



**Proposed Amendments to the  
Airborne Toxic Control Measure (ATCM) for  
Chromium Electroplating and  
Chromic Acid Anodizing Operations**

January 27, 2023

# Chrome Plating

- Chromium Electroplating
  - Deposits a layer of chromium metal on to a surface of a part
  - Decorative or hard plating
- Chromic Acid Anodizing
  - Creates an oxide layer on the surface of an aluminum part
- 117 facilities in California



# Decorative Chrome Plating

- Short plating times (seconds to minutes)
- Thin layer of chromium
- For aesthetics and wear resistance
- Used for furniture, car/motorcycle parts, faucets, etc.
- Primarily uses hexavalent chromium



# Hard Chrome Plating

- Longer plating times (hours)
- Thicker layer of chromium
- Physical performance of primary concern
- Aerospace parts, hydraulic equipment, steel rollers, and other high-stress parts
- Currently uses hexavalent chromium



# Chromic Acid Anodizing

- Different electrolytic process that uses hexavalent chromium
- Creates oxide layer on aluminum instead of depositing chromium
- Anodizing times around an hour
- High-stress aerospace applications





# Why Amend This Regulation

- Chrome plating facilities emit highly toxic hexavalent chromium
  - No safe level of exposure
  - 2<sup>nd</sup> most potent known carcinogen identified by the Board
  - Approximately 500 times more carcinogenic than diesel PM
  - Low concentrations lead to high potential risk

# Why Amend This Regulation

- Facilities located close to residences and schools
- Builds upon work to address cumulative impacts in communities
- AB 617 Community Air Protection Blueprint
- Fugitive emissions of hexavalent chromium are a concern
- Less toxic alternatives exists

# Ambient Monitoring

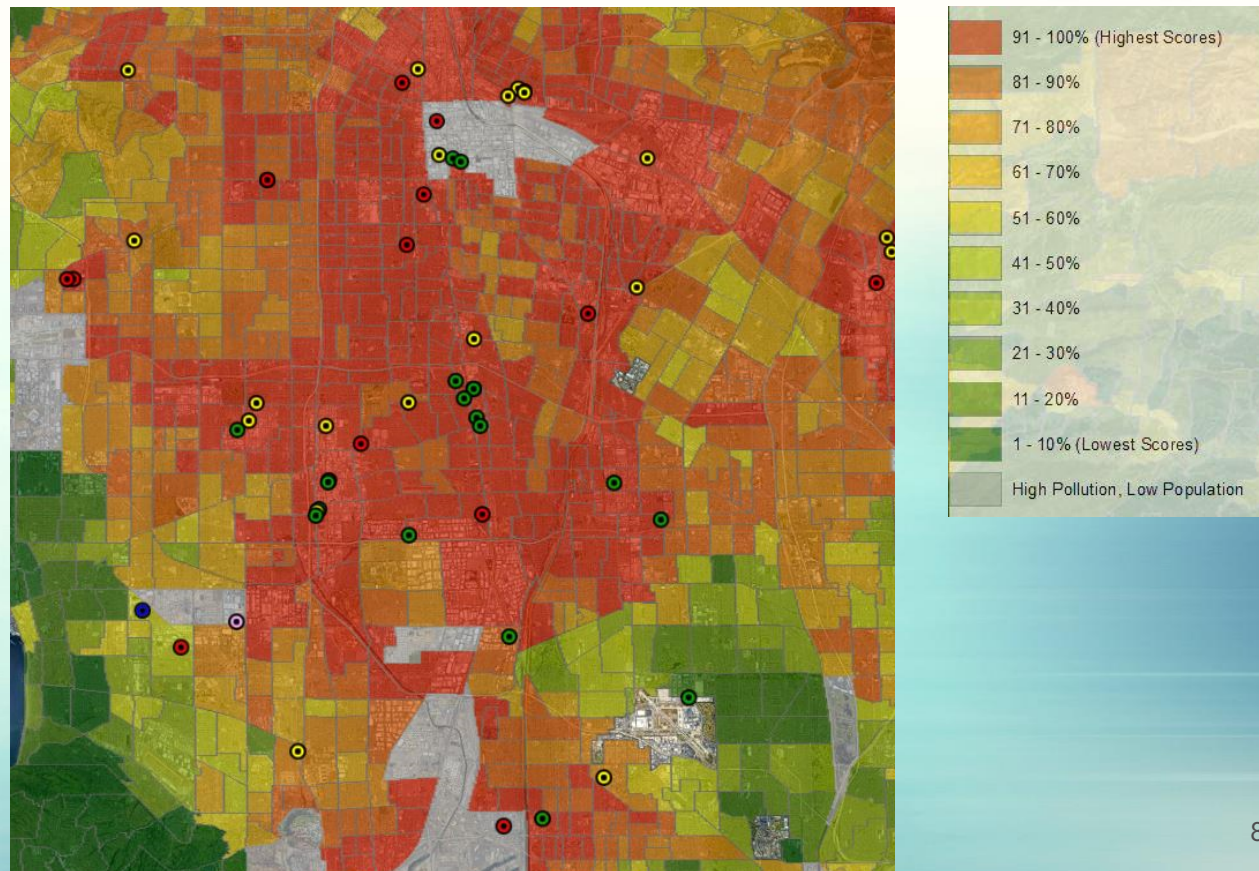
- Monitoring conducted near chrome plating facilities located close to residences and schools
- South Coast and Sacramento
- Monitoring showed elevated levels of hexavalent chromium near facilities





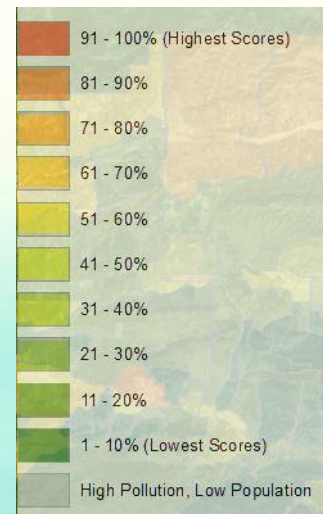
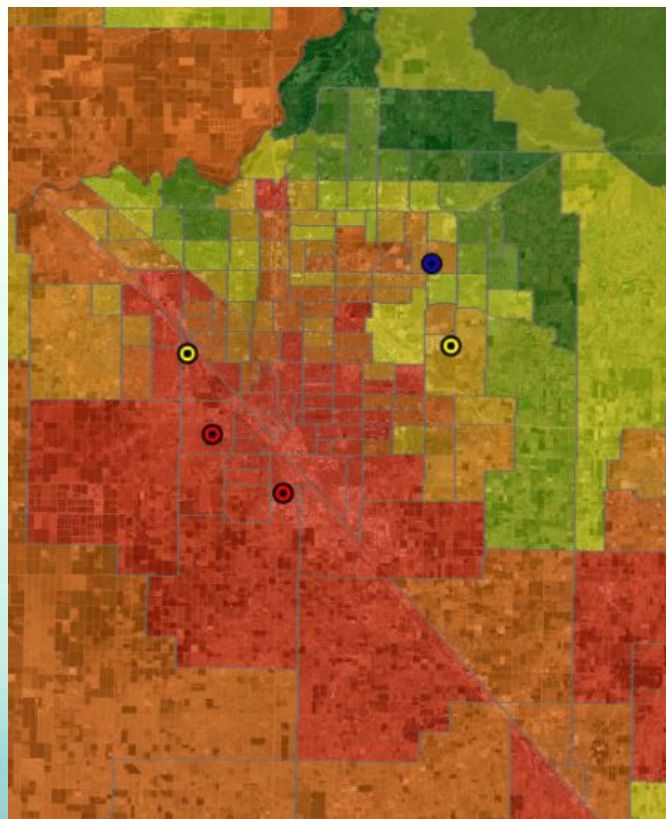
# Facilities in Disadvantaged Communities

South Coast  
SB 535 Communities



# Facilities in Disadvantaged Communities

San Joaquin  
SB 535 Communities





# Facilities In Communities



# Facilities In Communities





# Cumulative Impacts





# Cumulative Impacts



# Cumulative Impacts



# Trivalent Chromium is a Less Toxic Alternative

- Not a carcinogen
- Primarily used in decorative chrome plating
- Currently in use at California chrome plating facilities
- In development for other applications
- Does not use PFAS-containing fume suppressants

# Decorative Chrome Plating

- January 1, 2024: No new hexavalent chromium plating operations
- January 1, 2027: Phase out of hexavalent chromium
  - 1-year extension to address issues related to the conversion to alternative technologies



# Hard Chrome Plating and Chromic Acid Anodizing

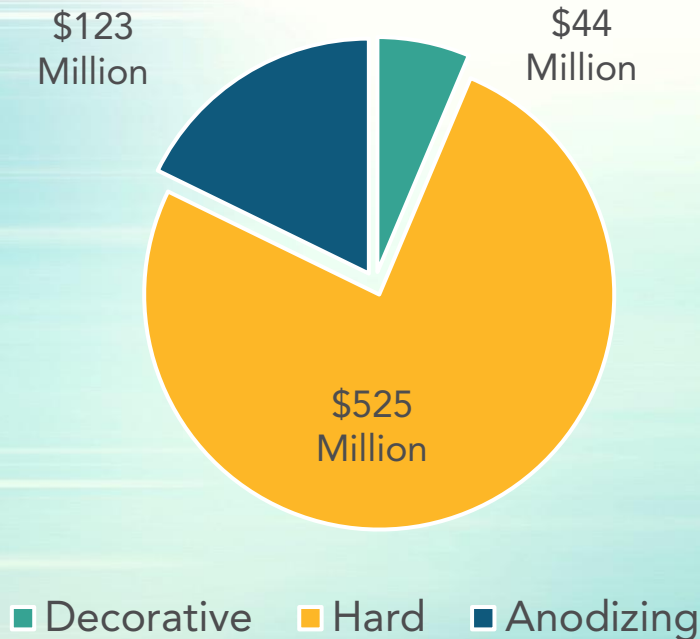
- January 1, 2024: No new hard hexavalent chromium plating or chromic acid anodizing operations
- January 1, 2026: Emission limit reduced (0.00075 mg/ampere-hour)
- January 1, 2039: Hard plating/chromic acid anodizing phase out of hexavalent chromium
  - Two technology reviews prior to phase out (by 2032 and 2036)



# Hard Chrome and Chromic Acid Anodizing Additional Requirements

Requirement	Effective Date
Enhanced Housekeeping and Best Management Practices	January 1, 2024 to January 1, 2026
Additional Hexavalent Chrome Tank Add-on Controls Requirements	January 1, 2026
Building Enclosures	January 1, 2026
Biennial Source Testing	January 1, 2026

# Total Costs of Proposed Amendments



- Decorative Plating – \$44 Million
- Anodizing – \$123 Million
- Hard Plating – \$525 Million
- Total Cost – \$692 Million (from 2024 – 2043)

# Facility Equipment Costs

Requirement	Decorative Facility Cost (per facility)	Hard/Anodizing Facility Cost (per facility)
Hexavalent Chromium Phase Out	~\$323,000	~\$4,000,000
Housekeeping & Best Management Practices	No new requirements	~\$5,300
Additional Hex Chrome Tanks Add-on Controls	No applicable requirements	~\$132,000 per system
Building Enclosures	No applicable requirements	~\$17,000 per facility
0.00075 mg/amp-hr emission limit	No applicable requirements	~\$132,000 per system (if needed)

# Incentive Funding

- AB 617 Community Air Protection Grants
  - Grants for trivalent chromium systems
  - 90 percent of conversion cost
- Legislature intends to provide CARB with
  - \$10 million for hexavalent chromium replacement technology
  - Intent language established in AB 211 to assist with the necessary transition away from the use of hexavalent chromium

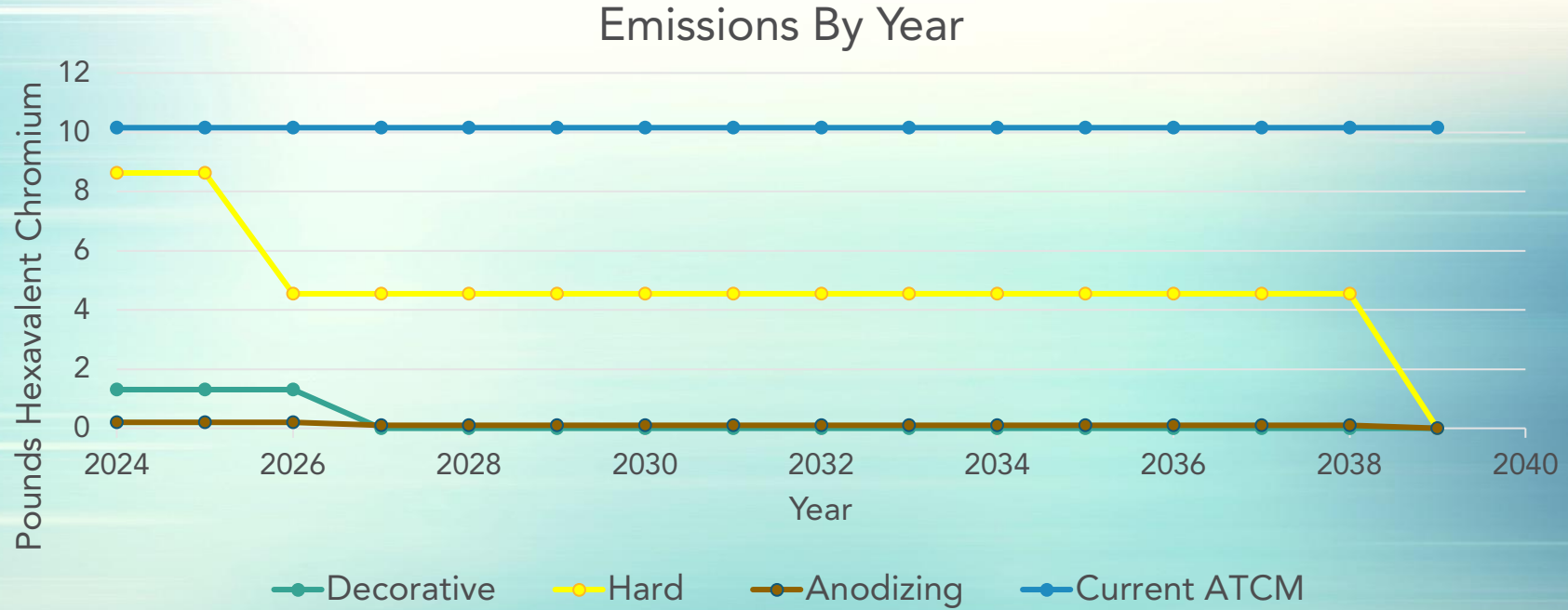
# Expected Benefits

- Emission and cancer risk reductions from both stack and fugitive emissions
- Reduced hexavalent chromium exposure in communities, including AB 617 communities
- Aligns with CARB's environmental justice and equity goals
- Reduced need for PFAS-containing fume suppressants due to phase out

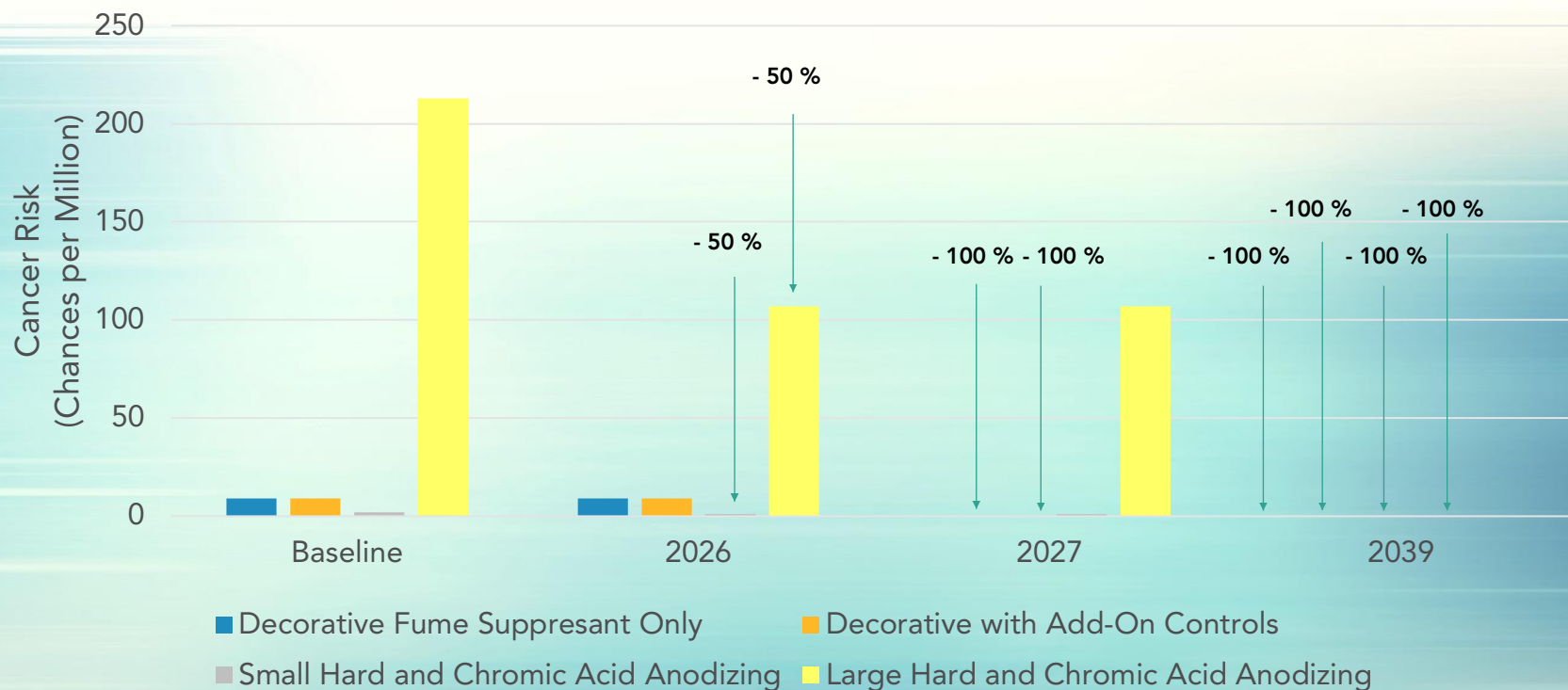




# Emission Reductions (Controlled Tanks)

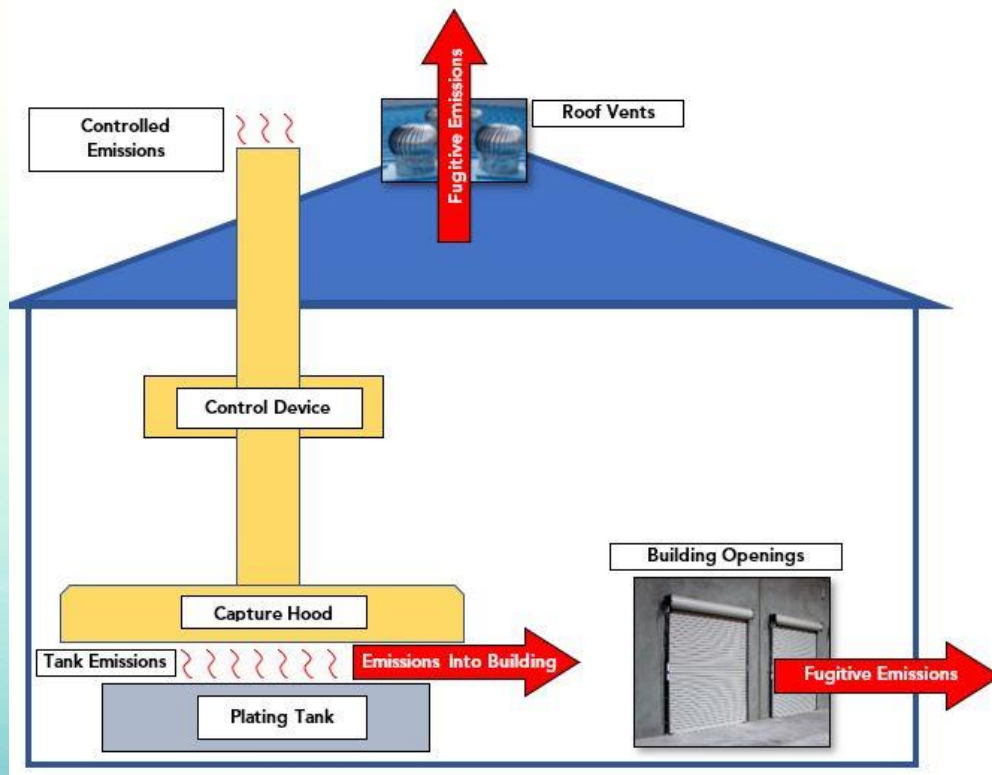


# Cancer Risk Reduction (Controlled Tanks)



# Fugitive Emissions

- Emissions that escape through building openings, not through controls
- Estimated risk ranges from 1 to over 1,000 chances per million



# Comparison to Other Control Measures

- CARB has phased out air toxics in other control measures
  - Perchloroethylene in dry cleaning
  - Hexavalent chromium and cadmium in automotive coatings
  - Chlorinated solvents in automotive maintenance and repair
- Baseline cancer risk from chrome plating facilities comparable to other control measures
- No methodology exists to monetize health benefits from reductions of non-diesel air toxics

# Baseline Cancer Risk vs. Other Control Measures

ATCM	Pollutant	Baseline Residential Cancer Risk (chances per million)
Chrome Electroplating and Chromic Acid Anodizing (2023)	Hexavalent Chromium	9 – 213*
Transport Refrigeration Units (2022)	Diesel Particulate Matter	510 – 1460
Ocean-Going Vessels At Berth (2020)	Diesel Particulate Matter	14 – 54
Perchloroethylene from Dry Cleaning Operations (2007)	Perchloroethylene	99 – 196
Hexavalent Chromium and Nickel from Thermal Spraying (2004)	Hexavalent Chromium and Nickel	230 – 690
Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities (2000)	Perchloroethylene, methylene chloride, and trichloroethylene	158 – 280



# Outreach

2018 Public  
Regulatory Notice

2 Public Workshops  
and 7 Technical  
Workgroup Meetings

29 Facility Site Visits  
1 Community Tour

More than 50  
individual stakeholder  
meetings

Preliminary Cost  
Document Released  
January 2022

# Environmental Impact Analysis

- Draft Environmental Analysis released for comment December 2, 2022 – January 17, 2023
- Prepare written response to comments
- Present Final Environmental Analysis and written responses to comments to the Board

# Summary of Community Comments

- Support phase out with accelerated timeline
- Proximity of chrome plating facilities to residents and schools
- Use of forever chemicals (PFAS) in fume suppressants
- Want facilities to take advantage of legislative funding opportunity

# Summary of Industry Comments

- Trivalent chromium customer acceptance due to color differences
- Postpone phase out date to allow further development of alternative technologies
- High cost to individual facilities
- Facilities will leave the state or shut down

# Potential 15-Day Changes

- Corrections to Appendix B (Emission Inventory)
- Clarify applicability of specific requirements
- Non-substantive changes for consistency and clarification

# Next Steps

- 15-day changes
- Second Board Meeting (2<sup>nd</sup> quarter 2023)