



November 19, 2018

VIA ELECTRONIC FILING

AP-42, Section 508
Environmental Protection Agency
efcomments@epa.gov

Re: Comments on Proposed Revisions to AP-42 Chapter 7, Section 7.1 – Organic Liquid Storage Tanks

To Whom It May Concern:

The GPA Midstream Association ("GPA Midstream") respectfully submits the following comments on EPA's proposed revisions to AP-42 Chapter 7, Section 7.1 – Organic Liquid Storage Tanks published online on July 25, 2018.

GPA Midstream has served the U.S. energy industry since 1921 as an incorporated non-profit trade association. GPA Midstream is composed of nearly 100 corporate members that are engaged in the gathering and processing of natural gas into merchantable pipeline gas, commonly referred to in the industry as "midstream activities." Gathering and processing facilities include several storage vessels that hold both petroleum hydrocarbons and produced water. As such, GPA Midstream members will be directly affected by the revisions to the AP-42 emission factors for Organic Liquid Storage Tanks.

General Comments

GPA Midstream suggests EPA evaluate the overall organization of the document. It may merely be a consequence of the content additions to AP-42 Chapter 7 through the years, but the current document resembles an amalgamated reference that is difficult to follow. Given this observation and the fact that this chapter is by far the most voluminous section of AP-42, GPA Midstream believes Chapter 7 would greatly benefit from a reorganization of content. Some examples of such improvement opportunities are as follows:

- Remove "Section 7.1.1.1 Scope" as it is unnecessary and inconsistent with the format of other Chapters of AP-42.

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- Align figures with sections of narrative where it makes sense. For example, Section 7.1.2.1 Fixed Roof Tanks on page 8 would be prime territory to place Figure 7.1-1 Typical fixed-roof tank as an illustration of said tank. As the document is currently constructed, that figure isn't shown until page 74.
- Present final equations with a simple description of variables in the main body of the document. Move detailed discussion of how the equations or variables are derived into separate narrative preferably in an appendix to the document.

GPA Midstream suggests that EPA refrain from using the word “routine” as it pertains to emission losses with organic liquid storage tanks since it can be misleading. E.g., section 7.1.1.1 (“Sections 7.1.3.1 and 7.1.3.2 present emissions estimating methodologies for routine emissions from fixed roof tanks and floating roof tanks.”) Taken out of context, the word “routine” can imply that emissions occur at a regular frequency without regard for the actual operations of a particular process. For fixed and floating roof tanks, for example, working losses are driven by withdrawal of product. If there is no withdrawal of product, then no emissions would occur. Similarly, standing losses are driven by diurnal changes in temperature. If there is no substantial change in temperature, then there would be no emissions. Furthermore, GPA Midstream fails to see the reasoning behind classifying these emissions as routine when there is no assignment of non-routine emissions from storage tanks. In sections 7.1.3.1 and 7.1.3.2, the titles would be more appropriately phrased as working and standing losses for fixed and floating roof tanks.

GPA Midstream additionally requests that EPA develop a replacement to the TANKS 4.0 software program. This free software tool has been widely used to calculate tank working and breathing loss emissions by industry and state/local agencies for many years. EPA has laid out the case for the TANK software program's shortcomings in this revision; however, the Agency presents no plans to replace the TANK program and places sole responsibility on state and local regulators and industry to ensure the agreement of 3rd party, commercial software programs with AP-42 Chapter 7. GPA Midstream urges the Agency to reconsider this approach – and encourages EPA instead to develop a replacement software program or calculation spreadsheet to provide more certainty in future emission estimations. As seen in the GHG reporting program in Part 98, EPA has the ability to develop and make available spreadsheets that involve complex emission calculations. GPA Midstream represents a number of small businesses that do not have access to expensive emission modeling software or employ the staff to run them, let alone to vet the software to ensure it complies fully with EPA's revised requirements. EPA should continue to provide a free calculation tool based on the agency's proposed AP-42 Chapter 7 revisions so that industry and state/local agencies are not required to purchase additional emission modeling software. Moreover, an EPA-developed program or spreadsheet would remove substantial uncertainty that may result if there are multiple, different commercial programs available, as opposed to an agency established standard.

Additionally, GPA Midstream requests that EPA establish a defined phase-in period for using these revised emission calculations. GPA Midstream suggests EPA provide at least 180 days from when the finalized revisions are published to allow stakeholders time to integrate these changes and for software to be revised/developed to accommodate this wholly revised standard.

The following specific comments are organized by the section, table or equation, and include the page number on the proposed revisions, clean version:

I. Equation 1-5 (pg. 7.1-16)

The discussion for the calculation of the vapor space expansion factor in equation 1-5, previously identified as 1-7, mentions that this factor, K_E , must be between the values of zero and one if standing losses occur. The maximum value of one for this factor is a new addition in the proposed revisions, and GPA Midstream requests clarification in the equation, or an additional equation, that reflects this upper limit. One possibility would be to provide two equations as shown below:

$$0 < K_E \leq 1$$

$$K_E = \frac{\Delta T_V}{T_{LA}} + \frac{\Delta P_V - \Delta P_B}{P_A - P_{VA}}$$

II. Equation 1-6 (pg. 7.1-16)

GPA Midstream requests clarification regarding the changes to the equation previously identified as 1-8, now represented as 1-6. In the proposed revisions, EPA decided to eliminate two constants and substitute them with an equation that includes more variables for the user to define. To elaborate, the equation previously had four variables and now has seven. The new variables include tank shell height, tank diameter, tank roof surface solar absorptance and tank shell surface solar absorptance. The constants used in the original equation come from API MPMS 19.1. GPA Midstream requests confirmation that using the constants in lieu of the newly developed equations is still an acceptable methodology. GPA Midstream believes it should be acceptable to use the constants as long as they continue to reside in the API Standard. The redlined version of the proposed revision should also be reorganized to show the updated version of Equation 1-6 vs. the previous version 1-8 so it more easily displays for the reader how the equation has changed if the user continues to use 1-6 with default values for H/D and solar absorptance.

III. Equation 1-12 (pg. 7.1-18)

GPA Midstream believes that equation 1-12 on page 7.1-21 of the redlined draft was erroneously redlined. The equation and the associated text is all outlined in red as if it was new, but after reviewing the current version of the document, the same equation and some of the text is included on page 7.1-11. GPA Midstream requests EPA to maintain a public redline version of this chapter when the Agency finalizes these revisions, but only redline the parts of this section that are new to the document in its entirety. For example, the addition of “average” in front of the temperature variables and the new paragraph discussing average maximum and minimum ambient temperatures. In addition, there are slight changes to the direction on how to handle a situation if the tank location is unknown. Instead of underlining the whole paragraph in red because it is in a new place in the document, only the actual changes from the last version should be redlined. This will allow the user to better understand the actual changes to the calculation methodology.

IV. Equation 1-22 (pg. 7.1-21)

GPA Midstream requests EPA clearly indicate the new variable in equation 1-22 on page 7.1-23 is now T_V rather than T_{LA} . Although this is identified through redline in the explanation of variables, GPA Midstream also requests that it be redlined in the actual equation. An explanation as to why this variable has changed in the equation should also be included. Finally, clarification needs to be included on how these numbers will change when the new equations are adopted by a facility, perhaps using an example calculation.

V. Equation 1-24 (pg. 7.1-22)

Equation 1-24 requires the use of Raoult's law to calculate the total vapor pressure of the stored liquid. While GPA Midstream supports the use of Raoult's law as a calculation option, we believe that other options should be allowed for vapor pressure calculations in addition to Raoult's Law. Thermodynamic equations of state, while much more rigorous, are also more accurate than Raoult's Law, as they don't make many of the "ideal solution" assumptions that Raoult's law uses. Many of the other changes proposed for this document stem from the fact that computer software is now widely available and more rigorous calculations can be performed. There are several software programs commercially available that do rigorous thermodynamic calculations using equations of state like Peng-Robinson and Soave-Redlich-Kwong (SRK) that would more accurately predict vapor pressure from a given sample. However, these software packages are often expensive and can be cost prohibitive. Therefore, we support the use of Raoult's law since it provides a method of calculation that all companies have access to, and for EPA to include the option to use other software option that utilize equation of state calculations.

VI. Note 2 on True Vapor Pressure (pg. 7.1-22)

In note 2 on true vapor pressure there are calculations for true vapor pressure. Similar to comment V above, GPA Midstream would like to propose the option to use software programs to perform true vapor pressure calculations. These calculations could also be performed using rigorous thermodynamic equations of state. ASTM D2879 states "Vapor pressure, per se, is a thermodynamic property which is dependent only upon composition and temperature for stable systems. The isotenoscope method of ASTM 2879 is designed to minimize composition changes which may occur during the course of measurement." A thermodynamic equation of state is also able to calculate the thermodynamic property of True Vapor Pressure given a liquid composition and temperature, without the issue of composition changes during measurement. However, these software packages are often expensive and can be cost prohibitive. Therefore, we support the use of more simplistic calculations methods that all companies would have access to.

VII. Equation 1-39 (pg. 7.1-27) and Note 1 for Equation 2-19 (pg. 7.1-33)

On page 7.1-30, EPA added a statement to equation 1-39 stating that the "use of gross throughput to approximate the sum of increases in liquid level will significantly over estimate emissions...". GPA Midstream requests that EPA acknowledge that continued use of gross throughput is still allowed, since it is clearly a conservative estimate of emissions. Many company throughput

tracking systems are based on gross throughput to truck loadout and has been used to establish throughput limits and specific permit conditions, therefore the option to continue with this process should be made to available to companies. Additionally, tracking liquid throughput at specific tanks would require additional liquid meters for each tank. This is not common practice and would require costly modifications to thousands of existing facilities.

GPA Midstream requests that EPA also add this clarification to Note 1 on page 7.1-33. The option to continue using gross throughput should be made to available to companies.

VIII. Equation 2-5 (pg.7.1-29)

On p. 7.1-29, the definition of T_B says to see note 5 for Eqn 1-22, but then other equations for T_B are given in Eqn. 2-9 and Eqn. 2-12. GPA Midstream recommends that EPA just refer to Eqn. 2-9 and 2-12 directly instead of Note 5. This will add clarity and eliminate confusion.

IX. Equations 2-6 and 2-7 (pg.7.1-30)

The draft revisions present significant changes to T_{LA} . The method for calculating T_{LA} has gone from one equation (previously 1-26) to four equations: one for fixed roof, one for internal floating roof and two for external floating roof tanks as outlined starting on page 7.1-30. The use of a single equation aligned with API MPMS Chapter 19.4 which indicates “for an IFRT with a steel pan floating roof, the liquid surface temperature would be calculated as for a fixed roof with no floating roof.” Therefore, that was the standard practice for calculating T_{LA} for all tank types. None of the new equations to calculate T_{LA} match the previous, single equation. By developing all new equations for T_{LA} based on tank type, a significant effort will have to be put forth to update calculation software and spreadsheets that relied on the well-established, single equation. As such, if these changes are retained, all tank emission calculations would need to be updated to reflect this new methodology for T_{LA} . In light of these concerns, GPA Midstream requests that EPA defer these revisions to this methodology for calculating T_{LA} until the Agency further explains the proposed changes to this calculation methodology in order to allow stakeholders to comment fully on that explanation, as these proposed changes would produce a significant amount of work for the end user without any apparent benefit in the form of improved results. Indeed, the record does not indicate that EPA has considered fully how this update creates a significant change in the calculation process, the substantial burdens on stakeholders that those changes would impose, and what the repercussions would be if emissions must be recalculated using these new equations.

X. Section 7.1.3.5 Flashing Loss (pg. 7.1-51)

Despite providing reference to the Texas Commission on Environmental Quality’s (TCEQ) 2016 Emissions Inventory Instructions, Section 7.1.3.5 Flashing Loss appears to borrow logic from state guidance documents on the subject. GPA Midstream believes that including such discussion in a technical reference document such as AP-42 may be misguided and result in unintended consequences. For example, language on page 62 of the draft document suggests that direct measurement should be the primary method of estimating flashing emissions; however, this method is not widely practiced by industry as it is expensive and logistically challenging

(more on next comment). In addition, while the draft text briefly touches on certain limitations associated with the listed methodologies, it does not lay out the detailed considerations needed to be made when selecting a method to characterize emissions in order to achieve a satisfactory balance of cost and benefits. GPA Midstream suggests that EPA remove guidance language on estimating flashing emissions from AP-42 Chapter 7 and evaluate addressing the matter in a separate and more appropriately suited document format.

At a minimum, EPA needs to include the appropriate language to indicate the origin of this text and ensure facility owner/operators have the necessary flexibility, consistent with existing state requirements. For example, in TCEQ's "Calculating Volatile Organic Compounds (VOC) Flash Emission from Crude Oil and Condensate Tanks at Oil and Gas Production Sites" TCEQ carefully presents their guidance by stating,

"This guidance is being provided to help evaluate flash emissions and the methodologies used to estimate those emissions...The Air Permits Division of the TCEQ is aware of the following methods to estimate emissions (seen in the table below). Each method for estimating emissions has specific constraints.... The relative accuracy of the methods shown below is a preliminary opinion only."

Additionally, in Oklahoma Department of Environmental Quality's (ODEQ) "Guidance on Estimating Flashing Losses and Guidance on Determining Process Stream Composition Data for Oil and Gas Facilities", ODEQ provides background discussion on the approaches by stating,

"It is the philosophy of the AQD to empower the owner/operator of a facility to use whatever method he or she believes is most appropriate, providing that the method chosen is adequate to the task of providing an estimate of emissions that both parties can be reasonably confident is sufficiently accurate."

XI. Section 7.1.3.5 Flashing Loss, Direct Measurement (pg. 7.1-52)

GPA Midstream requests EPA remove the language in Section 7.1.3.5 which states direct tank measurement is the preferred option to determine flash emissions at storage tanks. EPA adds the following caveat for direct vent measurement, "if a reliable means of measurement for both the flash vapors and the amount of liquid produced during the testing period were employed." However, listing the method as preferred may still lead state and local permitting authorities to rely on it as the best option above others listed for flash emission calculations. In the experience of GPA Midstream members, direct tank vent measurement produces an unreasonable result since emissions at tanks are determined by field conditions that are variable over short time periods. For gathering compressor stations specifically, the amount and quality of hydrocarbon liquid is dependent on the upstream producer's method of operating and there can be multiple upstream producers on each gathering system. For example, during the time of direct tank vent measurement, an upstream producer may have a failure on its production separation equipment and send the gathering station more liquid than the average daily amount. The inverse could be true as well, where a producer may shut in oil and gas for a variety of reasons without the knowledge of the gathering company. In either case, the direct measurement result should not be used to determine an hourly or annual emission rate for permitting purposes. GPA Midstream is concerned state and local permitting authorities may require industry to use this "preferred"

method for flash emission calculations, even though it may produce short-term results that are not representative of typical hourly or annual emissions for the facility.

Furthermore, there are safety issues that would limit the use of direct measurement on tank vents. Oil and gas operators try to limit the time employees spend on top of tank batteries to prevent exposure to either explosive environments or specific chemicals present in the gas stream, such as H₂S. Operators have installed wave guided radar systems or other tank level gauge methodology that limit the number of times employees must be on top of the tanks to hand gauge for liquid measurement. Direct measurement of the tank vents would introduce increased risk operators prefer to avoid or may be prohibited in a high H₂S area.

GPA Midstream requests EPA keep direct measurement as an option for flash emissions but remove the “preferred” language as shown below:

“Direct measurement. Direct measurement of emissions at the tank vent *can be utilized* ~~would be a preferred approach~~, if a reliable means of measurement for both the flash vapors and the amount of liquid produced during the testing period were employed. Efforts at direct measurement should account for uncertainty in the field measurements of vapor concentration and flow rate through the vent and in the field measurements of volume of liquid produced during the test period, as well as variation in emission rates over time. Uncertainty may be mitigated by use of EPA Method 25A over an extended period of time.”

XII. Section 7.1.3.8.1 Time Periods Shorter Than One Year (pg. 7.1-53)

AP-42 Scope Section 7.1.1.1, paragraph f, states that because certain assumptions are made in equations for routine emissions based on annual averages, adjustments are required for calculations of shorter time periods, “with the caveat that a one-month time frame is recommended as the shortest.” Section 7.1.3.8.1 provides discussion on the necessary adjustments for short time periods. Further discussion is included explaining why routine emissions are “inappropriate for time period shorter than one month” included in Section 7.1.3.8.1 paragraphs a through l (hereinafter “Paragraphs a through l”).

Average hourly tank emissions that are calculated based on the AP-42 methodology for annual emissions and dividing by the annual in-service hours, typically 8760 hours, is a reasonable representation of average hourly emissions. A reading of the revised AP-42 document implies, however, that such a calculation would be invalid. Yet, even recognizing that there are multiple factors that could increase or decrease emissions throughout a day, month, and year that are listed in Paragraphs a through l, it is still the case that calculating the average hour best represents the average hour and is therefore appropriate to use for the purposes of reporting and/or permitting an hourly average where that is required.

At the same time, the factors listed in Paragraph a through l do affect a calculation of a *maximum* hourly emission rate. Default factors may not be accurate based on actual meteorology data for a given year (changing tank conditions, liquid composition, etc.), and thus a maximum hourly calculation may be estimated based on a combination of worst-case estimates. The Texas

Commission of Environmental Quality (TCEQ) provides guidance documents that allow for calculating worst-case hourly emissions based on the maximum fill rate for fixed roof tanks,¹ and maximum withdrawal rate for floating roof tanks² combined with conservative estimates of vapor pressure and temperature. Similarly, the Bay Area Air Quality Management District (BAAQMD) provides guidance for calculating worst-case hourly emissions that assumes negligible standing losses on fixed roof tanks and negligible emissions from rim seal, deck fitting and deck seams from a floating roof tank during withdrawal.³

GPA Midstream supports the addition of language in Paragraphs a through l, but believes the statement that these parameter “render the equations for routine emissions inappropriate for time period short than one month” is not correct. EPA should provide guidance on preferred methodologies for maximum hourly calculations, either quantitative or qualitative. If EPA cannot provide guidance for preferred methodologies for hourly emission calculations than EPA should, at a minimum, remove language indicating that AP-42 methodologies are “inappropriate” for time periods less than one month. In this way, the AP-42 document will not invalidate maximum hourly emission calculation guidance from State or Local agencies that derive hourly calculations from the AP-42 methodology.

XIII. Table 7.1-7 (pg. 7.1-96)

GPA Midstream identified multiple changes within Table 7.1-7 that are not clearly identified. For example, in Birmingham, AL, T_{AN} in January was previously 33.0°F, while in the draft version of the document it's 31.3°F. GPA Midstream requests that any changes made within Table 7.1-7 also be identified with redline. The redline version will allow for the user to easily determine which values in the table have changed; therefore, need to be updated in related calculations. For new cities that have been added, that data should be redlined as well.

XIV. Table 7.1-12, footnote “i” (pg. 7.1-138)

GPA Midstream requests that EPA define “flexible enclosure system” as referenced in footnote “i” to match the definition that is finalized in API MPMS 19.2.

GPA Midstream has worked collaboratively with EPA for many years and appreciates the opportunity to continue working with EPA on regulations affecting the midstream industry segment. GPA Midstream is standing by to provide further information or answer any questions.

We appreciate the agency's consideration of our comments and look forward to working with the agency on the final revisions to AP-42 Chapter 7. If you have questions, please contact me at (202) 279-1664 or by email at mhite@GPAglobal.org.

¹ “Estimating Short Term Emission Rates from Fixed Roof Tanks” TCEQ APDG 6250v1, Revised 02/18

² “Short-term Emissions from Floating Roof Storage Tanks” TCEQ APDG 6419v1, Released 02/18

³ “Guidance for Calculating Maximum Hourly Toxic Air Contaminant Emission Rates”, BAAQMD, June 16, 2005

Sincerely,

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