AB 617
WCWLB
CSC Member Updates
AB 617
WCWLB
Outreach
Updates
UPDATE ON COMMUNITY AIR MONITORING IN WCWLB
OLGA PIKELNAYA PH.D
PROGRAM SUPERVISOR
OUTLINE

- Air Monitoring Near Oil Wells in Community
- Refinery VOC Baseline Measurements Update
- Dominguez Channel Odor Event
MOBILE MEASUREMENTS NEAR OIL WELLS
MEASUREMENT ROUTE

North-East Region
October 6 and 7, 2021
50 Oil Wells

South-West Region
October 5 and 6, 2021
548 Oil Wells
## Mobile Monitoring Near Oil Well
### Summary of Identified Emission Sources

<table>
<thead>
<tr>
<th>Region</th>
<th>Date</th>
<th>Range of Total VOC Concentrations** (ppb)</th>
<th>Range of Benzene Concentrations** (ppb)</th>
<th>Location / Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>South East</td>
<td>October 5, 2021</td>
<td>&lt; 25 - 2334</td>
<td>&lt; 2 - 10</td>
<td>1120 Pier F Ave (Slurry Facility)</td>
</tr>
<tr>
<td>North East</td>
<td>October 6, 2021</td>
<td>&lt; 25 - 26844</td>
<td>&lt; 2 - 191</td>
<td>Linden and Spring (Oil Sites)</td>
</tr>
<tr>
<td>North East</td>
<td>October 6, 2021</td>
<td>&lt; 25 - 7113</td>
<td>&lt; 2 - 39</td>
<td>Pasadena and Spring</td>
</tr>
<tr>
<td>North East</td>
<td>October 6, 2021</td>
<td>&lt; 25 - 598</td>
<td>&lt; 2 - 4.5</td>
<td>E 28th and Olive (Oil Sites and Recycling Center)</td>
</tr>
<tr>
<td>North East</td>
<td>October 7, 2021</td>
<td>&lt; 25 - 1204</td>
<td>&lt; 2 - 6</td>
<td>Linden and Spring (Oil Sites)</td>
</tr>
<tr>
<td>North East</td>
<td>October 7, 2021</td>
<td>&lt; 25 - 8925</td>
<td>&lt; 2 - 40</td>
<td>E 28th and Olive (Oil Sites and Recycling Center)</td>
</tr>
</tbody>
</table>

*Tables shows days only when elevated VOC emissions were measured from the site. Follow-up measurements were conducted to confirm that elevated emission were no longer present

**Instantaneous reading recorded during mobile survey.

- Oil wells emissions are variable in time and magnitude
• Compliance staff conducted on-site inspections
• Facilities conducted repairs
• Additional follow-up mobile monitoring will be conducted in the future
Elevated VOCs (Alkanes) and Benzene were observed downwind of Site 1 and Site 2.

Compliance staff conducted on-site inspections

*Instantaneous readings during mobile survey
#Typical benzene range: 0.1 - 1.8 ppb
PASADENA AND SPRING WELLS
OCTOBER 6, 2021

Picture of Oil Site 1

FLIR video
Oil Site 1

Fugitive Emissions
Follow-up ORS survey on October 7, 2021 did not detect elevated emission from Site 1

Levels of VOCs (Alkanes) and Benzene downwind of Site 2 were substantially reduced

*Instantaneous readings during mobile survey
Typical benzene range: 0.1 - 1.8 ppb
Elevated VOCs (Alkanes) and Benzene were observed downwind of Slurry facility.

Compliance staff conducted on-site inspections.

Follow-up ORS survey on October 6, 2021 did not detect elevated emission.
**BASELINE REFINERY EMISSIONS: STATUS UPDATE**

- Four 2-month measurement periods distributed over July 2021 through June 2022
  - Minimum of 23 days of measurements, 4-5 days of measurement days per refinery
  - Detailed analysis of measurements completed so far, and comparison with historical trend is in progress

<table>
<thead>
<tr>
<th>Year</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Measurement Period #1 Completed</td>
<td></td>
<td></td>
<td>Measurement Period #2 In Progress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>Measurement Period #3</td>
<td>Measurement Period #4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
REPORT ODORS TO SOUTH COAST AQMD

There are 3 ways to file:

- Call 1-800-CUT-SMOG
  (1-800-288-7664)
- Visit www.AQMD.gov/Complaints
- Download the South Coast AQMD app and select “1-800-CUT-SMOG”
CARSON H$_2$S ODOR EVENT AFFECTED AREA

- **Rule 1180 Fenceline and Community Air Monitoring**
  Continuous real-time measurements of VOCs, H$_2$S and other air pollutants
  Automatic email notifications in case of increased air pollution levels
  https://xappprod.aqmd.gov/Rule1180CommunityAirMonitoring/

- **New Air Monitoring Site (213th&Chico)**
  Located near E 213th Street and the Dominguez channel
  Continuous real-time measurements of H$_2$S
  Measurements started on October 14, 2021

South Coast AQMD Dominguez Channel Webpage
https://www.aqmd.gov/home/news-events/community-investigations/dominguez-channel
HOURLY H$_2$S MEASUREMENTS AT 213TH & CHICO

Decline in H$_2$S concentrations
HOURLY H$_2$S MEASUREMENTS AT 213TH & CHICO

California Nuisance Standard (30 ppb)
HOURLY $\text{H}_2\text{S}$ MEASUREMENTS AT COMMUNITY AIR MONITORING SITES

Decline in $\text{H}_2\text{S}$ concentrations
HOURLY H₂S MEASUREMENTS
AT COMMUNITY AIR MONITORING SITES

Date

H₂S (ppb)

20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0

G Street
Guenser Park
Hudson
Inner Port
Judson
St. Luke
First Methodist
Harbor Park
H₂S MOBILE MEASUREMENTS

October 10 - 14, 2021

November 6 and 8, 2021
Approximately 2,800 individual Jerome readings collected.
DISCUSSION

- Comments, Suggestions, Questions

Please contact:
Olga Pikelnaya
opikelnaya@aqmd.gov
909-396-3157
RULE 1109.1
EMISSIONS OF OXIDES OF NITROGEN FROM PETROLEUM REFINERIES AND RELATED OPERATIONS

RULE 429.1
STARTUP AND SHUTDOWN PROVISIONS AT PETROLEUM REFINERIES AND RELATED OPERATIONS

RULE 1304
EXEMPTIONS

RULE 2005
NEW SOURCE REVIEW FOR RECLAIM
Background

- **2016 Air Quality Management Plan**
  - Adopted Resolution called for 5 tons per day NOx reduction from transitioning RECLAIM to a command-and-control regulatory structure

- **2017 – AB 617**
  - Applicable to facilities in the state greenhouse gas cap-and-trade program
  - Requires the highest priority for implementation will be for those sources that “have not modified emissions-related permit conditions the greatest period of time”

- **Rule 1109.1** is critical for South Coast AQMD to meet:
  - Requirements under state and federal law
  - Commitment under AB 617 and CERP to achieve a 50% reduction for communities of WCWLB
Compliance with the WCWLB CERP

- Final Community Emission Reduction Plan (CERP) approved in September 2019
- CERP for Wilmington, Carson, West Long Beach include goals for emission reductions from refinery equipment, flaring, storage tanks
- One goal targets 50% reduction in NOx emissions with implementation of Rule 1109.1
  - Equates to 3-4 tons per day NOx reduction by 2030
- Rule 1109.1 anticipates overall 7.7 – 7.9 tons per day reduction from full implementation
- Reductions from WCWLB refineries ~4.5 tons per day NOx reduction so CERP goal will be satisfied
Affected Facilities

- Applies to 16 facilities
- 11 facilities are located in the communities of WCWLB
- Establishes NOx limits for nearly 300 pieces of combustion equipment

9 Petroleum Refineries
- Chevron
- Marathon (Carson)
- Marathon (Wilmington)
- Marathon – Calciner
- Marathon – Sulfur Recovery Plant
- Phillips 66 (Carson)
- Phillips 66 (Wilmington)
- Torrance Refining Company
- Ultramar (Valero)

3 Small Refineries
- Asphalt Refineries
  - Lunday-Thagard DBA World Oil Refining
  - Valero Wilmington Asphalt Plant
- Biodiesel Refinery
  - Alt Air Paramount

4 Related Operations
- Hydrogen Plants
  - Air Liquide Large Industries
  - Air Products and Chemicals (Carson & Wilmington)
- Sulfuric Acid Plant
  - Eco Services Operations
Rule 1109.1 Rulemaking Public Process

Initiated Rule Development February 2018
25 Working Group Meetings
100+ Individual Stakeholder Meetings
Two Community Meetings for AB 617 Carson, Wilmington, and West Long Beach Community
One Public Workshop
South Coast AQMD Governing Board adopted Rule 1109.1 on November 5, 2021.

Rule 1109.1 is an industry-specific rule that sets BARCT NOx standards for nearly 300 units at refineries and facilities with operations related to refineries.

Unlike RECLAIM, Rule 1109.1 does NOT allow facilities to purchase “emission credits” to meet emission reduction requirements.

Allows for two alternative compliance pathways for facilities with six or more pieces of equipment:

- **B-Plan:** Focuses on individual pieces of equipment at BARCT or alternative BARCT limits.
- **B-Cap:** Establishes a facility-wide emission target with an additional 10% reduction as an environmental benefit.

At full implementation, Rule 1109.1 will significantly reduce NOx emissions:

- 7.7 to 7.9 tons per day (tpd) reduced
- ~75% of the emission reductions by 2027
Rule 1109.1 - 2017 Baseline Emissions (Tons per Day or TPD)

- Rule 1109.1 facilities represent 62% of the NOx emissions in RECLAIM.
- NOx Emissions from large boilers and heaters (≥40 MMBtu/hour) represent 57% of the emissions from Rule 1109.1 combustion equipment.

2017 RECLAIM NOx Emissions 19.9 tons per day

Rule 1109.1 Facilities
- Large Boilers and Heaters 7.1 TPD
- Calciner, 0.7 TPD
- FCCU, 0.9 TPD
- Turbines, 1.5 TPD
- SRU/TG Incinerator, 0.5 TPD
- SMR Heaters, 1.1 TPD
- Small Boilers and Heaters, 0.6 TPD

Other RECLAIM Facilities
- 7.5 Tons per Day 38%

RECLAIM NOx Emissions 19.9 tons per day
NOx limits are designed to achieve maximum reductions taking into account economic impacts.

Staff uses a cost-effectiveness threshold of $50,000/ton of NOx reduced.

Incremental cost-effectiveness is the incremental cost over the incremental reductions for the next more stringent NOx limit.

- >>>$50,000 indication that next more stringent NOx limit does not achieve substantially more reductions.

BARCT NOx limit established using a methodical approach that meets state law.

BARCT is defined in the California Health and Safety Code §40406 as

"...an emission limitation that is based on the maximum degree of reduction achievable by each class or category of source, taking into account environmental, energy, and economic impacts."
Core Requirements

- Operators must meet NOx limits in Table 1
- If the conditional requirements can be met, operators can meet Table 2 “conditional NOx limits” in lieu of Table 1 limits
- Conditional NOx limits were developed to acknowledge achieving Table 1 NOx limits for some units have:
  - A high cost-effectiveness due to high capital cost and/or low emission reduction potential
- Incorporating the conditional NOx limits reduced the average cost-effectiveness to near or below $50,000 per ton of NOx reduced for each class and category (BARCT)
## Requirements for Large Boilers and Heaters (≥ 40 MMBtu/Hour)

<table>
<thead>
<tr>
<th>Unit</th>
<th>Table 1 NOx Limit (ppmv)</th>
<th>Table 2 Conditional NOx Limit (ppmv)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boilers 40 – 110 MMBtu/hour</td>
<td>5 ppm</td>
<td>None</td>
</tr>
<tr>
<td>Boilers &gt;110 MMBtu/hour</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>Process Heaters 40 – 110 MMBtu/hour</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Process Heaters &gt;110 MMBtu/hour</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

* Emission reductions range based on units identified as possibly meeting Table 2

### Initial Estimated

#### Reductions Large Boilers and Heaters

<table>
<thead>
<tr>
<th>NOx Emissions (Tons/Day)</th>
<th>2017 Baseline</th>
<th>PR 1109.1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>
### Conditions for Using Table 2 NOx Limits

- Operators cannot use Conditional Limits if:
  - Permit to Construct issued on or after December 4, 2015 for post combustion controls
  - Potential NOx reductions is greater than:
    - 10 tons per year for boilers or process heaters 40 and 110 MMBtu/hour
    - 20 tons per year for boilers and process heaters ≥110 MMBtu/hour
  - Unit currently has permit limit or is currently performing at or below the applicable Table 1 NOx limit
  - Unit will be decommissioned
- Operators must submit a permit application by July 1, 2022 and meet Table 2 limit 18 months after Permit to Construct is issued
- Rule 1109.1 includes provisions for “pre-qualified” units – early permit submittal is not required for pre-qualified units

### Table 2 Conditional NOx Limits

<table>
<thead>
<tr>
<th>Unit</th>
<th>NOx (ppmv)</th>
<th>CO (ppmv)</th>
<th>O2 Correction (%)</th>
<th>Rolling Averaging Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boilers &gt;110 MMBtu/hour</td>
<td>7.5</td>
<td>400</td>
<td>3</td>
<td>24-hour</td>
</tr>
<tr>
<td>Gas Turbines fueled with Natural Gas</td>
<td>2.5</td>
<td>130</td>
<td>15</td>
<td>24-hour</td>
</tr>
<tr>
<td>Process Heaters 40 – 110 MMBtu/hour</td>
<td>18</td>
<td>400</td>
<td>3</td>
<td>24-hour</td>
</tr>
<tr>
<td>Process Heaters &gt;110 MMBtu/hour</td>
<td>22</td>
<td>400</td>
<td>3</td>
<td>24-hour</td>
</tr>
<tr>
<td>SMR Heaters</td>
<td>7.5</td>
<td>400</td>
<td>3</td>
<td>24-hour</td>
</tr>
<tr>
<td>Vapor Incinerators</td>
<td>40</td>
<td>400</td>
<td>3</td>
<td>24-hour</td>
</tr>
</tbody>
</table>
**Rule 1109.1 Potential Emission Reductions**

- Rule 1109.1 will potentially reduce 7.7 – 7.9 tpd of NOx
- Estimated to achieve over 70% reduction in NOx emissions from boiler and process heater categories
  - Percent reductions vary based on emission reduction potential, some units already achieving low emissions
  - SCR can achieve 95% NOx Reductions for uncontrolled units
  - 41 boilers and process heaters currently have SCRs installed
  - Emission reduction estimates account for potential eligibility to meet Table 2 conditional limits

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>2017 NOx Baseline Emissions (tpd)</th>
<th>Potential NOx Emission Reductions (tpd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boilers &amp; Process Heaters ≥40 MMBtu/hr</td>
<td>7.1</td>
<td>5.0 – 5.2 (1)</td>
</tr>
<tr>
<td>Coke Calciner</td>
<td>0.71</td>
<td>0.68</td>
</tr>
<tr>
<td>SMR Heaters</td>
<td>1.1</td>
<td>0.6</td>
</tr>
<tr>
<td>Gas Turbine</td>
<td>1.4</td>
<td>0.4</td>
</tr>
<tr>
<td>FCCU</td>
<td>0.83</td>
<td>0.4</td>
</tr>
<tr>
<td>Boilers &amp; Process Heaters &lt;40 MMBtu/hr</td>
<td>0.64</td>
<td>0.32 (2)</td>
</tr>
<tr>
<td>SRU/TG Incinerator</td>
<td>0.43</td>
<td>0.1</td>
</tr>
<tr>
<td>Vapor Incinerators</td>
<td>0.05</td>
<td>0.02</td>
</tr>
<tr>
<td>Sulfuric Acid Plants</td>
<td>0.1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12.4</strong></td>
<td><strong>7.7 – 7.9</strong></td>
</tr>
</tbody>
</table>

1 Estimated reductions based on units anticipated to meet conditional limits
2 Includes projected NOx emission reductions from end-of-life burner replacement and emerging technologies
Rule 1109.1 Implementation Considerations

- Refineries competing for same pool of skilled labor, equipment manufacturers, source testing companies, etc.
- Integrating projects in refinery turnaround schedules minimizes fuel supply disruptions
- Most turnaround schedules are 3 to 5 years, a few are 9 to 10 years
- Staggered schedules reduce demand for resource
- Large number of complex projects
- Need to minimize disruptions in fuel supply
- Capital investment
- ~90 new or upgraded selective catalytic reduction (SCR) projects
- SCR projects customized and require complex engineering
- Challenging to integrate within existing facility structure
- Capital costs for each project $10 to $70 million
- Cost per petroleum refinery ranges from $179 million to $1 billion
The B-Plan and B-Cap would be implemented through an implementation schedule called an I-Plan.

B-Plan and B-Cap provides options to achieve BARCT in the aggregate.

Both alternative compliance options require each unit to have an enforceable permit limit:
- Some permit limits will be higher than Table 1 limits, however the higher emission limits will have to be offset by lower limits.

- B-Plan is a BARCT equivalent *concentration* plan.
- Allows operators to select a NOx concentration limits that are equivalent BARCT in aggregate.

- B-Cap is a BARCT equivalent *mass* cap.
- Requires operators to accept a NOx emission limit for each unit.
- Allows facilities to take credit for equipment shutdowns and throughput reductions.
NOx Emission Targets for B-Cap and B-Plan

Aggregate NOx concentration limits must meet Emission Target

Facility-wide emissions must meet Emission Target + 10% Environmental Benefit

B-Plan and B-Cap are designed to achieve Facility-Specific Emission Targets that are Based on Table 1 and Table 2 NOx Limits

Emission Targets for all facilities based on NOx limits in Table 1 and Table 2
Alternative Implementation Schedule (I-Plan)

- I-Plans are needed due to the complexity and number of projects required to achieve Rule 1109.1 limits.
- The flexibility in the I-Plans allows the facilities to install the NOx emission reduction projects during schedule maintenance to help minimize downtime and additional cost.
- I-Plans are designed to achieve early emission reductions and allow longer implementation periods for the units that have longer maintenance schedules.

I-Plan is a phased implementation schedule.
- Allows operators to tailor the implementation schedule to meet NOx limits to minimize operational disruptions.
### I-Plan Options

- Rule 1109.1 includes five I-Plan Options
- Some I-Plans are limited to the type of BARCT Compliance Plan
- I-Plan Option 2 and 3 have an additional condition that the facility must be achieving a NOx emission rate less than 0.02 pound per million BTU of heat input

<table>
<thead>
<tr>
<th>I-Plan Options</th>
<th>Provision</th>
<th>Phase I</th>
<th>Phase II</th>
<th>Phase III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1 for B-Plan or Table 1 or 2</td>
<td>Targets</td>
<td>80%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Submit Permit Application</td>
<td>Jan 1, 2023</td>
<td>Jan 1, 2031</td>
<td></td>
</tr>
<tr>
<td>Option 2 B-Plan¹</td>
<td>Targets</td>
<td>65%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Submit Permit Application</td>
<td>July 1, 2024</td>
<td>Jan 1, 2030</td>
<td></td>
</tr>
<tr>
<td>Option 3 B-Plan or B-Cap¹,²</td>
<td>Targets</td>
<td>40%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Submit Permit Application</td>
<td>July 1, 2025</td>
<td>July 1, 2029</td>
<td></td>
</tr>
<tr>
<td>Option 4 B-Cap Only²</td>
<td>Targets</td>
<td>50%</td>
<td>80%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Submit Permit Application</td>
<td>N/A</td>
<td>Jan 1, 2025</td>
<td>Jan 1, 2028</td>
</tr>
<tr>
<td>Option 5 for B-Plan or Table 1 or 2</td>
<td>Targets</td>
<td>50%</td>
<td>70%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Submit Permit Application</td>
<td>Jan 1, 2023</td>
<td>Jan 1, 2025</td>
<td>July 1, 2028</td>
</tr>
</tbody>
</table>
Socioeconomic Impact Analysis

- Socioeconomic Impact Assessment and 3rd Party Reviews released September 7, 2021
  - Total cost estimated to be $2.34 billion (net present value)
  - Estimated average annual costs of $132.5 million per year

- Local price of gasoline is projected to increase by less than one cent per gallon

- Average annual regional job impacts are projected increase by 213 jobs per year
  - In general, job gains are in the construction sector
  - Job gains from construction is expected to outweigh any negative impacts on affected industries

- Monetized public health benefits estimated to be $2.63B (net present value)
  - Benefits include approximately 370 premature deaths avoided, 6,200 asthma attacks avoided, and 21,400 work loss days avoided
Rule 1109.1 Staff Contacts

Susan Nakamura
Assistant DEO
snakamura@aqmd.gov
909.396.3105

Michael Krause
Planning & Rules Manager
mkrause@aqmd.gov
909.396.2706

Heather Farr
Program Supervisor
hfarr@aqmd.gov
909.396.3672

Sarady Ka
AQ Specialist
ska@aqmd.gov
909.396.2331

Mojtaba Moghani, Ph.D.
AQ Specialist
mmoghani@aqmd.gov
909.396.2527

Zoya Banan, Ph.D.
AQ Specialist
zbanan@aqmd.gov
909.396.2332
NEXT STEPS

Future Announcements
- Newsletters or emails
- Continue CERP implementation

Future Meeting
- Tentatively 1st Quarter 2022 (virtual)
- AQ Priority Updates & Agenda Topics
  - What would you like to hear about?
Public Comment
SOUTH COAST AQMD CONTACTS: WCWLB

- CERP
  Nicole Silva
  Program Supervisor
  nsilva@aqmd.gov
  909-396-3384

- CAMP
  Payam Pakbin
  Program Supervisor
  ppakbin@aqmd.gov
  909-396-2122

- CSC
  Ryan Stromar
  Senior Public Affairs Specialist
  rstromar@aqmd.gov
  909-396-2637