



CORRECTED MEETING INFORMATION

Proposed Amended Rule 1118: Control of Emissions from Refinery Flares

Working Group Meeting #3

April 26, 2023

Join Zoom Webinar

<https://scaqmd.zoom.us/j/96627887514>

Webinar ID: 966 2788 7514

Teleconference Dial-In: +1 669 900 6833

Agenda

Background

Summary of site visits

Flare Events Data Analysis

Clean Service Flares

Hydrogen Plants

Summary of Scoping Documents

Preliminary Concepts for Proposed Amended Rule 1118

Proposed Updates to FENS

Next Steps

Regulatory Background

Rule 1118 Background

- Rule 1118 was adopted on February 13, 1998, and was amended in 2005, 2017, and 2023
- Eight petroleum refining facilities, three hydrogen plants, and one sulfur recovery plant within Los Angeles County operate a total of 31 flares subject to Rule 1118
- Rule 1118 requires facilities to submit notifications and reports, monitor emissions, meet emissions targets, and maintain a public inquiry hotline

(Adopted February 13, 1998)(Amended November 4, 2005)(Amended July 7, 2017)
(Amended January 6, 2023)

RULE 1118. CONTROL OF EMISSIONS FROM REFINERY FLARES

(a) Purpose and Applicability

The purpose of Rule 1118 is to monitor and record data on refinery and related flaring operations, and to control and minimize flaring and flare related emissions. The provisions of this rule are not intended to preempt any petroleum refinery, sulfur recovery plant and hydrogen production plant operations and practices with regard to safety. This rule applies to all flares used at petroleum refineries, sulfur recovery plants and hydrogen production plants.

(b) Definitions

For the purpose of this rule, the following definitions shall apply:

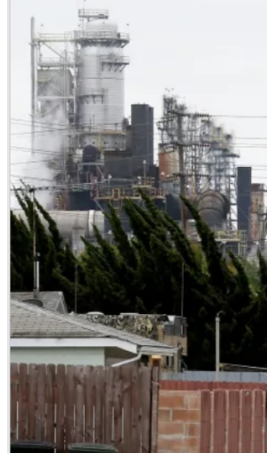
- (1) CLEAN SERVICE STREAM is a gas stream such as natural gas, hydrogen gas and/or liquefied petroleum gas. Other gases with a fixed composition that inherently have a low sulfur content and are vented from specific equipment may be classified as clean service streams if determined to be equivalent and approved in writing by the Executive Officer.
- (2) EMERGENCY is a condition beyond the reasonable control of the owner or operator of a flare requiring immediate corrective action to restore normal and safe operation, which is caused by a sudden, infrequent and not reasonably preventable equipment failure, upset condition, equipment malfunction or breakdown, electrical power failure, steam failure, cooling air or water failure, instrument air failure, reflux failure, heat exchanger tube failure, loss of heat, excess heat, fire and explosion, natural disaster, act of war or terrorism or external power curtailment, excluding power curtailment due to an interruptible power service agreement from a utility. For the purpose of this rule, a flare event caused by poor maintenance, or a condition caused by operator error that results in a flare event shall not be deemed an emergency.
- (3) ESSENTIAL OPERATIONAL NEED is an activity other than resulting from poor maintenance or operator error, determined by the Executive Officer to meet one of the following:

1118 - 1

AB 617 Background

- AB 617 signed into law in 2017
 - Statewide strategy to reduce toxic air contaminants and criteria pollutants in designated environmental justice communities
 - Establishes community-focused and community-driven actions to reduce air pollution and improve public health
- Wilmington/Carson/West Long Beach (WCWLB) is one of the first designated AB 617 communities
- Most of the refineries located in Wilmington/Carson/West Long Beach

AB 617 Community Emissions Reduction Plans (CERPs)



WCWLB CERP included the following action items for Rule 1118:

- Lower performance targets and/or increased mitigation fees
- Increase capacity of vapor recovery systems to store gases during shutdowns
- Header modifications for gas diversion with process controls
- Back-up power systems for key process units
- Remote optical sensing for flare emission characterization
- Lower-emission flaring technologies
- Additional flare minimization plans

WCWLB CERP: <http://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/wilmington/cerp/final-cerp-wcwlb.pdf?sfvrsn=8>

Summary of Working Group Meeting #2 and Progress Since Meeting

Summary of Working Group Meeting #2 – October 2022

Staff discussed:

- Regulatory background of Rule 1118
- U.S. EPA partial SIP disapproval of the July 2017 version of Rule 1118
- Proposed amendment to Rule 1118 to address U.S. EPA's disapproval
- Preliminary analysis of flare events data
- Presentation by a technology vendor for a flaring reduction solution
 - RANE Ring Vapor Bladder System

Progress Since Working Group Meeting #2

Proposed Amended Rule 1118 was adopted by the Governing Board and is being submitted to CARB and U.S. EPA for inclusion in the State Implementation Plan

Staff continued rule development for next amendment

- Continued evaluating:
 - Flare event data and emissions
 - Available Documents (e.g., Scoping Plans, Specific Causes Analysis Reports, Flare Minimization Plans, Flare Monitoring and Reporting Plans)
- Completed site visits to all facilities subject to Rule 1118
- Initiated development of new features in Flare Event Notification System (FENS)
- Held meetings with technology vendors – Optical Remote Sensing Technologies

Meeting on Optical Remote Sensing Technologies

- Staff met with Zeeco and Providence Photonics
 - Providence Photonics agreed to present information on Mantis and Mantis light Video Imaging Spectral Radiometry (VISR) technology
- Primarily measures flare combustion efficiency
 - Direct measurement versus indirect
 - U.S. EPA has conducted testing using VISR technology



Staff Received a Comment Letter from Coalition of Environmental Groups* on April 13, 2023

Letter can be found on South Coast AQMD [website](#)

* California Communities Against Toxics, Center for Biological Diversity, Coalition for Clean Air, Communities for a Better Environment, Earthjustice, and East Yard Communities for Environmental Justice

April 13, 2023

VIA ELECTRONIC MAIL ONLY

Heather Farr, Planning and Rules Manager
South Coast Air Quality Management District
hfarr@aqmd.gov

Re: Comments on Proposed Amended Rule 1118 (Control of Emissions from Refinery Flares)

Dear Ms. Farr:

The undersigned organizations submit these comments on Proposed Amended Rule 1118. Updates to the rule are critical to fulfill the Air District's commitment in the Community Emissions Reduction Plan (CERP) for Wilmington, Carson, and West Long Beach to reduce flare events and/or emissions by 50% by 2030.¹ To achieve these reductions, the Air District proposed several amendments to Rule 1118 that should be analyzed as part of this rulemaking in order to assess their effectiveness:

- 1) Lower performance targets and substantially increased mitigation fees for exceeding targets to strongly disincentivize and prevent all kinds of flaring;
- 2) Additional flare minimization plans for all refineries with the Air District's evaluation of plans that best minimize flaring as benchmarks for approval;
- 3) Remote optical sensing for improved flare emission characterization since flare combustion efficiency is regularly overestimated, causing emissions underestimation; and
- 4) Facilities to submit flare data in publicly available form, and a commitment by the Air District to publish data about individual flaring events and Specific Cause Analysis on its website.

Each of these amendments is essential to confront the significant emissions from flares that contribute to the dire air quality in fence-line communities and the region. The District also proposed the evaluation of additional measures, such as backup power to prevent flaring due to power outage, the possibility of header modifications with process controls to divert gases, and

¹ S. Coast Air Quality Mgmt. Dist., *Community Emissions Reduction Plan for Wilmington, Carson, West Long Beach*, at 5b-9 (Sept. 2019), <http://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/wilmington/cerp/final-cerp-wcwlb.pdf?sfvrsn=8> [archived at <https://perma.cc/6H2C-UJEX4>].

□ Letter stated:

- Amendments must fulfill CERP commitment for 50% flare reductions by 2030, recommends:
 - Lower performance targets and increased mitigation fees
 - Additional flare minimization plans for all refineries
 - Include remote optical sensing
 - Submit flare data in publicly available form
- Recommended following actions:
 - Release specific cause analysis (SCA)
 - Enumerate minimum corrective actions to address issues in SCA
 - Require SCA and corrective action

Summary of South Coast AQMD Visits to Rule 1118 Facilities Sites

Staff's Site Visits to Rule 1118 Facilities

November 3,
2022

Phillips 66
(Wilmington)

November 16,
2022

Valero

Torrance
Refining
Company

December 1,
2022

Air Products
(Carson and
Wilmington)

December 14,
2022

AltAir

Marathon
(Carson)

January 18,
2023

Chevron

Air Liquide

Summary of Site Visits – Logistics

REVISED

- Each facility is unique in operation and structure
- Seven out of twelve facilities operate clean service flares
 - Two refineries are continuously flaring at clean service flares
 - Four clean service flares are located at hydrogen plants
- All facilities have flare gas recovery (FGR) systems
 - Vent gases generated during the refining process are often sent to FGR
 - Gases are recovered by being injected into the refinery's fuel gas system for use in other processes
 - Flaring occurs when the FGR system is unable to handle the amount or type of gases being directed into the system
 - Gases are routed to the flare to avoid unsafe over-pressurization
 - Gases are combusted at flare tip to reduce emissions and potential buildup of combustible gases
- Facilities that can utilize a significant quantity of excess gas have the least amount of flaring
 - Larger facilities have more flexibility to re-route flare gas
 - Gas turbine generators consume a large quantity of gas

Summary of Site Visits – Operations

- Many facilities have reduced flaring emissions through operational changes
 - Slow down shutdown process
 - Increased reliability of process equipment
 - Renting thermal oxidizer to combust excess gases during scheduled shutdown/startup
- Flow meters can have issues detecting the gas flow at low rates
 - Complicates determination of when a flare event starts/stops
- Hydrogen plants have unique causes leading to flaring
 - Most flaring is originated from customer kick back
 - Hydrogen plants do not have many options to use excess hydrogen gas
 - Flared gas is clean stream of hydrogen
 - Flared gas has minimal to zero sulfur content

Flare Events Data Analysis

Flare Events Data Analysis

- Facilities have been submitting quarterly reports to South Coast AQMD for more than a decade
- Staff compiled all data in quarterly reports (2007 through 2021) for the purpose of a thorough analysis of flare event frequency and magnitude
- Quarterly reports contain flare events details including date, duration, cause, level of emissions, etc.
- Facility owners use 16 codes to classify flare events by cause in quarterly reports

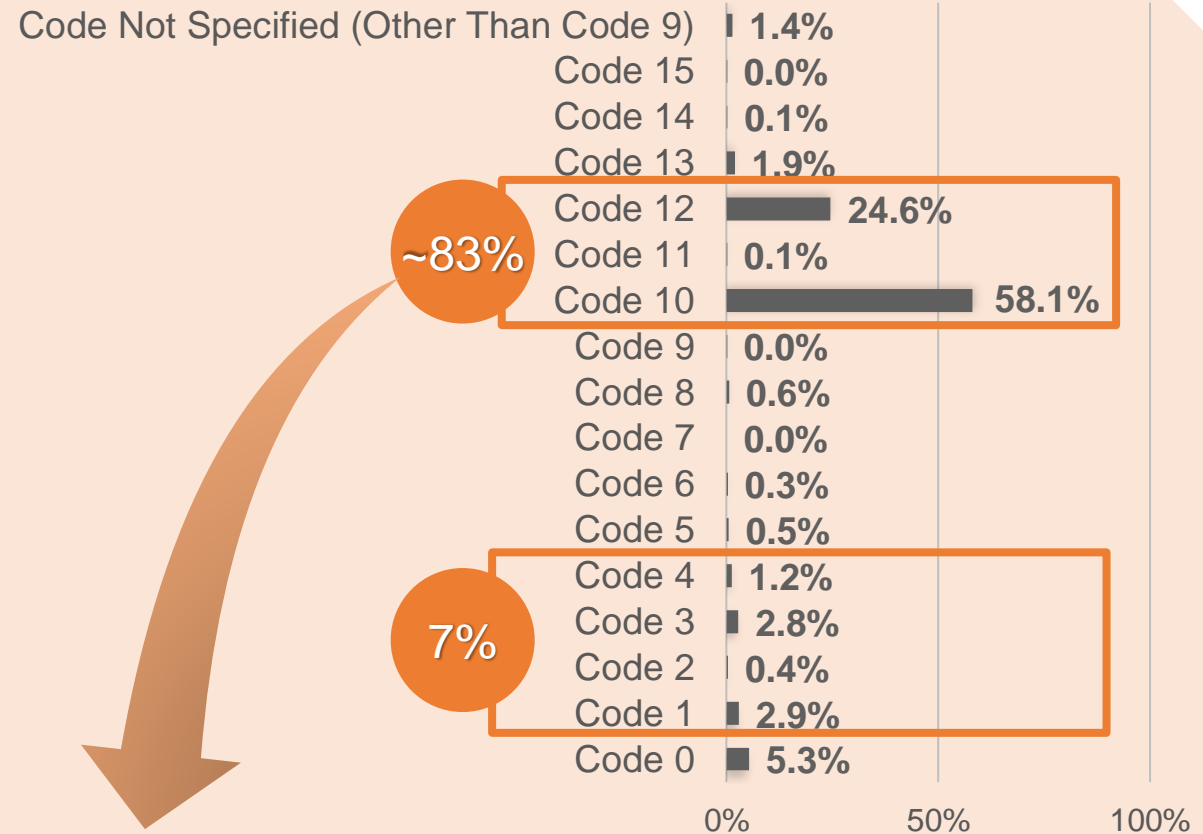
Code	Description of Cause
0	Undetermined (use only if flow was >5,000, but ≤ 500,000 scf and a cause analysis did not reveal a cause)
1	Turnaround Activity (Excluding planned maintenance and planned start-ups and shutdowns)
2	Planned Maintenance (Excluding turnarounds, and planned start-ups and shutdowns)
3	Emergency Flaring (includes any unplanned shutdown, subsequent start-up, valid breakdown, etc.)
4	Planned Start-up or Shutdown (Excluding planned maintenance and turnarounds)
5	EON - Relief Valve Leakage due to malfunction
6	Non-Emergency Flaring (For use only if no other code is the primary cause of the flare event)
7	Process Vent (i.e., facilities/units with no vapor recovery installed) – use only if flow was >5,000 but ≤ 500,000 scf
8	EON - Temporary Fuel Gas Imbalance
9	Code unassigned - Reserved for future use
10	Minor Vent (may only be used for < 5,000 scf flow)
11	EON - Unrecoverable Stream
12	EON - Clean Service Stream
13	EON - Intermittent Minor Venting
14	EON - Pressure/Temperature Excursion
15	Purge Gas (i.e., refinery fuel gas, no flare gas recovery installed)

Flare Events Categorization by Code (2012 – 2021)

REVISED

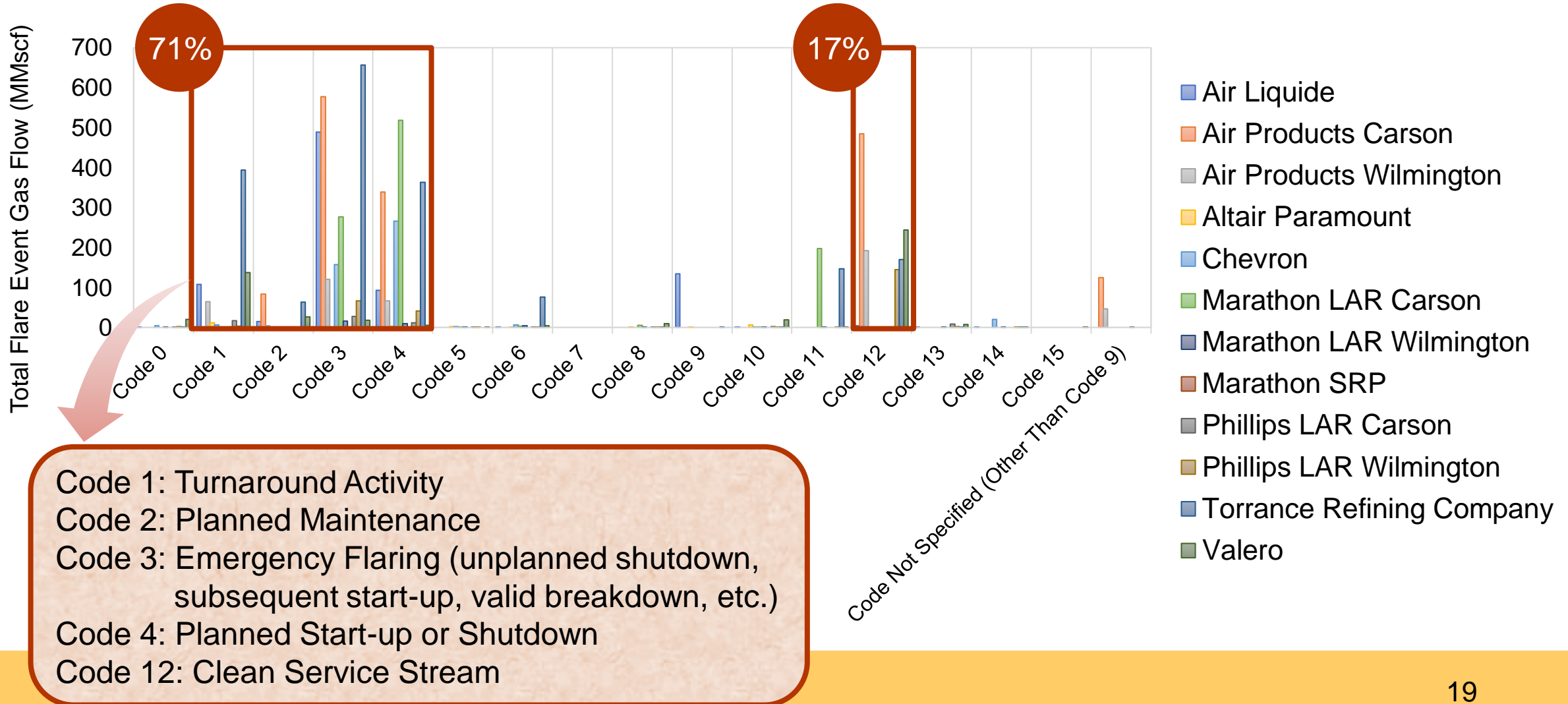
- Facilities report flare events by code in the quarterly reports
- Not all flare events are reported both in quarterly reports and on FENS
 - All flare events are reported in quarterly reports
 - Only flare events that exceed the thresholds specified in the rule are reported on FENS
- Staff evaluated quarterly submitted data for frequency of flare events by code (2012 – 2021)
- More than 80% of the events (i.e., counts) that occurred between 2012 and 2021 were either minor gas vent or clean service stream

Events Frequency by Code (2012 – 2021)



Code 10: Minor Vent (< 5,000 scf flow)
Code 12: Clean Service Stream

Total Gas Flow of Flare Events by Code per facility (2012 – 2021)



Code 1: Turnaround Activity
 Code 2: Planned Maintenance
 Code 3: Emergency Flaring (unplanned shutdown, subsequent start-up, valid breakdown, etc.)
 Code 4: Planned Start-up or Shutdown
 Code 12: Clean Service Stream

Key Takeaways from Flare Data Analysis

- Flaring data shows that reducing number of flare events may not be the sole path towards reducing flaring emissions
 - 7% of the flare events (by counts) caused more than 70% of total flared gas (2012 – 2021)
 - Planned maintenance and planned startup/shutdowns generate about 27% of total flared gas
 - Emergency flaring (unplanned shutdown, subsequent start-up, valid breakdown, etc.) generate about 34% of total flared gas
 - Over 10 years, clean service streams constituted:
 - 25% of the flare events by counts
 - Almost 20% of the total flared gas
- Reduction in flaring emissions is achievable through lower frequency of flaring at clean service flares and conducting alternative practices to flaring

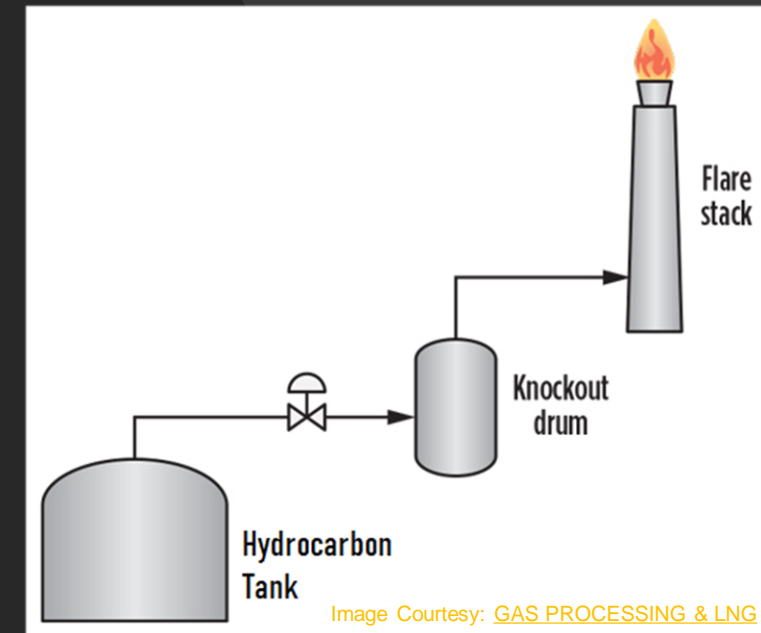
Clean Service Flares



Background on Clean Service Flares (Facilities Other Than Hydrogen Plants)

REVISED

- Quarterly reports show “clean service stream” as a significant cause for flaring
 - 25% of the flare events by count (8% for non-hydrogen plants)
 - 17% of the flare events by size (8% for non-hydrogen plants)
- Clean service flare is a flare that is designed and configured by installation to combust only clean service streams
- Clean service stream is a gas stream such as natural gas, hydrogen gas, liquefied petroleum gas, and/or other gases with a fixed composition that inherently have a low sulfur content and are vented from specific equipment
- Clean service flares control the pressure of refinery product tanks storing either propane or butane through combusting the off-gas from the tanks

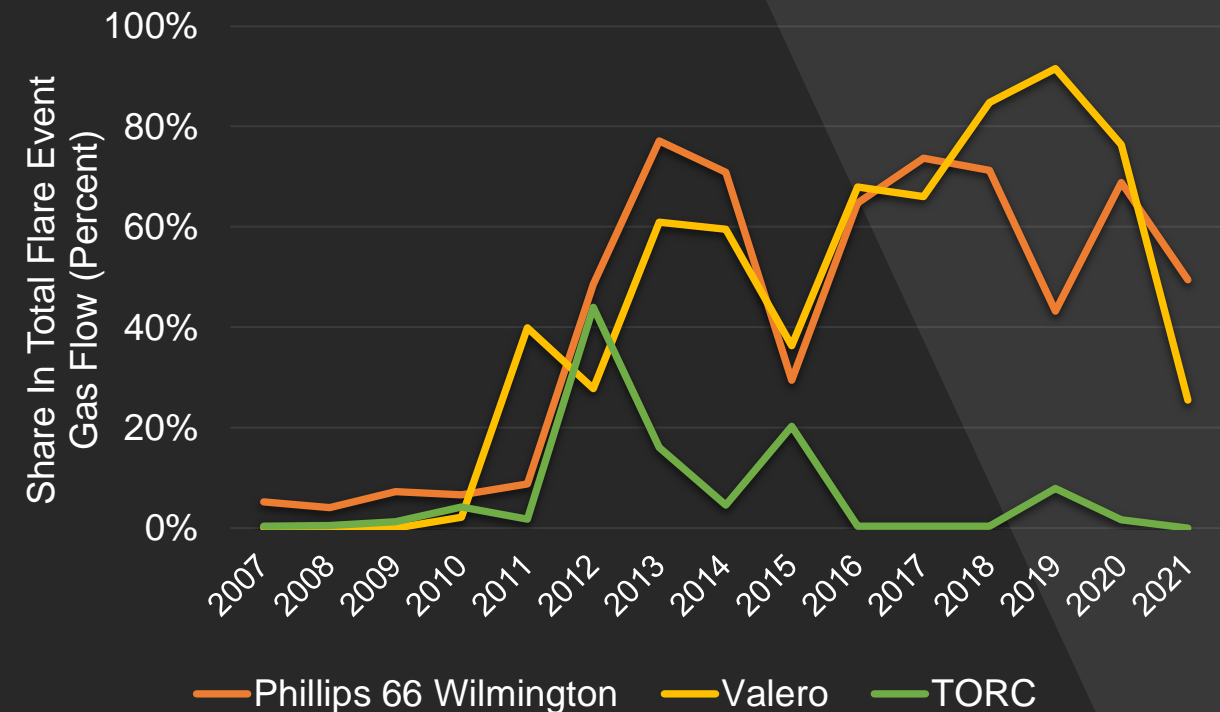


Total Flared Gas at Clean Service Flares (Facilities Other Than Hydrogen Plants)

REVISED

- Three refineries subject to Rule 1118 operate clean service flares
 - Chevron operates clean service hydrogen flare only during startup/shutdown
- Significant flaring occurs at 2 out of 3 clean service flares
- Gas flow from clean service flares represents high share out of the total flared gas at these refineries
- Staff is considering limiting the frequency of clean service flaring

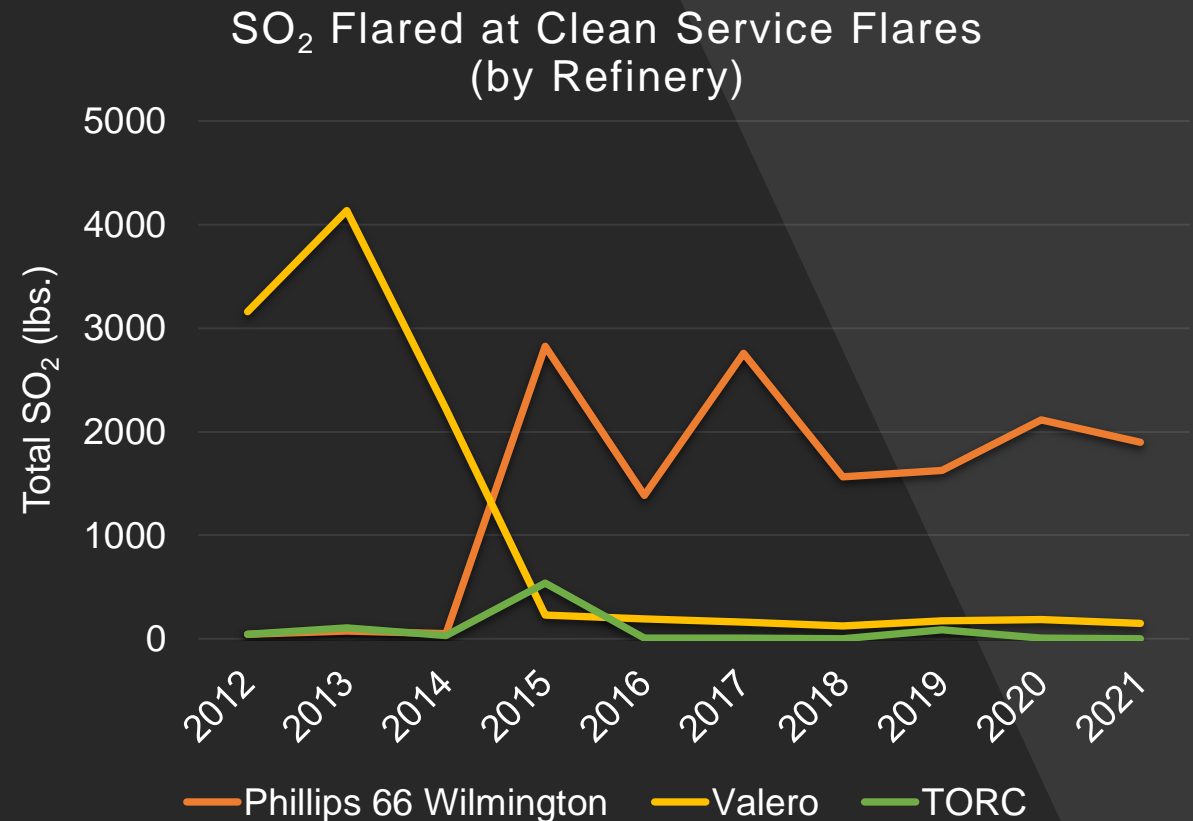
Share of Clean Service Flares
(Out of All Flared Gas for Each Refinery)



* The chart does not include hydrogen plants

Total Sulfur Dioxides Flared at Clean Service Flares (Facilities Other Than Hydrogen Plants)

- Clean service stream is a gas stream with a low sulfur content
- Based on emissions reported by the refineries, sulfur dioxides content in the clean service stream is not negligible
 - SO_x emissions are calculated using emission factors for vent stream, e.g., propane, butane, natural gas
- Reducing flaring at clean service flares will reduce SO_x emissions
- Staff is looking into clarifying the definition for clean service stream with respect to defining the “low” level of sulfur



* The chart does not include hydrogen plants



Image Courtesy: Imperial



Image Courtesy: AFC Energy

Alternatives to Clean Service Flaring

Initial Considerations on Potential Alternatives to Flaring

- Majority of refineries subject to Rule 1118 do not own or operate any clean service flare
 - Gases can be compressed in a vapor gas recovery system
- Clean service flares serve the same purpose as the flares subject to Rule 1118.1
- Rule 1118.1 – Control of Emissions from Non-Refinery Flares was adopted on January 4, 2019
 - Regulates the NO_x and VOC emissions from non-refinery flares located at landfills, wastewater treatment plants, oil and gas production facilities, organic liquid loading stations, and tank farms
- Any flare subject to Rule 1118.1 that operates at a level greater than the specified capacity threshold is required to, either:
 - Reduce the level of flaring to below the capacity threshold (e.g., through beneficial use strategies)
 - Replace the flare with a unit complying with the lower NO_x emissions limits



New Flare Minimization Considerations for Clean Service Flares

- Non-hydrogen plant clean service flares should be subject to the same stringent requirements as Rule 1118.1
 - Rule 1118.1 purpose is “to reduce NOx and VOC emissions from flaring”
 - Rule 1118 purpose is “to control and minimize flaring and **flare related emissions**”
- Rule 1118.1 facilities are required to maintain their flare throughput below an Annual Capacity Threshold (Table 2)
 - Thresholds are based on two consecutive years exceeding
- Staff is considering a requirement for clean service flares to operate below comparable Annual Capacity Thresholds:
 - Type of gas (produced gas or any gas combusted in an open flare)

Table 2 – Annual Capacity Thresholds

Flare Gas	Threshold
Any gas combusted in an open flare	5%
Digester gas	70%
Landfill gas	20%
Produced gas	5%



Hydrogen Plants

Background on Flaring at Hydrogen Plants

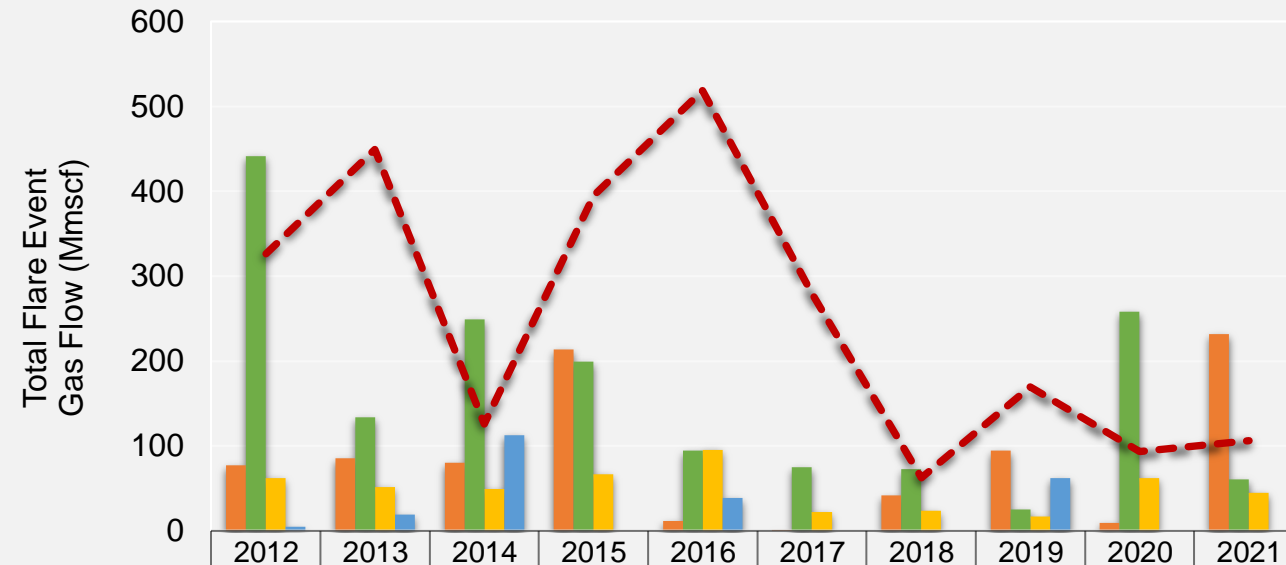
- Hydrogen plants subject to Rule 1118 mainly produce hydrogen for local petroleum refineries
 - Hydrogen sent either via a shared, medium-pressure product pipeline or direct high-pressure product pipelines
- Hydrogen plants subject to Rule 1118 operate two types of clean service flares
 - Enclosed/shrouded ground Flare (top image)
 - Elevated Flare (bottom image)
- Three hydrogen plants operate ground flares and one plant operates an elevated flare
- Two hydrogen plants located at a refinery site and uses the refinery's general service flares
 - Air Products operates hydrogen plants within Torrance Refinery



Total Flared Gas at Hydrogen Plants

- Many hydrogen plants have flare events every day
- Most of these flare events are below the notification thresholds
 - 1.8% of the events exceeded either of the thresholds
- Flares use either nitrogen or natural gas as purge gas
 - Nitrogen does not combust
 - Natural gas combusts and generates NOx emissions

Volume of Vent Gas Flared (Hydrogen Plants)



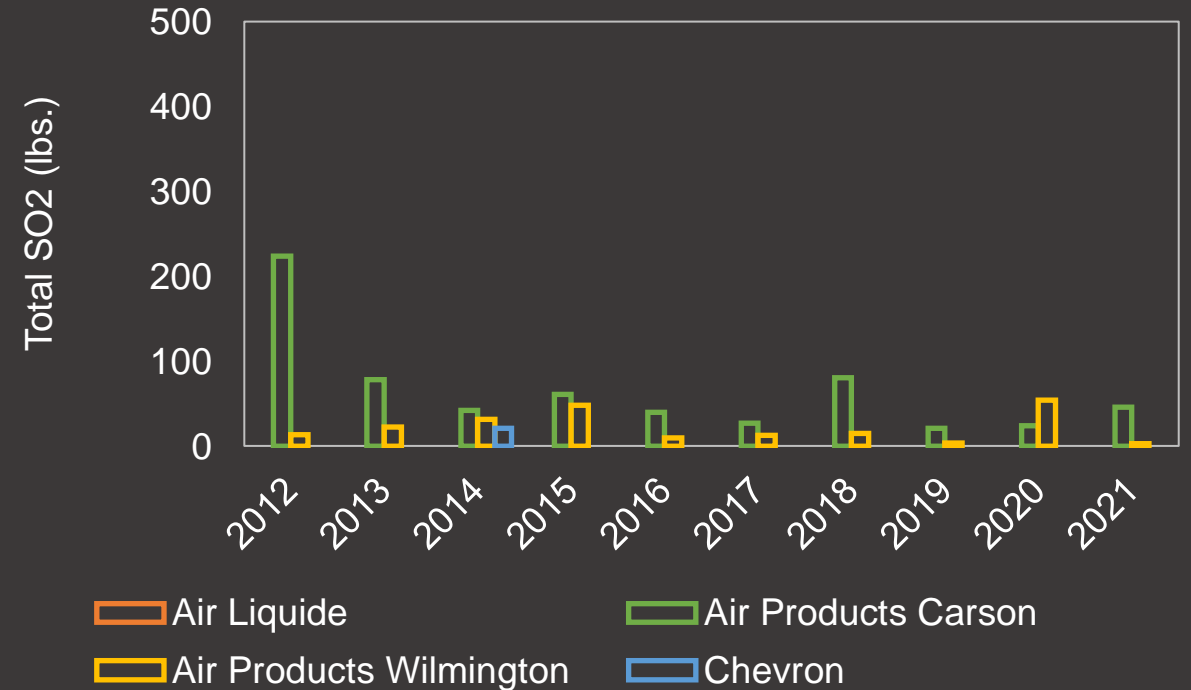
■ Air Liquide	77	86	80	214	11	0	42	95	10	232
■ Air Products Carson	441	133	249	200	94	75	73	25	258	60
■ Air Products Wilmington	62	52	50	67	95	23	24	17	62	44
■ Chevron	5	19	113	0	38	0	0	62	0	0
- - - Maximum of All Refineries	326	449	126	395	518	280	63	170	94	107

* "Maximum of All Refineries" is any single refinery with the highest level of Total Gas Flow to the flare in the corresponding year

Total Sulfur Dioxide Flared at Hydrogen Plants

- Level of sulfur content in the flare gas flow is low at hydrogen plants
 - SO₂ is the byproduct of combusting natural gas and refinery fuel gas as feedstock to pilots
 - Air Liquide had zero level of SO₂

SO₂ Flared at Hydrogen Plants (by Refinery)



Air Product Hydrogen Plant at Torrance Refinery

- Air Products is currently operating two hydrogen plants located at Torrance Refinery site
 - Hydrogen plants were sold to Air product in 2020
 - Air Products took over the hydrogen plants operation in May 2022, but the change of operator still in progress
- Hydrogen plants are operated exclusively by Air Products, but generated flare vent gas is directed to the Torrance Refinery's flare gas recovery system and general service flares
- Flare vent gas generated at hydrogen plants causes flare events to occur at Torrance Refinery
 - Flare vent gas streams from refinery and hydrogen plants are not separable, they share a common header
 - High volumes of flare vent gas that cannot be recovered in flare gas recovery system leads to flaring
 - Due to common header, when a flare event is initiated at the hydrogen plants, refinery gas is also swept into the flare stream resulting in SO_x emissions

Key Takeaways from Scoping Plans for Hydrogen Plants

- Stakeholders indicated the following measures to reduce flaring in Scoping plans:
 - Minimizing emergency flaring through eliminating the sources of plant tripping
 - Addition or removal of specific instruments or equipment
 - Proper operation/maintenance of specific instruments or equipment
 - Operate the plant with an uninterrupted power system
 - Provides approximately 30 minutes of power to keep critical instrumentation and equipment online
 - Limit the duration of planned shutdown event and planned startup event
 - Use the hot restart operating procedure in the event of a plant shutdown following a process upset
 - Temporarily maintain normal operating temperature in the heater when condition allows
- All measures currently being implemented at Air Liquide

Takeaways from Scoping Plans for Hydrogen Plants – *cont.*

- Stakeholders indicated the following measures to reduce flaring in Scoping plans (cont.):
 - Installation of flare gas recovery system and gas turbine generator (reduce planned and unplanned events)
 - Estimated capital cost: \$50 million – \$100 million
 - Estimated operational cost: \$20 million – \$65 million per year (reflecting savings from reduced power demand)
 - Pressurize gases and place into on-site storage containers
 - May not be a feasible alternative due to safety concerns, physical plot space availability, and significant operational complexities
 - Project implementation cost: \$50 million – \$100 million

Initial Considerations on Flaring at Hydrogen Plants

- Staff is considering options for reducing flaring at hydrogen plants
- Increased compression/storage or using hydrogen to generate power are alternative options to flaring at hydrogen plants
 - Space constraints and cost may be an issue
- Staff is considering to require the use of flow meters for the pilot and purge gas to better characterize flare gas flow and flare emissions
 - Rule currently does not require flow meters for clean service flares
 - Facilities may overestimate flare gas emissions by including flow from purge and pilot gas
 - Use of flow meters would increase accuracy of the data

Scoping Document Summaries for Petroleum Refineries



Background



Each facility is unique in arrangement, complexity, and operation with several potential ways to reduce flaring emissions



The cause of a flare event varies and each refinery has differing abilities to mitigate or handle a flaring event



Operators of facilities were required to submit a Scoping Document within 12 months of last Rule 1118 amendment

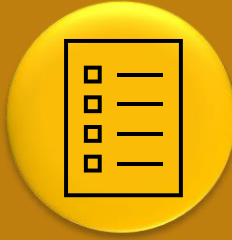


Scoping Documents were required to evaluate feasibility and cost of minimizing or avoiding planned and unplanned flaring events

Scoping Documents – Requirements

- Planned Flare Events, facilities had to evaluate emission reductions from flaring through two potential alternatives for each of the following performance targets:
 - 0.10, 0.05, and ≤ 0.01 tons of SO_x per million barrels of crude processing capacity
 - 0.1 tons of VOC per year from clean service flares
- Unplanned Flare Events, facilities had to evaluate emission reductions from flaring based on four scenarios:
 1. Sudden influx of vent gas into the flare gas header
 2. Sudden loss of the process unit with the highest fuel gas consumption rate of recovered flare gas
 3. Sudden loss of all externally generated electrical power
 4. Sudden loss of internally generated electrical power

Scoping Documents Summary – Planned Flare Events



Emission Monitoring Enhancements	
Actions	Notes
Modify existing flare header flow meters to more accurately measure low molecular weight gas	Better characterize and measure the flow gas, not for specific emission reductions
Install new/additional flow meters	
New HHV analyzer for faster response time	
Modify flare water seal settings	

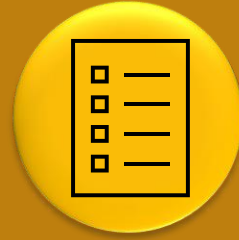
Scoping Documents Summary – Planned Flare Events



Source control modifications

Actions	Notes
Develop planned turnarounds and perform critical maintenance during turnarounds	Refineries implementing most of these actions already
Capture lessons learned from flaring events with continuous improvement	
Operator training and developing a mindset for minimum flaring	
Evaluate root cause of all unplanned flaring events and propose corrective actions to minimize these events in the future	
Modify Operating Procedure for startup, shutdown and clean service flare	
Use modified operating procedures and work practices to mitigate flaring	
Reduce plant feed rates which will reduce the amount of vent gas flared	Staff will investigate feasibility and cost

Scoping Documents Summary – Planned Flare Events



Tail End Control Enhancements

Actions	Notes
Flare Gas Recovery compressors reliability modifications	Refineries implementing most of these actions already
Keep spare equipment in optimal running condition	
Planning/managing the shutdown/startup activities to effectively manage the available vapor recovery capacity	
Use rental vapor/gas recovery equipment	Staff will investigate feasibility and cost effectiveness of these actions
Use of temporary portable condensing system or sulfur scrubbing system	

Scoping Documents Summary – Unplanned Flare Events



A sudden influx of vent gas into a flare gas header

Actions	Notes
<ul style="list-style-type: none">• Maximize operation of the Vapor Recovery System• Use of spare Flare Gas Recovery equipment• Improve reliability of process equipment	Refineries implementing most of these actions already
<ul style="list-style-type: none">• Balance production and use of fuel gas at the refinery to minimize instances where excess fuel gas must be flared• Automate the reduction of feed rate to the lower priority process units• Reduce flaring by increasing fuel gas consumption to units within the plant• Export excess fuel gas to third party to relieve pressure	Staff will investigate feasibility and cost effectiveness of these actions

Scoping Documents Summary – Unplanned Flare Events



A sudden loss of the process unit with the highest fuel gas consumption rate of recovered flare gas at that facility`

Actions	Notes
<ul style="list-style-type: none">• Maximize operation of the Vapor Recovery System• Use of spare Flare Gas Recovery equipment• Improve reliability of process equipment• Automation of using spare equipment (if available)	Refineries implementing most of these actions already
<ul style="list-style-type: none">• Balance production and use of fuel gas at the refinery to minimize instances where excess fuel gas must be flared• Automate the reduction of feed rate to the lower priority process units• Export excess fuel gas to a third party to relieve pressure	Staff will investigate feasibility and cost effectiveness of these actions

Scoping Documents Summary – Unplanned Flare Events



Loss of all external electrical power to the facility

Actions	Notes
<ul style="list-style-type: none">• Operate Cogeneration Unit• Install and use independent underground power feeders• Reduce feed rates to lower priority process units• Reduce power production of the cogeneration unit	Staff will investigate feasibility and cost effectiveness of these actions
<ul style="list-style-type: none">• Import electricity from a Third Party	Included in one refinery's scoping plan; already implemented
<ul style="list-style-type: none">• Switch to Secondary External Feeder	

Scoping Documents Summary – Unplanned Flare Events



A sudden loss of all electrical power from any non-backup electrical generation unit currently operating at the facility

Actions	Notes
<ul style="list-style-type: none">• Import electricity from a Third Party• Control mechanism to automatically receive power from local power supplier	Included in one refinery's scoping plan; already implemented

Initial Conclusions

- Each facility is unique in operation and ability to divert flare gases
- Many actions provided in the scoping plans are actions that facilities are already implementing to reduce flaring
 - Training, managing flare gas, planning turnarounds, maintaining equipment, etc.
- Actions that could be most impactful are listed as very costly, e.g., flare gas recovery with gas turbine ~ \$50 million – \$100 million

Preliminary Concepts for Proposed Amended Rule 1118 (PAR 1118)

Preliminary Concepts for PAR 1118

Reduce flare emissions

- Clean Service Flares: establishing flare throughput threshold (presented in earlier slides)
- General Service Flares: lowering performance target for sulfur dioxide

Address facility concerns

- Align planned and unplanned flare event notification requirements
- Data substitution methodology

Address public request to improve access to flare event data

Performance Target for Sulfur Dioxide – Requirements

- Rule 1118 establishes the performance target for sulfur dioxide emissions from flares to be determined at the end of each calendar year
 - Based on the facility's annual flare sulfur dioxide emissions normalized over the crude oil processing capacity in calendar year 2004
- Performance target is 0.5 tons per million barrels of crude processing capacity (averaged over one calendar year)

$$\text{Refinery Specific Performance Target} = 0.5 \left[\frac{\text{Tons}}{\text{Million Barrels}} \right] \times \text{Crude Processing Capacity [Million Barrels]}$$

Excess Emissions (%)	Mitigation Fee (\$/ton of Excess SO ₂)
≤10%	25,000
>10% to ≤20%	50,000
>20%	100,000



Performance Target for Sulfur Dioxide

- If performance target is exceeded, facilities are required to:
 - Submit an FMP and pay the mitigation fees within 90 days following the end of a calendar year for which the performance target was exceeded
 - Comply with all provisions of the FMP once approved
- Fees are determined based on the percent of emissions in excess of petroleum refinery specific performance target

Future Considerations for Performance Target for Sulfur Dioxide

Staff is considering to:

- Lower the sulfur dioxide performance target to address AB 617 CERP actions
 - Investigating the possibility of lowering the performance target to 0.25 tons/MMbbl to address the AB 617 CERP requirement to achieve 50% reduction in flaring emissions
- Require more frequent FMPs

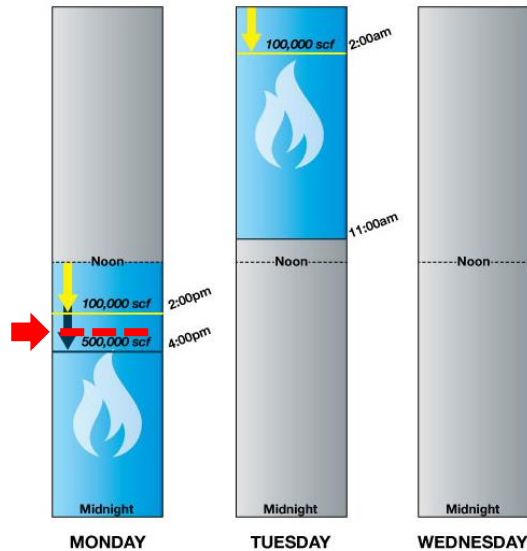
Year	Chevron	Marathon Wilmington & SRP	Marathon Carson	AltAir	Valero	TORC	Phillips 66
2012	0.11	0.59	0.02	0.001	0.48	0.80	0.61
2013	0.29	0.07	0.06	0.000	0.21	0.40	0.31
2014	0.29	0.04	0.00	0.000	0.54	0.50	0.57
2015	0.23	0.01	0.03	0.003	0.13	1.90	0.91
2016	0.13	0.08	0.01	0.001	0.63	0.30	0.30
2017	0.00	0.17	0.02	0.001	0.15	0.70	0.30
2018	0.11	0.01	0.03	0.001	0.01	0.20	0.74
2019	0.07	0.43	0.02	0.000	0.01	0.20	0.47
2020	0.03	0.06	0.08	0.001	1.10	0.11	0.20
2021	0.16	0.64	0.06	0.001	0.51	0.10	1.02

Exceeding performance target of 0.5 tons/MMbbl

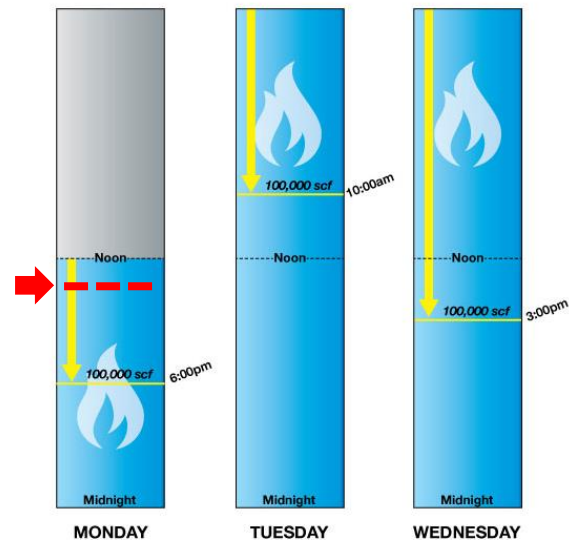
Exceeding performance target of 0.25 tons/MMbbl

Flare Event Notification and Reporting Requirements

Unplanned Event



Planned Event



- Rule 1118 establishes different initial notification requirement for planned and unplanned flare events
 - Notification for unplanned flare are not required until one hour after **emissions exceedance occurs from any thresholds**
 - Notification for planned flare events are required at least 24 hours before the start of the event and within one hour of the **start of flare gas flow** (no threshold exceedance)

Flare Event Notification and Reporting Requirements – *cont.*

- Some facilities have been able to control the level of flared gas below the notification thresholds through improved operational practices such as increased reliability
- This capability occasionally led to mischaracterizing flare events (i.e., planned vs unplanned)
 - Facility did not submit the notification for planned flare events at least 24 hours before the start of the event
 - Emissions exceeded one or more notification thresholds during the scheduled flare event for which the owner expected no exceedance to occur
 - Facility reported the flare event as an “unplanned” flare event due to the timing limitations not allowing for reporting the flare event as “planned”

Flare Event Notification and Reporting Requirements – *cont.*

- During staff's site visits, facilities expressed concern about the timing requirement of public notification at the start of a planned flare event
 - Notification for a planned flare event is required at least 24 hours before the start of the event and within one hour of the start of flare gas flow (no threshold exceedance)
 - There are several operational tasks to take place upon start of an event and during the initial hours
- Staff is considering aligning the notification requirements for start of a planned and unplanned flare events
 - Retain requirement to submit notification 24 hours before a planned flare event
 - Align the public notification requirement with the requirement for an unplanned flare event that requires public notification not until one hour after emissions exceedance occurs from any threshold

Missing Data Substitution

- The owner or operator of a facility is required to calibrate the flare and sulfur monitoring systems daily
 - Flare emissions cannot be measurement during calibration procedures
- Missing data substitution procedures are required pursuant to Rule 1118 Attachment B
 - Use maximum flow rate measured and recorded for a flare during the previous 20 quarters preceding the flare event
- Missing data procedures are intended to be punitive to minimize missing data

Staff Proposal

To use the maximum of the recorded values during one hour before and one hour after the event where missing data occurred due to instrument calibration, or any other operation or activity required to comply with AQMD regulations

Improving Public Access to Flare Events Data

- Staff is looking into requiring facilities to submit preliminary flare event data on a monthly basis and report more detailed flare event data quarterly
 - Preliminary flare emissions data due on or before 30 days after the end of each month
 - Data might have to be flagged as preliminary
 - Allow for some flare event details (e.g., cause) not to be required in preliminary data
 - Allow facilities the ability to go back and update/finalize data
 - Making the preliminary data available to the public sooner than quarterly data reports

Public Access to Live Images of Flare Tip



- Members of the community and South Coast AQMD enforcement staff requested access to refinery flare images
 - Community members want the visual assurance that the flare is burning cleanly
 - All flares are required to be operated in a smokeless manner with no visible emissions except for periods not to exceed a total of five minutes during two consecutive hours
- Staff is considering a requirement for high frequency images of the flare tip during a flare event (or live feed) for public access
 - Refineries expressed security concerns about direct feed from their control room systems to a public webpage
 - Considering to allow for lower quality images (e.g., webcam images)
- Enclosed/ground flares may be excluded from this requirement due to limited access to the flare tip



Proposed Updates to Flare Event Notification System (FENS)

Background on Flare Event Notification System (FENS)

- FENS is a web-based system for facilities to submit notifications as required by Rule 1118
- Facilities have been using FENS since 2019 to report the flare events that exceed the thresholds specified in Rule 1118
- FENS is available for public access [here](#):
 - Provides flare event data including event type, start time, stop time, reason for flaring, exceeded threshold(s) and AQMD staff comments (if any)
- Staff has initiated the process of updating FENS features alongside the ongoing phase of amendments to the rule

Public Access to Flaring Data

- Facilities have been submitting quarterly reports to South Coast AQMD for more than a decade
- Community members have requested for more data on a timely manner
- Quarterly flare event reports including comprehensive flare event data is available to public through submitting a Public Records Request to South Coast AQMD
 - Staff posts an [annual summary](#) of flare emission data on the website
- Bay Area Air Quality Management District provides [flare event data](#) reported by facilities to public more frequently than South Coast AQMD
 - Flare events frequency and magnitude
 - Flare events emissions (by pollutant)

Proposed Updates to FENS

- Staff is looking into implementation of following updates to FENS:
 - Providing the interface for facilities to submit the flare events reports and specific cause analysis report (SCAR) through FENS
 - Providing public access to comprehensive flare events data through the FENS public portal
- Staff is investigating the feasibility of automation of daily 100,000 standard cubic feet threshold notification
 - Refineries data collection system could directly send notifications to FENS without operator action

Next Steps

Continue meeting with stakeholders

Continue meeting with technology vendors

Work on an initial preliminary proposed amended draft rule

Working Group Meeting #4

Staying Updated with PAR 1118

- Sign up and receive email updates via: <http://www.aqmd.gov/sign-up>

South Coast AQMD

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<input type="checkbox"/>	Rule 1117	Emissions of Oxides of Nitrogen from Glass Melting Furnaces
<input checked="" type="checkbox"/>	Rule 1118	Control of Emissions from Refinery Flares
<input type="checkbox"/>	Rule 1118.1	Control of Emissions from Non-Refinery Flares

Additional Information on Rule 1118

- South Coast AQMD website has further information on Rule 1118 including:

- Link to FENS

- Contact information for the Rule 1118 facilities

- Information on subscription to receive community notifications and information via email

- Supporting documents including files from past rule amendments

- Frequently asked questions

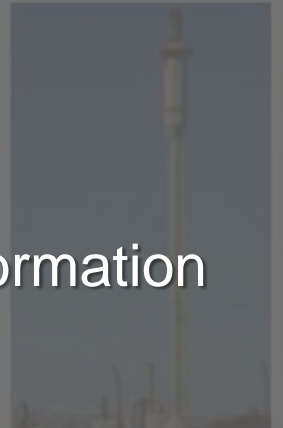
- Access through the following link:

<http://www.aqmd.gov/home/rules-compliance/compliance/r1118>

A gas flare, also known as a flare stack, is a gas combustion device used in a variety of industrial plants. In petroleum refineries, flares are used as safety devices to prevent over pressure of equipment via planned and unplanned flaring.

- Planned Event: Used for scheduled maintenance, plant startup/shutdown, or other activities where the refinery can reasonably anticipate the need to dispose of excess combustible gas.

Unplanned Event: Used for emergencies caused by equipment failure, process upsets, or other participating event which requires the refinery to dispose of the gases in order to prevent harm to workers, the community, or to the



Flares can come in different shapes and sizes. See the example above for a common refinery flare.

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