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Mikulka Comments on MEDEP report

1. The MEDEP stated that using the tenting (TTE) method for measuring emissions is flawed, and induces falsely elevated emission values.

It is incumbent upon the DEP to provide data that proves their point. The TTE method utilizes a very low vacuum to induce enough air flow from the tanks to be measurable. It should be possible to calculate the increased in VOC's caused by inducing that slight vacuum and demonstrate the degree of increase caused. For example, water at 70 F is slowly evaporating. It normally boils at 212 F at normal atmospheric pressure (760 mm Hg). At this point the evaporation rate is at its maximum and it rapidly goes from the liquid to vapor state. However, it is possible to boil water at 70 F by significantly reducing the atmospheric pressure, ie. by applying a vacuum. This is a popular Chemistry classroom demonstration. There is a mathematical relationship between the evaporation rate of water and the degree of reduction in atmospheric pressure. At some point the vacuum applied could be so low that the evaporation rate increase would be minimal, barely different from the normal evaporation rate for that temperature. The same concept applies to the petroleum product in a tank. It should be possible to show what the increase in emissions would be with increasing vacuum. The EPA would probably argue that the small amount of vacuum needed to induce a measurable air flow from the tank will not significantly alter the evaporation rate. MEDEP argues that this is not the case but does not provide any analysis. Without this evidence, the DEP claim that the EPA method for measuring emissions is not valid is without merit.

As a first step, MEDEP should have asked the EPA to defend their TTE method.

Mass DEP has developed its own method for measuring emissions from heated tanks of asphalt and residual fuel. MEDEP failed to consult with Mass DEP regarding their methodology.

In the 2006 EPA publication, Emission Factor Documentation for AP-42, Table 5-17 compares calculated (estimated) emissions from gasoline internal floating roof tanks to actual emissions. The Radian Corporation was noted as having measured the actual tank emissions. The calculated values range from 32 to 48 lb per day while the measured emissions were 78 lb per day. It is clear from Table 5-17 that AP-42 methods for estimating emissions from gasoline storage tanks tend to underestimate emissions. What was the method that Radian used? The DEP needs to comment on that data and they need to critique the method Radian used.

In addition to Radian Corp, a second company capable of measuring emissions, Western Oil and Gas is mentioned w.r.t. table 5-15 data in the same document. Again, DEP needs to consult with this company about their method for measuring tank emissions before concluding that there are no valid methods and that AP-42 is the only choice.

2. Maine DEP states that they will allow tank farms with gasoline storage tanks to continue to use updated AP-42 calculations rather than require measurement of emission. As noted above, the 2006 EPA document states that calculated IFR gasoline tank emissions

are lower than actual measured emissions. MEDEP needs to present evidence that this problem has since been corrected.

For example, using the measured emission rate for a 930,000 gal gasoline tank shown in Table 5-17 of the above noted EPA document, total emissions for three of South Portland's gasoline tank farms were calculated (see Appendix A of the DEP report for gallons of gasoline for each tank farm). Below is the comparison of the permitted VOC's for these 3 tank farms versus the projected emissions based upon use of the actual emission measurements by Radian Corp.

Tank Farm	Permitted VOC's	Actual VOC's
Citgo	117	324
SP Terminal	135	394
Gulf	49.9	333

In each case the calculated emissions are lower than the actual emissions predicted from the Radian Corp. data for similar tanks. This is consistent with the data in Table 5-17 of the EPA document cited above.

MEDEP needs to address this apparent discrepancy. It is suggested that they resolve it by actually proposing a method to measure actual emissions.

3. MEDEP states AP-42 methodology provides accurate emissions data. A careful reading of EPA document cited above shows that the results can vary significantly partly due to the assumptions that are allowed to be made concerning variables.

This is best illustrated by the fact that prior to 2012 Global Companies LLC reported zero emissions for their heated asphalt and residual tanks using AP-42 methodology based upon the assumption that the vapor pressures of asphalt and residual fuel were low. It took Mass DEP and EPA Region 1 to challenge this assumption and require actual vapor pressure and emission measurements. MEDEP now admits that those vapor pressure assumptions made by Global were incorrect. How can they assure the public that similar incorrect assumptions are not being made by other tank farms?

At this point MEDEP relies upon the tank farms to calculate their emissions. The assumptions made by the tank farm owners in reaching those emission estimates are not available to the public. This is a serious transparency problem. To establish the credibility of their endorsement of using AP-42 methodology the MEDEP needs to do their own calculation of the emission rates for the SP Terminal, Gulf and City tank farms. To do this they will need to use their inspection data on the types emission control devices such as primary and secondary rim seals and the condition of the tank walls (lightly rusted versus heavily rusted versus Gunite lined) to come up with an independent estimate of emissions. Only then can the public be assured that the AP-42 methods have been properly applied. In summary, DEP needs to present data to support their contention that AP-42 methods for gasoline storage tanks are indeed accurate. A direct comparison between their calculated emissions and the tank farm calculated emissions is needed to instill public confidence in this report.

4. The report describes the degassing of emptied tanks but offers no data to demonstrate the impact of those temporary emissions on nearby neighborhoods. Workers performing the task wear

HAZMAT gear and respirators, yet the vapors are potentially blown into neighboring residential areas. Two residents living near the Gulf tank farms reported irritating vapors during a 2020 tank degassing event. There was no indication that MEDEP plans to require the use of VRU's in the future.

5. With regard to monitoring emissions the MEDEP points out shortcomings of using EPA Method 325 to monitor tank farm benzene and naphthalene emissions. However, in 2016, Patrick C. Bird, Supervisory Life Scientist in the Air and Radiation Division of the United States EPA, Region 1 proposed a fence line monitoring study for the city of South Portland at a cost of $120,000. Unfortunately, funding for the study was not obtained. It should be noted that the chief EPA scientist who validated Method 325 has stated, "the method is simple, sensitive and powerful".

   The MEDEP needs to address the justification for this study before they dismiss the utility of this method. The DEP claims that the use of EPA Method 325 would be subject to interference from other existing sources of benzene and naphthalene such as home heating units, trucks, autos and boats. They need to explain why a well designed study employing numerous sampling sites could not address these concerns.

   Finally, a preliminary fence line study was done in 2020 using this method by two South Portland citizen scientists. The report was submitted to both the MEDEP and the MECDC for comment. At this date CDC scientist Andrew Smith has commented on the study while DEP has not.

6. With regard to monitoring fence line neighborhoods using EPA Method TO-15 (MEDEP's method of choice) the report briefly references the use of EPA health risk assessment model HEM-3 to determine sites in fence line neighborhoods for locating the five permanent monitoring stations. The model was used by David Falatko, PE, to assess cancer risk from tank farm emissions. HEM-3 is the product of years of EPA research. The MEDEP needs to address the reason why they should not become proficient in the use of the HEM-3 model for assessing cancer risk in fence line neighborhoods. So far they have not commented on Falatko's results but they have consulted with the EPA about them. What was the EPA's assessment of Falatko's work? The results of the HEM-3 modeling of cancer risk clearly show the need for monitoring in the fence line neighborhoods.

   It is suggested that the DEP partner with the EPA to design a study that will focus on tank farm emissions using a method of their choice.

   In summary :

   1) There are major information gaps in the DEP report. Descriptions of the actual EFR and IFR tanks found on SP tank farms are needed. Without that, the reader has no way to assess the quality of the tanks.

      A factual assessment of methods for measuring emissions from gasoline storage tanks is needed. The lack of any input from the EPA, Mass DEP, Radian Corp. and Western Oil and Gas is troubling.

2) To support their claim that AP-42 calculated results are accurate MEDEP should be required to submit their own independent emission calculations for the Gulf, SP Terminal and Citgo tank farms.

3) A detailed analysis of David Falatko's HEM-3 analysis and its potential use for future monitoring studies is required.

4) A peer reviewed study design to measure measure tank farm impacts upon fence line neighborhoods using EPA 325 or TO-15 methodology needs to be submitted.

5) New rules for degassing tanks that require capture of VOC's are required.