SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Draft Staff Report
Proposed Rule 1407.1 – Emissions of Toxic Air Contaminants from Chromium Alloy Melting Operations

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INTRODUCTION

Proposed Rule 1407.1 – Emissions of Toxic Air Contaminants from Chromium Alloy Melting Operations (Proposed Rule 1407.1) is a source-specific rule that gathers information and quantifies arsenic, cadmium, chromium, hexavalent chromium, and nickel emissions from melting operations of metals that contain greater than 0.5% chromium content, including, but not limited to alloy steel, stainless steel, and superalloys. Metal melting operations, such as smelting, tinning, galvanizing, and other miscellaneous processes where metals are processed in molten form, have the potential to emit toxic air contaminants and particulate matter. Proposed Rule 1407.1 will focus on obtaining information regarding facility operations, furnaces, composition of metals, recordkeeping, and emissions testing. The provisions in Proposed Rule 1407.1 include requirements for submittal of an operational information survey, emissions testing, metals composition testing, and recordkeeping.

In March 2017, the SCAQMD adopted the Final 2016 Air Quality Management Plan (2016 AQMP). Control of Toxic Emissions from Metal Melting Facilities (TXM-06) is a control measure in the 2016 AQMP that seeks to further reduce arsenic, cadmium, nickel, other toxic metals, and particulates from foundry operations. This stationary source air toxic control strategy is not required by state or federal law, and thus is not a commitment under the State Implementation Plan.

REGULATORY HISTORY

Proposed Rule 1407.1 is a new rule and is associated with a similar rule, Rule 1407 – Control of Emissions of Arsenic, Cadmium, and Nickel from Non-Ferrous Metal Melting Operations. Rule 1407 was adopted in July 1994 to implement the non-ferrous metal melting Air Toxics Control Measure (ATCM) adopted by the California Air Resource Board (CARB) in October 1992. The ATCM and Rule 1407 require the reduction of emissions of arsenic, cadmium, and nickel by the installation of air pollution control equipment, parametric monitoring, and housekeeping practices to minimize fugitive particulate emissions. Non-ferrous metal melting operations were focused on due to known presence of arsenic and cadmium in these operations. Rule 1407 and the ATCM did not include ferrous metals since it was beyond the scope of the investigation. CARB intended to evaluate the need for proposed controls for ferrous metal melting operations in the future.

In 2015, to fill a regulatory gap, staff initiated the rule development process to amend Rule 1407 to address toxic air contaminant emissions from ferrous metal melting operations and update existing requirements for non-ferrous metal melting operations currently regulated under Rule 1407. After several working group meetings, industry stakeholders recommended that the proposed rule be separated into non-ferrous (Proposed Amended Rule 1407) and ferrous (Proposed Rule 1407.1) metal melting rules. Industry stakeholders had commented that there was insufficient evidence that hexavalent chromium was emitted from metal melting operations and were concerned about a one-size fits all approach since the type of toxic air contaminants emitted from non-ferrous and ferrous metal melting operations would differ. Additionally, although implementation of Rule 1407 would concurrently reduce hexavalent chromium emission reductions from ferrous metal melting operations, the level of control is probably not sufficient since hexavalent chromium is a more potent toxic air contaminant than arsenic, cadmium, and nickel which are the focus of Rule 1407. In April 2018, staff decided to bifurcate the two rules into non-chromium alloy (Rule 1407) and chromium alloy (Rule 1407.1) metal melting.

Staff bifurcated the two rules into non-chromium and chromium instead of non-ferrous and ferrous because certain ferrous alloys do not contain chromium and some non-ferrous alloys contain chromium. For example, superalloys, a non-ferrous metal, are alloyed with chromium and carbon steel, a ferrous metal, does not have a minimum specification or requirement for chromium. Therefore, the rules were divided on the potential to emit hexavalent chromium. It is expected that the level of pollution controls will be driven by the toxicity of the metal particulate. As discussed below under "Hexavalent Chromium Emissions Data", emissions data has shown that during the heating process, metals containing chromium can emit hexavalent chromium emissions. Since hexavalent chromium has a significantly higher cancer potency factor than other metal toxic air contaminants, staff separated the two rules based on chromium content of the alloys.

Currently, superalloys are regulated by Rule 1407, but are exempt due to their low arsenic and cadmium content. Melting operations of metals containing chromium, such as alloy steel and stainless steel are currently not regulated under a source-specific rule to address toxic air contaminant emissions. As a result, information regarding these metal melting operations is not readily available, housekeeping operations are not regulated, and a number of these furnaces may not be permitted. Proposed Rule 1407.1 is needed to fill a regulatory gap to address toxic air contaminant emissions from melting operations of metals containing chromium.

HEXAVALENT CHROMIUM EMISSIONS DATA

Ambient monitoring conducted in Paramount in 2016 and 2017 indicated that hexavalent chromium was being emitted by high-temperature metalworking operations. In October 2016, the SCAQMD deployed several ambient monitors in the mostly industrial areas of the City of Paramount. After an intensive investigation, in November 2016, SCAQMD determined that Aerocraft and a nearby facility was one of the sources of elevated levels of hexavalent chromium emissions. At Aerocraft, SCAQMD inspectors found hexavalent chromium in the dust collected in several different locations within the facility. Finding elevated levels of hexavalent chromium at Aerocraft was surprising, since the processes conducted at this facility were not previously known to generate large amounts of hexavalent chromium emissions. The carcinogenic substance was also found within Aerocraft's equipment for cooling its metal heat treating operations. In addition, a screening source test showed that hexavalent chromium emissions were being generated from the furnace that contained an alloy with a high percentage of chromium.

Hexavalent Chromium Screening Tests for Heat Treating and Forging Furnaces

SCAQMD conducted screening source tests on several heat treating and forging furnaces processing metals or using materials that contained chromium. During source testing, the furnaces operated between 1,725 to 2,100˚F and the results showed hexavalent chromium exhaust concentrations between 376 to 24,500 ng/m^3. Table 1.1 summarizes the results of the screening source tests of heat treating and forging furnaces.

Table 1.1: Screening Source Test of Heat Treating and Forging Furnaces

Source Test	Temperature (˚F)	Material	Hexavalent Chromium Concentration (ng/m^3)
Aerocraft Heat Treating Furnace[1]	2100	Inconel (14 to 30% chromium)	376
Mattco Forge Heat Treating Furnace[2]	2050	Metal parts with 15.53% chromium	2080
Weber Metals Heat Treating Furnace[3]	1725 to 1746	Titanium billets and potentially furnace components (refractory or stainless steel table)	24,500

These heat treating and forging furnaces were processing materials similar to the metals that are applicable to Proposed Rule 1407.1, but at lower temperatures. For metal forging operations, metals are heated to a soft and workable temperature, but not to a molten stage. Heat treating operations such as Aerocraft includes a number of controlled heating and cooling operations to bring about a desired change in the physical properties of the metal such as hardening, case hardening, annealing, normalizing, and tempering. Metal melting operations occur at higher temperatures than heat treating and forging operations. With the higher temperature required for chromium alloy melting, it is expected that hexavalent chromium emissions from melting operation will be similar or possibly higher. The source testing required in Proposed Rule 1407.1 is needed to quantify emissions to identify the appropriate level of pollution control.

Hexavalent Chromium Source Tests from Metal Melting Operations

Additionally, staff reviewed source test reports of metal melting operations. Most of these source tests only tested for elemental chromium and did not test for hexavalent chromium because it is a separate test and those operations were not expected to be a source of hexavalent chromium. Staff did find a source test, however, that tested for hexavalent chromium and found that there were hexavalent chromium emissions. The source test was conducted in December 1993 for Total Chromium and Hexavalent Chromium using CARB Method 425. Three 192-minutes runs were conducted while the furnace melted low carbon steel and grade B wrought carbon steel alloyed with low carbon ferro manganese, ferro silicon, and sorrel pig iron. Table 1.2 summarizes the alloying element content of low carbon steel and wrought carbon steel.

[1]SCAQMD,http://www.aqmd.gov/docs/default-source/compliance/Carlton-Forge-Works/aerocraft-16-334.pdf?sfvrsn=6
[2] SCAQMD, http://www.aqmd.gov/docs/default-source/compliance/Paramount/source-test-mattco.pdf?sfvrsn=6
[3] SCAQMD, http://www.aqmd.gov/docs/default-source/compliance/Paramount/source-test-weber.pdf?sfvrsn=6

Table 1.2: Alloying Element Content of Carbon Steel

Material	Carbon (%)	Manganese (%)	Phosphorous (%)	Sulfur (%)	Aluminum (%)	Titanium (%)	Silicon (%)
Low Carbon Steel*[4]	0.02 – 0.12	0.40 – 0.60	0.025 – 0.040	0.020 – 0.050	0.0 – 0.020	0.0 – 0.3	No specification
Wrought Carbon Steel – Grade B**[5]	0.30	1.00	0.035	0.035	No specification	No specification	0.60

* Residual amount of copper, nickel, molybdenum, and chromium.
** Up to 1.00% total of copper, nickel, molybdenum, chromium, and vanadium.

The three runs ranged from 2,711 to 4,064 pounds per melt. The source test report did not record the furnace temperatures, but carbon steel melts at 2,600 to 2,800˚F. Table 1.3 summarizes the results of the source test.

Table 1.3: Source Test Results

Run Number	Amount Processed (lbs)	Total Chromium Emissions (lbs)	Hexavalent Chromium Emissions (lbs)
1	2,810	0.00012	0.00004
2	4,064	0.00021	0.00016
3	2,711	0.00052	0.00038

Staff calculated the percentage of hexavalent chromium to total chromium from the source tests; Table 1.4 summarizes the results.

[4] Armco, http://www.armco.com.br/wp/wp-content/uploads/2011/08/BaixoCarbono_especificacaotecnica.pdf
[5] Steel Founders' Association of America, https://www.sfsa.org/publications/hbk/s2.pdf

Table 1.4: Percent of Hexavalent Chromium Emissions Relative to Total Chromium

Source Test	Total Chromium Emissions (lbs)	Hexavalent Chromium Emissions (lbs)	Percent of Hexavalent Chromium*
Run 1	0.00012	0.00004	33%
Run 2	0.00021	0.00016	76%
Run 3	0.00052	0.00038	73%

* Percent of Hexavalent Chromium to Total Chromium (Hexavalent Chromium / Chromium)

The source test showed that some chromium is converted to hexavalent chromium during carbon steel metal melting operations. The alloys melted during this source test contained less than 1 percent chromium; other chromium alloys can have as high as 28 percent chromium. Higher percentages of chromium in the alloy is expected to result in higher hexavalent chromium emissions. Additional emissions data is needed to quantify the amount of hexavalent chromium emissions occur from metal melting operations.

Hexavalent Chromium Emissions from Grinding and Plasma Arc Cutting

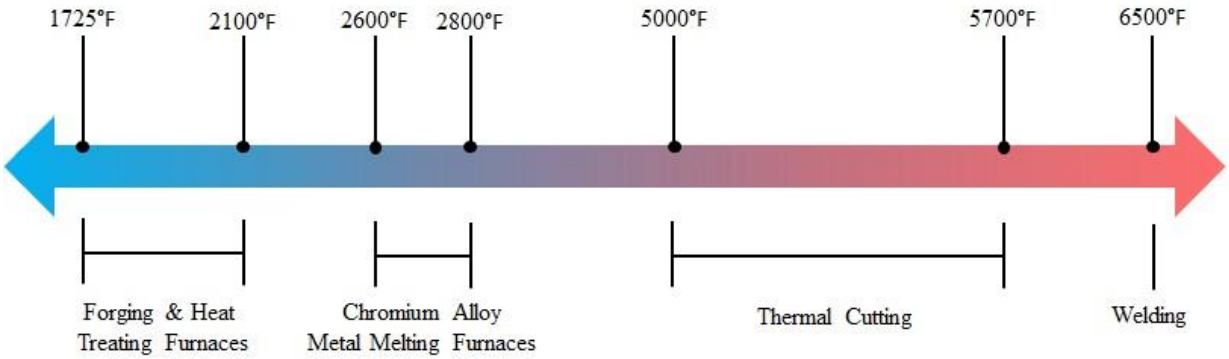
Welding and plasma arc cutting of metals were found to oxidize elemental chromium into the hexavalent state. U.S. Department of Labor Occupation Safety and Health Administration states that worker exposure to hexavalent chromium can occur during "hot work" such as welding of steels containing chromium metal.[6] The Department of Health and Human Services, Centers for Disease Control and Prevention, and National Institute for Occupational Safety and Health[7] noted that hexavalent chromium is formed as a by-product when metals containing metallic chromium are used, such as welding and the thermal cutting of metals and operations at steel mills, iron foundries, and steel foundries. These operations and processes use extremely high temperatures which result in the oxidation of the metallic forms of chromium to hexavalent chromium. Thermal cutting temperatures can reach as high as 5,700˚F while welding can produce temperatures as high as 6,500˚F. These activities utilize some of the highest temperatures amongst metal working processes.

Figure 1.1 below depicts the spectrum of operating temperatures for forging and heat treating furnaces, chromium alloy metal melting furnaces, thermal cutting, and welding. Throughout this temperature spectrum, testing results from SCAQMD or literature developed by other regulatory agencies indicated conversion of chromium to hexavalent chromium.

[6] U.S. Department of Labor Occupation Safety and Health Administration, https://www.osha.gov/SLTC/hexavalentchromium/

[7] Department of Health and Human Services, Centers for Disease Control and Prevention, and National Institute for Occupational Safety and Health, https://www.cdc.gov/niosh/docs/2013-128/pdfs/2013_128.pdf

Figure 1.1: Operating Temperatures of Metal Working Processes



METAL TOXIC AIR CONTAMINANTS AND HEALTH EFFECTS

Metal melting operations with chromium alloys, such as alloy steel, stainless steel, and superalloys can result in toxic air contaminant emissions of arsenic, cadmium, hexavalent chromium, and nickel. Table 1.5 provides a brief overview of the toxicity of these metals and potential health effects:

Table 1.5: Toxicity of Metals

Metal	US EPA Carcinogenic Classification[8]	Chronic Target Organs[9]
Arsenic	Carcinogenic to Humans	Inhalation & oral: Development; cardiovascular system; nervous system; respiratory system; skin
Cadmium	Likely to be Carcinogenic to Humans	Inhalation: Kidney; respiratory system Oral: kidney
Chromium (hexavalent)	Carcinogenic to Humans	Inhalation: Respiratory system Oral: Hematologic system
Nickel	Carcinogenic to Humans	Inhalation: Respiratory system; hematologic system Oral: Development

NEED FOR PROPOSED RULE 1407.1

Currently, superalloys are regulated by Rule 1407, but are exempt due to their low arsenic and cadmium content. Melting operations of ferrous metals containing chromium, such as alloy steel and stainless steel are currently not regulated under a source-specific rule to address toxic air

[8] California Office of Environmental Health Hazard Assessment, https://oehha.ca.gov/media/downloads/crnr/appendixa.pdf

[9] California Office of Environmental Health Hazard Assessment, https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary

contaminant emissions. Testing done at heat treating and forging operations, SCAQMD source tests of metal melting furnaces, and worker safety regulations in very high temperature welding and cutting operations bracket the temperature range for chromium metal melting operations and all indicate that hexavalent chromium emissions are occurring during chromium metal melting operations. Hexavalent chromium, and potentially other toxic air contaminants including arsenic, cadmium, and nickel, are being emitting from chromium metal melting operations that may be uncontrolled and are not regulated by a source-specific SCAQMD rule.

The rate of conversion from chromium to hexavalent chromium from Table 1.4 ranged from 33 to 76%. There is a wide range of conversion rates and data directly from chromium metal melting operations is limited, therefore, additional source tests are needed to quantify the amount of toxic air contaminant emissions. SCAQMD staff initially offered to conduct source tests at certain facilities at no charge, however facilities were non-responsive or declined. Staff then offered at subsequent working group meetings to conduct a free source test for any stakeholder subject to the proposed rule. At this time, no facility has agreed. The purpose of the rule is to require facilities to conduct those needed source tests. The tests will quantify arsenic, cadmium, hexavalent chromium, and nickel emissions by furnace types, sizes, and configurations and by various alloys. With that information, the appropriate pollution controls necessary to protect public health from arsenic, cadmium, hexavalent chromium, and nickel emissions from chromium metal melting operations can be identified.

AFFECTED INDUSTRIES

Approximately 14 facilities are expected to be impacted by Proposed Rule 1407.1. The facilities are foundries or metal casting businesses generally classified under the NAICS code 331XXX and 332XXX, including:

- 331110 Iron and Steel Mills and Ferroalloy Manufacturing;
- 331512 Steel Investment Foundries;
- 331513 Steel Foundries (except Investment); and
- 332XXX Metal Operations.

Iron and steel mills subject to Proposed Rule 1407.1 make alloy steel, stainless steel, and superalloy ingots or shapes including bars, plates, rods, sheets, strips, or wire. Steel foundries manufacture castings, including investment castings that leave a seamless mold providing a highly detailed and consistent casting. Steel foundries also make castings in which the molten metal is poured into a mold and allowed to solidify. Operations that cast molten metal into various parts and products are classified by the type of part they manufacture. Often these facilities cast parts for a wide variety of industries.

Mills and foundries melt and cast metals and their alloys. The alloys are a combination of metals and elements that provide qualities such as corrosion resistance or strength. Common alloy materials include chromium and nickel. Even when a pure metal is melted, it often contains trace contamination of other metals or elements. The metal, alloy, or contamination can consist of toxic air contaminants. Chromium, arsenic, and cadmium may be found as contaminants. Metal emissions may occur during metal melting, transfer, pouring, and sand reclamation. Emissions may also occur during casting shakeout when the casting is freed from the mold. Mechanical finishing operations, including abrasive blasting, burnishing, grinding, polishing and sawing, may

emit particulates possibly containing toxic air contaminants. Fugitive emissions may result from crushing, grinding, and handling of materials. Other potential sources of emissions are re-entrainment of surface dust by foot and vehicle traffic in areas of the facility where metal-containing particulate matter has been deposited. Lastly, emissions may occur from the collection points of an emission control device or from the exhaust of an emission control device.

The 14 facilities subject to Proposed Rule 1407.1 were identified by reviewing SCAQMD permits for furnaces, reviewing SCAQMD inspector reports for metal operations facilities, searching websites for facilities that offer metal melting services, and site visits to 11 of the 14 affected facilities. Facilities that conduct heat treating or other metalworking operation but do not melt the metal were excluded. Additionally, facilities that melt metals but do not melt alloy steel, stainless steel, or superalloys were excluded.

PUBLIC PROCESS

Proposed Rule 1407.1 is being conducted through a public process. A working group was formed to provide the public and stakeholders an opportunity to discuss the proposed rule and to provide the SCAQMD staff with input during the rule development process. The Working Group is comprised of representatives from industry, consultants, agency representatives, environmental groups, and community groups. The Working Group originally met under Proposed Amended Rule 1407 and had four Working Group Meetings. Based on industry stakeholder input, Proposed Amended Rule 1407 was separated into two rulemakings: Proposed Amended Rule 1407 and Proposed Rule 1407.1. Staff has held three additional Working Group Meetings since Proposed Rule 1407.1 was separated. The seven working group meetings were held at the SCAQMD Headquarters in Diamond Bar on the following dates: September 5, 2017, November 9, 2017, January 30, 2018, April 25, 2018, June 6, 2018, July 10, 2018, and August 9, 2018. A Public Workshop was held on August 30, 2018.

CHAPTER 2: SUMMARY OF PROPOSAL

INTRODUCTION

PROPOSED RULE 1407.1

INTRODUCTION

The primary objective of Proposed Rule 1407.1 is to gather information and to quantify the toxic air contaminant emissions from alloy steel, stainless steel, superalloys, or any chromium alloy containing greater than 0.5% chromium melting operations. The information obtained will be assessed to determine the appropriate pollution controls needed to reduce toxic air contaminant emissions from those operations.

PROPOSED RULE 1407.1

Purpose (Subdivision (a))

The purpose of Proposed Rule 1407.1 is to gather information to quantify arsenic, cadmium, chromium, hexavalent chromium, and nickel emissions from facilities conducting chromium alloy melting operations. Chromium alloys contain toxic air contaminants, such as arsenic, cadmium, and nickel, which have the potential to be emitted during metal melting operations. Additionally, these metals contain chromium, which has the potential to emit hexavalent chromium. A source test of a steel furnace showed that some chromium is converted to hexavalent chromium. However, additional emissions data is needed to quantify the type and amount of toxic air contaminant emissions that occurs during the melting process. The emissions data from testing and process data from operational information surveys will provide the necessary information to assess the need for future requirements.

The proposed purpose is as follows:

> *The purpose of this rule is to gather information and quantify arsenic, cadmium, chromium, hexavalent chromium, and nickel emissions from chromium alloy melting operations.*

Applicability (Subdivision (b))

Rule 1407 currently applies only to non-ferrous metal melting applications. Ferrous metal melting operations are not subject to an industry or equipment specific regulation to address toxic air contaminant emissions. Initially, during the rule development process one approach was to expand Rule 1407 to apply to all metal melting operations (non-ferrous and ferrous). Industry requested separating the rules because there was insufficient evidence that hexavalent chromium was emitted from metal melting operations and that the type of toxic air contaminants emitted from non-ferrous and ferrous metal melting operations could differ significantly.

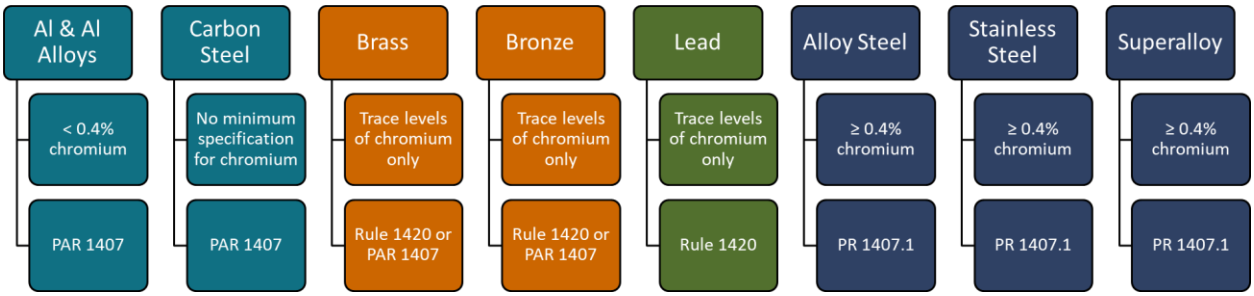
Staff agreed to bifurcate the proposed rules but did so based on the chromium content in the metal or alloy. Hexavalent chromium has a cancer potency factor that is one or more orders of magnitude higher than arsenic, cadmium, or nickel. Thus emissions of hexavalent chromium would likely need more stringent controls than other metal toxic air contaminants. Separating the proposed rules based on iron content (ferrous and non-ferrous) is not an indicator of chromium content, as superalloys are non-ferrous alloys with high levels of chromium, while iron and carbon steel have high iron content, but are expected to have only trace chromium content as impurities.

Staff reviewed the composition of metal alloys. Staff determined that aluminum alloys have less than 0.4% chromium content with Aluminum 6066 being the aluminum alloy with the highest chromium content. Brass, bronze, and lead alloys are expected to have only trace contaminant quantities of chromium. Carbon steel and iron have no minimum specifications for chromium, but

are also expected to have only trace contaminants. Alloy steel, stainless steel, and superalloys are expected to have a chromium content greater than 0.4%. Therefore, Proposed Rule 1407.1 will apply to chromium alloys, which is defined as a metal that is an alloy steel, stainless steel, superalloy, or any metal that is at least 0.5% chromium by weight.

With the adoption of Proposed Rule 1407.1 and Proposed Amended Rule 1407, metal melting operations will be regulated by metal or alloy as depicted in Figure 2-1 below.

Figure 2.1: SCAQMD Rules by Metal Type



The proposed applicability is as follows:

> *This rule shall apply to the owner or operator of any facility conducting chromium alloy melting operation(s) including, but not limited to, smelters (primary and secondary), foundries, die-casters, and other miscellaneous melting processes.*

Definitions (Subdivision (c))

Proposed Rule 1407.1 includes definitions to clarify and explain key concepts. Please refer to Proposed Rule 1407.1 subdivision (c) for each definition.

Proposed Definitions:

Alloy Steel
Casting
Chromium Alloy
Die-Caster
Dross
Duct Section
Emission Collection System
Emission Control Device
Emission Point
Facility
Foundry
Fugitive Metal Emissions
Mechanical Finishing
Metal
Metal Melting Furnace
Molten Metal
Point Source
Rerun Scrap
Scrap
Slag
Smelter

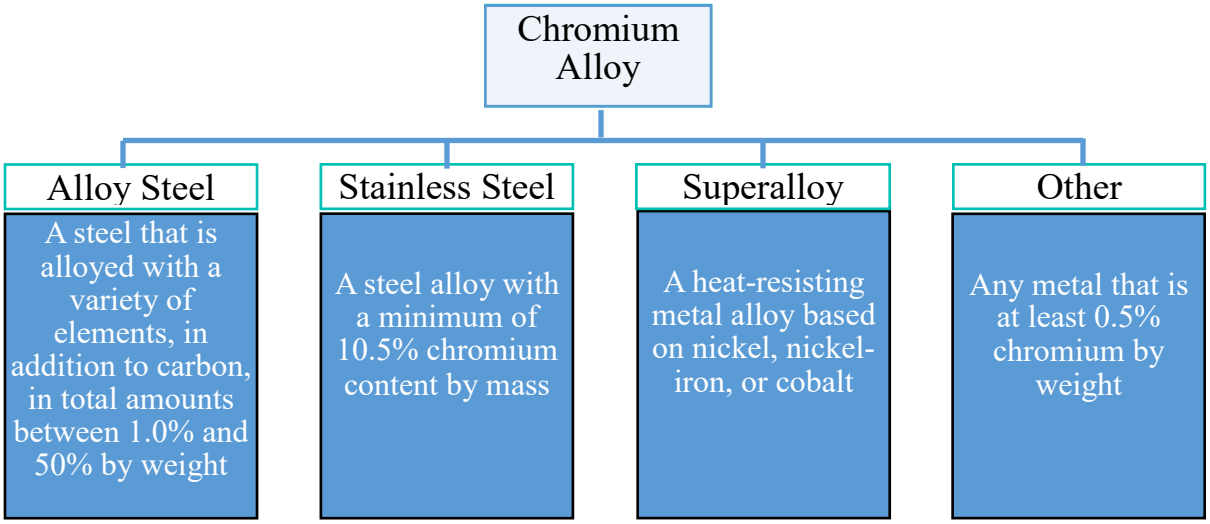
Stainless Steel
Steel
Superalloy

The applicability of Proposed Rule 1407.1 specifies chromium alloys which is defined as any metal that is an alloy steel, stainless steel, superalloy, or any metal that is at least 0.5% chromium by weight. Alloy steel, stainless steel, and superalloys are standard definitions. Chromium alloy is defined to include any metal with has a chromium content greater or equal to 0.5%, including alloy steel, stainless steel, and superalloys.

These proposed definitions are as follows:

> ***ALLOY STEEL*** *is a steel that is alloyed with a variety of elements, in addition to carbon, in total amounts between 1.0% and 50% by weight.*
>
> ***CHROMIUM ALLOY*** *is any alloy steel, stainless steel, superalloy, or any metal that is at least 0.5% chromium by weight.*
>
> ***STAINLESS STEEL*** *is a steel alloy with a minimum of 10.5% chromium content by mass.*
>
> ***SUPERALLOY*** *is a heat-resisting metal alloy based on nickel, nickel-iron, or cobalt.*

Figure 2.2: Chromium Alloy



Operational Information Survey Requirements (Subdivision (d))

Many of the processes subject to Proposed Rule 1407.1 are not regulated by an industry-specific or source-specific rule to control toxic air contaminants. Additionally, in many cases the equipment does not require a permit because of throughput and/or burner size. As a result, detailed information of the metals processed, mechanical finishing activities, equipment parameters, and housekeeping is not known by SCAQMD. An operational information survey will identify types of operations and processes performed, collect detailed furnace information and, if applicable, identify pollution controls and specify existing housekeeping procedures. The survey will be required to be completed and submitted to the SCAQMD within 60 days of the adoption of Proposed Rule 1407.1.

Casting techniques performed are required to assist in further delineating potential requirements if significant differences in emissions are noted by technique or process. Information regarding mechanical finishing activities will help identify other potential emission sources. Information regarding metal melting furnaces and associated pollution controls will create an inventory of non-permitted and permitted chromium alloy metal melting furnaces. Refractory information is being requested to assess if the refractory brick or coating contains toxic air contaminants. Current housekeeping activities will provide details on current housekeeping practices that are implemented at the facility. Volume and metals melted will be used along with emissions data to calculate annual emissions.

The proposed requirements for the Operational Information Survey are listed below.

Within [60 Days After Date of Adoption], the owner or operator of a facility conducting chromium alloy melting operation(s) shall submit a completed survey that includes:

(1) Casting techniques or melting processes performed on chromium alloys;

(2) Mechanical finishing activities or operations performed on chromium alloys;

(3) For each metal melting furnace melting chromium alloy:

(A) South Coast Air Quality Management District (SCAQMD) application or permit number and device identification number, if applicable;

(B) The equipment make, model, serial number, date of manufacture, and date of installation;

(C) Furnace type;

(D) Size and capacity;

(E) Range of operating temperatures;

(F) Minimum, average, and maximum weight of metal processed per batch and per day, based on data from calendar year 2018;

(G) Fuel type, if gas fired, include British Thermal Unit (BTU) gas rating and burner age;

(H) Refractory information, including, but not limited to, type of refractory brick and refractory coating, chromium content, frequency of refractory brick replacement and refractory coating application, based on data from calendar year 2018, if applicable;

(I) Minimum, average, and maximum operating temperatures, based on data from calendar year 2018;

(J) The equipment make, model, serial number, date of manufacture, and date of installation of associated Emission Collection System(s) and/or Emission Control Device(s), and corresponding SCAQMD application or permit number and device identification number, if applicable; and

(K) Metals and alloys melted, based on data from calendar year 2018; and

(4) Housekeeping activities routinely performed, including schedule, method(s) used, and location(s) of activities.

Source Test Requirements (Subdivision (e))

SCAQMD currently has one hexavalent chromium source test for a steel metal melting furnace. Hexavalent chromium was detected during the source test. Stakeholders and staff agree that further testing is necessary to assess toxic air contaminant emissions during chromium alloy melting operations. During the rule development process, staff offered to conduct source tests at certain facilities to obtain additional information about toxic air contaminant emissions from

chromium alloy melting operations. However, facilities were non-responsive or declined to allow the SCAQMD to conduct source testing. Therefore, Proposed Rule 1407.1 will require source testing at facilities that currently vent exhaust from chromium alloy melting operations to a control device. An owner or operator with chromium alloy melting operations that are not vented to a control device will not be required to source test these operations. Equipment that is vented to a control device has exhaust ducting that typically has sample ports that meet the minimum upstream and downstream duct diameter requirements, which is more conducive for source testing. Whereas, equipment without a control device may not have similar ducting and may need to be modified.

Source Test Protocol (Paragraphs (e)(1),(e)(2), and (e)(3))

Proposed Rule 1407.1 proposes to require the owner or operator of a facility to submit to the Executive Office a Source Test Protocol within 60 days of the adoption of the proposed rule. Appendix 1 – *SCAQMD Guidelines for the Preparation of Rule 1407.1 Source Test Protocols* is a guidance document which lays out the process for developing a Source Test Protocol. The Source Test Protocol shall include the source test criteria and all assumptions, required data, and calculated targets. Additionally information on proposed pollutant and capture efficiency test methods, analytical detection limits, sampling parameters, equipment, logistics, personnel, and other resources necessary is required in the Source Test Protocol.

The Executive Officer may approve or reject the Source Test Protocol. The basis for approval or rejection will be whether or not the owner or operator selected a furnace in accordance with the provisions in this subdivision and material deviations from source test protocol guidelines. If rejected, the owner or operator shall revise and resubmit the Source Test Protocol to correct all deficiencies within 30 days of the date of notification of rejection. This revised and resubmitted Source Test Protocol will either be approved by the Executive Officer or modified and approved as modified by the Executive Officer.

Conducting the Source Test (Paragraphs (e)(4) and (e)(5))

Within 90 days of the approval of the Source Test Protocol, the owner or operator shall conduct the source tests. The source test shall measure mass emissions and concentration for particulate matter; arsenic, cadmium, chromium, and nickel; and hexavalent chromium emissions at the inlet and outlet to the control device. The source test shall be conducted according to the Source Test Protocol and using the following test methods:

- For particulate matter,
  - SCAQMD Method 5.1 – *Determination of Particulate Matter Emissions from Stationary Sources Using a Wet Impingement Train;*
  - SCAQMD Method 5.2 – *Determination of Particulate Matter Emissions from Stationary Sources Using Heated Probe and Filter;* or
  - SCAQMD Method 5.3 – *Determination of Particulate Matter Emissions from Stationary Sources Using an In-Stack Filter;*
- For chromium and hexavalent chromium, CARB Method 425 – *Determination of Total Chromium and Hexavalent Chromium Emissions from Stationary Sources; and/or*
- For arsenic, cadmium, chromium, and nickel, CARB Method 436 – *Determination of Multiple Metal Emissions from Stationary Sources.*

SCAQMD Methods 5.1, 5.2, and 5.3 all test for particulate matter but have a specific applicability. All three methods are listed so that the owner or operator can select the applicable method, which will be approved through the Source Test Protocol by the Executive Officer.

SCAQMD Method 5.1 measures particulate emissions from stationary sources, except when determining compliance with New Source Performances Standards. In SCAQMD Method 5.1, stack gas is isokinetically withdrawn from the source through a sample train. Particulate matter is collected in chilled impingers and on a non-heated backup filter.

SCAQMD Method 5.2 measures particulate emissions from stationary sources. In SCAQMD Method 5.2, the sample is withdrawn isokinetically from the source through a sample train by a metering system. Filterable particulate matter is collected on a heated glass fiber filter. Condensables and particulate passing through the filter are collected in chilled impingers. SCAQMD Method 5.2 may require a separate train for sulfuric acid mist.

SCAQMD Method 5.3 measures particulate emissions from stationary sources, except when determining compliance with New Source Performance Standards. It does not apply to stacks that contain liquid droplets, or saturated with water vapor, where the temperature is greater than 400°F, or if the projected cross sectional area of the probe extension-filter holder assembly covers more than 5 percent of the stack cross sectional area. This method is recommended for testing cement plants and other sources emitting highly hygroscopic particulate matter. In SCAQMD Method 5.3, the sample is withdrawn isokinetically from the source through a sample train by a metering system. Filterable particulate matter is collected on a glass fiber filter kept inside the stack. Condensables and particulates passing through the filter are collected in chilled impingers. SCAQMD may require a separate train for sulfuric acid mist.

CARB Method 436 measures aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, phosphorus, selenium, silver, thallium, vanadium, and zinc stack emissions from stationary sources. In CARB Method 436, the stack sample is withdrawn isokinetically from the source, with particulate emissions collected in the probe and on a heated filter and gaseous emissions collected in a series of chilled impingers.

CARB Method 425 measures hexavalent chromium and total chromium emissions from stationary sources. Applicability has been demonstrated for the metal finishing and glass industries, but has not been demonstrated for sources with high particulate mass emission rates. In CARB Method 425, particulate emissions are withdrawn isokentically from the source and collected in a series of chilled impingers followed by a glass fiber backup filter. Although CARB Method 425 has not been demonstrated for the metal melting industry, it is the only available reference method applicable to measure hexavalent chromium emissions from this category of stationary sources. CARB Method 425 is widely used and has been used successfully by the SCAQMD for determination of hexavalent chromium emissions from metal melting, chrome plating/anodizing, heated dichromate sealing, cement kilns, heat treating furnaces, and forging operations. Other air districts have used CARB Method 425 similarly. EPA Method 0061 – Determination of Hexavalent Chromium Emissions from Stationary Sources measures hexavalent chromium emissions from hazardous waste incinerators, municipal waste incinerators, municipal waste combustors, and sewage sludge incinerators. This method has been evaluated for sampling train temperatures below 300˚F, which may not be the case for Proposed Rule 1407.1 sources. For the most part, EPA Method 0061 has not been used in the past two decades as it is more expensive

and difficult than CARB Method 425 and has potential contamination issues from the required recirculation system.

For all the source tests, paragraph (e)(10) allows for alternative methods to be used provided they are approved in writing by the Executive Officer.

Furnace Selection (Paragraphs (e)(6) and (e)(7))

Under Proposed Rule 1407.1, an owner or operator is required to select the furnace to be source tested using the following parameters: the furnace is vented to a control device, produces the final product with the highest chromium concentration, and has the highest throughput in the facility. If approved by the Executive Officer, the owner or operator may select an alternative furnace and/or final product for source testing. Approval or rejection will be based on the furnace, final product processed, schedule, and throughput.

Capture Efficiency Testing (Paragraph (e)(8))

At the time of the source tests, the owner or operator shall also perform capture efficiency testing to determine the efficacy of the collection system. A hot-wire anemometer, a vane anemometer, or device approved by the Executive Officer, shall quantitatively measure velocity across a pre-determined matrix of parts. Additionally, a qualitative demonstration using smoke tubes or smoke sticks shall be conducted. Proposed Rule 1407.1 has a requirement to measure capture efficiency, but does not have a limit for capture efficiency. Capture efficiency will indicate whether the emission collection system adequately captures the emissions.

Materials Composition Testing (Paragraph (e)(9))

Under Proposed Rule 1407.1, the owner or operator is required to conduct Materials Composition Testing of the raw materials, molten material, final product, slag, dross, and baghouse catch. The materials composition testing should be from one batch processed during the chromium and hexavalent chromium source test. Facilities that melt scrap material do not need to test each piece of scrap in a melt, but must test, at a minimum, three different pieces from each batch of scrap. If the slag, dross, or baghouse catch is not accessible during the source test, then the samples must be tested as soon as they become accessible. Materials Composition Testing will allow an assessment of the materials added to the furnace and the substances created during the melting process which staff can correlate with the source test results.

Alternative Test Methods (Paragraph (e)(10))

A facility may request to use an alternative or equivalent source test method if approved in writing by the Executive Officer.

Testing Laboratories (Paragraph (e)(11))

All testing shall be conducted at a laboratory approved under the SCAQMD Laboratory Approval Program. If there is no approved laboratory for the test, then a laboratory may submit their

procedures to the Executive Officer for approval. This ensures that quality assurance and quality control measures are adequate.

Notification of Source Testing (Paragraph (e)(12))

Proposed Rule 1407.1 requires that the owner or operator notify the Executive Officer in writing 10 calendar days prior to conducting the source test. This gives the opportunity for SCAQMD staff to be available to observe the source tests.

Submittal of Reports (Paragraph (e)(13))

Proposed Rule 1407.1 requires that no later than 60 days after the completion of the source test, the owner or operator submit reports from source tests, capture efficiency, and Materials Composition Testing.

SCAQMD Source Testing (Paragraph (e)(14))

SCAQMD will conduct source testing for the first three facilities that submit requests for SCAQMD to conduct source tests to the Executive Officer. Initially, SCAQMD offered to conduct source testing at certain facilities, but facilities were either non-responsive or declined. At subsequent working group meetings, staff offered to conduct source tests for any stakeholder subject to the proposed rule. Currently, no facility has agreed. Further testing is needed to assess toxic air contaminant emissions during chromium alloy melting operations. The proposed rule will require source testing, but SCAQMD wants to maintain its offer to conduct source testing. The source testing required by this rule is for informational purposes and not compliance testing.

Previous Source Tests (Paragraph (e)(15))

Facilities that have conducted source tests up to 12 months prior to the adoption of Proposed Rule 1407.1 will not be required to conduct this source test if the prior source tests meets the requirements of paragraphs (e)(4) through (e)(11).

Materials Composition Testing (Subdivision (f))

Facilities that were not required to conduct source testing because their furnaces did not have control devices must conduct Materials Composition Testing of the raw materials, molten material, final product, slag, and dross within 180 days of the adoption of Proposed Rule 1407.1. Facilities that melt scrap material do not need to test each piece of scrap in a melt, but must test, at a minimum, three different pieces from each batch of scrap. If the slag or dross is not accessible during or after the melt, then the samples must be tested as soon as they become accessible. Collecting materials composition data will provide information of the type and amount of toxic air contaminants throughout the metal melting process.

Materials Composition Testing will determine the weight percent of arsenic, chromium, hexavalent chromium, and nickel using the following test methods that are most applicable to the sample matrix and approved by Executive Officer:

- U.S. EPA 200.7 – *Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry*;
- U.S. EPA 6010D – *Inductively Coupled Plasma-Optical Emissions Spectrometry*;
- U.S. EPA 6020B – *Inductively Coupled Plasma-Mass Spectrometry*;
- U.S. EPA 6200 – *Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment*;
- U.S. EPA 7196A – *Chromium, Hexavalent (Chelation/Extraction)*; and/or

- U.S. EPA 7199 – *Determination of Hexavalent Chromium in Drinking Water, Groundwater and Industrial Wastewater Effluents by Ion Chromatography*.

For all the materials composition testing, paragraphs (e)(10) and (f)(4) allows for alternative methods to be used provided they are approved in writing by the Executive Officer.

Recordkeeping Requirements (Subdivision (g))

For a one year period beginning January 1, 2019 and ending January 1, 2020, the owner or operator must keep monthly records of run hours and type and amount of materials processed for each furnace that processes chromium alloys. This information provides a better understanding of the on-going daily activities and supplements the data received from conducting the source test. Vendor information is also to be provided to follow up on questions regarding consistency of products supplied. The vendor information may be provided as a list of vendors for all metals, additives, alloys, and scrap. For each baghouse venting furnace melting operations of chromium alloys, records shall be kept of baghouse catch weight per container and the date collected. The records shall be submitted to the Executive Officer by February 1, 2020 and shall be maintained for at least three years.

Exemptions (Subdivision (h))

The requirements of the proposed rule do not apply to equipment and operations that are subject to the lead series rules; Rules 1420, 1420.1, or 1420.2. These operations are already subject to point source controls, parametric monitoring, periodic source testing, and housekeeping provisions. Operations or equipment not subject to Rules 1420, 1420.1, or 1420.2, but located at a facility subject to those rule may be subject to Proposed Rule 1407.1 if they are melting chromium alloy. In order to exclude small operations, the requirements of the rule also do not apply to facilities that melt one ton per year or less of chromium alloys or to small furnaces with a capacity of 25 pounds or less, such as jewelers and testing laboratories.

CHAPTER 3: IMPACT ASSESSMENT

INTRODUCTION

RULE ADOPTION RELATIVE TO COST-EFFECTIVENESS

COMPLIANCE COSTS

SOCIOECONOMIC ASSESSMENT

CALIFORNIA ENVIRONMENTAL QUALITY ACT ANALYSIS

DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727

COMPARATIVE ANALYSIS

INTRODUCTION

Proposed Rule 1407.1 will gather information and quantify the toxic air contaminant emissions from chromium alloy melting operations, including alloy steel, stainless steel, and superalloy melting operations. Cost information is provided though cost-effectiveness is not applicable for a rule controlling toxic air contaminants. Information pursuant to California Environmental Quality Act Analysis, required findings, and a comparative analysis of federal and SCAQMD rules applicable to the same source are provided below.

RULE ADOPTION RELATIVE TO COST-EFFECTIVENESS

On October 14, 1994, the Governing Board adopted a resolution that requires staff to address whether rules being proposed for amendment are considered in the order of cost-effectiveness. The 2016 Air Quality Management Plan (AQMP) ranked, in the order of cost-effectiveness, all of the control measures for which costs were quantified. It is generally recommended that the most cost-effective actions be taken first. However, cost-effectiveness defined as cost per ton of emission reductions is not meaningful for toxic risk since risk depends on several factors in addition to emission numbers such as geography, meteorology, and location of receptors.

COMPLIANCE COSTS

Proposed Rule 1407.1 is expected to affect 14 facilities. Five of the facilities will be required to conduct source testing at an estimated cost between $20,000 and $30,000 per facility based on vendor estimates. Three facilities may request that SCAQMD conduct the source testing at no charge to the facility. All 14 facilities will be required to do Materials Composition Testing. For a single material, an outside laboratory provided an estimate of $300 which includes hexavalent chromium testing. Staff is assuming that five raw materials will be tested along with a single test each of the final material, slag, dross, and baghouse catch for a total of nine materials tested. The total cost for nine materials tested at 14 facilities is $37,800. Lastly, industry estimates the additional recordkeeping associated with Proposed Rule 1407.1 will cost between $3,000 and $5,000 per facility. The total costs of Proposed Rule 1407.1 is a one-time cost of approximately $240,000 to $350,000. The one-time cost per facility is shown in Table 3.1 below.

Table 3.1: Estimated One-Time Costs per Facility

Facility Type	Source Testing	Materials Composition Testing	Recordkeeping	Total Cost
Chromium Metal Melting Facility with No Controls (6 facilities)	$0	$2,700	$3,000 - $5,000	$5,700 - $7,700
Chromium Metal Melting Facility with Controls (5 facilities)	$20,000 - $30,000	$2,700	$3,000 - $5,000	$25,700 - $37,700
Chromium Metal Melting Facility with Controls; SCAQMD Conducts Testing (3 facilities)	$0	$2,700	$3,000 - $5,000	$5,700 - $7,700

SOCIOECONOMIC ASSESSMENT

The proposed rule does not directly affect air quality or establish emissions limitations, therefore, a socioeconomic impact assessment pursuant to California Health and Safety Code Section 40440.8 is not necessary or required. Nonetheless, staff conducted an alternative cost analysis so that the potential cost impacts to the affected industries may be considered. The majority of the affected facilities are in the primary metal manufacturing sector (94%), including iron and steel mills and ferroalloy manufacturing (NAICS 331110), steel investment foundries (NAICS 331512), and steel foundries (except investment) (NAICS 331513). The remaining facility is in fabricated metal product manufacturing (NAICS 332).

Of the 14 facilities identified, eight are required to conduct source testing and all 14 facilities will be required to conduct Materials Composition Testing. Staff expects source testing conducted in 2019 to cost $20,000 to $30,000 per facility based on vendor estimates. SCAQMD has provided the option for three facilities to request that SCAQMD conduct the source testing at no cost to the facility. The total cost of Materials Composition Testing (nine materials across 14 facilities) is expected to be $37,800 based on vendor estimates. Lastly, additional recordkeeping requirements are expected to cost $3,000 to $5,000 per facility in 2019 only.[10] In total, costs for all affected

[10] Cost estimate from California Metals Coalition.

facilities are expected to range from $240,000 to $350,000, while the average cost per facility ranges from $17,100 to $25,000.

It has been a standard practice for SCAQMD's socioeconomic impact assessments that, when the annual compliance cost is less than one million current U.S. dollars, the Regional Economic Models Inc. (REMI)'s Policy Insight Plus Model is not used to simulate jobs and macroeconomic impacts, as is the case here. This is because the resultant impacts would be diminutive relative to the baseline regional economy.

CALIFORNIA ENVIRONMENTAL QUALITY ACT ANALYSIS

Pursuant to the California Environmental Quality Act (CEQA) and SCAQMD Rule 110, the SCAQMD, as lead agency for the proposed project, has reviewed Proposed Rule 1407.1 pursuant to: 1) CEQA Guidelines Section 15002(k) - General Concepts, the three-step process for deciding which document to prepare for a project subject to CEQA; and 2) CEQA Guidelines Section 15061 - Review for Exemption, procedures for determining if a project is exempt from CEQA. As provided in CEQA Guidelines Section 15306 - Information Collection, the proposed project is exempt because it will consist of basic data collection, research and resource evaluation activities and will not result in a serious or major disturbance to an environmental resource. CEQA Guidelines Section 15306 exempts such a project for information-gathering purposes, or as part of a study leading to future action which the agency has not yet taken. Furthermore, SCAQMD staff has determined that it can be seen with certainty that there is no possibility that the proposed project may have a significant adverse effect on the environment. Therefore, the project is also considered to be exempt from CEQA pursuant to CEQA Guidelines Section 15061(b)(3) - Activities Covered by General Rule. A Notice of Exemption will be prepared pursuant to CEQA Guidelines Section 15062 - Notice of Exemption. If the project is approved, the Notice of Exemption will be filed with the county clerks of Los Angeles, Orange, Riverside and San Bernardino counties.

DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727

Requirements to Make Findings

California Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the SCAQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report.

Necessity

Proposed Rule 1407.1 is needed to gather information and quantify toxic air contaminant emissions data from melting operations of chromium alloys, including alloy steel, stainless steel, and superalloy melting operations. Data from these operations are limited because many melting furnaces do not require SCAQMD permits and these operations are not regulated by a source specific regulation for toxic air contaminants. Proposed Rule 1407.1 proposes an operation information survey to be conducted by applicable facilities to collect detailed furnace information, mechanical finishing activities, casting techniques, and understand current housekeeping practices. Proposed Rule 1407.1 also requires source testing that is needed to quantify emissions to identify the appropriate level of pollution control. Metals composition testing requirements included in Proposed Rule 1407.1 will provide information on the type and amount of toxic air contaminants in alloys.

Authority

The SCAQMD obtains its authority to adopt, amend, or repeal rules and regulations pursuant to California Health and Safety Code Sections 39002, 39650 et. seq., 40000, 40440, 40441, 40702, 40725 through 40728, 41508, and 41511.

Clarity

Proposed Rule 1407.1 is written or displayed so that its meaning can be easily understood by the persons directly affected by it.

Consistency

Proposed Rule 1407.1 is in harmony with and not in conflict with or contradictory to, existing statutes, court decisions or state or federal regulations.

Non-Duplication

Proposed Rule 1407.1 will not impose the same requirements as any existing state or federal regulations. The proposed amended rules is necessary and proper to execute the powers and duties granted to, and imposed upon, the SCAQMD.

Reference

In amending this rule, the following statutes which the SCAQMD hereby implements, interprets or makes specific are referenced: Health and Safety Code sections 39002, 40001, 40702, 40440(a), 40725 through 40728.5, and 41511.

COMPARATIVE ANALYSIS

Health and Safety Code Section 40727.2 requires a comparative analysis of the proposed amended rule with any Federal or SCAQMD rules and regulations applicable to the same source. See Table 3.2 below.

Table 3.2: Comparative Analysis

Rule Element	PR 1407.1	Rule 1407	40 CFR Part 63 ZZZZZ	40 CFR Part 63 EEEEE	CARB Non-Ferrous Metal Melting ATCM
Applicability	Smelters (primary and secondary), foundries, die-casters, and other miscellaneous melting processes conducting chromium alloy (>0.5% chromium by weight) melting operations	Non-ferrous smelters (primary and secondary), foundries, die-casters, coating processes (galvanizing and tinning) and other miscellaneous processes such as dip soldering, brazing and aluminum powder production conducting non-ferrous metal melting	Area source iron and steel foundries emitting less than 10 tons per year of any single hazardous air pollutant or less than 25 tons of any single hazardous air pollutant constructed after September 17, 2007	Major source iron and steel foundries emitting 10 tons per year or more of any single hazardous air pollutant or 25 tons or more of any single hazardous air pollutant	Non-ferrous smelters (primary and secondary), foundries, die-casters, coating processes (galvanizing and tinning) and other miscellaneous processes such as dip soldering, brazing and aluminum powder production conducting non-ferrous metal melting
Requirements	• Source test on one chromium alloy furnace if vented to control device • Materials composition testing on one alloy	• Control particulate emissions from emission collection system by 99% • Temperature in exhaust stream may not exceed 360F	• New foundries control particulate emissions to 0.1 lb/ton and hazardous air pollutant emissions to 0.008 lb/ton	• Existing electric arc furnaces control particulate emissions to 0.005 gr/dscf and hazardous air	• Control particulate emissions from emission collection system by 99% • Temperature in exhaust stream may not exceed 360F

Rule Element	PR 1407.1	Rule 1407	40 CFR Part 63 ZZZZZ	40 CFR Part 63 EEEEE	CARB Non-Ferrous Metal Melting ATCM
	• Informational survey	• Maintenance program for emission control device monitoring • Housekeeping • Visible emission standards	• Pollution prevention management practices for metallic scrap and mercury switches • Maintenance program for emission control device monitoring • Housekeeping • Visible emission standards	pollutant emissions to 0.0004 gr/dscf • Existing cupolas control particulate emissions to 0.006 gr/dscf and hazardous air pollutant emissions to 0.0005 gr/dscf • New electric induction furnaces control particulate emissions to 0.001 gr/dscf and hazardous air pollutant emissions to 0.00008 gr/dscf • New electric arc furnaces and cupolas control particulate emissions to 0.002 gr/dscf and hazardous air pollutant emissions to 0.0002 gr/dscf • Plan or certification to minimize hazardous air pollutants from scrap • Maintenance program for emission control device monitoring • Housekeeping • Visible emission standards	• Maintenance program for emission control device monitoring • Housekeeping • Visible emission standards
Reporting	Source test results, materials composition testing results, process records	None	Semiannual compliance reports for exceedances, parametric monitor downtime, deviations from pollution prevention practices	Semiannual compliance reports for exceedances, parametric monitor downtime, deviations from pollution prevention practices	None
Monitoring	One time source test on a chromium alloy furnace that is vented to a control device	• One time source test on a furnace that is vented to a control device • Parametric monitoring • Bag leak detection system	• Source test on a furnace that is vented to a control device every five years • Parametric monitoring • Bag leak detection system	• Source test on a furnace that is vented to a control device every five years • Parametric monitoring • Bag leak detection system	• One time source test on a furnace that is vented to a control device • Parametric monitoring • Bag leak detection system
Recordkeeping	One year of process records for chromium alloy metal melting furnaces, vendors of raw materials, and baghouse catch weights	Source testing results made available for two years	Test reports, notifications, semiannual reports made available for five years	Test reports, notifications, semiannual reports	Source testing results made available for two years

APPENDIX 1: SCAQMD GUIDELINES FOR THE PREPARATION OF RULE 1407.1 SOURCE TEST PROTOCOLS

INTRODUCTION

PREPARING A SOURCE TEST PROTOCOL

INTRODUCTION

A Rule 1407.1 source test protocol specifies which source will be tested and how emissions and samples will be sampled, analyzed, and reported. Source test protocols establish procedures to ensure results are accurate and representative of a source's emissions. Once SCAQMD evaluates and approves a test protocol, the owner or operator of a facility conducting chromium alloy melting operation(s) can be reasonably assured that test results will be accepted if the source test protocol is followed.

PREPARING A SOURCE TEST PROTOCOL

The source test protocol shall include the following sections: Cover Page; Table of Contents; Introduction; Equipment, Process, and Operation Description; Testing Methodology; Quality Assurance/Quality Control (QA/QC) Procedures; Calculations Procedures; and Report Information and Format.

Cover Page

The Cover Page shall include the following:

1.) The facility name and facility identification number;
2.) The metal melting furnace and associated emissions collection system and emissions control device to be tested pursuant to Rule 1407.1 paragraph (e)(6) or (e)(7);.
3.) The principal author's company, name, job title, address, phone number, and e-mail address;
4.) The date of the protocol submittal, given in a month, day, and year format (mm/dd/yy); and
5.) The signature of the principal author.

Table of Contents

The Table of Contents shall identify each section with their commencing page numbers. Each page of the source test protocol (including, but not limited to, sample forms, copies of SCAQMD permits, and third party reports) must have a unique and sequential page number.

Introduction

The Introduction shall include the following:

1.) The name of facility, facility identification number, mailing address, and equipment address, if different from the mailing address;
2.) The facility contact's name, job title, phone number, and e-mail address;
3.) The name of the source testing laboratory, mailing address, contact name, phone number, and e-mail address;
4.) The name of the analytical laboratory, mailing address, contact name, phone number, and e-mail address; and
5.) The number of testing days and the estimated test date(s).

Equipment, Process, and Operation Description

The Equipment, Process, and Operation Description shall include the following information for the source to be tested:

1.) Justification for selection of the metal melting furnace and associated emissions collection system and emissions control device to be tested pursuant to Rule 1407.1 paragraphs (e)(6) and (e)(7);
2.) Information requested in Rule 1407.1 paragraph (d)(3);
3.) Copy of the SCAQMD permit(s), if applicable;
4.) Description of how fuel usage or energy consumption will be monitored;
5.) Typical operating conditions of the device;
6.) Operating conditions of the device at the time of the test and validation that these conditions are representative of normal operations;
7.) Description of what and how products are produced at the facility, including, but not limited to, the final specifications of those products;
8.) Description of material produced during the test, details of the melt, final specifications of the product, and validation the alloy has the highest chromium concentration in the final product processed or justification for processing an alternative product;
9.) Control parameters for the control device, if applicable;
10.) Schematic diagram of the exhaust stack showing the stack location with regard to the number of duct diameters to the nearest upstream/downstream flow disturbances;
11.) Description of access to the sampling ports, and availability of a platform and room for testing equipment at the sampling port;
12.) Flow diagram and a stepwise description explaining the equipment's operation with respect to the facility's process. Include a schematic of the equipment, fuel lines, instruments, control device, and other major ancillary equipment. Also include all emission points (or potential emission points), and bypass stacks in the schematic;
13.) Location and specifications of process monitoring instruments. Information for process monitoring instruments shall include:
    - Dates the process monitoring instruments were last calibrated;
    - Documentation which can verify the process monitoring instrument's accuracy; and
    - Whether or not the instruments that report output need to be corrected to standard conditions and, if so, how the output is to be corrected, and what other calibrated instruments are needed to adjust the raw measurement;
14.) Configuration of the exhaust stream, including the positioning of dampers, the presence of dilution flow, or whether flow is partially emitted through bypass stacks; and
15.) Special safety considerations when collecting samples or performing the laboratory analysis.

Testing Methodology

The Testing Methodology shall include the following:

1.) Test methods that will be employed to determine emissions, capture efficiency, and materials composition;
2.) General description which summarizes each proposed method. List and justify all proposed deviations from the standard test method. For instrumental methods, submit a detailed description of the sampling and analytical system. This description shall include specifics, such as the sampling procedures, sample preparation, analytical principle of each instrument, the available analytical ranges,

detection limits, sample conditioning equipment, materials for construction of sample lines, a sampling flow schematic, the instrument stripchart manufacturer, frequency of data recording, etc;

3.) Ambient parameters that will be monitored during the test, a description of how the parameters will be monitored, and frequency of the readings;

4.) Equipment parameters that will be recorded during the test, a description of how the parameters will be monitored, and frequency of the readings;

5.) Whether the process monitoring instruments are calibrated and whether there are records to confirm the accuracy and precision of the instrument;

6.) Whether the sampling equipment requires a special set-up and/or warm-up period with pre-test and post-test diagnostics;

7.) Parameters that will be monitored to assure the proper or timely operation of the sampling equipment, such as the conditioning temperature, orifice pressures, instrument response time, etc;

8.) How exhaust flow conditions, such as stratification or cyclonic flow, will be addressed during the test. If these conditions have been addressed in previous testing, include detailed results;

9.) Problems unique to specific equipment and how they will be addressed;

10.) Proposed sampling time. The total sample volume for each sample must be sufficient to achieve analytical results at least three (3) times greater than the method detection limit. Alternatively, collect a minimum sample volume of 150 dry standard cubic feet (dscf) for each sample, assuming the following method detection limits from CARB Methods 425 and 436:

- Arsenic $\leq$ 2.1 µg/l,
- Cadmium $\leq$ 0.01 µg/l,
- Chromium $\leq$ 0.4 µg/l,
- Hexavalent Chromium $\leq$ 0.02 µg/l, and
- Nickel $\leq$ 0.07 µg/l;

11.) Any special sampling considerations due to the nature of the emissions or stack configuration requiring accommodations for lengthy heated lines, saturated moisture content, interferences, toxic emissions, hygroscopic particles, or other non-routine sampling conditions;

12.) How the samples are to be analyzed once the collection at the source is completed:

- Identify the analytical procedures that will be performed. These methods and procedures shall provide the sensitivity to detect the anticipated emission concentrations, be recognized by the SCAQMD, and represent the most current and reliable means for analysis;
- Identify the analytical laboratories that will perform the analysis and if these laboratories are SCAQMD approved, if applicable;
- Identify the laboratory's detection limits for the proposed analysis;
- Describe how blank analyses will be handled; and
- Identify any deviations to the recognized analytical test procedure;

13.) Signed statement confirming that the test laboratory qualifies as an independent laboratory, per SCAQMD Rule 304(k) definitions; and

14.) Current approval letter that the testing lab is a SCAQMD Laboratory Approval Program (LAP) testing lab or proof of Executive Officer approval.

Quality Assurance/Quality Control (QA/QC) Procedures

The QA/QC Procedures shall include:

1.) Sample field data sheets, calibration forms, and equipment maintenance records. Where possible, standardized forms shall be used (see the SCAQMD Source Test Manual for standard data sheets and forms);

2.) Calibration procedures of the field and laboratory instruments. Indicate whether calibration and maintenance schedules comply with the Chapter III procedures of the SCAQMD Source Test Manual. If not, justify the reason for deviating from the SCAQMD procedures;

3.) Sampling handling, chain-of-custody, and sample storage procedures employed by the testing laboratory. Provide assurances that the samples will be properly stored at the required environmental conditions in a tamper-proof and secure container;

4.) Sample forms for verifying that the sampling equipment (including glassware, filters, canisters, bags, tubing, etc.) will be properly cleaned and stored prior to field and laboratory use;

5.) QA/QC procedures employed by the analytical laboratory. Example QA/QC topics for analytical laboratories include: instrument calibration procedures, matrix spiking, duplicate injections, blank analyses, control samples, and interference checks;

6.) For low level analyte measurements, include a discussion of:
- Special cleaning procedures, such as acid washing of equipment;
- The purity level of analytical reagents;
- Low level calibrations, especially if close to the detection limit;
- A limited storage time prior to analysis;
- Handling of field blanks; and,
- Replicate analyses; and

7.) Calibration data of instruments.

Calculations Procedures

Calculations Procedures shall include:

1.) The proposed formulas to calculate gaseous concentrations, exhaust flow, mass emissions, etc., based on measurements of the raw data;

2.) Sample forms showing how intermediate calculations will be used to arrive at the final result. If constants are used, provide derivations showing how the constants were determined. If the calculation form is formatted as a spreadsheet, include cell formulas so that the calculations may be reviewed. In order to demonstrate the use of the calculation form or spreadsheet, provide a numerical example using hypothetical realistic data set;

3.) How the bias or drift correction factors will be determined and applied, if applicable; and

4.) How low concentrations will be expressed.

Report Information and Format

Report Information and Format shall include:

1.) Description of how the report will be organized. Whether it follows the general outline of the source test report described in Chapter II of the SCAQMD Source Test Manual. If not, explain how the proposed format differs;

2.) Identification of each section of the report in the order that they will be presented and an explanation of what topics will be discussed in each section. Indicate which section(s) will contain the raw field data, analytical results, calculations, calibration results, facility data, copy of the SCAQMD permit(s), etc.;

3.) Items to be submitted with the full laboratory package, which, at a minimum, shall include: sample preparation, raw analytical data, instrument calibrations, QA/QC checks, and calculations;

4.) A description of how digitized media will be presented, (e.g. digitized pictures, DVD videos, scanned images, or computer spreadsheets); and

5.) A confirmation that the report will include all elements from the Source Test Protocol, as discussed in these guidelines.

APPENDIX 2: COMMENTS AND RESPONSES

Comment Letter #1: California Metals Coalition September 13, 2018

CALIFORNIA METALS COALITION

Main Office and Mailing Address: 2971 Warren Lane, El Dorado Hills, CA 95762
Lobbying Office: 1215 K Street, 17th Floor, Sacramento, CA 95762
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September 13, 2018

Susan Nakamura, Assistant Deputy Executive Officer
South Coast Air Quality Management District
21865 East Copley Drive
Diamond Bar, California 91765

Dear Ms. Nakamura:

The California Metals Coalition appreciates the opportunity to comment on the South Coast Air Quality Management District ("District" or "SCAQMD") workshop proceedings and possible creation of SCAQMD Rule 1407.1.

These comments are divided into the following sections: Summary; Background on CMC; Previously Asserted and Unaddressed Questions and Concerns; Additional Comments on August 30, 2018 Public Workshop; and Conclusion.

SUMMARY

This comment letter addresses concerns held by CMC members regarding the SCAQMD rulemaking process in connection with proposed Rule 1407.1. CMC and other industry members have been involved in the rule making process for Proposed Rule 1407.1 since it was proposed and have been involved in the rulemaking process for Proposed Rule 1407 and other rules prior to that. Throughout its involvement, CMC has made comments regarding Proposed Rule 1407.1 and SCAQMD's improper approach to rule making in regards to Rule 1407.1, including its efforts to rush through the process without developing a proper scientific and data-driven basis for the proposed rule. CMC submitted written comments on March 30, 2018, May 4, 2018, and June 25, 2018. To date, CMC's comments have largely gone ignored and its questions remain unanswered. This letter restates CMC's concerns and requests, once again, that SCAQMD staff address in writing CMC's stakeholder questions.

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Finally, this letter also addresses issues that arise from the 1407.1 slides presented at the SCAQMD Proposed Rule 1407.1 Public Workshop on August 30, 2018. On August 30, the SCAQMD staff addressed plans to establish source testing, and broad data and informational gathering requirements for facilities that melt metals with a certain percentage of chromium content. Staff's stated goal is to bring Proposed Rule 1407.1 to the SCAQMD Board for a vote on November 2, 2018.

BACKGROUND ON CMC

California is home to approximately 4,000 metalworking facilities, employing over 350,000 Californians. The average industry salary is $66,400/year in wages and benefits.

8 out of 10 employees in the metalworking sector are considered ethnic minorities or reside in disadvantaged communities throughout Southern California. A job in the metals sector is often the only path to the middle class for many of these Californians.

Here is a breakdown of the metalworking industry's impact on the 4 counties within SCAQMD jurisdiction:

- Los Angeles County: 54,290 Direct Jobs | 52,741 Indirect Jobs | $7 billion wages | $26 billion economic activity
- Orange County: 25,448 Direct Jobs | 18,912 Indirect Jobs | $2.9 billion wages | $10.8 billion economic activity
- San Bernardino: 9,778 Direct Jobs | 8,378 Indirect Jobs | $1.2 billion wages | $4.5 billion economic activity
- Riverside: 6,971 Direct Jobs | 7,712 Indirect Jobs | $957 million wages | $3.2 billion economic activites
- Total: 96,487 Direct Jobs | 87,743 Indirect Jobs | $12 billion wages | $33.8 billion economic activity

California metal manufacturers use recycled metal (ex: aluminum, brass, iron and steel) to make parts for the aerospace industry, clean energy technologies, electric cars, biotech apparatuses, medical devices, national defense items, agriculture, infrastructure, construction machinery, household appliances, food processing and storage, movement of water, and millions of other products demanded by society.

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CMC'S PREVIOUSLY ASSERTED AND UNADDRESSED QUESTIONS AND CONCERNS

Item #1: Rushed Rulemaking for New Rule 1407.1 Without Metal Melting Science and Data

In a letter concerning the April 25, 2018, Group Meeting # 4 on Rule 1407.1, CMC addressed its concerns with 1407.1. In that letter and again in a letter dated June 25, 2018, CMC objected to SCAQMD's rush to quickly push through rule making for Proposed Rule 1407.1. CMC reiterates its strong disagreement that this rulemaking should be rushed prior to gathering the proper data and science for metal melting. There is no evidence in the record to support material aspects of Proposed Rule 1407.1. The addition of hexavalent chromium requires a thorough and complete investigation to fully develop an appropriate rule. A typical development stage could take over two years to properly complete and is supported by peer reviewed literature, data relevant to metal melting, and science relevant to metal melting. With respect to Proposed Rule 1407.1, which was first proposed on April 25, 2018, SCAQMD is attempting to complete the rule making process in half a year without consideration of a full and complete analysis of all relevant information.

1-1

Health & Safety Code section 40727 requires that "[b]efore adopting, amending, or repealing a rule or regulation, the district board shall make findings of necessity, authority, clarity, consistency, nonduplication and reference ... based upon information developed pursuant to Section 40727.2, information in the rulemaking record ..., and relevant information presented at the hearing." (See Health & Safety Code § 40727(a)). Section 40727.2 requires that the District prepare a comprehensive written analysis of the proposed rule or rule amendment, including its relation to other existing federal air pollution requirements, as well as an analysis of the impact of the proposed regulations. (See Health & Safety Code § 40727.2). CMC is unaware of any effort by the District to complete such an analysis. The proposed change to include hexavalent chromium in Rule 1407.1 is material and the significance of its inclusion should not be an afterthought.

Item #2: Ignoring and Misrepresenting Temperature in New Rule 1407.1

SCAQMD staff have not conducted research nor provided any science on how temperature impacts the potential conversion of chromium to hexavalent chromium during the metal melting process. When CMC asked SCAQMD staff to provide literature on the issue of temperature, staff presented a study from India at the January 30, 2018 working group meeting.

1-2

On slide 14 of the January 30, 2018, presentation, SCAQMD staff represented that "[t]rivalent chromium in chromium(III) oxide (Cr203) could be converted to hexavalent chromium at a temperature range of 200-300ºC (392-572ºF)." In support of this statement, the presentation cited an article entitled "Extent of oxidation of Cr(III) to Cr(VI) under various conditions pertaining to natural environment," from the Journal

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of Hazardous Materials, February 6, 2006. The study contained in this article concerns an investigation of chromium-contaminated tannery sludge at a dumping site in Kanpur, India. The study's conclusions are completely unreliable as they are based on limited information derived from a questionable source and have not been properly subjected to peer-review. Moreover, the tannery processes at issue in the study differ drastically from processes involved in metal melting operations, the subject of Rule 1407.1.

Differing processes in different industries will subject chromium compounds to factors other than temperature that could potentially contribute to and alter the conversion process. As such, the study upon which SCAQMD staff relies fails to establish a scientifically reliable basis in support of staff's assertions regarding the conversion temperatures of chromium compounds. CMC also commented that presenting the India study in a public meeting is potentially misleading to the public. With only 5 bullet points, and a single footnote on Slide 14, the public could conclude that this study supports the conversion of hexavalent chromium at temperatures as low as 392 ºF for the metal melting industry. Many households and restaurants use stainless steel cookware, ovens, and oven racks. These items contain chromium that, based on staff's January 30, 2018 presentation, is converted to hexavalent chromium at very low temperatures. Slide 14 could lead the public to believe that hexavalent chromium is released when the cooking temperature exceeds 392 ºF. 1-2

Item #3: Failed Bifurcation in New Rule 1407.1

CMC also expressed concerns in writing, and at the working group meetings, that placing non-ferrous and ferrous metals in a single rule further ignored the issue of temperature in metal melting. Chromium has a melting point of 3465 ºF. Non-ferrous metals melt at a temperature far below the melting point of chromium (ex: aluminum has a melting point of 1200 ºF). And ferrous metals also melt at a temperature below the melting point of chromium (ex: steel has a melting point of 2600 ºF). In December 2017, CMC asked staff to acknowledge the issue of temperature, respond to the fact that chromium doesn't reach its melting point in many alloys, and bifurcate the rules into ferrous and non-ferrous rules. 1-3

Staff appeared to have agreed with CMC and stated in the April 25, 2018 presentation, on Slide 18, that "As a result, staff has decided to bifurcate the rulemaking; Rule 1407 will address non-ferrous metal melting; Rule 1407.1 will address ferrous metal melting."

But staff quickly changed its position and in the August 2018 staff report, stated on Page 1-2 that "Staff bifurcated the two rules into non-chromium and chromium instead of non-ferrous and ferrous because certain ferrous alloys do not contain chromium and some non-ferrous alloys contain chromium." It is clear to CMC that the bifurcation was a complete failure. Staff's comments also further demonstrate that staff does not have information, understanding, or insight on why CMC requested a bifurcation based on

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temperature and how temperature impacts the potential conversion of chromium to hexavalent chromium in metal melting. 1-3

Item #4: Improper Application of CARB Test Method 425 for Metal Melting

CMC has previously objected to the use of CARB Test Method 425 for Proposed Rule 1407.1. The metal melting sector has voiced many concerns with using CARB 425 as the preferred or sole solution for chromium and hexavalent chromium testing for metal melting. On August 9, 2018, Slide 26, staff has even gone as far as to label CARB 425 as the "Gold Standard for Cr+6 Testing." This is an arbitrary comment, based on opinion and not on any standard. In fact, CMC is unaware of a single government agency that has approved CARB 425 for metal melting. CARB Test Method 425 has not been approved by CARB, or any other entity, for use in connection with metal melting operations.

The applicability of CARB Test Method 425 is made very clear by CARB. As amended on July 28, 1997, the "Applicability" of the CARB 425 test method is described by CARB on Page 1 as: 1-4

> *1.1 Applicability: This method (CARB 425) applies to the determination of hexavalent chromium (Cr6) and total chromium (Cr) emissions from stationary sources. Applicability has been demonstrated for the metal finishing and glass industries. Its applicability has not been demonstrated for sources with high particulate mass emission rates.*

SCAQMD staff argues that CARB Method 425 is appropriate because it was used once for a source test at a metal melting facility in 1993. However, CARB Method 425 was revised in 1997 and its applicability to metal melting has never been tested in its revised state. One instance of prior use twenty-five years ago is not an appropriate basis for applying the method to an entire industry. For Proposed Rule 1407.1, CARB 425 provides an unguided path that can result in the collection of bad data.

Item #5: Staff Dismissing the Benefit and Need for Academic Research and Data Collection for Metal Melting

At the April 25, 2018 working group meeting CMC, and numerous industry stakeholders, expressed their support for the collection of metal melting data at Cal Poly Pomona's metal melting facility. It is hard to argue against the pursuit of good science, and collection of relevant data, at a California university. 1-5

But at the August 30, 2018 public workshop, SCAQMD staff dismissed Cal Poly Pomona and stated it was not suitable for research because of the the size of the furnace. This position holds no merit as there is no evidence that furnace size has any impact on the potential conversion of chromium to hexavalent chromium in the metal melting processes.

This position is also contradictory to SCAQMD's definition of a "metal melting furnace," which is defined as "any apparatus in which metal in a container is brought to a liquid state including, but not limited to, reverberatory, cupola, induction, direct arc furnaces, sweat furnaces, and refining kettles, regardless of the heating mechanism. METAL MELTING FURNACE does not include any apparatus in which the metal is heated but does not reach a molten state, such as a sintering furnace or an annealing furnace." There is no reference to size in this definition. As such, SCAQMD's refusal to engage Cal Poly Pomona for academic research based on the size of its furnace lacks credibility.

At the August 30, 2018 public workshop, SCAQMD staff also rejected academic research by alleging that such academic research cannot provide real world data. This blanket statement is contrary to years of research conducted by the SCAQMD, as well as a precedent previously set by the SCAQMD Board for metal heat treating. The SCAQMD funded research, and on June 28, 2018 executed a contract for heat treating research at UC Riverside, prior to doing a rule for that sector. SCAQMD staff says that the UC Riverside study has no bearing on the rulemaking status for heat treating because it has data on this sector. However, the October 2017 proposal that the Board authorized states otherwise. On page 5 of the October 6, 2017 SCAQMD Board Meeting Agenda No. 9, it outlines many unknowns and states as follows: 1-5

> *Several mechanisms **may be** causing increased production of Cr6+ at heat-treating furnaces. These include: conversion of chromium by heat in the furnace insulating refractory materials, conversion of stainless steel type chromium-containing materials used in the construction of the furnaces, conversion of stainless steel type chromium containing-parts and parts racks placed in the furnaces, conversion in the accumulated metal and refractory dust on the furnace floors, conversion of airborne chromium laden dusts in the facility pulled into the furnaces, and exacerbation of the conversion dependent on oxygen or other combustion conditions in the furnaces. **The relative impact of each mechanism to the overall Cr6+ emissions is not yet fully understood**. This action is to authorize the Chairman to execute a contract with CE-CERT in an amount not to exceed $174,000 to fully characterize and quantify the specific mechanisms that lead to Cr6+ production from forging and heat treating furnaces.*

Many questions being researched at UC Riverside are the same issues unresolved for metal melting. The influence of temperature on chromium—not the process at which the heat is being applied—is useful and could create universally acceptable data. Any perceived inadequacy of Cal Poly Pomona's capacity, or value of the required research, is unfounded and does not negate the need to complete the research.

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ADDITIONAL COMMENTS ON AUGUST 30, 2018 GROUP MEETING

Item #1, Slide # 4, SCAQMD's Inaccurate Statements Regarding Regulated Operations

On Slide 4 of the August 30, 2018 presentation, the SCAQMD claims that alloy steel and stainless steel facilities are "not regulated." This is inaccurate. Eight out of fourteen CMC facilities that will be impacted by Proposed Rule 1407.1 have permits and pollution control systems. The other six are very small facilities that have SCAQMD permits. CMC requests that this language be omitted as it is misleading to the SCAQMD Board. 1-6

Item #2, Slide # 4, SCAQMD's Unsupported Statements Regarding the Correlation Between High Temperatures and Hexavalent Chromium Emissions

On Slide 4 of the August 30, 2018 presentation, SCAQMD makes the conclusion that "it is expected that at higher temperatures and higher chromium concentrations, more hex chrome emissions will occur." SCAQMD has not provided any data in support of this statement. It is just a hypothesis, at best. Either data supporting this statement should be presented or the statement should be removed. 1-7

Item #3, Slide # 5, SCAQMD's Improper Reliance on Irrelevant Studies

On Slide 5 of the August 30, 2018 presentation, SCAQMD reference an OSHA study as support for Proposed Rule 1407.1. The OSHA study is asserted to support the statement that "[w]orker exposure can occur during 'hot work' of steels containing chromium." The OSHA study is referring to welding, which can operate at temperatures up to 30x higher than metal melting. The term "hot work" is defined by OSHA as "riveting, welding, flame cutting or other fire or spark-producing operation." This definition does not include metal melting operations and, as such, does not support Proposed Rule 1407.1. 1-8

Item #4, Slide # 5, SCAQMD's Improper Reliance on Irrelevant Studies

The same slide also references a 2013 CDC study as support for statement that [a]t high temperatures, hexavalent chromium is formed as a by-product when metals containing chromium are processed. The bulk of this study references welding uses data was collected using NIOSH Test Method 7703, which includes a portable personal pump clipped to a worker's collar for 8 hours. The worker is mobile throughout the facility. As such, this study also fails to provide support for Proposed Rule 1407.1. 1-9

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Item #5, Slide # 5, SCAQMD's Improper Reliance on Irrelevant Studies

Slide 5 also references "Screening Tests on Heat Treating Furnaces" as evidence that metal melting converts chromium to hexavalent chromium, as well as the 2016-2017 ambient air monitoring in Paramount, California as evidence that metal melting converts chromium to hexavalent chromium. This is improper because heat treating and metal melting are different. Also, CMC is unaware of any ambient air monitoring results from the Paramount ambient air monitoring being traced back to metal melting facilities. 1-10

Conclusion

As a stakeholder, CMC continues to outline numerous comments, questions and concerns that the metals industry has about 1407.1 and a rushed rulemaking process leaves little or no time for discussion and review. This is made even more important by the fact that SCAQMD has failed to respond to several of CMC's letters in writing.

It has been nearly 5 months since CMC offered to fund research at Cal Poly Pomona that will provide currently unavailable data on the potential conversion of chromium to hexavalent chromium during the metal melting process. There are enormous benefits to conducting this research since:

(1) The SCAQMD does not have any literature supporting the conversion of chromium to hexavalent chromium during the metal melting process;

(2) The SCAQMD does not have any research to refer to that demonstrates the conversion of chromium to hexavalent chromium during the metal melting process;

(3) The SCAQMD does not have any acceptable data from metal melting facilities that demonstrates the conversion of chromium to hexavalent chromium during the metal melting process;

(4) The SCAQMD does not have an approved test method for metal melting to measure the potential conversion of chromium to hexavalent chromium during the metal melting process; and

(5) The SCAQMD has no answers to the impact of temperature during the metal melting process and no information detailing the chemical reaction where heat may convert chromium to hexavalent chromium during the metal melting process.

And since hexavalent chromium is very unstable (the half-life is 12 hours in the atmosphere) and wants to grab electrons from any surface to change to chrome 3 which is not toxic, unknowns also include the

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duration of heat needed to create the conversion, and how cooling impacts the change of hexavalent chromium back to chromium.

According to Cal Poly Pomona's College of Engineering website, "Cal Poly Pomona is the home of the largest and best equipped university foundry in the West...Melting is accomplished using an induction furnace as well as a gas-fired unit." The time is now to take a positive step forward and engage California's finest university for metal melting before making any unfounded conclusions through Proposed Rule 1407.1.

Sincerely,

James Simonelli
CMC Executive Director

Cc: Mike Morris, SCAQMD
Uyen Uyen Vo, SCAQMD
SCAQMD Stationary Source Committee

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Response to Comment 1-1

Staff disagrees that the rulemaking has been rushed. Site visits to gather information began in 2015. The first working group meeting was held on September 5, 2017 and there have been seven working group meetings in total and a public workshop. The reference to the April 25, 2018 date is when Proposed Amended Rule 1407 was bifurcated into Proposed Amended Rule 1407 and Proposed Rule 1407.1, as requested by industry stakeholders. The first four working group meetings, held as Proposed Amended Rule 1407, addressed toxic air contaminants (in particular, arsenic, cadmium, hexavalent chromium, and nickel) from ferrous and non-ferrous metal melting operations. Describing the rulemaking process timeframe as "half a year" is misleading as it discounts all the visits, meetings, and discussions that led to the formation of Proposed Rule 1407.1 as meaningless.

Staff agrees with California Metals Coalition (CMC) that the addition of hexavalent chromium requires a thorough investigation. This is precisely the foundation of Proposed Rule 1407.1 as an information gathering rule. Typically this is done as part of the development of the rule, but facilities have declined to allow SCAQMD to conduct the needed source testing as part of the investigation.

Health and Safety Code 40727.2 requires a comparative analysis to be completed 30 days before the adoption of Proposed Rule 1407.1. This comparative analysis is included in the Draft Staff Report for Proposed Rule 1407.1.

Response to Comment 1-2

Staff provided evidence during Working Group Meeting #3 on January 30, 2018 from two source tests of metal melting furnaces indicating that hexavalent chromium is emitted. The source tests showed hexavalent chromium conversion rates of between 3% and 76%. Staff also referenced a tannery sludge study which, as working group members correctly pointed out, is not directly related to metal melting. It was included as background information only and is not used to make any conclusions.

Response to Comment 1-3

At the recommendation of CMC, staff bifurcated the rule so that more information could be gathered regarding hexavalent chromium emissions. At Working Group Meeting #4 on April 25, 2018, staff's initial concepts were to bifurcate the rules into ferrous and non-ferrous metal melting. Staff noted that not all ferrous metals contain chromium (i.e. steel and iron) and that some non-ferrous alloys (superalloys) contain chromium. To better address the potential sources of hexavalent chromium emissions, staff chose not to bifurcate between ferrous and non-ferrous, and instead chose to bifurcate between chromium containing (> 0.5% by weight) and non-chromium alloys; this concept was presented at Working Group Meeting #5 on June 6, 2018. CMC's assertion that non-ferrous metals have lower melting points is incorrect as nickel alloys and superalloys have melting temperatures above 2,000˚F.

Response to Comment 1-4

CARB Test Method 425 is the appropriate method to determine hexavalent chromium emissions from stationary sources. CMC's assertion that it has not been approved by CARB, or any other entity, for use in connection with metal melting operations is incorrect. While the method

description notes that it has been "demonstrated for the metal finishing and glass industries", that does not mean that it isn't applicable to other stationary sources. CARB Test Method 425 has been used by SCAQMD and other air districts for testing the exhaust of boilers[11], testing emissions from a cement plant[12], ash handling systems[13], steel casting[14], and heat treating operations[15], among others. If facilities wish to use an alternative method, they may do so with approval of the Executive Officer.

Response to Comment 1-5

CMC mischaracterizes SCAQMD's position regarding laboratory testing in a university setting. Staff does not reject academic research or data generated in a laboratory setting. The letter fails to mention CMC's verbally stated position during the meeting and public workshop that the laboratory testing should be conducted ***instead*** of Proposed Rule 1407.1. Staff welcomes the data that would be generated by such a study and is pursuing funding laboratory testing in parallel with the required facility source testing. The laboratory testing could provide relevant supplementary information.

However, staff does not feel that the information generated by the laboratory testing alone would be sufficient to quantify emissions from the variety and scale of equipment used in industrial applications. The 48 pound electric induction furnace at Cal Poly Pomona would not provide suitable emission factors for different types of furnaces (vacuum induction, electric arc, crucible), different refractory types and ages, or much larger furnaces that have up to 360 times greater capacity and greater surface area. Source testing in real-world applications with various capacities and configurations is essential in developing emission factors.

Response to Comment 1-6

Staff has not said that alloy steel and stainless steel facilities are "not regulated". All stationary sources that generate air pollution emissions are subject to SCAQMD rules. However, alloy steel and stainless steel facilities are not subject to a source-specific regulation for toxic air contaminants. Source-specific regulations include provisions for a particular industry or type of equipment to reduce emissions. Rule 1407 is the source-specific rule for non-ferrous metal melting applications. There is no such rule currently for ferrous metal melting applications.

Response to Comment 1-7

Staff provided information of two source tests during the PAR 1407 working group meeting. The first test was an aluminum furnace with an approximate melting temperature of 1,200˚F while the second test was a steel furnace with an approximate melting temperature of 2,500˚F. The

[11] https://rma.org/sites/default/files/TDF-023_-_Evaluation_Test_Report,_Emissions_Tests_of_the_Wheelabrator_Shasta_Energy_Company.pdf

[12] https://rma.org/sites/default/files/TDF-016_.pdf

[13] http://www.deq.state.mi.us/aps/downloads/SRN/N1604/N1604_TEST_20170626.pdf

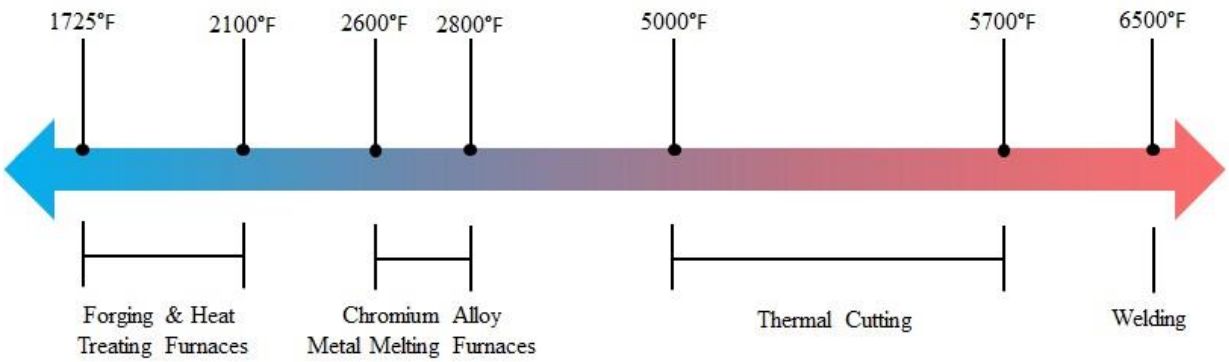
[14] http://www.baaqmd.gov/~/media/files/engineering/title-v-permits/e2605-smop/e2605_06_25_18_revision_smop_final_eval_clean_14029-pdf.pdf?la=en

[15] http://www.aqmd.gov/docs/default-source/compliance/Paramount/source-test-mattco.pdf

conversion rate from the lower temperature test ranged from 3-18 percent while the conversion rate from the higher temperature test ranged from 31-76 percent. This indicates that higher temperatures likely increases the conversion rate.

The figure below (Figure 1.1) depicts the spectrum of operating temperatures for various metalworking operations. Throughout this temperature spectrum, testing results from SCAQMD or literature developed by other regulatory agencies indicated conversion of chromium to hexavalent chromium.

Figure 1.1: Operating Temperatures of Metal Working Processes



Response to Comment 1-8

SCAQMD has provided source test results on metal melting furnaces, screening test results for heat treating and forging furnaces, and references to other agency data all indicating that high temperatures can lead to the conversion of chromium to hexavalent chromium. CMC has rejected all of the data without providing any evidence that emissions do not occur.

Response to Comment 1-9

See Response to Comment 1-8

Response to Comment 1-10

See Response to Comment 1-8

Comments received verbally from the August 30, 2018 Public Workshop with no corresponding written comments are presented and responded to below.

Comment #2 – Mr. Ryan Pickett, Griswold Industries

Comment 2-1

It is unclear how hexavalent chromium is forming and an academic setting is more appropriate for the type of testing SCAQMD is pursuing.

Comment 2-2

Please better define what finishing activities means.

Comment 2-3
Are there enough companies to do all the testing required in this rule?

Comment 2-4
How will the SCAQMD handle non-detect readings?

Comment 2-5:
What methods are available to test dross and slag?

Response to Comment 2-1
See Response to Comment 1-5

Response to Comment 2-2
A definition has been included in paragraph (c)(13) for mechanical finishing which is defined as a metal removal or reshaping process and includes, abrasive blasting, burnishing, grinding, polishing, and sawing.

Response to Comment 2-3
There are at least nine companies that do the required testing in the SCAQMD Laboratory Approval Program. Only five to eight tests are required over a one-year period.

Response to Comment 2-4
Provisions for non-detection are included in the Testing Methodologies section of SCAQMD Guidelines for the Preparation of Rule 1407.1 Source Test Protocols included in this document in Appendix 1.

Response to Comment 2-5
Test methods for dross and slag are included in paragraph (f)(3).

Comment #3 – Mr. Jim Bonny, Certified Alloyed Products

Comment 3-1
Heat treating is not indicative of our process and information from that type of operation is not applicable to metal melting.

Comment 3-2
Testing scrap, slag, and dross is not necessary. The metal melt and baghouse provide all the relevant information.

Response to Comment 3-1
See Response to Comment 1-7. Heat treating furnaces process materials similar to the metals that are applicable to Proposed Rule 1407.1, but at lower temperatures. For metal forging operations, metals are heated to a soft and workable temperature, but not to a molten stage. Hexavalent chromium emissions were detected at those temperatures. Metal melting operations occur at higher temperatures than heat treating operations. With the higher temperature required for chromium alloy melting, it is expected that hexavalent chromium emissions from melting

operation will be similar or possibly higher. Testing of activities conducted at higher temperatures such as welding also detected emissions of hexavalent chromium.

Response to Comment 3-2

SCAQMD is requiring scrap, slag, and dross to be tested to do a mass balance of materials entering the furnace and exiting the furnace. This will help indicate the fate of materials as they are processed in the furnace.

Comment #4 – Mr. Albert Chung, Keramida

Comment 4-1

Maintaining the pH during the source testing for CARB Method 425 introduces more source test error.

Comment 4-2

Has CARB Method 425 been tested in highly acidic or basic conditions?

Comment 4-3

A university setting is needed to examine an appropriate source test method.

Response to Comment 4-1

The sodium bicarbonate used in the CARB Method 425 keeps the chromium in its current state and does not change its state. The pH of the sample is checked and it must remain within test specification to be a valid source test.

Response to Comment 4-2

Yes. Even in those conditions the sample must remain within test specifications for a valid source test.

Response to Comment 4-3

See Response to Comment 1-5

Comment #5 – Mr. Charles Figueroa, Almega Environmental

Comment 5-1

There are recommended changes to source test provision in subdivision (e) to clarify requirements.

Comment 5-2

The source test protocols for the proposed rule should be presented prior to rule adoption so that the testing requirements can be reviewed.

Response to Comment 5-1

The provisions of subdivision (e) have been clarified as requested.

Response to Comment 5-2

The protocols for source testing have been included in Appendix 1 of this document.

Comment #6 – Mr. James Gutierrez, Strategic Materials Corporation

Comment 6-1

When will the list of approved labs be made available?

Comment 6-2

Stakeholders have requested that a socioeconomic analysis be provided for the proposed rule. There may be some economic impacts.

Comment 6-3

Supports California Metal Coalitions position that testing should be conducted at Cal Poly Pomona.

Response to Comment 6-1

The list is available on the SCAQMD website at: http://www.aqmd.gov/docs/default-source/laboratory-procedures/lap-list-by-method.pdf?sfvrsn=4.

Response to Comment 6-2

Costs and a socioeconomic analysis are included in this report. However, it has been a standard practice for SCAQMD's socioeconomic impact assessments that, when the annual compliance cost is less than one million current U.S. dollars, the Regional Economic Models Inc. (REMI)'s Policy Insight Plus Model is not used to simulate jobs and macroeconomic impacts, as is the case here. This is because the resultant impacts would be diminutive relative to the baseline regional economy.

Response to Comment 6-3

See Response to Comment 1-5

Comment #7 – Mr. Ron Hayes, Keramida

Comment 7-1

A source specific test method for metal melting is needed and Cal Poly Pomona is the proper setting for test method development.

Response to Comment 7-1

See Response to Comments 1-4 and 1-5