

## Refineries

### Background

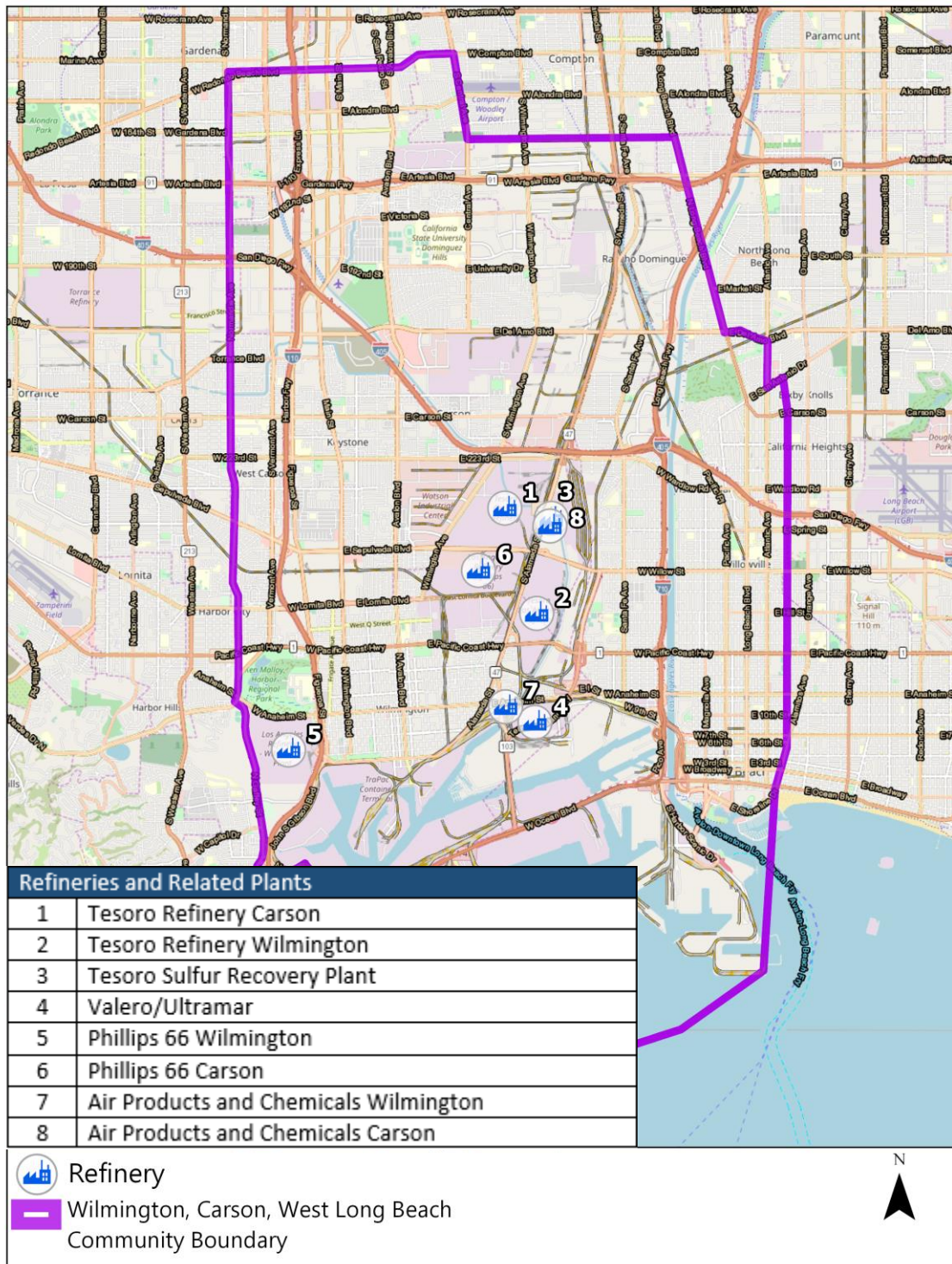
Petroleum refineries are among the largest stationary sources of air pollution in the South Coast Air Basin (SCAB). These sources process crude oil into various products, such as gasoline, diesel fuel, aviation fuel, and other products. Petroleum refineries also have other related processes at their facilities, for example, sulfur recovery and hydrogen production. Sulfur recovery plants convert hydrogen sulfide to elemental sulfur used for other industrial processes. Hydrogen production plants generate hydrogen, which is used in the refining and other processes.

The Wilmington, Carson, West Long Beach community includes five petroleum refineries, one sulfur recovery plant, and two hydrogen production plants. A general overview of the location and type of facilities is provided in Table 5b-1 – Petroleum Refineries and Related Facilities in the Wilmington, Carson, and West Long Beach Community. Petroleum refineries, sulfur recovery plants, and hydrogen production plants are subject to rules and regulations adopted by the South Coast AQMD and other regulatory agencies. A list of South Coast AQMD regulations that apply to these facilities is provided in Appendix 5b.

Table 5b-1. Petroleum Refineries and Related Facilities in the Wilmington, Carson, West Long Beach Community

Name	Facility Type	Location
Air Products and Chemicals	Hydrogen Production Plant	Carson
Phillips 66	Refinery	Carson
Tesoro Refinery	Refinery	Carson
Tesoro	Sulfur Recovery Plant	Carson
Air Products and Chemicals	Hydrogen Production Plant	Wilmington
Phillips 66	Refinery	Wilmington
Tesoro Refinery	Refinery	Wilmington
Valero/Ultramar	Refinery	Wilmington

Figure 5b-1. Petroleum Refineries and Related Facilities within the Wilmington, Carson, West Long Beach Community



### Community Air Quality Priority – Flaring Events and Refinery Process Equipment

Two main air quality priorities related to refinery emissions were identified by the Wilmington, Carson, West Long Beach Community Steering Committee (CSC): (1) emissions from flaring events, and (2) emissions and leaks from refining process equipment and storage tanks. To address these priorities, the CSC has identified the potential need for additional regulation that requires more stringent air pollution controls on refinery process equipment and flaring, and an improved process for notifying the public of refinery flaring events and associated air emissions. Details for these actions are described below.

Figure 5b-2. A photograph of a flaring event at a refinery



Rule 1118 – Control of Emissions from Refinery Flares,<sup>1</sup> requires refineries to notify South Coast AQMD of all flaring events above a specified threshold. The CSC identified ways to improve the notification process for Rule 1118 and the need for additional information that would be important to community members during flaring events. For example, providing real-time air quality information could help community members make more informed decisions about outdoor activities during these events (e.g., outdoor exercise, etc.) to reduce exposure to emissions from these sources.

South Coast AQMD regulates emissions from refinery processes, including major process units, storage tanks, boilers and heaters. The CSC recommended more stringent requirements for refineries through implementing Best Available Retrofit Control Technology (BARCT) and other command-and-control regulations. The CSC has noted emissions from boilers, heaters, and storage tanks (i.e., fugitive emissions leaks) as a priority.

#### Ongoing Efforts

Ongoing rule development and air monitoring efforts by South Coast AQMD will help address some of these air quality priorities in the Wilmington, Carson, West Long Beach community. For example, South Coast AQMD staff is developing Proposed Rule 1109.1 – Reduction of Emissions of Oxides of Nitrogen from Refinery Equipment.<sup>2</sup> In the rule development process for Proposed Rule 1109.1, South Coast AQMD staff is working with stakeholders to evaluate BARCT to further reduce emissions from refinery equipment (e.g., boilers, heaters, coke calciners, fluid catalytic cracking units, gas turbines), provided they are technologically feasible and cost-effective. The proposed rule may also incorporate emission limits to further reduce emissions.

Another example of ongoing efforts, is the implementation of Rule 1118 – Control of Emissions from Refinery Flares. Rule 1118 requires refineries and related facilities to notify the South Coast AQMD about flaring events that exceed specified limits. These notifications are part of the Flaring Event Notification System (FENS). FENS is being updated to include a user-friendly map identifying current flaring events, and to provide information regarding any upcoming and past flaring events.

Additionally, Rule 1180 – Refinery Fenceline and Community Air Monitoring,<sup>3</sup> requires petroleum refineries to conduct real-time fenceline air monitoring and provide fees to fund refinery-adjacent community air monitoring systems. These air monitoring systems will provide nearby communities with real-time air quality data for the most important pollutants that are associated with refineries. Information from these systems can also be used by refineries to identify and resolve potential leaks more quickly. Additional information on refinery fenceline and community monitoring through Rule 1180, including the monitoring plans, can be found on the South Coast AQMD’s website: <https://www.aqmd.gov/home/rules-compliance/rules/support-documents/rule-1180-refinery-fenceline-monitoring-plans>.

### Opportunities for Action

In addition to the ongoing rule development and air monitoring efforts described in this chapter, the CSC identified specific actions to address community priorities related to petroleum refineries. The actions are described below.

<b>Action 1: Improve Refinery Flaring Notifications</b>
<b>Course of Action:</b>
<ul style="list-style-type: none"> <li>• Work with stakeholders, including the CSC, to gather input on identifying specific fields to include in the notifications (e.g., access to fenceline and community monitoring data, and ways to reduce exposure to flaring emissions)</li> <li>• Work with local public health departments to develop informational outreach materials for the community to describe the risks posed by emissions from refinery flaring, and how to reduce exposures</li> <li>• Hold workshops in the community to provide training on how to use these notification systems</li> <li>• Provide flare emissions data in a user-friendly format on South Coast AQMD’s website and/or the mobile app</li> <li>• Collaborate with the CSC (e.g., community-based organizations and others) on community air monitoring efforts</li> </ul>
<b>Strategies:</b>
<ul style="list-style-type: none"> <li>• Public Information and Outreach</li> <li>• Collaboration</li> </ul>
<b>Goals:</b>
<ul style="list-style-type: none"> <li>• Work with stakeholders to gather input on fields to incorporate into flare notifications</li> <li>• Develop informational public health outreach materials that provide guidance on reducing exposure to refinery flaring emissions</li> <li>• Implement flare notification improvements</li> <li>• Hold community workshops to provide training on how to use notification systems</li> <li>• Provide quarterly or biannual updates to the CSC on progress</li> </ul>
<b>Estimated Timeline:</b>

<ul style="list-style-type: none"> <li>• First quarter of 2020, initiate process to work with the California Energy Commission (CEC) and other stakeholders, on additional improvements to refinery flaring notifications</li> <li>• Second quarter of 2020, initiate process to work with the local public health departments to develop outreach materials</li> <li>• Third quarter of 2020, begin providing quarterly or biannual updates to CSC on efforts on refinery flaring event notifications</li> <li>• 2021, hold community workshops to provide training on how to use the notification system</li> <li>• Second half of 2019, provide a summary of flare emissions data from the Rule 1118 quarterly reports</li> <li>• Continue collaborating with CSC on community air monitoring</li> </ul>	
<b>Implementing Agency, Organization, Business or Other Entity:</b>	
<b>Name:</b>	<b>Responsibilities:</b>
South Coast AQMD	<ul style="list-style-type: none"> <li>• Improve flaring event notifications for the public, host community workshops for training on updated notification system</li> <li>• Provide informational outreach for materials developed with Departments of Public Health</li> <li>• Provide summaries of flare emissions data from the Rule 1118 quarterly reports</li> </ul>
Los Angeles Department of Public Health	Collaborate with South Coast AQMD to develop outreach materials for communities to distribute at key locations, such as schools, civic and activity centers
Long Beach Department of Public Health	Collaborate with South Coast AQMD to develop outreach materials for communities to distribute at key locations, such as schools, civic and activity centers
CSC Members	Conduct community air monitoring that is complementary to South Coast AQMD community monitoring efforts
<b>Additional Information:</b>	
Requirements for 1118 (Refinery Flaring Activities): <a href="http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1118.pdf">http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1118.pdf</a>	

<b>Action 2: Conduct Refinery Monitoring to Identify and Address VOC Leaks</b>
<b>Course of Action:</b>
<ul style="list-style-type: none"> <li>• Conduct mobile monitoring in and around refineries and use monitoring results to identify potential leaks</li> <li>• Explore opportunities to develop enhanced leak detection and repair (e.g., Smart Leak Detection and Repair (LDAR)) programs</li> </ul>

<ul style="list-style-type: none"> <li>• Follow-up with inspections, as needed</li> </ul>	
<b>Strategies:</b>	
<ul style="list-style-type: none"> <li>• Monitoring</li> <li>• Enforcement</li> </ul>	
<b>Goals:</b>	
<ul style="list-style-type: none"> <li>• Begin initial mobile monitoring at each of the eight facilities (petroleum refineries and related facilities, as noted in Table 5b-1 above) in Summer 2019, and conduct periodic mobile monitoring at these facilities</li> <li>• Establish Smart LDAR techniques to identify, quantify, and locate leaks in real-time allowing for faster repair</li> <li>• Conduct follow-up inspections on an as-needed basis</li> <li>• Provide quarterly or biannual updates to the CSC on progress</li> </ul>	
<b>Estimated Timeline:</b>	
<ul style="list-style-type: none"> <li>• Summer 2019, begin mobile monitoring at refineries, and conduct follow-up inspections as needed</li> <li>• Third quarter of 2019, begin providing quarterly or biannual updates to CSC on refinery monitoring efforts to identify and address VOC leaks</li> <li>• First quarter of 2020,               <ul style="list-style-type: none"> <li>– Begin evaluating Rule 1180 monitoring results</li> <li>– If data suggest persistent elevated levels, conduct on-site refinery monitoring and equipment compliance inspections, and take enforcement actions where appropriate</li> <li>– Identify whether Rule 1180 fenceline or community monitoring locations need to be modified to capture air pollution levels in critical areas</li> </ul> </li> <li>• Explore Smart LDAR technologies and programs</li> </ul>	
<b>Implementing Agency, Organization, Business or Other Entity:</b>	
<b>Name:</b>	<b>Responsibilities:</b>
South Coast AQMD	Conduct mobile monitoring, evaluate data, evaluate Smart LDAR, and conduct follow-up inspections as needed, and enforcement action where appropriate
Refineries and related plants (see Figure 5b-1)	<ul style="list-style-type: none"> <li>• Work with South Coast AQMD staff to develop protocols (e.g., safety protocols) to conduct monitoring (e.g., mobile monitoring) inside refineries and related plants, if fenceline or community monitoring systems show ongoing elevated emissions levels</li> <li>• Work with South Coast AQMD on enhanced leak detection and repair programs</li> </ul>
<b>Additional Information:</b>	
<ul style="list-style-type: none"> <li>• Requirements for 1180 (Refinery Fenceline and Community Monitoring): <a href="http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1180.pdf">http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1180.pdf</a></li> </ul>	

- Optical Remote Sensing pilot project: [http://www.aqmd.gov/docs/default-source/fenceline\\_monitoring/project\\_2/fluxsense\\_project2\\_2015\\_final\\_report.pdf?sfvrsn=6](http://www.aqmd.gov/docs/default-source/fenceline_monitoring/project_2/fluxsense_project2_2015_final_report.pdf?sfvrsn=6)
- Smart Leak Detection and Repair: <http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/appendix-iv-a.pdf>

### Action 3: Evaluate and Require Methods to Reduce Refinery Flaring Emissions through Amendments to Rule 1118

#### Course of Action:

- Evaluate additional methods and practices to further reduce flaring events, including the consideration of existing scoping documents submitted for Rule 1118 requirements
- Amend Rule 1118 to further reduce flaring. Examples of additional requirements that could be considered are:
  - Increased penalties or mitigation fees
  - Increased capacity of vapor recovery systems
  - Back-up power systems
  - Lower-emission flare technologies
- Develop an improved system for refineries to submit flare emission data, to be able to display data on South Coast AQMD's webpage for easy user access
- Emission Reduction Target: reduce flaring by 50%, if feasible

#### Strategies:

- Rules and Regulations

#### Goals:

- If determined to be feasible, reduce refinery flaring emissions by at least 50%

#### Estimated Timeline:

- First half of 2020, initiate rule development activities and hold first working group meeting

#### Implementing Agency, Organization, Business or Other Entity:

Name:	Responsibilities:
South Coast AQMD	<ul style="list-style-type: none"> <li>• Evaluate the feasibility of requirements to reduce emissions from refinery flaring</li> <li>• Conduct rule development</li> </ul>
CSC Members	Participate in the South Coast AQMD rule development process (e.g., attending working group meetings, providing comments on draft rule materials, etc.)

#### Additional Information:

Requirements for Rule 1118 (Refinery Flaring Activities):  
<http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1118.pdf>

### Action 4: Initiate Rule Development to Amend Rule 1178 – Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities

#### Course of Action:

- Evaluate feasibility to improve leak detection and repair (LDAR) programs for storage tanks at refineries through amendments to Rule 1178
- Explore opportunities to incorporate new, advanced tools to modernize and improve LDAR programs for storage tanks at refineries

#### Strategies:

- Rules and Regulations

#### Goals:

- Amend Rule 1178 to improve LDAR programs to further reduce emissions from storage tanks at refineries

#### Estimated Timeline:

- 2021, initiate rule development for Rule 1178 and hold the first working group meeting

#### Implementing Agency, Organization, Business or Other Entity:

##### Name:

South Coast AQMD

##### Responsibilities:

- Evaluate the feasibility of requirements to reduce fugitive emissions from storage tanks at refineries
- Conduct rule development

CSC Members

Participate in the South Coast AQMD rule development process (e.g., attending working group meetings, providing comments on draft rule materials, etc.)

#### Additional Information:

Requirements for Rule 1178 (Storage Tanks at Petroleum Facilities):  
<http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1178.pdf>

## References

1. South Coast AQMD, Rule 1118 - Control of Emissions from Refinery Flares, 7 July 2017, <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1118.pdf>, Accessed May 2019.



2. South Coast AQMD, Proposed Rule 1109.1 - Reduction of Emissions of Oxides of Nitrogen from Refinery Equipment, 2020, <http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules#1109.1>, Accessed May 2019.
3. South Coast AQMD, Rule 1180 - Refinery Fenceline and Community Air Monitoring, 1 December 2017, <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1180.pdf>, Accessed May 2019.

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