

Proposed Rule 1435 – Control of Toxic Air Contaminant Emissions from Metal Heating Operations

WORKING GROUP MEETING #7



June 18, 2026
9:30 AM (PT)
South Coast AQMD
Diamond Bar, CA

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Agenda

- Overview of PR 1435
- Reassessment of PR 1435 – Applicability
- Reconsiderations for Compliance Options for Furnace Emissions
- Next Steps

Overview of Proposed Rule 1435

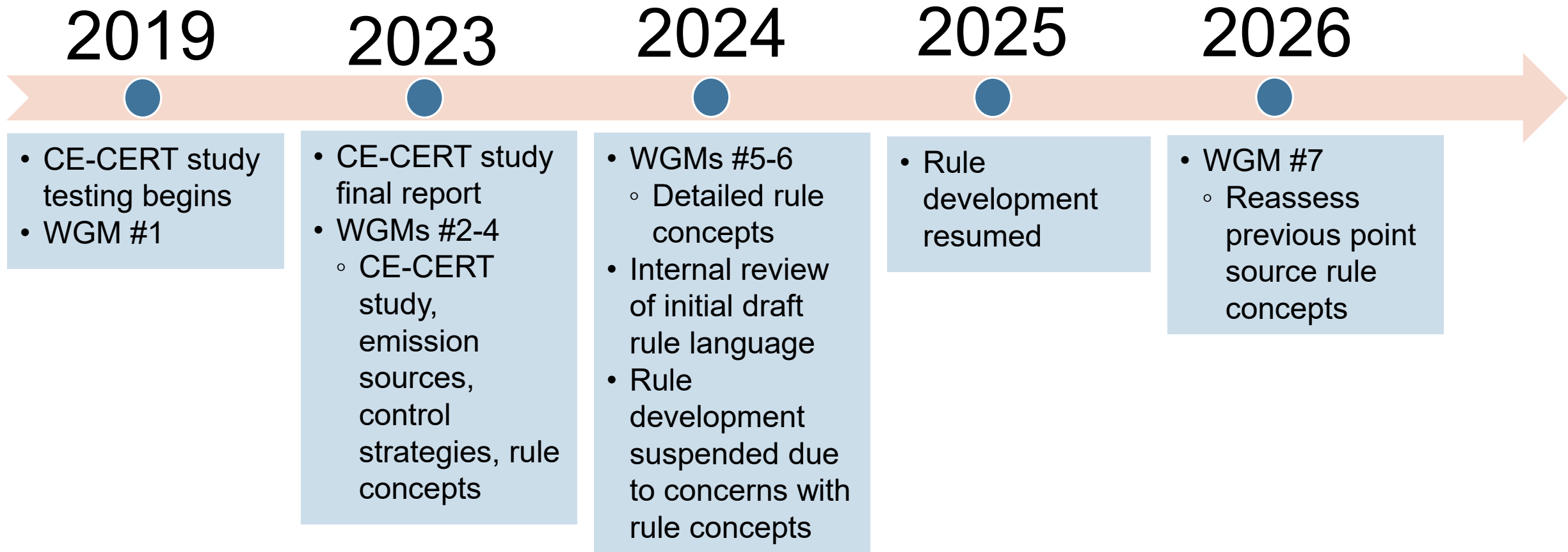
Background – Paramount Investigation

- Elevated levels of hexavalent chromium (cancer-causing toxic air contaminant) were observed during the 2016 monitoring efforts in Paramount
- Further investigation identified a heat treating facility as one of the sources of hexavalent chromium emissions
- Heat treating is when workpieces are heated in furnaces to attain desired properties such as hardness, durability, strength, ductility, etc. and then cooled (e.g., quenching)
- Proposed Rule 1435 was initiated to address hexavalent chromium emissions



An example of a furnace used for heat treating at a heat treating operation

Timeline of Rule Development



Summary of Proposed Rule Concepts 1.0

Purpose

- Reduce emissions of toxic air contaminants from metal heating operations

Quench Tank Requirements

Applicability

- Furnaces that operate equal to or greater than 1250°F
- Contain Rule 1401 metals

Housekeeping/Best Management Practices

Metal Heating Furnace

- Control emissions
- Assess emissions

Building Requirements

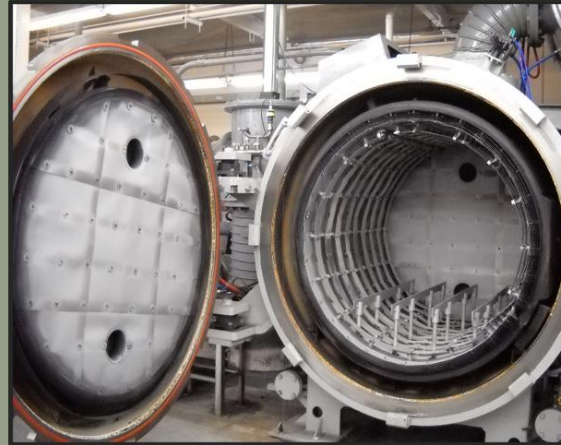
Proposed Rule Concepts 1.0 – Types of Furnaces

- Rule concepts 1.0 previously defined two furnace types:



Air Furnaces heat metals in an ambient air atmosphere where oxygen is present

(Previously called “uncontrolled atmosphere” furnaces)



Vacuum furnace



Endothermic furnace

Non Air Furnaces typically heat metals in a controlled atmosphere to avoid exposing the workpiece to ambient air during the heating process (*previously called “controlled atmosphere” furnaces*)

- Includes vacuum furnaces, endothermic furnaces, hydrogen furnaces, or furnaces that use inert gases in the furnace chamber, such as nitrogen, helium, or argon

Proposed Rule Concepts 1.0 – Classes

Class	Criteria	Estimated Number of Facilities	Furnace Requirements	Fugitive Controls
4	<ul style="list-style-type: none"> ≥ 17 air furnaces that process Cr alloys (≥ 0.5% Cr by weight) 	<ul style="list-style-type: none"> Four 	<ul style="list-style-type: none"> Option A – Permanent Total Enclosure (PTE) Option B – Add-on controls (e.g., overhead hood) Option C – Health Risk Assessment (HRA) with periodic source testing Option D – Fenceline monitoring 	<ul style="list-style-type: none"> Proposed
3	<ul style="list-style-type: none"> ≥ 8 air furnaces that is not a Class 4 facility ≥ 17 applicable furnaces with at least one air furnace 	<ul style="list-style-type: none"> 11 	<ul style="list-style-type: none"> Conduct source tests or Comply with options above 	<ul style="list-style-type: none"> Proposed
2	<ul style="list-style-type: none"> ≤ 7 air furnaces that process Cr alloys All applicable facilities that are not in Classes 1, 3, or 4 	<ul style="list-style-type: none"> Estimated 72 	<ul style="list-style-type: none"> Submit information for all furnaces 	<ul style="list-style-type: none"> BMP/house keeping only
1	<ul style="list-style-type: none"> ≤ 7 air furnaces that don't process Cr alloys Exclusively non-air furnaces 		<ul style="list-style-type: none"> Submit information for all furnaces 	<ul style="list-style-type: none"> BMP/house keeping only

Proposed Rule Concepts 1.0 Concerns – Low Emitting Sources

- Feedback about non-air furnaces from industry stakeholders:
 - Hexavalent chromium forms in the presence of oxygen
 - Non-air furnaces rely on an oxygen free environment
 - Scale is significantly reduced in these furnaces
 - Exclude these furnaces from point source requirements



A vacuum furnace is an example of a non-air furnace

Proposed Rule Concepts 1.0 Concerns – Option A and Option B

Option A

Capture and Control:
PTEs vented to HEPA

Option B

Capture and Control:
Furnace exhausts vented to
HEPA

- Industry stakeholders expressed concerns with capturing and controlling emissions at facilities:
 - Challenging to modify buildings to reduce volume of air required to be controlled to meet PTE requirements
 - Feasibility of installing control equipment and the associated ducting due to space and equipment constraints
 - Insufficient electrical capacity to power control equipment

Proposed Rule Concepts 1.0 Concerns – Option C and Option D

Option C

Demonstrate low emissions
and low health risk

Option D

Fenceline air monitoring

- Staff identified the following concerns with assessing emissions at facilities:
 - Utilizing risk as an off-ramp may conflict with AB 2588 process
 - Assigning emissions to one facility is challenging with multiple facilities grouped together (e.g., Paramount)
 - Fenceline monitor may not capture emissions from the facility
 - Lack of continuous monitor for hexavalent chromium

Approach to Revise Proposed Rule Concepts 1.0

- Through site visits with facilities, discussions with the California Metal Coalition (CMC), and internal discussions, staff identified concerns with the rule concepts 1.0:

Concern of having control requirements for non-air furnaces or low temperature air furnaces

Feasibility of installing add-on controls at large forging facilities

Fenceline monitoring as a compliance option

Health Risk Assessment as a compliance option

- Reassessment of rule concepts will address feedback while maintaining:
 - The purpose of the rule to reduce emissions of hexavalent chromium from heat treating operations
 - A technology-based approach as opposed to risk-based

Reassessment of PR 1435 – Applicability

Key Findings of Information Sources

Paramount Heat Treating Facility Investigation

- Heat treating operations are a source of hexavalent chromium emissions

Source Tests

- Confirmed heat treating air furnaces are a source of hexavalent chromium
- Hexavalent chromium emissions form when heating chromium alloy at temperatures of 1250 °F and higher
- Support racks and other metal furnace components can be sources of hexavalent chromium

CE-CERT Study

- Confirmed emissions can be generated from support racks and other metal furnace components
- Emissions detected in empty furnaces due to contamination

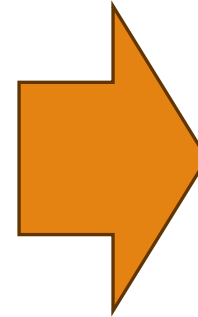
Proposed Rule Concepts 2.0 – Applicability Assessment

- Metal heating is very broad and can encompass unintended operations
 - Changing the rule name from “metal heating” to “heat treating”
 - Focus the applicability to heat treating operations
- Address emissions of a known and evaluated toxic air contaminant from heat treating operations based on evidence from multiple studies
 - Focus the applicability on hexavalent chromium

Proposed Rule Concepts 2.0 – Point Sources

Initial Concept

- PR 1435 applies to facilities conducting Metal Heating including forges, heat treaters, and other establishments conducting Metal Heating processes
- Would not apply to furnaces that:
 - Operate at maximum temperatures of less than 1250°F
 - Do not contain Rule 1401 metals



Revised Concept

- Require emissions from air furnaces to be controlled, if the following criteria are met:
 - Potential source of chromium in furnace (e.g., chromium alloy parts, chromium containing fixture, chromium containing refractory/coating)
 - Greater than or equal to 1250°F

Class	Criteria *
4	<ul style="list-style-type: none"> • ≥17 air furnaces that process Cr alloys (≥0.5% Cr by weight)
3	<ul style="list-style-type: none"> • ≥8 air furnaces that is not a Class 4 facility • ≥17 applicable furnaces with at least one air furnace
2	<ul style="list-style-type: none"> • ≤7 air furnaces that process Cr alloys • All applicable facilities that are not in Classes 1, 3, or 4
1	<ul style="list-style-type: none"> • ≤7 air furnaces that don't process Cr alloys • Exclusively non air furnaces

Proposed Rule Concepts 2.0 – Point Source Assessment



Point source requirements for air furnaces that have evidence to generate hexavalent chromium as emissions

- Source of chromium, operating at temperature ≥ 1250 degree °F, and heating occurs in an oxygen environment



Removes approach to have less stringent point source requirements for facilities with fewer furnaces (e.g., data collection)

- Number of furnaces is not a surrogate for the potential amount of hexavalent chromium emissions from a facility
- Does not account for the operational parameters that increase hexavalent chromium emissions



Heat treating furnaces will have point source requirements to control emissions based on the furnace types

Proposed Rule Concepts 2.0 – Summary of Furnace Types

Furnace Type	What is the maximum temperature?	Does the furnace heat metal in the presence of oxygen?	Does the furnace processes chromium alloy parts and/or chromium-containing furnace elements?	Point source control requirements?
Emitting Air Furnace	Greater than or equal to 1250 °F	Yes	Yes	Yes
Non-Qualifying Air Furnace	Less than 1250 °F	Yes	Yes	No
Non-Air Furnace	No restriction	No	Yes	No

Reconsiderations for Compliance Options for Furnace Emissions

Limitations of Proposed Rule Concepts 1.0

Option C – Health Risk Assessment

- Option C was for facilities going through the health risk assessment process through Rule 1402
- Six PR 1435 facilities are currently required to submit risk characterization or risk reduction documents
- Option C may have created duplicative risk assessment requirements for facilities being evaluated under Rule 1402
- A facility that exceeds the risk level would still need to control emissions

Limitations of Proposed Rule Concepts 1.0

Option D – Fenceline Monitoring

- Source apportionment to one facility is challenging
 - Multiple facilities that emit hexavalent chromium can be clustered together in one area
 - Variability in meteorological conditions (e.g., wind speed and temperature)
- Limitations to fenceline monitoring and measurement technology
 - Monitors placed at the fenceline may not adequately measure heat treating operations emissions
 - Continuous monitors of hexavalent chromium is not available
- An elevated fenceline measurement would still require the facility to control emissions

Proposed Rule Concepts 2.0 – Compliance Options

- Removed Option C – HRA and Option D – Fenceline monitoring
- Modified applicability to negate the need to assess if the furnace is a source of hexavalent chromium emissions
- Control emissions from furnaces that have been determined to be sources of hexavalent chromium emissions

Option A
Capture and Control:
Permanent Total Enclosure
vented to HEPA

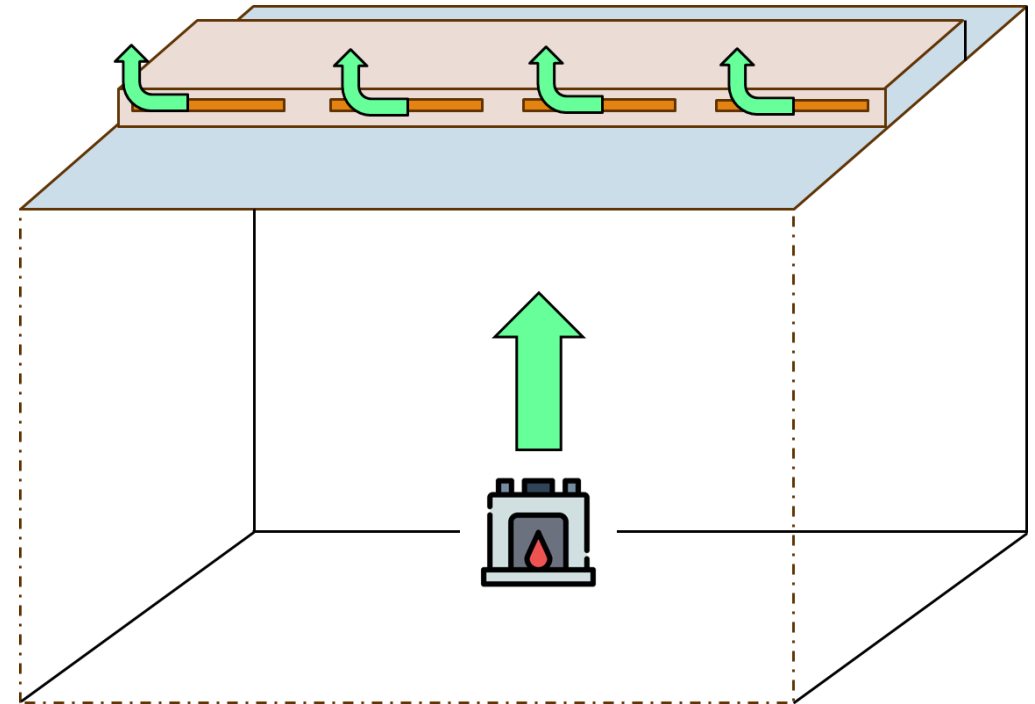
Option B
Capture and Control: Modified
Permanent Total Enclosure
vented to HEPA



Option C
Capture and Control:
Furnace exhausts vented to
HEPA

Observations of Large Forging Facilities

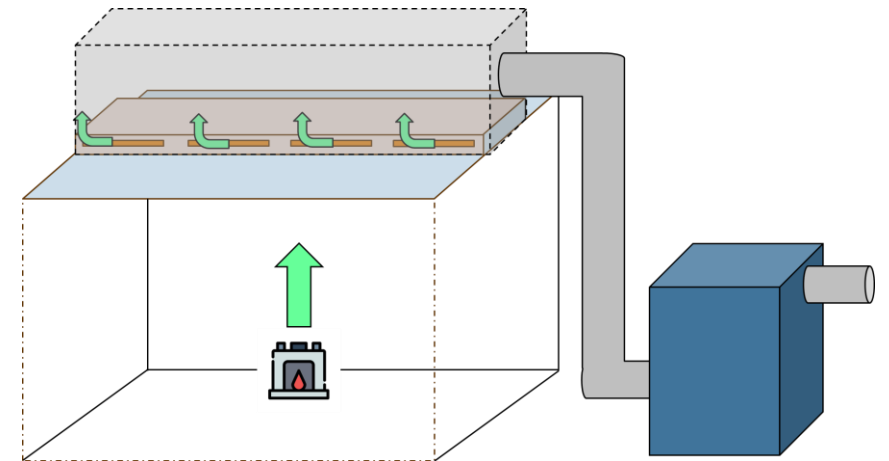
- Staff conducted a site visit at three of the four large forging facilities to assess the feasibility concerns
 - Buildings are large (~150,000 sq ft) and have high ceiling (~50 ft)
 - Air furnaces release emissions primarily from the exhaust stack and the door when opened
- Routine operations are dynamic and need space for overhead cranes and forklifts to quickly move workpieces
- Heat from the operations creates an inward and upward airflow that exhausts from roof vents or roof slots
- Measured an inward velocity of ≥ 200 feet per minute at bay door openings (equivalent to the inward velocity specified in Method 204)



Option B – Modified Permanent Total Enclosure



- Modified PTE is an alternate compliance pathway to address the concerns with a PTE or point source controls
 - Focuses on controlling building emissions instead of a processing the entire volume of the building (**no minimum number of air exchanges**)
 - Additional requirements to ensure maximum collection of furnace emissions without a minimum number of air exchanges
- Modified PTE will have prescriptive design requirements:
 - Limits on allowable openings
 - Minimum inward velocity at enclosure openings or utilize prescriptive method(s) to close enclosure openings
- Verify design requirements are met by frequent testing of enclosure operating parameters



Design Requirements for PTE and Modified PTE

Parameter	PTE	Modified PTE
Number of Air Exchanges Per Hour	<ul style="list-style-type: none"> Minimum of four per hour 	<ul style="list-style-type: none"> No minimum number of air exchanges
Natural Draft Opening	<ul style="list-style-type: none"> Not exceed 5% of the surface area May exclude access doors and windows 	<ul style="list-style-type: none"> Not exceed 3.5% of the surface area Could be an access door/corridors meeting the minimum facial velocity
Facial Velocity Through Natural Draft Openings	<ul style="list-style-type: none"> ≥ 200 feet per minute into the enclosure 	<ul style="list-style-type: none"> ≥ 200 feet per minute into the enclosure
Access Doors/Corridor	<ul style="list-style-type: none"> Closed except the passage of vehicles, people or equipment, (if excluded from 5%) 	<ul style="list-style-type: none"> Closed with a prescriptive door system except during the passage of vehicles, people or equipment, (if excluded from 3.5%)

Modified PTE – Periodic Tests

- Periodic tests will be conducted to verify that the modified PTE is operating as designed, and emissions are not escaping the enclosure

Assessment		PTE	Modified PTE	Key Difference
Smoke Test	<ul style="list-style-type: none"> • Qualitatively demonstrate air is not escaping from the enclosure at each opening 	Not Specified	Monthly	Frequency
Facial Velocity Test	<ul style="list-style-type: none"> • Measure the inward face velocity at each natural draft opening 	Quarterly (Rule 1405)	Monthly	Frequency
Pressure Test	<ul style="list-style-type: none"> • Measure the pressure differential • Maintain a negative pressure at least 0.007 inches of water 	Continuous (Rule 1405)	Continuous	None

Summary of Working Group Meeting #7

- Provided an overview of the previously developed rule concepts (rule concepts 1.0)
- Reassessed rule concepts 1.0 and developed rule concepts 2.0 based on internal and external feedback
- Air furnace that meets the criteria (e.g., temperature, chromium content) will be required to install controls
- Air furnaces will have the following technology-based options to control furnace emissions
 - Option A – PTE vented to HEPA
 - Option B – Modified PTE vented to HEPA
 - Option C – Furnace exhausts vented to HEPA

Next WGM will discuss reassessment of fugitive source rule concepts

Next Steps

Next Steps

Continue site visits



Continue to re-assess previous PR 1435 rule concepts



Next working group meeting



Draft preliminary rule concepts

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Rule 1426

Emissions from Metal Finishing Operations

Rule 1426.1

Point Source Emissions from Hexavalent Chromium Metal Finishing Operations

Rule 1435

Control of Emissions from Metal Heat Treating Processes

Rule 1460

Control of Particulate Emissions from Metal Recycling and Shredding Operations


Rule 1466

Toxic Air Contaminant Emissions from Decontamination of Soil

PR 1435 Staff Contacts

Marisa Gonzalez, Ph.D.


Air Quality Specialist

 (909) 396-2681

 mgonzalez@aqmd.gov

Neil Fujiwara


Program Supervisor

 (909) 396-2512

 nfujiwara@aqmd.gov

Michael Krause

Assistant Deputy Executive Officer

 (909) 396-2706

 mkrause@aqmd.gov