September 26, 2006

Via Electronic Mail

Chairman Sawyer and Board Members
California Air Resources Board
1001 I Street
P.O. Box 2815
Sacramento, CA 95812

Re: Comments to Proposed ATCM for Chrome Plating and Chromic Acid Anodizing Operations

Dear Chairman Sawyer and Board Members:

We are writing this letter on behalf of the Metal Finishing Association of Southern California, Inc. ("MFASC") and the Surface Technology Association ("STA") regarding the California Air Resources Board ("CARB") Staff's Initial Statement of Reasons document ("Staff Report") on the Proposed Amended Air Toxic Control Measure ("PAATCM") for chrome plating and chromic acid anodizing operations, which addresses hexavalent chromium ("Cr6") emissions from these businesses.

In order to prepare these comments, we have enlisted the assistance of two highly respected professionals with years of experience in the metal finishing industry, Mr. Dean High and Mr. Stuart Sessions. Mr. High helped prepare the technical information provided herein. Mr. Sessions prepared the economic analysis. Their background and experience is provided as Attachment 1. Their input is included in our comments outlined below.

I. INTRODUCTION AND SUMMARY

In this letter and at the September 28, 2006 hearing we will present the industry's background and pro-active efforts as they relate to air toxics regulations. We will summarize the current status of statewide Cr6 emissions as well as the levels of control and cancer burden associated with our industry. Next we will identify our objections to certain significant items in the Staff Report. We will evaluate and compare the requirements of the PAATCM and the South Coast Air Quality Management District ("SCAQMD") Rule 1469 ("R1469"), which is presently the most stringent standard in the nation for chrome plating and chromic anodizing operations and which we believe would be a more effective control method if adopted statewide. Further, we will provide comments on the Staff Report's economic analyses, which we have used as a starting point to determine that the cost of this proposal will have a significant adverse economic impact on businesses in California and that the economic cost per cancer case avoided is well beyond anything ever adopted by the Board. To conclude, we will recommend minor but important changes to the PAATCM that will provide effective and adequate health protection to the public, but do so at a greatly reduced cost to society and the economy.

We oppose the PAATCM for many technical and economic reasons, but could accept it in principle if three changes were made that we believe will not affect the health protections of the PAATCM. First, all facilities between 200,000 & 5,000,000 ampere-hours per year ("AH/Y") should not be mandated to install add-on control equipment, but should be permitted the flexibility to comply with a 0.0015 milligrams per ampere-hour ("mg/AH"). Second, the PAATCM should not de-list or otherwise disapprove foam blankets as certified fume suppressants without further testing and research. Third, most facilities under 200,000 ampere-hours per year ("AH/Y") should be allowed to meet 0.01 mg/AH, not 0.0015 mg/AH since the actual risk is the same as the proposed standard.

We also believe that R1469, if adopted statewide, would provide a more effective control method than the PAATCM. That conclusion is based not only on the amount of Cr6 reduced, but also on the risk prevention provisions of R1469 that are lacking in the PAATCM and the overall lesser economic impact to the industry and other businesses statewide. Application of R1469 statewide is a more effective control method; however, we also believe that if the PAATCM were modified for the three suggested issues we identified, the PAATCM would provide similar control of Cr6 emissions as the PAATCM, but at a greatly reduced cost, about $600,000 versus $14,200,000 (as estimated in the Staff Report).

Our economic analysis of the PAATCM suggests that the return on owner's equity ("ROE") under the PAATCM would result in a 44-60% decline in profits, not 9% as the Staff Report suggests. We believe the PAATCM will accelerate the contraction of this industry in California by forcing closure of 68 facilities, result in a ripple effect costing more than 3,000 jobs and affect these businesses competitive position outside of this state . The reduction in cancer burden caused by the PAATCM we estimate will cost more that $150 million per cancer case avoided, an amount higher than anything ever adopted by CARB.

Industry has already provided written and verbal comments, letters and supporting information to CARB Staff at the various workshops and telephone conferences well before and during this comment period, and this letter and our presentations at the September 28, 2006 hearing will provide additional support. Our twenty year involvement to improve the environment by working with regulatory agencies is a model for all businesses. We believe the alternatives we offer, like R1469 and our PAATCM modifications, are more effective control methods especially when cost is taken into account.

We ask that in the absence of adopting our proposal, a 60-90 day delay in this rulemaking be granted to provide additional time for Staff and stakeholders to clarify a number of technical issues that are not resolved at this time.

II. BACKGROUND OF INDUSTRY

Our industry is a vital and integral part of necessary and high paying manufacturing businesses in the State of California. *See* Attachment 2. The metal finishing industry has been pro-active in meeting regulatory requirements for the past twenty years. We cooperated with CARB & SCAQMD in 1987 to develop test procedures for Cr6. Jointly with CARB in 1988, we

conducted a demonstration project to evaluate the control efficiency of alternative control equipment on Cr6 emissions. We worked with CARB in the 1990's to obtain equivalency between the chrome ATCM and U.S.E.P.A. chrome NESHAP. We assisted SCAQMD to develop control efficiencies of fume suppressants for Rule 1169, which implemented the ATCM, and later assisted to certify fume suppressants for amended R1469. We jointly developed with SCAQMD toxic emission rate data for nickel plating processes, hydrochloric acid etch and sodium hydroxide cleaning processes.

Most recently, we were very involved with the Negotiated Rulemaking for R1469 and Rule 1426 with SCAQMD and multiple stakeholders. SCAQMD R1469 was amended through a very lengthy and involved Negotiated Rulemaking Pilot Program in 2003 (as part of a Strategic Alliance Initiative) and implemented in 2004 and 2005. It is the most stringent rule on our industry in the entire United States and perhaps the world. As a result of these efforts, the MFASC was presented a 2003 Clean Air Award by SCAQMD (Attachment 3). Stakeholders represented industry, environmental advocates, technical specialists, Air Pollution Control Districts, CARB and U.S.E.P.A. Except for CARB, all parties, including the environmental advocates, signed an agreement, wherein all interested parties accepted the final rule as the best that could be negotiated. (Attachment 4) As SCAQMD noted, "The intent of negotiated rulemaking is to promote consensus-based rules that require fewer resources to enforce, promote high rates of compliance, and result in fewer litigation actions. When successful, negotiated rulemaking can provide the public with air quality benefits and improve draft regulations." *See* http://www.aqmd.gov/hb/2003/030112a.html.

It is therefore very disconcerting to have a PAATCM that ignores these efforts and the benefits they provide and now proposes even further drastic "add-on" control measures for at least 89 facilities, of which, a significant number are located within SCAQMD. Some facilities just completed their construction and implementation last year to comply with R1469 and in several cases, are still paying for the added or upgraded control measures. Furthermore, of the 89 facilities, 45 are small operators (less than 200,000 AH/Y), and their continued survival is severely threatened by the economic burden imposed by the PAATCM.

III. CURRENT SITUATION

A. Current Emissions of Cr6

The Staff Report estimates for 2005 four pounds per year ("lb/Y") of Cr6 emissions from our industry statewide, with other industry sources contributing 996 lb/Y, 260 lb/Y from gasoline vehicles, and 1,660 lb/Y from other mobile sources, for a total statewide of 2,920 lb/Y. Staff

Report, Page 15.[1] Our industry now contributes only 0.14 of 1% of the state's Cr6 emissions due primarily to the existing stringent regulations on chrome plating and chromic acid anodizing operations. We question the priority of further regulation on our industry for very diminishing returns before addressing Cr6 reduction measures for other sources.

B. Current Levels of Control

Since 1988, Cr6 emissions from our industry have been reduced between 99% and 99.999%. Within SCAQMD, the minimum reductions for open tanks has been 99.8%, while tanks with ventilation systems has been 99.97% or even greater for shops using in-tank control measures plus add-on controls. Outside SCAQMD, the reductions have been between 99.1% for open tanks and 99.86% or better for ventilated tanks. The Staff Report understates and/or misrepresents the level of control and the amount of reductions that have already occurred in our industry.[2]

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[1] Note that we use the Staff Report figures; however, the Staff Report's cited source shows different numbers and a different exposure picture. "The California Almanac of Emissions and Air Quality", 2006 Edition, provides the following information:

Stationary Sources	1,040 lbs/Y*
Areawide Sources	60 lbs/Y
Gasoline Vehicles	260 lbs/Y
Other Mobile Sources	1,660 lbs/Y
Total	3,020 lbs/Y

*Includes 4 lbs./Y from chrome plating and chromic acid anodizing operations. Our estimate of emissions is lowered to 0.13% of total statewide emissions. The Almanac also reports that four counties account for 46% of the hexavalent chromium emissions; Kern (19%), San Diego (16%), Mojave Desert portion of San Bernardino County (6%) and Tuolomne (6%) and that approximately 25% of the statewide emissions occur in the Mojave Desert Air Basin. Notably, none of these counties has significant operations at issue in the PAATCM.

[2] Our calculations are based on figures recognized as being the levels of Cr6 emissions before control from industry operations as well as the current control values. The figure 4.4 pounds represents the uncontrolled value.

1. Within SCAQMD
   a. open tanks 4.4 lb. - 0.01/4.4 lb. = 99.8%
   b. controlled tanks 4.4 lb. – 0.0015/4.4 lb. = 99.97%
2. Other districts
   a. open tanks 4.4 lb.– 0.04/4.4 lb. = 99.1%
   b. controlled tanks 4.4 lb.– 0.006/4.4 lb. = 99.86%

C. Current Cancer Burden

We requested at workshops and in writing that Staff calculate the cancer burden both before and after implementation of the PAATCM and the alternative R1469 statewide.[3] The reason for this request was to ascertain both the alleged health benefits received by the PAATCM as well as serving as a basis to calculate the economic costs incurred and received for those alleged health benefits. The performance of a cancer burden calculation is consistent with previous CARB control measures, yet was not performed in this instance. *See e.g.,* CARB Staff Report for Air Toxic Control Measure of Emissions of Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities ("Chlorinated ATCM Report"), Chapter IX, Section D (Analysis of Cost-Effectiveness of the Proposed ATCM), Pages IX-9 to IX-25, March 10, 2000; http://www.arb.ca.gov/regact/amr/isor-vol2pdf. We note that a section like the one cited should be included in the Staff Report as part of the economic analysis required under Government Code Section 11346.3.

Despite our requests, to date we have seen no such calculations, so we elected to prepare our best estimate. The calculations to determine our industry's share of total cancer cases in the state used SCAQMD's "Risk Assessment Procedure For Rules 1401 and 1402," version 6.0, dated August 18, 2000.[4] Our calculations are derived by applying values found within the Staff Report, which we believe provide very conservative assumptions that are likely to overestimate the cancer risk. Our calculation results show that current Cr6 emissions within the SCAQMD from chromium plating and chromium anodizing facilities account for much less than one excess cancer death assuming a seventy year exposure. For the remainder of the state where R1469 has no impact, that existing cancer value is about 3.6 over a 70 year period. The results of the calculations and supporting assumptions are provided in the following pages (Table 1).

Table 1 demonstrates that the major potential health benefit from further Cr6 emission reductions within our industry lies in further regulatory control of facilities outside of the SCAQMD. R1469 has already provided adequate health protection around chrome plating and chromic acid anodizing facilities within SCAQMD. Implementation of either R1469 statewide or the PAATCM with our requested modifications, especially when coupled with existing laws that address risk directly at the highest risk sources (like "Air Topics Hot Spots"), provide an ample and conservative regulatory mechanism that is health protective.

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[3] See July 26, 2006 letter to Carla Takemoto, CARB, from Dan Cunningham, Executive Director for MFASC and STA.

[4] The most recently released Version 7 is fundamentally the same.

Table 1
Existing Cancer Burden In California From Chrome Plating And Chromic Acid Anodizing Operations In 2005 Before PAATCM Adoption[5]

Size Category		Within SCAQMD		Outside SCAQMD	
Range/ Midpoint AH/Y	Number of Facil.	No. of Facilities / Emission Rate / MICR	Cancer Burden All Facil.	No. of Facilities / Emission Rate / MICR	Cancer Burden All Facil.
0 - 20,000 / 10,000	48	36*@<0.01 mg/AH MICR=<1 x 10^{-6}	0	2*@<0.01 mg/AH MICR=<1x10^{-6} 10@0.04 mg/AH MICR=2.1x10^{-6}	0 0.0005
20,000 - 200,000 / 110,000	60	15*@<0.0015 mg/AH MICR=<1 x 10^{-6} 30@<0.01 mg/AH MICR=5.7 x 10^{-6}	0 0.011	15@<0.04 mg/AH MICR=22.55x10^{-6}	0.128
200,000 - 1,000,000 / 600,000	45	27*@<0.0015 mg/AH MICR=<1 x 10^{-6} 7@<0.0015 mg/AH MICR=5.7 x 10^{-6}	0 0.0026	11@<0.006 mg/AH MICR=22.74x10^{-6}	0.087
1,000,000 - 5,000,000 / 3,000,000	34	21*@<0.0015 mg/AH MICR=0.5 x 10^{-6} 5@<0.0015 mg/AH MICR=28.5 x 10^{-6}	0.006 0.058	4@<0.006 mg/AH MICR=113.7x10^{-6} 4@<0.0015 mg/AH MICR=28.5x10^{-6}	1.254 0.047
5,000,000 - 15,000,000 / 10,000,000	15	9*@<0.0015 mg/AH MICR=5 x 10^{-6} 2@<0.0015 mg/AH MICR=35.4 x 10^{-6}	0.007 0.077	2@<0.006 mg/AH MICR=141.8x10^{-6} 2@<0.0015 mg/AH MICR=35.4x10^{-6}	1.613 0.077
> 15,000,000 / 30,000,000	18	11*@<0.0015 mg/AH MICR=10 x 10^{-6} 3@<0.00075mg/AH MICR=53-2 x 10^{-6}	0.042 0.300	4@<0.00075 mg/AH MICR=53.2x10^{-6}	0.400
Total	**220**	**166**	**0.50**	**54**	**3.61**

[5] Asterisk denotes substantial compliance with PAATCM.

Assumptions for Table 1 - Cancer Burden Calculations:

1. Information was taken from the Staff Report.

2. Calculations were done using SCAQMD's "Risk Assessment Procedures For Rules 1401 and 1402," version 6.0, dated August 18, 2000, using the mid-point of each facility size category.

3. Facilities were assumed to be evenly distributed by size category between SCAQMD and the other districts; 75% are within SCAQMD and 25% outside SCAQMD.

Size AH/Y	Number of Facilities in California	Number of Facilities Within SCAQMD	Number of Facilities Outside of SCAQMD
< 20,000	48	36	12
20,000 - 200,000	60	45	15
200,000 - 1,000,000	45	34	11
1,000,000 - 5,000,000	34	26	8
5,000,000 - 15,000,000	15	11	4
> 15,000,000	18	14	4
Total	**220**	**166**	**54**

4. Facilities with operations ≤ 200,000 AH/Y were assumed to use in-tank controls only achieving 0.04 mg/AH outside SCAQMD and 0.01 mg/AH within SCAQMD.

5. Facilities with operations > 200,000 AH/Y were assumed to use add-on controls to achieve 0.006 mg/AH or less outside SCAQMD and 0.0015 mg/AH or less within SCAQMD.

6. Requirements for add-on controls for 40% of the facilities >200,000 AH/Y were assumed to be evenly distributed between the four size categories:

Size AH/Y	Number of Facilities in California	Essentially Comply With PAATCM	Required Add-on Controls
200,000 - 1,000,000	45	27	18
1,000,000 - 5,000,000	34	21	13
5,000,000 - 15,000,000	15	9	6
> 15,000,000	18	11	7
Total	**112**	**68**	**44**

Note: Under the PAATCM, in the 20,000 – 200,000 AH/Y category, 15 meet the proposed standard and 45 will require reduction to 0.0015 mg/AH.

IV. OBJECTIONS TO SIGNIFICANT TECHNICAL POINTS IN THE STAFF REPORT

A. Dispersion Modeling Assumptions

The CARB Staff conducted dispersion modeling to calculate the maximum ground level concentrations of Cr6 for input into health risk analyses for persons very close to the chrome plating and chromic acid anodizing operations. These calculations required many assumptions and selections for data input. The Staff Report characterized its analyses as conservative and very health protective, but it goes beyond good science. Here are but three problems:

1. The Staff Report estimated risk using 1981 Pasadena meteorological data for facilities located throughout the state. The Office of Environmental Human Health Assessment ("OEHHA") adopted "Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxic Hot Spots Program Guidance Manual for Preparation of Health Risk Assessment" (August 2003) ("HRA Guidelines") recommending five years of meteorological data be used for an HRA, not one year. *See* HRA Guidelines, Section 4.8, Page 4-20. Dispersion conditions in Pasadena are very poor and do not represent all areas of the Los Angeles Basin and certainly not the rest of the state. There is no metal finishing business in Pasadena. Calculations using the Pasadena meteorology overestimate ground level concentrations, and thereby health risks, by two to three times for facilities in San Diego, Fresno, and Oakland. Five years of meteorological data were available for San Diego, Fresno, and Oakland and many other sites throughout the state where the facilities are located. *See* Staff Report, Appendix H, Table 4. While the data are shown to be calculated (Appendix H, Tables 6 through 9), only the information from the Pasadena data were used to determine risk.[6] Use of meteorological data from areas outside of the SCAQMD is important since it would mirror conditions that could be fairly compared with a proposed application of R1469 statewide.

2. For calculations of ground level Cr6 concentrations from facilities with stacks, the Staff Report assumed that the stacks were one (1) foot higher than the building housing the chrome plating or chromic acid anodizing operation. *See* Staff Report, Appendix H, Table 2, Note 1. Stacks are always set on top of the control device or the motor and blower housing. Typically the stack is 5 to 15 feet, or even higher, above the top of the building to allow maximum dispersion of emissions and to avoid downwash under medium to strong wind conditions. The assumed one foot stack height above the building height leads to a calculated downwash with much higher ground level concentrations very close to the building at distances of 25 to 100 meters. Our opinion is that the calculated maximum ground level concentrations in the Staff Report will be two times the correct value if the actual stack heights had been used.

3. The Staff Report states: "since not all of the data were used, downwind

[6] One can observe, for example, that the maximum annual average at 1000 meters in the Pasadena table is twice the amount of the other three tables and locations.

concentrations for group A & B will be biased toward overestimation of the mean." Staff Report, Appendix H, Page 4 [Note: group A is <5 million AH/Y and group B is 5-50 million AH/Y]. Group A facilities are automatically assumed to have a low plume rise potential. The stated bias therefore applies to more than 95% of all facilities in the state. Figure 1 in Appendix H of the Staff Report visually portrays the result of the bias.[7]

The Staff Report states correctly that "downwind concentration is a function of the quantity of emissions, release parameters at the source and appropriate meteorological conditions" Staff Report, Page 69. We agree and urge that "best available scientific evidence be employed", not unfounded assumptions, to reach a fair and scientific result. *See* Health & Safety Code Section 39650(d). The three examples stated above create a result whereby the risk is overstated. We must therefore conclude that the health risk estimates throughout the Staff Report are not conservative and health protective, but are exaggerated and misleading and do not render a reasonable understanding of downwind concentrations and associated health risks.

Our industry previously requested to CARB that actual monitoring, not modeling, be performed to make correct determinations on the potential risk. We make that request again.

B. Dispersion Modeling Receptors

The modeling evaluation also fails to comply with Health & Safety Code Section 39665(b)(4) since the anticipated effect of airborne toxic control measures on levels of exposure has not been determined. The OEHHA HRA Guidelines set forth the method by which actual levels of exposure are to be determined. The estimated point of maximum impact ("PMI")(described in the Staff Report at Page 74 (and hereafter in this letter as the Maximum Individual Cancer Risk or "MICR"), identifies a location using the model's input parameters. The standard as set forth in the HRA Guideline is described in Chapter 4, Air Dispersion Modeling, as part of receptor siting (section 4.7.1, Page 4-19):

> "The modeling analysis should contain a network of receptor points with sufficient detail(in number and density) to permit the estimation of the maximum concentrations. Locations that must be identified include [the PMI], the maximum exposed individual at an existing residential receptor (MEIR), and the maximum exposed individual at an existing occupational worker receptor (MEIW)." (emphasis added).

[7] It seems ironic that the PAATCM creates categories (small (<20,000 AH/Y), medium (20,000 to 200,000 AH/Y) and large (>200,000 AH/Y)) that bear no relationship to the categories described in the Staff Report to model these same facilities.

No analysis of the MEIR or the MEIW was performed. This is significant; analysis under the Air Toxics "Hot Spots" program establishes a mechanism to reduce excess risk that is based on risk to the MEIR and the MEIW, not only to a hypothetical location. *See* Health & Safety Code Section 44391. The Staff Report ignores the legal obligation required of this statute and applies the PMI as the most conservative method to achieve a risk value. Unfortunately, when coupled with the exaggerated and misleading model inputs described earlier in this letter, the unintended result is staggering.[8]

Here is an example: A facility in the desert three miles from the nearest residence and five miles from the nearest "sensitive receptor" has a PMI value by CARB's modeling that exceeds 100 in one million. The MEIR and the MEIW for that source are significantly less than one in one million. Under the PAATCM, the facility must arbitrarily incur the costs of control technology installation, even though no one is being harmed.

C. Requirements For Add-On Equipment (HEPA)

The Staff Report proposes that all facilities exceeding 200,000 AH/Y (only about 833 AH per work day) would be required to install add-on control equipment (i.e., HEPA filter systems) to achieve an emission rate of 0.0015 mg/AH.[9] We have been told that HEPA filter systems are best available control technology ("BACT") for toxics. We described to Staff at earlier workshops and provided to them in writing during the comment period a source test report demonstrating compliance with the 0.0015 mg/AH using only in-tank control measures – fume suppressants, foam blanket, and polyballs. The test was conducted at California Electroplating in Los Angeles and showed an average of three tests at 0.00013 mg/AH, far below the requirement (and the Staff Report requirement of 0.0015 mg/AH). The facility has two chrome tanks with a production between 1-5 million AH/Y. A summary of those results are provided as Attachment 5.[10]

We note the U.S.E.P.A. Chrome NESHAP (Title 40, Code of Federal Regulations ("C.F.R.") Sections 63.342 et. seq.) was modified in 2004 to allow hard chrome plating tanks to comply using in-tank control measures and that Rule 1469 specifies emission limits without

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[8] We note that the Chlorinated ATCM Report mentioned earlier in this letter also reviewed MEIR and MEIW.

[9] The Staff Report suggests that in addition to HEPA filters, "[a]ny other combination of control devices that can meet [an emission rate of 0.0015 mg/AH] would be considered equivalent to BACT." Staff Report, Page ES-10. The Staff Report fails to suggest that *any* technology that can meet this standard would be the equivalent of BACT.

[10] We also provide a brief summary from Dr. Alan R. Jones, from Atotech, a leading supplier of chemical fume suppressants. Dr. Jones identifies that several tests have demonstrated effectiveness at numbers significantly lower than 0.01 mg/AH. See Attachment 6.

mandating add-on controls for small hard chrome facilities and for all decorative chrome plating and chromic acid anodizing tanks. The PAATCM proposes that facilities under 200,000 AH/Y can meet this standard without add-on control equipment. We believe this demand for add-on pollution controls for certain facilities that can meet the standard with other technological controls equivalent to add-on controls is unreasonable.

The requirement for add-on controls for any facility exceeding 200,000 AH/Y in proposed section 93102.4(b)(2)(B) is arbitrary and fails to comply with Health & Safety Code Section 39650(d) since it fails to consider the best available scientific evidence in the regulation of Cr6 in the PAATCM. A different control technology that is not an "add-on control, but meets its level of controls, would conform with current laws. Current regulations requiring add-on controls apply only to hard chrome facilities exceeding 500,000 AH/Y. An "anti-backsliding" provision already exists in the PAATCM at Section 93102.5 and prevents existing sources already using add-on controls from applying any other method prospectively. No rationale explains why a facility using 200,000 AH/Y that meets a standard of control of 99.97% (0.0015 mg/AH) through means other than add-on controls is deemed to be applying best available control technology while a facility using 200,001 AH/Y and required to meet the same standard of control of 99.97% (0.0015 mg/AH) cannot apply the equivalent technology. See Staff Report, Page 78 ("Use of BACT...would reduce hexavalent chromium emissions to no more than 0.0015 milligrams/ampere-hour.").

The Staff Report is incorrect when it states that BACT means "best available *add-on air pollution* control technology (BACT)" (Staff Report, page 2) since the term "BACT" does not consider whether a technology is add-on equipment or some other form of control, but is only a mechanism to reach an emissions limitation achieved in practice. *See* New Source Review Workshop Manual, Page B.1; Title 40, C.F.R. Section 51.165(a)(1)(xiii). Likewise, as we demonstrated with our test data and report, a less costly alternative such as in-tank controls "would be equally as effective in achieving increments of environmental protection in a manner that ensures full compliance with statutory mandates within the same amount of time as the proposed regulatory requirements." Health & Safety Code Section 57005(a).[11]

The technology of in-tank controls cost only a fraction of add-on controls and can achieve the same result in many cases. We therefore recommend that the emission rate be

[11] The use of the term "air pollution control technique" is misleading within the PAATCM (at proposed section 93102.3(a)(2)) when describing mechanical and fume suppressants since both are forms of control technologies. By definition, a "technique" describes a procedure. On the other hand, "technology" describes the application of science to an industrial or commercial objective. *See* The American Heritage Dictionary, Second College Edition, 1985. We therefore recommend that the PAATCM definitional term "air pollution control technique" be revised to read "air pollution control technology."

specified at 0.0015 mg/AH without the mandate that add-on control equipment be required.

D. Arbitrary De-listing of Foam Blankets

The Staff Report (Page 45) proposes to disallow foam blankets as a possible in-tank control measure and does not consider them for certification for use in emission control. The reasoning is based on the time needed to form the foam blanket, the fear of explosion and need for increased cooling. Staff Report, Page 55.

The SCAQMD, as part of Rule 1469, set up a certification procedure to approve fume suppressants. SCAQMD approved among others, Dis-Mist NP, which is a foaming agent that demonstrated compliance with 0.01 mg/AH (*See* Attachment 7, listing approved fume suppressants). Several businesses in the MFASC/STA use Dis-Mist NP or other foaming agents with fume suppressants that lower the surface tension. The foam blanket works well with polyballs, which help hold the foam in place on the plating solution surface.

The suggested reasoning in the Staff Report is without merit. First, the ongoing compliance and recordkeeping requirements in the PAATCM as well as permit conditions that may be imposed upon a facility, create a mechanism to penalize and deter any facility that could create such a condition.[12] As SCAQMD provides with its certification, a minimum thickness and coverage are necessary for the product to be deemed protective. Second, the fear of explosion is overstated and was an issue primarily when foam blankets first became available more than 15 years ago and has been adequately addressed by manufacturers. Finally, the need for increased cooling has little impact on the emission control qualities of the foam blanket and temperature regulation may be adequately controlled by the user since most tanks have both heating and cooling systems.

Most importantly, the PAATCM should not arbitrarily de-list Dis-Mist NP or any other foaming agent without conducting source tests or implementing a separate certification program. We ask that such testing be performed before a decision on this issue is made.

E. Requirement For Facilities < 200,000 AH/Y To Meet 0.0015 mg/AH

This requirement is a major and serious problem for the industry. Presently, only 15 facilities meet the PAATCM.[13] Based on the Staff Report, 45 of the remaining 60 facilities in

[12] *See* PAATCM proposed section 93102.9(e), which requires hourly monitoring of the foam blanket thickness for the initial 15 days of use and daily thereafter. The MFASC and STA support further reasonable enhanced recordkeeping and monitoring to demonstrate compliance. *See, supra,* Attachment 11.

[13] *See* Table 1, *infra.*

this category would need to meet 0.0015 mg/AH, which as we understand, currently means a HEPA filter add-on control device. Using the Staff Report estimates, the capital cost alone for this group of 45 facilities is $4,000,000 or $88,888 ($4,000,000/45) per facility. Of the 89 facilities requiring control, 28 are small businesses with less than $1,000,000/year gross revenue. Staff Report, Page 106. Furthermore, we suspect that most of these 28 facilities are the ones with less than 200,000 AH/Y production. The Staff Report (at page 106) states: "This [proposal] could result in a potential significant adverse cost impact. These businesses' profit could decline by 33% in order to comply with the PAATCM."[14]

Secondly, this requirement demonstrates a "one size fits all" mentality. Only 19%, or nine facilities, are within 25 meters of a residence or sensitive receptor. Therefore, 36 facilities are more than 25 meters from a residence or sensitive receptor and 17 of the 36 facilities are more than 100 meters away. Even by the Staff Report's conclusions, the distance to the receptor is important since the amount of Cr6 reduces to near zero only a short distance away from the source. Staff Report, Page 72.

As the Staff Report provides, the risk for facilities at less than 20,000 AH/Y has been determined as one in one million or less. Staff Report, Page 80. This same level of risk is more than likely demonstrable for larger facilities, particularly as the distance to a sensitive receptor increases. Our calculations suggest that the one in one million threshold is reached at 25 meters, a distance exceeded by 36 of 45 facilities in this category.

If our suggestion is adopted, all of the 36 facilities of this category could comply with 0.01 within 6 months, which is consistent with the <20,000 AH/Y category. The 9 closer facilities would comply with the more stringent standard in two years. This change to the PAATCM would still provide adequate health protection to the public, but would be a much less costly alternative.

We request that only those nine facilities less than 25 meters from a residence or sensitive receptor be required to meet a standard of 0.0015 mg/AH. The remaining 36 facilities should be able to meet 0.01 mg/AH if their MICR is equal or less than one per one million, the same threshold as the <20,000 AH/Y category and the same as that size facility in SCAQMD.

[14] As we report herein, this estimate is too low. The *average* loss in profitability over the entire industry is 44-60%. See Section VI, *supra*.

V. COMPARISON OF REQUIREMENTS AND IMPACTS OF THE PAATCM AND R1469 ALTERNATIVE AND MFASC/STA ALTERNATIVE

A. Comparison of Emission Reductions Expected

The Staff Report proposes to reduce Cr6 emissions from our industry by 2.19 lb/Y, which we calculate to be 0.5 lb/Y within SCAQMD and 1.69 lb/Y outside SCAQMD. (*See* Table 2, *supra.*) The CARB Staff estimates that the alternative proposal, R1469 statewide, would reduce Cr6 emissions outside SCAQMD by 1.39 lb/Y or 63.5%. *See* Attachment 8, Facsimile, September 11, 2006, from Shobna Sahni, CARB, to Harry Levy.[15] However, we question these 1.39 lb/Y or 63.5% values. If R1469 is equally effective outside SCAQMD as inside SCAQMD and there is a fairly uniform distribution of shops by size category around the state, then we would expect the reductions to be 85.1% as was found between 2003 and 2005 by R1469 within SCAQMD, (12.15 lb/Y - 1.81 lb/Y)/12.15 lb/Y = 85.1%. If so, the reduction outside SCAQMD by the alternative approach would be 1.86 lb/Y compared to 1.39 lb/Y by the PAATCM.

We estimate that remaining Cr6 emissions would be 0.33 lb/Y outside SCAQMD and 1.81 lb/Y within SCAQMD for a total of 2.14 lb/Y statewide if Rule 1469 were adopted statewide versus 1.81 lb/Y under the staff proposal. Therefore, the two alternatives are very much equal in their effectiveness (0.33 lb/Y difference) and the R1469 approach is a far less costly alternative.

Table 2
Cr6 Emissions from Chrome Plating and Chromic Acid Anodizing (lb/Y)

Area of State	Year 2003	Year 2005	Year > 2007 PAATCM Staff Estimate	Year > 2007 R1469 Statewide Staff Estimate	Year > 2007 R1469 Statewide MFASC/STA Estimate
Emissions SCAQMD	12.15	1.81	1.31	1.81	1.81
Emissions Other Areas	2.19	2.19	0.50	0.80	0.33
Emissions Statewide	14.384	4.00	1.81	2.42 (2.61)*	2.14
Emissions Reductions	-	10.34	2.19	1.56 (1.39)*	1.86

* Values corrected from original table provided by CARB.

[15] The calculations provided do not add properly and their corrections are described herein.

B. Comparison of Emission Limits, MICRs and Cancer Burden

Table 3 compares the PAATCM requirements versus the R1469 statewide alternative by facility size category. It is meant to demonstrate there are no differences in the requirements of the two approaches for 161 facilities in the state.

The difference in the two measures falls on 45 facilities in the 20,000-200,000 AH/Y category, 11 facilities in the 200,000-1,000,000 AH/Y category; and 3 facilities in the 1,000,000-5,000,000 AH/Y category for a total of 59 facilities. Each of the 59 facilities would be required to meet 0.0015 mg/AH under the PAATCM but 0.01 mg/AH under the R1469 statewide alternative. The difference in the remaining emissions between the two approaches is 0.38 lb/Y which compares favorably with the MFASC/STA estimate above of 0.33 lb/y. The 0.38 lb/Y is made up of the incremental emissions between 0.01 and 0.0015 or 0.0085 mg/AH:

45 facilities @ 0.0085 x 110,000 AH/Y x 1/454,000 = 0.092 lb/Y
11 facilities @ 0.0085 x 600,000 AH/Y x 1/454,000 = 0.123 lb/Y
3 facilities @ 0.0085 x 3,000,000 AH/Y x 1/454,000= 0.169 lb/Y
Total 0.384 lb/Y

Also shown on this Table 3 are the calculated MICRs at 25 meters from the source for each category. These are theoretical values only since: (1) emission rates in many cases will be much lower than the legal requirement; (2) the nearest receptor in many cases will be greater than 25 meters from the source and exposed to lower concentrations of Cr6 due to dilution and dispersion, and (3) the receptor in many cases will be an offsite work location thereby having a much shorter lifetime exposure than calculations for a residence. Other district rules, applying the requirements of the Toxic "Hot Spots" Act (Health & Safety Code Sections 44300 *et. seq.*) will require that all facilities reduce the health risk to less than the action level, which, for example, in SCAQMD is 25 in one million.

The total difference in cancer cases between the two control approaches is only about 0.5 person over a 70-year period (or 0.007 cancer cases per year) when calculated utilizing the theoretical MICR as the exposure of all persons within the zone of impact around the chrome plating or chromic acid anodizing facilities. The real difference in the cancer burden would be expected to be even less for the reasons cited earlier regarding the theoretical MICRs.

Table 3
Comparison of Requirements of the PAATCM and Alternative R1469 Statewide

Category Range/Midpoint	Number of Facilities	Rule 1469	PAATCM
< 20,000 / 10,000	48	36 meet PAATCM 12 @ 0.01 mg/AH MICR=<1:M @25m	36 meet PAATCM 12 @ 0.01 mg/AH MICR=<1:M @25m
20,000 – 200,000 / 110,000	60	15 meet PAATCM 45 @ 0.01 mg/AH MICR=55:M @25m	15 meet PAATCM 45 @ 0.0015 mg/AH MICR=<1:M @25m
		ΔCB=0.02	
200,000 - 1,000,000 / 600,000	45	27 meet PAATCM 7 @ 0.0015 mg/AH MICR=5.7:M @25m 11 @ 0.01 mg/AH MICR=37.9 @25m	27 meet PAATCM 18 @ 0.0015 mg/AH MICR=5.7:M @25m
		ΔCB=0.20	
1,000,000 - 5,000,000 / 3,000,000	34	21 meet PAATCM 10 @ 0.0015 mg/AH MICR=28.5:M @25m 3 @ 0.01 mg/AH MICR=189:M	21 meet PAATCM 13 @ 0.0015 mg/AH MICR=28.5:M @25m
		ΔCB=0.28	
5,000,000 - 15,000,000 / 10,000,000	15	9 meet PAATCM 6 @ 0.0015 mg/AH MICR=35.4 @25m	9 meet PAATCM 6 @ 0.0015 mg/AH MICR=35.4 @25m
		ΔCB=0.0	
>15,000,000 - 30,000,000	18	11 meet PAATCM 7 @ 0.0015 mg/AH MICR=106.4:M @25m	11 meet PAATCM 7 @ 0.0015 mg/AH MICR=106.4:M @25m
		ΔCB=0.0	
Total	**59**	**ΔCB=0.50**	

As Table 3 shows, even when using the Staff Report assumptions, the difference between the PAATCM and applying R1469 statewide amounts to one-half of one cancer case over seventy years.[16]

VI. OBJECTIONS TO ECONOMIC ANALYSIS IN THE STAFF REPORT

A. The Staff Report's Inadequate Analysis Of The Impacts Of The Proposed Regulation Prevents Meaningful Public Comment On The Proposal.

The Staff Report is seriously deficient in several respects concerning its economic information and conclusions, making it impossible for the public or the affected industry to comment effectively on key elements of the proposed rulemaking. A more thorough discussion of our economic findings for this conclusion is provided as Attachment 9, "Proposed ATCM for Chrome Plating and Chromic Acid Anodizing Operations: Comments on CARB Staff's Economic Impact Analysis", Environomics, September 25, 2006. In particular, neither the Staff Report nor any other materials made available by CARB:

- Estimate the number of cancer cases or other adverse health effects expected to be avoided due to the rulemaking. The Staff Report estimates the reduction in individual risks for "most exposed individuals" under a variety of very conservative worst-case modeling assumptions, but there is no estimate of population risks to Cr6 from this industry (either in the baseline or avoided by the regulation), and there is no "best estimate" or "most likely estimate" of either individual or population risks under more representative, realistic modeling assumptions. Absent such information, CARB has not described for the public in a meaningful way what will be gained if the PAATCM is adopted.

- Estimate the monetary value of the health benefits expected from the rule. The lack of any monetized benefits estimate makes it impossible for the public or the Board members to weigh the benefits of the PAATCM against its costs. The Staff Report should be developed to provide a benefit-cost analysis for the PAATCM. Following the methodology developed by the U.S. Occupational Safety and Health Administration (U.S. OSHA) for their recent rulemaking addressing Cr6 in the workplace, we have prepared a rough benefit-cost analysis for the proposed California standard. We find that the costs of the proposed rule greatly exceed its benefits.

- Document the process by which the Staff Report concluded that the ATCM would not result in a significant adverse economic impact. The Staff Report concludes that the

[16] We note that this value is compelling when considered with the economic information discussed herein. The cost of R1469 implementation would be considerably lower than the PAATCM.

proposed amendments "are expected to result in an average ROE decline of nine percent" (Page ES-15), a figure that is just below the threshold figure of a ten percent decline in profitability that would indicate a significant adverse economic impact. Neither the Staff Report nor any other docket materials provide calculations or a description of how this nine percent figure was obtained. It is entirely unclear how the Staff Report reached this conclusion and what degree of error exists in that number. Absent explanatory documentation, it is not possible for the public to comment effectively on the Staff Report's conclusion that there will be no significant adverse economic impact.

B. The Proposed Rule Will Have Severe Adverse Economic Impacts On Affected California Businesses.

The Staff Report's conclusion that profitability of affected businesses will decline by only nine percent (less than the ten percent threshold for "significant adverse impact") is incorrect. The PAATCM will result in far more than a ten percent decline in profitability for affected metal finishing businesses in California. Even using the Staff Report's unrealistically low compliance cost estimate for affected facilities, these facilities' average loss in profitability will range from 44% to 60%, not 9% as the Staff Report estimated. Drawing from the U.S. Environmental Protection Agency's (U.S. EPA's) most recent economic analysis of a regulation affecting the metal finishing industry, we estimate that the high costs to comply with the proposed regulation will force the closure of 30% of the affected metal finishing facilities in California.[17]

The Staff Report prepared its economic analysis by focusing only on the metal finishing industry and failed to consider the ripple effect within the state. The Staff Report states that other customer businesses are "potentially affected," but specifically declines to analyze that impact. Staff Report, Page 105. We therefore prepared an analysis estimating the likely number of jobs that will be lost among the metal finishing businesses as well as their suppliers and customers if the PAATCM is adopted. From our analysis, we determined that the state will suffer a loss of 3,860 manufacturing jobs as a result of the adoption of this PAATCM. See Attachment 9, Page 5.[18]

The Staff Report's economic impact analysis is inadequately documented. Although there is some indication of the data sources and assumptions that are used in the analysis, no explanation is provided that traces the calculations for the affected businesses from estimated

[17] That EPA analysis was conducted in 2002 as part of the Metal Products and Machinery effluent guidelines rulemaking.

[18] Our estimates come from 2002 data. We know that the 570 metal finishing facilities cited as being located in California in 2002 is overstated. Ongoing global competition and the high cost of regulatory compliance have reduced this number to the approximately 225 facilities described in the Staff Report and seriously impacted profitability.

initial, pre-regulation profitability to some lower estimated post-regulation profitability. We are simply told that the reduction in profitability is 9%, without explanation. Although the public is not provided the opportunity to follow the Staff Report's calculations, we can nevertheless infer that there are numerous errors or shortcomings in the analysis. The Staff Report has:

- Significantly underestimated the costs for affected businesses to comply with the proposed regulation;
- Overestimated the fraction of affected businesses that already comply with the proposed emission standards and underestimated the fraction that will need to install or upgrade HEPA filtration or other "add-on" systems;[19]
- Selected inappropriate data with which to represent the baseline revenues and/or profitability of affected businesses;
- Used an incorrect procedure to reflect the "tax shield" associated with air pollution control expenditures;
- Made inappropriate choices in performing annualization or amortization calculations in converting capital costs into a stream of recurring annual costs. Inappropriate choices were made with respect to both discount rate and useful life.
- Badly underestimated the fraction of the affected industry that consists of small businesses and the impact of the regulation on small businesses.

We provided a thorough analysis estimating the severe economic impacts of the proposed regulation on affected businesses in California. Our analysis relies on respected, publicly available data sources (U.S. Census, published data from the U.S. Internal Revenue Service, *Annual Statement Studies* by the Risk Management Association) and methodologies applied in regulatory impact analyses of this industry by the U.S. OSHA and U.S. EPA, and avoids the errors listed above.

We note that the failure to properly identify this measure as having a significant adverse economic impact violates Government Code Sections 11346.3 and 11346.5. Within the former section, the proposing agency is to assess whether and to what extent its proposal will affect:

> (A) The creation or elimination of jobs within the State of California.

[19] We are unable to reach the same conclusion as the Staff Report that compliance with R1469 would only cost $600,000 for equipment. Staff Report, Page 99.

> (B) The creation of new businesses or the elimination of existing businesses within the State of California.
>
> (C) The expansion of businesses currently doing business within the State of California.

Government Code Section 11346.3(b)(1)

The latter section requires notice to the public when a proposal "may have a significant, statewide adverse economic impact directly affecting business, including the ability of California businesses to compete with businesses in other states." Government Code Section 11346.5(a)(7). If an initial determination is made by the agency that the action will not have a significant adverse impact, the agency must "provide in the record facts, evidence, documents, testimony, or other evidence upon which the agency relies to support its initial determination." Government Code Section 11346.5(a)(8)[20]

To date, we fail to see the necessary information within the Staff Report or the record to meet these provisions. Without it, the CARB Board, the public and the metal finishing industry cannot make meaningful determinations on this PAATCM.

C. The Proposed Rule Would Be Among The Least Cost-Effective Environmental, Health Or Safety Regulations Ever Promulgated In The U.S.

We include a separate report to describe the cost of this regulation, both in terms of the cancer risk avoided as well as to compare the PAATCM cost to the benefit allegedly derived. *See* Attachment 10, "Proposed ATCM for Chrome Plating and Chromic Acid Anodizing Operations: Cost per Cancer Case Avoided and Comparison of Benefits and Costs", Environomics, September 25, 2006.

The PAATCM will cost approximately $154 million per statistical life saved. This cost per unit of benefit would put it among the least cost-effective environmental, health or safety regulations ever promulgated in the U.S. Several compilations exist comparing the cost-per-life-saved or cost-per-year-of-life-saved across hundreds of U.S. regulations (environmental, health care, occupational, residential, transportation) and other life-saving interventions (e.g., medical treatments), including Morrall (2003), Tengs, et al (1995) and others. In general, a rule such as the PAATCM that costs $154 million per life saved would be significantly higher than any regulation previously adopted by CARB. See Chlorinated ATCM Report, Table IX-12, Page IX-25.[21] Thus, this PAATCM would, by far, be the least cost-effective measure CARB has ever

[20] If the agency's declaration under this section is in conflict with substantial evidence in the record, it provides grounds for a declaration of invalidity. Government Code Section 11350.

[21] Even the highest one noted for non-ferrous metal melting, adopted in 1992 at a maximum case of $18.6 million, is more than eight (8) times lower than our estimate.

adopted. The proposed regulation will yield very little in the way of health benefits at an extremely high cost per unit of benefit.

We looked at the analysis performed on the cancer risk associated with the current status, R1469 and the PAATCM. Presently, the metal finishing industry is estimated to cause 4.11 cancer risks throughout the state, assuming a 70 year exposure or slightly less than 0.06 cancer risks per year.

D. The health benefits of the proposed rule are trivial in comparison to the rule's costs.

The Staff Report does not provide any estimate of the reduced number of adverse health effects that would occur among individuals exposed to hexavalent chromium emissions from affected facilities if the rule were to be promulgated. Nor does the Staff Report estimate the monetary value of these or any other benefits expected from promulgation of the PAATCM. Such information is necessary if the CARB Board members and the public are to be able to judge whether the proposed rule's benefits exceed its costs.

As part of our report, we prepared a conservative (likely too high, since it is based on the Staff Report's worst-case modeling assumptions) estimate of the number of health effects that will be avoided each year if the rule were promulgated. Standard techniques exist for assigning a dollar value to this reduction in health effects that would result from implementation of the PAATCM (see, for example, U.S. Occupational Safety and Health Administration: *Final Economic and Regulatory Flexibility Analysis for OSHA's Final Standard for Occupational Exposure to Hexavalent Chromium*, 2006). Applying U.S. OSHA's approach, we estimate that the annual benefits from the proposed rule would amount to range from $28,000 to $175,000 per year and compare it to the costs estimated at $4.97 million per year in the Staff Report. The result shows that the annual costs of the proposed regulation are some 30 to 180 times larger than the benefits. The health benefits of the rule are trivial in comparison to the rule's costs.

VII. COMPARISON OF MFASC ALTERNATIVE TO PAATCM

The first part of our proposal is to eliminate the requirement for add-on equipment for facilities of >200,000 AH/Y allowing facilities to meet 0.0015 mg/AH by any combination of control measures, in-tank measures or add-on equipment.

The second part of our proposal is to not de-list foaming agents as certified or approved fume suppressants.

The final part of our proposal would allow 36 of the 45 facilities within the 20,000-200,000 AH/Y category to meet 001 mg/AH rather than 0.0015 mg/AH. Nine of the 45 are estimated to be within 25 meters of a residence or sensitive receptor and would have to meet 0.0015 mg/AH. This 20,000-200,000 AH/Y category has 15 facilities which already substantially comply with the PAATCM.

1. Difference in emission rates

If 36 facilities operate at 0.01 mg/AH versus 0.0015 mg/AH, the difference is (0.01-0.0015) or 0.0085 mg/AH. Assuming an average size of 110,000 AH/Y, then the difference in emission rates is:

36 facilities x 110,000 AH/Y x 0.0085 mg/AH x 1 lb/454,000 mg = 0.074 lb/y

2. Difference in cancer burden

We showed earlier in Table 3 the difference in cancer burden between the PAATCM and R1469 to be 0.02 for 45 facilities in the 20,000-200,000 AH/Y category. Under our proposal, only 36 would be allowed to meet 0.01 mg/AH vs. 0.0015 mg/AH. Table 4 shows the remaining cancer burden difference to be less than .0035.

Table 4
Comparison of Requirements of the PAATCM and Revised PAATCM for Facilities in the 20,000 AH/Y to 200,000 AH/Y Range

<table>
<tr><th>Category Range/Midpoint</th><th>Number of Facilities</th><th>PAATCM</th><th>Revised PAATCM</th></tr>
<tr><td>20,000 – 200,000 / 110,000</td><td>60</td><td>15 meet PAATCM
45 @ 0.0015 mg/AH
MICR=<1:M @25m
CB=0.0031</td><td>15 meet PAATCM
9 @ 0.0015 mg/AH
MICR=<1:M @25m
36@ 0.01 mg/AH
MICR=3.76:M
CB=0.0000</td></tr>
<tr><td></td><td></td><td colspan="2">ΔCB=0.0035</td></tr>
</table>

As Table 4 below shows, when the cancer cases are further distinguished for the 45 facilities within the 20,000 to 200,000 AH/Y category by distance to a receptor, the nine facilities suggested for control to the 0.0015 mg/AH reduce the cancer cases of the remaining 36 facilities to less than 0.0035 over 70 years or 0.00005 cases per year.

3. Difference in MICRs

The MICRs of these facilities are shown below for different distances using either 0.01 mg/AH or 0.0015 mg/AH emission rates. The values are determined using the Staff Report's information, which as already discussed herein, is overly conservative.

No. of Facilities	Distance From Residence Or Sensitive Receptor	MICR with 0.01 mg/AH Emission Rate	MICR with 0.0015 mg/AH Emission Rate
9*	<25 meters	5.7:M	0.9:M
9*	50 meters	1.9:M	0.3:M
10*	75 meters	0.9:M	0.1:M
17*	>100 meters	0.5:M	<0.1:M
45			

* The Staff Report states 17 of the 45 facilities are at greater than 100 meters and 19% of the total 220 facilities are less than 25 meters; 19% of 45 = 9. The number of facilities at 50 meters or 75 meters were arbitrarily assigned.

It is quickly obvious that the PAATCM gets the MICR far below one in one million risk. Historically, other ATCMs have sought an end point based upon one cancer case in one million persons exposed over seventy years. *Cf.,* ATCM for Cruise Ship Onboard Incineration, effective November 17, 2005 (1.5 per million); ATCM for Thermal Spraying, December 9, 2004 (10 per million). We question the need for a statutory requirement that goes below this threshold since it is an assumed "worst-case" scenario; (i.e., how low is low or how clean is clean?).[22] Under our proposal using the Staff Report assumptions, all but possibly a few in the 50 meter range from a residence or sensitive receptor would achieve a MICR of less than one. In contrast, the MICRs would be far below one in one million in the PAATCM, but we question the wisdom and practicality of such a proposal when cost is considered. We suggest that these new facilities be allowed a 0.01 or 0.0015 mg/AH based upon being able to meet a MICR of one in one million.

A copy of our proposed changes to the PAATCM are provided as Attachment 11. We formatted our changes by comparing them to the proposal offered by SCAQMD as an alternative

[22] If more accurate assumptions are applied for the modeling, the MICR should drop an additional magnitude level (i.e., 0.9 becomes 0.09 per million, etc.).

to the PAATCM. Note that we differ in only one respect and we believe our alternative is as health protective as that offered by SCAQMD.[23]

VIII. OTHER CONCERNS

We note that Health & Safety Code section 39665(c) has not been met as part of the requirements for this rulemaking. Specifically, the section provides that "[t]he staff report, and relevant comments received during consultation with the districts, affected sources, and the public, shall be made available for public review and comment at least 45 days prior to the public hearing required by Section 39666." We requested and reviewed the entire file for this PAATCM and found significant omissions especially for relevant oral comments made before the 45 day period began. These relevant comments made by the affected sources in workshops and on telephone calls are not present in the existing public record. During the workshops we observed that industry, agency and public comments were being noted by Staff, but when the file was reviewed, those comments and the Staff notes were not made available to us in any manner. While we found written comments from this period of time, we are concerned that these limited written documents do not reflect all relevant comments received and used by Staff to prepare the PAATCM. As such, the public has not been meaningfully apprised of the relevant comments used to prepare the PAATCM and required to be provided pursuant to this section.[24]

IX. CONCLUSION

If the Board chooses to go forward with an amendment to the ATCM, we urge the Board to adopt our suggested changes since they are more effective than the current proposal. This less costly alternative "would be equally as effective in achieving increments of environmental protection in a manner that ensures full compliance with statutory mandates..." Health & Safety Code Section 57005(a). That statutory mandate includes adoption "of best available control technology or a more effective control method...". Health & Safety Code Section 39666(d). R1469, in conjunction with effective enforcement of existing statutes including Toxic "Hot Spots" (Health & Safety Code Sections 44300 et. seq.) and permitting (Health & Safety Code Sections 42300 et. seq.) creates a regime that meets all other legal requirements, including those addressing economic impact.

The Staff Report partially estimates the cost of the R1469 alternative as about $600,000 (for equipment at seven facilities) which is primarily for facilities not in SCAQMD, compared to

[23] While we endorse most of the general terms within the SCAQMD proposal, we have not been able to adequately review the profile data used by SCAQMD and are therefore not including it with our Attachment 11.

[24] See, infra, Attachment 6. Several emails concerning the source test that are very relevant to the issue of the estimation of emissions and the methods employed by CARB to reach those results. These emails were not found in the record.

the PAATCM cost of $14,200,000 or more. Our R1469 alternative would reduce cancer risk from our industry from about four persons for the entire State of California to a value that is effectively equivalent to the estimate for the PAATCM, but at a greatly reduced cost.

As found in our proposal revising the PAATCM, an even more conservative option also results in an alternative that is a more effective control method. As we demonstrate by coupling the cancer burden calculation with the Staff Report's own economic calculations and endorsing a greater compliance and training regime, our proposal revising the PAATCM in three ways would provide more effective and realistic control for all air districts in California. This alternative is a more effective control measure than the PAATCM as currently written. We demonstrated in this letter that the changes we propose do not impact risk in any manner and make economic sense.

As we outlined, the cost of this PAATCM is well beyond the threshold causing significant impact to business in this state. As we also show, the impact spreads to other industry. The loss of jobs and the inability to compete against out-of-state metal finishers will have a major impact. Likewise, the adoption of this PAATCM will be at a cost far exceeding any other ATCM adopted by CARB for a measure whose costs far exceed its alleged benefits.

This letter demonstrates that our alternatives comply with the requirement of being a "more effective control measure" as well as "a less costly alternative... which would be equally as effective in achieving increments of environmental protection". *See* Health & Safety Code Sections 39666(c) and 57005(a). We are opposed to this PAATCM in its present form, unless requested changes are made and our comments, presented in this letter, are addressed in a comprehensive manner. If the Board were to extend the hearing date 60 - 90 days to allow Staff and stakeholders a chance to further investigate technical areas that have not been substantiated by CARB, as well as to modify the PAATCM, we would pledge our industry cooperation.

Very truly yours,

Daniel A. Cunningham
MFASC Executive Director
STA Executive Director

ATTACHMENT 1

M. DEAN HIGH, P.E.
Pacific Environmental Services, Inc.
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RETIRED

Professional Specialties

Project and contract administration; evaluation of source test data and procedures; policy evaluations for proposed regulations; permit support; dispersion modeling analysis; engineering analyses of air pollution control systems; industrial hygiene surveys; health risk assessments; industrial wastes; environmental audits.

Experience

Pacific Environmental Services, Inc. (PES), **Los Angeles, CA, 1985-Date.** Responsible for administration and technical direction of air quality planning, testing, modeling, engineering and industrial hygiene projects throughout the western USA.

Engineering Science, Inc., **Los Angeles, CA, 1970-1985.** Responsible for all technical and administrative aspects of air pollution control projects nationwide.

SEDRA, **Washington, D.C., 1968-1970.** Directed pollution engineering projects including emission inventories, stack sampling and dispersion estimates of dusts and sulfur oxides.

U.S. Public Health Service - NAPCA, **Washington, D.C., 1966-1968.** Developed SO_2 regulations for Federal facilities, and directed various air pollution projects.

Indiana State Board of Health, **Indianapolis, IN, 1962-1966.** Founded and administered Indiana's air pollution control program.

U.S. Public Health Services, **Cincinnati, OH, 1957-1962.** Air pollution research.

Education

B.S.	Civil Engineering, Purdue University, 1956
M.S.	Sanitary Engineering, Purdue University, 1957
M.P.H.	Air Pollution, University of Minnesota, 1960

Professional Affiliations, Honors and Awards

Registered Engineer (Indiana, Minnesota, District of Columbia)
Member, American Academy of Environmental Engineers (Diplomate)
Member, American Industrial Hygiene Association

Member, American Society of Mechanical Engineers
Member, Air & Waste Management Association:
Chairman, West Coast Section 1996-1998
Board of Directors, West Coast Section (1977-1978 & 1991-1995)
Past Chairman, Consultants Committee (1972-1977)
Past Chairman, Membership Committee (1977-1979)
Past Chairman, South Atlantic Region (1972)
Past Chairman, Government Affairs Seminar (1972)
Intersociety Committee on Methods for Air Sampling and Analysis.
Chairman, Subcommittee on Stack Sampling (1972-1974)
Consultant, National Academy of Sciences (1972-1974)
Technical Evaluation Committee on Air Pollution, Metropolitan Washington Council of Governments (1968-1969)
Award of Special Recognition-National Association of Metal Finishers, March 7, 1995

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"Stationary Source Sampling", presented at Eastern Analytical Symposium, Atlantic City, New Jersey, November 2, 1972.

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Control", presented at Symposium of the American Association of Textile Chemists and Colorists: "The Textile Industry and the Environment - 1973." Washington. D.C., May 23, 1973.

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"Glass Melting Air Quality Issues In Southern California." Presented at the workshop "Glass Melting: Air Quality Issues & Technology." Pittsburgh, PA, September 25, 1989.

"California Environmental Regulations Affecting The Ceramics Processing Industry." Presented at the American Ceramic Society, Inc.'s "Ceramic Science & Technology Congress." Orlando, FL, November 12, 1990.

"Environmental Testing In Thermal Spray." Presented at the National Thermal Spray Conference. Anaheim, CA, June 7-11, 1993.

"Status Of Toxic Rules In The SCAQMD." Presented at the Metal Finishing Association of Southern California March Dinner Meeting. Monterey Park, CA, March 16, 1994.

"Metal Finishing Association Of Southern California Self Certification For Environmental Compliance." Presented at the California Water Pollution Control Association Meeting. City of Industry, CA, February 4, 1994.

"Regulation Of Chromium Emissions In California." Presented at the American

Electroplaters And Surface Finishers Society Chromium Colloquium. Orlando. FL. January 27-28, 1994.

"Source Tests For Measurement Of Total And Hexavalent Chromium And PM_{10} On Nine Paint Spray Booths At McClellan Air Force Base, California." Presented at the Air & Waste Management Association 7th Annual Meeting & Exhibition. Cincinnati. OH. June 19-24, 1994.

"Environmental Certification Program For Metal Finishing Facilities In Southern California." Presented at the Air and Waste Management Association West Coast Section's Annual Meeting. Las Vegas, Nevada, March 6, 1997.

STUART L. SESSIONS

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Bethesda, MD 20814
301-657-7762x10
Sessions@Environomics.com

SUMMARY OF EXPERIENCE

Stuart Sessions is an environmental economist with more than 30 years of experience in analysis of environmental, health, and safety issues. He has a particular interest in practical ways of applying quantitative analytical methods to improve environmental regulatory and policy decisions. Half of Mr. Sessions' experience has been as a consultant to industry and government; half has been as an analyst and manager with the U.S. federal government.

As a consultant, he has employed a wide range of analytical techniques (e.g., benefit-cost analysis, risk analysis, financial analysis, economic impact assessment, statistics and econometrics, institutional analysis, computer simulation) in performing over 200 assignments for diverse clients. He has supported numerous industry groups in analysis and advocacy pursuing more cost-effective environmental, health and safety (EH&S) regulations. He has consulted extensively for government officials in the U.S. and abroad in developing and improving their procedures for evaluating environmental regulations and policies. He has led teams preparing the Regulatory Impact Analyses for several of the U.S. Environmental Protection Agency's (EPA's) most important recent regulations.

Before beginning consulting, Mr. Sessions for five years was a manager with the Office of Policy Analysis at the U.S. EPA. Here he was generally responsible for directing analyses of the costs and benefits of proposed EPA regulations. As Director of the Regulatory Policy Division he reviewed and contributed to the Regulatory Impact Analyses for all EPA regulations affecting air and water pollution and hazardous wastes. As Chief of the Water Branch he directed economic analyses of water pollution questions. As Chief of the Industrial Analysis Branch, he was responsible for managing analysis of the economic impacts of EPA regulations on individual plants, on key industries, and on the economy as a whole.

Mr. Sessions has a particular expertise in the economics of the U.S. metal finishing industry. He worked for a year to support the industry in its interactions with the U.S. EPA regarding a potential wastewater regulation. He worked for two years to support the industry on a variety of concerns (economic impact analysis, benefit-cost analysis, health risk assessment, international competitive impacts) relating to the U.S. Occupational Safety and Health Administration's recent major rulemaking revising the occupational exposure standard for hexavalent chromium. He participates as a senior economist in the metal finishing industry trade associations' project on "The Future of Finishing". He has also conducted a series of case studies on the impact of environmental regulations on the profitability and competitive position of individual metal finishing companies.

Mr. Sessions' undergraduate and graduate degrees are in economics and environmental policy. His graduate thesis was on improvements to the travel cost method for valuing the recreational benefits of improvements to water quality. His undergraduate thesis was on the economics of water quality management.

Stuart Sessions is now a principal with Environomics, Inc.. Environomics is a small consulting firm specializing in applying systematic analytical techniques to assist industry and governments in improving EH&S regulations, policies and programs.

STUART L. SESSIONS

EDUCATION

M.P.P. Master of Public Policy (concentration in environmental economics)
Kennedy School of Government, Harvard University (1974)

Graduate study in natural resource planning (concentration in policy and institutions)
School of Natural Resources, University of Michigan (1970 - 1971)

B.A. Economics, magna cum laude, Amherst College (1970)

PROFESSIONAL HISTORY

1991 - now **Principal, Environomics Inc.** Direct consulting projects for industry and government clients on environment, health and safety regulatory and policy issues.

1985 - 1991 **Vice President, Sobotka & Co.** Directed consulting projects for government clients in environmental management and policy analysis.

1983 - 1985 **Director, Regulatory Policy Division, EPA.** Reviewed all proposed EPA regulations affecting air, water and wastes; directed policy studies; conducted program evaluations; analyzed policy alternatives.

1982 - 1985 **Chief, Water Economics Branch, EPA.** Directed economic analyses of water pollution programs, regulations and legislation.

1980 - 1982 **Chief, Energy Facilities Branch, EPA, and Chief, Industrial Analysis Branch, EPA.** Analyzed the financial effect of EPA regulations on major plants and industries and on the economy as a whole.

1979 - 1980 **Special Assistant, the White House.** Developed and sought enactment of Carter Administration energy legislation.

1979 **Consultant, U.S. Federal Trade Commission.** Analyzed the financial prospects and potential role for small businesses in the synthetic fuels industry.

1975 - 1979 **Staff Analyst, U.S. Office of Management and Budget.** Reviewed and evaluated natural resource and park programs of the U.S. Department of the Interior.

1974 - 1975 **Instructor, applied statistics, econometrics and policy analysis, Kennedy School of Government, Harvard.**

ATTACHMENT 2

ABOUT THE METAL FINISHING INDUSTRY IN CALIFORNIA...

Metal finishing is the process of coating, usually a metallic or plastic object, with one or more layers of another metal, paint or plastic to furnish its surface with desired properties. Such as:

improved appearance	improved lubrication	insulation or conductivity
corrosion resistance	non-toxicity	conductivity
abrasion resistance	altered dimensions	solderability
wear resistance	light reflection	heat and cold resistance

The industry serves a wide range of other industrial sectors, including:

automotive	shipbuilding	steel mill products
medical equipment	petroleum	jewelry
aerospace and defense	computer and electronics	household appliances
tools and dies	furniture	construction

The metal finishing industry in California is comprised of small business concerns. In fact, statistics show that there were over 800 job-shop electroplaters (SIC 3471) in California, employing over 20,000 people. About 90 percent of the job-shops in business employ fewer than 50 people, while 68 percent employ fewer than 20 people. Most job-shop metal finishing firms are family-owned businesses, with a large percentage of minority employees. Annual sales for a typical firm are approximately $1 to $1.5 million.

The metal finishing industry is subject to very high costs of compliance with environmental regulations. California plating operations spent approximately $10 million in 1991 in pollution control and prevention capital expenditures, roughly 27.5 percent of their total capital expenditures. Further, total pollution control expenditures, including operations and capital, were $80 million in 1991, equaling 5.8 percent of sales and 8.8 percent of value added. According to a survey by the Surface Finishing Market Research Board, the annual environmental equipment expenditure was $42,750 per metal finisher in 1992.

The Metal Finishing Association of Southern California, Inc. (MFASC) and the Surface Technology Association (STA) represent more than 300 metal finishing and supplier member companies representing custom and job shop metal finishers and suppliers in California.

Affiliates of the National Association of Metal Finishers (NAMF), MFASC and STA are nonprofit trade associations of management executives in the fields of metal finishing, electroplating, powder coatings, enameling, galvanizing, anodizing, buffing, polishing, plating on plastics, bumper recycling, electroforming and related processes.

ATTACHMENT 3

South Coast Air Quality Management District

2003 Clean Air Award

Presented to

Metal Finishing Association of Southern California

In the category of

Promotion of Good Environmental Stewardship

For working cooperatively to develop workable rules (Amended Rule 1469 & Rule 1426) for the region's metal plating facilities.

October 15, 2003

ATTACHMENT 4

1469/1426 Admin fol

Metal Finishing Negotiated Rulemaking

South Coast Air Quality Management District

Proposed Amendments to Rule 1469 and Proposed Rule 1426

Summary of Negotiation Process and Agreement

In April 2002, AQMD established a Working Group to conduct a negotiated rulemaking process related to the metal finishing industry, addressing potential amendments to Rule 1469 as well as Proposed Rule 1426. From its inception through the completion of negotiations in early April 2003, the Working Group met 12 times. The Working Group was comprised of representatives from state and local regulatory agencies, industry, and environmental/community organizations, each of which actively participated.

Early in the negotiated rulemaking process, AQMD in concert with the Working Group came to the conclusion that insufficient information existed on which to base a rule requiring emission controls on other plating and related processes. As such, Proposed Rule 1426 calls for two years of data collection, after which an assessment will be made as to whether emission controls are necessary and justifiable.

Most of the Working Group's efforts were focused on PAR 1469. An Issues Resolution Subcommittee met six times from November 2002 to January 2003 to resolve the details of suggested rule amendments during the final stages of the negotiation. A Technical Subcommittee also met several times to address and resolve technical issues related to the rule. A Pollution Prevention Subcommittee met on two occasions to consider pollution prevention options that might be included in the rule. Additionally, several meetings were held with AQMD permitting staff to discuss permitting issues related to but outside the rule.

The differing views about how to approach proposed amendments to Rule 1469 made it difficult to create rule language everyone could endorse on behalf of their constituencies. Nonetheless, Working Group members participated in good faith and made every effort to develop acceptable refinements given the widely divergent views and interests.

Industry representatives maintain that efforts to further reduce emissions are not warranted. They submit South Coast AQMD already has the most stringent regulations governing metal finishing in the nation. Given background levels of pollutants in the Los Angeles basin, they suggest the metal plating industry contributes an insignificant portion of the overall risk. With the downturn in the economy, and the shift of market share offshore, the cost of additional controls further reduces their ability to compete. Furthermore, they suggest AQMD should focus on identifying non-complying facilities through site-specific air monitoring, using increased field inspections in tandem with enhanced educational outreach, to minimize emission violations.

Environmental and community representatives, on the other hand, approached the process primarily from the standpoint of concerns about public health. Recent findings associated with a metal plating facility in San Diego's Barrio Logan contributed to their apprehension. They expressed the need to employ a precautionary approach to address

concerns and uncertainty about emission estimation, rule compliance and reliability of fume suppressants, suggesting HEPA filters be used at each facility. They identified environmental justice and cumulative impacts as other major issues, along with emissions from facilities in close proximity to residences, schools and other sensitive receptors.

The suite of changes recommended for Rule 1469, and the data gathering approach recommended for PR 1426, represents the outcome of the negotiated rulemaking process. The signatures below from industry and environmental/community Working Group members who participated throughout the process acknowledge: 1) the accuracy of concerns and perspectives summarized in this document, 2) the extensive effort expended to address the critical interests expressed by each group throughout the process, and 3) their support for the negotiated rulemaking process which provided the basis for the proposed staff recommendations.

Metal Finishing Negotiated Rulemaking Working Group:

Sam Bell, *Metal Surfaces*

Geoff Blake, *All Metals Processing of Orange County*

Elaine Chang, *AQMD*

Curt Coleman, *CMTA SCAQA*

Dan Cunningham, *MESC*

Dean High, *PES*

Bahram Fazeli, *CBE*

Paula Forbis, *Environmental Health Coalition*

Bill La Marr, *California Small Business Alliance*

Harry Levy, *Gene's Plating Works*

Harold Martinez, *Able Indus. Products*

Anastacio Medina, *Amer. Lung Assoc.*

Tom Miles, *Conserve Engineering* 4/29/03

Alan Olick, *General Plating*

Barry Wallerstein, *AQMD*

Jill Whynot, *AQMD*

ATTACHMENT 5

Attachment 5

Hexavalent and Total Chromium Emissions from Chrome Plating Tank Number 19B at California Electroplating, Inc. Using Fumetrol 140, Dis-Mist NP and Polyballs

Conducted at
California Electroplating, Inc.
3510 East Pico Street
Los Angeles, CA 90023

For submittal to the
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, CA 91765

Submitted November 2004

Prepared by
Professional Environmental Services, Inc.
5027 Irwindale Avenue, Suite 100
Irwindale, CA 91706

Process Data
Tank: 36"W x 72"L x 48"H
Rectifier (nominal): 600A 3V
Chromic acid: 30.2 ounces per gallon
Temperature: 105°F
Freeboard: 5"
Mixing: None
Surface tension: 29 dynes per centimeter
Foam thickness: 1-1.25"
Polyballs: 1"0; 95% coverage of tank surface area

Results	Test 1	Test 2	Test 3	Test average
Current AH/H	411	362	425	---
Cr6 emission rate (mg/AH)	**0.00022**	**0.00009**	**0.00007**	**0.00013**
Cr total emission rate (mg/AH)	0.00057	0.00043	0.00037	0.00046

ATTACHMENT 6

ATOTECH

Allen R. Jones, Ph.D.
Group Leader - Staff Chemist
Worldwide R&D

Atotech GMF Worldwide
1750 Overview Drive
Rock Hill, SC 29730
Tel: (803) 817-3568 – Cell: (803) 370-2090
e-mail: allen.jones@atotech.com

Subject: Comments on "Proposed Amendments to the hexavalent chromium airborne toxic control measure for chrome plating and chromic acid anodizing operations" Board review on Sept. 28, 2006.
Date: 9/25/2006
File: CARB 3 min

1. Mist (Fume) Suppressants.
    a. Effectiveness
        i. ARB (http://www.arb.ca.gov/regact/chrom06/cpisor.pdf) (1) page 41. Fumetrol 140 with polyballs (insignificant contribution) emission rate of **0.003** mg/Ahr (3/2003)
        ii. SCAQMD Decorative Test up to 99.96% effective, **0.0091** mg/Ahr using Fumetrol 140 in 1996 Tests. (2)(Source test report 95-0027).
        iii. Fumetrol 140 average emission rate of **0.0026** mg/Ahr, Allen R. Jones (3).
        iv. Canadian regulations will allow surface tension (mist suppressants) control in lieu of stack testing.
        v. Different mist suppressants have different emission rate reduction effectiveness. Factors such free board, airflow, and **surface tension** (3) are also important factors.
    b. General. Mist suppressants are very useful since that keep the chromic acid in the tank. This reduces worker exposure and improves the house keeping by reducing the chromic acid on bus bars, fixtures, tanks, and auxiliary equipment. This reduces fugitive emissions.
2. OSHA Lower PEL limits
    a. Will require better house keeping.
    b. Mist suppressants are recommended as a control method.
    c. The use of liquid chromic acid for tank additions will eliminate dusting from adding dry chromic acid to plating/anodizing tanks.
    d. These steps will reduce fugitive emissions and may reduce stack emissions.
3. ARB "Hood"
    a. Data from "Hood" Testing on page 43 and 44 was used to arrive at the nonSCAQMD emission rate of 0.04 mg/Ahr. I sent comments by email on 1/5/06 (4) to ARB with concerns on the use of the "Hood" and other testing protocols. This value may be high for several reasons:
        i. The apparatus is not a "hood' but an **encapsulation** of the tank.
        ii. This system may remove mist from below the tank lip that would normally fall back to the solution. In an email from Shobna on 1/9/06 (5) she said that the airflow at the curtain was "relatively high". The airflow should have been quantified based upon some data I estimate that this flow rate could have been 770 ft/min (1 inch gap with 16 ft perimeter tank). This is a very high airflow and could easily suck mist out of the tank and increase the emission rate.
        iii. The curtains of the hood extended to within inches of the floor. Chromium contaminated dust could easily be sucked up into the analysis stream. During the testing only 10 to 30 mg of chromium was captured. This could be a few particles from the floor.

iv. The curtains could disturb chromium on the tank or racks during the loading or unloading of parts. This could over estimate the tank emissions
v. Controls should have been performed with the current off and when parts were loaded and unloaded.
vi. The sample time was much longer than the plating time. During this time fugitive chromic acid could be collected.

4. ARB Housekeeping improvements. I agree with this improvement but it will be implemented due to the new OSHA PEL regulations.
5. ARB (1).
   a. Sources. Hexavalent chromium emissions from stationary source are estimated to be 1000 lbs/year in California. Flame spray and furnace emissions accounts for 99.6% (P. 15). The 4 lbs from plating/anodizing has been drastically reduced in the last decade (well over 99% reduction) and now is a minor source. There is no discussion of stainless steel welding (muffler shops) contributions. There are 1759 muffler shops in Ca. (6). These facilities are a source of airborne hexavalent chromium.
   b. Barrio Logan. The 2002 study (P. 40) that predicated the recent testing and proposed regulation showed that housekeeping was the source of chromium, not plating emissions. HEPA filters will not address this problem. PEL limit decreases will eliminate this source.
6. Conclusions.

References:

1. http://www.arb.ca.gov/regact/chrom06/cpisor.pdf, page 41
2. SCAQMD: Source test report 95-0027
3. Allen R. Jones, "Using Fume Suppressants in Hard Chromium Plating," Proc. AESF Second Chromium Colloquium, (1990).
4. Allen R. Jones email 1/5/06 is attached below.
5. Shobna Sahni email 1/9/06 is attached below.
6. An Internet search engine result is attached below.

(4) Allen R. Jones email 1/5/06

ARB Deco Emission Testing

Dear Shobna Sahni,

I have many questions and comments about the testing by ARB.

Did ARB do stack testing or did they put a hood over the tanks and capture all of the mist?
Plating time was 20 to 30 minutes or 10 sets of parts were plated for 2-3 minutes?
What was the sampling time? Much longer than the plating time?
In the table ng refers to nano or micrograms?
In the table three of the tests show only 1 significant figure. Does this mean that very little chromium was collected? This could lead to large errors.
Did you run a blank with no plating but the same collection time?
Surface tension should be measure with a Tensiometer on every test. Stalagmometer can produce readings that are up to 20 dynes/cm high.
SCAQMD testing appeared to use 10 times more amp-hours. This would give more accurate results.
In a stack test some chromium mist may fall out or impinge on a surface before it gets up the stack. If a hood collects more chromium it will have a higher apparent emission rate. A high flow rate may suck mist out of the tank that could fall back into the tank.
What was the air flow during the test, m3?
What was the air flow velocity at the edge of the tank?

Best regards.

Allen R. Jones, Ph.D.
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(5) Shobna Sahni email 1/9/06 is attached below.

Mr. Jones, Here are the responses to your questions.

1. Did ARB do stack testing or did they put a hood over the tanks and capture all of the mist?

For the type of testing, we combined both. Our hood collected all mist from the tank - we used smoke sticks for each sample run to prove this. We used 12-inch I.D. plastic ducting to move that mist from the hood to our stack sampling location. At the stack sampling location we used standard stack sampling procedures to collect a portion of the captured mist. The balance of the plating tank mist continued past the sampling location, through our fan box and finally through additional 12-inch ducting out of the plating facility. For sample collection we used ARB Methods 1 through 4 (for flows and sampling locations) similar to US EPA Methods 1 through 4, and ARB Method 425 for chromium emissions collection and analysis. ARB Methods 1-4 can be found at http://www.arb.ca.gov/testmeth/vol1/vol1.htm and
ARB Method 425 can be found at http://www.arb.ca.gov/testmeth/vol3/vol3.htm.

Our hood stood about 4 feet above the tank and is about the same size as entire tank surface - similar to a stove hood. Plastic curtains came down 3 sides outside the

hood and plating tank. (We found we could maintain capture efficiency with an open front.) The hood height was also above the operator's head and allowed operators to load any part of the tank from the front without bumping into the hood. Our dummy parts were about 3 feet long and our hood height also allowed them to be loaded vertically into the tank. (They did not have to be turned horizontally to get under this hood.) These are standard plater operating procedures at most plating facilities per our observations and in consultation with the facilities we tested. Dominic Nole with the Northern California Platers Association and a very knowledgeable plater also greatly assisted with our design of this hood setup. His facility, Alta Plating was the first facility we tested with our capture hood setup and

, located a couple of blocks from our facility, allowed us to efficiently fine tune the setup at the first outing.

For the tests that you have, Alta, Sherm's and Clovis, some reports are available on the web. Tests from two facilities, Alta, and Sherm's have been finalized and are available on the following ARB website.
http://www.arb.ca.gov/toxics/chrome/etest.htm
If you would like, we can send you the draft reports for the Clovis test as well. Pictures of the capture hood setup and stack sampling area can be seen in the test reports at the website included above.

2.Plating time was 20 to 30 minutes or 10 sets of parts were plated for 2-3 minutes?

The plating time for each set of parts ranged from 30 seconds to 2-3 minutes. We did not plate parts continuously for 20 -30 minutes. Each part was plated, stripped, plated again with Nickel and then chromium plated. Effort was made to simulate real decorative plating conditions.

3.What was the sampling time? Much longer than the plating time?

The sampling time was 2 hours for the Clovis tests. The sampling times for the other two tests ranged from 5 - 8 hours. Please refer to the source test report. It was much longer than the plating time. However, since there are no emissions from the tank while there is no plating, we do not believe it would bias the results. Also, the hood was tested before and after each test to make sure our testing setup was not contributing to emissions.

4.In the table ng refers to nano or micrograms?

In the table, for indoor air, the numbers are in ng/m3.

5.In the table three of the tests show only 1 significant figure. Does this mean that very little chromium was collected? This could lead to large errors.

No, the amount of chromium collected was significant. ARB results are 2 significant figures per the website test reports. The single digits were used for clarification. Theoretical detection limits are about 100 ng/sample for Cr and 20 ng/sample for Cr VI+ with three samples analyzed per run (or sample train). Realistically, only one of the three samples needs a detectable amount to report an emission number, but the other two probably have some chrome below the detection limit so the true detection limit is between 100 - 300 ng for Cr and 20 - 60 ng for Cr VI+. ARB Northern Lab limits of detection (LOD) are 1.0 ng/ml for Cr by GFAA and 0.2 ng/ml Cr VI+ by IC. This ARB lab supports the ARB ambient air network (the reason for such low detection limits - our luck) and for years they have run their hex chrome ambient air samples quarterly, so this is a very experienced lab for

chrome analysis (again, our good luck). For each sample train I give them 3 samples (probe rinse,
1st impinger, and impingers 2&3 combined) with about 100 ml each to analyze. (Three sample trains or nine ~100 ml samples per test.) The lab analyses these ~100ml samples individually so minim detection per sample is ~100 ng Cr and 20 ng Cr VI. Lab results, including "ng/recovered" for Cr and Cr VI for each sample and each train (test run) collectively are in the appendices of the test reports. For individual samples there are some non-detects, but collectively as a sample train, all plating shop sample trains collected at least 1,000 ng (Alta 30 dyne/cm test) to over 10,000 ng (Clovis trains).

6.Did you run a blank with no plating but the same collection time?

Yes, but not in the tested plating facilities. Before and after testing at each plating facility we "blank" tested the entire setup in an ARB warehouse. The hood setup pre-tests were used to prove our setup would not significantly add chromium to our test results. The post-tests were used to prove the hood setups did not "retain" a significant portion of the chromium. We used ambient samplers in our warehouse and the plating facilities during sampling to determine indoor air chromium (outside the tank) was also insignificant.

Results from those ambient samplers and the blank runs were not used to correct our emissions results. They are data quality assurance checks. ARB staff rejected a complete test, Clovis 1, based on unusual and high indoor ambient results and high post test results.

7.Surface tension should be measure with a Tensiometer on every test. Stalagmometer can produce readings that are up to 20 dynes/cm high.

We would have liked to have a tensiometer reading for each test. However, there was no lab in the area we were testing that had a tensiometer available.

8.SCAQMD testing appeared to use 10 times more amp-hours. This would give more accurate results.

I am not sure where in the table it shows ARB testing has less amp-hours. The total amp-hour information for each run is not contained in the table. However, SCAQMD certification tests were done with each run at 800 ampere-hours. For ARB testing, each run was done closer to 400 ampere-hours. We do believe we collected enough sample. Please refer to the response to question 5.

9.In a stack test some chromium mist may fall out or impinge on a surface before it gets up the stack. If a hood collects more chromium it will have a higher apparent emission rate. A high flow rate may suck mist out of the tank that could fall back into the tank.

We believe we did not collect more chromium because the flow rate was so low. We and our stakeholders (local District staffs and platers) had the same concerns during the design of our capture hood and sampling setup. We designed around the maximum uplift flow South Coast AQMD and their stakeholders had set to prevent collecting chrome that would not escape the tank, or would fall back into the tank. With our curtains loosely draping down outside the tank and the open front, we did not disturb any mist formed between the plating solution surface and the top lip of the tank.

Any solution dripping off a plated part as it was removed from the plating solution dripped back into the tank, partly due to large clearance above the tank provided by our hood and our "sweep air" coming from outside the tank. Your concern is valid

and this seemed to have contributed to our problems with the rejected Clovis 1. In that case, parts were rinsed by hose under the hood. We assume some chromium laden spray bounced off those parts and were carried into our sampling system. This showed up in the post test as relatively high "blank" results. As mentioned above, we rejected the Clovis 1 results. After those post test results we also replaced all ducting upstream of our fan box including the stack sampling area. (Plastic sheeting for the side curtains and hood cover were replaced automatically after each post-test.) And, we replaced everything again after Clovis 2 (once burned, twice shy) so Clovis 3 could be done in a timely manner. And, for Clovis 2 through 4, parts were not rinsed under the hood.)

10.What was the air flow during the test, m3?

Attached is a spreadsheet to answer ATOTECH question 10. The averages for each test are the BIG font numbers.

11.What was the air flow velocity at the edge of the tank?

Inside the tank (below the tank lip and above the plating solution), velocity was very low, even at the tank edge as indicated above. Next to our plastic curtains, above the tank lip, the velocity was relatively high. But directly above the tank away from our curtains, velocity was very low until near the hood, where velocity also increased. This would sweep emissions up into our duct and out to the sampling zone instead of impinging on the plastic sheeting. For Clovis 1, we did find that water drops from rinsed parts would get past this sweep air and impinge on our plastic curtain. We do not think this curtain splash added to the high post test results for Clovis 1. At Alta, parts were dragged out the side underneath the curtain to the rinse tank. This put chrome solution on the front of that side curtain. With the Alta post test results it was clear this solution would remain on the curtain rather than add significantly to subsequent Alta results. The soiled curta
in was replaced anyway per our normal procedures for this setup at plating facilities.

We do not have actual velocity measurements near our curtains or above the tank. We tried with 2 different hot wire anemometers and a velometer (wind run measured over time. We relied on smoke sticks (smoke is formed when combined with air - no heat applied) for relative velocity under the hood at various locations, including near the curtains and open face. The smoke also let us know where emissions may leak out from under the hood. Those "leaks" were fixed before plating and sampling would start, and checked for each run (at least 3 per test).

If you have any more questions, please let us know. I have added David Todd to this e-mail. He can answer any questions you have regarding the source test method or specifics of our testing program.

Again, please let me know when you are available for a conference call and we can forward the questions to you in advance.

Thank you again for your time and we look forward to your comments.

Shobna

ATOTECH Questn 10.xls

Dear Shobna Sahni,

I have many questions and comments about the testing by ARB.

1. Did ARB do stack testing or did they put a hood over the tanks and capture all of the mist?
2. Plating time was 20 to 30 minutes or 10 sets of parts were plated for 2-3 minutes?
3. What was the sampling time? Much longer than the plating time?
4. In the table ng refers to nano or micrograms?
5. In the table three of the tests show only 1 significant figure. Does this mean that very little chromium was collected? This could lead to large errors.
6. Did you run a blank with no plating but the same collection time?
7. Surface tension should be measure with a Tensiometer on every test. Stalagmometer can produce readings that are up to 20 dynes/cm high.
8. SCAQMD testing appeared to use 10 times more amp-hours. This would give more accurate results.
9. In a stack test some chromium mist may fall out or impinge on a surface before it gets up the stack. If a hood collects more chromium it will have a higher apparent emission rate. A high flow rate may suck mist out of the tank that could fall back into the tank.
10. What was the air flow during the test, m3?
11. What was the air flow velocity at the edge of the tank?

Best regards.

Allen R. Jones, Ph.D.
Staff Chemist
Atotech WW R&D
1750 Overview Drive
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(6) Internet search engine results:

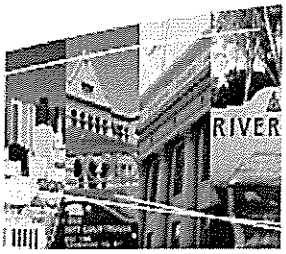
Your search for "muffler" matches multiple categories.
Category Matches
Click on a category to see results < OR > Check multiple boxes and click GO!
Top of Form

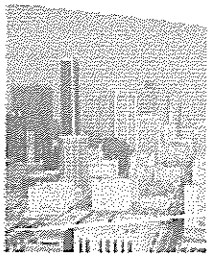
Check All | Clear All

Mufflers & Exhaust Systems-Engine (1759)

http://www.yellowpages.com/sp/yellowpages/ypresults.jsp;jsessionid=IJG1N2Z42G3QTQFI4AZRNWQ?t=0&v=3&s=2&q=muffler&st=CA&cv1=y&_requestid=389987

ATTACHMENT 7





Certified List of Fume Suppressants for Facilities Performing Chrome Plating and Chromic Acid Anodizing Operations

Air Quality
Clean Air Plans
Clean Air Technologies
Governing Board
News & Features
Rules

Rule 1469, as amended May 2, 2003, requires the owner or operator of a chrome plating or chromic acid anodizing tank currently using a wetting agent fume suppressant to begin using a wetting-agent fume suppressant certified by AQMD. This requirement becomes effective on May 2, 2004. This is only one of several requirements facilities must comply with in Rule 1469.

Certification requires that the fume suppressant be able to reduce or suppress hexavalent chromium emissions at the surface of an electroplating or anodizing bath through the reduction of surface tension of the bath to a level at which an emission factor of 0.01 milligrams per ampere hour is achieved.

The following list of certified fume suppressants have all been tested and determined to meet an emission limitation of 0.01 milligrams of Cr+6/ampere-hour of applied current at the stated surface tension.

List of Certified Wetting-Agent Chemical Fume Suppressant Products, Companies, and Usage Restrictions

Company	Product	Usage Restrictions	Contact Name	Telephone
Atotech USA	Fumetrol 140	Shall be used at or below 40 dynes/cm	Gary Wannlund	(800) 443-9746
Atotech USA	Fumetrol 140 + Dis-Mist NP	Both products shall be used in combination at or below 45 dynes/cm. A foam blanket of not less than one inch shall be maintained while plating, with foam blanket coverage of not less than 95% of the tank surface area.	Gary Wannlund	(800) 443-9746
Benchmark Products	Benchbrite CR-1800	Shall be used at or below 40 dynes/cm	Steve Erwin	(317) 875-0051
Enthone,				

Cookson Electronics	Zero Mist Liquid R	Shall be used at or below 32 dynes/cm	Brad Kerr	(800) 496-8326
MacDermid	Clepo Chrome Mist Control 74095	Shall be used at or below 40 dynes/cm	Ken Kraemer	(714) 850-1477

This list will be updated periodically when new products have been certified to meet the rule limit. Contact Tom Liebel at (909) 396-2554 or tliebel@aqmd.gov for more information on product testing.

DISCLAIMER: All wetting-agent fume suppressant products included in this list are certified as able to meet an emission limitation of 0.01 milligrams of hexavalent chromium per ampere-hour of applied current, by reducing the surface tension of hexavalent chromium electroplating or chromic acid anodizing baths, provided they are used in sufficient quantity to reduce the surface tension of the plating or anodizing bath to the maximum level listed under "Usage Restrictions" in the table and while following manufacturers' usage directions. SCAQMD Rule 1469(c)(3) requires the use of certified wetting-agent chemical fume suppressants as of May 2, 2004. SCAQMD in no way endorses any of these products. This list is arranged alphabetically. Source test results used to develop the maximum surface tensions listed under "Usage Restrictions" in this table are limited to certification of wetting-agent chemical fume suppressants only and should not be used for other purposes.

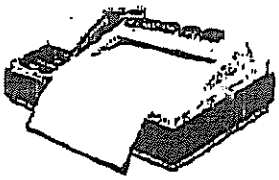
This page updated: September 15, 2005
URL: http://www.aqmd.gov/prdas/ChromePlating/ChromePlating.htm

ATTACHMENT 8

(310) 373-4409

California Environmental Protection Agency
Air Resources Board

Facsimile Message



Stationary Source Division
Air Quality Measures Branch
1001 I Street, P.O. Box 2815
Sacramento, California 95812-2815

Date:	**9/11/2006**
To:	**Harry Levy** **Fax: 949-515-3584**
Re:	**MFASC Emissions**
Sender:	**Jose Saldana**

You should receive 2 pages, including this cover sheet.
If you do not receive all of the pages, please call (916) 322-7072.

From: Shobna Sahni (626)575-7039	**Phone: 626 575 7039** **Fax:**	**E-mail:** **spandhoh@arb.ca.gov**

Comments:

"The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at www.arb.ca.gov."

California Environmental Protection Agency

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Emissions Information:

	Year 2003	Year 2005	Staff Proposal	Apply 1469 Statewide
SCAQMD	12.15	1.81	1.31	1.81
Other Areas	2.19	2.19	0.50	0.50
Total Emissions Remaining	14.33	4.00	1.81	2.42
Emission Reduction from Baseline			2.19	1.58

All emissions are in pounds. Year 2005 represents emissions after implementation of Rule 1469 in the SCAQMD.

ATTACHMENT 9

Environomics
4405 East-West Highway, Suite 307
Bethesda, Maryland 20814
(301) 657-7762
Fax (301) 657-9025
www.environomics.com

Proposed ATCM for Chrome Plating and Chromic Acid Anodizing Operations:

Comments on CARB Staff's Economic Impact Analysis

Stuart L. Sessions
Environomics, Inc.
September 25, 2006

Severe Economic Impacts of CARB's Proposed Hexavalent Chromium Regulation on California Businesses

CARB Staff's conclusion that profitability of affected businesses will decline by only nine percent (less than the ten percent threshold for "significant adverse impact") is incorrect. The proposed rule will result in far more than a ten percent decline in profitability for affected metal finishing businesses in California. Even using CARB Staff's unrealistically low compliance cost estimate for affected facilities, these facilities' average loss in profitability will be 44% - 60%, not 9% as the Staff has estimated. We estimate the following economic impacts from the proposed regulation:

- **44% to 60% reduction in profitability for affected businesses;**
- **Closure of 68 California electroplating facilities, about 30% of all affected facilities;**
- **Loss of 3,860 California jobs.**

This paper describes how we reach these conclusions.

Our Calculations

For purposes of this calculation only, we will use CARB Staff's estimate of compliance costs for this regulation:[1] (see page 6 for details of CARB Staff's cost calculations):

- $4.97 million/year, spread across 228 regulated facilities = $21,800/year/facility
- ***CARB Staff estimate:*** **Compliance cost for the average affected facility will be $21,800/year.**

[1] We believe that CARB Staff has sharply underestimated likely compliance costs, for many reasons that are detailed elsewhere in our comments.

For comparison against this annual compliance cost, how much profit does the average electroplating facility earn per year?

Calculation #1, using data from U.S. OSHA:

- The average electroplating facility in the U.S. earns pretax profits of $36,194/year[2]
- Using this data, CARB Staff's estimated compliance cost of $21,800/year would **reduce the average affected electroplating facility's profitability by 60.2%**
  - For the average facility, $21,800 in additional environmental compliance expenses per year will reduce pre-tax profits from $36,194 to $14,394, a reduction of 60.2%[3]
  - It does not matter whether the profit rate is expressed in terms of return on owner's equity (ROE, the particular measure of profitability that CARB Staff chooses to estimate; see pages ES-15 and 105 of the Staff Report), return on sales (a perhaps more conventional measure of profitability) or return on assets; the percentage decline in any of these measures of profitability will be identical to the percentage decline in

---

[2] This estimate generated by U.S. OSHA is from their massive regulatory impact analysis in support of the recent revisions to the Permissible Exposure Limit (PEL) for occupational exposures to hexavalent chromium. U.S. Occupational Safety and Health Administration. Final Economic and Regulatory Flexibility Analysis for OSHA's Final Standard for Occupational Exposure to Hexavalent Chromium. February 23, 2006. See page ES-68, Table ES-8. This is the most recent Federal environmental, health or safety regulation substantially affecting the electroplating industry, and the most recent Federal analysis of economic impacts on the industry. This annual profitability estimate is for all facilities in NAICS 332813, Electroplating, Plating, Polishing, Anodizing and Coloring. This NAICS code is essentially equivalent to SIC 3471, and includes virtually all the electroplating job shops in the country, and very little in the way of other businesses. OSHA generated their profitability estimate for facilities in this industry through analysis of data in U.S. Internal Revenue Service. Corporation Source Book of Statistics of Income, 2002 (IRS, 2005). This IRS compilation reflects, for each industry, data obtained from a statistically valid random sample of the corporate tax returns from all companies active in that industry.

[3] This assumes that the affected businesses absorb 100% of the compliance costs – thus reducing profits dollar-for-dollar – rather than passing some of these costs on to customers. CARB Staff makes this assumption also (see page 105 of the Staff Report). In actuality, given the generally highly competitive nature of the electroplating/metal finishing industry and intense interstate and international competition for the industry, near zero pass-through of regulatory costs is the likely outcome in practice. The most recent analysis of likely pass-through of regulatory costs in the electroplating industry of which we are aware is U.S. EPA's economic analysis in 2002 of the impact of the proposed Metal Products and Machinery effluent guidelines on the job shop metal finishing industry. In this analysis, based on examination of various factors such as concentration ratios, degree of import competition, barriers to entry and profit margins, EPA estimated that metal finishing job shops had "low" potential relative to other industries for passing regulatory costs on to their customers. Based on an econometric analysis, EPA ultimately estimated that 25% of the regulatory costs for job shop metal finishers would be passed through to customers. (67 Fed. Reg. at page 38770 (June 5, 2002). If we were to adopt for this regulation EPA's estimate that 25% of regulatory costs could be passed through to customers, affected California electroplaters would absorb costs amounting to 3/4 of the compliance costs averaging $21,800 per facility per year, or $16,350 per year. Under this assumption of cost pass-through, the proposed CARB regulation would reduce affected California business' profitability by an average of 45.2%. This would still be a devastating impact. We believe the more likely case, though, is near-zero pass through of regulatory costs, as CARB Staff has assumed.

profit amount.

- Analyzed in this manner, using CARB's estimate of compliance costs per facility per year and OSHA's estimate of profits per facility per year, the reduction in profitability for the average affected facility will be 60.2%, vastly higher than the 9% figure that CARB Staff estimates.

Calculation #2, using data from the U.S. Census Bureau and from the Risk Management Association (RMA)

- The average electroplating facility in California had annual revenues of $1.498 million in 2002.[4]

- Based on data from Census and RMA, we estimate the long-term average pretax profitability of electroplating businesses to be 3.3% of revenues. See page 12 for how we derive this estimate.

- Combining the estimated revenues of $1.498 million per year per facility for California facilities with the profit rate of 3.3%, we estimate that the average California electroplating facility earns $49,434 in pretax profits per year.

- Using a combination of Census and RMA data, we estimate that CARB Staff's projected compliance cost of $21,800/year would **reduce the average affected California electroplating facility's profitability by 44.1%**

  - For the average affected California facility, $21,800 in additional environmental compliance expenses per year will reduce pre-tax profits from $49,434 to $27,634, a reduction of 44.1%

In sum, using two different data sets to generate the estimates, we estimate that CARB Staff's projected compliance cost of $21,800 per year per facility will **reduce the average affected California electroplating facility's profitability by 44% - 60%**, far more than CARB Staff's estimate of 9%.

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[4] Source: U.S. Census Bureau. 2002 Economic Census. Manufacturing Industry Series: Electroplating, Plating, Polishing, Anodizing and Coloring: 2002. Table 2. The Census found 570 facilities in California in this industry (NAICS 332813) in 2002, with total revenues of $854,029,000, for average revenues per facility of $1,498,296. The 2002 Economic Census is the most recent data source available for this 6-digit NAICS code. More recent Census information (e.g., the Annual Survey of Manufactures for 2003 and more recent years) do not provide a breakout at the 6-digit level for this industry.

Projected Electroplating Facility Closures Due to the Proposed Regulation

For an average affected electroplating facility, the proposed regulation will cause a 44% - 60% reduction in profitability, from a long-term average of 3.3% on sales (pretax) to roughly 1.3% - 1.8%. The represents a reduction in profit margin of 1.5 to 2.0 percentage points. If all affected facilities were to suffer this reduction in profit margin of 1.5 to 2.0 percentage points, then any facilities whose baseline long-term profitability was in the range of 1.5% to 2.0% or less would be changed by the regulation from profitable in the long term to unprofitable in the long term. Such a facility would be unable to pay the projected regulatory compliance costs and remain profitable. It would be forced to close by the regulation. We believe this provides a reasonable way to estimate how many facilities would be forced to close by the regulation – all those whose long-tem pretax profitability has been in the range of 1.5% to 2.0% or less of sales.

We have examined 11 years worth (1992 - 2002) of profitability data collected by Dun and Bradstreet for electroplating firms in order to estimate the fraction of these firms that have profitability in the range of 1.5% to 2.0% or less of sales.[5] Dun and Bradstreet provides information on the distribution of firms' post-tax return on sales. We converted Dun and Bradstreet's post-tax information to pre-tax estimates by assuming that firms earning this relatively low rate of return pay state and federal corporate income taxes at a rate averaging 20%. Thus, if Dun and Bradstreet were to report in some year that the lowest quartile (in terms of profitability) of electroplating firms earned, say, 1.2% on sales after taxes, we would then assume that this lowest quartile of firms earned 1.5% on sales before taxes (1.5% before taxes and a tax rate of 20% yields 1.2% after taxes). The following table provides our estimates of the fraction of electroplating firms in each year that earned less than 1.5% to 2.0% pre-tax on sales (1.2% to 1.6% post-tax on sales), using the Dun and Bradstreet data.

Approximate Percentage of Electroplating Firms With Pretax Profitability Less than 1.5% - 2.0% Pretax (1.2% - 1.6% Post-tax)

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Avg
%of firms	34	33	27	27	25	26	21	34	33	47	60	33

We thus estimate that roughly 30% of electroplating firms have profitability sufficiently low so that CARB Staff's projected compliance costs for the proposed regulation ($21,800 per facility per year) will cause them to close.[6] In California, among the estimated 228 affected electroplating facilities, roughly 68 if them will close.

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[5] Dun and Bradstreet. Industry Norms and Key Business Ratios. Desktop Editions, 1992-1993 through 2002-2003. Data for SIC 3471, plating and polishing.

[6] This estimate that about 1/3 of affected electroplating facilities would close when faced with regulatory costs averaging $21,800 per facility per year is roughly consistent with the U.S. EPA's recent estimates regarding electroplating facility closures from a proposed water pollution control regulation. In the Agency's economic impact analysis for the proposed Metal Products and Machinery effluent guideline, EPA found that 52% of all affected U.S. metal finishing job shops would close if they faced regulatory costs averaging roughly $61,000 per year per facility.

- **The proposed regulation will force the closure of roughly 30% of all affected California electroplating facilities, for a total of 68 facility closures.**

Projected Job Losses Due to the Proposed Regulation

The average California electroplating facility employs 20.3 people.[7] If 68 facilities close due to the proposed regulation, roughly 1,380 California jobs will be lost directly due to the proposed regulation. Assuming a direct impact in-State jobs multiplier of 1.8,[8] an additional 2,480 California jobs will be lost among California businesses that supply the electroplating facilities that will close and among other California businesses that sell to the electroplating employees that will lose their jobs.

- **We project that a total of 3,860 California jobs would be lost due to the proposed regulation.**

[7] Source: U.S. Census Bureau (2002) op cit., Table 2. 570 California electroplating facilities and total employment at these facilities of 11,586 workers gives 20.3 employees per facility.

[8] A direct effects in-State jobs multiplier is roughly typical of what will be found in the U.S. Department of Commerce, Bureau of Economic Analysis RIMS II Regional Input-Output Multipliers.

CARB Staff's Compliance Cost Estimate:

The Staff Report nowhere presents the Staff's cost estimates in "annualized" terms – the levelized annual amount of costs which, if incurred each year forever, would exactly equal the total of capital, one-time and recurring costs. One needs to express costs in annualized terms, as the amount that will be incurred each year, so as to be able to compare costs against an affected business' annual profits. A comparison of costs against profits for an affected business is the key first step in estimating economic impacts.

We can, however, estimate what CARB Staff would calculate annualized costs to be. CARB Staff estimates compliance costs of:[9]

- $9.6 million Capital costs for add-on air pollution control devices
- $3.6 million Recurring costs (every year) for operation & maintenance of these devices, purchase of fume suppressants, etc.
- $1.0 million Additional costs for "reports, source testing, permit fees, and site-specific analyses"

It's not clear how CARB Staff intend the $1.0 million in additional costs to be interpreted, but we will interpret them as capital costs akin to those for add-on air pollution control devices.[10]

CARB Staff annualizes (amortizes) the capital costs by assuming a useful life of 10 years and applying a discount rate of 5 % per year.[11] This yields a capital recovery factor (CRF) of 0.1295 (see page 108 of the Staff Report). CARB Staff would then calculate the $10.6 million in capital costs as equivalent to $1.37 million per year in annualized costs ($10.6 million x 0.1295 = $1.37 million).

CARB Staff would thus estimate total annualized compliance costs as $4.97 million/year ($3.6 million/year in recurring costs, plus $1.37 million/year in annualized capital costs). Spread across 228 affected facilities, this amounts to an average compliance cost of $21,800 per year per affected

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[9] These figures are taken from the Staff Report, page ES-16. Slightly different figures can be obtained by adding the numbers provided in the Staff Report Chapter X, pages 109 - 111. We will use the figures provided in the Executive Summary.

[10] We would guess that some of these costs are actually one-time costs (a site-specific analysis), some are costs that need to be incurred every several years (e.g., a permit fee for a permit that must be renewed every five years), and some may be recurring costs that are incurred every year (e.g., record-keeping, reporting). Nevertheless, we are probably roughly correct if we treat them all like capital costs – they are incurred in the first year and then, depending on their "useful life", they will be incurred again some years in the future.

[11] We disagree with CARB Staff's choice of a 5% discount rate. It is unrealistically low. Businesses in this industry would likely use a discount rate of 10 - 20% (nominal) in doing pay-back calculations when evaluating whether or not to make capital investments. This would suggest a real discount rate for annualization calculations of roughly 7 - 15%, representing the nominal rate less about 3 - 5% expected inflation. At the Federal level, OMB requires Federal agencies to use a real discount rate of 7%. Using a 7% discount rate would increase the CRF by about 10% relative to CARB Staff's 0.1295 figure.

facility.[12]

Shortcomings in CARB Staff's Analysis Concluding That the Regulation Will Reduce Average Profitability by Only 9%

How does CARB Staff reach this erroneous conclusion? We don't know. CARB Staff provides 1 ½ pages describing their approach for evaluating the potential economic impact of the proposed regulations (pages 105 - 106 of the Staff Report), but does not include in this description any of the actual data or calculations that were used. CARB Staff does not indicate what pre-regulation profitability is assumed for affected businesses nor what post-regulation profitability is estimated. The reader is provided only with the result of CARB Staff's calculation to the effect that post-regulation profitability is 9% lower than pre-regulation profitability, a reduction that Staff asserts "does not represent a noticeable decline in the profitability of most affected businesses." (Page 106)

This lack of adequate documentation makes it difficult to comment meaningfully on CARB Staff's economic impact analysis.

Nevertheless, CARB Staff does describe on page 105 some elements of their analytical approach. We object strongly to several aspects of how they have apparently performed the analysis.

First, CARB Staff's choice of the Dun and Bradstreet data series to represent "a typical business engaged in plating and polishing businesses" is poor. We agree that SIC 3471 (NAICS 332813) is the correct industry to evaluate. The Dun and Bradstreet data on this industry, however, is limited and biased, and does not provide an accurate picture of "a typical business engaged in plating and polishing". Using the Dun and Bradstreet data in an attempt to estimate the annual profits of a typical electroplating firm, whether in the U.S. in general or in California in particular, will result in a serious overestimate. In then comparing regulatory compliance costs against a too-high estimate of electroplating facility profits, CARB Staff will obtain a much too low estimate of economic impacts.

Indeed, we formerly used the Dun and Bradstreet data on SIC 3471 for a variety of economic analysis purposes relating to the electroplating industry. However, we abandoned use of this data series in 2002 for several reasons.

1. Declining coverage of the electroplating industry. Dun and Bradstreet (D&B), as well as a competitor in providing industry financial information, Risk Management Associates (RMA), develop data on an industry by collecting the financial statements of firms in that industry. The data profiles that D&B or RMA then provide describing an industry such as electroplating represent the average or other

[12] Note that the CARB Staff report nowhere indicates what the annualized compliance cost per average facility is expected to be. On page 106, the Staff Report cites "an average compliance cost for all facilities of $23,000", but provides no indication whether this cost is an annual figure or a one-time figure. We guess that CARB Staff means this to be an annual figure; it is very close to the $21,800 per year per facility figure that we can generate using CARB Staff's raw figures.

statistics (e.g., the 25th percentile, the median, etc.) across the financial statements D&B or RMA have obtained for firms in that industry. An initial concern with the D&B data on the electroplating industry is the declining number of financial statements they have obtained in recent years from firms in this industry. The following table shows the number of financial statements obtained and aggregated into an overall electroplating industry profile by D&B and by RMA in years since 1991.

Number of Financial Statements or Establishments Used to Derive Ratios. SIC 3471

Year	D&B: "Industry Norms and Key Business Ratios"	RMA: "Statement Studies"
1992	449	?
1993	468	?
1994	398	?
1995	347	?
1996	461	?
1997	262	?
1998	216	160
1999	155	156
2000	135	155
2001	55	170
2002	97	167
2003	?	182
2004	?	175

In 2002, we decided to switch from using D&B to using RMA data for profiling electroplating firms because of the much larger sample of such firms represented in recent years in the RMA collection of financial statements.

2. Bias in the electroplating data profiles toward larger and more profitable firms. Both D&B and RMA suffer from this problem. Both D&B and RMA collect the financial statements that comprise their industry profiles from affiliated banks and other financial institutions. The financial statements that are voluntarily provided to D&B and RMA are for the banks' and other financial institutions' customers and prospective customers. Electroplating firms seeking bank loans or issuing debt or equity through other financial institutions are mostly the more profitable, larger firms. Smaller electroplating firms are often individually or family-owned, and they are often provided with debt or equity capital directly from their individual owners rather than from financial institutions. Smaller electroplating firms often are not sufficiently credit-worthy to approach a bank at all about a commercial loan, or they may obtain a bank loan but their loan may be personally guaranteed by the owner and the bank may not obtain a financial

statement for the business. Banks are much less likely to obtain financial statements from smaller electroplating firms, and D&B and RMA are thus more likely to have in their data pools financial statements from larger and more profitable firms.

Some indication of this bias can be obtained by comparing the Census data for 2002 for SIC 3471 (which represents the collection of information from virtually every electroplating facility) against D&B and RMA data for this industry for this year. Census counts 3,050 electroplating establishments, with average revenues of $1.799 million per establishment. D&B's compilation includes data for only 97 electroplating establishments , with average revenues of $2.529 million each, nearly 50% higher than the presumably accurate industry average figure obtained by the Census. RMA provides data for 167 firms, only 58 of which have revenues of less than $3 million per year.

The nature of the bias resulting from the D&B and RMA manner of collecting data is further suggested by the first table on page 12. From this table, consisting of 10 years of RMA data on electroplating firms, it is immediately apparent that large electroplating firms tend to be far more profitable than small firms. Over the ten year period, firms with revenues of less than $1 million per year earned pre-tax profits averaging only 0.6% of sales, while the largest electroplating firms, those with annual revenues exceeding $25 million, earned pre-tax profits averaging 5.4% of sales. The relationship between profitability and size of firm is nearly unifomly increasing across all the size categories.

The substantial bias toward unrepresentatively large and profitable firms is why both we and CARB Staff should choose to use Census and/or IRS data when creating a financial profile of electroplating firms. The Census data is a nearly complete census, while the information in IRS' "Corporation Source Book"(which U.S. OSHA used in generating the profitability figure that we used in our initial economic impact calculation) derives from a representative stratified random sample of firms.

Although both the D&B and RMA profile data on electroplaters are clearly biased toward larger and more profitable firms, a crucial distinction between these two data sets is that the RMA data are presented in a manner such that this bias can be reduced or eliminated. This is not possible with the D&B data. The RMA profitability data are provided with a breakout by size class of firm. One can obtain the average profitability for firms in each size class (as shown in the first table on page 12) and then estimate reasonably accurately the average profitability across all electroplating firms by combining this data on profitability by size class with information from Census on the true distribution of firms across size classes. This is what we do on the second table on page 12. We use this procedure to estimate reasonably accurately that the average pretax profit rate across the entire industry in 2002 was 3.3% of sales. In estimating the annual profits of an average electroplating firm in California, then, we multiply this reasonably accurate estimate of profitability against presumably accurate revenue information from Census.

We are quite certain that whatever estimate CARB Staff drew from the D&B data for the average profitability of firms across the electroplating industry is substantially overstated. The D&B data are not available broken down by size class of firm or facility, so one cannot apply to the D&B data the disaggregation process that we applied to correct the bias in profitability data in the RMA data set. If

CARB Staff persist in using the D&B sample to estimate the profitability of an average electroplating firm, they will be stuck with the fact that the D&B sample disproportionally includes larger and thus more profitable firms. The average or median profitability of the electroplating firms in the D&B data set is undoubtedly far higher than the true average profitability of electroplating firms in the U.S. or in California.

We suspect that CARB Staff may have used the D&B data to estimate not only the profitability of an average electroplating firm, but also the size of the average electroplating firm. Doing so would compound the overestimate inherent in using the D&B data. We suspect that CARB Staff's economic impact analysis involves comparing the annual profits of an average electroplating firm against the annualized compliance cost for an average affected electroplating firm. We suspect that CARB Staff estimated the annual profits of an average electroplating firm by multiplying:

(1) The estimated average profitability of an electroplating firm (return on sales, ROE, etc.)

by

(2) The estimated average size of an electroplating firm (sales, owner's equity, etc.).

Both quantities (1) and (2) are seriously overstated in the D&B database. If CARB Staff in fact used the D&B profile in this manner, we would not be surprised if the annual profits of an average electroplating firm or facility were overestimated by a factor of 4 -5.

3. The D&B profitability data are specified on an after-tax basis. Our third problem with using the D&B data is that they are provided only on an after-tax basis. In the D&B industry profile, each of the profitability measures that are provided – return on sales, return on assets, and return on net worth – are on an after-tax basis. This forces the analyst to conduct the analysis on an after-tax basis rather than a before-tax basis, which we believe to be far better. We will explain why.

The CARB Staff appears to conduct their economic impact analysis on an after-tax basis. It appears from the discussion on page 105 of the Staff Report that the Staff estimates compliance costs for an affected facility, assumes that these costs are deductible for tax purposes at maximum marginal Federal and California State corporate income tax rates, and then calculates the after-tax compliance costs as 55.7% of the pretax compliance costs. CARB Staff assume that every facility affected by the proposed regulation benefits from a tax shield of 44.3%, consisting of 35% for Federal corporate income tax and 9.3% for State corporate income tax. This is highly inappropriate. Most electroplating firms are small enough and/or insufficiently profitable so that they do not pay Federal and State taxes at the highest marginal rate. U.S. OSHA calculates the average annual taxable income for an electroplating firm at some $36,000, which would put the marginal Federal corporate income tax rate at 15%, not 35%. Many electroplating firms suffered substantial losses during the manufacturing recession several years ago and have not yet recovered; they carry forward substantial tax losses that make their marginal tax rate effectively zero for some years to come. Some electroplating firms are organized as partnerships or Subchapter S corporations, which receive different tax treatment and different marginal tax rates.

We doubt that CARB Staff can accurately estimate the marginal tax rates that affected electroplating firms in California will face over the next several years. The answer certainly is not 44.3%. CARB Staff should conduct the economic impact analysis on a before-tax basis and thereby avoid the likely error in estimating realistically what the average tax shield is likely to be. CARB Staff should estimate pre-tax profits and profitability for an average affected facility, compare the estimated average compliance costs against these figures, without concern for tax shield, and then estimate the resulting percentage reduction in pretax profitability. Using the post-tax D&B data would not be appropriate in this calculation.

Annual Sales	Electroplating Industry (SIC 3471, NAICS 332813) Pretax Profits as Percentage of Sales (Source: RMA Statement Studies, various issues)										
	93 - 94	94 - 95	95 - 96	97 - 98	98 - 99	00 - 01	01 - 02	02 - 03	03 - 04	04 - 05	Average
0-1million $	4.3%	4.4%	5.4%	3.3%	-3.2%	xxx	-2.8%	0.5%	1.2%	-7.3%	**0.6%**
1-3 million $	2.7%	5.9%	3.5%	4.3%	-1.5%	1.4%	-2.8%	-0.8%	-0.6%	2.1%	**1.4%**
3-5 million $	5.4%	5.5%	9.4%	4.5%	4.5%	4.8%	1.7%	-0.2%	0.9%	4.6%	**4.1%**
5-10 million $	5.9%	7.3%	5.1%	6.5%	5.2%	6.9%	0.5%	1.1%	2.2%	4.6%	**4.5%**
10-25 million $	6.9%	6.7%	5.0%	8.7%	7.9%	5.6%	4.0%	5.4%	4.8%	1.9%	**5.7%**
25 million $ & Over	xxx	6.5%	7.9%	5.4%	8.2%	5.4%	2.3%	5.2%	3.9%	4.0%	**5.4%**

xxx -- Not reported

Data for Electroplating Facilities (NAICS 332813 or SIC 3471) by Size of Establishment. For 2002, Entire Nation

2002		$ in thousands			$ in thousands
Size class (# employees)	# Establishments	Value of Shipments/Sales	Sales per Facility	Est. Pretax Profit Rate	Total Pretax Profits
1 - 4	1092	175,747	160.9	0.6%	1,054.5
5 - 9	499	289,586	580.3	0.6%	1,737.5
10 - 19	632	717,114	1,134.7	1.4%	10,039.6
20 - 49	504	1,337,028	2,652.8	1.4%	18,718.4
50 - 99	226	1,478,563	6,542.3	4.5%	66,535.3
100 - 249	86	1,125,591	13,088.3	5.7%	64,158.7
250 - 499	8	186,527	23,315.9	5.7%	10,632.0
500 - 999	3	177,436	59,145.3	5.4%	9,581.5
1,000 - 2,499	0				
2,500 or more	0				
All facilities	3050	5,487,582	1,799.2	3.3%	182,457.6

Dividing total pretax profits for all facilities by value of shipments/sales for all facilities, one obtains an average industry pretax profit rate of 3.3%

Data in the first four columns of this table are taken directly from the 2002 Census. The fifth column (estimated pretax profit rate) is taken from the previous table; the RMA data on profitability by size class. For example, electroplating facilities with 50 - 99 employees have average sales per facility of $6.5 million per year. The first table indicates that a facility with this amount of sales should earn pretax profits at an average rate of 4.5% of sales. We multiply these average profit rates in the fifth column by the total sales in the size

class (the third column) in order to estimate the final column of the second table, the total pretax profits in the size class. Finally, the average pretax profit rate of 3.3% calculated across the entire industry is the ratio between pretax profits in the entire industry ($182.5 million) and sales in the entire industry ($5.49 billion).

ATTACHMENT 10

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Proposed ATCM for Chrome Plating and Chromic Acid Anodizing Operations:

Cost per Cancer Case Avoided and Comparison of Benefits and Costs

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September 25, 2006

Summary

CARB Staff have not prepared estimates of the population risks or total number of cancer cases that will be avoided by the proposed regulation. This lack of information prevents the public from commenting effectively on the proposed regulation, since the public is not provided with information regarding the cost-effectiveness of the proposed rule (the cost per cancer case avoided) or information regarding the monetized benefits of the proposed rule (for comparison against the costs of the rule).

Using CARB Staff's conservative modeling assumptions and CARB Staff's (too low) estimate of compliance costs for the proposed rule, we have prepared an estimate of the cost per cancer case avoided by the rule, and a comparison of the rule's benefits against its costs. We conclude:

- **The rule avoids approximately 0.0323 cancer cases per year, at a cost of $154 million per cancer case avoided.. The proposed rule is extremely cost-ineffective. This cost per cancer case avoided is some eight (8) to 15,000 times higher than the least cost-effective previous ATCM promulgated by CARB.**

- **The monetized value of the health benefits generated by the proposed rule is only $28,000 - $175,000 per year in comparison to the rule's costs of $4.97 million per year. The costs of the proposed regulation are some 30 to 180 times larger than the benefits.**

Estimated Cost Per Cancer Case Avoided by the Proposed Regulation

CARB Staff have estimated, based on a chain of worst-case modeling assumptions, the maximum individual lifetime cancer risk (MICR) for each chrome plating and chromic acid anodizing facility based on the facilities' baseline 2005 emissions. (See page 75 of the Staff Report.) The MICR is calculated at the predicted point of highest modeled hexavelent chromium concentration downwind of each facility, either 20 meters from a facility (for a volume source) or 30 meters from a facility (for a point source). The Staff Report provides a figure showing how the concentration of hexavalent chromium declines from this maximum with increasing distance from the facility (page 72). The Staff Report does not provide any indication of the even greater reduction below the maximum that would be experienced at locations up-wind or side-gradient.

It is clear that the vast majority of individuals that are exposed to hexavalent chromium emissions from a facility will be exposed at concentrations substantially less than those prevailing at the single point of maximum concentration. There may be no individuals at all located at the single point of maximum concentration. If there is a roughly constant spatial density of population around a facility, then there will be: a) Many more people located far from a facility than are located near it; and b) Many more people located off-axis (not directly downwind) of a facility than are located on-axis.

There are thus several reasons why the average cancer risk experienced by those individuals who

are exposed to hexavalent chromium emissions from an electroplating facility will be far less than the MICR calculated by CARB staff for each facility:

- Actual risks will be far lower than the maximum risks modeled by CARB Staff because of the Staff's conservative, worst case (not "best estimate") modeling assumptions.

- Most individuals surrounding a facility are off-axis and much farther from the facility than the point of maximum concentration, and hence are subject to much lower risks than would be incurred for an individual located at the point of maximum concentration.

In order to estimate the number of cancer cases that will be avoided by the proposed regulation, CARB Staff would need to estimate: 1) the average (not maximum) expected (not worst case) concentration at which individuals surrounding an electroplating facility are exposed; and 2) the number of individuals so exposed. CARB Staff apparently have not conducted any analysis to estimate these two quantities. Thus, CARB Staff have estimated for each facility only the maximum individual risk for a hypothetical most exposed individual. CARB Staff have not developed the information that would be necessary to estimate the population risk (i.e., the number of cancer cases expected to occur among the entire exposed population) posed by each facility. Information on population risks is necessary if one is to estimate the number of cancer cases prevented by the regulation and, ultimately, the benefits of the regulation.

The failure by CARB Staff to estimate the population risks avoided by the proposed regulation is unfortunate. In our view, this sort of quantitative information about the benefits expected from a regulation is crucial to meaningful public review of the proposal. CARB Staff has prepared such an estimate of population risks avoided for other regulations; see, for example, the CARB Staff Report for Airborne Toxic Control Measure for Emissions of Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities, March, 2000.) In the absence of such an estimate from CARB Staff for the proposed regulation, the affected industry has prepared its own best estimate. The industry estimate of baseline 2005 population cancer risks posed by hexavalent chromium emissions from chrome plating and chromic acid anodizing operations – prepared using the conservative modeling assumptions found within the Staff Report – will be provided in industry's comments to the California Air Resources Board.

Industry estimates that baseline cancer risks from hexavalent chromium emissions from these facilities amount to 4.11 cases in an assumed 70 year lifespan for the population of individuals exposed around these facilities. See Table 1 in industry comments.

Assuming conservatively that the PAATCM results in elimination of all emissions of hexavalent chromium from electroplating facilities, the proposal would abate 0.0587 cancer cases per year among the entire population exposed to these emissions in the baseline.[1] If the proposed regulation is something less than 100% effective in reducing baseline cancer cases, then the reduction would be fewer than 0.0587 cases per year. We will assume that the proposal will avoid a similar fraction of baseline estimated cancers as the fraction of baseline hexavalent chromium emissions that the proposal will abate – 55 %, according to CARB Staff (page 81 in

[1] 4.11 cases over a 70-year lifetime amounts to 4.11/70 = 0.0587 cases avoided per year.

the Staff Report). In this case, we estimate that the proposal would abate 0.0323 cancer cases per year.

The PAATCM is estimated by CARB Staff to cost an annualized amount of $4.97 million/year (see page ES-16 of the Staff Report and our paper on economic impacts from the proposed regulation). At a cost of $4.97 million/year and 0.0323 cancer cases avoided per year, the PAATCM would avoid a case of cancer at a cost of nearly $154 million. **At $154 million per cancer case avoided, the PAATCM would be by far the least cost-effective ATCM promulgated by CARB.**[2] Other ATCMs adopted by CARB have cost between $10,000 and $60,000 per cancer case avoided.[3] The PAATCM avoids cancer cases at a cost that is some eight (8) to 15,000 times higher than the least cost-effective previous regulations.

Benefits and Costs of the Proposed Regulation

We can estimate the monetized benefits of the PAATCM using a methodology and values developed by the U.S. Occupational Safety and Health Administration for their recent regulatory impact analysis in support of revisions to the Permissible Exposure Limit (PEL) for occupational exposures to hexavalent chromium.[4] The following are the key data or estimates that OSHA used in its analysis:

- 88% of lung cancer cases from hexavalent chromium exposure are fatal, 12% are non-fatal

- The value of a statistical life (VSL) is $6.9 million in 2003 dollars. Each fatal cancer that is prevented by a regulation is worth $6.9 million in 2003 dollars.

- VSL will increase in real terms from the baseline year of 2003 until the year when the regulation takes effect to reflect the increase in individuals' real income over that period.

- Lung cancer has a long latency period, likely somewhere between 15 and 30 years. Preventing exposure to hexavalent chromium now avoids cancers on average some 15 to 30 years in the future. The dollar value of avoiding a cancer death many years in the future is less than the dollar value of avoiding a cancer death now. The value of the statistical lives saved in the future should be discounted back to the present, using possible discount rates of either 3% or 7% per year.

- Avoided non-fatal cancers may be valued by either of two approaches: using a cost-of-illness (COI) method (results in a value of $188,502 per case in 2003 dollars) or using an estimate that values them at 58% of the value for a fatal cancer (results in a value of

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[2] The PAATCM is expected to abate no non-cancer health effects, since there is no facility for which baseline hexavalent chromium emissions are sufficient to exceed a threshold for non-cancer effects. Lung cancers from hexavalent chromium exposure constitute the only health effect that will be avoided by the proposed regulation.

[3] See Chlorinated ATCM Report, Table IX-11, Pge IX-24

[4] U.S. Occupational Safety and Health Administration. Final Economic and Regulatory Flexibility Analysis for OSHA's Final Standard for Occupational Exposure to Hexavalent Chromium. February 23, 2006. See Chapter VI, Benefits and Net Benefits.

about $4 million in 2003 dollars). The value of avoided future non-fatal cancers should be discounted back to the present in a manner similar to how the VSL is discounted.

Applying this information, OSHA estimated the following range of values (in 2003 dollars) for avoided fatal cancers and for avoided non-fatal cancers:

- Lower estimates: Value of avoided lung cancer death $1.0 million
  Value of avoided non-fatal cancer $0.022 million

  These lower estimates result assuming a low rate of annual increase in real income, a 30 year average latency period between exposure to hexavalent chromium and lung cancer, a COI valuation for non-fatal lung cancers, and a 7% discount rate.

- Higher estimates: Value of avoided lung cancer death $5.7 million
  Value of avoided non-fatal cancer $3.3 million

  These higher estimates result assuming a high rate of annual increase in real income, a 15 year average latency period between exposure to hexavalent chromium and lung cancer, a valuation for non-fatal lung cancers based on 58% of VSL, and a 3% discount rate.

We can use these figures developed by U.S. OSHA to value the 0.0323 cancer cases per year that we estimate would be avoided by the PAATCM.

88% of these cases will be fatal, giving an estimated 0.0284 fatal cases avoided per year. 12% of these cases will be non-fatal, giving an estimated 0.0039 non-fatal cases avoided per year. Valuing these avoided cases at U.S. OSHA's figures, we estimate the value of the health effects avoided by the PAATCM as:[5]

- $28,000 per year (lower estimate) to $175,000 per year (higher estimate).

The benefits of the proposed regulation are thus estimated at $28,000 - $175,000 per year, compared against costs estimated at $4.97 million per year. The monetized health benefits of the proposed regulation are very small compared with the costs of the regulation. **The costs of the proposed regulation are some 30 to 180 times larger than the benefits.**

[5] There are no health effects abated by the PAATCM other than fatal and non-fatal lung cancers.

ATTACHMENT 11

Suggested Amendments by Industry to Revision to the Proposed Chrome Plating ATCM

Alternative Proposal

Existing and Modified Facilities

- Control Requirement
  - ≤ 20,000 A-Hr: 0.01 mg/A-Hr
  - > 20,000 and ≤ 200,000 A-Hr: 0.0015 mg/A-Hr (HEPA equivalent) for all facilities within 25 meters or less of sensitive receptor; 0.01 mg/A-Hr for all facilities greater than 25 meters from sensitive receptor and MICR at 1: 1million or lower
  - > 200,000 A-Hr: 0.0015 mg/A-Hr (HEPA equivalent)
  - >15 grams per year: 0.0011 mg/A-Hr (HEPA and fume suppressant equivalent or AB2588)*

**0.0011 based on avg of 7 pre-2003 dec chrome source test results for HEPA and fume supp.*

- Backstop
  - HEPA and fume suppressant (0.0011 mg/amp-hours) if:
    - 3 strikes on emissions related violations in any five year period for facilities
- Enhanced Operator Compliance Demonstration
  - Stepped up recordkeeping and maintenance:
    - Daily recording of APC operating parameter, i.e., pressure drop across filters, properly operating nozzles, fan and motor, etc.
    - Conduct and record weekly smoke tests to ensure proper effluent capture efficiency
    - Maintain maintenance records for all related equipment
    - Retain purchase orders for filters and waste manifest for filter disposal for 2 years
  - Design criteria for APC, i.e. sight glass to inspect filters
  - Trained environmental compliance person, (i.e., attended CARB or district course approved by CARB) required at all times
- Enhanced Field Inspections and Compliance Demonstration
  - Complete annual field inspections by air district staff
  - Quarterly field inspections by air district staff, including periodic third party analysis of surface tension (currently facilities conduct daily on-site testing)
  - Source test requirements every 5 years at the air district's discretion
  - Smoke tests to be witnessed by compliance staff upon request
  - Standardized compliance/enforcement guidelines developed jointly by CARB and CAPCOA
  - Establish protocol to address inlet capture efficiency
  - Develop enhanced environmental compliance training classes to be offered by CARB and air districts

Compliance Schedule for Existing Facilities

- Submit compliance plan within 6 months, unless already submitted to local air agency
- ≤ 20,000 amp-hours: 6 months
- >20,000 and ≤200,000 A-Hr, >100 m: 4 years (0.01 mg/A-Hr in interim, after 6 months)
- >20,000 and ≤200,000 A-Hr, ≤100 m: 3 years (0.01 mg/A-Hr in interim, after 6 months)
- >200,000 A-Hr: 2 years (0.01 mg/A-Hr in interim, after 6 months)

New Facilities

- Control requirements:
  - 0.0011 mg/amp-hours (HEPA **and** fume suppressant equivalent)
- Buffer zone:
  - Site 300 meters from area:
    - zoned residential
    - zoned mixed use
    - **add** school or school under construction

Comparison with ATCM

Elements	Proposed State Chrome ATCM	ATCM with Suggested SCAQMD Amendments	ATCM with Industry Amendments
Existing Facilities ≤ 20,000 A-Hr	• 0.01 mg/A-Hr (No foam blanket)	• 0.01 mg/A-Hr (Any approved method)	• Same as SCAQMD
Existing Facilities >20,000 -≤200,000 A-Hr • Sensitive receptor ≤100 m • Sensitive receptor >100 m	• 0.0015 mg/A-H (2 years) • 0.0015 mg/A-H (5 years)	• 0.0015 mg/A-H (3 years) • 0.01 mg/A-H (interim, 6 mo) • 0.0015 mg/A-H (4 years) • 0.01 mg/A-H (interim, 6 mo)	• 0.0015 mg/A-H (2 years) • Sensitive receptor ≤25 m • 0.01 mg/A-H (6mo) • Sensitive receptor > 25m • MICR 1:1M or greater
Existing Facilities >200,000 A-Hr	• 0.0015 mg/A-H must use HEPA (2 years)	• 0.0015 mg/A-H any approved method (2 years)	• Same as SCAQMD
Existing Facilities >15 g/year	• AB2588	• 0.0011 mg/A-H (=HEPA and Fume) or AB2588	• Same as SCAQMD
Buffer zone for new facilities	• 150 meters • Zoned for residential or mixed use	• 300 meters • Add to ATCM school and school under construction	• Same as SCAQMD
Backstop	• None	• 3 strikes within 5 year: 0.0011 mg/A-H (=HEPA and Fume)	• Same as SCAQMD
Compliance	• Designated to local air agency's policy	• Complete annual inspection • Quarterly inspection • Source tests • Smoke tests • Standardized guidelines with CARB and CAPCOA • Enhanced training classes	• Same as SCAQMD
Recordkeeping	• Same	• Same, **PLUS** • Enhanced daily records for APC operating parameters • Weekly smoke tests • Maintenance records • Purchase orders for filters and waste manifest for disposal	• Same as SCAQMD
Training	• Same	• At all times, more frequent	• Same as SCAQMD