

**CHROME PLATING  
RULE EFFECTIVENESS STUDY REPORT**



**Prepared by:  
California Air Resources Board  
Stationary Source Division  
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State of California  
California Environmental Protection Agency  
Air Resources Board

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## **Chrome Plating Rule Effectiveness Study**

July 2002

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## **ACKNOWLEDGMENTS**

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# **Chrome Plating Rule Effectiveness Study**

## **Introduction**

A joint study of chrome plating facilities was conducted in five air districts in California (Bay Area, Sacramento, San Diego, San Joaquin and South Coast) between November 16, 1999 and November 9, 2000. ARB and district staff inspected 188 chrome platers for compliance with the Chrome Plating Airborne Toxic Control Measure (ATCM).

In order to evaluate the effectiveness of the ATCM and its implementation, this report looks at non-compliance rates among the facilities and permit units inspected, violations of the ATCM requirements, inspection frequency, inspector training, enforcement actions, penalty settlement amounts, settlement times, parameter monitoring, calibration requirements and permit quality. The report also makes recommendations for improving compliance with the ATCM and summarizes several improvements voluntarily made by the participating air districts.

As a separate effort, ARB staff is in the process of updating the ATCM to ensure it continues to provide the most feasible public health protection. As part of the update process, staff is evaluating new and existing technologies for pollution prevention, and also evaluating control equipment that may further reduce emissions from hard and decorative chrome plating and anodizing facilities. Another part of our evaluation is an emission testing program focussed on better quantifying emissions from the decorative chrome plating process. The results of all of these evaluations will aid in determining if further control of hexavalent chromium emissions is needed. ARB's current hexavalent chromium activities can be seen at <http://www.arb.ca.gov/toxics/chrome/chrome.htm>.

## **What is a rule effectiveness study?**

A rule effectiveness study is a thorough examination of a rule category and its implementation. Rule effectiveness studies are field evaluation studies designed to determine the percentage of non-compliance among sources within a selected rule category. A representative number of sources within the study group are chosen at random and inspected. The effectiveness of a rule is reflected in the non-compliance rates determined by dividing the number of non-complying facilities and/or equipment by the number inspected.

## **Why was this project initiated?**

This project was done in order to examine how well chrome plating facilities were performing with respect to their compliance with the existing Chrome Plating Airborne Toxic Control Measure (ATCM) and the air districts' chrome plating regulations. The first ATCM on this subject was adopted by the ARB in 1988. This was amended in 1998 in order to improve the State's control measure and make it as stringent as the Chrome Electroplating Standard promulgated by the U.S. EPA in 1995. U.S. EPA granted

California the authority to implement and enforce its Chrome Plating ATCM (equivalency) in place of the Chrome NESHAP on April 14, 1999. Local air districts are required to implement and enforce the ATCM no later than 120 days after the effective date of the ATCM or adopt an alternative regulation no later than six months after the effective date of the ATCM.

### **Why Chrome Plating?**

The potential hazard posed by emissions from chrome plating operations makes it necessary to ensure their full compliance. Hexavalent chromium compounds are regulated as toxic air contaminants in California under AB 1807 (1983) and federally as hazardous air pollutants under the Clean Air Act Amendments of 1990. Hexavalent chromium is a potent known carcinogen. This compound is emitted during chrome plating and anodizing operations. Public exposure to hexavalent chromium can be elevated in communities near plating facilities. Chrome plating operations are typically small facilities often located in low-income areas. Thus, improved compliance rates will reduce exposure in these low-income communities.

### **Project Preparation**

ARB staff invited five California air districts (Bay Area, Sacramento, San Diego, San Joaquin and South Coast) to participate in a rule effectiveness study on chrome plating operations. Even though the study is limited to these five districts, the results should indicate statewide trends because approximately 98% of the State's chrome plating operations are concentrated in these five districts. Representatives of ARB and the five air districts met at the South Coast AQMD for a Chrome Plating Study Group Meeting to finalize project plans. The study group decided to conduct joint inspections, take enforcement action according to each District's existing policy, collect chromic acid samples to verify surface tension, share inspection results, and prepare a consensus report.

### **Field Inspections**

Inspections were conducted jointly by ARB and the five districts. Inspectors conducted a walk-through inspection of each facility and reviewed records for ampere-hours, surface tension measurements, inspection and maintenance of the air pollution control devices, and initial and ongoing compliance status reports. Samples of chromic acid solution were collected by ARB in the Bay Area, Sacramento, San Diego, and the San Joaquin Valley and sent to a laboratory for surface tension analysis. Sample results were returned to ARB and then transmitted to the Districts. In the South Coast AQMD, District inspectors collected chromic acid samples and sent them to a laboratory for surface tension analysis. Sample results were returned to the District. Notices of Violation (NOVs) and Notices to Comply (NTCs) were issued by district inspectors subsequent to the inspections and sample analysis. Each District provided copies of its inspection checklists, inspection reports, NOVs and NTCs to ARB.

Table 1 below summarizes the number of chrome platers in each District and the number of chrome platers inspected. In the South Coast AQMD, the 128 facilities inspected represent the number of sources that needed to be inspected to obtain statistically valid results with a 95% confidence level. In the other four districts, almost all permitted chrome platers were inspected. Inspection results from the 188 facilities inspected are sufficient to draw conclusions about compliance in this source category on a statewide basis.

**Table 1  
Facility Inspection Summary**

District	Number of Permitted Chrome Platers	Number of Chrome Platers Inspected
Bay Area	23	21
Sacramento	6	6
San Diego	13	12
San Joaquin Valley	21	21
South Coast	171	128
Totals	234	188

### **Types of Violations**

Violations documented during inspections can be broadly divided into three categories: direct excess emission violations (DEEVs), emission-related violations (ERVs) and non-emissions related violations (NERVs).

Direct excess emission violations occur when an emission standard is violated in the presence of an inspector based on visual observation, record review or sample analysis. Examples of DEEVs are: failure to install an add-on control device or not maintaining the surface tension of chromic acid solution below 45 dynes/centimeter.

Emission-related violations are violations that could result in excess hexavalent chromium emissions to the atmosphere. Examples of ERVs are: insufficient polyball coverage or foam blanket thickness, no water to a scrubber, exceeding the pressure drop across an add-on control device, failure to inspect and maintain the add-on control device, failure to measure surface tension, failure to add fume suppressant, missing or broken pressure drop gauges, ampere-hour meters not installed or not operating, and failure to keep critical records such as in-house surface tension analysis results, fume suppressant additions and operating parameters of add-on control equipment.

Non-emission related violations are administrative or procedural violations. Examples of NERVs violations are: failure to prepare or submit an initial or ongoing compliance status report, no operation and maintenance plan, ampere-hour meters not hard wired, incomplete records or failure to keep non-critical records such as source test results and outside laboratory results of surface tension analysis on-site and make them available to the District upon request.

Table 2 below illustrates the type of violations discovered during the rule effectiveness study. This table shows each section of the ATCM, the type of violation by section, and the number of facilities in each District violating the ATCM. Most of the violations documented in the study pertained to monitoring, recordkeeping and reporting, and were not contributing to “direct excess emissions” at the time of the inspection.

**Table 2  
Violations of the ATCM by Section & District**

ATCM Section	Facilities In Violation				
	Bay Area	Sacramento	San Diego	San Joaquin	South Coast
<b>(c) Standards – (DEE)</b> Specifies the method of compliance and emission limits for hard, decorative & chromic acid anodizing facilities.	0	0	3	1	11
<b>(d) Performance Test Requirements &amp; Methods - (NER)</b> Specifies when testing must occur, approved test methods & pre-test protocol.	0	0	0	0	1
<b>(e) Parameter Monitoring – (ER)</b> Establishes monitoring frequency for ampere-hours, pressure drop, inlet velocity pressure, surface tension, foam blanket thickness & mechanical fume suppressants.	8	4	9	13	40
<b>(f) Inspection &amp; Maintenance Requirements – (ER)</b> Specifies what equipment needs to be inspected, at what frequency & maintenance requirements for add-on control devices. Specifies maintenance requirements for ampere-hour meters and for equipment used to measure surface tension.	1	0	0	7	5
<b>(g) Operation &amp; Maintenance Plan Requirements – (NER)</b> Directs facilities subject to Section (f) to prepare an Operation & Maintenance Plan.	1	0	0	3	30
<b>(h) Recordkeeping – (ER/NER)</b> Requires facilities to keep inspection records for add-on control devices, fume suppressants, performance tests, monitoring data, breakdowns, excesses, facility size, fume suppressant additions & trivalent bath components.	2	0	0	13	51
<b>(i) Reporting – (NER)</b> Requires facilities to notify the district prior to performance testing and report test results to the district. Requires facilities to provide an initial and ongoing compliance status report to the district and reporting requirements for facilities using trivalent chromium baths and wetting agents.	1	0	10	15	69
<b>Total Facilities Inspected</b>	21	6	12	21	128

Table 3 below summarizes the non-compliance rates among chrome plating facilities.

**Table 3  
Non-Compliance Rates Among Chrome Plating Facilities**

District	Facilities Inspected	Facilities Violating ATCM		Facilities With ERVs		Facilities With DEEVs		Facilities With NERVs	
		#	%	#	%	#	%	#	%
Bay Area	21	8	38	3	14	0	0	8	38
Sacramento	6	4	67	1	17	0	0	4	67
San Diego	12	10	83	7	58	3	25	10	83
San Joaquin	21	17	80	14	67	1	5	17	80
South Coast	128	99	77	48	38	11	9	90	70
Totals	188	138	73	73	39	15	8	129	68

Table 4 below summarizes the non-compliance rates on a permit-unit basis. Non-compliance rates (percent in violation) among the facilities and permit units inspected was determined by dividing the number of facilities in violation by the number inspected.

**Table 4  
Non-Compliance Rates Among Permit Units**

District	Chromic Acid Anodizing Tanks		Decorative Chrome Tanks		Hard Chrome Tanks		Add-on Control Devices	
	Inspected	% IV	Inspected	% IV	Inspected	% IV	Inspected	% IV
Bay Area	1	100	14	29	25	64	12	33
Sacramento	1	0	5	80	6	0	1	0
San Diego	1	100	9	100	9	11	3	0
San Joaquin	0	N/A	17	88	8	63	6	50
South Coast	40	63	93	66	122	48	73	58
Totals	43	65	128	73	170	48	95	53

% IV = Percentage of permit units inspected that were in violation of ATCM

## Findings

### Violations of the ATCM by Section

- 1) 8% of the facilities violated Section (c) - Standards.
- 2) One facility violated Section (d) – Performance Test Requirements/Methods.
- 3) 39% of the facilities violated Section (e) – Parameter Monitoring.
- 4) 7% of the facilities violated Section (f) – Inspection & Maintenance.
- 5) 18% of the facilities violated Section (g) - Operation & Maintenance.
- 6) 35% of the facilities violated Section (h) – Recordkeeping.
- 7) 50% of the facilities violated Section (i) – Reporting.

### Non-Compliance Rates Among Chrome Plating Facilities

- 1) 73% violated the ATCM.
- 2) 39% had emission-related violations.
- 3) 68% had non-emission related violations.
- 4) 8% had direct excess emissions.

### Non-Compliance Rates Among Permit Units

- 1) 65% of the chromic acid tanks violated the ATCM.
- 2) 73% of the decorative chrome tanks violated the ATCM.
- 3) 48% of the hard chrome tanks violated the ATCM.
- 4) 53% of the add-on control devices violated the ATCM.

### **Data Analysis**

**Overall Non-Compliance Rates:** Inspection data collected from joint inspections of 188 chrome plating facilities suggests that most (73%) of the facilities violated at least one section of the ATCM. Non-compliance rates were high among all tank categories, i.e., chromic acid anodizing – 65%, decorative chrome – 73% and hard chrome – 48%.

**Non-Compliance Rates among Add-On Control Devices:** Hard chrome plating operations using more than 500,000 ampere-hours a year are required to use an add-on control device and conduct a source test to determine its emission rate. Most decorative chrome platers choose to comply with the emission standards by using a chemical fume suppressant with a wetting agent to reduce the surface tension of the bath solution below 45 dynes per centimeter. However, a few decorative chrome plating, chromic acid anodizing and trivalent chrome plating operations have opted to use add-on control devices to comply with the emission standards. These add-on control devices are composite mesh pad scrubbers, pack bed scrubbers or high efficiency particulate arrestors. All of the 95 add-on control devices inspected during this study had previously been source tested and were found to be operating within their allowable emission rate limits. However, there is no guarantee that these control devices will continue to operate within their allowable emission limits unless they are inspected and maintained according to the schedule contained in Section (f)(1) of the ATCM. In order to show compliance with Section (f)(1), facilities must prepare an Operation and Maintenance Plan as required by Section (g) of the ATCM. Seven of the 95 add-on control devices inspected violated Section (f)(1) and 32 violated Section (g) of the ATCM.

Two hard chrome plating facilities in the South Coast were operating without add-on control devices. Both facilities were using chemical fume suppressants and exceeded 500,000 ampere-hours a year. The District issued NOVs to these facilities. One facility attended an abatement hearing and installed a control device. The other facility conducted a source test to determine its emission rate and applied to the U.S. EPA to continue to use a chemical fume suppressant as an equivalent alternative to an add-on control device. Official confirmation by U.S. EPA is pending.

**Emission Standards Violation Rate:** Only 8 percent (15/188) of the facilities inspected violated Section (c) of the ATCM (Emission Standards). This section of the ATCM specifies the method of compliance and emission limits for hard, decorative, and chromic acid anodizing facilities. Actual source testing of facilities to determine compliance of stack outlet emissions with the ATCM standards was not conducted as part of this study. However, ARB staff did review the compliance history of every inspected facility equipped with add-on control devices to ensure that they had been successfully source tested in the past. Two hard chrome plating violated Section (c) by not installing add-on control devices. Eleven decorative chrome plating facilities, one small hard chrome, and one chromic acid anodizing facility exceeded the 45 dynes per centimeter surface tension standard.

**Recordkeeping Violation Rate:** Thirty-five percent (66/188) of the facilities inspected violated Section (h) – Recordkeeping. Section (h) requires owners and operators to keep inspection records of add-on control devices, performance test records, monitoring data records (cumulative rectifier usage, pressure drop, inlet velocity pressure, surface tension, foam blanket thickness), equipment breakdowns, excess emissions, fume suppressant additions and trivalent bath components. Recordkeeping is necessary to show that the facility is operating in compliance with the ATCM and without records, inspectors cannot verify compliance. It should be noted that this study was conducted soon after the ATCM became effective (April 14, 1999) and prior experience has shown that violations, especially recordkeeping violations, are the highest right after a rule becomes effective. Violations will decrease as the regulated industry learns how to comply. Towards this end, Districts should take a proactive approach through source education and outreach. It may be necessary for Districts to provide facilities with standardized recordkeeping forms and instructions on how to complete the forms in order to ensure compliance with this section of the ATCM.

**Parameter Monitoring Violation Rate:** Thirty-nine percent (74/188) of the facilities inspected violated Section (e) – Parameter Monitoring. Section (e) requires owners and operators to monitor ampere-hours, pressure drop, inlet velocity pressure, surface tension, foam blanket thickness and polyball or similar mechanical fume suppressant coverage of the tank surface. Failure to monitor these parameters can result in excess chromium emissions to the atmosphere. Inspectors found three add-on control devices that exceeded their pressure drop limit. An increase in pressure drop, decreases control efficiency. In two instances inspectors found an insufficient foam blanket thickness. In two other instances inspectors found the polyballs or polypropylene tubes did not cover the tank surface. The control efficiency of these mechanical fume suppressants is dependent upon complete coverage of the tank surface. These violations will tend to reoccur unless districts conduct source education and outreach.

**Reporting Violation Rate:** Fifty percent (95/188) of the facilities inspected violated Section (i) – Reporting. Section (i) requires owners and operators to submit the results of their performance tests, initial and ongoing compliance status reports, breakdown reports and trivalent chrome bath components to the district. The majority of the violations were the result of facilities failing to submit an initial or ongoing

compliance status report to the district. Initial compliance status reports (ICSR) are prepared by each facility and show how they will comply with the requirements of the ATCM. Ongoing compliance status reports (OCSR) are prepared annually and are intended to show compliance with the ATCM.

## **Other Findings**

### Inspection Frequency

The frequency of inspections is often a good indicator of compliance rates and rule effectiveness. It has been ARB's experience that more frequent inspections result in higher compliance rates and subsequently more effective rule implementation. In this study, the average time in months since the last facility inspection for the five districts was as follows: Sacramento – 6 months; Bay Area – 11 months; San Diego – 12 months; San Joaquin Valley – 18 months and South Coast – 26 months. The percentage of facilities violating the ATCM in these Districts is as follows: Sacramento – 67%; Bay Area – 38%; San Diego – 83%; San Joaquin Valley – 80% and South Coast – 77%.

Chrome platers in the Bay Area had the lowest non-compliance rate (38%) among all five districts. Bay Area AQMD inspects these facilities annually. Chrome platers in San Diego had the highest non-compliance rate (83%) among all five districts. San Diego County APCD also inspects these facilities annually. The difference in non-compliance rates among chrome platers in these two districts may be attributed to the fact that the San Diego chrome platers had not been inspected since the new chrome plating requirements became effective (April 14, 1999) and were not familiar with the requirements of the new regulation.

### Inspector Training

Documenting violations requires inspectors to be knowledgeable about the process they are inspecting and the regulations they enforce. Since hexavalent chromium is a toxic compound regulated by air districts, inspectors need to be able to identify emission points in the process and determine whether or not there is a violation before the community is affected. Inspectors in all five districts are trained to inspect chrome plating facilities and enforce the ATCM. However, there was some variation in the quality of inspections between the three zones in the San Joaquin Valley. There were differences among inspectors with respect to interpretation of the ATCM as well as thoroughness of inspections and enforcement actions. In order to improve the quality of these inspections and promote consistency within the District, inspectors should meet periodically to discuss their inspections and enforcement actions.

### Enforcement Actions

Generally speaking, NOV's are intended for ERVs and Notices To Comply (NTCs) are intended for NERVs. Penalties associated with NOV's help to deter ERVs. NTC's are not associated with penalties.

Table 5 below shows the total number of facilities inspected, the number of facilities with ERVs and the number of facilities receiving NOVs for ERVs. Of the 188 facilities inspected, 73 (39%) had ERVs and 41 (56%) of the facilities with ERVs received NOVs.

**Table 5**  
**Facilities With Emission-Related Violations**

District	Total Facilities Inspected	Facilities With ERVs	Facilities Receiving NOVs For ERVs
Bay Area	21	3	3
Sacramento	6	1	1
San Diego	12	7	7
San Joaquin	21	14	9
South Coast	128	48	21
<b>Totals</b>	<b>188</b>	<b>73</b>	<b>41</b>

Bay Area AQMD, Sacramento Metropolitan AQMD and San Diego County APCD issued NOVs to all facilities with ERVs. In the San Joaquin Valley, 64% of the facilities with ERVs received NOVs. In the SCAQMD, 44% of the facilities with ERVs received NOVs.

Forty-one facilities in the SCAQMD were operating without records. Thirty facilities received NTCs and eleven received NOVs. However, in the SCAQMD, when records are not provided upon request during an inspection and there is no direct excess emissions violation, a NTC is issued to produce the records by a certain date. If the records are provided and compliance determined, SCAQMD does not consider the initial lack of records to be an emission-related violation. On the other hand, if the records are not ultimately provided, SCAQMD agrees there is an emission-related violation and issues a NOV. All NTCs issued by SCAQMD inspectors for failure to provide records include a facility inspector follow-up to determine whether or not a NOV should be issued, consistent with AQMD Rules and their Policies and Procedures. When a NOV is warranted per District policy, one is issued. Two of the thirty facilities issued NTCs for no records failed to produce records by the follow-up inspection and were subsequently issued NOVs.

ARB considers the absence of records to be an emission-related violation since without records, inspectors cannot make a compliance determination. Records that are required by rule and permit conditions should be kept on-site and made available to the District upon request. We realize there are situations where immediate access to records is not always possible, e.g., records in locked storage and owner/manager not on-site. The issuance of a NTC may be an appropriate enforcement action for this situation. However, there are other situations where a NOV may be more appropriate because of the nature of the records involved, time frame of missing records and no justifiable reason why records cannot be produced during the inspection. Non-critical records, such as source test results and outside laboratory results of surface tension analysis can be produced at a later date without a loss of confidence as to their authenticity. Critical records, such as in-house surface tension analysis, addition of chemical fume

suppressants to the plating tank, operating parameters of add-on control equipment are of value only when field readings are recorded on a contemporaneous basis. There is no assurance that records produced two weeks after an initial inspection are credible. Districts should develop guidelines so that inspectors recognize these situations and take appropriate and consistent enforcement action.

Penalty Settlement Amounts & Settlement Times

As a follow-up to the field inspections, each District was asked to provide ARB with a summary of final case dispositions, i.e., penalty settlement amounts and settlement dates, for facilities receiving NOVs during the inspections. This information was provided to ARB.

ARB tabulated this information and determined the average penalty settlement amounts and settlement times for the NOVs issued during the rule effectiveness study. This information is summarized in Table 6 below.

**Table 6  
Average Penalty Settlement Amounts & Settlement Times**

Districts	NOVs Issued	NOVs Settled For a Penalty (as of 5/3/02)	Penalties Collected	Average Penalty Settlement Amount	Average Penalty Settlement Time	NOVs Pending Settlement (as of 5/3/02)
Bay Area	10	7	\$7,450	\$1,064	5 Months	2
Sacramento	1	1	\$840	\$840	15 Months	0
San Diego	10	7	\$3,700	\$529	6 Months	0
San Joaquin Valley	12	10	\$6,760	\$676	14 Months	0
South Coast	25	21	\$201,975	\$9,618	12 Months	4
Totals	58	45	\$215,725	\$4,794	10 Months	6

It is our finding that penalty amounts vary within each district, and from district to district for similar types of violations. Also, we believe penalties are in general too low to act as an effective deterrent for future violations. Since hexavalent chromium is a toxic air contaminant, it is especially important to ensure that penalties are commensurate with the nature, scope, and seriousness of the violations. The use of meaningful penalties should provide a financial incentive for this industry to comply with the air toxic control measure and should create an environment where full compliance is the most cost-effective option available. We recommend that districts should work together on developing enforcement guidelines to achieve uniform and credible penalty assessments at chrome plating facilities. ARB staff is willing to assist air districts in developing uniform enforcement guidelines for this source category.

Parameter Monitoring

*Surface Tension* – Section (e)(4) of the ATCM requires owners and operators of chrome plating facilities to measure surface tension daily for 20 operating days and weekly thereafter. Since inspection results revealed that all of the direct excess emission violations were due to exceedances of this standard, districts need to be able to collect

samples of chromic acid solution and analyze the samples to verify compliance with this section of the ATCM. Five of the 26 chromic acid samples collected by ARB exceeded the 45 dynes/centimeter standard. South Coast AQMD collects samples and uses an independent laboratory to analyze them. Other districts should also take random samples of chromic acid solution to verify compliance with the surface tension standard.

Section (e)(4) of the ATCM also requires owners and operators to monitor the surface tension of the chrome plating or chromic acid anodizing tank that contains a wetting agent with either a stalagmometer or tensiometer. Most chrome plating facilities use stalagmometers to measure surface tension. Stalagmometers cost about \$250. A few facilities use tensiometers that cost several thousand dollars. ARB has been informed that stalagmometers may not be as accurate as tensiometers. Although no test data has been presented to ARB to support this hypothesis, it should be investigated since the 45 dynes/cm standard is very important in the control of chromium emissions.

*Operating Parameters* – Sections (e)(2)(3)(5)(6) of the ATCM require owners and operators to do parameter monitoring. Pressure drop, inlet velocity pressure, foam blanket thickness and the use of mechanical fume suppressants are supposed to be maintained within the range established during the performance test of the air pollution control device. Appendix 1 of the ATCM requires facilities to record these parameters during their performance test and Section (i)(1) requires facilities to report this information to the district. It was noted during the field study that these parameters are not always reported to the District. Districts should enforce this requirement and incorporate these operating parameters into facility permits as permit conditions.

### Calibration Requirements

Section (f)(2) of the ATCM requires facilities to install and maintain ampere-hour meters according to the manufacturer's specifications. There were only a few instances noted during the study where inspectors enforced this requirement. Stalagmometers and tensiometers are required to be calibrated and maintained according to the manufacturer's specifications, but this requirement was not widely enforced.

### Permit Quality

*Best Permits* – The Sacramento Metropolitan AQMD incorporates all of the requirements of the ATCM as permit conditions. Permit conditions are organized according to the sections of the ATCM, i.e., emission limits, source testing requirements, parameter monitoring, inspection and maintenance, operation and maintenance plan, recordkeeping and reporting. These permits are easy to read and enforce.

*Outdated Permit Conditions* – In the South Coast AQMD, some permit conditions specify the surface tension of a chromic acid bath be maintained at 63 dynes/cm or less. In San Diego County APCD, some permits require the use of Dis-Mist NP, a chemical fume suppressant to control surface tension. According to the manufacturer (McGean-Rohco), Dis-Mist NP forms a foam blanket on the tank surface and does not contain a

wetting agent, although six of the nine chrome platers using Dis-Mist NP complied with the surface tension standard. In the San Joaquin Valley Unified APCD, some decorative chrome plating permit conditions require an anti-mist additive providing at least 95% control of chromium emissions. The permit conditions noted above are not current with the ATCM.

*Outdated Permit Descriptions* – Some permit descriptions may not match the equipment at the facility. This may be due to a backlog in the processing of applications for Authorities to Construct and Permits to Operate. This situation was especially true in the SCAQMD where some applications can take up to three years to process. The SCAQMD has made an effort through the use of agency staff and contract permit processors to eliminate the aged permit application inventory and maintain future permit issuance within acceptable time frames.

## **Recommendations**

### Improving Compliance with the ATCM

- 1) The California Air Pollution Control Officers Association should form a committee to address the report's findings and recommendations.
- 2) Increase inspection frequency to at least once every 12 months.
- 3) Districts should work together on developing enforcement guidelines to achieve more uniform and credible penalty assessments at chrome plating facilities. ARB staff is willing to assist districts in developing uniform enforcement guidelines for this source category.
- 4) Provide standardized recordkeeping forms and instructions to facilities on how to complete the forms.
- 5) Inspectors in the San Joaquin Valley APCD should meet periodically to discuss their inspections and enforcement actions.
- 6) Districts need to identify emissions and non-emissions related recordkeeping violations and issue NOVs for emissions-related recordkeeping violations.
- 7) Randomly sample and analyze chromic acid solutions to verify compliance with the surface tension standard.
- 8) Require facilities to record and report the performance test values (operating parameters) of their add-on control devices to the district and districts should incorporate these values as permit conditions into facility permits to operate.
- 9) Enforce the calibration requirements for ampere-hour meters and tensiometers.
- 10) Permit conditions should be current with the ATCM and enforceable. Permit descriptions should be current with the equipment at each facility.
- 11) Provide compliance assistance to owners and operators who continue to violate the ATCM.
- 12) Investigate the issue of variation in results between stalagmometers and tensiometers.

### Improving the ATCM

- 1) Section (f) of the ATCM has inspection and maintenance requirements for sources using chemical or mechanical fume suppressants. Stalagmometers are required to be calibrated and maintained according to the manufacturer's specifications. Compliance with this section of the ATCM could not be verified since the instrument cannot be calibrated. In order to check the accuracy of the instrument, facility owners or operators could check the surface tension of distilled water to see if it approximates 72 dynes/centimeter.

### **Program Improvements since the Study**

The Districts participating in the chrome plating rule effectiveness study have implemented a number of improvements to their programs since the study began. These improvements are noteworthy and are listed below:

#### South Coast AQMD

- 1) Inspection frequency has been increased to no less than annually and attention is being paid to these sources to bring compliance up to acceptable levels.
- 2) The District purchased a tensiometer and now has in-house capability to verify compliance with surface tension requirements.
- 3) The District engaged a contractor to update permit conditions. The work is almost complete.
- 4) The District has significantly eliminated the aged permit application inventory.
- 5) The District is ensuring that permit issuance for current permit applications are maintained within acceptable time frames.

#### San Diego County APCD

- 1) The District has a 12-month inspection cycle.
- 2) The District developed standardized recordkeeping forms and instructions for these facilities. In addition, the District's Small Business Assistance specialist has offered and provided individual assistance to each source.
- 3) The District has a specialized team responsible for inspecting chrome plating operations and has provided training to these inspectors to ensure the ATCM is consistently enforced.
- 4) The District purchased a stalagmometer and is verifying compliance with the surface tension requirement.
- 5) Permit conditions require operating parameters and compliance is verified during the annual inspection.

#### San Joaquin Valley Unified APCD

- 1) The District increased the inspection frequency of chrome platers to twice per year in order to improve compliance rates.