [http://californiacore.org/](http://californiacore.org/)
  • Helps cost difference between ZE and comparable diesel equipment
  • No scrappage required

• Funding enhancements for
  • Low-Income and Disadvantaged Community Use Area
  • Infrastructure
  • Extended Warranty

Spark-Ignition Marine Standards

- 1998 CARB adopted new outboard (OB) and personal watercraft (PWC) HC+NOx standards

- Potential measure:
  - Zero emission (ZE) technologies for <19 kW OB and some PWC
  - For ≥40 kW OB and PWC catalyst-based standards
    - Considering 5.0 g/kW-hr HC+NOx (70% below current levels)
  - For <40 kW OB and PWC improved engine controls
    - Considering 10.0 g/kW-hr HC+NOx (40% below current levels)

- Averaging allowed
Potential Measures
Other Sources
Amendments to the Consumer Products Regulation

• CARB adopted first consumer product regulation in 1989
  • Two dozen amendments have reduced emissions by >50%
• Potential measure
  • Target maximum feasible reductions to offset projected growth in VOC emissions
  • Update category-specific emissions data through surveys
• Evaluate potential control strategies
  • Focus on high-growth categories with greatest ozone impact
  • Consider technical and commercial feasibility

https://ww2.arb.ca.gov/our-work/programs/consumer-products-program
Zero-Emission Standards for Space and Water Heaters

- **Potential Measure**: Beginning in 2030, 100% of sales of new space heaters and water heaters statewide would meet:
  - Zero-GHG emission limit
  - Provides NOx co-benefits
  - By 2037, building-related NOx and GHG emissions can be reduced by ~40% 
  - Total statewide NOx emissions can be reduced by ~3% by 2037
- To electrify all end-uses statewide:
  - An additional ~10% building-related NOx and GHG emissions could be reduced by 2037

### 2019 NOx emissions (65 tons/day)

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<tr>
<th>Light duty vehicles (100)</th>
<th>Natural gas Combustion (65)</th>
<th>Electric utilities (16)</th>
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<tbody>
<tr>
<td>Source: NOx emissions from CEPAM: California 2019 - Version 1.02.</td>
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Potential Measures
Primarily Federally & Internationally Regulated Sources
No current California regulation for locomotives
California regulation is needed to reduce emissions in rail communities
CARB staff regulatory concepts (still in development):
  • Spending Account
  • In-use Operational Requirements
  • Idling Limit
  • District Level Reporting

https://ww2.arb.ca.gov/our-work/programs/reducing-rail-emissions-california
Future Measures For Aviation Emissions Reductions

- Further action on aviation is needed, including strong action at the federal and international levels.
- Potential CARB actions:
  - Explore requiring airports to perform a comprehensive and standardized emission inventory.
  - Further evaluate federal, State and local authority in setting requirements for aircraft/airports.
  - Work with airports, airlines, and stakeholders to evaluate and develop incentive programs.
  - Pursue stricter emission reduction strategies.

Statewide Aircraft NOx Emissions

An annual average growth of 1.47% in NOx between 2017-2037.
Future Measures for Ocean-Going Vessel Emissions Reductions

• CARB has two main regulations designed to reduce emissions from OGVs: Vessel Clean Fuel Regulation & At Berth Regulation

• Incentive or regulatory measures could be pursued to achieve further emissions reductions from OGVs, including:

  o Cleaner engines or cleaner fuels than those required by EPA and IMO
  o At anchor emissions reductions
  o Sailing at slower speeds while in California waters
  o At berth emissions reductions from bulk and general cargo vessels

At Berth Regulation: https://www.arb.ca.gov/ports/shorepower/shorepower.htm
Clean Fuel Regulation: https://ww2.arb.ca.gov/our-work/programs/ocean-going-vessel-fuel-regulation
Federal Actions Needed
## Primarily Federally-Regulated Sources: Federal Action

<table>
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<th>Off-Road Equipment:</th>
<th>Ocean-Going Vessels:</th>
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<tr>
<td>On-Road Heavy-Duty Low-NOx Engine Standards (2016 SSS Measure)</td>
<td>Off-Road Equipment Tier V Standard for Preempted Engines</td>
<td>More Stringent NOx and PM Standards for Ocean-Going Vessel Requirements (2016 SSS Measure)</td>
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<tr>
<td>On-Road Heavy-Duty Vehicle Zero-Emission Engine Standards</td>
<td>Off-Road Zero-Emission Standards Where Feasible</td>
<td>Cleaner Fuel and Visit Requirements for Ocean-Going Vessels</td>
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<tr>
<td><strong>Locomotives:</strong></td>
<td><strong>Aviation:</strong></td>
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<tr>
<td>Zero-Emission Standards for Switch Locomotives</td>
<td>Cleaner Fuel and Visit Requirements for Aviation</td>
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<tr>
<td>Address Locomotive Remanufacturing Loophole</td>
<td>Zero-Emission Airport On-Ground Operation Requirements</td>
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Federally Certified Trucks

Clean Trucks Plan

- EPA last revised the NOx standards for on-highway heavy-duty trucks and engines in 2001 - more than 20 years ago

- By December 2022, EPA is planning to propose and finalize new stringent emissions standards to reduce NOx from trucks starting in MY 2027

Zero-Emission Heavy-Duty Vehicle Requirements

- Heavy-duty truck manufacturers are already signaling a large-scale migration from gasoline and diesel engines to zero-emission technologies in their products

- CARB would request EPA to adopt national level zero-emission requirements similar to California’s Advanced Clean Trucks regulation

Locomotives

- EPA to adopt more stringent standards for new locomotives and require remanufactured locomotives to meet current standards as described in CARB’s 2016 petition*
- EPA to establish ZE standards for switchers and provide funding toward technology and infrastructure development for ZE line-haul locomotives

*https://ww2.arb.ca.gov/resources/documents/petition-rulemaking-seeking-amendment-locomotive-emission-standards
Preempted Off-Road Engines

- EPA to adopt more stringent national level emissions standards for off-road engines (gasoline and diesel)
- EPA to establish national ZE requirement for off-road engines where feasible
- EPA and U.S. DOE to prioritize federal technology demonstration funding to zero emission off-road equipment
Ocean-Going Vessels

- EPA to advocate in IMO for more stringent NOx and PM standards for marine engines
- EPA to establish clean fuel and clean vessel visit requirements for OGVs at national level
- EPA to consider national level Vessel Speed Reduction (VSR) programs
Aviation

- EPA should initiate public rulemakings for more stringent and technology forcing CO2 and criteria pollutant standards for new and in-service aircraft engines operated at US airports
- Promote/require zero-emission on-ground operations for aircrafts (e.g., ZE APUs, Taxi-bots)
- Establish mechanisms to incentivize cleanest aircrafts visiting U.S. airports
Public Measure Suggestions
# Public Measure Suggestions

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<tr>
<th>On-Road Mobile Source Strategies</th>
<th>On-Road Heavy-Duty Useful Life Strategy</th>
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<td>Additional Incentive Programs – Zero-Emission Trucks</td>
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<td>Enhanced Transportation Choices</td>
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<td>Enhanced BAR Consumer Assistance Program</td>
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<th>Stationary/Area Source Strategies</th>
<th>Suggested Control Measure – Indirect Source Rule</th>
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<td>BACT/BARCT Determinations</td>
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<td>Additional Building and Appliance Emission Standards</td>
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<td>Pesticide Regulation</td>
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Moving Forward
## Timing and Next Steps

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<th>Event Description</th>
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<tr>
<td>2022 State SIP Strategy: 2nd Public Workshop</td>
<td>October 19, 2021</td>
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<tr>
<td>Release Draft 2022 State SIP Strategy</td>
<td>Winter 2022</td>
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<tr>
<td>Informational Update to the Board</td>
<td>Early Spring 2022</td>
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<tr>
<td>2022 State SIP Strategy: 3rd Public Workshop</td>
<td>Spring 2022</td>
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<tr>
<td>Release Proposed 2022 State SIP Strategy</td>
<td>Early Summer 2022</td>
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<tr>
<td>Board Consideration</td>
<td>Summer 2022</td>
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Contact Us!

• Austin Hicks, Air Pollution Specialist
  Austin.Hicks@arb.ca.gov

• Ariel Fideldy, Manager
  Ariel.Fideldy@arb.ca.gov

• General SIP Questions: SIPplanning@arb.ca.gov

## Program Staff Contacts

### On-Road Mobile Measures

<table>
<thead>
<tr>
<th>Category</th>
<th>Contact Details</th>
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</table>
| **Advanced Clean Fleets**       | Craig Duehring, Manager, [craig.duehring@arb.ca.gov](mailto:craig.duehring@arb.ca.gov)  
Paul Arneja, Lead Staff, [paul.arneja@arb.ca.gov](mailto:paul.arneja@arb.ca.gov) |
| **Medium-/Heavy-Duty GHG Phase 3** | Kim Heroy-Rogalski, Branch Chief, [kim.heroy-rogalski@arb.ca.gov](mailto:kim.heroy-rogalski@arb.ca.gov)  
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| **Clean Miles Standard**        | Shobna Sahni, Manager, [shobna.sahni@arb.ca.gov](mailto:shobna.sahni@arb.ca.gov)  
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<tr>
<td>Tier 5 Off-Road Standards</td>
<td><a href="mailto:Tier5@arb.ca.gov">Tier5@arb.ca.gov</a>&lt;br&gt;Kim Heroy-Rogalski, Branch Chief, <a href="mailto:kim.heroy-rogalski@arb.ca.gov">kim.heroy-rogalski@arb.ca.gov</a></td>
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<tr>
<td>In-Use Off-Road Diesel Fleets</td>
<td>Johanna Levine, Manager, <a href="mailto:johanna.levine@arb.ca.gov">johanna.levine@arb.ca.gov</a>&lt;br&gt;Nathan Dean, Lead Staff, <a href="mailto:Nathan.dean@arb.ca.gov">Nathan.dean@arb.ca.gov</a></td>
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<tr>
<td>Transport Refrigeration Units</td>
<td>Lea Yamashita, Lead Staff, <a href="mailto:lea.yamashita@arb.ca.gov">lea.yamashita@arb.ca.gov</a></td>
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<td>Commercial Harbor Craft</td>
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<td>Cargo Handling Equipment</td>
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<tr>
<td>ZE Targeted Manufacturer Rule</td>
<td>Matthew Diener, Lead Staff, <a href="mailto:matthew.diener@arb.ca.gov">matthew.diener@arb.ca.gov</a></td>
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<tr>
<td>Clean Off-Road Fleet Recognition</td>
<td>Johanna Levine, Manager, <a href="mailto:johanna.levine@arb.ca.gov">johanna.levine@arb.ca.gov</a></td>
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<tr>
<td>CORE - Construction</td>
<td>Todd Sterling, Lead Staff, <a href="mailto:Todd.Sterling@arb.ca.gov">Todd.Sterling@arb.ca.gov</a></td>
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<tr>
<td>Spark Ignition Marine Engines</td>
<td>Jeff Lowry, Lead Staff, <a href="mailto:Jeff.Lowry@arb.ca.gov">Jeff.Lowry@arb.ca.gov</a></td>
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# Program Staff Contacts

**Primarily-Federally Regulated – CARB Measures**

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<td>In-Use Locomotive Regulation</td>
<td>Layla Gonzalez, Lead Staff, <a href="mailto:Layla.gonzalez@arb.ca.gov">Layla.gonzalez@arb.ca.gov</a></td>
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<tr>
<td>Future Measures for Aviation</td>
<td>Angela Csondes, Manager, <a href="mailto:angela.csondes@arb.ca.gov">angela.csondes@arb.ca.gov</a></td>
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<td>Nick Storelli, Staff, <a href="mailto:nicholas.storelli@arb.ca.gov">nicholas.storelli@arb.ca.gov</a></td>
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<td>Future Measures for OGV</td>
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## Program Staff Contacts

### Other Sources

<table>
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<tr>
<th>Consumer Products</th>
<th>Ravi Ramalingam, Branch Chief, <a href="mailto:ravi.ramalingam@arb.ca.gov">ravi.ramalingam@arb.ca.gov</a></th>
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<td>ZE Space and Water Heaters</td>
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<td>Melanie Zauscher, Manager, <a href="mailto:Melanie.Zauscher@arb.ca.gov">Melanie.Zauscher@arb.ca.gov</a></td>
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<tr>
<td></td>
<td>Dana Waters, Lead Staff, <a href="mailto:dana.waters.@arb.ca.gov">dana.waters.@arb.ca.gov</a></td>
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