VALERO

June 8, 2017

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Dear Dr. Fine:

Valero is submitting this letter as partial response to discussions and presentations that took place during the April 19 Rule 1410 Working Group Meeting held in Torrance, CA. Numerous items were stated and presented at that meeting, as well as in various public forums in the preceding months, that are either misleading or absolutely incorrect. This letter addresses some of those items. More detailed response to these and additional items is under development and will be submitted in the near future. We are providing these statements to this Working Group with the expectation that any rule making development will be driven by facts and not alarmist statements that are not fact driven.

1. Relative maturity and use of Sulfuric acid alkylation versus HF acid alkylation: The statement was made that Sulfuric Acid Alkylation is obviously the more mature and prevalent technology. This is incorrect. In fact, the technologies were developed at approximately the same time and each are presently used in approximately 50% of the US refineries that utilize alkylation.

2. Additized HF as a passive mitigation system: Additized HF has long been recognized as a form of passive mitigation for purposes of EPA's Risk Management Program regulations. Notwithstanding statements made to the Working Group that EPA or its contractors have recently opined that additized HF should be viewed as an active mitigation, this view is not supported by the federal RMP regulations codified in 40 CFR Part 68:

> *Mitigation or mitigation system* means specific activities, technologies, or equipment designed or deployed to capture or control substances upon loss of containment to minimize exposure of the public or the environment. Passive mitigation means equipment, devices, or technologies that function without human, mechanical, or other energy input. Active mitigation means equipment, devices, or technologies that need human, mechanical, or other energy input to function. [40 CFR 69.3]

The definitive industry standard[1] for HF alkylation systems, API RP 751, classifies specific forms of HF mitigation as "active" or "passive" with reference to the federal RMP regulations, concluding that additized HF represents passive mitigation:

> *API RP 751 6.6 - Passive Mitigation Systems.* Examples of passive mitigation systems include barriers, catch-pans, settler compartments, vessel design to minimize HF inventory, vessel baffles to segment HF inventory, minimizing dead-legs and flanges as potential leak sources, dual seal or seal-less pumps, **and vapor suppression additives**.[2]

The basis for this interpretation is that passive mitigation systems do not require human or mechanical interaction to function. They are always available and inherently more reliable because there is no reliance on human intervention to 'turn on' the mitigation. This is a long held position that is consistent with API, AFPM, and CCPS guidance. This position clearly reflects the practice at the Wilmington Refinery, which receives its HF from the vendor as an additized product so that the additive is always present in circulating acid and in stored acid inventories from the moment the product arrives onsite.

3. Norton report in general: Many portions of the study by Norton Engineering have been presented as fact in statements made to the Working Group. As Valero has stated previously to the SCAQMD during refinery visits, the Norton study relies on numerous incorrect assumptions and its conclusions are therefore deeply flawed. A more detailed point by point response is in development, but meanwhile, Valero suggests that the Norton paper should not be accepted at face value without independent and critical assessment of the underlying assumptions made in that whitepaper.

4. Cost of technology replacement: One of the Norton Engineering report findings presented as fact had to do with Norton's $120 MM cost estimate for replacing an HF alkylation unit with Sulfuric acid technology. It should be noted that the authors of the Norton study qualified this number and pointed out numerous caveats. Many of those caveats would increase the estimated cost significantly. There are many costs associated with projects in Southern California that would further drive the cost for any replacement of the Valero Wilmington ReVAP Alkylation higher than an average location. Therefore, the Norton rough estimate is unreliable and inaccurate.

5. Significantly greater acid volumes required for sulfuric acid alkylation: HF alkylation units regenerate spent acid within the process unit, minimizing acid consumption and the need for fresh catalyst deliveries. Further, HF alkylation units have the capability to efficiently process a

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[1] OSHA and CAL-OSHA define API Recommended Practices (RPs) as recognized and generally accepted good engineering practices (RAGAGEP).

[2] American Petroleum Institute 2013, *API Recommended Practice 751 (Safe Operation of HF Acid Alkylation Units).*

wide range of feedstocks such as propylene (C3) and amylene (C5). Sulfuric acid alkylation units consume a much greater volume of acid to process these streams and produce lower alkylate yields and product quality (octane) for those feedstocks.

These and other factors lead to sulfuric acid alkylation units utilizing up to 200 times more acid. This acid is typically sent to an offsite regeneration facility. This results in up to 400 times more local truck traffic. Each delivery of fresh acid corresponds to a truck of spent acid sent offsite for regeneration. This significant increase in delivery truck traffic results in a corresponding increase in mobile source emissions.

6. Impacts from loss of alkylate production: Misleading statements were made in the Working Group meetings suggesting that alkylate is needed as a high octane blending component only for high performance vehicle fuel. In fact, alkylate is a key component in producing all grades of California gasoline due to the lack of olefin and aromatic content along with a low vapor pressure, very low sulfur and relatively high octane. As noted in a recent CSB report, the loss of the Torrance FCC / Alkylation units in 2015 – 2016 cost California consumers approximately $2 billion in increased fuel costs.

   Alternate Technologies: Due to the importance of this topic and potential misconceptions that may be developing from incorrect or incomplete statements made in the first two working group meetings and other presentations, we recommend that this topic be specifically addressed in an upcoming working group meeting and that Valero and others be allowed to present on this topic.

7. Conversion of HF alkylation unit to sulfuric acid alkylation at undisclosed UK refinery: Valero's experts in process safety technology have devoted considerable time and effort to trying to find information to support claims made to the Working Group about an unnamed UK refinery having successfully converted an HF alkylation unit to sulfuric alkylation. In addition to drawing on Valero's in-house expertise, we have consulted with three major alkylation technology licensors (UOP, Honeywell, and Stratco); three industry advocacy groups (AFPM, API, and the United Kingdom Petroleum Industry Association); five leading refining consultants (HF Alky Consultants, FCC/HF Alky Experts Ltd, BakerRisk, ABS, and Foster Wheeler); and other petroleum refiners (PBF, Exxon, Marathon, HollyFrontier, BP, and Western Refining). After a thorough and detailed inquiry, we can find *no* UK refinery that matches the design and commissioning details provided in the Bastleford Consultancy presentations. We request that either these claims be supported by facts that can be effectively confirmed or that any statements claiming effective conversion of an HF alkylation unit at a petroleum refinery being converted to sulfuric acid alkylation be disregarded and that they be stricken from the administrative record in this matter.

8. Presentation Summary Table: The table presented in Slide 21 of the April 19 meeting is misleading. The table should be retracted. The following information is incorrect or incomplete:

Modified HF

- Advantages – Can process wider range of feedstocks, which matches the configurations of the refineries now using this technology
- Examples (there are 2 additional US refineries) In comparing to Sulfuric Acid Alkylation either an additional row for standard HF units of which there is an equal amount to Sulfuric Acid units should be added or that number be included with a footnote to the MHF line representing the maturity of HF Alkylation overall

Sulfuric Acid

- Advantages (HF is as widely used as Sulfuric Acid so this point is misleading)
- Potential Disadvantages – Would require unit replacement vs. new equipment. Would require additional pretreatment equipment. Would result in significant gasoline supply interruption to replace existing unit with new unit.
- Cost is understated by orders of magnitude

Solid Acid

- Disadvantages – Not commercially proven
- Examples – Strike the UK reference (not true) Strike Chinese Chemical plant – not comparable unit – not refinery or equivalent feeds / processing objectives
- Cost – Question basis for cost on comparable feed rate and composition needed for refineries potentially impacted

Ionic Liquid

- Disadvantages – Not commercially proven
- Examples – Strike these or qualify that all are on a demonstration scale with feedstocks that do not match those of the refineries potentially impacted
- Cost – Question basis for cost on comparable feed rate and composition needed for refineries potentially impacted

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We look forward to this information being entered in to the Working Group material to establish factual information into this process.

Very truly yours,

Mark Phair
Vice President and General Manager

cc: Mr. Wayne Nastri, Acting Executive Officer
Ms. Susan Nakamura, Assistant Deputy Executive Officer
Mr. Mike Krause, Planning & Rule Manager