Update on Implementation of:
Regulation 11, Rule 18
Reduction Of Risk From Air Toxic Emissions at Existing Facilities

Stationary Source Committee
Meeting
March 18, 2019

Carol Allen
Assistant Manager, Engineering Div.
OUTLINE

Regulation 11, Rule 18: Reduction of Risk from Air Toxic Emissions at Existing Facilities

• Overview of Rule and Requirements
• Implementation Process and Schedule
• Actions to Date
• Next Steps
REGULATION 11, RULE 18 OVERVIEW

• **Adopted November 15, 2017**
  • Established the most health protective risk management thresholds for existing stationary sources.

• **Requires facilities to:**
  • Reduce their health risks below stringent risk action levels; or
  • Implement best available retrofit control technologies, or “TBARCT” on all significant risk sources.
Key health risk measures are:

- **Cancer Risk** – Probability of contracting cancer during one’s lifetime due to long term exposure to air toxics.

- **Chronic Hazard Index** - Potential for non-cancer health impacts resulting from long term exposure to air toxics.

- **Acute Hazard Index** - Potential for non-cancer health impacts resulting from one-hour exposure to air toxics.
REGULATION 11, RULE 18 OVERVIEW

- **Air District determines health risks using:**
  - Improved toxic emission inventories,
  - Updated air dispersion modeling procedures, and;
  - Latest health impact science from the Office of Environmental Health Hazard Assessment (OEHHA).
REGULATION 11, RULE 18 REQUIREMENTS

- Facilities with HRA (Health Risk Assessment) results above a Risk Action Level (RAL) must have an approved Risk Reduction Plan (RRP) and must implement this RRP within 5 years.

<table>
<thead>
<tr>
<th>Risk Action Levels</th>
<th>2018</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer Risk</td>
<td>25 per million</td>
<td>10 per million</td>
</tr>
<tr>
<td>Non-Cancer Hazard Index (Chronic HI or Acute HI)</td>
<td>2.5</td>
<td>1.0</td>
</tr>
</tbody>
</table>
NEXT STEPS

- Publish Final Hearing Package (??? 2017)
- Public Hearing Notice
- Proposed Rule
- Staff Report
- Socioeconomic Analysis
- CEQA Analysis: Negative Declaration

Board Hearing for Adoption (???? 2017)
REGULATION 11, RULE 18 IMPLEMENTATION PROCESS

1. Screen and Classify Facilities
2. Validate Inventories and HRA Input Data
3. Conduct Health Risk Assessments
4. Approve Risk Reduction Plans
5. Implement Risk Reduction Measures
Phase I
43 Facilities

- Preparing Data Requests: 6 Facilities
- Awaiting Data Return: 20 Facilities
- Validating Data: 9 Facilities
- Validation Complete: 8 Facilities
- Exempt or Deferred: 5 Facilities
- HRAs Underway: 3 Facilities
**RULE 11-18 SCHEDULE FOR PHASE I SITES**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Build Additional Infrastructure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1. Classify Facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2. Validate Data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 3. Conduct Preliminary HRAs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facility Review of Preliminary HRAs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Review of draft HRAs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respond, Correct, Post Final HRA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 4. Approve Risk Reduction Plans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 5. Implement Risk Reduction Measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* As of June 2018, Phase I had 43 Facilities.
RULE 11-18: ACTIONS TO DATE

- Rule 11-18 Implementation Work Group
  - Held 3 Meetings
  - Discussed Plans, Schedules, and Review Processes
  - Reviewing Guidance Documents

- New Data Collection and Management Process
  - Update Annual Inventories
  - Add 1-Hour Emissions Data
  - Collect and Verify HRA Inputs

- Enhanced Web Site

- Updated Fee Structure
RULE 11-18: NEXT STEPS

- Complete Guidance Documents (emission factors, 1-hour inventories, and modeling protocols)
- Complete Data Validation for Phase I Facilities
- Complete HRAs for Phase I Facilities
- Update Web Site (add guidance documents and public notice area)
- Organize the Dispute Resolution Panel (as needed)
Refinery and Flare Overview

Stationary Source Committee Meeting
March 18, 2019

Jeff Gove
Director of Enforcement
Overview

- Refinery Process
- Refinery Flares
- Refinery Flare Monitoring
- Refinery Flare Minimization
District Refineries
Products of Petroleum Refining

Small Molecules
- Low boiling point
- Light in colour
- Easy to light
- Runny

Large Molecules
- High boiling point
- Dark in colour
- Hard to light
- Thick

Crude Oil → Fractioning Column

- Refinery Gas 20°C
- Petrol 70°C
- Naphtha 120°C
- Kerosine 170°C
- Diesel 270°C
- Lubricating Oil
- Fuel Oil
- Bitumen 340°C

Bottled Gas
- Petrol for Vehicles
- Chemicals
- Jet fuel, Paraffin for lighting and heating
- Diesel fuels
- Lubricating Oils, Waxes, Polishes
- Fuel for Ships, Factories and Central Heating
- Roads and Roofing
Refinery Sources of Emissions

• **Storage and Transfer of Organic Liquids**
  – Organic Liquid Storage Tanks
  – Piping and Equipment
  – Marine Vessel Loading Terminals

• **Processing Equipment**
  – Products of Combustion
  – Crude Unit
  – Fluid Catalytic Cracker (FCC) / Coker Unit
  – Sulfur Removal / Sulfur Recovery
  – Reformers / Treatment

• **Waste Streams**
  – Wastewater Collection and Separation Systems
  – Waste product (i.e, Coke, Catalyst)

• **Operational Upsets & Emergency Conditions**
  – Flares
Refinery Emissions

- Carbon Dioxide (a greenhouse gas)
- Volatile Organic Carbon (VOC)
- Hydrogen Sulfide (H$_2$S)
- Sulfur Dioxide (SO$_2$)
- Nitrogen Oxide (NO$_x$)
- Benzene
- PM$_{2.5}$
<table>
<thead>
<tr>
<th>Regulation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reg 8, Rule 5</td>
<td>Storage Tanks of Organic Liquids</td>
</tr>
<tr>
<td>Reg 8, Rule 8</td>
<td>Wastewater Collection and Separation Systems</td>
</tr>
<tr>
<td>Reg 8, Rule 10</td>
<td>Process Vessel Depressurization</td>
</tr>
<tr>
<td>Reg 8, Rule 18</td>
<td>Equipment Leaks</td>
</tr>
<tr>
<td>Reg 8, Rule 28</td>
<td>Episodic Releases from Pressure Relief Devices</td>
</tr>
<tr>
<td>Reg 8, Rule 33</td>
<td>Gasoline Bulk Terminals &amp; Gasoline Cargo Tanks</td>
</tr>
<tr>
<td>Reg 8, Rule 44</td>
<td>Marine Vessel Loading Terminals</td>
</tr>
<tr>
<td>Reg 12, Rule 11</td>
<td>Flare Monitoring at Petroleum Refineries</td>
</tr>
<tr>
<td>Reg 12, Rule 12</td>
<td>Flaring &amp; Flare Minimization Plan</td>
</tr>
</tbody>
</table>
Refinery Flare Systems

Flares are safety devices used to combust process gasses produced in petroleum refining from the following activities:

- Emergency/Process Upsets
- Start-up and Shutdown
- Turnaround and maintenance activities
Refinery Flare Systems

Flare Gas Treatment System

- Flare Gas Compressors
- Excess Refinery Process Gases/Liquids
  - > Pressure Relief Valves
  - > Vessel Depressurization
  - > Vapor Recovery, etc.

Air Pollution Control Equipment

- Heaters
- Boilers

Vent Gas Flow Meter

To Recovery/Waste System

Knockout Drum

- Vent Gas
- Liquid

Water Seal

Purge Gas

Pilot Gas

Steam

- Refinery Flare
Refinery Maintenance

Turnaround
A planned activity for the purpose of performing periodic maintenance, repair or replacement, or installation of new equipment.
Regulation 12, Rule 11

Flare Monitoring Rule

Requires:

- **Monitoring**
  - flow, vent gas composition

- **Sampling**
  - during flaring events
  - hydrocarbon and sulfur content

- **Video surveillance**

- **Monthly reporting of emissions data**
Regulation 12, Rule 12

Flares at Petroleum Refineries

Flare Minimization

- Flaring is prohibited unless due to emergency or consistent with the Flare Minimization Plan

Notification

- Required when greater than 500,000 standard cubic feet per day is flared
- As soon as possible, consistent with safe operation of the refinery
Regulation 12, Rule 12

**Flares at Petroleum Refineries**

**Causal Analysis Reports**
- Investigation of cause of flaring
- Requires prevention measures to be implemented

**Flare Management Plan Updates**
- Annual update and review to ensure continuous improvement in minimizing the frequency and magnitude of flaring
Frequency of Flaring Events

Refinery Flaring Events 2005 through 2018

<table>
<thead>
<tr>
<th>Year</th>
<th>Valero</th>
<th>Tesoro</th>
<th>Shell</th>
<th>Phillips</th>
<th>Chevron</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005*</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>2006</td>
<td>14</td>
<td>15</td>
<td>10</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>2007</td>
<td>22</td>
<td>22</td>
<td>5</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>2008</td>
<td>12</td>
<td>9</td>
<td>3</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>2009</td>
<td>18</td>
<td>14</td>
<td>7</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>2010</td>
<td>11</td>
<td>19</td>
<td>5</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>2011</td>
<td>17</td>
<td>9</td>
<td>5</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>2012</td>
<td>5</td>
<td>12</td>
<td>7</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td>2013</td>
<td>8</td>
<td>11</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>2014</td>
<td>9</td>
<td>9</td>
<td>3</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>2015</td>
<td>12</td>
<td>18</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2016</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>2017</td>
<td>9</td>
<td>7</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>2018</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>9</td>
</tr>
</tbody>
</table>
Amount of Gas Flared

Refinery Vent Gas Volume Flared

<table>
<thead>
<tr>
<th>Year</th>
<th>Valero</th>
<th>Tesoro</th>
<th>Shell</th>
<th>Phillips</th>
<th>Chevron</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>144.9</td>
<td>330.4</td>
<td>113.4</td>
<td>43.1</td>
<td>51.7</td>
</tr>
<tr>
<td>2005</td>
<td>206.9</td>
<td>278.3</td>
<td>50.4</td>
<td>24.9</td>
<td>67.0</td>
</tr>
<tr>
<td>2006</td>
<td>245.7</td>
<td>308.6</td>
<td>51.7</td>
<td>43.1</td>
<td>67.0</td>
</tr>
<tr>
<td>2007</td>
<td>245.7</td>
<td>308.6</td>
<td>51.7</td>
<td>43.1</td>
<td>67.0</td>
</tr>
<tr>
<td>2008</td>
<td>245.7</td>
<td>308.6</td>
<td>51.7</td>
<td>43.1</td>
<td>67.0</td>
</tr>
<tr>
<td>2009</td>
<td>245.7</td>
<td>308.6</td>
<td>51.7</td>
<td>43.1</td>
<td>67.0</td>
</tr>
<tr>
<td>2010</td>
<td>245.7</td>
<td>308.6</td>
<td>51.7</td>
<td>43.1</td>
<td>67.0</td>
</tr>
<tr>
<td>2011</td>
<td>245.7</td>
<td>308.6</td>
<td>51.7</td>
<td>43.1</td>
<td>67.0</td>
</tr>
<tr>
<td>2012</td>
<td>245.7</td>
<td>308.6</td>
<td>51.7</td>
<td>43.1</td>
<td>67.0</td>
</tr>
<tr>
<td>2013</td>
<td>245.7</td>
<td>308.6</td>
<td>51.7</td>
<td>43.1</td>
<td>67.0</td>
</tr>
<tr>
<td>2014</td>
<td>245.7</td>
<td>308.6</td>
<td>51.7</td>
<td>43.1</td>
<td>67.0</td>
</tr>
<tr>
<td>2015</td>
<td>245.7</td>
<td>308.6</td>
<td>51.7</td>
<td>43.1</td>
<td>67.0</td>
</tr>
<tr>
<td>2016</td>
<td>245.7</td>
<td>308.6</td>
<td>51.7</td>
<td>43.1</td>
<td>67.0</td>
</tr>
<tr>
<td>2017</td>
<td>245.7</td>
<td>308.6</td>
<td>51.7</td>
<td>43.1</td>
<td>67.0</td>
</tr>
<tr>
<td>2018</td>
<td>245.7</td>
<td>308.6</td>
<td>51.7</td>
<td>43.1</td>
<td>67.0</td>
</tr>
</tbody>
</table>
Questions?