

# **Proposed Rule 1430 Control of Toxic Emissions from Grinding Operations at Forging Facilities**

**Working Group Meeting #2**  
September 14, 2016



# Background

- First Working Group Meeting – October 2015
- Since first Working Group Meeting staff:
  - Further investigated potential affected sources
  - Conducted site visits – gathered additional information
  - Reviewed ambient monitoring data near Carlton Forge Works in Paramount
- Rulemaking temporarily paused to allow SCAQMD staff to communicate findings from ambient monitoring data to community (hexavalent chromium)
  - August 23, 2016 SCAQMD staff hosted a second Town Hall Meeting in the City of Paramount to discuss ambient monitoring results

# Efforts that Lead to Ambient Monitoring in Paramount



Beginning 2012, SCAQMD began receiving a series of burnt metallic odor complaints - a number of complaints focused on Carlton Forge Works (CFW)



May 2013 - Glass plate sampling at and near CFW confirmed fugitive metal particulate emissions



August 2013 - SCAQMD begins ambient air monitoring near CFW



September 2013 - CFW began voluntarily implementing measures to reduce fugitive emissions from their grinding operations

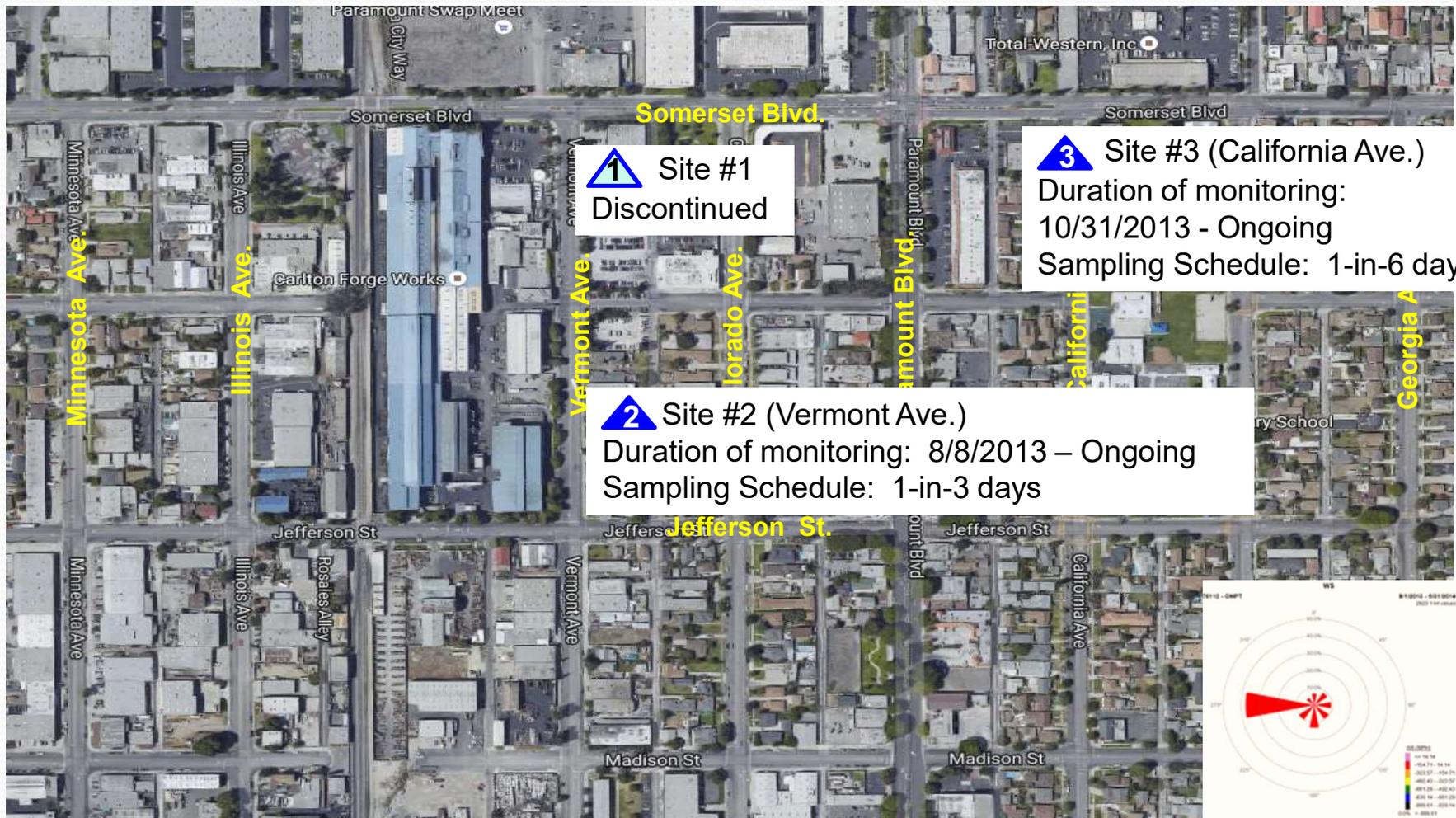


January 2014 - SCAQMD hosts a town hall meeting to report initial monitoring results

# Background on Paramount Ambient Air Monitoring

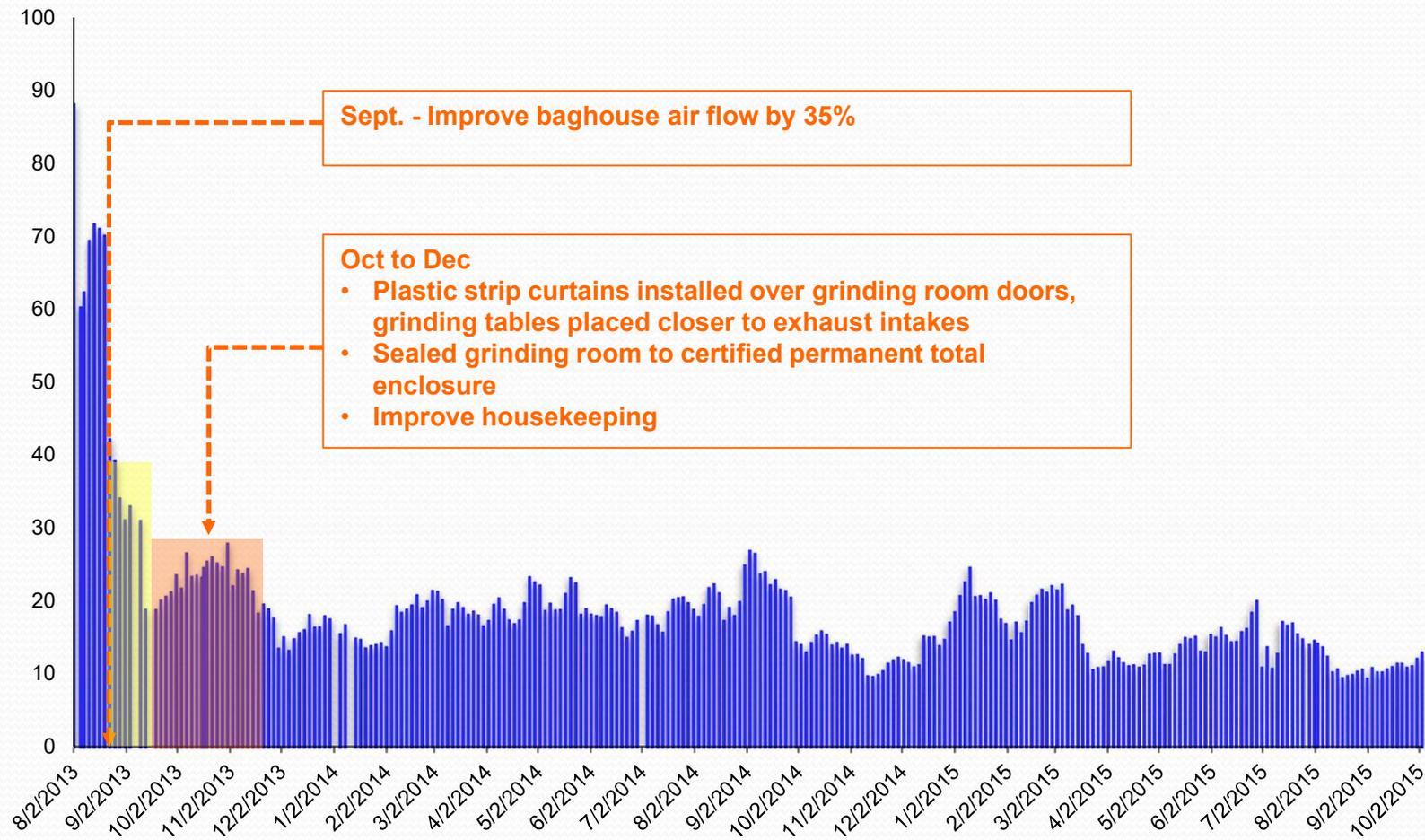
- Ambient air monitoring at two sites in Paramount community since August 2013
  - Site #2 (Vermont Ave.)
  - Site #3 (California Ave.)
  - Site #1 (Site discontinued due to access issues)
- Initial monitoring identified Nickel and Hexavalent Chromium as two key toxic metals of concern
  - Nickel (primary health effects non-cancer)
  - Hexavalent Chromium (primary health effects cancer)
- Monitoring results for the two metals were compared to:
  - Background levels from the Multiple Air Toxics Exposure Study (MATES IV)
  - Other health thresholds (discussed in next slides)

# Ambient Air Monitoring – Sampling Locations

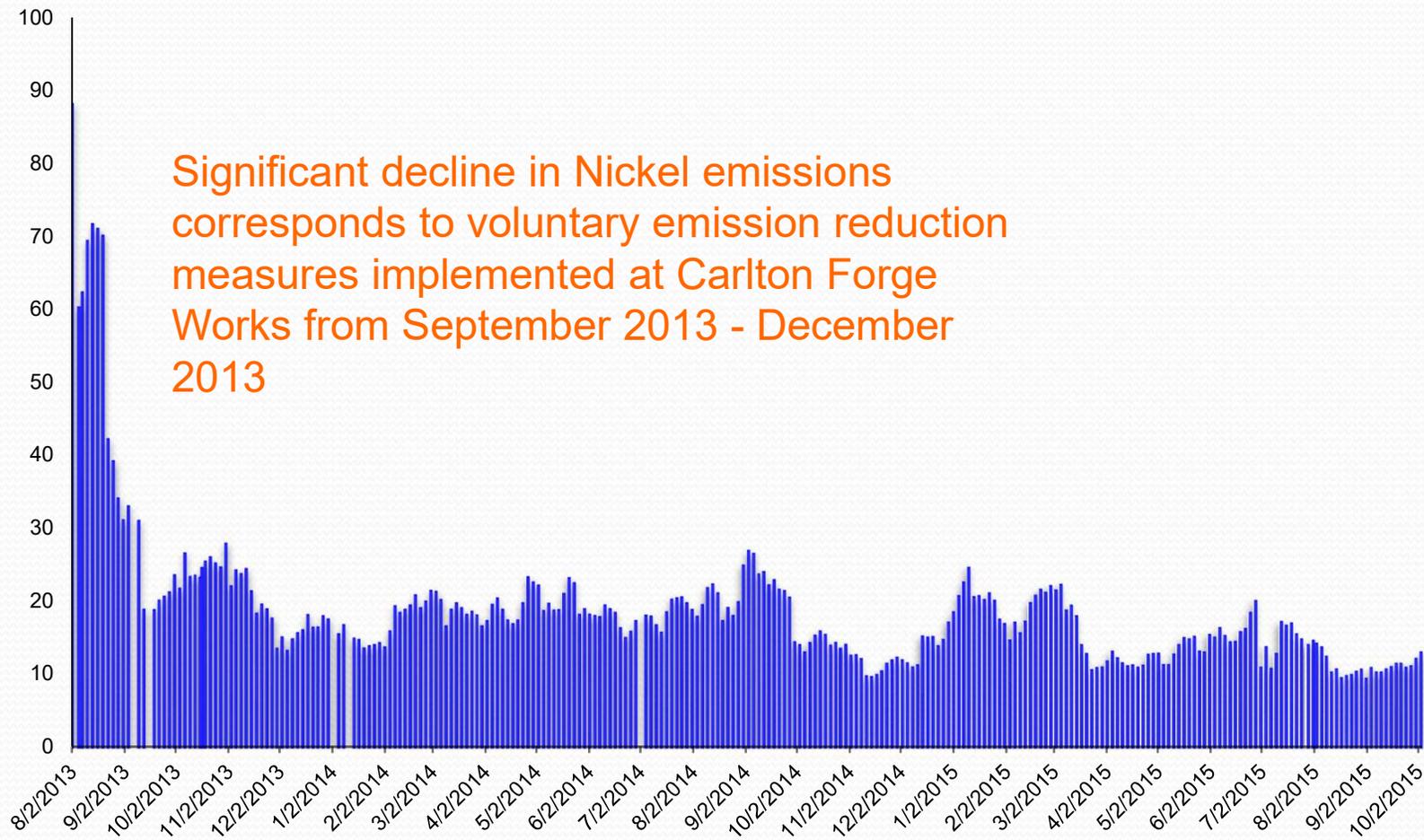


**1** Site #1 **2** Site #2 **3** Site #3

# Nickel Ambient Air Monitoring Results (30-Day Average)



# Nickel Ambient Air Monitoring Results-Actual Sample Data



# Voluntary Emission Reduction Measures at CFW



## Voluntary Emission Reduction Measures

**September  
2013**

Increased baghouse airflow by 35% for improved collection efficiency

**October  
2013**

Installed plastic strip curtains on all building overhead doors

**October  
2013**

Placed grind shop work tables closer to baghouse exhaust intakes

**November  
2013**

Sealed grind shop roof to provide a Permanent Total Enclosure

**December  
2013**

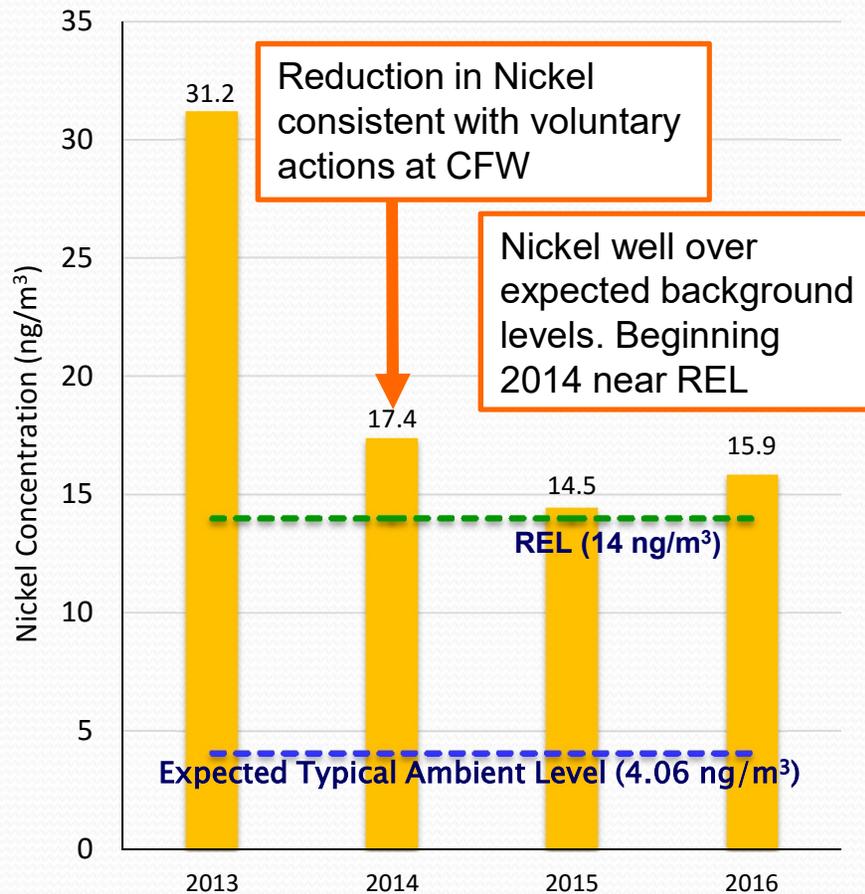
Enhanced house-keeping measures such as routine sweeping

**Spring  
2015**

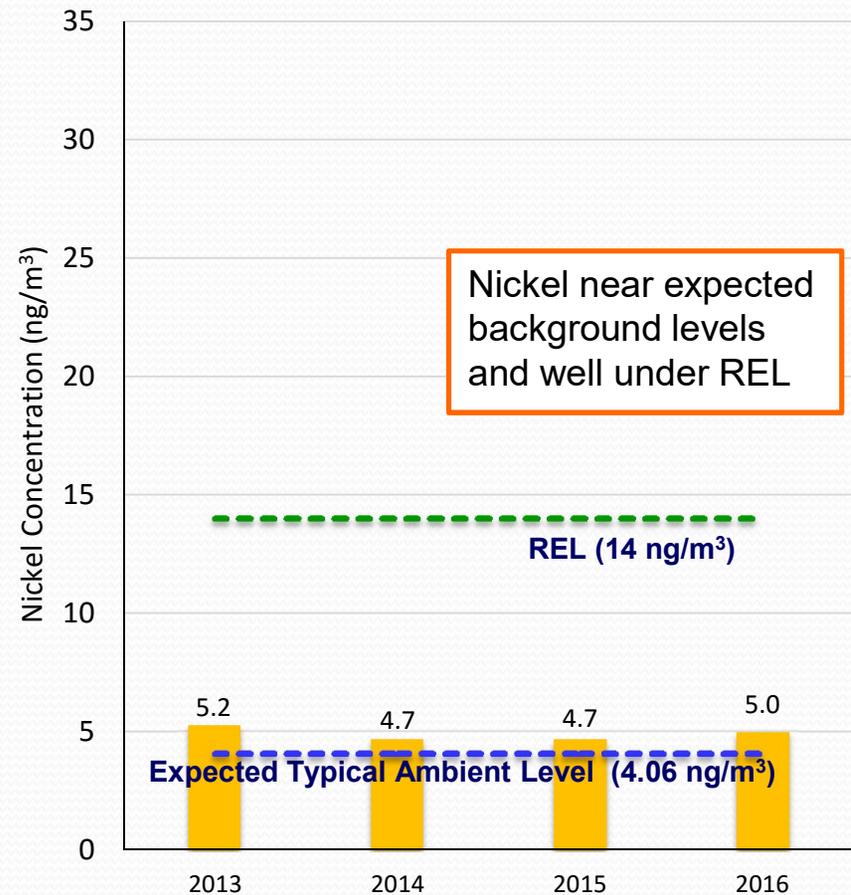
Installed HEPA filters on baghouse

# Results of Nickel Ambient Air Monitoring-Annual Average Data

## Site #2 (Vermont Ave.)



## Site #3 (California Ave.)



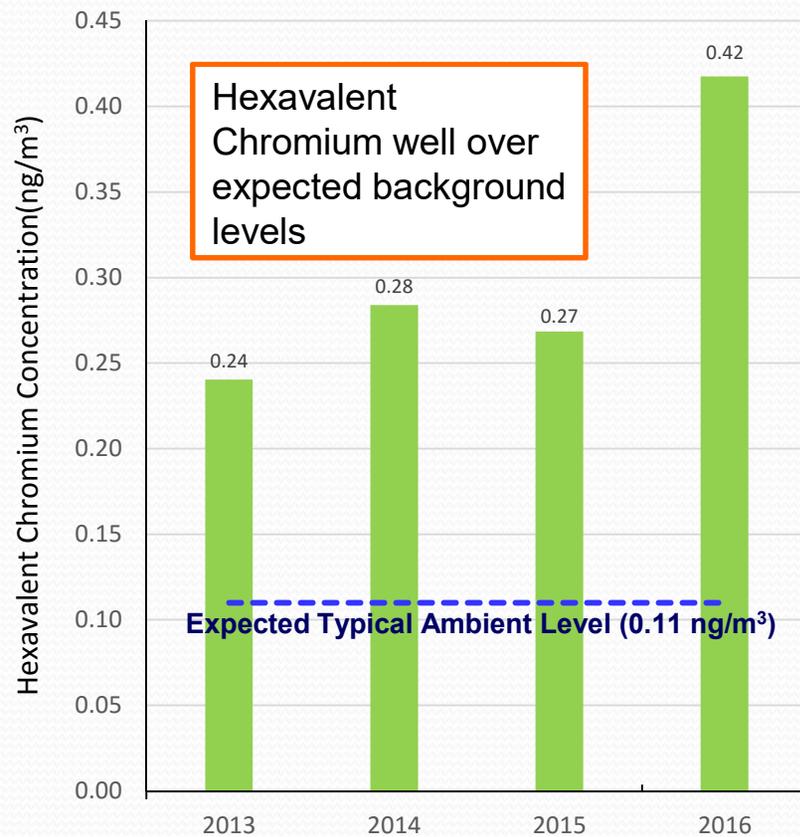
\* 2013 and 2016 data are partial years

# Hexavalent Chromium - Ambient Air Monitoring

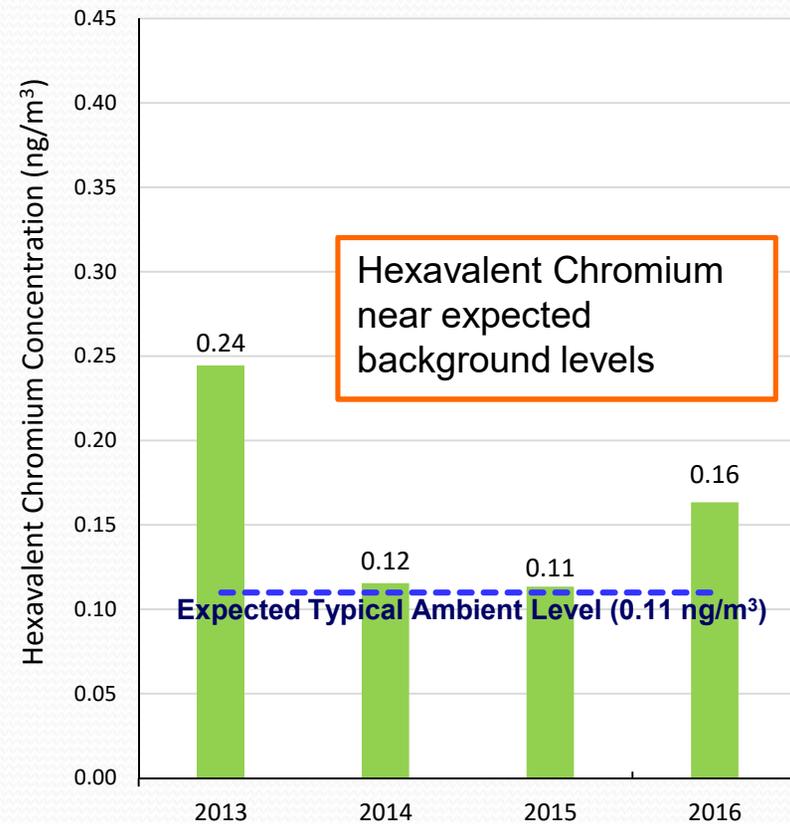
- Initial monitoring identified Hexavalent Chromium as a toxic metal of concern in addition to Nickel
- Ambient air monitoring results show elevated Hexavalent Chromium at Site #2 (Vermont Ave)
- Determining if Hexavalent Chromium is related to forging operation or other source(s)
- SCAQMD staff continuing air monitoring efforts, with an expanded focus on identifying and controlling source(s) of Hexavalent Chromium

# Results of Hexavalent Chromium Ambient Air Monitoring (Concentration)\*

## Site #2 (Vermont Ave.)



## Site #3 (California Ave.)



\* 2013 and 2016 data are partial years

# Potential Health Risks Based on Monitoring Data

- Potential **cancer risk** from long-term exposure to Nickel and Hexavalent Chromium:
  - Site #2 (Vermont Ave.): 176 in-one-million
  - Site #3 (California Ave.): 74 in-one-million
  - Hexavalent Chromium ~95% of cancer risk
- Potential **non-cancer risk** from long-term exposure to Nickel:
  - Site #2 (Vermont Ave.): levels have dropped since 2013, but still above REL
  - Site #3 (California Ave.): levels well below REL
  - Hexavalent Chromium non-cancer risks well below thresholds

# Summary of Monitoring Results for Nickel

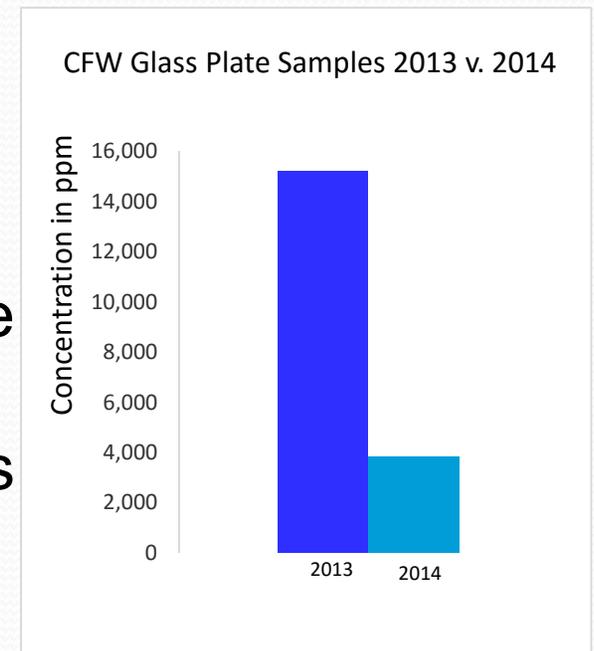
- Site #2 (Vermont Ave.)
  - Beginning 2014 Nickel levels near REL
  - 2014 Nickel reductions consistent with 2013 voluntary measures implemented at CFW
    - Demonstrates efficacy of measures to reduce nickel emissions from grinding operation
- Site #3 (California Ave.)
  - Near expected background levels in 2014 and 2015, but higher in 2016

# Summary of Monitoring Results for Hexavalent Chromium

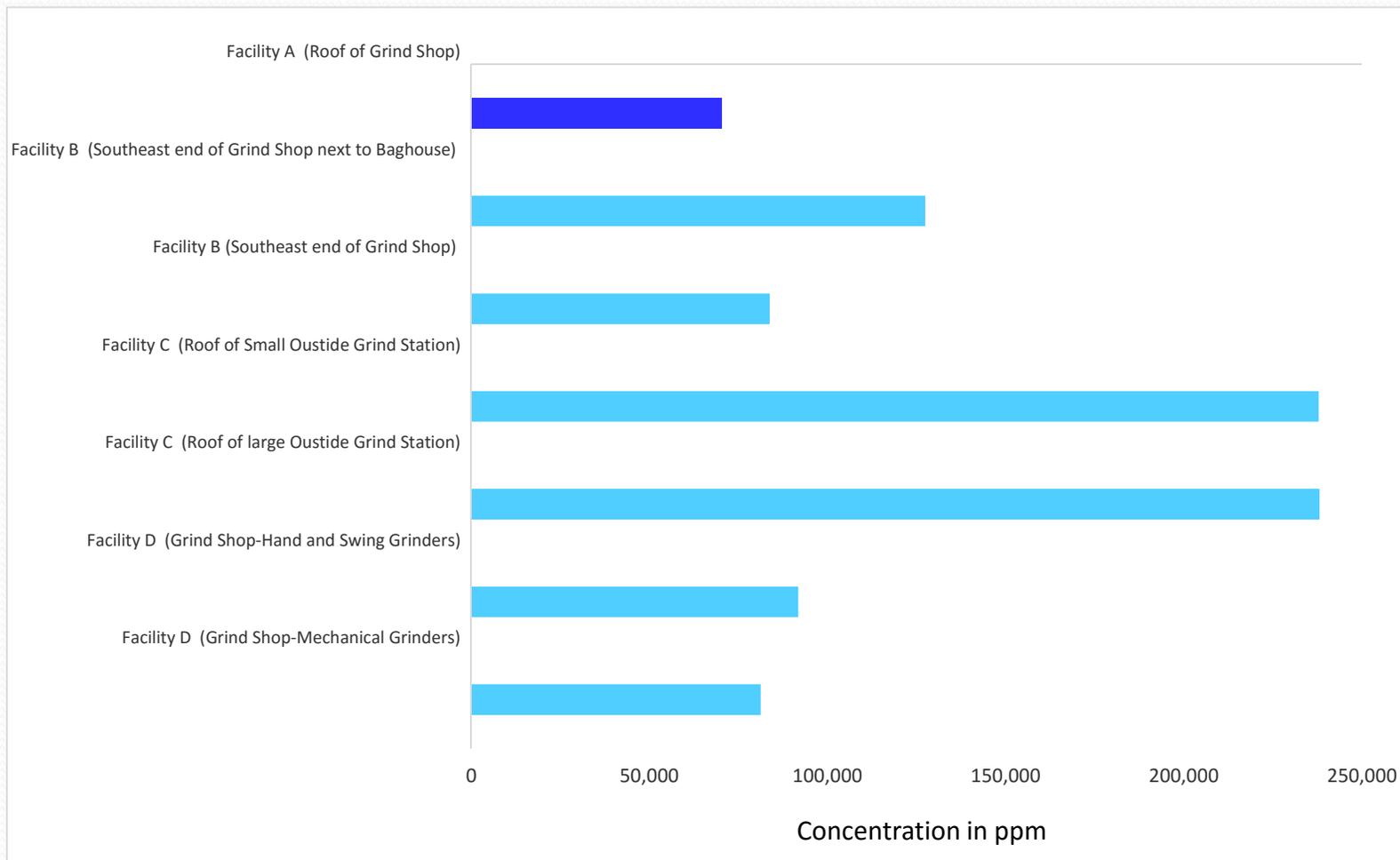
- Site #2 (Vermont Ave.)
  - Estimated cancer risk is of concern (Hexavalent Chromium contributes to 95% of cancer risk) - up to 4 times higher than expected background levels
    - Additional sampling needed to identify Hexavalent Chromium source(s)
    - Expanded ambient air monitoring focused on Hexavalent Chromium source(s) in progress
    - Sampling results may require expanding scope of PR 1430 or additional rulemaking activities
- Site #3 (California Ave.)
  - Near expected background levels in 2014 and 2015, but higher in 2016

# Glass Plate Sampling

- 2013/2014 deployed glass plate samples at Carlton Forge Works Press Forge, Weber Metals, and Schlosser Forge:
  - Results showed elevated levels of metals near grinding operations
- Comparison of 2013 and 2014 glass plate samples at Carlton Forge Works showed a decrease in metal particulate further demonstrating efficacy of voluntary emission reduction measures for grinding operation



# 2014 Total PM Glass Plate Sample Results Near Grinding



# Conclusions from Ambient Monitoring and Glass Plate Samples

- Ambient monitoring and glass plate sampling showed nickel decreased with improvements of point source controls, enclosure, and housekeeping of grinding operations
- Glass plate samples at other forging facilities showed higher concentrations of total PM than Carlton Forge
- Additional monitoring is needed to identify the source of hexavalent chromium from the monitor near Carlton Forge



# Overview of Site Visits and Findings

# Update on Site Visits

Since 1<sup>st</sup> Working Group Meeting Rule staff has visited 8 additional forging facilities for a total of 21 site visits

| Facilities Visited                 |                            |                               |
|------------------------------------|----------------------------|-------------------------------|
| • Foot Axle & Forge Company        | • Schlosser Forge Facility | • Shultz Steel                |
| • Carlton Forge Works              | • Pacific Forge Inc        | • Weber Metals                |
| • Quality Aluminum Forge, LLC      | • Press Forge Co           | • Firth Rixson                |
| • California Drop Forge            | • Continental Forge        | • Ajax Forge                  |
| • Aluminum Precision Products Inc. | • California Amforge Corp. | • Valley Forge Acquisition    |
| • American Handforge               | • Chen Tech Industries     | • Performance Forged Products |
| • Sierra Alloys Co.                | • Mattco Forge Inc.        | • MS Aerospace                |

# Site Visit Findings

| Findings   | Number of Facilities* |
|--|-----------------------|
| Facilities Visited                                       | 21                    |
| Grinding   |                       |
| Dry Grinding Operations                                  | 21                    |
| Wet Grinding Operations                                  | 2                     |
| Sawing   |                       |
| Dry Cutting Operations                                   | 2                     |
| Wet Cutting Operations                                   | 19                    |
| Containment Structures for Grinding                      |                       |
| Grinding Operations within a Total Enclosure             | 2                     |
| Grinding Operations within a Partial Enclosure (3 Walls) | 15                    |
| Grinding Operations Conducted Outside an Enclosure       | 4                     |

\* Some facilities have multiple types of operations



# Focus of Site Visits

- Observations focused on dry grinding operations
  - Billet grinding
  - Swing grinding
  - Utility grinding
  - Large and small hand grinding
- Observed point and fugitive control approaches
- Did not focus on wet cutting and grinding operations
  - fugitive emissions controlled at the site

# Control Approaches for Dry Grinding Operations



## Point Source Controls for Metal Particulate

- Metal particulate vented to a collection or filtration device
- Examples of point source controls includes baghouse with or without HEPA filtration, collection device to cyclone



## Containment of Fugitive Emissions (Enclosure)

- Physical structure that contains metal particulate
- Examples of enclosures can be partial enclosure, total enclosure, or total enclosure vented to pollution controls



## Housekeeping Measures

- Measures to reduce the accumulation of metal particulate that can be re-entrained
- Examples of housekeeping measures include sweeping, roof washing, covering containers with metal particulate

# General Observations of Point Source Controls

- Most facilities are operating air pollution controls without a SCAQMD permit (permit not required)
  - Only two facilities have gone through the SCAQMD permitting process
- Baghouses are the primary air pollution control device
  - Concern for proper ventilation, operation, and maintenance of pollution controls
- Greatest concern is for facilities conducting grinding operations with no pollution controls



# Metal Grinding-Billet Grinders



- Traveling grinders designed to prepare large billets prior to forging
- 2 facilities with billet grinding operations (total of five billet grinders)
- Point source control
  - All billet grinders vented to baghouse without HEPA filters

# Metal Grinding-Swing Grinders



- Rugged, heavy-duty grinder with full lateral movement used to prepare medium sized billets
- 7 facilities with swing grinding operations
- Point source controls
  - 4 vented to a baghouse without HEPA filters
  - 1 vented to a baghouse with HEPA filters
  - 2 facilities operating without air pollution controls

# Metal Grinding-Utility Grinders



- Designed for smaller casting and lighter metal removal
  - Typically have a slotting wheel on one end for reaching into deep, narrow recesses
- 9 facilities with utility grinding operations
- Point source controls
  - 2 vented to vacuum collection, lubricant or no baghouse
  - 1 vented to a cyclone
  - 4 vented to a baghouse without HEPA filters
  - 2 facilities operating without air pollution controls

# Metal Grinding-Hand Grinders



- Handheld power tools used for preparing, cutting, grinding and polishing (finishing) smaller castings
- 17 facilities with hand grinding operations
- Point source controls
  - 2 vented to a cyclone
  - 3 vented to a baghouse without HEPA filters
  - 3 vented to a baghouse with HEPA filters
  - 9 facilities operating without air pollution controls

# General Observations of Enclosures



- Greatest concern is for facilities that conduct grinding operations in the open air (four facilities)
- Fugitive emissions escape partial enclosures
- Most facilities conduct grinding operations within a building
  - Many enclosures have cross draft issues and openings at the roof top where fugitive emissions can escape
  - Some grinding operations conducted close to roll-up doors
  - Maintenance of enclosures is needed to ensure fugitive emissions are contained

# Enclosures for Grinding Operations

- Billet grinding
  - All billet grinding operations conducted within an enclosure
- Swing grinding
  - 4 facilities within an enclosure
  - 1 facility within a partial enclosure
  - 1 facility with no enclosure
- Utility grinding
  - 8 facilities within an enclosure
  - 1 facilities within a partial
- Hand grinding
  - 12 facilities within an enclosure
  - 1 facilities within a partial enclosure
  - 4 facility with no enclosure



# General Observations of Housekeeping Provisions

- Concern for accumulation of metal particulate that can become airborne
- Housekeeping varied at each facility
  - Variation in cleaning method – brooms to mobile vacuum sweepers
  - Variation in frequency
  - Variation in areas cleaned – inside and/or outside
- Storage of grinding waste varied
  - Open and closed containers
  - Accumulation of dust around storage area varied



# Housekeeping and Maintenance



- 18 facilities conducting some level of housekeeping
- 3 facilities did not conduct any housekeeping measures
- 2 unknown
  - Most housekeeping measures focused on sweeping or vacuuming



# Conclusions from Site Visits

- Grinding operations conducted in the open without an enclosure or pollution controls of greatest concern
- Partial enclosures do not contain fugitive emissions
- Most air pollution control devices are not permitted
  - Maintenance and operation of pollution control devices a concern
  - Concerned that many pollution control devices do not have proper collection efficiency

# Concepts for Proposed Rule 1430



# Purpose

- Reduce exposure to toxic metal particulate emissions resulting from metal grinding activities at forging operations
- Scope of PR 1430 may change based on information gained from continued investigation and monitoring of ambient levels near forging facilities



# Applicability

- Includes facilities that press and grind metal parts for:
  - Aerospace and defense
  - Automobile industry
  - Oil field industry
  - Other industrial applications
- Potential metrics considered for applicability threshold:
  - Volume of metal processed
  - Total operational hours for grinding
  - Amount of grinding equipment
- Metal cutting operations conducted with lubricants will not be included



# Current Universe of Sources

- Staff initially identified 37 potential forging facilities by internet search and permit database
- Through site visits conducted, staff has confirmed 22 forging facilities
- Staff will continue to evaluate additional potential sources based on any new information acquired

# Concepts for General Requirements of PR 1430

- Point Source Emission Control
- Emission Control Source Testing and Maintenance
- Enclosures
- Housekeeping Practices
- Monitoring, Recordkeeping, and Reporting
- Exemptions

# Concepts for Point Source Emission Control Requirements

- Grinding operations will require SCAQMD permits
- In addition to PR 1430 point source requirements, permitted equipment will be subject to:
  - Rule 1401 – Toxics New Source Review
  - Rule 1155 – PM Control Devices
- Initial permitting exempt from Regulation XIII – New Source Review
  - Modifications to equipment would be subject to Regulation XIII

# Overview of SCAQMD Rules that Will Affect Permitted Grinding Equipment

## PR 1430

**Applicability:**  
Grinding  
Operations at  
Forging Facilities

Determining  
Point Source  
Requirements

## Rule 1401

**Applicability:**  
Toxic Evaluation  
for All Permitted  
Sources

1 in a million  
without T-BACT\*  
10 in a million  
with T-BACT\*

## Rule 1155

**Applicability:**  
Permitted PM for  
Non-Combustion  
Sources

Emission limit:  
0.01  
grains/DSCF

# Compliance Options for Point Source Requirements

- Considering two compliance options:
- Compliance Option 1:
  - Include key point source requirements of R1401 and R1155 in PR 1430; or
  - Establish requirements in PR1430 that would be at least, equivalent to R1401 and R1155
- Compliance Option 2:
  - Establish requirements for PR1430 and facilities must also comply with R1401 and 1155

# Concepts for Point Source Emission Control Requirements

- Vent individual or series of grinding stations to an emissions control device
- Collection efficiency of pollutants to control device
  - Ventilation and hood system must meet minimum capture velocity standards per U.S. Industrial Ventilation Handbook
- Point source emission control – considering two approaches
  - Technology-based approach
  - Emissions-based approach



# Technology-Based Approach

- Establishes control efficiencies or emission limits based on specific pollution controls
- Can require varying levels of control technologies for grinding operations based on different criteria such as:
  - Type or size of equipment
  - Intensity of grinding operation
  - Best available controls
  - Proximity to sensitive receptors
- Varying control technologies may include HEPA filters/cartridges, baghouses, collection devices, etc.



# Emissions-Based Approach

- Establish an emission rate standard that each individual control device is to meet
- Emissions-based approach can incorporate health risk parameters
- Emission rate can vary based on parameters similar to technology-based approach
- Facility determines the appropriate control device to achieve the emission standard

# Concepts for Enclosure Requirements

- Require billet, swing, utility, and large hand grinding activities to be conducted inside a total enclosure to minimize process fugitive emissions
- Total enclosure requirements
  - Close all openings that may affect emission control devices (e.g., windows, bay doors)
  - Alternative methods may include installing plastic strip curtains or vestibules
  - Meet the industrial ventilation requirements
- Maintenance requirements to ensure enclosure is free of openings, gaps, cracks, etc.

# Concepts for Housekeeping Requirements

- Periodic wet wash or vacuum sweep of all paved metal grinding area surfaces
  - Frequency can differ based on location (building interior/exterior)
- Pave surfaces of facility grounds near:
  - Metal grinding work station(s)
  - Metal waste storage areas capable of generating fugitive metal particulate emissions (for example, grinding or saw dust)

# Concepts for Housekeeping

## Requirements (continued)

- Storage and transport requirements for all metal waste capable of generating any amount of fugitive metal particulate in sealed or leak proof containers
- Periodic wet wash or vacuum sweep w/HEPA equipped vacuums all grinding waste storage area surfaces



# Source Testing Requirements

- Periodic source test of all emission control devices (Once every three years)
- Source tests conducted using test approved by the Executive Officer



# Recordkeeping Requirements

- Housekeeping records for the following:
  - Interior and exterior wet or vacuum sweeping
  - Pressure measurements of add-on control devices
  - Process upsets
- Operations records for the following:
  - Throughput volume of forged metal
  - Volume of grinding operations
- Emission Control Maintenance and Monitoring Records

# Potential Exemptions

- Low emitting grinding operations
  - Grinding conducted with a coolant
    - For example, grinding units that apply a continuous stream of coolant to the grinding wheel while in operation
  - Small hand grinders
    - Grinders that are characterized by a small chuck, drum, or shank diameter, for example, “tootsie roll” grinders
  - Grinders used for small forgings
    - For example, grinders used to grind small fasteners such as bolts or screws
  - Facilities that contain minimal grinding
    - For example, less than “x” hours of grinding activity or generate less than “x” amount of grinding dust

# Schedule

- Public Workshop – January 2017
- Board Hearing - March 2017

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