11th Working Group Meeting for

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

South Coast AQMD
February 27, 2018
Overview of Proposed Revisions of PAR 1469

- Tiered Tanks
- Building Enclosures
- Source Testing and Parameter Monitoring Requirements
- Triggers for Permanent Total Enclosures
- Other Revisions
Comments Regarding Tiered Tanks

- Previous Tier II Tank definition based on concentration and operating condition or concentrations at several identified temperatures
- Industry stakeholders requested a more comprehensive method (e.g., curve, formula) that fills in gaps between specific data points to identify all heated tanks of concern
- Requirements for add-on controls are expensive for tanks that narrowly meet the definition of a Tier II Tank and emit at low uncontrolled levels
Overview of Revisions for Tiered Tanks

- Revising approach for the tiered tanks to add an intermediate tier
  - Uncontrolled emission rate for intermediate tier (new Tier II) is 0.20 - 0.40 mg/hr
  - Intermediate tier would not require add-on air pollution controls
  - Requires use of other air pollution control techniques that will reduce hexavalent chromium emissions from tank such as in-tank controls (e.g. mechanical fume suppressants, tank covers)
- Expanded the number of temperature (°F) and in tank hexavalent chromium concentrations (ppm) to cover more scenarios
- Temperature and concentrations combinations are based on testing data of tanks conducted by SCAQMD staff (presented in previous working group meetings)
Revision to Tank “Tiers”

<table>
<thead>
<tr>
<th>Tier I Tank</th>
<th>Tier II Tank</th>
<th>Tier III Tank</th>
</tr>
</thead>
<tbody>
<tr>
<td>No changes</td>
<td>New intermediate Tier</td>
<td>Previously Tier II</td>
</tr>
</tbody>
</table>
Defining Tier II and Tier III Tanks

- Using data from emissions testing staff developed equations based on the temperature and tank concentration.
- Staff developed two equations based on emission rate range of 0.20 - 0.40 mg/hr to define Tier II and III Tanks when considering specific operating temperatures:
  - Lower Concentration Limit (ppm) = $1.92 \times 10^{42} \times [\text{Operating Temp} \, °\text{F}]^{-17.92} - 105.9$
  - Upper Concentration Limit (ppm) = $2 \times (1.92 \times 10^{42} \times [\text{Operating Temp} \, °\text{F}]^{-17.92} - 105.9)$
- Temperature and hexavalent chromium concentration thresholds were developed for temperatures between 140-170 °F in increments 5 °F that will define Tier II and Tier II tanks.
### Criteria for Tier II and Tier III Tanks.

- Additional criteria for Tier II and Tier III tanks (See next slide)

<table>
<thead>
<tr>
<th>Temperature (° F)</th>
<th>Tier II Tank Concentration (ppm)</th>
<th>Tier III Tank Concentration (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 140 to &lt; 145</td>
<td>≥ 5,160 to &lt; 10,320</td>
<td>≥ 10,320</td>
</tr>
<tr>
<td>≥ 145 to &lt; 150</td>
<td>≥ 2,720 to &lt; 5,450</td>
<td>≥ 5,450</td>
</tr>
<tr>
<td>≥ 150 to &lt; 155</td>
<td>≥ 1,450 to &lt; 2,890</td>
<td>≥ 2,890</td>
</tr>
<tr>
<td>≥ 155 to &lt; 160</td>
<td>≥ 763 to &lt; 1,525</td>
<td>≥ 1,525</td>
</tr>
<tr>
<td>≥ 160 to &lt; 165</td>
<td>≥ 390 to &lt; 780</td>
<td>≥ 780</td>
</tr>
<tr>
<td>≥ 165 to &lt; 170</td>
<td>≥ 180 to &lt; 360</td>
<td>≥ 360</td>
</tr>
<tr>
<td>≥ 170</td>
<td>≥ 100 to &lt; 200</td>
<td>≥ 200</td>
</tr>
</tbody>
</table>
Requirements for Tier II Tanks

- Building Enclosure Requirements
- In-tank Controls
  - Tank covers
  - Mechanical fume suppressants
- Data logger for temperature gauge
- Conditional Provisions for Permanent Total Enclosure
Classification of Tier II Tanks

- Table below based on equations for Lower and Upper Hexavalent Chromium Concentration Limits
- Applied for bath temperatures between 140°- 170° F

<table>
<thead>
<tr>
<th>Temp (F)</th>
<th>Tier II Tank</th>
<th>Lower Limit (ppm)</th>
<th>Upper Limit (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>140°</td>
<td></td>
<td>6,573</td>
<td>13,145</td>
</tr>
<tr>
<td>141°</td>
<td></td>
<td>5,773</td>
<td>11,546</td>
</tr>
<tr>
<td>142°</td>
<td></td>
<td>5,074</td>
<td>10,147</td>
</tr>
<tr>
<td>143°</td>
<td></td>
<td>4,462</td>
<td>8,923</td>
</tr>
<tr>
<td>144°</td>
<td></td>
<td>3,925</td>
<td>7,851</td>
</tr>
<tr>
<td>145°</td>
<td></td>
<td>3,455</td>
<td>6,910</td>
</tr>
<tr>
<td>146°</td>
<td></td>
<td>3,043</td>
<td>6,085</td>
</tr>
<tr>
<td>147°</td>
<td></td>
<td>2,680</td>
<td>5,360</td>
</tr>
<tr>
<td>148°</td>
<td></td>
<td>2,361</td>
<td>4,723</td>
</tr>
<tr>
<td>149°</td>
<td></td>
<td>2,081</td>
<td>4,162</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temp (F)</th>
<th>Tier II Tank</th>
<th>Lower Limit (ppm)</th>
<th>Upper Limit (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150°</td>
<td></td>
<td>1,834</td>
<td>3,668</td>
</tr>
<tr>
<td>151°</td>
<td></td>
<td>1,616</td>
<td>3,232</td>
</tr>
<tr>
<td>152°</td>
<td></td>
<td>1,424</td>
<td>2,848</td>
</tr>
<tr>
<td>153°</td>
<td></td>
<td>1,254</td>
<td>2,509</td>
</tr>
<tr>
<td>154°</td>
<td></td>
<td>1,105</td>
<td>2,209</td>
</tr>
<tr>
<td>155°</td>
<td></td>
<td>972</td>
<td>1,944</td>
</tr>
<tr>
<td>156°</td>
<td></td>
<td>855</td>
<td>1,709</td>
</tr>
<tr>
<td>157°</td>
<td></td>
<td>751</td>
<td>1,501</td>
</tr>
<tr>
<td>158°</td>
<td></td>
<td>659</td>
<td>1,317</td>
</tr>
<tr>
<td>159°</td>
<td></td>
<td>577</td>
<td>1,154</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temp (F)</th>
<th>Tier II Tank</th>
<th>Lower Limit (ppm)</th>
<th>Upper Limit (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>160°</td>
<td></td>
<td>504</td>
<td>1,009</td>
</tr>
<tr>
<td>161°</td>
<td></td>
<td>440</td>
<td>880</td>
</tr>
<tr>
<td>162°</td>
<td></td>
<td>383</td>
<td>765</td>
</tr>
<tr>
<td>163°</td>
<td></td>
<td>332</td>
<td>663</td>
</tr>
<tr>
<td>164°</td>
<td></td>
<td>286</td>
<td>572</td>
</tr>
<tr>
<td>165°</td>
<td></td>
<td>246</td>
<td>491</td>
</tr>
<tr>
<td>166°</td>
<td></td>
<td>210</td>
<td>419</td>
</tr>
<tr>
<td>167°</td>
<td></td>
<td>177</td>
<td>355</td>
</tr>
<tr>
<td>168°</td>
<td></td>
<td>149</td>
<td>297</td>
</tr>
<tr>
<td>169°</td>
<td></td>
<td>123</td>
<td>246</td>
</tr>
<tr>
<td>&gt; 170°</td>
<td></td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>
# Tier II and III Hexavalent Chromium Tanks

## Previous Tier II

**Operating Condition**
- Electrolytic: $\text{Cr}^{+6}$ concentration $> 1,000$ ppm
- Air sparged: $\text{Cr}^{+6}$ concentration $> 1,000$ ppm

- or -

**Bath Temperature**
- 140-150° F: $\text{Cr}^{+6}$ concentration $> 1,500$ ppm
- 150-160° F: $\text{Cr}^{+6}$ concentration $> 500$ ppm
- > 160° F: $\text{Cr}^{+6}$ concentration $> 100$ ppm

## Tier II

**Operating Condition**
- Electrolytic: $\text{Cr}^{+6}$ concentration between Lower Limit and Upper Limit
- $> 170°$ F – $\text{Cr}^{+6}$ concentration of 100-200 ppm

## Tier III

**Operating Condition**
- Electrolytic: $\text{Cr}^{+6}$ concentration $> 1,000$ ppm
- Air sparged: $\text{Cr}^{+6}$ concentration $> 1,000$ ppm

- or -

**Bath Temperature**
- 140-169° F: $\text{Cr}^{+6}$ concentration $> \text{Upper Limit}$
- $\geq 170°$ F: $\text{Cr}^{+6}$ concentration $> 200$ ppm
Emission Control Requirements for Tier I, II, and III Tanks

**Tier I**
- Not air sparged
- Not electrolytic
- Tank bath < 140°F
- > 1,000 ppm Cr\(^{+6}\)
- No Controls

**Tier II**
- Not air sparged
- Not electrolytic
- 140°-169°F
  - > Lower Limit ppm Cr\(^{+6}\)
  - < Upper Limit ppm Cr\(^{+6}\)
- > 170°F
  - 100-200 ppm Cr\(^{+6}\)
- Tank Covers and/or Mechanical Fume Suppressants

**Tier III**
- Air sparged or electrolytic - and -
  - > 1,000 ppm Cr\(^{+6}\)
  - OR -
  - 140°-169°F
    - > Upper Limit ppm Cr\(^{+6}\)
  - > 170°F
    - > 200 ppm Cr\(^{+6}\)
- Add-on Air Pollution Control Devices
General Requirements for Tier I, II, and III Tanks

- **Tier I Requirements**
  - Operation of Tanks Indoors
  - Housekeeping Requirements
  - Best Management Practices

- **Tier II Requirements**
  - Building Enclosure Requirements
  - In-tank Controls
  - Data logger for temperature gauge
  - Conditional Provisions for Permanent Total Enclosure

- **Tier III Requirements**
  - Add-on Pollution Controls
  - Source Testing
  - Parameter Monitoring
**Add-on Air Pollution Control Devices and Emission Standards (h) – Tier III Emission Rate**

- Removed prerequisite of having a permanent total enclosure in order to use permitted tanks to determine emission rate

<table>
<thead>
<tr>
<th>Exhaust Flow Rate</th>
<th>Applicable Square Footage to Determine Emission Rate</th>
<th>Emission Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 5,000 CFM</td>
<td>Not Applicable</td>
<td>0.20 mg/hr</td>
</tr>
<tr>
<td>&gt; 5,000 CFM</td>
<td>Controlled Tier II and III Tanks and tanks requiring controls by a SCAQMD Permit</td>
<td>0.004 mg/hr-ft²</td>
</tr>
</tbody>
</table>
Permit Application Submittal Dates for Controls on Tier II Tanks

- For Tier III Tanks existing prior to date of rule adoption, the owner or operator must submit permit applications for control equipment as follows:

<table>
<thead>
<tr>
<th>Electrolytic Process at the Facility</th>
<th>Compliance Date for Permit Application Submittal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II Tank(s) at Chromic Acid Anodizing Facilities</td>
<td>180 days after Rule Adoption</td>
</tr>
<tr>
<td>Tier II Tank(s) at Hard Chromium Electroplating Facilities</td>
<td>365 days after Rule Adoption</td>
</tr>
<tr>
<td>Tier II Tank(s) at Decorative Chromium Electroplating Facilities</td>
<td>545 days after Rule Adoption</td>
</tr>
</tbody>
</table>

- Installation required no later than 1 year after Permit to Construct is issued
- Interim requirements for tank covers until controls are installed
Some industry representatives have commented that:

- Proposed building enclosure requirements will require facilities to close up facilities resulting worker safety and comfort issues
  - Prohibitions on forced air ventilation within a building enclosure
- Tier I Tanks should not be subject to building enclosure requirements as they have been determined by SCAQMD staff to not be an emission source of hexavalent chromium
- Permanent total enclosures should be allowed a 5% building enclosure envelope similar to EPA Method 204
Requirements (d) – Prohibition on Tanks Located Outdoors

- Added provision that applies to Tier I, II, or III Tanks and associated process tanks
  - Prohibits tanks from being located/operated outdoors
  - Effective 90 days after Date of Rule Adoption
Building Enclosures (e)

- Revised applicability – only required for Tier II and Tier III Tanks
- Maintain 3% of building enclosure envelope for building enclosure
- Added provision to allow 5% building enclosure envelope for permanent total enclosures (EPA Method 204)
- Revised provision for devices that pull air within a building enclosure
  - Provision only applies to powered devices located within 30 feet of a Tier III Tank
Comments Regarding Housekeeping & Best Management Practices

- Some industry representatives have commented that:
  - Cleaning requirements for buffing, grinding, and polishing within 20 feet of workstations are sufficient – confusion on why the requirement is applied to exits and entrances for building enclosures
  - Wet grinding should be exempt from requirements for buffing, polishing, and grinding similar to Rule 1430
  - Hexavalent chromium abatement procedures for installation, modification, or construction of air pollution controls are overly broad
Housekeeping and Best Management Practices (f) and (g)

- Clarified that cleaning locations for buffing, grinding, or polishing areas do not include exits/entrances to building enclosures
  - Any exit/entrance that is within 20 feet of a workstation will be captured
- Buffing, grinding, or polishing conducted under a continuous flood of metal removal fluid are exempt from paragraphs (g)(5) and (g)(6)
- Added provision that required tank labels identify the tier of the tank if applicable (i.e. Tier I, II, or III Tank)
- Revised abatement requirements of (f)(8) to apply to cutting of roof surfaces:
  - Concern is disturbing roof surfaces that may contain hexavalent chromium dust when any type of activity on the roof is occurring
  - Requires cleaning roof prior to work, conducting activity in a manner that does not lead to fugitive dust, and notifying the SCAQMD at least 48 prior to commencement of work
Some industry representatives have commented that:

- Periodic source testing should be 5 years instead of 3 years
- Parameter monitoring requirements for facilities that have already installed controls for Tier III Tanks should not be effective upon rule adoption
  - Design of ventilation system when permitted was determined prior to promulgation of PAR 1469
  - Another source test needed to establish acceptable ranges
- Not enough data to determine the measurements for static pressure
- Failed measurements for smoke tests or slot velocities should require shutting down the tank rather than the air pollution control device
  - Loss of production if other tanks that are in compliance with measurements cannot be operated since the air pollution control venting it is shutdown
Source Test Requirements and Test Methods (k)

- Modified provision for source testing frequency
- Operator is required to conduct a source tests once every 3 years (after initial source test)
- Added provision that will allow a facility to conduct source tests once every 4 years, if facility:
  - Shows full compliance with requirements for capture efficiency Paragraph (k)(6) – Slot velocities and smoke tests
  - Appendix 4 – Inspection and Maintenance of Controls
Parameter Monitoring (m)

- Added effective date for parameter monitoring requirements for Tier III Tanks
  - 60 days after initial source test specified in (k)(6)(A)
- Static pressure monitoring requirement revised to only require installation and maintenance of the gauge and recordkeeping
- Clarifications to Table 4 – Add-on Air Pollution Control Device Parameter Monitoring:
  - Failed measurements result in shutting down subject tank and not the add-on air pollution control device venting it
Trigger for Permanent Total Enclosure with Negative Air

- Some industry representatives have commented that trigger for installation of Permanent Total Enclosure should be based on failure to shutdown the tank instead of a failed slot velocity or smoke test.
- Staff has modified the provision for trigger for Permanent Total Enclosure.
  - Trigger is based on failure to shutdown the tank after a non-compliant slot velocity or smoke test.
  - Facility is required to report failed test to the Executive Officer and cannot operate the tank until the slot velocity and/or smoke test pollution is in compliance.
Other Provisions

- Recordkeeping (o)
  - Parameter monitoring records kept weekly versus daily
  - Maintain timeframe to report incidents to 1 hour
    - Received comments that 1 hour is too short
    - Reporting requirement is for provisions where there is some type of failure related to the pollution control equipment
    - 1 hour is consistent with breakdown provisions under Rule 430

- Hexavalent Chromium Phase-Out Plan
  - Default frequency for periodic reports is quarterly versus monthly

- Notification
Cost Estimates
Background – Cost Estimates

- Four general cost categories associated with PAR 1469
  - Add-on Air Pollution Control Devices
  - Periodic Source Testing/Emission Screening
  - Building Enclosure Modification
  - Maintenance and Housekeeping

- Providing a range of costs that considers high and low estimates
Add-on Air Pollution Control Equipment

- Provided unit costs for add-on air pollution control equipment and source testing/emission screening at Working Group Meeting #10
- In addition to capital costs:
  - Electrical power for ventilation blower ($0.15/kW-hr)
  - Installation of parameter monitoring instrumentation
    - 2 static pressure and 2 differential pressure gauges ($1,400/APC)
    - Existing tanks only – instrumentation included in cost of new tanks
  - Parameter monitoring costs (5 mins/reading)
  - Operating and maintenance (25% of capital/installation costs)
Source Testing/Emission Screening & Permitting

- **Initial source test costs**
  - 65 - 117 APCs for new Tier III tanks ($18,000 per test)
  - 89 APCs for existing tanks ($14,000 - $18,000 per test)
  - 27 APCs if no CFS available after 2022 ($18,000 per test)

- **Emission screening test**
  - 154 - 233 emission screening tests ($14,000 per test/4 years)

- **Permitting costs**
  - 65 - 144 permit application fees ($4,354 per application)

- **Annual permit renewal**
  - 65 - 144 renewal fees ($1,409/yr)
Building Enclosure Modification Costs

• Assumptions
  • Building enclosures sufficient to comply
  • Proposal provides enough flexibility to:
    • Introduce sufficient ventilation air into building enclosure
    • Remove heat and moisture/condensation from building enclosure
  • Average of 4 openings per facility modified
    • Based on site visits
  • Various methods used to modify openings
  • $200 per opening – materials plus labor
Housekeeping & One-Time Costs

- **Housekeeping**
  - Floor cleaning w/in 20 feet of buffing/grinding/polishing (15 min/shift)
  - Cleaning of surfaces contaminated with Cr\(^+6\) (15 min/shift)

- **One-time costs**
  - Drip trays
  - Splash guards
  - Barrier between tank area and buffing/grinding/polishing area
  - Labeling of tanks
  - Relocating of 6 stripping tanks indoors
Next Steps

- Set Hearing Date – March 2, 2018
- Release of 30-Day Documents – March 6, 2018
  - Draft Rule Language
  - Draft Staff Report
- Close of Comment Period for Draft EA – March 20, 2018
- Public Hearing – April 6, 2018

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