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February 16, 2021

Re: Comments on BAAQMD Draft Regulation 6, Rule 5 (Oil Refinery FCCUs):

Dear Mr. Joe,

Thank you for hosting the Bay Area Quality Management Districts' Public Workshop Rule 6-5 last week. It was well-organized and very informative. I am a second-year student in the University of San Francisco's Environmental Management Graduate Program and was unaware of the tremendous health impacts of PM emissions on frontline communities in the Bay Area.

After reading and listening to Public Comment from residents, community groups and refineries and reviewing the BAAQMD's Initial Staff Report (ISR), it is clear that particulate matter (PM) especially PM<sub>2.5</sub> emissions released from petroleum refinery fluidized catalytic cracking units (FCCUs) are responsible for unhealthy levels of air pollution in the Bay Area and creating serious health risks to residents living near East Bay refineries.

The ISR cites recent studies linking PM exposure to respiratory and cardiovascular diseases, higher rates of asthma, cognitive impairment and cancer. Communities for a Better Environment (CBE) references findings by Harvard researchers which found that long-term exposure to PM<sub>2.5</sub> is associated with higher COVID-19 mortality rates. According to public comment by the Sunflower Alliance, FCCUs are the largest industrial source of PM<sub>2.5</sub> emissions in the Bay Area and the BAAQMD Advisory Council meetings on particulate matter reached the conclusion that there are no proven "safe" levels for PM emissions.

From reviewing public comments, there appear to be three key issues and concerns:

- 1. Tighter PM emissions standards for Bay Area refineries are necessary to limit the PM<sub>10</sub> emissions -including PM<sub>2.5</sub> and concentrated PM (cPM)- from FCCUs.**

The World Health Organization recommended safe limit for PM<sub>2.5</sub> is 10µg/m<sup>3</sup>. In 2018, wildfire smoke created hazardous PM<sub>2.5</sub> levels of between 197-247 µg/m<sup>3</sup>

in the East Bay. With record-high levels of air pollution from wildfires due to climate change, PM<sub>2.5</sub> is a major health concern in California. The cumulative effects of wildfire smoke, COVID-19 and PM<sub>2.5</sub> emissions from oil refineries has made air pollution and PM<sub>2.5</sub> a serious public health risk especially for communities on the refineries' frontlines. Every effort should be made to reduce anthropogenic air pollution such as PM<sub>2.5</sub> emissions generated by FCCUs.

Two refineries already meet BAAQMD standards which are weaker than the standards in other Air Districts in Southern California and Louisiana. Valero Benicia's refinery's annual emissions are much lower than all other Bay Area refineries by using Wet Gas Scrubber (WGS) technology, indicating it's possible for other refineries to meet stricter standards. However, a WGS System would require approximately 6-10 years to complete and may not be feasible for each refinery due to costs and space constraints. Therefore, BAAQMD should adopt lower PM emissions standards which can be achieved in the short-term with stricter PM emissions standards as a long-term goal.

**2. Need independent and accurate PM testing methods at all Bay Area FCCUs.**

In order to monitor PM<sub>2.5</sub> and condensable particulate matter (cPM) emissions levels, accurate and reliable source tests and more data are necessary. The Martinez Refining Company (MRC) public comment suggests that Method 202 (the BAAQMD-approved test method) is too variable and problematic for cPM testing due to potentially forming PM "artifacts" in test equipment that would not form in ambient air. The BAAQMD PM emissions reduction estimate of 80 tons annually doesn't account for potential increased PM artifacts or filterable PM emissions.

Chevron proposes an alternate testing method, OTM 37, which is a "dilution tunnel method designed to simulate the natural cooling and diluting process that happens when a plume leaves the stack and enters the atmosphere." OTM 37 is a more accurate test method because it simulates how much SO<sub>2</sub> and NH<sub>3</sub> are actually being formed in the atmosphere. This method has been developed and improved upon over 10 years and used by the EPA's National Emissions Inventory Group for estimating emissions from heaters and boilers. BAAQMD proposed further cPM source testing in 2020, but this has not yet been completed. To ensure reliable and comparable data, BAAQMD should consider using both test methods - Method 202 and OTM 37 – to conduct testing .

Currently, the testing results are self-reported by the oil companies. Instead, the Sunflower Alliance and 350 Bay Area request that the Air District perform

independent testing at each facility and make the results available to the public. The overall consensus is that more data and reliable source testing administered by BAAQMD, instead of the oil companies, is required in order to ensure accurate PM emissions standards for Rule 6-5 compliance.

- 3. Determine best available retrofit control technology (BARCT) to regulate PM emissions.** CBE and Community Energy Resource (CER) are asking that Wet Gas Scrubbers (WGS) be used in FCCUs to reduce cPM emissions. Bay Area health care professionals and residents advocate that WGS systems be installed to dramatically reduce PM emissions. However, Chevron and MRC state that this is not feasible because 1) both refineries already use Electrostatic precipitators (ESPs) to reduce PM and 2) MRC does not have adequate space to install a WGS system. MRC estimates that the cost for installing a WGS system would be close to \$750-800M (based on Valero's costs) and requests a cost-effective analysis.

The refineries also contend that the WGS system is not optimal for FCC PM Control. WGS technology was designed to reduce NOx and SO2 emissions, not PM. Ammonia injection in ESPs also reduces NOx emissions – replacing ESPs with a WGS system would lose this benefit.

Both ESPs and WSGs have negative environmental impacts and risks. ESPs are a potential risk for fires or explosions at high CO levels. WGS systems require significant amounts of fresh water - approximately 150M gallons per year (equivalent to the annual water usage of 2400 households). This is an important concern since California experiences frequent droughts. Using WSGs to reduce PM emissions would greatly increase water usage, energy demands and GHG emissions which would likely cancel out any potential benefits from PM reductions.

## Conclusion

**All stakeholders must agree on acceptable PM emissions levels and monitoring, but the refineries may determine which option(s) are used to meet requirements.**

Representatives from Chevron and MCR, the BAAQMD Advisory Council, the Ad Hoc committee on Equity and Inclusion, and frontline communities should collectively, decide on the acceptable PM emissions levels to be incorporated into BAAQMD Draft Regulation 6, Rule 5 and monitoring guidelines. The group would also determine the optimal PM emissions testing method, schedule and reporting requirements. Each group would have the opportunity to review, discuss and approve the standards for rule compliance under AB 617's Expedited BARCT Implementation schedule.

David Joe, BAAQMD  
February 14, 2021

If Chevron and MRC are unable to install the Air District's recommended BARCT (i.e. WGS), then the refineries shall submit alternative option(s) to bring agreed-upon FCCU PM emissions levels into compliance under the Amendments to Rule 6-5. Some of these options may include: retrofitting ESPs, increasing hydro-treating or implementing the use of sulfur reducing additives (which lower PM). A retrofit and emission reduction compliance must be completed by AB 617's Expedited BARCT Implementation deadline of December 31, 2023.

The Air District will be responsible for completing quarterly and annual emissions testing with reports made accessible to the public on the BAAQMD website. It is recommended that BAAQMD conduct source testing using both Method 202 and OTM-37 for 1-2 years in order to compare results and ensure cPM testing accuracy. The test results will be used to determine if cPM levels are in compliance and the best reduction mitigation measures.

**All stakeholders must work together to identify and achieve short-term and long-term PM reduction goals.** The community would be better off with options that the refineries could implement sooner to reduce PM, NOx, SO2 and/or other pollutants. Even though it may not be possible to lower FCCU's PM10 emissions reductions to 0.02 gr/dscf (grains/dry standard cubic foot) by 2023 as proposed in the draft regulation, sulfur dioxide and ammonia emissions reductions are achievable and could improve air quality levels while reducing the health risks to residents living near refineries.

A long-term plan must be developed concurrently to reduce PM emissions even further. Federal and State government regulations will require massive GHG reductions in order to achieve U.S. net-zero emissions goals by 2050. Refineries can start working towards meeting government requirements in addition to lowering emissions to improve air quality now and address the local communities' health concerns.

Thank you for the opportunity to comment on Amendment to Regulation 6, Rule 5.

Sincerely,

Stephanie Fong  
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University of San Francisco

David Joe, BAAQMD  
February 14, 2021