

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report

Proposed Amended Rule 1118 – Control of Emissions from Refinery Flares

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EXECUTIVE SUMMARY

In recent years several incidents at some refineries, including offsite power disruptions and onsite process unit breakdowns, resulted in subsequent flaring events and increased emissions. These recent significant flaring events at some refineries have resulted in increased public concern over the potential air quality impact of flaring emissions. Flaring activities have been conducted as a safety measure to relieve pressure in process units that are temporarily not operating within design parameters. Flaring also commonly occurs through routine activities such as planned start-ups/shut-downs of process units and facility turnarounds.

In 2012 US EPA initiated a review of its Refinery Regulations, New Source Performance Standards (NSPS), and National Emission Standards for Hazardous Air Pollutants (NESHAP) and Maximum Achievable Control Technology (MACT) I and MACT II regulations for refinery process units and ancillary equipment operations, including flare operations. The review resulted in a Final Refinery Sector Rule released in December 2015. These updated federal requirements for flaring focus on reducing significant flaring events, and ensuring that when flaring does occur, combustion is as efficient as possible in order to reduce emissions. Based on recent studies, in December 2016 EPA also revised its AP-42 guidance for estimating Volatile Organic Compound (VOC) emissions from flaring, increasing the emission factor about 10-fold.

Staff is proposing to amend Rule 1118 in two phases. Proposed amendments presented in this staff report represent the first phase, while the second phase of rulemaking is expected to begin in 2018. In this first phase for Proposed Amended Rule 1118, staff is recommending to:

1. Harmonize Rule 1118 with key updates from US EPA's recent Refinery Sector Rule update regarding flares, including new prohibitions on some types of flaring,
2. Require facilities subject to Rule 1118 to prepare a Scoping Document that evaluates the feasibility of eliminating all planned flaring events,
3. Remove the \$4 million annual cap on mitigation fees that facilities may pay for flaring,
4. Update the VOC emission factor based on EPA's updated AP-42 guidance, and
5. Update and clarify reporting requirements for facilities.

Concurrently, but separate from the first phase of amendments, staff proposes to initiate a Pilot Study of optical remote sensing technologies that can monitor flaring emissions at their release point above the flare tip.

In the second phase of rulemaking, staff is proposing to use the information from Scoping Documents provided by facilities, the updated reporting requirements, and the optical remote sensing Pilot Study to develop a more comprehensive update to Rule 1118, though concepts for this second phase have not yet been developed.

BACKGROUND

Introduction

In recent years several incidents at some refineries, including offsite power disruptions and onsite process unit breakdowns, resulted in subsequent flaring events and increased emissions, impacting neighboring communities. The amount of flaring that has occurred in recent years has varied, with some refineries flaring more than others (described further below). Whether from unplanned events like external power disruptions or onsite emergencies, or from planned events like refinery turnarounds, flaring occurs when the Flare Gas Recovery (FGR) system is unable to handle the amount or type of gases being directed into that system at that time. Vent gases generated during the refining process (typically hydrocarbons) are often sent to the FGR system, where they are recovered by injecting them into the refinery's fuel gas system for use in other processes, such as fuel for a steam boiler. However, if the amount of gas coming into the FGR system is higher than the capacity of that system, for example higher than the gas compressor capacity of the FGR system, then the extra gas is discharged into the atmosphere at the flare tip to avoid any unsafe over-pressurization. These gases are then combusted at the flare tip to reduce emissions and the potential buildup of combustible gases. While this simplified explanation describes why flaring occurs, individual flaring events all have their own unique cause and each refinery has varying abilities to prevent and/or handle flaring due to the complexity of each refinery.

All refineries in the SCAQMD have FGR systems, partially as a result of Rule 1118, and the amount of flaring has been reduced since the last amendment to the rule in 2005. However, some refineries continue to experience thousands of individual flaring events each year. While most events have only a minor release of emissions, some are significant events that result in substantial emissions of many pollutants, along with dark plumes of smoke. Proposed Amended Rule (PAR) 1118 seeks to build upon the improvements that refineries have made, and reduce flaring even further. This rulemaking effort consists of a phased approach, where Phase I includes mechanisms to gather more information, makes some adjustments to the rule to be consistent with federal requirements (described below). Phase II of the rulemaking will begin in 2018 and will act upon the information gathered from Phase I, and will seek more comprehensive changes to the rule.

The amendments being sought in Phase I include:

1. Harmonize Rule 1118 with key updates from US EPA's recent Refinery Sector Rule update regarding flares, including new prohibitions on some types of flaring,
2. Require facilities subject to Rule 1118 to prepare a Scoping Document that evaluates the feasibility of eliminating all planned flaring events,
3. Remove the \$4 million annual cap on mitigation fees that facilities may pay for flaring,
4. Update the VOC emission factor based on EPA's updated AP-42 guidance, and
5. Update and clarify reporting requirements for facilities.

Each of these proposed amendments is described in more detail below. In addition to these rule amendments, staff is proposing to initiate an optical remote sensing Pilot Study to

evaluate the viability of emerging technologies' ability to monitor emissions above the flare tip.

Flaring Emissions

The types of petroleum refinery operations subject to this rule are petroleum refineries, sulfur recovery plants that recover sulfur compounds from sour water generated by petroleum refineries and hydrogen production plants that produce hydrogen from refinery gas and supply hydrogen for petroleum refinery operations that operate a gas flare. The gas flares are used for the combustion and disposal of combustible gases due to emergency relief, overpressure, process upsets, startups, shutdowns and other operational and safety reasons. Presently, there are eight operating petroleum refineries, one sulfur recovery plant and three hydrogen production plants with a total of 31 existing flares affected by this proposed rule.

Facilities Subject to Rule 1118

Facility Name	Number of Flares
Air Liquide	1
Air Products Carson	1
Air Products Wilmington	1
Chevron Products Company	6
Paramount Petroleum	1
Phillips 66 Carson	2
Phillips 66 Wilmington	4
Tesoro Carson	5
Tesoro Wilmington	2
Tesoro Sulfur Recovery Plant	1
Torrance Refinery	3
Ultramar/Valero	4
12 Facilities	31 Flares

Under the existing Rule 1118, facilities subject to the rule must report their flaring emissions by category every quarter to SCAQMD. Rule 1118 requires facilities to classify all flaring events using one of the categories listed in the box below.

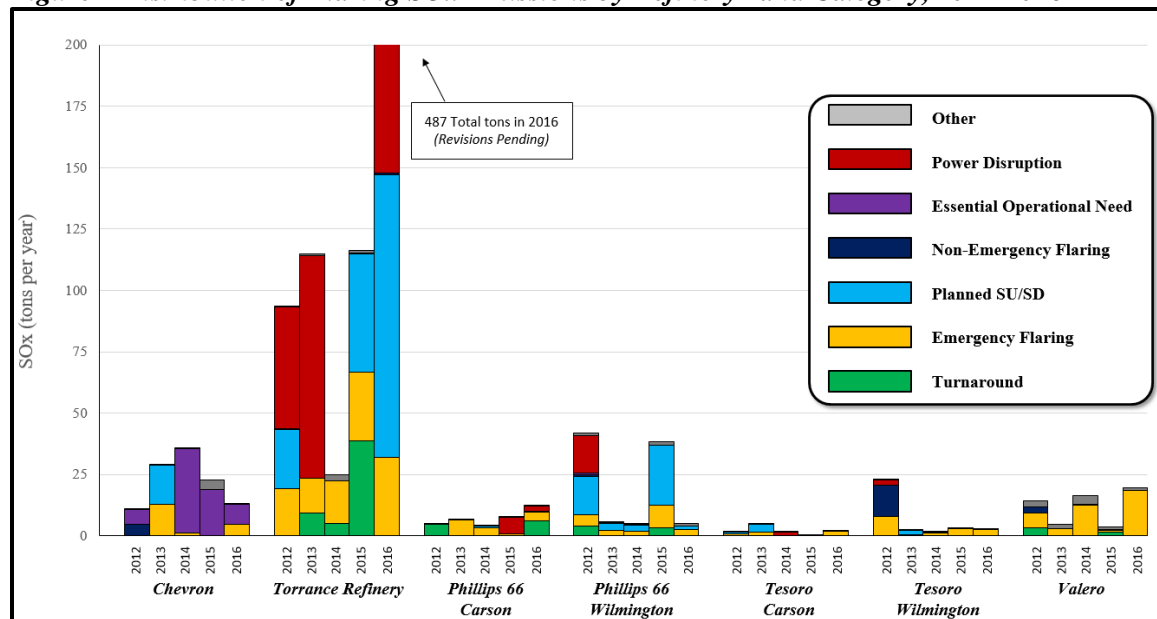
Categories of Flaring	
Turnarounds	Essential Operational Need (EON) –
Planned Maintenance	Clean Service Stream
Planned Start-up / Shut-down (SU/SD)	EON – Intermittent Minor Venting
Emergency Flaring	EON – Pressure/Temperature Excursion
Non-Emergency Flaring	EON – Relief Valve Leakage
Minor Venting (<5,000 standard cubic feet)	EON – Temporary Fuel Gas Imbalance
Undetermined / Other	EON – Unrecoverable Stream
Force Majeure (power disruption, natural disaster, acts of war/terrorism)	

In addition to the category of flaring each facility must report the following information for each flaring event: criteria pollutant emissions (including sulfur oxides [SO_x], volatile organic compounds [VOC], particulate matter [PM], carbon monoxide [CO]), the start and end time of the event, the heating value of the vent gas, the total vent gas flow, and which flare was used.

SO_x Emissions

Although there have been nearly 59,000 reported flaring events between 2012-2016, about 44% of the total SO_x emissions (506 tons of SO_x out of a total of 1,158 tons) have been reported from 13 power disruption events. All other remaining events have resulted in 652 tons of emitted SO_x. Of these ~59,000 non-power disruption events, approximately 96% of the total SO_x emitted from flaring has come from the top 1% of flaring events. Further, 62% of all SO_x has come from the top 50 non-power disruption flaring events. This distribution of emissions data indicates that while flaring is a common occurrence, the bulk of flaring emissions come from just a small number of high emitting events. Figure 1 provides a more detailed distribution of SO_x emissions caused by flaring at each facility since 2012.

Figure 1 Distribution of Flaring SOx Emissions by Refinery* and Category, 2012-2016

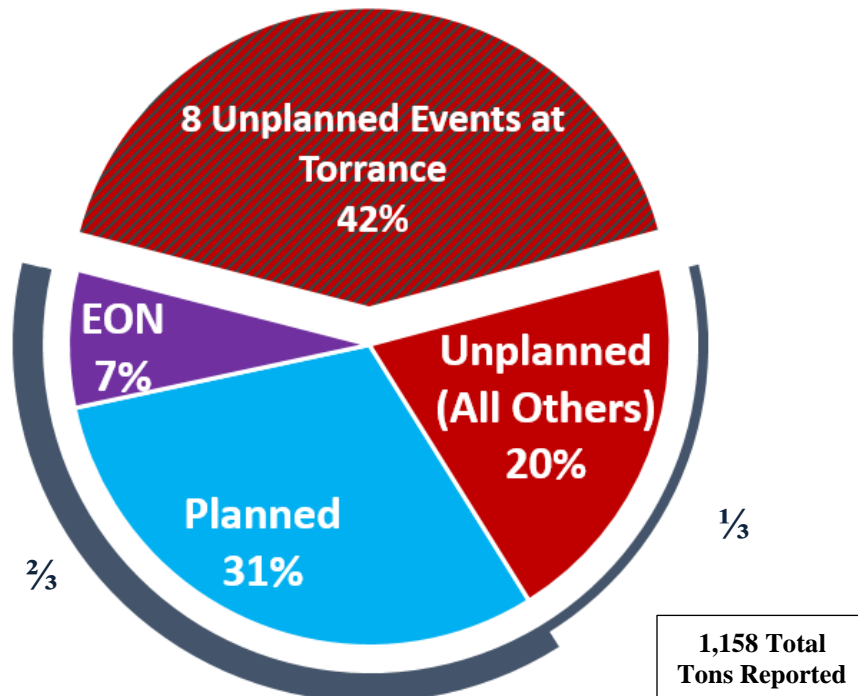


*Five other facilities subject to Rule 1118 emitted <1.0 tons of SOx cumulatively between 2012-2016

As illustrated in this chart, flaring emissions are not uniform, with emissions varying by year, category, and facility. Outside of emissions from external power disruptions, the largest source of flaring is from planned events, such as planned start-ups/shutdowns, and turnarounds. The pie chart in Figure 2 below illustrates the cumulative total SOx emissions from flaring, using simplified categories. As seen in Figure 2, a significant portion of the emissions is reported from eight individual power disruption events at Torrance Refinery.¹ Outside of these eight events, planned flaring events and essential operational needs (e.g., from flaring of gases that are incompatible with the fuel gas system) make up two-thirds of the remaining emissions.

¹ Torrance Refinery has submitted a draft revised estimate of their 2016 reported emissions which would reduce the estimated emissions if approved by SCAQMD.

Figure 2 Total SOx Flaring Emissions from 2012-2016 from All Rule 1118 Facilities



Torrance Refinery Flaring

The significant flaring that has occurred at the Torrance Refinery (previously ExxonMobil) recently from power disruptions was recently addressed in February 2017 through a Stipulated Order for Abatement with the SCAQMD Hearing Board.² This order, agreed to by Torrance Refinery, requires the facility to:

- Provide information regarding its plan to upgrade its power connection with the local electrical utility to a direct 220 kV connection, and conduct public outreach regarding the plan;
- Evaluate a temporary supply of steam to its flares that would be available during power outages;
- Evaluate the critical onsite utility systems (e.g., steam, nitrogen) that may need upgrading in case of power outages, and install all feasible upgrades within one year after receiving a permit or during the next facility turnaround;
- Evaluate all safety critical devices to determine which do not have backup power supply, and install backup within one year of receiving a permit or during the next facility turnaround;
- Conduct refresher training on refinery procedures during a power outage

² Available here: <http://www.aqmd.gov/docs/default-source/compliance/Torrance-Refinery/stipulated-order-for-abatement-torrance-refinery-215-216-2017.pdf>

SOx Mitigation Fund

Under Rule 1118, facilities must pay a Mitigation Fee if their SOx emissions exceed a Performance Target. The current version of Rule 1118 set a progressively declining Performance Target that began at 1.5 tons per million barrels of crude processing capacity³ (tons/mmbbl) in 2006, and was reduced to its current level of 0.5 tons/mmbbl by 2012. All flaring emissions with the exception of those occurring from Force Majeure events (such as power disruptions) are subject to this fee. The fee level is set at:

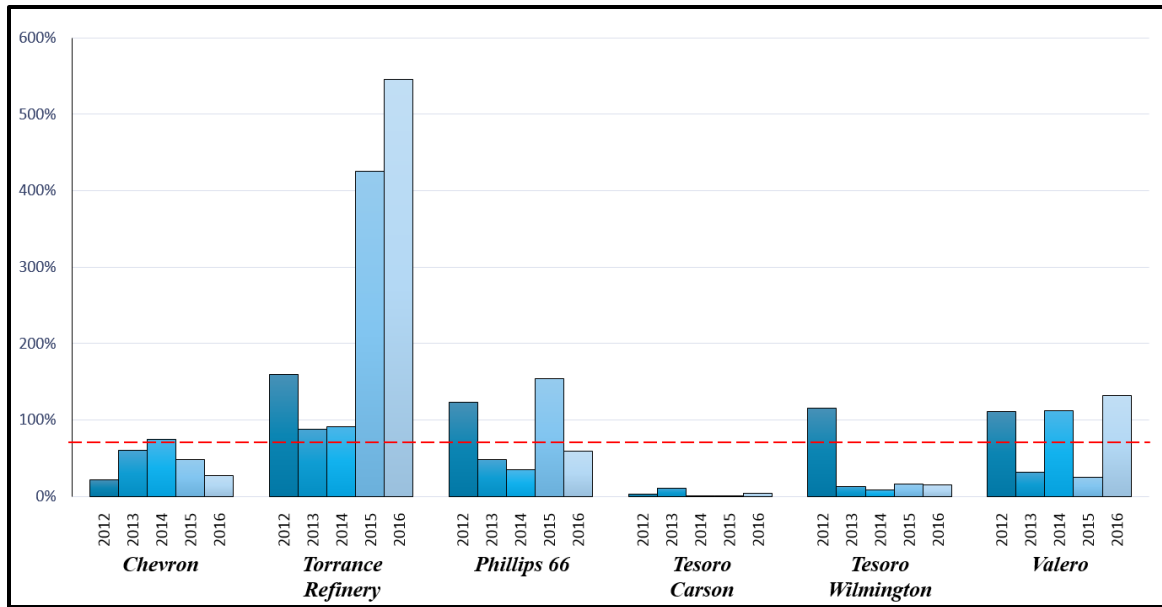
- \$25,000 per ton up to 10% over the Performance Target
- \$50,000 per ton between 10% and 20% over the Performance Target
- \$100,000 per ton when 20%+ of the Performance Target
- With an annual cap of \$4,000,000 per year

The chart in Figure 3 below illustrates each facility's SOx emissions relative to its performance cap between 2012-2016. To date, approximately \$22.5 million has been deposited into a Mitigation Fund held by SCAQMD, with about 85% of this amount collected over the past three years, and more than three quarters collected from Torrance Refinery. This mitigation fund can only be spent with authorization from the SCAQMD Governing Board. A program for spending these mitigation fees will be developed outside of this rulemaking process.

The lowering of the performance targets from 2006 to 2012 has led to an increased number of exceedances of the Performance Targets in recent years. Four facilities have exceeded their targets a total of 8 times since 2012, as shown in the chart below. Note that target exceedances in 2016 for two facilities are not yet final as estimates are still being reviewed by SCAQMD staff. The most significant exceedances have been reported by the Torrance Refinery. The 2012 exceedance was due to the identification of a bypass around the flare vent gas flowmeter in 2013 that meant the facility had been under-reporting their emissions, and was required to nearly double their reported emissions for 2012. This problem was corrected in 2013. The Torrance Refinery's second exceedance occurred in 2015, when an explosion in the ESP unit caused a shutdown (for the next ~12 months) of the Fluid Catalytic Cracking (FCC) unit. The remainder of the refinery was able to operate only at a low capacity for the remainder of the year, and multiple units were shut down for maintenance throughout that year. These two periods of flaring by Torrance Refinery are the only times that a facility has reached the annual cap of \$4,000,000.

³ Based on calendar year 2004 crude processing capacity.

Figure 3 Flaring SOx Emissions as a Percentage of Annual Performance Target

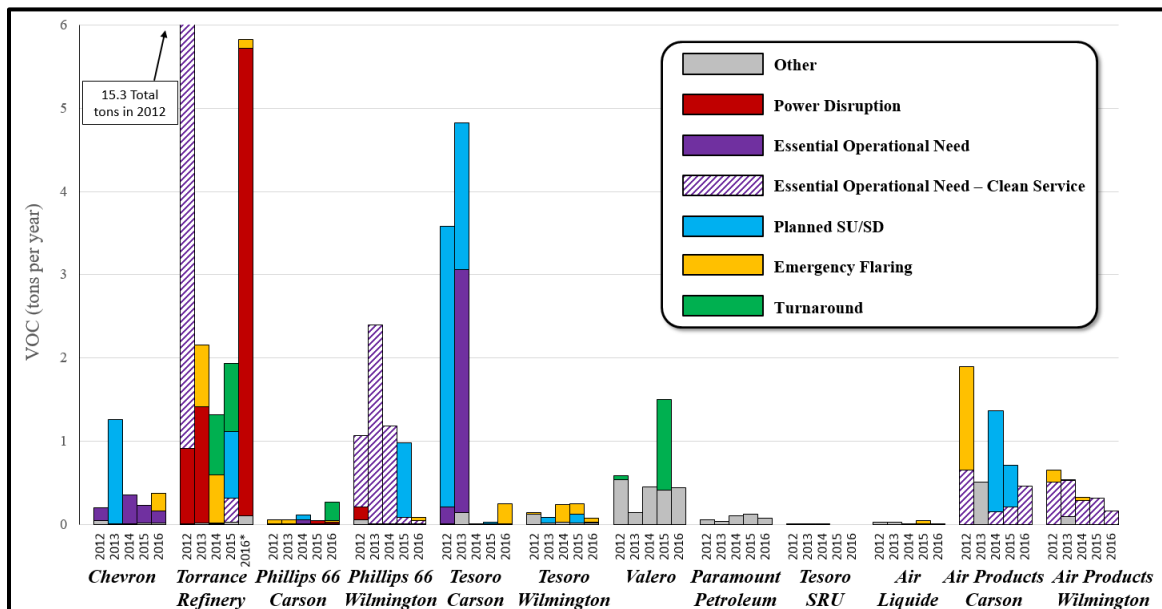


*Torrance Refinery has submitted a revision request for 2016 emissions

VOC Emissions

Although SOx emissions are used as the basis for paying mitigation fees under Rule 1118, there are other pollutants that are also emitted, including VOCs. While fees are not paid into the Rule 1118 Mitigation Fund for VOC emissions, facilities must pay annual emissions fees under Rule 301 for all flaring emissions, including those occurring under Force Majeure. Because some flaring of vent gases contain low levels of sulfur (such as clean service streams like natural gas or butane), the distribution of emissions among facilities shown below is different than that for SOx.

Figure 4 Distribution of Flaring VOC Emissions by Refinery and Category, 2012-2016



*Torrance Refinery has submitted a revision request for 2016 emissions

As seen in the chart above, some of the facilities subject to Rule 1118 that are not large refineries also emit VOCs at a similar level as some large refineries, largely due to their flaring of clean service streams, either as an Essential Operational Need, or through other flaring events.

Flaring Destruction Efficiency

A key factor in determining the amount of VOCs emitted during flaring events is the destruction efficiency of the combustion. The vent gases being released at the flare tip may be composed partially or entirely of VOCs. If the VOCs in the vent gas is entirely combusted with 100% efficiency at the flare tip (i.e. 100% combustion efficiency), then the only byproducts would be carbon dioxide and water (vapor). Similarly, the destruction efficiency is the percentage of a specific pollutant in the flare vent gas that is converted to a different compound (such as carbon dioxide, carbon monoxide, or other hydrocarbon intermediate). The destruction efficiency is higher than the combustion efficiency, though it is generally estimated that a combustion efficiency of 96.5% is equivalent to a destruction efficiency of 98%.

Estimated VOC Emissions from Flaring

EPA recently conducted a review of flaring⁴ emissions and found that several factors could affect destruction efficiency, such as the amount of steam or air injected into the flare combustion zone (i.e. steam or air assist), the heating value of the flare gas, and the rate of flare gas discharge. Each of these factors ultimately affect the net heating value of the gases in the combustion zone (measured in millions of British Thermal Units [mmBTU]). If the net heating value of the combustion zone gases is too low, then the destruction efficiency is reduced and a larger amount of VOCs is released into the atmosphere.

As part of this review of flaring emissions, EPA updated its AP-42 emissions guidance for VOC. The current VOC emission factor in Rule 1118 is based on the AP-42 Total Hydrocarbon (THC) emission factor of 0.14 pounds per mmBTU, with an assumption that 55% of the THC is methane⁵, yielding a final emission factor of 0.063 pounds VOC per mmBTU. Based on a review of more recent studies, the updated AP-42 guidance provides an updated VOC emission factor and states that “[t]he THC emissions factor may not be appropriate for reporting VOC emissions when a VOC emissions factor exists”. The updated AP-42 emission factor applies to “well-operated flares achieving at least 98% destruction efficiency” and is now 0.66 pounds VOC per mmBTU.

⁴ Table 13.5-2 in EPA AP-42 (2016) Chapter 13.5

https://www3.epa.gov/ttn/chief/ap42/ch13/final/C13S05_12-13-16.pdf

⁵ See page 13.5-5 in EPA AP-42 (1995) Chapter 13.5

https://www3.epa.gov/ttn/chief/ap42/oldeditions/5th_edition/ap42_5thed_orig.pdf

SCOPING DOCUMENT TO EVALUATE POTENTIAL ELIMINATION OF PLANNED FLARING

As shown in Figure 2 above, emissions from Planned Events and Essential Operational Needs make up about two thirds of total SO_x flaring emissions, outside of eight large flaring events reported from Torrance Refinery. Of this two thirds, the majority is from Planned Flaring Events such as start-ups, shut-downs, and turnarounds. There are many potential ways to reduce flaring from Planned Events, such as:

- Increasing the capacity of the Flare Gas Recovery and Treatment System.
- Ensuring that when excess flare gases are produced that could be diverted into the refinery fuel gas system, that there are consumers of this fuel at the time (e.g., boilers, heaters, cogeneration units).
- Taking longer periods of time to start-up and shut-down process units, for example through slower vessel depressurization.
- Reviewing and revising refinery processes/procedures before Planned Events occur to reduce flaring.

Because facility operators know their processes best, staff is proposing to require facility operators to conduct an evaluation of two alternatives to eliminate Planned Flaring Events. In addition to evaluating the elimination of Planned Flaring, facility operators must also present an analysis of how to reduce emissions from Planned Flaring Events to much lower levels than is currently required by the rule, such as 0.1 and 0.05 tons of SO_x per million barrels of crude processing capacity (tons/mmbbl). Table 1 below shows the distribution of the number of times that facilities have met or surpassed targets of 0.25, 0.1, and 0.05 tons/mmbbl between 2012 and 2016, based on reported emissions. The only threshold that facilities must meet currently in Rule 1118 is 0.5 tons/mmbbl, beyond which they must pay Mitigation Fees.

Table 1 Number of Times Planned Flaring SO_x Emissions in Specified Range, 2012-2016

Facility	>0.25	0.1 - 0.25	0.05 - 0.1	<0.05
	(tons/mmbbl)			
Chevron	1	3	1	0
Torrance Refinery*	3	2	0	0
Phillips 66	2	1	2	0
Tesoro – Carson	0	0	0	5
Tesoro – Wilmington	1	0	1	3
Valero	1	2	1	1

**Torrance Refinery has submitted a revision request for 2016 emissions*

Staff is proposing to review the results of these Scoping Documents (potentially with the assistance of a technical consultant with expertise in refinery processes) and to evaluate further potential amendments that could be made to Rule 1118.

REGULATORY HISTORY

SCAQMD Rule 1118

On February 13, 1998, the SCAQMD Governing Board adopted Rule 1118 with the purpose of monitoring, recording and reporting data on refinery and related flaring operations. Upon rule adoption, the AQMD Board passed a resolution directing staff to a) collect and analyze the data submitted by subject facilities and determine if flare emissions are significant, and b) recommend whether further controls are needed.

After evaluating the data submitted to the SCAQMD from October 1, 1999 through December 31, 2003, staff compiled the “Evaluation Report on Emissions from Flaring Operations at Refineries”, which was presented to the SCAQMD Governing Board on September 3, 2004. The report concluded that, although refineries had made important progress in reducing emissions since the rule was adopted, flare emissions, especially sulfur dioxide, were significant. The report recommended amending Rule 1118 to reduce emissions by minimizing flaring, treating flare vent gases and by refining the monitoring, reporting and emission calculation methodology in order to improve the data accuracy.

On November 4, 2005, the SCAQMD Governing Board amended Rule 1118 by requiring subject facilities to minimize or eliminate routine flaring from oil refining operations and by establishing facility specific sulfur dioxide annual emission performance targets. Facilities exceeding the annual emission targets pay mitigation fees and submit a Flare Minimization Plan to the District for approval, subject to public review. The amended rule also mandates the use of continuous emission monitor systems (CEMS) for total sulfur and higher heating value of the vent gases combusted in flares in addition to monitoring vent gas flow. The amended rule also enacted enhanced monitoring, recordkeeping and reporting for flares at subject facilities.

As a result of all of these rule requirements, sulfur dioxide emissions from flares have been reduced in line with the declining annual emission performance targets that were reduced from 1.5 tons/mmmbbl of crude capacity in 2006 to 0.5 tons/mmmbbl of crude capacity by 2012.

SCAQMD 2012 AIR QUALITY MANAGEMENT PLAN

In May of 2014, a Technical Support Document based on the 2012 AQMP Control Measure – Multiple Component Source (MCS)-03 included an evaluation of potential emissions from refinery process units during startups or shutdowns that typically occur during process unit turnarounds. MCS-03 was planned for implementation in two phases. Phase I would include collection and review of emission impacts and operational procedures. Evaluation of Phase I data would lead to Phase II, which would involve identifying potential improved operating procedures and controls. This phased approach identified in MCS-03 is consistent with the proposed phased approach in the current proposed rulemaking.

The Technology Support Document recommended increasing Rule 1118 (c)(3) Flare Minimization Options and requiring facilities to annually review and revise Flare

Minimization Plans to reduce flaring and flare emission during planned startup, shutdowns, and turnarounds. The Technology Support Document recommended amending Rule 1118 and requiring equipment upgrades and increased stringency in work practices and operational procedures to reduce flaring activity.

US EPA Regulations

The USEPA New Source Performance Standards (NSPS), under 40 CFR 60.18 – General Control Device Requirements, contains provisions for flare operations. The federal regulation requires flares to operate without visible emissions, to maintain a pilot flame present at all times the flare is in operation and observe certain limits for the net heating value and exit velocity of the gases being combusted. The regulation also requires monitoring of the flares to ensure that they are operated in compliance with these requirements.

In May 2007, USEPA promulgated a new regulation, 40CFR60 Subpart Ja - Standards of Performance for Petroleum Refineries for which Construction, Reconstruction or Modification Commenced After May 14, 2007, which contains additional requirements to Subpart J for flares, including requiring a Flare Management Plan and root cause analysis for flare events with emissions exceeding 500 lbs SO₂.

In December 2015, the EPA issued a final rule for the Petroleum Refinery Sector Risk and Technology Review, New Source Performance Standards (NSPS), and National Emission Standards for Hazardous Air Pollutants (NESHAP) that further control emissions from petroleum refineries and provide important information about refinery emissions to the public and neighboring communities. The final rule has many requirements for refineries, but relevant to flares it seeks to eliminate smoking flare emissions and ensure high destruction efficiency of flare gases when they are released. Most requirements of this rule take effect on January 30, 2019.

On February 1, 2016 the Refinery Sector Rule became effective. Following the promulgation of the final rule, the EPA received three separate petitions for reconsideration of certain provisions of the final rule, including some that pertain in a limited way to flaring such as certain recordkeeping requirements, and the designation of a single smokeless design capacity for a flare.⁶ These petitions are currently under review.

Work Practice Standards for Emergency Flaring

Well-operated flares used as air pollution control devices are expected to achieve a 98% Hazardous Air Pollutant (HAP) destruction efficiency. However, if vent gases being flared have insufficient heat capacity, or if the flare is not operated under appropriate conditions (e.g., over-steaming at the flare tip), EPA concluded that a 98% HAP destruction efficiency may not be achieved.

To ensure that the 98% HAP destruction efficiency was being met, EPA revised the NSPS, NESHAP, and MACT regulations to include two work practice standards for

⁶ See the following link for further information regarding EPA's rule and the petitions for amendment.
www.epa.gov/stationary-sources-air-pollution/petroleum-refinery-sector-risk-and-technology-review-and-new-source

flaring. The first work practice standard requires that flares operate with a continuously-lit pilot flame at all times when gases are sent to the flare, that a minimum net heating value in the combustion zone be maintained while flaring, and that refineries conduct additional monitoring and recordkeeping of flare operations.

A second work practice standard was established for flaring that occurs above a flare's smokeless capacity. In addition to the requirements from the first work practice standard, a flare management plan must be prepared detailing how a facility will minimize flaring, flaring above a flare's smokeless capacity must meet visibility and flare tip velocity limits, and if these limits are exceeded a root cause analysis and corrective action must be conducted. Violations of this second work practice standard occur when the smokeless capacity is exceeded and visibility or flare tip velocity limits are exceeded if: 1) any exceedance was caused by operator error or poor maintenance, or 2) two exceedances occur in any three year period and the exceedances have the same root cause (outside of force majeure), or 3) three exceedances occur in any three year period for any root cause (outside of force majeure).

SUMMARY OF PROPOSED RULE AMENDMENTS

The following amendments are proposed to Rule 1118. Each of these proposed amendments would be considered by the Governing Board for adoption as part of this first phase of rulemaking. A second phase of rulemaking would act upon the information gained from these currently proposed amendments. At this time, no language or concepts have been proposed for the second phase of rulemaking.

a. Purpose and Applicability

No changes are proposed in this section.

b. Definitions

The proposed rule has the following definitions amended, removed, or added to:

- "Clean Service Flare" – Removed and replaced with a definition for "Clean Service Stream" as follows:
"CLEAN SERVICE STREAM is a gas stream such as natural gas, hydrogen gas and/or liquefied petroleum gas. Other gases with a fixed composition that inherently have a low sulfur content and are vented from specific equipment may be classified as clean service streams if determined to be equivalent and approved in writing by the Executive Officer."
- Emergency Service Flare – Removed
- Essential Operational Needs – Removed flaring due to relief valve leakage and intermittent minor venting
- Flare – Added two classifications of flares, "clean service" and "general service" as defined below:

“CLEAN SERVICE FLARE is a flare that is designed and configured by installation to combust only clean service streams.

GENERAL SERVICE FLARE is a flare that is not a Clean Service Flare.”

- Flare Events – Amended with some clarifying text and added a new provision that defines that multiple flaring episodes within a single day and attributable to the same cause are considered a single flare event:

“For flare events that can be attributed to the same process unit(s) or equipment and has more than one start and end within a 24 hour period, it shall be considered a continuation of the same event, and not a separate or unique event.”

- Flare Tip Velocity – Added

“FLARE TIP VELOCITY is the velocity of flare gases exiting a flare tip averaged over 15 minutes and calculated as the volumetric flow divided by the area of the flare tip.”

- General Service Flare – Removed

- Planned Flaring Event – Added

“PLANNED FLARING EVENT is any flaring as a result from process unit(s) startup, shutdown, turnaround, maintenance, and non-emergency flaring. Flaring from the planned startup of a process unit that is more than 24 hours after an unplanned shutdown of that same process unit shall be considered a Planned Flaring Event.”

- Sampling Flare Event – Amended to narrow the definition to include only clean service streams.

- Smokeless Capacity – Added

“SMOKELESS CAPACITY is the maximum vent gas flow rate or mass rate that a flare is designed to operate without visible emissions.”

c. Requirements

The proposed rule has the following requirements that have been amended.

- All references to effective dates that have already passed (e.g., January 2006) have been removed and replaced with general text requiring facilities to operate flares in the same manner, but without specifying an effective date.
- A new requirement has been added that within six months of a facility’s approval of a Flare Monitoring Plan, and no later than January 30, 2019, the net heating value of the combustion zone (NHV_{CZ}) during flaring must be at or above 270 mmBTU per standard cubic foot, averaged over a 15-minute period. This requirement is consistent with the USEPA NESHAP, except that earlier compliance is possible if a Flare Monitoring Plan is approved before July 30, 2018.
- Specific Cause Analyses currently are required for flare events that exceed certain thresholds, except for planned start-ups, shut-downs, and turnarounds. A provision has been added to require Specific Cause Analyses *“for any flare event resulting from non-*

standard operating procedure during a planned shutdown, planned startup or turnaround” to provide greater clarity about which events are subject to this requirement.

- Consistent with requirements in the USEPA NESHAP, a requirement has been added for petroleum refineries that requires Specific Cause Analyses when the smokeless capacity of the flare is exceeded and either the visibility or flare tip velocity limit is exceeded, with an effective date of January 30, 2019.
- The timeline for facilities to submit a Specific Cause Analysis has been removed from section (i) Notification and Reporting Requirements and added in this section. The ability for facilities to request an extension up to 30 days beyond the original 30-day submission date has also been shortened to 15 days, to be consistent with the 45-day period facilities are provided to submit a root cause analysis under the USEPA NESHAP.
- A new provisions has been added, consistent with the USEPA NESHAP that requires facilities to complete the corrective action identified in a Specific Cause Analysis within 45 days of the flare event or as soon as practicable.
- Consistent with requirements in the USEPA NESHAP, a requirement has been added for petroleum refineries that prohibits flaring above the smokeless capacity of the flare when either visibility or flare tip velocity limits are exceeded if:
 - A single flare event is caused by poor maintenance or operator error, or
 - Two flare events are found to have the same cause in any three year period as determined by a Specific Cause Analysis, or
 - Three flare events occur in any three year period from any cause.

The visibility limits already in Rule 1118 are consistent with USEPA NESHAP visibility limits, however this requirement has been expanded to also include the limits in SCAQMD Rule 401 as this visibility standard is also used for determining compliance by SCAQMD inspectors during flaring events.

- A new requirement has been added requiring facilities to submit a Scoping Document by January 31, 2018 that includes:
 - An analysis of two alternatives to reduce Planned Flaring Events for each of three annual performance targets. The three performance targets are 0.1, 0.05, and 0.0 tons of SO_x per million barrels of crude processing capacity. The Scoping Document must analyze the potential controls, technical feasibility, approximate cost, and timing constraints to implementing each of these alternatives by January 1, 2021.
 - An analysis of how a facility can reduce emissions from flare events caused by emergencies, with the exception of emergencies caused by natural disasters or acts of war or terrorism. The analysis shall include an evaluation of three alternatives that can be available by January 1, 2021 to avoid flare events from emergencies. Existing alternatives (such as flare gas recovery systems) may count towards the three alternative requirement.
 - A description of the components of the flare system. Some portions of this description were previously required as part of a Flare Minimization Plan, but

have now been moved into the Scoping Document, and added to in order to account for additional requirements in other parts of PAR 1118 (such as smokeless capacity).

- Requirements regarding the effective date to install flare gas recovery and treatment systems have been removed as all facilities subject to this provision have already installed these systems under the current version of the rule.

d. Performance Targets

Petroleum Refineries are required to reduce sulfur dioxide emissions from flares to less than 0.5 tons per million barrels of crude processing capacity averaged over one year. The proposed amended rule also removes outdated compliance deadlines and removes the Mitigation Fee annual cap of \$4,000,000.

e. Flare Minimization Plan

Minor clarifying text has been added, and one provision requiring a detailed process flow diagram has been moved to the requirements for a Scoping Document.

f. Flare Monitoring and Recording Plan Requirements

Outdated administrative deadlines and alternative sampling requirements have been removed and provisions requiring monitoring of steam assist systems have been added. A new Revised Flare Monitoring Plan submittal date of January 31, 2018 has also been added. This new submittal date will provide District staff time to review and approve the Flare Monitoring Plan before the implementation date imposed in the EPA NESHAP of January 30, 2019.

g. Operation, Monitoring, and Recording Requirements

Outdated deadlines, provisions regarding alternative sampling before existing analyzers had been installed, and tables have been removed and an update for steam monitoring has been added. New requirements have been added to install a monitoring system to continuously measure, calculate, and record the volumetric flow rate in the flare header that feeds the flare and also record the pilot gas, purge gas, and assist air or steam flow to each flare using an approved flow meter and calorimeter. A new requirement to calculate the net heating value of the combustion zone using data collected from the updated monitoring systems has been added, consistent with the EPA NESHAP. Video monitoring requirements have been updated to now require recording at no less than one frame per second, and at a resolution, angle, and distance suitable for visible emissions observations.

h. Recordkeeping Requirements

The requirement to keep video records for a minimum of 90 days has been updated to five years.

i. Notification and Reporting Requirements

Outdated administrative deadlines have been removed and references have been updated. A new requirement has been added to submit flaring notifications via the existing web-based Refinery Flaring Notification System, instead of via telephone. Notifications would also now be required for all emergency flare events and essential operational needs flaring events, with the exception of clean service streams. Facilities would now need to indicate if the flaring event being reported is over the existing threshold of 100 pounds of VOC, 500 pounds of SO_x, or 500,000 standard cubic feet of flared vent gas. Staff is proposing to maintain the thresholds used for the District's public notification regarding flare events. A new requirement has also been added for facilities to submit quarterly reports of data from new monitoring requirements in PAR 1118 and the EPA NESHAP as soon as it becomes available, or on January 30, 2019, whichever is earlier.

j. Testing and Monitoring Methods

Outdated administrative deadlines and sections have been removed and updated ASTM methods have been incorporated.

k. Exemption

A new exemption has been added so that events outside of the operator's control (i.e. external power disruptions, natural disasters, and acts of war/terrorism) do not count towards the new prohibitions listed in paragraph (c)(10). The (c)(10) prohibitions include the new 'three strikes' requirement imposed by the EPA NESHAP. This new exemption in PAR 1118 is also consistent with the requirements in the EPA NESHAP.

EXPECTED EMISSIONS IMPACT

PAR 1118 affects 31 flares at 12 facilities, all located in Los Angeles County. The proposed amendments to this rule will prohibit some smoking flaring events, which tend to produce the highest emissions from flaring. PAR 1118 also requires a minimum net heating value in the combustion zone, ensuring that when flaring does occur that the destruction efficiency should be at least 98%. These prohibitions and limitations are consistent with federal requirements.

An updated emission factor for VOCs that is about ten times higher than the previous emission factor will increase the emissions inventory for each facility, assuming that their flaring is not reduced by more than a factor of ten. Although the inventory will show an increase for VOC emissions, this is not a reflection of an expected increase in emissions, rather it is an improvement in the understanding of emissions from this source.

Consistent with the EPA Refinery Sector Rule, the PAR 1118 should also reduce emissions from all pollutants due to the new prohibitions on flaring events above the smokeless capacity, and the new limits on flare tip velocity below the smokeless capacity that are designed to improve combustion efficiency. The level of emissions reductions

cannot be quantified because there are new criteria and monitoring requirements used to determine the future level of emissions that were not utilized in previous estimates.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

Pursuant to the California Environmental Quality Act (CEQA) and SCAQMD Rule 110, the SCAQMD, as lead agency for the proposed project, has reviewed the proposed amendments to Rule 1118 pursuant to: 1) CEQA Guidelines § 15002(k) - General Concepts, the three-step process for deciding which document to prepare for a project subject to CEQA; and 2) CEQA Guidelines § 15061 - Review for Exemption, procedures for determining if a project is exempt from CEQA.

As provided in CEQA Guidelines § 15306 - Information Collection, the proposed project is exempt because it will consist of basic data collection, research and resource evaluation activities and will not result in a serious or major disturbance to an environmental resource. CEQA Guidelines §15306 exempts such a project for information-gathering purposes, or as part of a study leading to future action which the agency has not yet taken. Furthermore, SCAQMD staff has determined that it can be seen with certainty that there is no possibility that the proposed project may have a significant adverse effect on the environment. Therefore, the project is considered to be exempt from CEQA pursuant to CEQA Guidelines § 15061(b)(3) – Activities Covered by General Rule. A Notice of Exemption will be prepared pursuant to CEQA Guidelines § 15062 - Notice of Exemption. If the proposed project is approved, the Notice of Exemption will be filed with the county clerks of Los Angeles, Orange, Riverside and San Bernardino counties.

SOCIOECONOMIC ASSESSMENT

Staff is preparing a socioeconomic assessment of the proposed amendments to Rule 1118. That assessment will be included in the staff report for the Set Hearing Package, which will be available at least 30 days before the rule is considered by the Governing Board for adoption, scheduled for July 7, 2017.

DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE

Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the hearing. The draft findings are as follows:

Necessity – PAR 1118 is needed to further reduce emissions from flaring, to gather more information about the emissions from flaring, and to update outdated administrative requirements in the rule.

Authority - The SCAQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from Health and Safety Code Sections 39002, 40000, 40001, 40440, 40702, and 41508.

Clarity – The amendments to PAR 1118 are written and displayed so that the meaning can be easily understood by persons directly affected by them.

Consistency – PAR 1118 is in harmony with EPA’s Refinery Sector Rule, and not in conflict with or contradictory to, existing statutes, court decisions, federal or state regulations.

Non-Duplication – PAR 1118 does not impose the same requirement as any existing state or federal regulation, and the proposed amendments are necessary and proper to execute the powers and duties granted to, and imposed upon, the SCAQMD.

Reference - In adopting these amendments, the AQMD Governing Board references the following statutes which the AQMD hereby implements, interprets or makes specific: Health and Safety Code Sections 40001 (rules to achieve ambient air quality standards), 40440(a) (rules to carry out the Air Quality Management Plan), and 40440(c) (cost-effectiveness), 40725 through 40728 and Federal Clean Air Act Sections 171 et seq., 181 et seq., and 116.

REFERENCES

South Coast AQMD Rule 1118 Implementation Guidelines August 2007 Version 2.0.
<http://www.aqmd.gov/docs/default-source/compliance/rule-1118/r1118igd.pdf>

South Coast AQMD 2012 Air Quality Management Plan Stationary Source Control Measures
[http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/final-2012-aqmp-\(february-2013\)/appendix-iv-\(a\)-final-2012.pdf](http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/final-2012-aqmp-(february-2013)/appendix-iv-(a)-final-2012.pdf)

South Coast AQMD Technical Support Document 2012 AQMP CM (MSC)-03
May 2014

US EPA AP-42 Emission Factors, 5th Edition, Volume 1, Chapter 13.5
https://www3.epa.gov/ttn/chief/ap42/ch13/final/C13S05_12-13-16.pdf

US EPA Petroleum Refinery Sector Risk & Technology Review & New Source Performance Standards (NSPS) & (NESHAPS)
<https://www.epa.gov/stationary-sources-air-pollution/petroleum-refinery-sector-risk-and-technology-review-and-new-source>

40 Code of Federal Regulations Part 60 Subpart Ja

40 Code of Federal Regulations Part 63 Subpart UUU

40 Code of Federal Regulations Part 63 Subpart CC