Feb. 22, 2024

COMMUNITIES FOR A BETTER ENVIRONMENT
established 1978

South Coast Air Quality Management District (AQMD)
Michael Krause, Heather Farr, Zoya Banan, Sarady Ka

Re: **Detailed CBE Comments on Rule 1118** - Earlier progress cutting oil refinery flaring has stagnated and even reversed; regulatory proposals to address this are still missing key tools

Dear AQMD Staff,

CBE and other Environmental Justice organizations submitted a separate short letter Feb. 22, 2024, summarizing our concerns and recommendations on proposed flare Regulation 1118. (Those recommendations are also repeated at the end of this letter.)

This letter provides technical support and additional information to support findings of that letter.

Refinery flaring and associated accidents have increased in recent years in total. In addition, frequent events emitted major levels of pollution in short periods (>65,000 lbs of SOx, and over 40,000 lbs of VOCs concentrated over days, not years).

We must emphasize the reason the District commited to cutting flaring, and flare emissions in the first place – the pollutants directly harm people's health, and contribute to smog formation. It is not acceptable that this is considered by the Oil Industry as normal business practice. The Center for Disease Control found:

> ***Sulfur dioxide is severely irritating to the eyes, mucous membranes, skin, and respiratory tract.*** *Exposure to high levels can cause pulmonary edema, bronchial inflammation and laryngeal spasm and edema with possible airway obstruction.* ***Chronic exposure*** *can result in . . .* ***increased susceptibility to respiratory infections, symptoms of chronic bronchitis, and accelerated decline in pulmonary function. Chronic exposure may be more serious for children*** *. .*

Furthermore the Air District's AB617 Community Emission Reduction Plan for Wilmington, Carson, West Long Beach found that the presence of several petroleum refineries caused the largest contribution of VOCs in this area.[1]

Flaring also causes major smoking events, like that pictured at right from last year (described later). Such events happen regularly. These emit toxics and particulate matter, adding to the burden of invisible SOx and VOC pollution.

Thank you for your consideration of the following details, urging adoption of all reasonably available control measures at this late juncture (after decades of flare regulation when such events should have been a thing of the past).

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[1] SCAQMD, Wilmington, Carson, West Long Beach Community Emission Reduction Plan, Sept. 2019, Final, p. 3b-6, *["The largest contribution to VOC emissions are from petroleum production and marketing, due to presence of several petroleum refineries in this community."],* available at https://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/wilmington/cerp/final-cerp-wcwlb.pdf?sfvrsn=8

I. Details of rule-strengthening needed in proposed updated Rule 1118

A. The proposed Annual SOx Target is too lax—refineries already achieved far lower levels

The proposed rule sets an Annual Performance Target at 0.25 tons SOx per million barrels of crude oil processed by 2028. Although this is tighter than past targets in the rule, most facilities *already* have done far better in practice to reduce this harmful pollutant.

In fact, the District's table below shows many refineries previously met 0.10 tons SOx per million barrels crude oil (and far lower). We propose no higher than this level should be considered. We also propose accelerating the deadline to *2026*.

This annual target provides a limit on the lump sum of all types of SOx flaring in one year. It is a major strategy AQMD used to make progress reducing overall SOx. Now the District is hampering its own efforts, by chosing a target too lax to move us forward in long-delayed regulatory updates. It would be much better to wait a month than to hurry at the end, leaving us without bringing SOx flaring levels at least down to those achieved in the past.

While refineries have already shown they can meet 0.10 tons (below), if they did *not*, they can still operate – they would only have to pay fees to AQMD until the next year. The staff report found such disincentives effective in reducing emissions in the past.

AQMD's own Table 3-3[2] shows a target of <0.10 was already achieved at multiple refineries:

- **Since 2012 Marathon Carson achieved 0.10 tons/million barrels crude every year** (and its average since 2012 was less than 0.03, and never higher than 0.08).
- **Since 2017 Chevron achieved it 3 out of 5 years** (and was close in 2012 and 2016).
- From **2013-2016 Marathon Wilmington achieved it every year** (as well as 2018 and 2020).
- **TORC achieved it in 2021 and was close to achieving it in 2020.**
- Only Phillips 66 failed to achieve 0.10 since 2012.
- **Half the refineries got worse in later years, indicating a need for tighter standards, higher fines, and stronger enforcement, to prevent backsliding and make forward progress.**

Table 3-3. SO_2 Emissions per Processing Capacity by Refinery

Year	Chevron	Marathon Wilmington & SRP	Marathon Carson	AltAir Paramount	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

[2] SCAQMD Reg. 1118 staff report, p. 3.3

Setting an achievable but strong standard, based on the tightest achieved in practice is a reasonably available control and a time-honored, successful strategy to reduce health-harming emissions. If the 2020 and 2021 years higher emissions were anomalies due to the pandemic, that is all the more reason to set a standard based on the many years of tighter SOx levels met before.

Contrary to arguments of the Oil Industry, questioning why the District would want to substantially reduce refinery SOx emissions, it should be no surprise to most that Sulfur Oxides are very harmful to health. The Center for Disease Control's Agency for Toxic Substances and Disease Registry (ATSDR) found:[3]

> ***Sulfur dioxide is severely irritating to the eyes, mucous membranes, skin, and respiratory tract.*** *Exposure to high levels can cause pulmonary edema, bronchial inflammation and laryngeal spasm and edema with possible airway obstruction.*
>
> ***Chronic exposure*** *can result in an altered sense of smell (including increased tolerance to low levels of sulfur dioxide),* ***increased susceptibility to respiratory infections, symptoms of chronic bronchitis, and accelerated decline in pulmonary function. Chronic exposure may be more serious for children*** *because of their potential longer life span.*

Oil Refineries are major sources of SOx in the South Coast. While refineries emit SOx from many *continuous* sources of pollution, episodic emissions from oil refinery flares can dump large volumes of SOx to the air in a short time, suddenly adding many tons in one day or a even a few hours.

Furthermore, SOx emissions are precursors to deadly particulate matter formation. The American Lung Association found: *"There is no safe threshold to breathe in fine particles. A recent review of all available scientific evidence to date clearly shows that particle pollution is associated with increased mortality from all causes, cardiovascular disease, respiratory disease and lung cancer."*[4]

The charts below show the largest of both SOx and VOC flaring in 2020-2022. (These do not show many other smaller flaring events that also dump cumulatively large volumes of SOx and VOCs to the air each year). SOx reductions from refineries was a major goal set by the Wilmington, Carson, Long Beach Community Emission Reduction Plan (CERP), although SOx reductions have also been an important goal of the District since its inception, due to the harmful impacts on health.

B. An Annual VOC target is completely missing

An Annual VOC target is necessary because the SOx target cannot by itself disincentivize high-VOC flaring with *lower* SOx emissions). Two different targets are needed for SOx and VOCs. **Of course, VOCs are well-established as very harmful to air quality.** They are smog precursors, in the region with the worst smog in the nation, and are directly toxic as they include chemicals like carcinogenic

[3] Medical Management Guidelines for Sulfur Dioxide, available at: https://wwwn.cdc.gov/TSP/MMG/MMGDetails.aspx?mmgid=249&toxid=46#:~:text=Sulfur%20dioxide%20is%20a%20severe%20irritant%20to%20the%20respiratory%20tract,edema%20with%20possible%20airway%20obstruction.

[4] American Lung Association, Particle Pollution, What Are the Health Effects of Particle Pollution?, available at: https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/particle-pollution

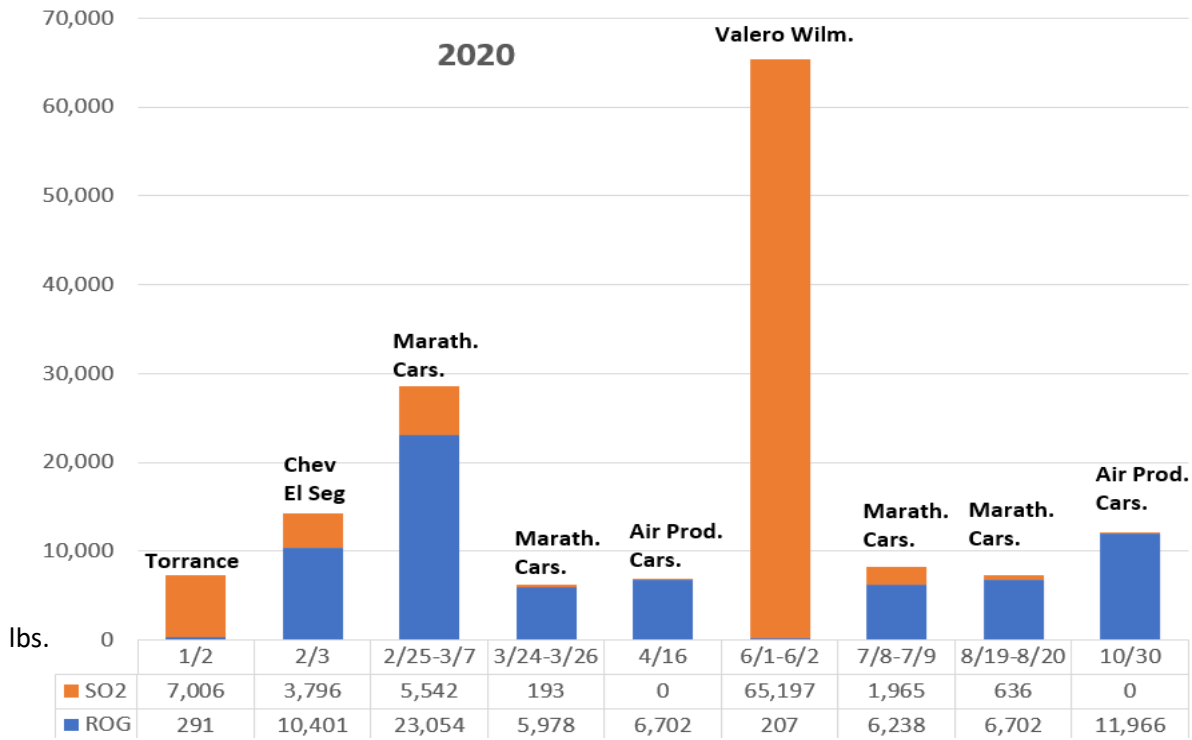
benzene. These emissions are not equally distributed across the region – they are concentrated in refinery towns - low income and communities of color.

In fact, AQMD's AB617 CERP for Wilmington, Carson, West Long Beach found that the presence of several petroleum refineries caused the largest contribution of VOCs in this area.[5]

CBE charted large emission events of 2020, 2021, and 2022, from AQMD public records received pursuant to Regulation 1118. Some of these occurred over multiple days. This showed:

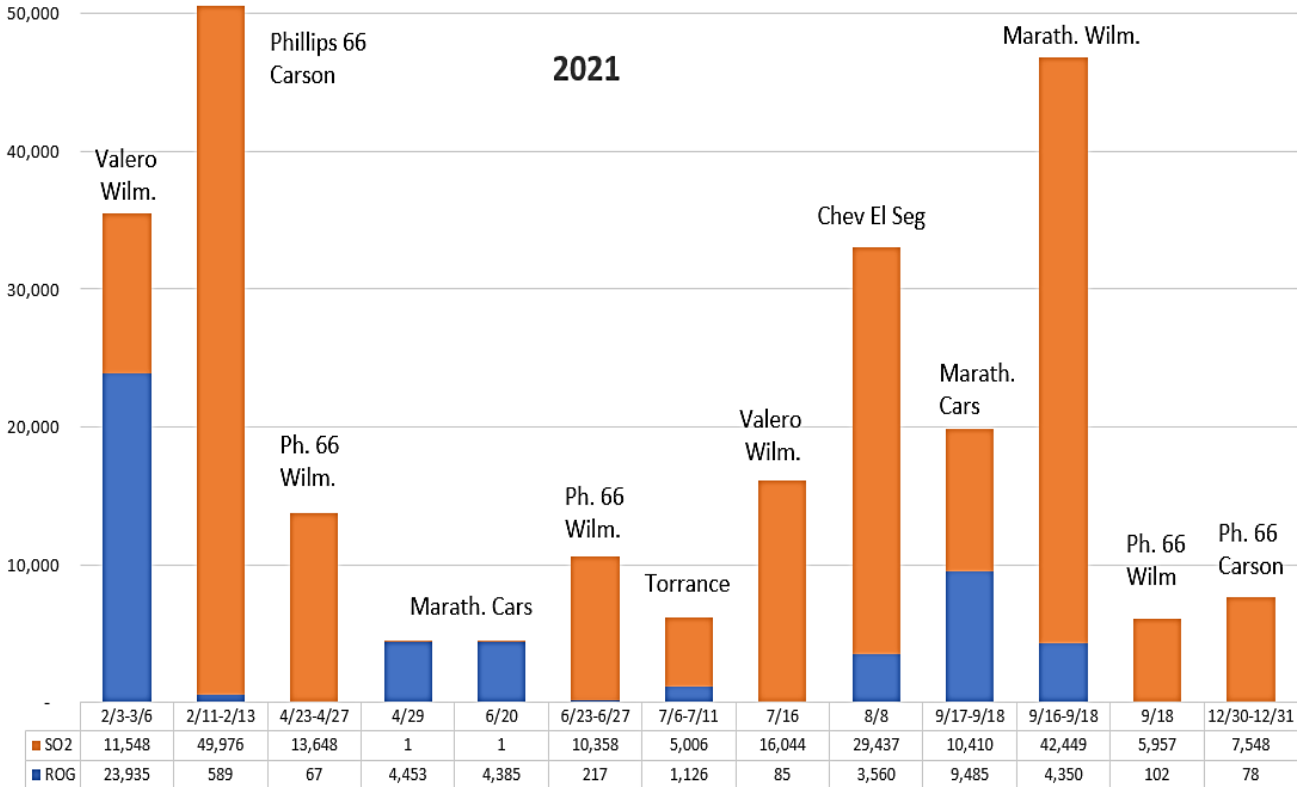
- 2020: **7 of 9 largest flaring events were high-VOC, lower SOx.**
- 2021: High SOx events dominated, but this year still had **six large VOC emitting events**, each with thousands of lbs. of VOC emissions.
- 2022: **VOCs again dominated the largest flaring events.**

(Note that flare combustion efficiency (of VOC destruction efficiency) can go far lower, so that VOCs emissions would be even higher, including those large events below.)

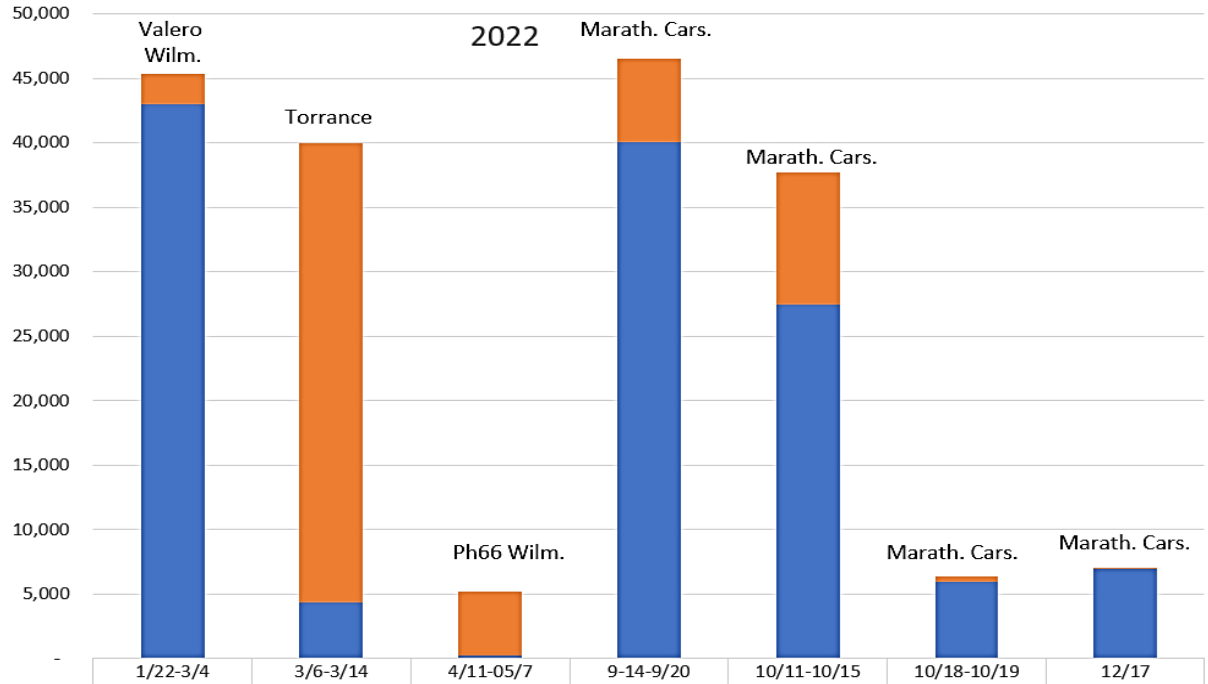


	1/2	2/3	2/25-3/7	3/24-3/26	4/16	6/1-6/2	7/8-7/9	8/19-8/20	10/30
SO2	7,006	3,796	5,542	193	0	65,197	1,965	636	0
ROG	291	10,401	23,054	5,978	6,702	207	6,238	6,702	11,966

[5] SCAQMD, Wilmington, Carson, West Long Beach Community Emission Reduction Plan, Sept. 2019, Final, p. 3b-6, *["The largest contribution to VOC emissions are from petroleum production and marketing, due to presence of several petroleum refineries in this community."],* available at https://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/wilmington/cerp/final-cerp-wcwlb.pdf?sfvrsn=8



	2/3-3/6	2/11-2/13	4/23-4/27	4/29	6/20	6/23-6/27	7/6-7/11	7/16	8/8	9/17-9/18	9/16-9/18	9/18	12/30-12/31
SO2	11,548	49,976	13,648	1	1	10,358	5,006	16,044	29,437	10,410	42,449	5,957	7,548
ROG	23,935	589	67	4,453	4,385	217	1,126	85	3,560	9,485	4,350	102	78

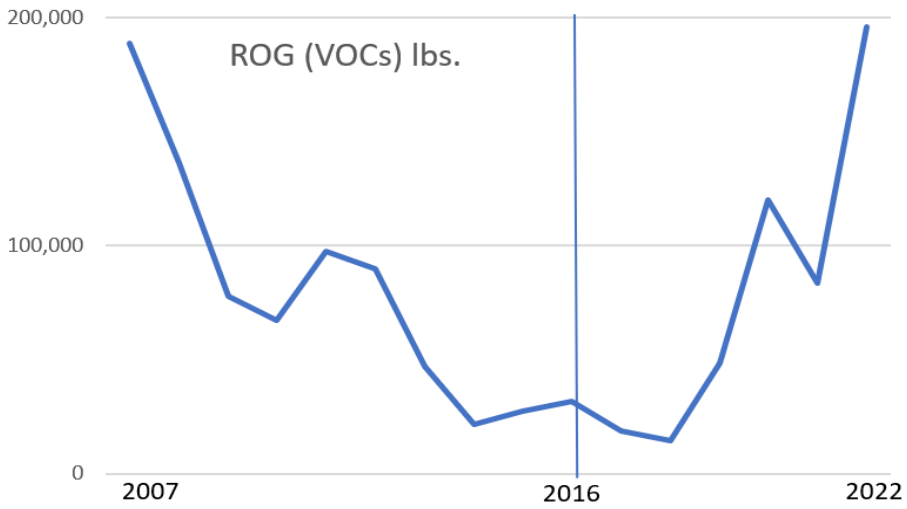


	1/22-3/4	3/6-3/14	4/11-05/7	9-14-9/20	10/11-10/15	10/18-10/19	12/17
SO2	2,294	35,664	4,973	6,458	10,174	421	17
ROG	43,022	4,337	223	40,026	27,495	5,944	6,938

The charts above don't even show the full extent of the VOC flaring problem – only the largest events. **Frequent smaller events occur every year, adding up to hundreds of thousands of pounds.**

In addition to individual events, total annual emissions can be graphed. Based on aggregated quarterly data reports AQMD provides online, we charted the trend in total VOCs from flares over the years. *(2016 is delineated because Torrance had particularly high flaring that year, with major Notices of Violation.)* Note that after the 2017 flare rule update, some VOCs changed to higher emission factors. (EPA found flare destruction efficient not as high as assumed, resulting in higher emissions). Thus VOCs post-2017 are not directly comparable to previous years (which would have been shown even higher emissions.)

Regardless of changes in emission factors post 2017, the chart clearly shows that **past VOC flaring emissions were headed down, but in recent years VOC flaring emissions are headed up.** Total emissions are in the hundreds of thousands of pounds, concentrated in refinery communities.



We urge AQMD to apply to VOCs the same method used to chart tons of SOx per million barrels of crude oil at each refinery, each year (as in Table 3.3 shown earlier).[6] This would identify the best annual VOC levels of the past, to help identify best practices toward lowering VOC emissions. (We could do the analysis ourselves with available data, but it would be helpful to have such a chart in AQMD's staff report, which includes many other valuable charts).

(In addition to the need for this target for refineries, it is unclear whether proposed standards for "Clean Service" flares outside of refineries will sufficiently limit VOCs. See below.)

C. Each facility should do Flare Minimization Plans (FMPs) yearly to prevent repetition of the previous years' flaring causes

It is crucial that refineries rigorously review the unplanned causes of flaring that have occurred in the past, and ensure these are not repeated. Each refinery is customized, and unplanned flaring is caused by a wide variety of accidents, but breakdowns are common. These can include breakdown of varied process control equipment in different refinery units, temperatures too high, other necessary process parameters out of specification in various process units, loss of steam, compressor breakdown, power outages,and any malfunctions that causes shutdown and subsequent flaring.

[6] As in the Annual SOx target in Table 3.3 shown in the previous section.

Failure to prevent predictable repeated breakdowns can be illegal, according to U.S. EPA:

> *EPA, believes that repeated malfunctions for the same cause, generally, could be predicted and prevented. If flaring results from a preventable upset, EPA believes that it does not represent good air pollution control practices and that it may violate the CAA [Clean Air Act].*[7]

Therefore maintaining and updating Flare Minimzation Plans (FMPs) each year in order to prevent repeat malfunctions needs to be required at each refinery. FMPs should also address minimization of Planned Flaring, and ensure routine flaring does not occur.

It is unclear whether the Air District rigorously reviews and enforces actual flare minimization in FMPs, or just accepts FMPs as a rote exercise. Given flaring increases in recent years and unplanned flaring event numbers almost doubling,[8] it appears that enforcement of flare minimization is not happening. It would be helpful to know whether refineries received violation notices for the increased number of unplanned flaring events due to failure to meet general flare minimization requirements, or whether such increases were considered acceptable by the District under the current rules.

The Air District should ensure sufficient fees are charged to refineries and other facilities subject to the rule, so that AQMD is sufficiently staffed to evaluate FMP effectiveness. Fees and fines should later be further increased, if FMPs are found ineffective in minimizing flaring.

D. Flare video monitoring with online realtime access is needed to enforce against flare smoking and other violations

Staff proposed last year to add realtime online video-access requirements to Rule 1118, but only late in the process have oil companies opposed, and succeeded in strickening this highly practical and innovative proposal.

At right is a photo of a Phillips 66 smoking flare event, 7/11/2023, showing the dramatic black smoke that can come from flares. Many other smoking flaring events occur, including the event 2/9/2024 nighttime event, shown on the next page.

***July 11, 2023** - Phillips 66, photo provided to Alicia Rivera, CBE, by CBE member*

Flare regulations limit smoke to 5 minutes,[9] because smoking is a source of additional pollution (beyond the invisible SOx and VOCs), including particulate matter emissions that further harm air quality.

It is impossible for inspectors to be on the spot in less than 5 minutes to see smoking. In fact, AQMD staff recently said during a hearing that having an inspector make it out in two hours is expeditious. These are the realities of logistics, but realtime video can entirely solve the problem. Video technologies are well-developed and readily available.

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[7] This has long been the case, as described in U.S. EPA's Enforcement Alert*: Frequent, Routine Flaring May Cause Excessive, Uncontrolled Sulfur Dioxide Releases Practice Not Considered 'Good Pollution Control Practice'; May Violate Clean Air Act*, 2000, https://www.epa.gov/sites/default/files/documents/flaring.pdf

[8] SCAQMD draft staff report, Jan. 2024, p. 2-12, **unplanned flaring events increased steadily from 129 in 2020 to 232 in 2023**

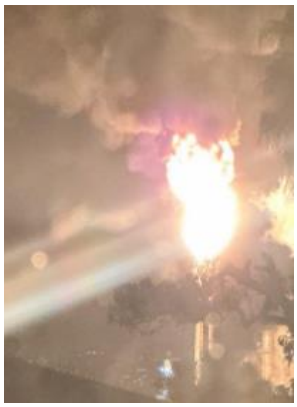
[9] Rule 1118 - (d)(1)(B) Operate all Flares in a smokeless manner with no visible emissions except for periods not to exceed a total of five minutes during two consecutive hours, as determined by the test method in paragraph (k)(2).

We have been told many times by regulators that a particular flaring event or accident reported by community members had not yet been reported by the refinery or other facility. In one example of another flaring event (not to be confused with the Phillips event above), Alicia Rivera, CBE Wilmington Community Organizer reported to CBE's Wilmington team via email that on 7/21/22 a Valero flaring event occurred:

> *Interesting facts about the latest Valero flaring of last night, and how important it is for us/members to see and report flaring. Talking to the inspector I found out that:*
>
> *1) **Valero did not report the incident to AQMD***
>
> *2) **FENS (flare notification sys.) did not go on***

Giving AQMD staff realtime access to online flare video monitoring will help inspectors to: 1) check immediately if a flare is smoking, 2) take follow-up action to determine if there is an emergency happening at the refinery, especially if community response is needed, and 3) determine if rule violations occurred.

We can't tell whether flaring receives Notices of Violation or not. **We do not think that the Air District currently comprehensively tracks such harmful flare smoking** (it appears hit or miss), and we don't think the associated emissions and health impacts are assessed.



***Another flare smoking event, with smells, this month - 2/9/2024**, Phillips 66, Wilm. CA, Ashley Hernandez, CBE*

But video monitoring provisions proposed by staff many months ago have fallen prey to oil industry arguments that video monitoring of flaring represents a security threat. Does that mean that neighbors looking at flaring from their homes, and recording it, represent a security threat? This is nonsensical. It is not necessary for online video monitoring to be connected into oil refinery control systems, they can be separated, and handled securely.

Please note that during Aparatheid in South Africa, oil refinery emissions in black communities were official state secrets.[10] This was absurd, immoral, and racist. Yet today in the South Coast, the Oil Industry has killed the staff proposal for simple provisions for online realtime video monitoring, using tactics reminiscent of this, based on Homeland Security.

Realtime online visual data of smoking flares is a bona-fide air quality monitoring tool to detect visible smoke, just as *infrared* cameras monitor a different part of the spectrum to detect invisible VOCs (eg for storage tanks). Outside the refinery, people can and sometimes do film and record visible

[10] Brian Maguranyanga, Engen Refinery in South Durban, South Africa International Case Studies, University of Michigan, available at https://websites.umich.edu/~snre492/cases.html , (page last updated 2004), *[". . . Apart from being the largest oil refinery in Durban as well as one of the two largest source of sulphur dioxide pollution in South Durban, Engen Refinery is closely located to two residential low-income black communities, Merebank and Wentworth. . . . **During the apartheid era, the refinery was considered a strategic infrastructure or National Key Point, and thus was able to avoid close scrutiny from the public regarding its environmental impact and public health costs. The refinery operated under the Official Secrets Act, which prevented us from dealing at any level with the public about the business** [a refinery manager's view as quoted by Sven Peek]. . . . **The community identified the problem areas to include regular flaring, sulphur dioxide emissions,** and oil spills, etc. However, the management responded by arguing that the pollution was wind-blown from other factories, flaring occurred for safety reasons, and that some oil spillage was beyond their control." . . .]* [emphasis added]

black clouds and large flames at refinery flares for themselves, but this unnecessarily burdens the public with the job of documenting air quality harms.

Continuous video monitoring with online access is a key tool for improving refinery emissions performance and reducing harmful emissions, and must be reinstated.

CBE Youth Member regarding Refinery Flaring experience *(excerpt below, full statement attached)*

. . . I'm a junior who just turned 17. I'm writing to you as a frontline resident living and attending school in Wilmington, CA that has high emissions due to refineries, oil extraction, and high diesel traffic in my community. . . . A home is where you are supposed to feel secure, but when these flares happen I get scared and confused, not knowing what's going on now.

. . . I've witnessed black smoke and strong smells in my home . . . It smelled that bad. **My brother and sister both have asthma and are really affected by these flares. They often start wheezing or need to use their inhalers because they can't handle the fumes anymore.** These flares put the people in my life in actual danger. Not to mention how the color the whole turns orange at night when these flares happen. I often will see just flashes of orange light coming outside my window, and at times I'd even witness smoke. When there's smoke that's when I'm most concerned.

. . . We need a stronger regulation. Please do not proceed to adoption until you add a standard for VOCs, a stronger standard for Sulfur Oxides, and **realtime video camera monitoring to record black smoke.**

E. Long-neglected "Clean Service" and Hydrogen Flares have new requirements

We are grateful for the staff's detailed work beginning the scrutiny of so-called "Clean Service" flaring (of VOCs and hydrogen), which staff found to be extensive in the District.

This category was defined as burning natural gas, Liquified Petroleum Gas (LPG), other low-sulfur streams, and hydrogen. (Now hydrogen flaring is being separated into its own new category.) *These flares contrast with general service flares, which burn gases from many parts of the refinery, including high-sulfur streams.*

"Clean Service" is a misnomer. Past District flare rules focused mainly on reducing SOx, so that low-sulfur flare streams were called "clean". But this failed to recognize the importance of VOC and NOx emissions (and the understimation of VOCs) at clean service, and all flares.[11] Misnaming is not without consequence – such flares were underregulated and have even been misrepresented as non-polluting by AQMD inspectors when responding to flare reports by neighbors. We accept that inspectors believed these flares were clean – after all, District regulations specifically label them as clean. **It is time to correct such misleading regulatory definitions, striking "Clean" Service, and renaming as "VOC" or "Hydrogen" Service flares.**

[11] While general service flares have higher total emissions and emit additional pollutants (like SOx), Clean Service flares have significant emissions without much regulation. Also, clean service flares *do* contain some sulfur, particularly at Phillips 66 Wilmington, which included thousands of pounds per year of SOx emissions from "clean service" flares.[11] Working Group Staff Report, Figure 2-7. Sulfur Dioxides Content from Clean Service Flares by Facility, p. 2-7

Two refineries were identified by the staff as <u>continuously</u> flaring at so-called "Clean Service" flares.[12] Staff found: *"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"; and "Staff is considering limiting the frequency of clean service flaring".* [13]

The non-hydrogen "clean service" LPG flares *"are dedicated to the LPG storage or loading areas of refinery. . . . **the majority of them are not integrated with refinery vapor recovery system**. Flaring at LPG flares occurs when LPG vapor is relieved from pressure control valves or pressure safety valves (PSV) of storage tanks/vessels, when the LPG tanks/vessels are being de-inventoried for cleaning or inspection, and during turnaround maintenance."*[14] [emphasis added]

Consequently, staff proposed a new throughput limit of 15,000 million BTUs per year before adding refrigeration to tanks, to limit flaring at LPG storage, an important step forward. However, it is unfortunate that unlike other refinery systems where routine flaring is not allowed, LPG flares aren't required to recover and recycle propane and butane inside the refinery (connecting with vapor recovery). This routine flaring likely is not in accordance with the EPA Enforcement alert (cited earlier) regarding good pollution control practices, since refineries do have places they could use these gases, rather than burning them.

AQMD staff have also added an important new NOx standard for Clean Service flaring, recognizing that: *"All flares, including clean service flares, are a significant source of NOx emissions.* *NOx emissions are the most significant precursor of ground level ozone formation and the South Coast AQMD must reduce these emissions wherever feasible."*

As in the choice of the annual SOx standard, the proposed NOx standard is not based on the *lowest* levels already achieved. The staff report found for hydrogen flares:

> *"NOx emissions have <u>ranged from zero to 0.37 pounds</u> per hydrogen production capacity (lbs/MMscf) over the last ten years and the emission vary based on operational needs and unit maintenance. . . The proposed NOx performance target is <u>0.3 pound[s]</u> per million standard cubic feet (MMscf) . . ."*

It may be *temporarily* sufficient to start with a NOx limit near the *top* of the range achieved since the standard is new. But the District should commit to review and consider tightening the NOx standard in a few years, evaluating the *lowest achievable NOx level*. The District needs all possible NOx reductions for all sources, beyond existing regulations. Since Hydrogen Plants are seeking to expand, the new NOx standard reductions will be in danger of being offset by increased production.

VOC emissions from "Clean Service" (non-hydrogen) flares are also underestimated (below).

Meeting #3, April 26, 2023, AQMD Presentation, Slide 14, available at https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1118

[13] Working Group Meeting #3 Presentation, April 26, 2023, available at https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1118

[14] Staff report, p. 3-5

F. EPA found much higher Emission Factors for flaring Methane, Propane, and Butane

Note that in 2017, CBE submitted the following comments on Rule 1118 updates at that time, regarding the great understimation of emissions factors for certain hydrocarbons –methane, propane and butane. EPA had already found emission factors for all process gas, and including flaring Natural Gas, and gases "Not Classified" -- at 0.66 lbs/MMBTU (in table below).

EPA Table 13.5-2 VOC & CO Emissions Factors for Flare Operations

Pollutant	SCC[d]	Emissions Factor (lb/10^6 Btu)
Volatile organic compounds[b]	30600904; 30119705; 30119709; 30119741; 30119799; 30130115; 30600201; 30600401; 30600903; 30600999; 30601801; 30688801; 40600240	0.66
Carbon monoxide[c]		0.31

Petroleum Industry Flaring of Process Gas

Petroleum Industry Flaring of Natural Gas

Petroleum Industry Flaring "Not Classified"

By contrast, the District regulation:

- Defines emission factors for propane and butane flaring at 0.009 lbs/MMBTU VOCs to atmosphere (**73 times lower than EPA**) and Methane flaring at 7 lbs/MMSCF (equivalent to ~.007 lbs/MMBtu[15]) or **94 times lower** than EPA's 0.66.
- EPA's much higher VOC factor of 0.66 lbs/MMBTU is only used by the District for "vent gas" flaring.
- Further, EPA's emission factor is based on achieving very high combustion efficiency and on sufficient heat content and flare tip velocity to maximize VOC destruction. If these conditions are *not* met, emissions can be even worse.

We urge the District to update the emissions factors for flaring of natural gas, propane, and butane, to at least as high as EPA's VOC factor of 0.66 lbs/MMBtu for all flaring of hydrocarbons. The current underestimation of emissions also underestimates the value of preventing flaring emissions, and of adopting all reasonably available control measures. It emphasizes the flaw in assuming VOC impacts are low compared to SOx impacts.

This underestimation also undermines the District's cost-effectiveness calculations for controlling routine flaring from LPG tanks (discussed above). With propane and butane emissions upward of 73 times higher, cost per ton of reduction is also 73 times less. **The District, after correcting the emissions factors to these much higher levels should re-calculate the cost-effectiveness of controls for non-hydrogen clean service flares.**

[15] Methane has about 1020 BTU/scf, so 7 lbs/1,000,000 SCF / (1020 BTU/SCF) ≈0.007 lbs/MMBTU, and EPA's factor for flaring methane is 0.66 lbs/MMBTU / 0.007 lbs/MMBTU = 94 times higher than the District factor.

This is another reason why specialized Remote Sensing of flares (discussed below) is needed. Especially for flares that operate almost continuously, the District would not have to wait for a flaring event to carry out the monitoring. The District should identify contractors who can perform this monitoring and at least begin pilot testing of flare destruction efficiency and actual VOC emissions.

G. In 2017 Flare Rulemaking, future Remote Sensing of flares was promised by AQMD, after EPA's remote sensing found much higher flare emissions

During the 2017 Rule 1118 update 2nd workshop, *March 22, 2017*, District staff presented the following slides 21, 22, and 23, which summarize Flare Remote Sensing well (highlights added) stating the *"Purpose of Remote Sensing is to more accurately determine emissions and to provide feedback on flare destruction efficiency"*

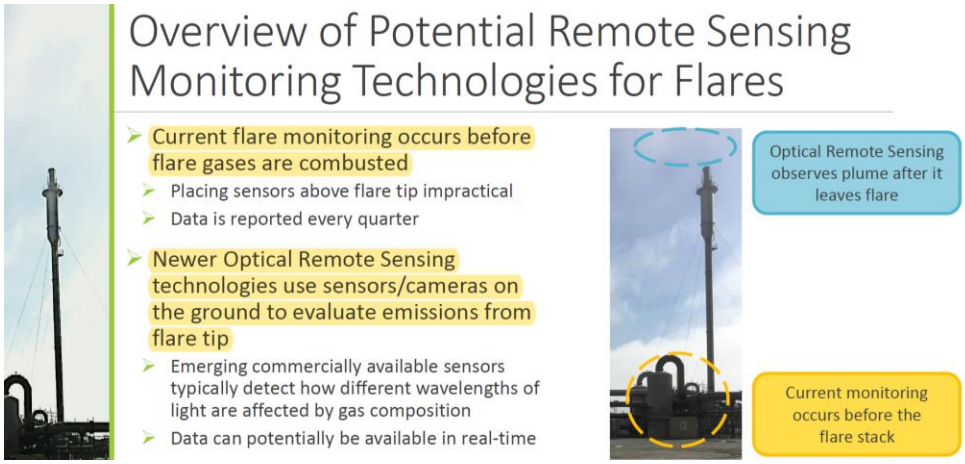
Flare Remote Sensing Pilot Program

- Purpose of Remote Sensing is to more accurately determine emissions and to provide feedback on flare destruction efficiency
  - Primary focus will be on Volatile Organic Compounds
- Evaluate multiple remote sensing technologies at multiple refineries
  - Logistics, cost, quality of data
- Data collected during Pilot Program compiled in a final report and made publicly available
  - Emissions data collected during Pilot Program not intended for compliance or fee purposes
- Incorporation of remote sensing requirements into rule pending assessment of Pilot Program

Monitoring of Flare Destruction Efficiency

- Flare destruction efficiency a significant factor for determining Volatile Organic Compounds (VOCs) emitted during flaring
- New monitoring technologies becoming available to directly measure flaring emissions
  - EPA used some of these new technologies to determine a new VOC emission factor that is ~10X higher than current Rule 1118 emission factor
- Recent SCAQMD-funded study that investigated total refinery VOC emissions using optical remote sensing technologies observed one flaring event in 2015

Estimation Method	Pollutants Measured	Emissions (pounds)
Rule 1118 VOC Emission Factor (Reported for 24-hour period)	Total VOC	244
EPA AP-42 Emission Factor (Using same 24-hour period)	Total VOC	2,556
SCAQMD-funded study (Observed over 4 hour period)	Fraction of VOC (non-methane alkanes only)	6,355 ± 4,103



US EPA found 10 times higher flare emissions for one event (over 24 hours) compared to when using the District's assumed high VOC flare destruction efficiency. AQMD measurements above found an even higher difference, (43 times higher emissions) for a four-hour period. This is consistent with evidence that we have submitted over the decades, since many studies show flare efficiency can vary widely.

We noted that at the October 25, 2023 workshop, Providence Photonics presented their remote sensing method, with added control to optimize steam (to both measure and reduce flare emissions).[16] But at the Feb. 8th workshop, AQMD found flare remote sensing infeasible, because the method did not yet have EPA approval.[17] However, AQMD has regularly authorized use of its own test methods or alternate methods, (not relying on EPA).

We propose the District re-commit to Remote Sensing emission characterization by a date certain (within 3 years). If it finds lower destruction efficiency and resultant higher VOC emissions, the District should correct its rules and emissions inventory. It is important to refine the emissions inventory to reflect true impacts of sources (whether from flares, storage tanks, or other emission underestimations).

H. Definition loopholes

"Essential Operational Needs" include a long list of activities, excusing refiners from flare minimization *by definition*.[18] This category is not present in Bay Area regulation[19] and should be eliminated as unecessary and counterproductive. (This was introduced in early regulation, when AQMD had little experience regulating flaring, but the Bay Area never included this category.)

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[16] Providence Photonics, The VISR Method for Flare Monitoring, Oct. 25, 2023 during Rule 1118 Meeting #4, available at: https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1118/providence-photonics-presentation-on-remote-sensing-of-flare-efficiency.pdf?sfvrsn=8

[17] Proposed Amended Rule 1118: Control of Emissions from Refinery Flares Public Workshop February 8, 2024, Slide # 9, [*"Remote optical sensing for flare emission characterization – ● Deemed infeasible at this time: ●Technology under review by U.S. EPA, but not approved".],* https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1118/par-1118-pw-presentation-20240208.pdf?sfvrsn=15

[18] SCAQMD Rule 1118: "(c)(14) **Operate all flares in such a manner that minimizes all flaring** and that no vent gas is combusted **except during emergencies, shutdowns, startups, turnarounds or *essential operational needs*."** [emphasis added]

[19] BAAQMD, Regulation 12-12:Flare Minimization Plan requirement (12-12-301): *"This standard shall not apply if the APCO determines, based on an analysis conducted in accordance with Section 12-12-406, that the flaring is caused by an emergency and is necessary to prevent an accident, hazard or release of vent gas directly to the atmosphere."*

I. Public access to SCAQMD flare data has been unecessarily difficult, contrasting with BAAQMD provisions for daily flare data, online since regulation adoption.

We appreciate the extensive work of the Public Records staff who provided us with flare data and root cause analysis in hundreds of spreadsheets and reports, pursuant to Rule 1118. We have made such Public Records Act (PRA) requests every few years to review updated data, because the South Coast website only provides quarterly aggregates, not measured daily emissions. It takes months to receive data.

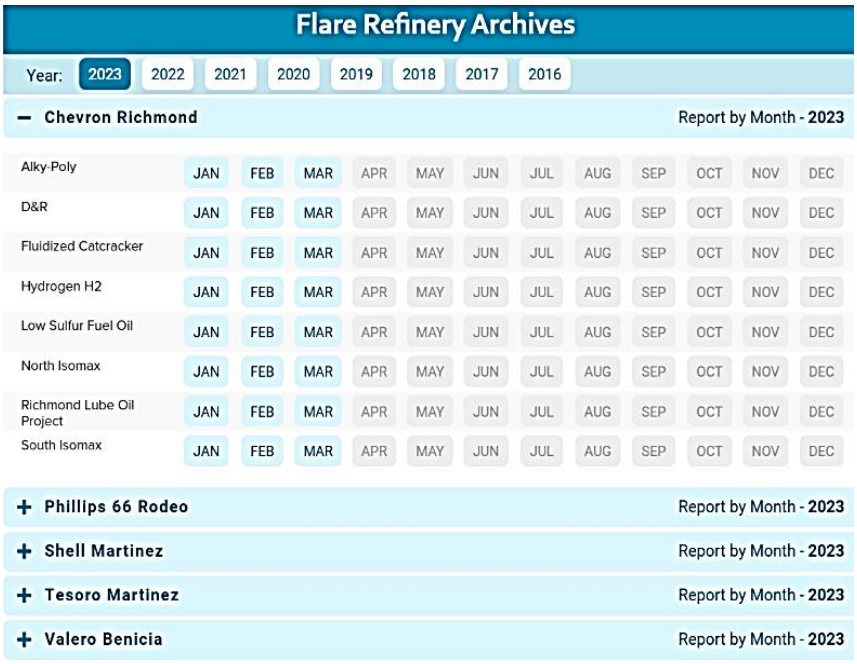
We also appreciate the engineering / regulatory staff addressing our concerns through a proposal to add flare emissions online to the FENS website. This will help the public, regulators, and refiners. Community members experience flaring smoke, odors, and bright lights at night, and deserve data quantifying event emissions. Good data access is also essential in leading to solutions. The Bay Area has provided such daily data online since its flare regulation was adopted (published online about a month later). The South Coast can use and improve on this example, with a few additions for accessibility.

In addition to the daily emissions and flow for each event at each separate flare, adding a running daily total by SCAQMD for each refinery on SOx, VOCs, and total flow would greatly increase accessibility beyond what the BAAQMD provides.

Right now, in the Bay Area data, the public has to look in each separate flare file, each month, at each refinery, each day, to determine if there were flare emissions that day.

Each refinery has many different flares (Chevron Richmond at right has eight), so it is still hard to find which days have flaring without opening many folders.

Bay Area online data provides daily flaring data for each month, flare, and refinery.



SCAQMD should require an additional chart, totalling emissions at each separate day as the years progress, at each refinery, to make it easier to see when events occurred. This would immediately show big events, rather than requiring looking through 84 separate files, in the Chevron Richmond example above. Annual totals, and measures of annual targets for SOx, VOCs (and NOx, discussed below), should also be provided, in tons per million barrels of crude oil processed. In the case of non-refiners (which do not process crude oil but are subject to the rule), totals should also be provided.**In addition, any preliminary information about cause of flaring would be very helpful.**

We understand that staff is planning to provide additional public process after adoption of Rule 1118 regarding FENS website format. However, there may be additional provisions needed in Rule 1118 itself needed now to ensure refinery data will be submitted in a form that will facilitate public access to flare data (already submitted to AQMD pursuant to existing Rule 1118 requirements)..

II. Summary of Recommendations

We urge the following improvements to the draft regulation (and moving adoption to May):

1) **The proposed 2028 Annual SOx emission target is so loose, most refineries already met far tighter standards years ago.** It acts like a backstop, not an achievable improvement.

   - *Tighten to <0.10 tons SOx per million barrels crude oil processed, which has already been met by multiple refineries (instead of 0.25, a step backward).*

2) **An Annual VOC target is entirely missing** – there is *no* such standard to address high-VOC, low-SOx events missed by the annual SOx target.

   - *Set a similar achievably low VOC target, based on long-term flare data, since such targets for SOX were found effective by the staff.*

3) **Flare Minimization Plans are not required every year**

   - *Require annually, ensure they plan to prevent causes of large flaring of previous years.*

4) **The oil industry killed staff-proposed Online Video Monitoring which could document harmful *smoking* flare violations** that would otherwise be missed by AQMD enforcement. Vague Homeland Security arguments were used by the industry, reminiscent of South African censorship during Apartheid (when refinery emissions were defined as official state secrets). This is absurd—neighbors can see and film flaring, but District staff must travel long distances, frequently arriving too late to see and enforce against smoking flare violations, unless staff has access to realtime flare video.

   - *Reinstate staff-proposed realtime online flare video monitoring.*

5) **The District promised in 2017 to carry out specialized Remote Optical Sensing of flares** to improve emissions understimations, but now says communities must wait until EPA develops its test protocol (though the District has many of its own protocols).

   - *Commit to Remote Sensing by a date certain (within 3 years).*

6) **Other key amendments are needed** including correcting low-ball VOC calculations (inconsistent with EPA), more comprehensive prevention of constant flaring at hydrogen and so-called "Clean Service" flares, definition loopholes, improvements in public access to online data.

We acknowledge steps forward made by the District toward reducing emissions from refineries, and highly appreciate the staff's attention to these issues.

At the same time, the District as a whole does not always seem to recognize the severity and level of pollution, accidents, smoke, flaring, and cumulative impacts from a variety of Oil Refinery emissions, added to the variety of other pollution sources endured by people in Wilmington, Carson, West Long Beach, (as well as by the other refinery communities in El Segundo and Torrance).

It is surprising to us that we have to work very hard to justify the need for pollution reductions in these communities.

The onslaught of refinery accidents (which frequently cause flaring) is unrelenting and traumatizing, and the onslaught of pollution from all the different fossil fuel sources in these communities is devastating to health, and to climate safety.

We urge the District to adopt all Reasonably Available Controls for Refinery Flares.

Another bright, disruptive, flaring event with strong, irritating smells - Valero Wilmington Refinery Flaring 7/20/22, Photo by Maria Gonzalez, CBE member. Flaring was so bright, she was awakened at night, and thought the house was on fire. Smells were bad, requiring shutting up windows. This was unreported to Air District by the refinery until she called.

Sincerely,

Julia May, Senior Scientist
Communities for a Better Environment (CBE)

ATTACHMENT - CBE Youth Member has submitted this statement to us for AQMD:

(Other such statements will be submitted later – some members were not able to speak at the public workshop, due to technical difficulties)

My name is Sheelsie and I'm a junior who just turned 17. I'm writing to you as a frontline resident living and attending school in Wilmington, CA that has high emissions due to refineries, oil extraction, and high diesel traffic in my community. Today I'm concerned about flaring in my community and the updates to the refinery rule because flaring happens when I'm idly minding my business in my own home. A home is where you are supposed to feel secure, but when these flares happen I get scared and confused, not knowing what's going on know We need strong regulations to understand and capture the real impacts that are being emitted in my community. Don't allow for delays and implement stronger regulations! I've witness black smoke and strong smells in my home almost as if someone set a fart bomb in my house. It smelled that bad. My brother and sister both have asthma and are really affected by these flares. They often start wheezing or need to use their inhalers because they can't handle the fumes anymore. These flares put the people in my life in actual danger. Not to mention how the color the whole turns orange at night when these flares happen. I often will see just flashes of orange light coming outside my window, and at times I'd even witness smoke. When there's smoke that's when I'm most concerned We know the District has been working for many decades to regulate Oil Refinery flaring, so we don't want to wait longer for adoption of ALL REASONABLY AVAILABLE CONTROL MEASURES. We need a stronger regulation. Please do not proceed to adoption until you add a standard for VOCs, a stronger standard for Sulfur Oxides, and realtime video camera monitoring to record black smoke.