SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report
Proposed Rule 1407.1 – Emissions of Toxic Air Contaminants from Alloy Steel, Chromium Alloy, Stainless Steel, and Superalloy Melting Operations

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INTRODUCTION

Proposed Rule 1407.1 – Emissions of Toxic Air Contaminants from Alloy Steel, Chromium Alloy, Stainless Steel, and Superalloy Melting Operations (Proposed Rule 1407.1) is a source-specific rule that gathers information to assess toxic air contaminant 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 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 because of 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 significantly higher potency then 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 are 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 metal 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 Furnaces

SCAQMD conducted screening source tests on several heat treating furnaces processing metals or using materials that contain chromium. During source testing, the heat treating 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 screen source tests of heat treating furnaces.

Table 1.1: Screening Source Test of Heat Treating 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 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 one of a number of controlled heating 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 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 2,711.36 to 4,063.72 pounds per melt. The source test report did not record the furnace temperatures, but carbon steel melts at 2,600 to 2,800ºF. Table 1.3 summarizes the results of the source test.

Table 1.3: Source Test Results

Run Number	Amount Processed (lbs)	Chromium (lbs)	Hexavalent Chromium (lbs)
1	2,810	0.00013	0.00004
2	4,064	0.00025	0.00019
3	2,711	0.00068	0.0005

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

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

Source Test	Chromium (lbs)	Hexavalent Chromium (lbs)	Percent of Hexavalent Chromium*
Run 1	0.00013	0.00004	31%
Run 2	0.00025	0.00019	76%
Run 3	0.00680	0.00050	74%

* 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.

[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

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.

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, nickel, cadmium, and hexavalent chromium. 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 and 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. Agencies such as the Department of Labor Occupation Safety and Health Administration, Department of Health and Human Services, Centers for Disease Control and

[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

[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

Prevention, and National Institute for Occupational Safety and Health recognize that hexavalent chromium is a by-product of exposing chromium to high temperatures. Additionally, SCAQMD has source test data from metal melting and heat treat operations that provide confirmation that hexavalent chromium emissions do occur from these operations. These operations that were source tested are either lower in temperature or lower in chromium concentration than chromium alloy melting operations; it is expected that at higher temperatures and higher chromium concentrations, more hexavalent chromium emissions will occur. Literature and data indicate that melting operations of metals containing chromium would potentially result in emissions of hexavalent chromium. Data is limited, therefore additional source tests are needed to quantify the amount of toxic air contaminant emissions and then to identify the appropriate pollution controls.

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 proposed rule. At this time, no facility has agreed. Further testing is needed to assess toxic air contaminant emissions during chromium alloy melting operations and therefore the proposed rule will require source testing and data gathering. Emissions data will be used to assess the need for requirements to address these toxic air contaminant emissions.

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, 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 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. 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. Common alloy materials include chromium and nickel. 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. Finishing operations, including grinding and buffing, 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. Facilities that conducted heat treating or other metalworking operation but did not melt the metal were excluded. Additionally, facilities that melted metals but did 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 is scheduled for August 30, 2018.

CHAPTER 2: SUMMARY OF PROPOSAL

INTRODUCTION

PROPOSED RULE 1407.1

DRAFT SCAQMD GUIDELINES FOR THE PREPARATION OF RULE 1407.1 SOURCE TEST PROTOCOLS

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 toxic air contaminant 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 requirements.

The proposed purpose is as follows:

> *The purpose of this rule is to gather information regarding toxic air contaminant emissions from chromium alloy melting operations.*

Applicability (Subdivision (b))

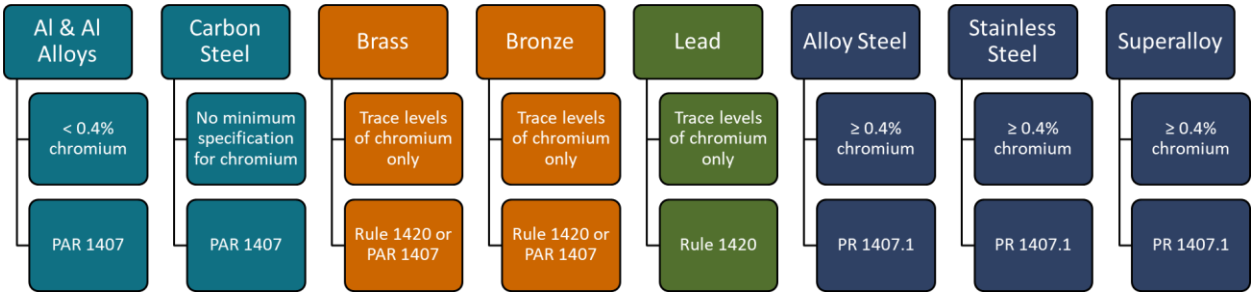
Rule 1407 currently applies only to non-ferrous metal melting applications. Ferrous metal melting operations are not subject to an industry or equipment specific regulation to address toxic air contaminant emissions. Initially, during the rule development process one approach was to expand Rule 1407 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
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.*

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, 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, 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 and processes performed are required to assist in further delineating potential requirements if significant differences in emissions are noted by technique or process. Information regarding 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.

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 Operational Information Survey that includes:*
>
> *(1) Casting techniques or processes performed on chromium alloys;*
>
> *(2) 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 stainless 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. Without ducting to a control device, only qualitative emissions screening can be conducted which provides some information, but cannot be used to establish an emission limit.

Furnace Selection (Paragraphs (e)(1) and (e)(2))

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. Additionally, if the control device vents multiples furnaces, then all furnaces must be operating during the source test, unless it is restricted by its permit. If approved by the Executive Officer, the owner or operator may select an alternative furnace and/or final product for source testing.

Source Test Protocol (Paragraphs (e)(3) and (e)(4))

Proposed Rule 1407.1 proposes to require the owner or operator of 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 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 paragraphs (e)(1) and (e)(2). 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)(5) and (e)(6))

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, multiple metals, and hexavalent chromium emissions. 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 multiple metals, CARB Method 425 – *Determination of Total Chromium and Hexavalent Chromium Emissions from Stationary Sources; and/or*
- For hexavalent chromium, 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. A separate train for sulfuric acid mist may be required.

SCAQMD Method 5.3 measures particulate emissions from stationary sources, except when determining compliance with New Source Performance Standard. It does not apply to stacks that contain liquid droplets, or saturated with water vapor, or 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. A separate train for sulfuric acid mist may be required.

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 (Cr) 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 determine of hexavalent chromium 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 chrome plating/anodizing, heated dichromate sealing, cement kilns, heat treating furnaces, and forging operations. 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 temperatures below 300ºF, which may not be the case for Proposed Rule 1407.1 sources. For the most part, EPA Method 0061 has not been use 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)(9) allows for alternative methods to be used provided they are approved in writing by the Executive Officer.

Capture Efficiency Testing (Paragraph (e)(7))

At the time of the source test required in paragraphs (e)(5) and (e)(6), 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)(8))

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. 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.

Testing Laboratories (Paragraph (e)(10))

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 is to ensure that quality assurance and quality control measure are adequate.

Notification of Source Testing (Paragraph (e)(11))

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)(12))

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)(13))

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)(14))

Facilities that have conducted source tests up to 6 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)(1), (e)(2), and (e)(5) through (e)(10).

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 during 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, paragraph (e)(9) 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 requirement of the proposed rule do not apply to equipment and operations that are subject to the lead series rules; Rules 1420, 1420.1, and 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. The requirements of the rule also do not apply to small operations that melt produce one ton per year or less of chromium alloys or to small furnaces with a capacity of 25 pounds or less. This excludes small operations including jewelers and testing laboratories.

CHAPTER 3: IMPACT ASSESSMENT

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. Eight 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. 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 as shown in Table 3.1 below.

Requirement	Cost	Number of Facilities	Total Proposed Rule 1407.1 Cost
Source Test	$20,000 - $30,000	8	$160,000 - $240,000
Materials Composition Testing	$300/test $2,700/facility	14	$37,800
Additional Recordkeeping	$3,000 - $5,000	14	$42,000 - $70,000
Total Costs	$239,800 - $347,800		

SOCIOECONOMIC ASSESSMENT

The proposed rule does not significantly affect air quality and emission limitations. As such no socioeconomic assessment is required.

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 toxic air contaminant emissions data from melting operations of chromium alloys, including alloy steel, stainless steel, and superalloys 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. Proposed Rule 1407.1 proposes an operation information survey to be conducted by applicable facilities to collect detailed furnace information, 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, and 41508.

Clarity

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

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 are necessary and proper to execute the powers and duties granted to, and imposed upon, the SCAQMD.

Reference

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

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. A comparative analysis will be prepared and released for public review and comment at least 30 days prior to the SCAQMD Governing Board Hearing of Proposed Rule 1407.1, which is anticipated for November 2, 2018.

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

COVER PAGE

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INTRODUCTION

EQUIPMENT DESCRIPTION AND PROCESS OPERATION

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REPORT INFORMATION AND FORMAT

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 Description and Process Operation; 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)(1);.
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 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 Description and Process Operation

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

1.) A 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 paragraph (e)(1);
2.) The information requested in Rule 1407.1 paragraph (d)(3);
3.) A copy of the SCAQMD Permit(s), if applicable;
4.) How the fuel usage will be monitored;
5.) The typical operating conditions of the device;
6.) The operating conditions of the device at the time of the test and a justification that the testing conditions are representative of normal operations;
7.) A description of what is produced at the facility and how it is produced, including, but not limited to, the final specifications of those products;
8.) A description of what will be produced during the test, details of the melt, and the final specifications of the product and a justification that this is representative of the alloy with 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.) A schematic of the exhaust stack showing the stack location in terms of the number of duct diameters to the nearest upstream/downstream flow disturbances;
11.) Whether there is access to the sampling ports, ample room to place testing equipment at the sampling port, and a platform available,
12.) A 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.) The location and specifications of process monitoring instruments. Information for process monitoring instruments shall include:
    - The dates the process monitoring instruments were last calibrated;
    - Any documentation which can verify the process monitoring instrument's accuracy; and
    - If the instruments report output which needs to be corrected to standard conditions and, if so, how is the output corrected, and what other calibrated instruments are need to adjust the raw measurement;
14.) The 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.) Whether there are special safety considerations when collecting samples or performing the laboratory analysis.

Testing Methodology

The Testing Methodology shall include the following:

1.) The test methods that will be employed to determine emissions, capture efficiency, and materials composition;
2.) A general description which summarizes each proposed method. List and justify all proposed deviations to 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,

lower 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.) Which ambient parameters will be monitored during the test, a description of how the parameters will be monitored, and frequency of the readings;

4.) Which equipment parameters will be recorded, a description of how the parameters will be monitored, and frequency of the readings;

5.) Whether the process monitoring instruments are calibrated and if 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.) The 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.) The 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:

- Cr6 $\leq$ 0.02 µg/l,
- As $\leq$ 2.1 µg/l,
- Cd $\leq$ 0.01 µg/l, and
- Ni $\leq$ 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.) A signed statement confirming that the test laboratory qualifies as an independent laboratory, per SCAQMD Rule 304(k) definitions; and

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

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 concentration, 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.) How the report will be organized. Whether or not 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.