1st Working Group Meeting for

Proposed Amended Rule 1469 – Hexavalent Chromium Emissions from Chromium Electroplating and Chromic Acid Anodizing Operations

and

Proposed Amended Rule 1426 – Emissions from Metal Finishing Operations

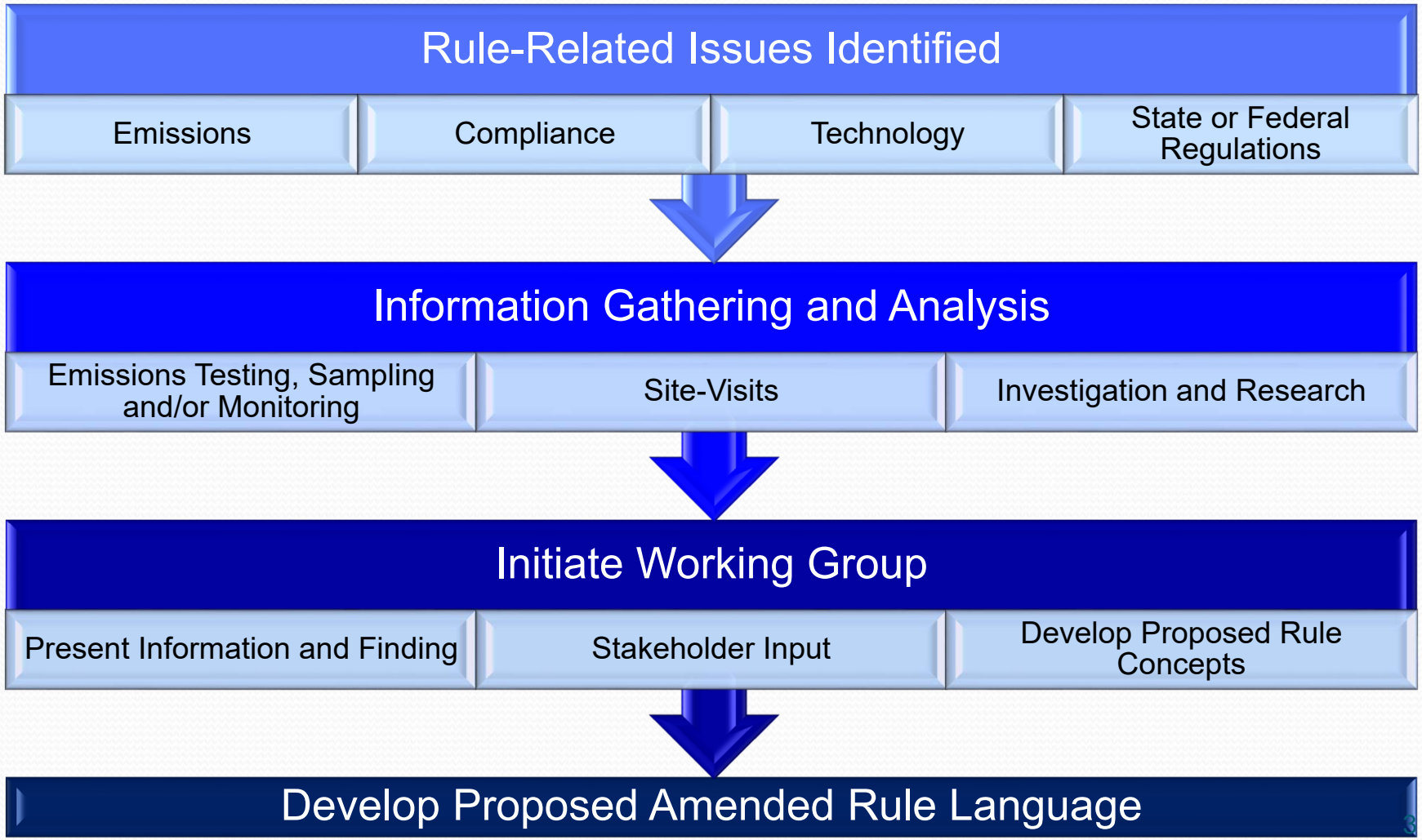
South Coast AQMD

March 23, 2017

Background

- Over past several years, air monitoring near two Rule 1469 facilities have shown high levels of hexavalent chromium
- As a result staff has been re-evaluating the overall efficacy of Rule 1469
- Based on findings, need to re-open Rule 1469 to:
  - Need to address findings from air monitoring and other efforts
  - Take into account the 2015 Revised OEHHA Guidelines for Estimating Health Risk
  - Incorporate inconsistencies with the 2012 National Emission Standards for Hazardous Air Pollutants (NESHAP) for Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

General Overview of Rule Amendment Process



EPA, CARB, and SCAQMD Regulations for Hexavalent Chromium Electroplating

EPA NESHAP: Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks	CARB Airborne Toxic Control Measure (ATCM) for Chromium Plating and Chromic Acid Anodizing Facilities	SCAQMD Rule 1469 incorporated changes made in CARB's ATCM for Chromium Plating and Chromic Acid Anodizing Operations
Amended in 2012	*Amended in 2007*	*Amended in 2008*

2012 NESHAP for Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

- NESHAP for Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks is the companion to Rule 1469
- Rule 1469 must be equally or more stringent than the state and federal regulations
- In general, Rule 1469 is more stringent than the 2012 NESHAP, however two areas that are less stringent
- Proposed Amended Rule 1469 must address those areas that are less stringent

2012 NESHAP Amendment Impacts to Rule 1469

- Reduction in surface tension limits
  - SCAQMD emissions are already lower
- Prohibition of PFOS
  - Prohibit use of chemical fume suppressant containing perfluorooctane sulfonic acid (PFOS) after September 21, 2015
- Lower surface tension limits

Regulation	Surface Tension (Stalagmometer)	Surface Tension (Tensiometer)
2012 NESHAP	40 dynes/cm	33 dynes/cm
Rule 1469	45 dynes/cm	35 dynes/cm

  - Non-PFOS chemical fume suppressants must be certified to meet both the NESHAP surface tension limits and the 0.01 mg/amp-hr of Rule 1469
  - Lower surface tension needed to meet 0.01 mg/amp-hr

Certified Non-PFOS Chemical Fume Suppressants

- September 2016 – SCAQMD certified 5 non-PFOS chemical fume suppressant products that meet Rule 1469 emission limits and NESHAP lower surface tensions

Chemical Fume Suppressant and Manufacturer (Product does not contain PFOS)	Applications	Stalagmometer Measured Surface Tension (dynes/cm)	Tensiometer Measured Surface Tension (dynes/cm)
Fumetrol 21 LF2 Atotech, USA	Hard Plating	≤30	≤27
Dicolloy CRPF ProCom LLC	Decorative plating and chromic acid anodizing	≤32	≤29
HCA - 8.4 Hunter Chemical LLC	Decorative plating and chromic acid anodizing	≤25	≤22
HCA – 8.4 Hunter Chemical LLC	Hard Plating	≤33	≤30
Macuplex STR NPFX MacDermid Enthone Industrial Solutions	Decorative plating and chromic acid anodizing	≤32	≤30

CARB Airborne Toxic Control Measure (ATCM) for Chromium Plating and Chromic Acid Anodizing Facilities

- CARB ATCM for Chromium Plating and Chromic Acid Anodizing Facilities was amended in 2007
- Rule 1469 is the companion to this ATCM
- Rule 1469 was amended in 2008 to be equally as stringent than the state ATCM
- SCAQMD staff has been coordinating with CARB staff regarding recent findings for Rule 1469 sources

Timeline

1998

Rule 1469 Adopted

2003

Rule 1469 Amended
- Allowed use of fume suppressants
- Established emission limit
- Housekeeping
- Training and Certification Requirement

Rule 1426 Adopted
- Required Submittal of Process Information
- Housekeeping Requirements
- Restrictions on Air Sparging of Tanks containing Chromic Acid

2008

Rule 1469 Amended
- Consistency with CARB's Air Toxics Control Measure for Chrome Plating
- Additional Housekeeping

General Scope of Rules 1469 and 1426

Rule 1469

- **Pollutant:** hexavalent chromium, trivalent chromium
- **Operations:** electroplating and anodizing
- **Industries:**
  - automotive
  - electronics
  - defense/aerospace
  - machinery/industrial equipment
- **116 Facilities:**
  - Hard plating
  - Anodizing
  - Decorative plating

Rule 1426

- **Pollutants:** nickel, lead, copper, cadmium; associated process chemicals
- **Operations:** electroplating and anodizing; associated processes
- **Industries:**
  - decorative/fixtures
  - electroforming
  - electronics
  - aerospace
- **~ 180 Facilities:**
  - Some of these facilities are also Rule 1469 facilities

General Requirements of Rules 1469 and 1426

Rule 1469

- **Emission Requirements**
  - Meet mg/amp-hr emission limit
  - Certified in-tank controls (must meet surface tension)
  - Source tested add-on controls
- **Monitoring and Reporting**
  - Monitor amp-hour usage
  - Ongoing compliance status reports
  - Periodic smoke tests
- **Housekeeping**
  - Maintain tank process area
  - Storage and transport
  - No air sparging of tanks; no compressed air cleaning by tanks

Rule 1426

- **Emission Requirements**
  - None
- **Reporting**
  - One-time information submittal requirement
- **Housekeeping**
  - Storage and transport
  - Restrictions on air sparging of tanks containing chromic acid

Process Equipment at Rules 1469 and 1426 Facilities

Rule 1469

- Decorative chrome plating
- Hard chrome plating
- Chromic acid anodizing

Rule 1426

- Electroplating/Anodizing Tanks
  - Nickel
  - Cadmium
  - Lead
  - Copper
- Associated process tanks containing:
  - Sulfuric acid
  - Nitric acid
  - Hydrochloric acid
  - Chromic acid (excluding chromic acid anodizing tanks)
  - Sodium hydroxide (used in spraying operations)

2015 Revised OEHHA Methodology to Estimate Risk

- In 2015 the Office of Environmental Human Health Assessment (OEHHA) revised methodology to estimate health risk
- Revised methodology accounted for child-specific factors
- Result is that estimated health risk is about 2-3x higher for sensitive receptors for most air toxics, even with no change in emissions
  - Many metals have multiple exposure pathways, increasing the estimated health risk
  - For hexavalent chromium, the estimated health risk is about 4x higher because there are multiple exposure pathways

Toxicity of Rule 1469 Metals

	Hexavalent Chromium
Exposure Pathways	• Inhalation • Contact • Ingestion
Carcinogen	• Yes Note: One of the only known human carcinogens and one of the most potent carcinogens as identified by OEHHA
Non-cancer health effects (Chronic and Acute)	• Chronic and Acute Health Effects

Toxicity of Rule 1426 Metals

	Cadmium	Copper	Lead	Nickel
Exposure Pathways	• Inhalation • Contact • Ingestion	• Inhalation • Contact • Ingestion	• Inhalation • Contact • Ingestion	• Inhalation • Contact • Ingestion
Carcinogen	• Yes	• No Cancer Potency Factor	• Yes	• Yes
Non-cancer health effects (Chronic and Acute)	• Chronic and Acute Health Effects	• Chronic and Acute Health Effects	• Chronic and Acute Health Effects	• Chronic and Acute Health Effects

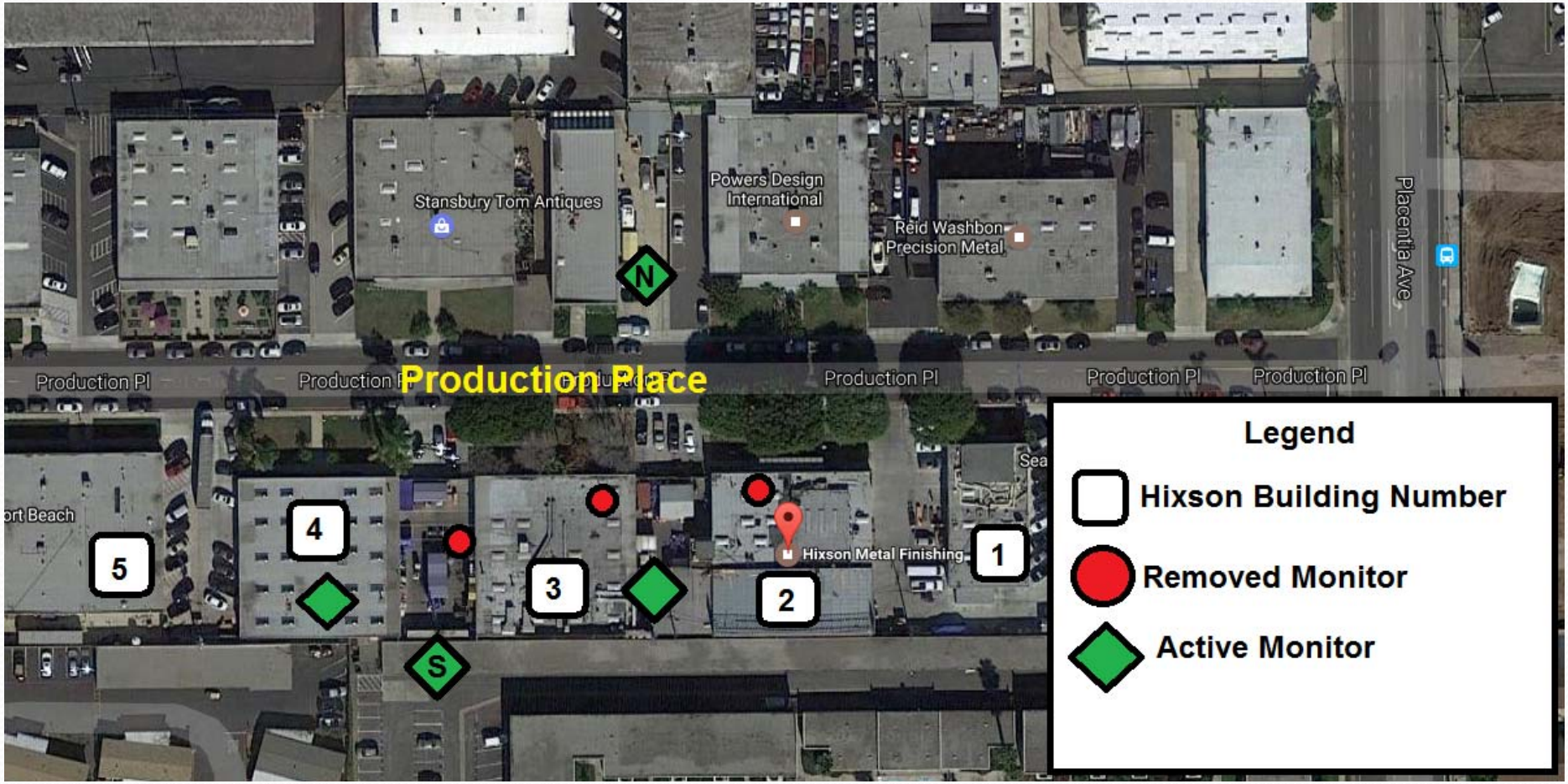
SCAQMD Hexavalent Chromium Ambient Air Monitoring Activities

- SCAQMD conducting ambient monitoring at the following metal finishing facilities:
  - Hixson Metal Finishing in Newport Beach
  - Anaplex Corporation in Paramount
- Ambient monitoring captures point and fugitive emissions from facility
  - Point source emissions are those released through a stack, generally after pollution controls
  - Fugitive emissions are those emissions that are not captured through pollution controls such as building openings (e.g. doors, windows, and vents)
- Monitoring primarily focused on hexavalent chromium

Hixson Metal Finishing – Background

- Hixson Metal Finishing (Hixson) conducts anodizing, plating, testing, coating, and painting of parts in the aerospace and defense industries
- 2008: Basin-wide air toxics monitoring detected elevated levels hexavalent chromium surrounding Hixson
- 2008-2011
  - Added additional off-site monitors
  - Compliance investigation of surrounding sources found Hixson to be the source of hexavalent chromium
- 2012-2014:
  - SCAQMD staff performed emission tests
  - Installed an additional multiple monitoring stations within Hixson to better pinpoint source(s)
- 2015: Hixson submit a Health Risk Assessment (HRA) and a Risk Reduction Plan (Rule 1402)

Hixson Location of Air Monitors



Comprehensive Facility Assessment of Air Quality Issues

- SCAQMD source testing and engineering staff conducted a comprehensive facility assessment to observe and better understand:
  - All processes, association to each other, and hexavalent chromium emission potentials
  - Condition of process equipment, structures housing processes, and breaches that could lead to fugitive emissions
- Sampling and source testing included:
  - Glass plate samples to find presence of hexavalent chromium in rule and non-rule tanks
  - Source testing of roof vents over tank areas, stacks of control equipment, and air spaces above and adjacent to tanks

Hixson Metal Finishing: Emission Testing Results

- SCAQMD staff conducted emission testing at the point sources that could be potential sources of hexavalent chromium and openings in structures
- Tests were conducted while the chromic acid anodizing test was not in operation

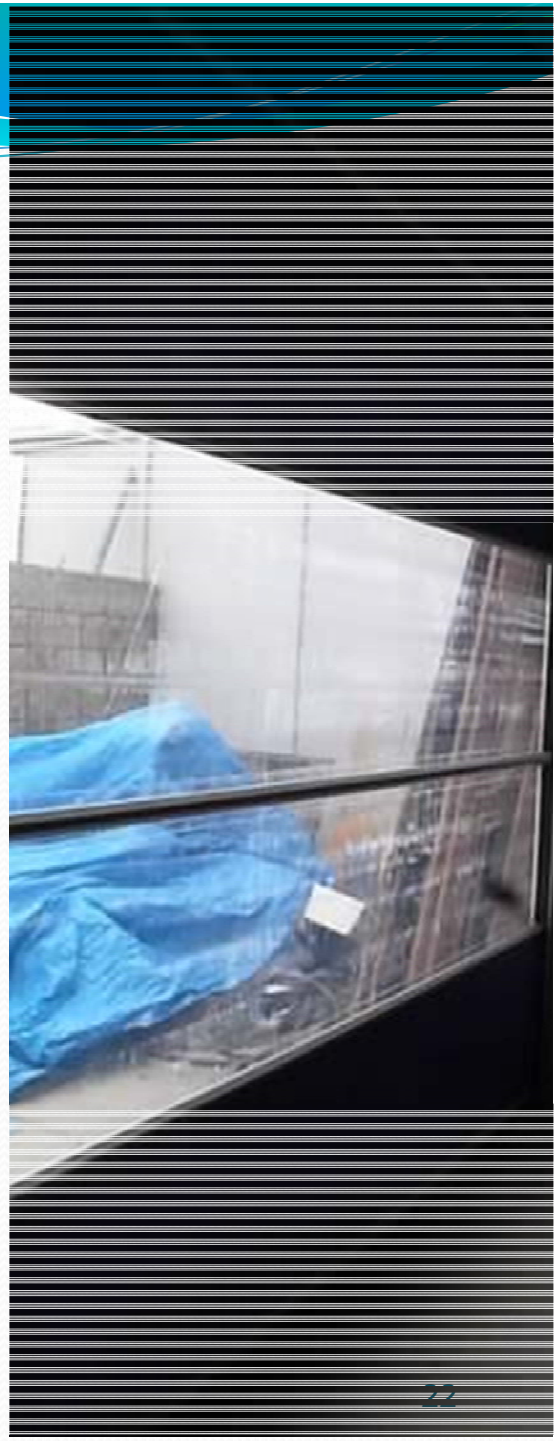
Emission Source	Concentration (ng/m^3)
Anodizing Tank #70 in Bldg #2	222,000
Sodium Dichromate Seal Tank #75 in Bldg #2	97,200
Bldg #2 Roof Vent	2,510
Spray Booth #1 Exhaust in Bldg #3	36
Interior of Bldg #3	14
Spray Booth #2 Exhaust in Bldg #4	10.8

Findings from Facility Assessment

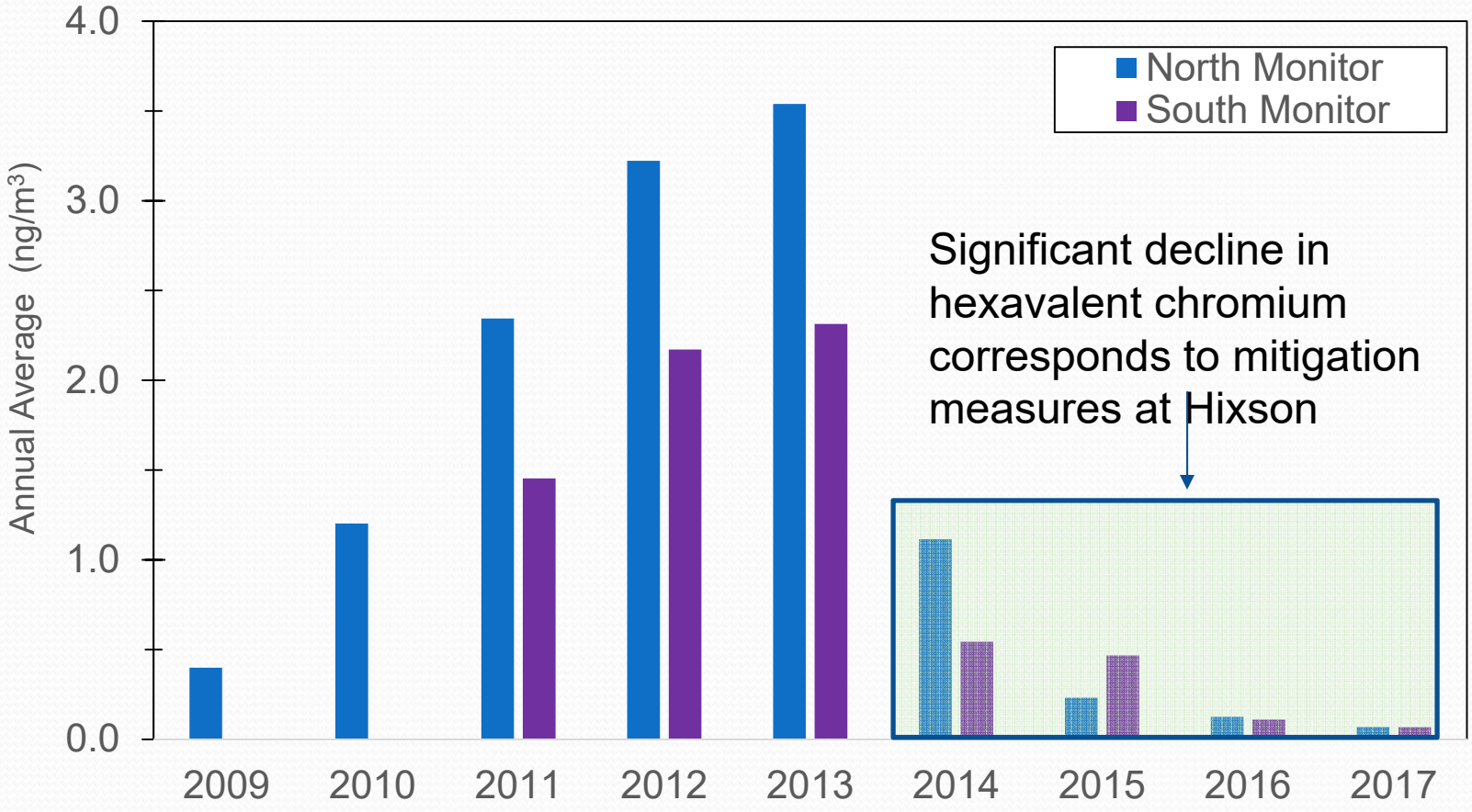
- Sodium dichromate seal tank (non-rule) determined as a source of hexavalent chromium
- Smoke tests confirmed breach created cross-draft conditions, impacting collection efficiency of air pollution equipment
  - Source testing confirmed hexavalent chromium emissions escaping breach
- Glass plates and source testing showed emissions present in air space above tank and escaping through the roof vent

Hixson - Risk Reduction Measures Implemented

- Construction of a Permanent Total Enclosure for Anodizing
  - Entire room vented to scrubber
  - Fast closing roll-up doors
- Installation of multiple HEPA system with scrubber system to control tanks and other operations
- Waste Treatment area enclosed using plastic strip curtains
- Increased housekeeping including daily HEPA-cleaning of multiple areas of facility



Hixson - SCAQMD Offsite Monitoring Data (Hexavalent Chromium)



Anaplex Corporation – Background

- October 2016, SCAQMD staff deployed several monitors in the city of Paramount to identify sources of high hexavalent chromium levels
- Staff identified high levels of hexavalent chromium downwind of Anaplex Corporation (Anaplex)
- Anaplex conducts chromic acid anodizing, nickel plating, and spray coating of metal parts for aerospace
- December 2016 Anaplex designated as a Potentially High Risk Facility under Rule 1402, required to submit Early Action Risk Reduction Plan, Health Risk Assessment and Risk Reduction Plan

Anaplex – Location of Air Monitors

Comprehensive Facility Assessment of Air Quality Issues

- SCAQMD source testing, engineering, and compliance staff conducted a comprehensive facility assessment to observe and better understand:
  - All processes, association to each other, and hexavalent chromium emission potentials
  - Condition of process equipment, structures housing processes, and breaches that could lead to fugitive emissions
- Sampling and source testing included:
  - Sampling of material around roof vents above process tanks
  - Source testing of air spaces above and adjacent to tanks
  - Assessment of air flow throughout building housing tank area

Anaplex – Emissions Testing Results

- SCAQMD staff conducted emissions testing at chrome containing tanks
- Elevated emissions from the sodium dichromate tank

Emission Source	Concentration (ng/m^3)	Tank Operating Temperature	Air Agitation
Sodium Dichromate Seal Tank	682,000	194-212°F	No
Chromate Film Tank	8,340	Ambient	Yes
Chromic Acid Anodizing Tank	6,880	91-99°F	Yes

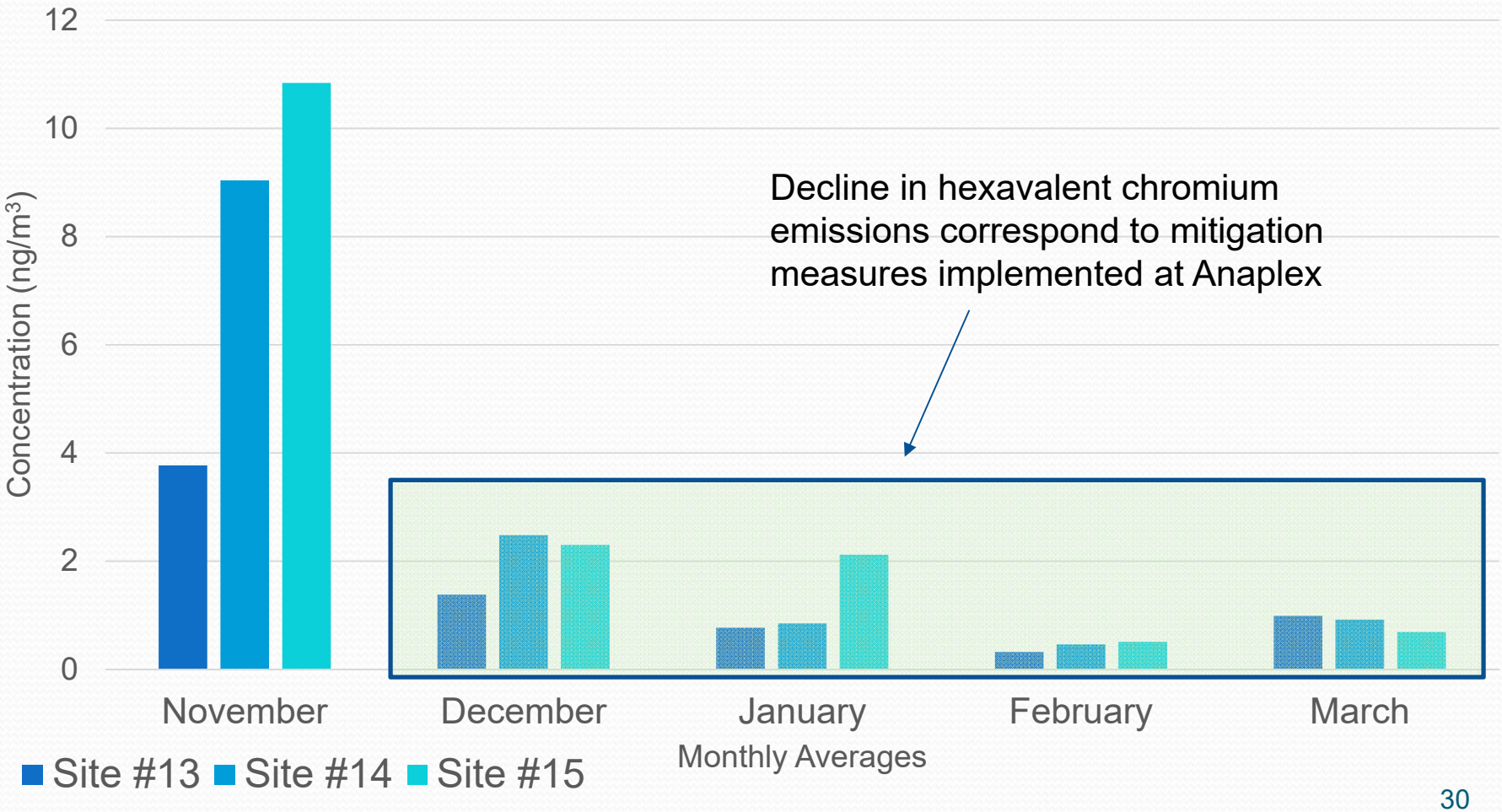
Findings from Facility Assessment

- Sodium dichromate tank (non-rule) determined as a source of hexavalent chromium
  - Heated tank with no controls
  - Emissions escaping associated roof vent
- Cross-draft conditions affecting tanks
  - Open bay doors on opposite ends of building housing tank area
  - Created cross-draft conditions such that air space above tanks are either escaping through bay doors or being pulled up through the roof vents

Anaplex – Interim Measures

- Interim measures implemented:
  - Closing of access doors
  - Implement practices to reduce emissions from tanks
  - Daily clean-up activities in areas that may create dust containing hexavalent chromium

Anaplex – SCAQMD Ambient Monitoring (Hexavalent Chromium)



Information Gathering - Facility Site Visits

- SCAQMD rule staff is continuing to conduct facility site visits
- Provides rule development staff with first hand information regarding operations and potential control options
- Staff is visiting facilities to observe:
  - Discussions with operators to inform them about the rulemaking process
  - Current operating practices
  - Housekeeping practices
  - Potential sources of fugitive emissions
  - Issues related to potential control options

SCAQMD Facility Site Surveys

- SCAQMD staff will be collecting additional information for Proposed Amended Rules 1469 and 1426 during regular quarterly inspections
  - Tank Process Area/Tanks
  - Finishing Operations
  - Housekeeping
  - In-tank and add-on controls
  - Specific facility practices
  - Control measures or practices facilities implement that go beyond Rule 1469 or Rule 1426 requirements
- Information also needed to determine PAR 1469/1426 impacts
  - Operational and capital costs
  - Existing control technology infrastructure
  - Feasibility of different control options

Next Steps

- Collect additional information from facilities with supplemental surveys
- Conduct emission testing at R1426 tanks
- Continue to conduct rule team site visits
- Present initial findings from site visits

Schedule

- 2nd Working Group: April 2017 (tentative)
- Governing Board Meeting: December 2017

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