



Proposed Rule 1407.1

**Control of Emissions of Toxic Air Contaminants
from Alloy Steel, Chromium Alloy, Stainless Steel,
and Superalloy Melting Operations**

**Working Group Meeting #7
August 9, 2018**

Previous Working Group Meeting

New Slide

- Presented preliminary draft rule language
- Received comments from stakeholders
 - Validity of CARB Method 425 and possibility of using other source test methods
 - Metals composition testing is overwhelming and will be expensive
 - Integrate metals composition testing with source testing
 - Possibly conduct studies in a laboratory or university setting
 - Source test data from single source test presented is based on equipment no longer used, facility configuration no longer applicable, and baghouse and exhaust system out of date
 - Disclosing the melt records of a facility would put that company at a competitive disadvantage
 - Rule development has been rushed

Testing at Cal Poly Pomona

New Slide

- Laboratory furnace may be available for testing purposes
 - 50 pound capacity
 - Induction furnace
 - Capable of melting aluminum and steel alloys; some superalloys
 - Refractory may be modified as needed
 - Exhaust system in place for emissions testing – needs further investigation
- Possible supplemental opportunity to test various alloys under laboratory conditions
 - Would provide limited emissions information on other types of furnaces
 - Does not represent real world conditions for collection efficiency or large-scale processes
 - Does not account for different techniques used in melting processes

Potentially Affected Facilities

Revised Slide

Approximately 14 facilities are expected to be impacted by PR 1407.1

7 Ferrous* Metal Melting Facilities	7 Non-Ferrous & Ferrous* Metal Melting Facilities
6 facilities have furnaces with air pollution control devices	2 facilities have furnaces with air pollution control devices

* Includes stainless steel

Preliminary Rule Language

Overview

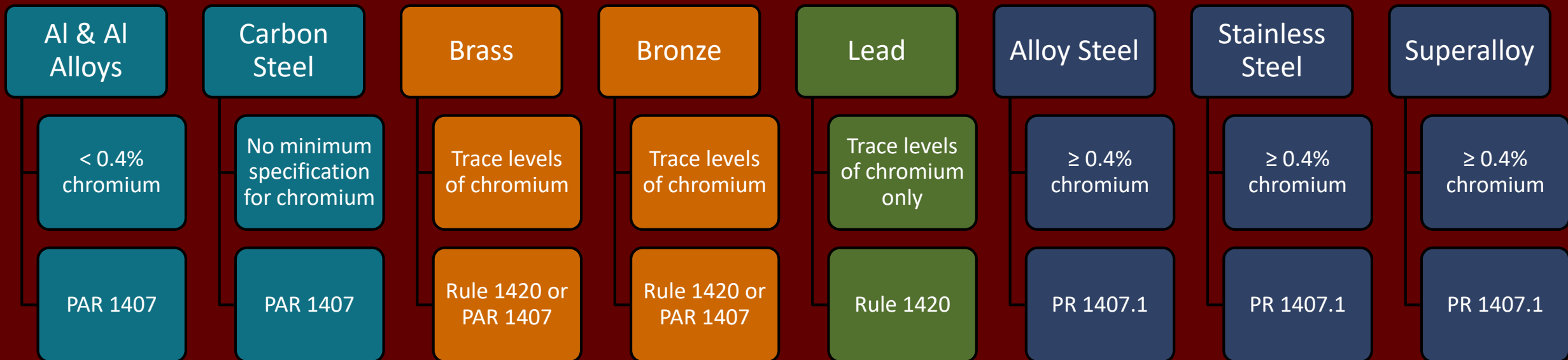
- Rule language provides the details necessary for implementation of the rule
- Rule language based on initial rule concepts with input from stakeholders
- Opportunities remain to revise rule language as rule development process progresses
 - Requesting further input from stakeholders where issues remain
- Presentation will highlight key provisions of preliminary rule language

Purpose (subdivision (a))

- To gather toxic air contaminant emissions information from alloy steel, chromium alloy (metal containing $\geq 0.5\%$ chromium), stainless steel, and superalloy melting operations
 - These metals contain toxic air contaminants which have the potential to be emitted during metal melting operations
 - A source test of a stainless steel and steel alloy furnace has shown that some chromium is converted to hexavalent chromium
 - Additional emissions data is needed to quantify the type and amount of toxic air contaminant emissions that occur from these melting operations
 - Emissions data will be used to assess the need for requirements to address toxic air contaminant emissions

Applicability (subdivision (b))

- All melting operations of alloy steel, chromium alloy (contains $\geq 0.5\%$ chromium), stainless steel, and superalloy



Key Definitions (subdivision (c))

Alloy Steel

- 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

- Any metal that is $\geq 0.5\%$ chromium by weight

Stainless Steel

- A steel alloy with a minimum of 10.5% chromium content by mass

Superalloy

- A heat-resisting metal alloy based on nickel, nickel-iron, or cobalt

- The applicability of the rule specifies alloy steel, chromium alloy, stainless steel, and superalloys
 - Alloy steel, stainless steel, and superalloys are standard definitions
 - Chromium alloy is defined to include any metal that may not be categorized as alloy steel, stainless steel, or super alloy, but has a chromium content greater or equal to 0.5%

Operational Information Survey Requirements (subdivision (d))

- Within 3 months of rule adoption date, submit a survey with details for the following :

Casting

- Casting techniques or processes performed

Finishing

- Finishing activities or operations performed

Furnaces

- Unpermitted and permitted furnaces

Housekeeping

- Housekeeping activities routinely performed

Operational Information Survey Requirements *(continued)*

Furnaces

- SCAQMD permit number, if applicable
- Make, model, serial number, date of manufacture and installation
- Furnace type
- Size and capacity
- Minimum, average, and maximum weight of metal processed
- Fuel type
 - If gas fired, BTU gas rating and burner age
- Refractory information
 - Type of refractory brick and refractory coating, including chromium content
 - Frequency refractory brick is replaced
 - Frequency refractory coating is applied
- Minimum, average, and maximum operating temperatures
- Associated Emission Collection System(s) and/or Emission Control Device(s)
- Metals and alloys melted

Housekeeping

- Method(s) used
 - For example: sweeping, washing, mopping, vacuuming
- Schedule
 - For example: daily, monthly, annually
- Areas housekeeping activities conducted
 - For example: near metal melting areas, outside of the buildings where metal melting occurs

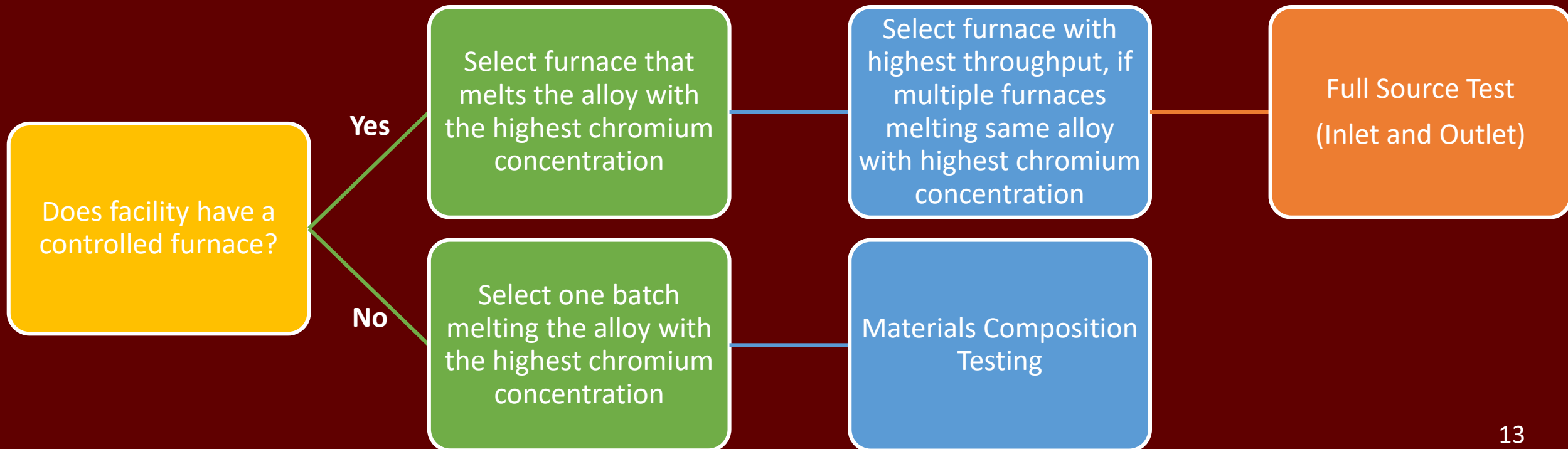
Operational Information Survey Requirements (*continued*)

- Stainless steel and alloy steel melting furnaces are not regulated by any SCAQMD source specific or industry specific toxic air contaminant rules
- Super alloys are exempt from Rule 1407 due to low arsenic and cadmium content
- As a result:
 - Information regarding metal melting operations not readily available
 - Housekeeping operations generally are not regulated
 - A number of furnaces may not be permitted

Source Test Requirements (subdivision (e))

- Facilities that have furnaces with an emissions control device to conduct a source test on one furnace

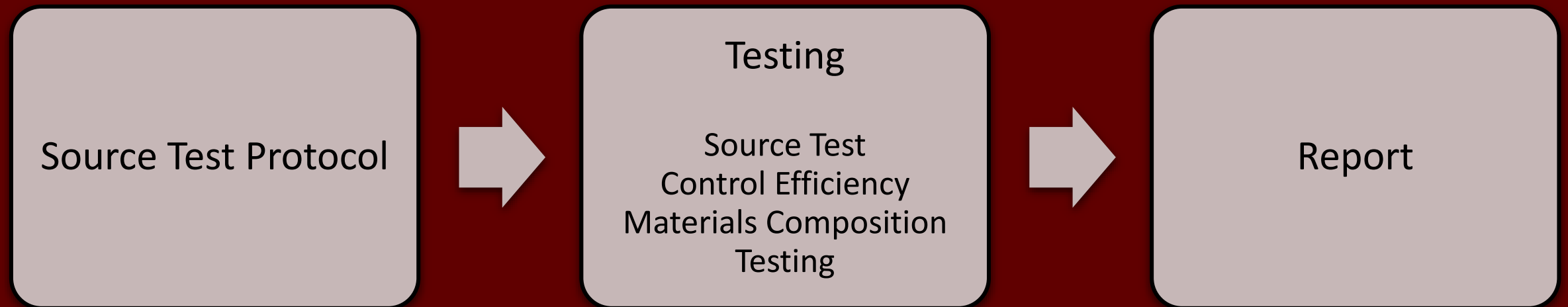
Selecting Furnace to Source Test



Source Test Requirements (*continued*)

- SCAQMD currently has one hexavalent chromium source test for a stainless steel and steel alloy furnace – hexavalent chromium was detected
- SCAQMD staff offered to conduct source tests at certain facilities as part of rule development, however, facilities were either reluctant or non-responsive
- Further testing is needed to assess toxic air contaminant emissions during alloy steel, chromium alloy, stainless steel, and superalloy melting operations
- Source tests will obtain emissions data to assess toxic air contaminant emissions

Source Test Requirements (continued)



Source Test Protocol

- Within 2 months after rule adoption, submit a Source Test Protocol
 - If the Source Test Protocol is rejected, must revise and resubmit within 30 days of rejection
 - The revised and resubmitted Test Protocol will be:
 - Approved; or
 - Modified by the Executive Officer and approved as modified
- Requirements for Source Test Protocol are contained in *SCAQMD Guidelines for the Development of Rule 1407.1 Source Test Protocols*

Background

- Source Test Protocols will specify which furnace is being tested and which methods will be used
- Source Test Protocols help ensure that results are accurate and representative

SCAQMD Guidelines for the Development of Rule 1407.1 Source Test Protocols

Source Test Protocol

Cover Page

Table of Contents

Introduction

Equipment Description and Process Operation

Testing Methodology

QA/QC Procedures

Calculations Procedures

Report Information and Format

Guidelines *(continued)*

Cover Page

- Facility information
- Furnace information
- Contact information

Introduction

- Detailed facility information
- Facility contact
- Source testing and analytical laboratory information
- Estimated test dates and number of testing days

Table of Contents

- List each section and initial page number
- Paginate each page of the test protocol

Guidelines (*continued*)

Equipment Description and Process Operation

Furnace

- Justification for selection
- Detailed information
- Applicable Permits
- Typical operating conditions
- Flow diagram and schematic

Description of what facility produces and process

Source test

- Proposed operating conditions and justification
- Proposed product to be produced and justification

Description of control parameters for the control device (if applicable)

Sampling port

- Access to sampling ports
- Room for equipment

Process monitoring instruments

Exhaust

- Configuration of exhaust stream
- Schematic of the exhaust stack

Safety considerations

Guidelines (*continued*)

Testing Methodology

Proposed test methods

- Deviations and justifications
- How samples will be analyzed once the collection is completed
- For instrumental methods, description of sampling and analytical system

Ambient and equipment parameters to be monitored

- Method and frequency

Monitoring instruments

- Calibration records
- Records to confirm accuracy and precision

Sampling equipment

- Special considerations for sampling equipment (set-up, warm-up period, pre/post-test diagnostics)
- Proposed parameters to be monitored

How will the following be addressed during testing

- Exhaust flow conditions
- Problems unique to the specific equipment

Proposed sampling time

- Must be sufficient to achieve three times the detection limit; or
- Minimum sample volume of 150 dcsf

Special sampling considerations

Laboratory confirmation

- An independent laboratory
- Part of SCAQMD Laboratory Approval Program

Guidelines *(continued)*

QA/QC Procedures

- Samples of field data sheets, calibration forms, and equipment maintenance records
- Description of calibration procedures
- Procedures for sampling handling, chain of custody, and sample storage
- Sample forms for cleaning and storage of sampling equipment
- QA/QC procedures

Calculations Procedures

- Proposed formulas
- Sample forms showing intermediate calculations
- Determining and applying bias or drift correction factors
- Expressing low concentrations

Guidelines *(continued)*

Report Information and Format

- How report will be organized
- Identify each section of the report, order it will be in, and topics discussed in each section
- Items to be submitted with the full laboratory package
- Format of the report
- Confirmation that report will contain all elements from the Source Test Protocol

Source Test Requirements

- Within 90 days of Source Test Protocol approval, conduct source tests for
 - Particulate matter
 - Multiple metals
 - Hexavalent chromium
- Applicable source test methods
 - Select the most applicable particulate matter method
 - SCAQMD Method 5.1
 - SCAQMD Method 5.2
 - SCAQMD Method 5.3
 - CARB Method 425 (Total and Hexavalent Chromium)
 - CARB Method 436 (Multiple Metals)

Source Test Requirements

- Within 90 days of Source Test Protocol approval, conduct source tests for
 - Particulate matter
 - Multiple metals
 - Hexavalent chromium
- Applicable source test methods
 - Select the most applicable particulate matter method
 - SCAQMD Method 5.1
 - SCAQMD Method 5.2
 - SCAQMD Method 5.3
 - CARB Method 425 (Total and Hexavalent Chromium)
 - CARB Method 436 (Multiple Metals)

- It is the only available reference method applicable to determination of Cr+6 from stationary sources
- Widely used and is gold standard for Cr+6 testing
- It has been used successfully by the SCAQMD for determination of Cr+6 emissions from chrome plating/anodizing, heated dichromate sealing, cement kilns, heat treating furnaces, and forging operations
- CARB Method 425 adopted in 1987 and updated in 1990 and 1997
 - New analytical techniques were added over time that are more precise and provide a lower detection limit
 - Source test method for hexavalent chromium emissions is still valid

EPA Method 0061 – Determination of Hexavalent Chromium Emissions from Stationary Sources

New Slide

- Method determines Cr+6 emissions from hazardous waste incinerators, municipal waste incinerators, municipal waste combustors, and sewage sludge incinerators
- Method only evaluated at temperatures below 300°F, may not be the case for PR 1407.1 sources
- Higher cost, high difficulty, and potential contamination issues from pump required
- Largely not used in past two decades
- PR 1407.1 includes a provision which may allow alternative or equivalent test methods to be use if approved in writing by the Executive Officer

EPA Method 0051 – Midget Impinger Hydrogen Chloride and Chlorine Emission Sampling Train

New Slide

- Method is for collection of hydrogen chloride and chlorine in stack gas emission samples from hazardous waste incinerators and municipal waste combustors
- Hydrogen chloride and chlorine are not applicable to PR 1407.1

Capture Efficiency Testing

- At the time source tests are conducted, perform capture efficiency testing
 - Quantitative measurement demonstrates equipment working as designed
 - Qualitative visual demonstration indicates that there is no interference with air flow

Quantitative Velocity Measurements

- Hot wire anemometer;
- Vane anemometer; or
- Device/method approved by the Executive Officer

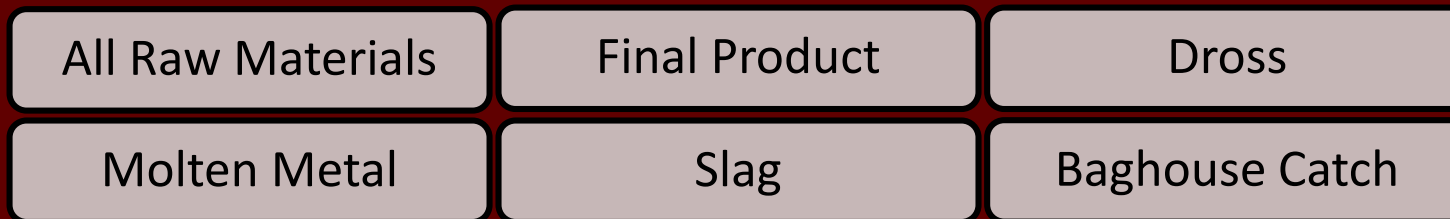
Qualitative Visual Demonstration

- Smoke generator

Metals Composition Testing Requirements

Revised Slide

- Revised metals composition testing based on stakeholders' comments
- At the time source tests are conducted, perform Materials Composition Testing for the following:



- Test for arsenic (As), cadmium (Cd), chromium (Cr), hexavalent chromium (Cr6), and nickel (Ni) using one or more of the applicable test methods

U.S. EPA 200.7	U.S. EPA 6010D	U.S. EPA 6020B	U.S. EPA 6200	U.S. EPA 7196A	U.S. EPA 7199
<ul style="list-style-type: none">As, Cd, Cr, and NiWater, wastewater, and solid wastes	<ul style="list-style-type: none">As, Cd, Cr, and NiAqueous matrices	<ul style="list-style-type: none">As, Cd, Cr, and NiWater samples and waste extracts/digests	<ul style="list-style-type: none">As, Cd, Cr, and Nisoil and sediment	<ul style="list-style-type: none">Cr6Extracts and ground water	<ul style="list-style-type: none">Cr6Drinking/ground water and industrial wastewater

Test Methods for Source Tests and Materials Composition Testing

- Alternative or equivalent test methods may be use if approved in writing by the Executive Officer
- Laboratories must be approved under SCAQMD Laboratory Approval Program
 - If there is no approve laboratory, Executive Officer may approve procedures used by a laboratory

Recordkeeping Requirements (subdivision (g))

Revised Slide

Background

- Data regarding furnace run hours and metals melted is needed to help assess emissions of toxic air contaminants

Proposed Rule 1407.1

- From 1/1/19 to 1/1/2020, keep records for the following:

Each metal melting furnace

- Monthly records of run hours and weight and type of raw materials processed

Each batch of raw material

- Vendor information

Each baghouse

- Weight of baghouse catch per container and date collected

- Submit all records by February 1, 2020
- Records marked “Confidential” will be treated as such under Gov. Code Sec. 6254.7(d)

Exemptions (subdivision (h))

- Equipment and operations subject to the requirements of Rules 1420, 1420.1, and 1420.2
 - These equipment and 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 PR 1407.1 if they are melting alloy steel, chromium alloy, stainless steel, or superalloys

Estimated Costs for PR 1407.1

Added Slide

Requirement	Cost	Number of Facilities	Total PR 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		

*Materials Composition Testing

- Assuming 9 materials for materials composition testing
 - 5 raw materials
 - 1 final material
 - 1 slag sample
 - 1 dross sample
 - 1 baghouse catch sample

Next Steps

Action	Target Dates
Stationary Source Committee	September 21, 2018
Public Workshop	August 30, 2018
Set Hearing	October 5, 2018
Public Hearing	November 2, 2018

Contact Information

Rule Development

Uyen-Uyen Vo, uvo@aqmd.gov, (909) 396-2238

Michael Morris, mmorris@aqmd.gov, (909) 396-3282

General Questions

Susan Nakamura, snakamura@aqmd.gov, (909) 396-3105