

Proposal for Amending the Chrome Plating & Chromic Acid Anodizing ATCM

Stakeholder Workgroup Meetings
May 10th, 2006, Sacramento, CA
May 12th, 2006, El Monte, CA

California Environmental Protection Agency

 **Air Resources Board**

Outline

- Overview
- Industry Characterization
 - Facility Survey / Receptor Survey
 - Economic Survey
 - Chemical Fume Suppressant Manufacturer Survey
- Emission Testing Program
 - Phase I & II Summary
 - Emission Factor Development
- Emissions Inventory

Outline

- Health Risk Assessment
 - Air Dispersion Modeling Assumptions & Results
 - Risk Assessment
- Proposed Regulatory Concepts
 - Existing ATCM Requirements
 - Limits (Existing, Modified and New Facilities)
 - Housekeeping
 - Continuous Compliance
 - Additional Requirements
 - NESHAP changes

3

Outline

- Cancer Risk Reduction
- Estimated Cost Impacts
- Related Activities
 - Loan Guarantee Program
 - OSHA
- Schedule

4

OVERVIEW

Hexavalent Chromium

- Hexavalent chromium is a known human carcinogen
- Potential excess cancer risk from exposure to 1 ng/M³ is 146 per one million people
- Despite stringent regulation, chrome plating and chromic acid anodizing facilities continue to be a source of adverse exposures, especially to near-by sensitive receptors

Goals of Amendments

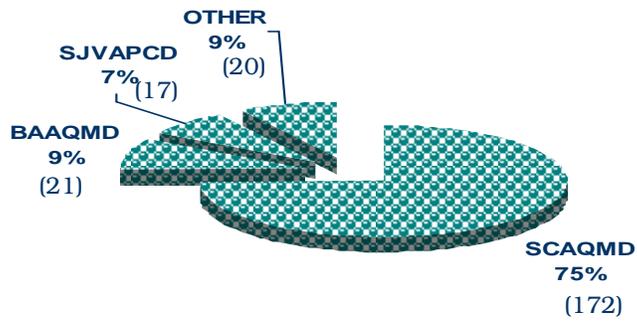
- Achieve maximum Hexavalent Chromium emissions reduction when sources are located near people
- Isolate people from new facilities
- Use the most reliable controls available to reduce the cancer risk

7

INDUSTRY CHARACTERIZATION

Summary of Survey
Information for
Calendar year 2003

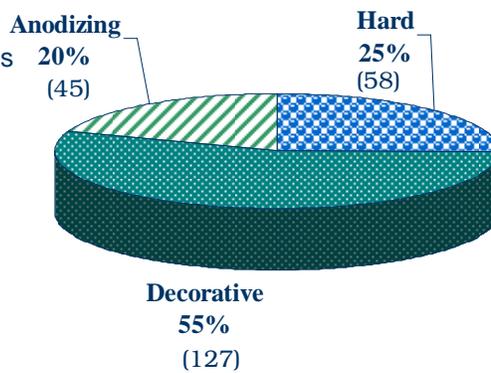
Most Hexavalent Chromium Operations Located in the SCAQMD



9

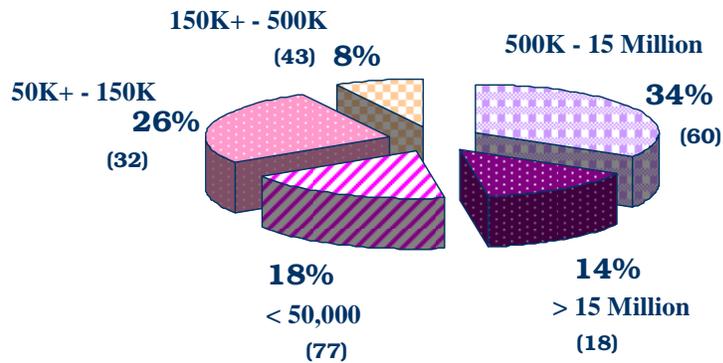
Decorative Chrome Platers are Over Half of the Industry

- 240 operations
- 10 trivalent chrome baths
- Out of 230 hexavalent chromium operations, 8 have multiple plating lines



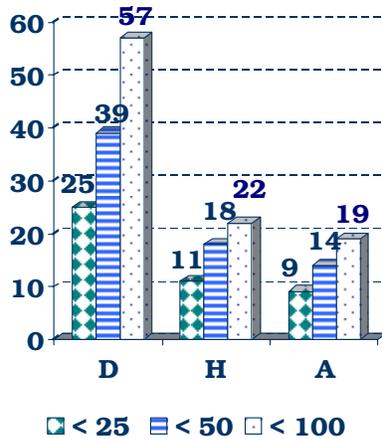
10

Half of the Operations have less than 500,000 amp-hrs



11

43% of Facilities Within 100 Meters of Sensitive Receptor



- Sensitive and residential receptor information available for all 230 operations.
- 98 (43%) are within 100 meters of a sensitive receptor.
- Facilities more than 100 meters are not represented.

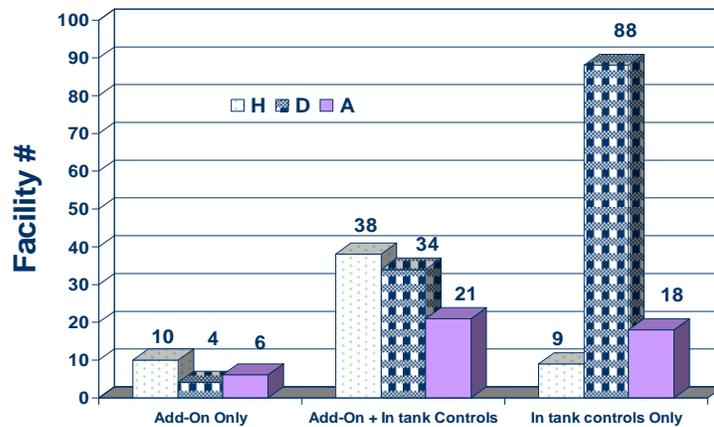
12

Controls Currently Used (2003)

- 115 use in tank controls only (fume suppressant or fume suppressants in combination with polyballs) (50%)
 - 88 are Decorative Chrome Platers
- 93 use fume suppressants in combination with add-on controls (40%)
 - 38 are Hard Chrome Platers
- 20 use add-on controls only (9%)
 - 10 are Hard Chrome Platers
- Of the 113 facilities with add-on controls, 69 use HEPA filters (61%)

13

Add-On Controls Used by 50% of Facilities



14

Over a Third of the Facilities are Small Businesses

- Total of 222 facilities were sent the questionnaire
- Information available for 86%
- 38% have an annual gross revenue of \leq \$1 Million



15

Chemical Fume Suppressant Manufacturer Survey Overview

- The survey requested information from 5 chemical manufacturers on 9 products being sold in California
 - primary mechanism of reducing hexavalent chromium emissions
 - recommended surface tension
 - fume suppressant formulations

16

Chemical Fume Suppressant Manufacturer Survey Summary

- Primary mechanism of reducing emissions
 - 7 surface tension reducer
 - 1 foam
 - 1 unknown
- Surface tension reducers recommended surface tension
 - 2 - 20-30 dynes/cm
 - 5 - 40 dynes/cm
- Fume suppressant formulation (7 surface tension reducers)
 - Water (84-95%)
 - Fluoro-surfactant (5-10%)
 - Other (5%)

17

EMISSIONS TESTING PROGRAM

Phase I & II Summary
Emission Factor
Development

Emissions Testing Program Overview

- Conducted in two phases to gather information on emissions from fume suppressant controlled facilities
- Only decorative chromium plating facilities tested

19

Emissions Testing Program Overview

- Phase I : ventilated facilities (4 tests)
- Phase II : open tanks (7 tests)
 - Results will be used to develop an emission factor for plating facilities using fume suppressants as sole source of control

20

Phase II Summary of Results

	A1	A2	S	C2	C3	C4
Date	1/2004	2/2004	5/2004	10/2004	5/2005	6/2005
Cr6+ (mg/amp-hr)	0.009	0.004	0.050	0.050	0.052	0.065
ST (dynes/cm)	39.9	29.5	36.8	42	30.1	31.5
Fume Suppressant	Protab 1000	Clepo Mist	Protab 1000	Chrome Foam	Chrome Foam	Chrome Foam
[Chromic Acid] (oz/gal)	36	34.7	33.4	30.2	25	28.2

21

Emissions Factor Development

- Emission rates from Phase II of the testing program were averaged to get an emission factor
- 6 tests from 3 facilities were used to get an average emission rate of 0.04 mg/amp-hr
- Represents fume suppressant controlled tank emissions prior to use of certified fume suppressants

22

EMISSIONS INVENTORY

Emissions for Calendar
Year 2003

Emissions

- Emissions based on Survey (2003)
 - Emission Rate (mg/amp-hr)* Production (amp-hrs/yr)
- Fugitive Tank Emission Rate
 - 0.04 mg/amp-hr for fume suppressant control
- Point Source Emission Rate
 - Source Test information
 - Based on type of controls
 - HEPA or ME combination– 0.006 mg/amp-hr
 - FS – 0.04 mg/amp-hr
 - Scrubber – 0.15 mg/amp-hr
- Does not Reflect Implementation of SCAQMD Rule

Total Emissions

- Point Sources
 - 113 operations
 - 9.8 lbs/year
- Fugitive Sources
 - 115 operations
 - 4.7 lbs/year

Total Emissions
14.5 lbs/year

* No information on 2 operations – they are no longer active

25

HEALTH RISK ASSESSMENT

Modeling Assumptions
and Results
Potential Health Risk
(2003)

Health Risk Assessment - Modeling

- Air Dispersion Modeling
 - U.S. EPA ISCST3 (02035)
 - Point and Volume (Fugitive) Source
 - Point source uses add-on control
 - Fugitive source uses in tank controls only
 - New Office of Environmental Health Hazard Assessment (OEHHA) guidelines
 - Tier 1 analysis
 - OEHHA Air Toxics “Hot Spots” Program Risk Assessment Guidelines (2003)

27

Health Risk Assessment - Modeling

- Four Meteorological Data Sets
 - Los Angeles area, San Francisco Bay area, San Diego area, Central Valley
- Point Sources (add-on control)
 - 3 categories based on amp-hr usage and stack
- Fugitive Source (in tank control, primarily fume suppressant)
 - 3 categories based on building size

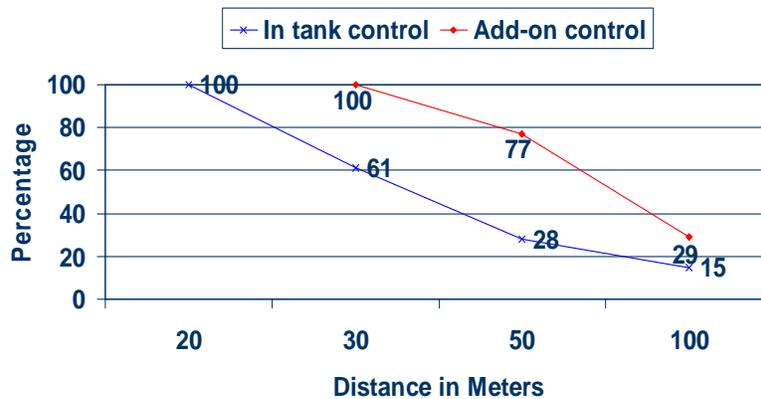
28

Modeling Findings

- Risk is localized
- Sensitive receptors are at greater risk if they are located near chromium plating and anodizing facilities
- Hexavalent chromium concentration drops off significantly at 100 meters

29

Hexavalent Chromium Concentration Significantly Reduced at 100 Meters



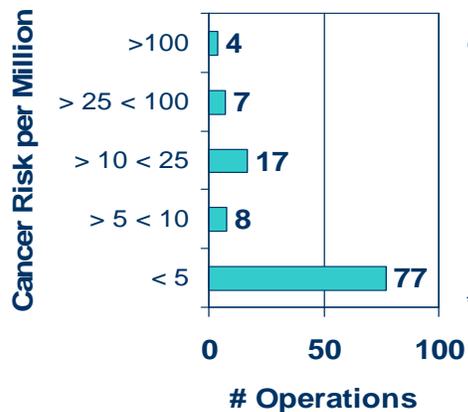
30

Estimated Maximum Individual Cancer Risk (MICR): Point Sources

- Assumptions for calculating MICR:
 - Facilities with add-on controls
 - Concentration at 30 meters (maximum impact)
 - Pasadena MET set (average conditions)
 - 80th percentile breathing rate
 - Operation 12 hrs/day, 7 days/week
 - Facilities divided into small, medium, large
 - Actual facility amp-hrs used

31

Facilities With Add-on Controls Estimated MICR (2003)



- Most point sources' [77/113 (~70%)] cancer risk has been reduced to no more than 5 per one million

* Does not reflect implementation of SCAQMD Rule 1469

32

PROPOSED REGULATORY CONCEPTS

Proposed Limits and Requirements

Concepts for Amending ATCM

- Same emission limits regardless of plating type
- More stringent requirements for facilities near sensitive receptors
- Requirements for modified/new facilities
- New housekeeping requirements
- Continuous compliance
- Additional requirements
- NESHAP changes

36

Current ATCM Requirements

- Requirements based on type of operation
 - Hard: emission limits based on size (0.15 to 0.006 mg/amp-hr)
 - Must be met with add-on control
 - Decorative/Anodizing: meet surface tension limit with fume suppressant only or meet an emission limit with add-on controls
 - Receptors not taken into account
- Emissions reduced by over 90%

37

Why are Further Controls Necessary?

- Hexavalent chromium is a known human carcinogen
- Remaining risk for people and children living, playing, or working is still too high
- Controls are available to reduce the risk

38

Emission Limit Proposal

- Proposal would harmonize limits for all plating types
 - Continued use of surface tension limit up to specified production levels
 - Above specified production levels, add-on controls plus fume suppressant required
 - Existing controls not to be removed unless upgrading
- Proximity to sensitive receptors determines threshold where add-on controls required

39

Proposed Emission Factor for Fume Suppressant Control

- South Coast AQMD 'certified' fume suppressants through source testing to an emission rate of 0.01 mg/amp-hr at specified surface tensions
- ARB has confirmed this result in 3 tests
- Most recent source test yields emission rate of 0.009 mg/amp-hr
- Proposing to establish fume suppressant emission factor of 0.01 mg/amp-hr if specified fume suppressants are used

40

Control Options Available

- Proposal would employ same technologies currently in use in the industry
- Add-on control systems
 - HEPA filters, composite mesh pads, scrubbers, or combination
- In tank controls
 - Fume suppressants: fluorinated surfactants to reduce surface tension
- Add-on controls to be used with fume suppressants to achieve emission control even under breakdown

41

Emission Limit Proposal: Facility ≤ 100 M from Sensitive Receptor

Fume Suppressant Emission Rate 0.01 mg/amp-hr

Annual Actual Amp-hours	Control Method
$\leq 84,000$	Use fume suppressant to reduce surface tension
$> 84,000$	Install HEPA or equivalent add-on control + fume suppressant*

42

* When emissions exceed 0.009 lb/yr, site specific analysis must be conducted using OEHHA guidelines. Facility must comply with air district's "Hot Spots" requirements.

Emission Limit Proposal: Facility > 100 M from Sensitive Receptor

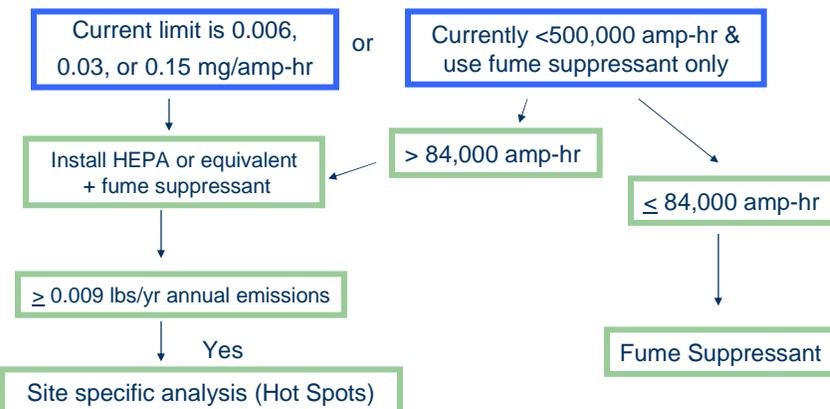
Fume Suppressant Emission Rate 0.01 mg/amp-hr

Annual Actual Amp-hours	Control Method
≤ 296,000	Use fume suppressant to reduce surface tension
> 296,000	Install HEPA or equivalent add-on control + fume suppressant*

* When emissions exceed 0.012 lb/yr, site specific analysis must be conducted using OEHHA guidelines. Facility must comply with air district's "Hot Spots" requirements.

43

Hard Chrome: Example of Determining Limit Based on the Proposal (<100 M)



44

Proposal for Modified Facilities

- Modified chromium plating or anodizing facility must meet following criteria:
 - Use add-on controls (HEPA or equivalent control) and fume suppressant regardless of production levels or receptor distance
 - Conduct performance test to determine emission rate
 - If emissions > 0.009 lbs/yr using actual annual amp-hrs:
 - Conduct site specific analysis using OEHHA guidelines. Facility must comply with air district's "Hot Spots" requirements.

45

Proposal: New Facilities

- No person shall operate a new chromium plating or anodizing facility unless all the following criteria are met:
 - Facility may not be located in an area zoned residential or mixed use, or within 500 feet of an area so zoned
 - Use add-on controls (HEPA or equivalent) and a fume suppressant
 - Conduct site specific analysis using OEHHA guidelines
 - Facility must comply with air district's "New Source Review" rule and "Hot Spots" program

46

Housekeeping Proposals

- Minimize dust
 - Enclose and clean chemical storage
 - Transport chemicals in closed containers
 - Clean up spills
 - Separate buffing/grinding areas
 - Proper disposal of waste containing chromium
 - Clean floor area

47

Housekeeping Proposals (con't)

- Minimize spills and dripping from drag-out
 - Use of drip trays for automated line
 - Rinsing parts over tank for non-automated lines
 - Splash guards for non-automated lines
 - Limit of freeboard height for automated and non-automated lines

48

Proposals for Continuous Compliance

- Operator training (provided by ARB)
 - SCAQMD training meets requirement
- Use of specified fume suppressants
- Require independent tensiometer readings for facilities without add-on controls
- Stalagmometer procedure

49

Proposed Additional Requirements

- Resubmit initial compliance report
- Additional information required in ongoing compliance report
- Prohibit air sparging
- Prohibit removal of existing controls, unless upgrading

50

NESHAP changes

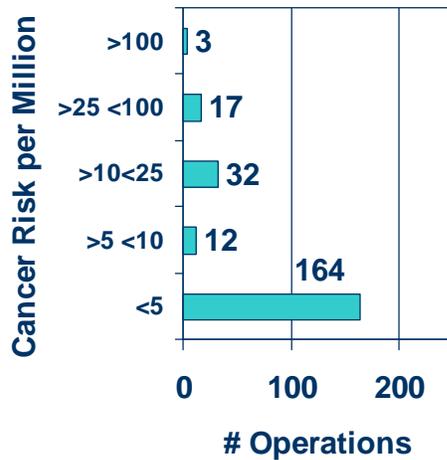
- Different surface tension readings based on type of instrument used (stalagmometer or tensiometer)
- Change in pressure drop for composite mesh pads
- Alternative requirements for enclosed electroplating tanks
- Definition changes

51

Cancer Risk Reduction

Rule 1469
ATCM Proposal

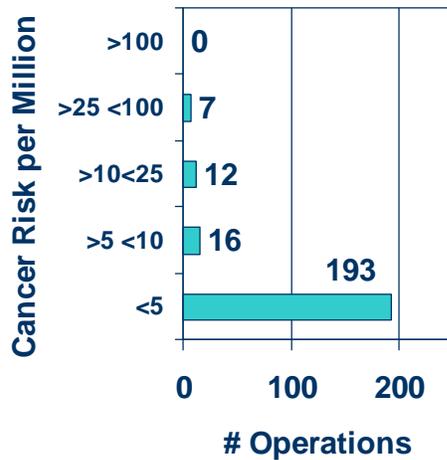
Impact of Implementation of Rule 1469: Estimated MICR



- 50 additional operations have cancer risk at or below 5 per one million

53

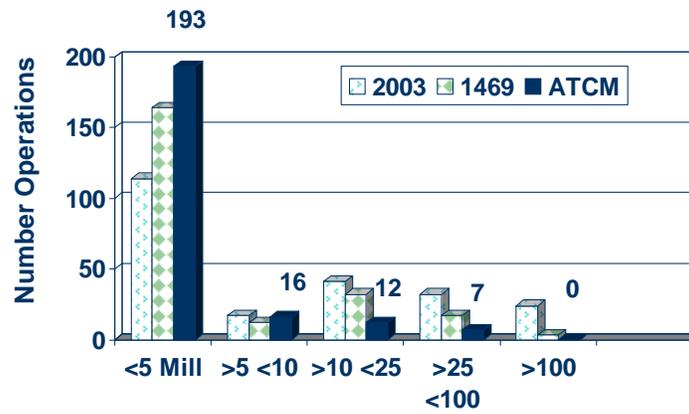
ATCM Proposal Impact: Estimated MICR for all Operations



- Additional 29 operations have cancer risk at or below 5 per one million (85% overall)
- 92% of operations have cancer risk at or below 10 per one million

54

Combined Rules Reduce Cancer Risk to < 10/Million for 92% of Operations



55

Estimated Cost Impacts

Impacts of Proposal

- Proposal requires:
 - 33 new HEPA add-on pollution control devices
 - 12 facilities upgrade to HEPA add-on pollution control devices
 - 56 additional facilities use specified fume suppressants
 - 36 site specific analyses
 - 108 source tests

57

Cost Impacts of Proposal

- One time costs include:
 - Purchase & installation of HEPA add-on pollution control devices
 - Includes tax, freight, instrumentation, contingency
 - Source test & cost of APCD review
 - Permit fee
 - Site specific analysis
 - Initial compliance status report

58

Cost Impacts of Proposal

- Ongoing costs include:
 - Use of fume suppressants
 - Permit fees if upgrading or installing HEPA add-on air pollution control devices
 - Operation & maintenance costs of HEPA add-on air pollution control devices

59

Cost Impacts of Proposal (estimated)

- One-time costs are estimated at \$6.5 million
 - Range is \$450 to \$550,000
- Recurring costs are estimated at \$2 million
 - Range is \$0 to \$150,000
- Total costs estimated at \$8.5 million

60

Proposed Implementation Schedule

Implement:

- Within 6 months:
 - Housekeeping
 - Use of specified fume suppressants
 - Additional requirements
- Within 2 years:
 - Add-on controls for facilities

61

RELATED ACTIVITIES

Loan Guarantee
Program
OSHA Rule

Loan Guarantee Program

- Result of Assembly Bill 721
- Guarantees loans to purchase pollution control equipment of up to \$100,000
- Designed for decorative chrome platers
- Expands Model Shop Program
- Implemented by Business, Transportation and Housing Agency
- Expect amendments to expand program to all metal plating facilities

63

OSHA Update

- Final rule published– February 28th, 2006
- New PEL 5 $\mu\text{g}/\text{m}^3$
 - Engineering controls
 - Local exhaust ventilation
 - Process enclosure
 - Process modification
 - Housekeeping requirements
 - All surfaces to be maintained as clean as practicable
 - Spills and releases to be cleaned up promptly

64

Schedule

- Next Stakeholder Workgroup Meeting – May, 2006
- Public workshop - June, 2006
- Board hearing – July 20, 2006, Sacramento