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Response to May 28 2020 Draft Amendments for BAAQMD Regulation 6-5
Particulate Matter Emissions from Fluidized Catalytic Cracking Units (FCCU's)

Mr. Broadbent

Front-line refinery communities of the Bay Area are exposed to particulate matter emissions (PM2.5) from refinery FCCU's, which represent the single largest industrial source of such emissions in the Bay Area. Grain-for-grain, FCCU PM uniquely contains heavy metals extracted from heavy petroleum and also metals desorbed from the FCCU's catalyst fines, which are not contained in other types of particulate matter, such as wild fire or wood smoke. Because metals such as vanadium and nickel are used by industry (and also in nature) to alter carbon-carbon bonds, only trace amounts can be tolerated by the human body, not industrial quantities emitted by refinery FCCUs. By not requiring highly efficient and cost-effective wet scrubbing technology to be installed in Bay Area FCCU's, BAAQMD's proposed FCCU PM reduction proposal manifestly undermines the requirements under AB617 to institute Best Available Retrofit Technology (BARCT) for communities disproportionately impacted by refinery PM2.5. (1)

The BAAQMD Advisory Council meetings on particulate matter emissions concluded that, as with most toxic exposures, there are no proven "safe" levels of PM emissions. They concluded that the Federal regional PM2.5 average exposure limit of 12 µg/m³ is unsafe and must be reduced to at least 8. A recent Harvard study correlating COVID-19 mortality rates to average PM2.5 exposure found that every 1 µg/m³ change in PM exposure resulted in an 8% increase in COVID-19 deaths. The need to control localized industrial hot spots such as those adjacent to refineries requires even further restrictions.

The draft regulation proposes a new measurement limit for total PM10 emissions of 0.02 gr/dscf (grains/dry standard cubic foot) as representative of BARCT. However, the BAAQMD Initial Staff Report (ISR) documents a broad achieved range from as low as 0.008 to an upper limit of 0.034.

The ISR also documents total PM10 emissions, in tons/year, from each Bay Area facility. The Valero facility, retrofitted with partial wet scrubbing technology, produced a range of 25-45% of the PM10 emissions of the other facilities. Yet the proposed standard will only reduce cumulative PM 10 emissions from all facilities to approximately 70% of current emissions.

Additionally, the ISR represents wet scrubbing and electrostatic precipitation (ESP) as equivalent routes to achieving BARCT levels. In terms of BAAQMD-documented FCCU PM control efficacy, existing wet scrubbing systems can typically achieve total particulate collection efficiencies up to 95 percent. (1) And SCAQMD reported source tests from a refinery FCCU with WGS showing achievement of total PM levels (filterable and condensable) of 0.003 gr/dscf (2)

As noted by Greg Karras:

BAAQMD specifies EPA Test Method 202 to measure that cPM for purposes of enforcing this proposed limit. (§ 6-5-604.) EPA reports source tests using its Method 202 for condensable PM at FCC units that emitted less than half as much (<0.010 grains per dscf) repeatedly. For example, at Valero's Port Arthur refinery (0.00839 gr/dscf), ExxonMobil's Torrance refinery (0.00964 gr/dscf) and CITGO's Lake Charles refinery (0.0097 gr/dscf).

The ability of the public to evaluate whether the proposed standard represents the best protection of our health and safety is highly restricted by the limited data publicly available on site-specific emissions. For example,

- There is no data presented to show the PM10 emissions from the Valero site both before and after installation of the partial wet scrubbing retrofit.
- The regulation proposes new measurement methods for the condensable PM portion of emissions, which would be applied within the Air District to Chevron's FCC in the context of its ESP and their NH3 use, is contrasted by FCC wet scrubber installation in the SCAQMD and elsewhere.

To insure reliable and comparable data across all facilities, the Air district should conduct its own measurements at each refinery and make that data publicly available this fall, prior to the proposed final review of Regulation 6-5 in Nov 2020. The public has understandable suspicion of reliance upon pollutant emission measurements controlled and conducted by industry.

The draft regulation must be revised such that the Air District conducts the source tests measuring total filterable and condensable PM emissions. Furthermore, reliance on refinery self-monitoring should be prohibited. Enforceable and effective PM standards must be based on measurements by publicly controlled agencies not polluters.

The proposed standard is an unexplained and under protective approach to reducing localized impacts of particulate matter emissions. The reluctance to set more stringent limits places communities exposed to metals-containing refinery emissions at continued risks of high asthma rates, cardiovascular disease and excess deaths.

Based on the currently available public data, there is no reason not to adopt a much stricter PM10 emission limit. Acknowledging that the PM-reduction success of refinery wet scrubber utilization is well proven, a feasible limit below 0.01 gr/dscf would be much more protective of the health and safety of exposed communities. Previously demonstrating markedly reduced PM emissions in a SCAQMD FCCU outfitted with a wet scrubber, this conservative request to BAAQMD for a total PM reduction target of 0.01 gr/dscf for FCCUs is still well below easily achievable PM containment levels. Lastly, wet scrubbers eliminate the possibility of potentially catastrophic ESP explosions, such as occurred in 2015 at the ExxonMobile refinery in Torrance. (3)

One has to wonder why wet scrubbing technology for FCCUs has not been a sought-after goal, particularly because it is so cost effective. For example, if so desired by Chevron, the total lifetime cost of a wet scrubber would be less than one-tenth of the cost of the recent Chevron Modernization Project and the initial installation costs of a wet scrubber would be much less, being only one-thirtieth of the total cost of the Project.

In contrast, the Project, using an ESP, was designed to increase the FCCU's sulfur throughput by over 50% and unfortunately, will likely increase similar amounts of FCCU PM emissions. To make matters worse, Chevron must now continuously attempt to reduce the vast amounts of ammonia slip at their FCCU, while they and BAAQMD may have lost the opportunity for long-term harm reduction using proven, cost-effective pollution control technology.

The final version of Rule 6-5 for FCCs must include a more publicly transparent discussion of both public health harm reduction technology and cost-benefit analysis when deciding which FCC BARCT to ultimately deploy.

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References:

¹ Refinery Rules Technical Working Group Discussion Topics – Amendments to Regulation 6: Particulate Matter, Rule 5: Particulate Emissions from Refinery Fluidized Catalytic Cracking Units. Rule Development Background (09/03/2019 (Purpose: Address condensable particulate matter (PM) emissions from refinery fluidized catalytic cracking units (FCCUs) and carbon monoxide (CO) boilers. Impetus: 2017 Clean Air Plan, AB 617 Expedited BARCT Implementation Schedule))

² SCAQMD, 2010. Final Staff Report SOx RECLAIM, Part 1: BARCT Assessment & RTC Reductions Analysis, November.

³ ExxonMobil Torrance Refinery Electrostatic Precipitator Explosion. Torrance, California. Incident Date: February 18, 2015. U.S. Chemical Safety and Hazard Investigation Board (CSB). ExxonMobil Torrance Refinery Investigation Report No. 2015-02-I-CA. (On-Site Property Damage, Catalyst Particles Released to Community, Near Miss in MHF Alkylation Unit)