energy API

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January 9, 2013

Dear Ms. Gere, Mr. Girard and Ms. Deshais:

The Connecticut Petroleum Council, a division of the American Petroleum Institute ("API"), respectfully submits this letter and the attached memo for your consideration and requests that you include this letter and the enclosed memo in the official record of the public hearing occurring on January 9th, 2013, noticed as "Notice of Tentative Determination and Public Hearing: Intent to Issue the General Permit to Limit Incompatibility Excess Emissions and Provide an Exemption form STAGE II Vapor Recovery Requirements." As you know, API is a national trade association that represents all segments of the oil and natural gas industry, including owners of some retail gasoline facilities in Connecticut.

The attached memo was written by API consultant Todd Tamura, who has extensive experience and expertise in analyzing and modeling emissions data for vapor recovery equipment. The memo was written in response to inaccurate conclusions that were drawn in the white paper entitled "STAGE II & ORVR and Associated Emissions of Gasoline Vapor---State of Connecticut Gasoline Dispensing Facilities, by Tiberi et al. Based on Mr. Tamura's analysis, API supports Connecticut issuing this general permit.

Please feel free to contact me should you have any questions regarding our analysis.

Thank you.

Sincerely,

Steven Guveyan
Executive Director

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TAMURA ENVIRONMENTAL

TO: Shane Skelton, American Petroleum Institute
FROM: Todd Tamura, QEP
RE: Review of Tiberi et al. paper, "Stage II & ORVR and Associated Emissions of Gasoline Vapor – State of Connecticut Gasoline Dispensing Facilities"
DATE: January 8, 2013

The principle conclusions of the paper "Stage II & ORVR and Associated Emissions of Gasoline Vapor – State of Connecticut Gasoline Dispensing Facilities" by Tiberi et al. are that "past studies and analyses" regarding Stage II removal have overlooked three things:

1. The "proper" quantification and accounting for the Incompatibility Excess Emissions (IEE) and the Storage Tank Breathing Losses (STBL) from the USTs
2. The adverse health impacts from raw, uncontrolled emissions from non-ORVR vehicles; especially the disproportionate share of this burden being borne by EJ Communities
3. The positive impact of using active processors to enhance Stage II by managing storage tank pressure and significantly reducing IEE and STBL

and that therefore the "optimal course of action is for CT DEEP to require Enhanced Stage II via vapor processors with continuous pressure monitoring and remote data acquisition" (p. 16). These conclusions are not accurate, as identified in more detail below.

"Proper" Quantification and Accounting of IEE and STBL Emissions: The paper by Tiberi et al. makes several assertions regarding emissions quantification without any citation or justification. Each of the charts that incorporates IEE shows the same 0.86 lb/1000 gal factor that was derived by CARB staff with the exception of Chart 5c, which identifies IEE of 3.67 lb/1000 gal without any discussion in the text regarding how this value was arrived at or why it was chosen. The analyses in the paper are based on the assumption that controlled STBL emissions are between 1.0 and 2.5 lb/1000 gal (substantially higher than any of the published data I have seen, which are cited in Connecticut Petroleum Council's previous comments to CT DEEP),[1] and Tiberi et al. also state that "in practice ARID has measured values...[of] about 5 lbs. of VOC per 1,000 gallons of fuel dispensed" (p. 10). Again there are no citations or justification for any of those factors. Although there is a test report available from ARID's website that identifies emissions of 3.48 lb/1000 gal without a PV valve and 1.20 lb/1000 gal with a PV valve,[2] those data were from a facility operating with a vacuum-assisted Stage II system, and are therefore not representative of emissions at a facility without Stage II. In contrast, testing conducted by Tiberi and his contractor at a 12-dispenser GDF without Stage II showed emissions (downstream

[1] S. Guveyan, written comments submitted to Mr. Ric Pirolli and Mr. Robert Girard, Feb. 2, 2012 (available from http://www.ct.gov/dep/lib/dep/air/stageii/Connecticut_Petroleum_Comments_on_Klausmeier_Report_February_2_2012.pdf).
[2] Matus Technical Services, "Test Report for the ARID Technologies Vapor Recovery Unit installed in Lantana, FL", Project No. 148, available from http://www.aridtech.com/study_lantana.html.

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of a PV vent valve) of just 0.09 lb over a 24-hour period.[3] (Although throughput information were not recorded, a 12-dispenser GDF is likely to have 24-hour throughput in the neighborhood of 8,000 gal/day = 240,000 gal/month or more, in which case 0.09 lb would correspond to no more than 0.011 lb/1000 gal.)

In contrast, CT DEEP's consultant (dKC) used a much lower emission factor—1.0 lb/1000 gal for uncontrolled STBL emissions (prior to control by the PV valve)—that was based on a 1962 study, and calculated impacts of the PV valve.[4] As identified in the Connecticut Petroleum Council's previous comments to CT DEEP,[1] this methodology substantially overestimated emissions for current-day facilities. Those comments provided a detailed explanation of why this was so (with specific references) and were also backed up by experimental data obtained from USTs at two non-Stage II gasoline distribution facilities (GDFs) located in Texas and Rensselaer, NY.

With regard to accounting, Tiberi et al. make the statement that

> "...when Stage II and ORVR are used together at a GDF, the storage tank emissions are called IEE (Incompatibility Excess Emissions). When Stage II is not present at the GDF, and only ORVR is employed, the storage tank emissions are called Storage Tank Breathing Losses (STBL)." (p. 4)

Tiberi et al. then indicate that when IEE are included in the evaluations of Stage II, STBL should be included for the case in which Stage II is removed. Specifically, they state that because they are not included in EPA's and dKC's Stage II analysis charts, they have been "set to zero" (even though dKC specifically quantifies them elsewhere in their report), "totally neglected", and "ignored" (p. 7), and that this constitutes a "fundamental flaw" (p. 10). It is actually Tiberi et al. who have erred here: IEE does not include all of the storage tank emissions, it includes only those emissions above those which occur in the absence of ORVR technology; i.e., baseline emissions from the UST (in the absence of ORVR) have been subtracted from the IEE.[5] Therefore, EPA's and dKC's charts are consistent in excluding normal storage tank emissions from their analyses (i.e., they are excluded from both the data for Stage II + IEE and the data for ORVR only). Tiberi et al. also indicate (on pp. 2-3 of their paper) that UST emissions may be greater without Stage II than with it (since the former ingest air when running at vacuum, and the latter return a mixture of air and vapor, at least when they fuel non-ORVR vehicles), but as identified previously in this memo, the data that they have collected at facilities with and without

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[3] Matus Technical Services, "Test Report for the ARID Technologies Vapor Recovery Unit installed at the Sunshine Gasoline Station, Miami, FL", Project No. 159, February 13, 2006, received by Florida DEP's Bureau of Air Monitoring and Mobile Sources on August 31, 2006.

[4] R. Klausmeier, "Final Report: Analysis of Future Options for Connecticut's Gasoline Dispensing Facility Vapor Control Program," prepared for Connecticut Department of Energy and Environmental Protection (Hartford, CT) by de la Torre Klausmeier Consulting, Inc. (Austin, TX), June 4, 2012, available from http://www.ct.gov/dep/lib/dep/air/stageii/final-report_future_options_gdf_vapor-control-program_%28dkc-finalreport%29.pdf.

[5] This is specifically shown in CARB, "EVR Emission Reduction Calculations – Module 3: ORVR Compatibility", in Appendix D of "Hearing Notice and Staff Report, Enhanced Vapor Recovery, Initial Statement of Reasons for Proposed Amendments to the Vapor Recovery Certification and Test Procedures for Gasoline Loading and Motor Vehicle Gasoline Refueling at Service Stations," February 4, 2000, available from http://www.arb.ca.gov/regact/march2000evr/march2000evr.htm.

Stage II show the opposite, probably as a result of (a) the fact that at facilities without Stage II, air is ingested at the PV valve vent (much higher above the liquid surface than vapors returned from Stage II equipment) and stays above the heavier hydrocarbon vapors rather than mixing downward, and/or (b) the fact that at facilities without Stage II, operating at vacuum all day means that the UST pressure can increase substantially in the evening (e.g., 10 inches of water column) without opening and venting through the PV valve, whereas at facilities with Stage II, operating under positive pressure or near zero during the day means that the UST can only increase a few inches of water column before opening and venting through the PV valve.

"Adverse health impacts from raw, uncontrolled emissions from non-ORVR vehicles": The paper by Tiberi et al. makes no quantitative assessment of health impacts; it largely mentions qualitative information which has been identified previously. For people refueling non-ORVR vehicles, very short-term exposures (during the few minutes that refueling occurs) could be higher during vehicle refueling without Stage II than with Stage II. However, cancer risk assessments are based on long-term exposures, meaning that whatever exposure exists for a few minutes per day (and probably only a few days per month at most) is not likely to have a significant impact on a quantitative cancer risk assessment. It should also be noted that whatever short-term exposures might be encountered for non-ORVR vehicles are the same as those experienced around most of the country in areas that do not have Stage II vapor recovery, and will be substantially lower that what they were prior to Connecticut's implementation of the Stage II vapor recovery program (i.e., in the 1980s and earlier) as a result of more recent restrictions on gasoline volatility and gasoline benzene content.

"Positive impact of using active processors to enhance Stage II by managing storage tank pressure": dKC specifically mentioned Stage II enhancements on pp. 12-13 of their report, and the reference to "CA EVR Module 2" would include processors that manage storage tank pressure such as ARID's Permeator technology. Tiberi et al.'s overestimation of STBL emissions (discussed earlier in this memo) not surprisingly causes the positive impacts of their active processor technology (both emissions reductions and associated cost savings) to be substantially overestimated as well.

In summary, I believe that (a) there are no fundamental flaws or omissions in the analyses as claimed by Tiberi et al. and that (b) Tiberi et al. have substantially overestimated STBL emissions without providing any supporting evidence.