Air Resources Board

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MEMORANDUM

TO: Alan C. Lloyd, Ph.D.
Chairman

Honorable Board Members

FROM: Catherine Witherspoon
Executive Officer

DATE: April 20, 2004

SUBJECT: SENATE BILL 25 (CHILDREN'S ENVIRONMENTAL HEALTH) REQUIRED REVIEW OF NON-FERROUS METAL MELTING AIRBORNE TOXIC CONTROL MEASURE FOR LEAD EFFECTS

Background:

This memorandum is to present our findings and recommendations on the Senate Bill 25 (SB 25) required evaluation of Airborne Toxic Control Measures (ATCM) for control of lead. As you may know, SB 25 required the Office of Environmental Health Hazard Assessment (OEHHA) to develop a list of five chemicals identified as toxic air contaminants (TAC) that may cause infants and children to be more susceptible to illness. Lead was one of the five TACs listed by OEHHA in October 2001. SB 25 also requires that within two years of the establishment of that list, the Air Resources Board (ARB or Board) review and, if necessary, revise any control measure affecting those five TACs to ensure that the control measures adequately protect public health, particularly infants and children. The ATCM for Emissions of Toxic Metals from Non-ferrous Metal Melting (Metal Melting ATCM) adopted in 1993 regulates emissions of toxic metals including lead from facilities that melt certain metals.

Findings:

ARB staff evaluated the current control requirements and exemption levels for inorganic lead contained in the Metal Melting ATCM and found that these requirements were adequate to protect public health, particularly infants and children, and the emissions from these facilities would not pose a significant cancer or non-cancer health risk. Therefore, no revisions to the existing Metal Melting ATCM are recommended at this time.

Discussion:

When inorganic lead was identified as a TAC in 1997, it was found to be more potent as a neurodevelopmental toxicant than as a carcinogen. ARB staff subsequently developed risk management guidelines to assist the air districts in evaluating non-cancer risk due to emissions of lead to the air under the Assembly Bill (AB) 2588 Air Toxic "Hot Spots" Program and Toxic New Source Review regulations. The guidelines provide a methodology for estimating the non-cancer risk and recommend significant risk levels for evaluating new, modified, and existing sources of lead. This methodology also takes into account high exposure areas where children may have higher baseline blood lead levels due to exposure to lead paint. The Lead Risk Management Guidelines was used in this evaluation to determine if lead emission sources subject to the Metal Melting ATCM are likely to pose a significant cancer or non-cancer health risk.

With the help of the air districts, ARB staff surveyed the metal melting industry and found only five facilities in the state operating under the lead exemption provisions in the Metal Melting ATCM. Using site-specific meteorology and meteorology expected to represent the worst case 30-day air concentration, ARB staff modeled emissions from the two largest exempt sources. Using the definition of significant risk recommended in the Lead Risk Management Guidelines, this modeling indicated that, even in a high exposure area, the estimated concentrations of lead from these facilities would not result in a significant non-cancer risk to children. The potential cancer risk was also below one-in-one million for the modeled concentrations.

Lead emission sources subject to the control requirements of the Metal Melting ATCM were also evaluated using the lead risk management guidelines. We determined that lead emissions from these sources should not pose a significant cancer or non-cancer risk to children, even in a high exposure area.

ARB staff is continuing to look at additional lead sources and will be preparing a lead needs assessment document. Once the assessment is complete, additional control measures may be considered. Staff is working with OEHHA to determine if the current blood lead level of concern (10 micrograms per deciliter) is protective enough for children. Recent studies have detected neurodevelopmental effects at lower blood lead levels. Once we have completed the lead needs assessment and resolved the question regarding a protective blood lead level, we will provide this information to the Board.

Additional details on the staff's analysis are provided in our Technical Assessment entitled *Review of the Airborne Toxic Control Measure for Emissions of Toxic Metals from Non-ferrous Metal Melting.*

If you have any questions about the evaluation, please contact me at (916) 445-4383.

TECHNICAL ASSESSMENT

REVIEW OF THE AIRBORNE TOXIC CONTROL MEASURE FOR EMISSIONS OF TOXIC METALS FROM NON-FERROUS METAL MELTING

April 2004

INTRODUCTION

Senate Bill 25 (Escutia, 1999) added a new section to the Toxic Air Contaminant Program established in the Health and Safety Code (Chapter 3.5, section 39650 et seq.) with special provisions for children. In these provisions, the Office of Environmental Health Hazard Assessment (OEHHA) is required to develop a list of up to five toxic air contaminants (TACs) that may cause infants and children to be especially susceptible to illness. Lead was listed as one of those five chemicals by OEHHA in October 2001 (OEHHA, 2001). Senate Bill 25 (SB25) further requires the Air Resources Board (ARB or Board) to review affected airborne toxic control measures for the TACs on the list to ensure they adequately protect infants and children. This report provides ARB's findings and recommendations from the assessment of the existing Airborne Toxic Control Measure for Emissions of Toxic Metals from Non-ferrous Metal Melting (Metal Melting ATCM). This assessment was completed pursuant to the requirements of SB 25 to ensure that the ATCM continues to protect public health, particularly infants and children.

FINDINGS AND RECOMMENDATIONS

The Metal Melting ATCM adopted in 1993 regulates emissions of toxic metals from facilities that melt lead, copper, zinc, cadmium, aluminum, and their alloys. The Metal Melting ATCM includes limited exemptions for specific metals and for facilities melting small quantities of the regulated metals (see attachment A). ARB staff evaluated the current control requirements and exemption levels contained in the Metal Melting ATCM and found that these requirements were adequate to protect public health, particularly infants and children, and the emissions from these facilities would not pose a significant cancer or non-cancer health risk. Therefore, no revisions to the existing Metal Melting ATCM are recommended at this time.

BACKGROUND

The Metal Melting ATCM

The Metal Melting ATCM requires certain non-ferrous metal melting facilities to reduce emissions of particulate matter containing toxic metals such as arsenic, cadmium, lead and nickel by 99 percent. Operators must also comply with a fugitive emissions limit by implementing a dust control plan and complying with a visible emissions limit of less than 10 percent. A variety of exemptions are offered to small and low-emitting facilities.

The Lead Risk Management Guidelines

In June of 2001, the ARB released the Risk Management Guidelines for New, Modified, and Existing Sources of Lead. These guidelines are designed to assist the districts in evaluating risk due to lead emissions under the Assembly Bill 2588 Air Toxic "Hot Spots" program and Toxic New Source Review regulations. The guidelines provide a methodology for estimating the non-cancer risk due to emissions of lead to the air. In addition, the guidelines recommend significant risk levels for evaluating new, modified, and existing sources of lead. This methodology can be used to evaluate the increased risk of harmful blood lead levels due to the emissions of lead from a specific facility. It also takes into account high exposure areas where higher baseline blood lead levels are likely due to exposure to lead paint.

The neurodevelopmental effects of lead are related to blood lead levels. Blood lead levels reflect a number of biokinetic processes, and past and present exposure through a variety of pathways. For the non-cancer effects of lead, no threshold was identified below which exposure to lead was not expected to result in adverse health effects. The Lead Risk Management Guidelines identify baseline blood lead distributions selected to represent typical urban exposure to lead in soil, dust, water, food, air, and high exposure areas with a probability of elevated exposure to lead paint. The risk assessment method uses these baseline blood lead levels, the blood lead/air lead concentration relationship, and standard statistical procedures to find the probability of a child having a blood lead level greater than or equal to 10 micrograms per deciliter.

In the Air Toxic 'Hot Spots' Program, significant risk levels are selected by the air district and used to determine which facilities need to develop an Airborne Toxic Risk Reduction Plan to reduce their emissions to below the significant risk level. The Lead Risk Management Guidelines recommend a significant risk level probability of children having a blood lead level of 10 micrograms per deciliter of five percent or more. In a high exposure area, the recommended significant risk level is when a facility contributes 10 percent or more of the mean blood lead level corresponding to the total lead exposure (baseline plus facility contribution).

EVALUATION OF MELTING MELTING ATCM

Recent Lead Usage Survey

ARB staff contacted the districts to identify metal melting sources that were exempt from the Metal Melting ATCM because they were melting lead containing materials below the minimum levels established in the ATCM. ARB staff then contacted each of the identified facilities to determine the type and quantities of metal melted and whether they were equipped with air pollution controls. This survey found five facilities melting lead or lead based solder below the lead exemption levels in the ATCM. Three of the exempt facilities were melting between 80 to 155 tons per year of lead containing material; the other two were melting less than 10 tons per year.

Exposure and Risk Analysis

Staff re-evaluated the control requirements of the Metal Melting ATCM and determined that they represent best available control technology for this source category. Staff also evaluated the reported emissions from the largest sources subject to the control requirements of the Metal Melting ATCM. Using the ratio of emissions to air concentration for Facility 2 in Table 2, staff calculated the emission rate that would result in a significant risk in a high exposure area. This emission rate was greater than the emissions reported by any of the existing controlled sources to the U. S. Environmental Protection Agency or the Air Quality Management or Air Pollution Control Districts. As this analysis incorporates conservative exposure assumptions, staff has concluded that the regulations for lead emissions from existing controlled sources are adequately protective of public health.

Staff next performed an analysis to determine if the exemption levels for lead in the ATCM were still appropriate and heath protective for children. This analysis involved computer modeling for two of the largest exempted sources melting lead containing material. One source was an open-air (outdoor) operation with no air emission controls. The other source was an enclosed (indoor) operation equipped with a ventilation system. These two sources were chosen because they were exempt from the Metal Melting ATCM and were operating with no air emission controls.

The first source (Facility 1 in Table 1) was an open-air source with no emission controls. The facility is in Watsonville, in Monterey County, and melts 80 tons per year with a maximum of 1,800 pounds per day on an intermittent schedule. Computer modeling was conducted to estimate the 30-day average ambient lead concentrations near the source. The meteorological conditions used for the analysis were from the Watsonville meteorological data set. This meteorological data set was developed using three years of meteorological data taken at Watsonville. This data set best represents the actual meteorology at the source.

Using the source melt rate, the emission factors that were used in the development of the ATCM, and the Watsonville meteorology, staff determined the estimated ambient

lead concentration and compared it to the concentrations allowed in the Lead Risk Management Guidelines. Staff then calculated the maximum allowable melt rate for this source under the Lead Risk Management Guidelines for comparison with the exemption levels in the Metal Melting ATCM. Table 1 shows that the modeled 30-day average air lead concentration is almost five times less (0.028 versus 0.123) than the allowable under the Lead Risk Management Guidelines. For this facility, the annual melt rate is almost 20 times less (80 versus 1,440) than the allowable under the Lead Risk Management Guidelines.

The second source (Facility 2), located in the Mojave Desert Air Quality Management District, is an enclosed source with a ventilation system melting 155 tons per year of lead containing material. A modeling analysis similar to the one described above was done for this source. The site-specific meteorological set used was from Ontario. The results of this analysis are presented in Table 1. As shown in Table 1, the modeled 30-day average air lead concentration is 185 times less (0.0007 versus 0.123) than the allowable under the Lead Risk Management Guidelines. For this facility, the annual melt rate is over 100 times less (155 versus 28,000) than the allowable under the Lead Risk Management Guidelines.

Table 1: Results of Air Dispersion Modeling Using Site-Specific Met Conditions

Facility	Meteorological Set	30-day Average Air Concentration (micrograms/cubic meter)		Annual Melt Rate (tons/year)	
		Maximum Allowable (in high exposure area) under Lead RMG	Modeled Concentration	Maximum Melt Rate Allowable under Lead RMG	Actual Melt Rate
1	Watsonville	0.123	0.028	1,440	80
2	Ontario	0.123	0.0007	28,000	155

Staff performed a second analysis to determine if using more conservative meteorological conditions would result in potential concerns with the exemption levels in the Metal Melting ATCM. Staff modeled the two sources again using the West Los Angeles meteorological data set. Because of the low wind speeds and stable conditions, this meteorological data set consistently gives the most health protective modeling results. Table 2 shows that the modeled concentrations are 3 to 100 times less than the allowable concentrations for the 30-day average. Since the exemptions levels in the Metal Melting ATCM are significantly less than the maximum allowable levels indicated in the Lead Risk Management Guidelines, staff finds that the current exemption levels are sufficiently protective for children.

Table 2: Results of Air Dispersion Modeling Using Conservation Met Conditions

Facility	Meteorological Set	30-day Average Air Concentration (micrograms/cubic meter)		Annual Melt Rate (tons/year)	
		Maximum Allowable (in a high exposure area) under Lead RMG	Modeled Concentration	Maximum Melt Rate Allowable under Lead RMG	Actual Melt Rate
1	West LA	0.123	0.038	1,062	80
2	West LA	0.123	0.00117	16,295	155

REFERENCES

ARB, 1997. Proposed Identification of Inorganic Lead as a Toxic Air Contaminant Staff Report/Executive Summary, California Air Resources Board, March 1997.

ARB, 1992. Proposed Airborne Toxic Control Measure for Emissions of Toxic Metals from Non-ferrous Metal Melting (Staff Report and Technical Support Document), California Air Resources Board, October 1992.

ARB, 2001. Risk Management Guidelines for New, Modified, and Existing Sources of Lead, California Air Resources Board, March 2001.

OEHHA, 2001. Prioritization of Toxic Air Contaminants – Children's Environmental Health Protection Act, Office of Environmental Health Hazard Assessment, October 2001.

Attachment A

AIRBORNE TOXIC CONTROL MEASURE FOR EMISSIONS OF TOXIC METALS FROM NON-FERROUS METAL MELTING