

SCAQMD Proposed Rule 1435 and the Impact on Metal Heat Treating Operations



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Agenda

1. Rule Background
2. Technology Assessment
3. Technical Implementation Challenges
4. Next Steps

Who is SCAQMD – Any why worry?

South Coast AQMD is the regulatory agency responsible for improving air quality for large [areas](#) of Los Angeles, Orange, Riverside and San Bernardino counties, including the Coachella Valley.

800 Employees

The region is home to more than 17 million people—44% of the population of the entire state of California.

Trend Setting Regulatory Agency – Known Internationally



Proposed Rule Title:

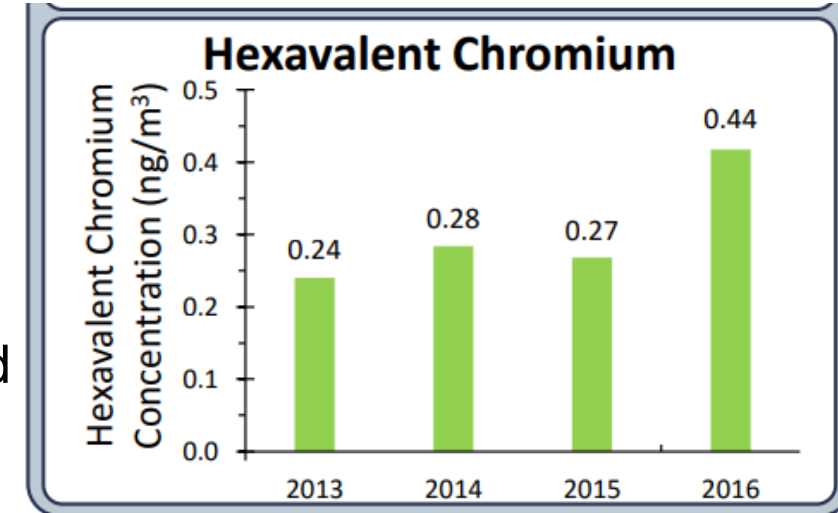
Control of Toxic Air Emissions from Metal Heating Operations

Background:

- Public Meeting - November 10, 2016, Carlton Forge Paramount California – Summary Report
- **Neighbor Complaints – Metallic odors**
- SCAQMD sampled at plant property line
- SCAQMD detected hexavalent chromium (Cr^{+6}) at property line and beyond, also nickel.
- Detected at property line of elementary School

Result:

- SCAQMD Rule 1430 – Control of Emissions from Metal Grinding Operations at Metal Forging Facilities – FINAL March 3, 2017



SCAQMD Proposed Rule 1435

Carlton Forge activity increased interest in similar hot work activities.

Such as:

Heating of stainless alloys above 1,200°F

Could there be similar emissions from just heating metal?

CE CERT Study

University of California, Riverside, and Bourns College of Engineering-
Center for Environmental Research and Technology (CE-CERT)

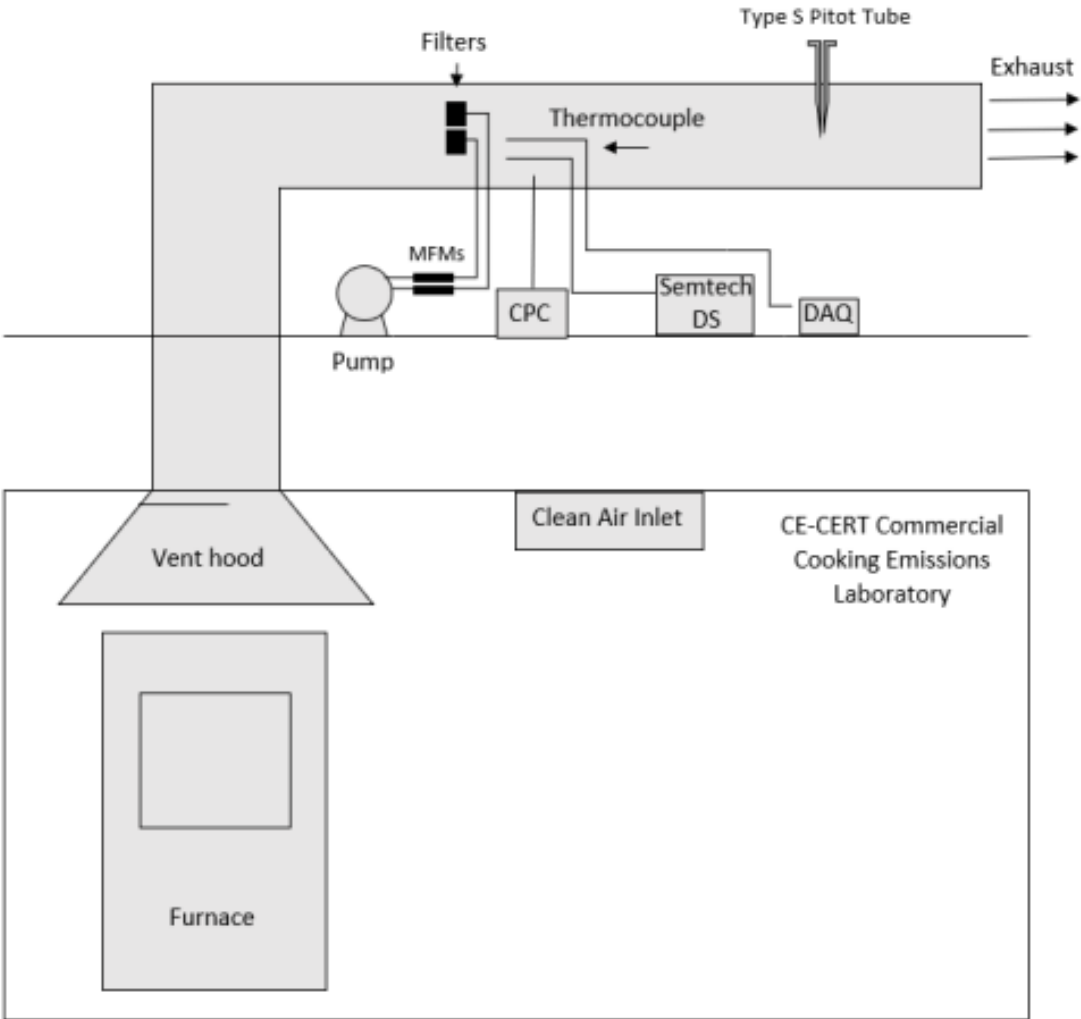
Investigations started in 2019 – then delayed – Covid 19.

University of California CE-CERT Study **September 2021.**

Study confirmed that heating certain stainless alloys above 1500°F generated Cr⁺⁶ emissions. Even as low as 1250°F

CERT study results were intended to be qualitative and not quantitative

CE Cert Study



Hexavalent Chromium - Cr⁺⁶ or Cr(VI)

Overview

CAS No. 18540-29-9

Hexavalent chromium (Cr(VI)) compounds are a large group of chemicals with varying properties, uses, and workplace exposures. Hexavalent chromium is harmful to the eyes, skin, and respiratory system. NIOSH considers all Cr(VI) compounds to be occupational carcinogens. Workers may be harmed from exposure to hexavalent chromium. The level of exposure depends upon the dose, duration, and work being done.

<https://www.cdc.gov/niosh/topics/hexchrom/>

Furnaces

- Due to oxidation, hexavalent chromium forms as loose scale on the surface of heated alloys
 - CE-CERT study estimates temperature of formation at around 1500 °F
 - Source tests measured elevated emissions from furnaces operating as low as 1250 °F
- Hexavalent chromium formed in furnaces also contaminates the refractory, leading to ongoing emissions regardless of material being processed in a furnace



Water Quench Tanks



- Oxidized scale from heated workpieces may be cooled in water quench tanks
 - Water can become laden with hexavalent chromium
- Open circuit cooling towers that directly cool the quench water circulate the hexavalent chromium-laden water and release airborne droplets
 - Rule 1404 limits hexavalent chromium concentration in cooling towers to 0.15 mg/L

Other SCAQMD Proposed Rules, hexavalent chromium metal finishing and hot work areas

Rule or Proposed Rule (PR)	Title
Rule 1407.1	Control of Toxic Air Contaminant Emissions from Chromium Alloy Melting Operations
Rule 1430	Control of Emissions from Metal Grinding Operations at Metal Forging Facilities
Rule 1426.1	Hexavalent Chromium Emissions from Metal Finishing Operations
PR 1435	Control of Toxic Emissions from Metal Heating Operation
PR 1445	Control of Toxic Emissions from Laser and Plasma Arc Cutting
PR 1455	Control of Toxic Emissions from Torch Cutting and Welding

Hexavalent Chromium Presence in Atmosphere

- The average half-life of hexavalent chromium in Los Angeles ambient air is approximately 14 hours¹
 - Cited in a Health Risk Assessment submitted by a heat treating facility
 - Emissions may travel more than 40 miles (~downtown LA to Ontario airport) within span of its half-life using an average windspeed of 3 miles per hour

¹ Grohse, P M, Gutknecht, W F, Hodson, L, & Wilson, B M. *Fate of hexavalent chromium in the atmosphere. Final report, January 1987-June 1988.*
United States.

Current Status

3rd Working Group Meeting September 28, 2023.

4th Working Group Meeting planned – November 16, 2023

Final Rule - Likely in Summer 2024

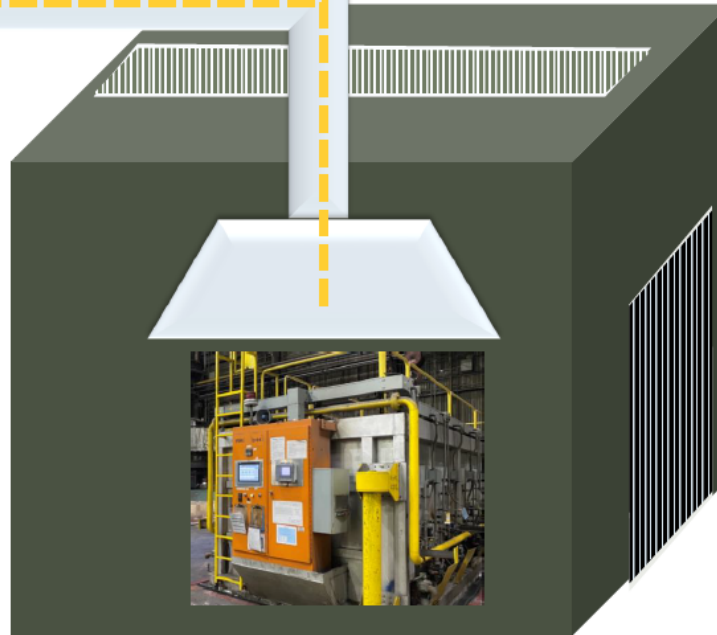
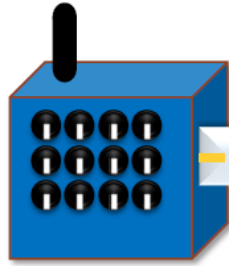
SCAQMD Staff implied that control technologies exist, to include three stages:

- Full process containment
- Bag Houses
- HEPA filters

Emission Control Strategies

Point Source Controls

Point source pollution controls reduce metal particulate emissions at source



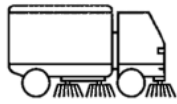
Enclosures

Buildings with minimal openings for ingress and egress contain fugitive metal particulate emissions

These control strategies would be effective in controlling hexavalent chromium emissions, as well as other toxic metal emissions

Housekeeping / Best Management Practices (BMPs)

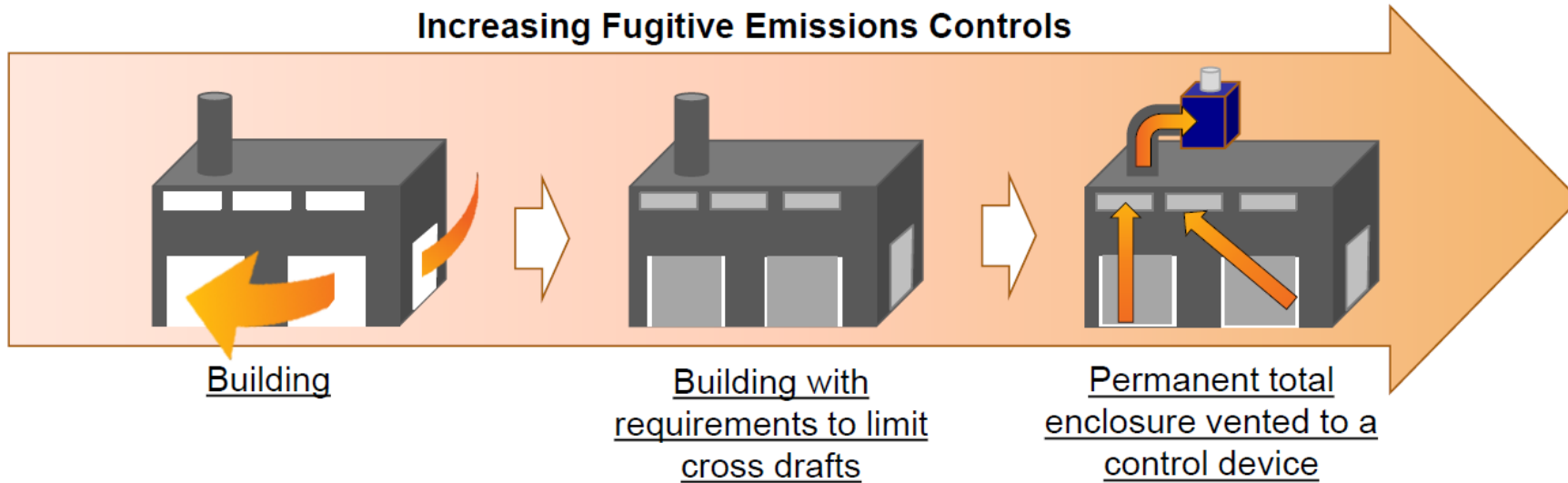
Minimize fugitive metal particulates from becoming airborne



Emission Control Strategies

Enclosures

- Enclosures minimize openings for ingress and egress, which reduces fugitive emissions



Challenges



Affected Groups

California Metals Coalition (all of California)

- 500 + members
 - They have alerted their members as a priority event
- Any heat treater processing any metal over 1250°F (677 °C) in SCAQMD
 - 120 actual heat treaters in SCAQMD
- Ultimately any heat treater processing high chrome alloys metals

Attention Heat Treaters

Point source identified as quench solutions

- Could be either water or oil quenchants

Could carry to down stream processes

- Cleaning
- Final machining – finish grinding / honing operations
- Exposure carries throughout the process

Impact:

- Cost to implement total enclosures may be prohibitive
- Cost to maintain equipment (HEPA filters) will be expensive

Implications well beyond SCAQMD

Next Steps

Attend Working Group Meetings (so far, all virtual)

Google SCAQMD PR1435 and it will take you to the web site

Provide Comments

- Aware of activities of the California Metals Coalition.
- Any one con comment, even outside of SCAQMD district.

Thank You!