Virtual Community Meeting about Ethylene Oxide
Additional Question and Answers
Charleston-area, WV
September 23, 2021

This document serves to provide responses to questions that were unanswered by the end of the virtual meeting on September 23.

1) How can chronic ethylene oxide (EtO) exposure be detected in the body?

EtO is readily metabolized and excreted rapidly, mostly in the urine. As a result, it is difficult to detect evidence of EtO exposure in the body in the short or long term. Scientists are researching by investigating EtO "hemoglobin adducts" as a way to evaluate a person's total exposure to EtO over the timescale of months. In the body, some chemicals like EtO, can bind to hemoglobin, a large protein in the red blood cells. The resulting complexes are called hemoglobin adducts, which can be measured in people's blood. However, this kind of hemoglobin adducts for testing is not available as a routine medical monitoring tool for community members. This tool is occasionally used in research settings to measure EtO exposure in the workplace. Here is the link to the recent small study by Szwiec et.al,. funded by the Centers for Disease Control and Prevention published in late 2020 that was mentioned during the public meeting.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7700168/

2) Why are there not dozens of real time monitors operating around these plants while EPA and WVDEP debate what models to use?

The model used for the 2014 National Air Toxics Assessment (NATA) used less specific weather and emissions data. The NATA is meant to be a high-level screening tool for all air toxics across the country to identify areas of concern. The 2014 NATA identified four census tracts in the Kanawha Valley that showed over 100 in a million excess cancer risk from ethylene oxide. As a result, the WVDEP refined the model for the Kanawha Valley using actual onsite weather data and looked at more accurate amounts and locations of emissions at the Institute and South Charleston sites. The WVDEP shared this data with EPA, who then ran the model and agreed with the results.

3) Will monitoring continue until the problem is fixed?

The model is a mathematical tool that uses onsite weather data and emission locations and amounts to estimate levels of risk for populated census blocks across the Kanawha Valley. The purpose of monitoring is to get actual measured data to compare to the results of the current model.

4) How are EPA and WVDEP analyzing and considering the exposure risk of all air toxics emitted from the facilities in these communities from a cumulative perspective? (not only EtO, but EtO + all other toxics combined)

Response in development.

5) Are there any plans for real-time, continuous monitoring of ethylene oxide? The canisters provide 24-hr integrated samples which don't give any indication of directional/traversed concentrations.

The first step of the project is to perform short-term monitoring. The results will be compared to the model. WVDEP will then determine how to proceed. The sampling goal is to sample with canisters on the same day as

the facilities are batch processing so that there will be a correlation on production day and sampling day. At this time, there is not an approved Federal Reference Method for continuous monitoring of EtO.

6) Are the model results saying there's "real cancers" or "predictive cancers"?

The model used by EPA estimates potential cancer risk to the community. It is not predictive of cancers. WVDEP and EPA performed facility-specific modeling of 3 chemical manufacturing facilities and offloading operations in South Charleston and Institute, WV. For each facility, we calculated the maximum individual cancer risk as the cancer risk associated with a continuous lifetime (24 hours per day, 7 days per week, 52 weeks per year, 70 years) exposure to the maximum concentration at the center of each inhabited census block. We calculated individual cancer risk by multiplying the estimated lifetime exposure to the ambient concentration of EtO (in micrograms per cubic meter ($\mu g/m^3$)) estimated by the Integrated Risk Information System modeling risk estimate. The calculated cancer risk from EtO represents the increased cancer risk from exposure to EtO from a facility, which is over and above the cancer risk expected from exposure to other substances as well as background levels of EtO.

7) Has the model ever been refreshed with real, measured data in the area?

The updated WVDEP model used onsite 2019 weather data and 2017 emissions data based on actual release points of EtO from the South Charleston and Institute facilities. The WVDEP is working on updating the risk map using 2020 emissions data. The upcoming monitoring event will be used to compare actual measured data to the short-term modeling results.

8) Someone referenced data from the West Virginia Bureau for Public Health. Is that study available for public? Is anyone from the Bureau of Public Health on the call?

WV Department of Health and Human Resources will be available at the next public meeting to answer questions.

9) The health history of plant workers are kept for the time they work there, plus 20 years. Can EPA use that data and unit(s) they worked in to understand cancer risks? Here in Kanawha County, there is a large cancer center. We seem to have an issue here, possibly as a result of cumulative impacts of all carcinogens.

The WVDEP's jurisdiction covers ambient air outside of a facility's fence line. The National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA) jurisdictions provide authority to investigate worker exposure.

10) Would you please share the sampling plan and protocol online?

The WVDEP will make this available online once the documents have been approved by EPA and WVDEP.

11) When does the EPA plan to hold another public hearing/informational meeting?

The WVDEP and EPA will schedule additional public meetings as new information becomes available.

12) Will the chemical companies be notified when air monitoring/sampling will occur?

Yes. The purpose of the upcoming monitoring event is to compare measured values to the model. The WVDEP intends to sample when most of the EtO emitting processes are operating. This will need to be coordinated between the four facilities. After monitoring, the WVDEP will have the companies provide actual emissions at all emission points, processes that operated, and weather data during this timeframe.

13) Will we be having any meetings/any attention/action on the sterilizers that emit ethylene oxide in our region--such as Alcon in Huntington, WV?

West Virginia has one ethylene oxide sterilizer, Alcon North in Lesage, WV. The facility's controls include a sparge tank and stripper tower combination which circulates water (scrubber section) followed by a catalytic oxidizer. The most recent stack test in 2019 shows the control device system has a 99.993% destruction removal efficiency. The building is under negative pressure and has no fugitive emissions. There is an alarm set for 0.1 parts per million of ethylene oxide outside the doors of the sterilization chambers that have never registered. The facility has never emitted over 100 pounds in a year, based on 2015-2020 emissions data. The ethylene oxide risk in the census tract where the facility is located shows a 2.2 in a million excess cancer risk. This census tract ranks 83rd of 540 census tracts in WV for ethylene oxide risk.

14) Would you also please share all of the data used in the models you presented including the wind patterns for the facility and at the airport?
The modeling files WVDEP used for the 2019 meteorology - 2017 ethylene oxide emissions can be downloaded from the following link:
https://drive.google.com/drive/folders/1rw1AMtS1GmTNdB0x5wXUMWNfuHpP-NlC?usp=sharing
The 2014 National Air Toxics Assessment (NATA) modeling data can be accessed at the following link:
https://www.epa.gov/national-air-toxics-assessment/2014-nata-map

15) Where will answers to unanswered questions be posted?

Meeting information and additional resources are posted on sites hosted by WVDEP and EPA.
WVDEP: https://dep.wv.gov/daq/Air%20Toxics/EthyleneOxide/Pages/default.aspx
EPA: https://www.epa.gov/wv/virtual-community-meeting-about-ethylene-oxide