



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

Lawrence J. Mackey, LEHP
Director, Environmental Health
Lake County Health Department
500 West Winchester Road
Libertyville, Illinois 60048

Dear Mr. Mackey:

In your letter of September 2, 2020, you requested EPA assistance in evaluating data quality of samples taken during Phase III of the Lake County Health Department's ethylene oxide (EtO) ambient air monitoring. Specifically, you requested review of summa canister pressure readings and of available chromatograms.

In reviewing canister pressure readings, we evaluated initial field pressure when the canister was deployed, final field pressure when the canister was collected and final laboratory pressure when the canister was analyzed, blind to reported EtO concentrations. For final pressure readings, we examined whether final pressure gauge readings were zero, meaning that the canister was measured to be at atmospheric pressure. Zero final pressure for a canister would indicate that the canister had leaked, potentially invalidating the sample.

For some of these samples, a final pressure reading of zero was recorded in the field, but with a positive final pressure reading in the lab (after the field pressure reading). This pattern occurred for many of the canister pressure readings for the V4 samples. In these cases, we believe that the most likely explanation for these zero readings is not that the actual pressures were zero, but that the particular pressure gauge that was used in the field for V4 was faulty. Since a canister should not gain pressure from the final field measurement to the final laboratory measurement, and since the laboratory measurement is likely to be more accurate than the field measurement, we recommend trusting the final (positive) laboratory measurement. To further support this recommendation, we also examined the initial field pressure readings for V4. They were systematically lower than the other sites, providing additional evidence that the V4 pressure gauge was biased low. In conclusion, we recommend treating the V4 samples that had a zero final field pressure measurement, but a positive final laboratory pressure measurement, as valid.

However, there were some samples that had a final laboratory pressure measurement of zero: M3 on April 13, V1 and V3 on April 19, and M3 and V3 on April 25. The zero laboratory pressure

measurement indicates leaking problems with these samples, which makes it impossible to know during what period of time the sample was being collected, and therefore impossible to know where the canister was while it was drawing in air. For this reason, we recommend invalidating these samples.

We also evaluated the initial field pressure readings, using the criterion that canisters must show greater than 28 inches Hg vacuum (see section 4.2.3.2.1 of the Technical Assistance Document for the National Air Toxics Trend Station (NATTS) Program¹). Initial field pressures that did not meet this criterion include M1 and M2 on April 4, M2 on April 10, M3 on April 13, V1 and V3 on April 19, M3 on April 25, and M2 on May 1. As discussed above, there were low field pressures measured for V4 canisters, but since it appears that the pressure gauge used for V4 was faulty and measuring below the true pressure values, we do not recommend disqualifying those samples.

In our evaluation of the chromatograms you provided, we looked to see whether compound identification criteria were met. When one or more identification criteria are outside the acceptable ranges in the Technical Assistance Document for the NATTS Program (section 4.2.8.5.3), it indicates the potential that the detected compound could not be positively identified as EtO. For all of the chromatograms provided, except for V1 and V3 on April 19, these ions were within the acceptable range. For this reason, as well as the final laboratory pressure measurement of zero for these samples, we recommend invalidating V1 and V3 on April 19.

In conclusion, based on pressure readings, there is sufficient evidence to invalidate samples M1 and M2 on April 4, M2 on April 10, M3 on April 13, V1 and V3 on April 19, M3 and V3 on April 25, and M2 on May 1. Based on an evaluation of chromatographs, there is also sufficient reason to invalidate samples V1 and V3 on April 19.

I hope that this is helpful. Please let me know if you would like to discuss these findings.

Sincerely,

Kathryn Siegel
Chief, Air Toxics and Assessment Branch
Air and Radiation Division

cc: Julie Armitage, Illinois Environmental Protection Agency

¹https://www3.epa.gov/ttn/amtic/files/ambient/airtox/NATTS%20TAD%20Revision%203_FINAL%20October%202016.pdf