Ethylene Oxide: Technical Review
Evonik Materials Corp. – Reserve, LA

As EPA pursues its mission to protect public health and the environment, addressing ethylene oxide (EtO) remains a major priority for the Agency. EPA's National Air Toxics Assessment (NATA), released in August 2018, identified a number of areas across the nation with potentially elevated risk from continuous exposure to EtO in the outdoor air. NATA estimated these risks based on EtO emissions from 2014, which were the most recently available at the time, and are now seven years old.

NATA is a screening-level analysis that is intended to identify pollutants or areas for closer examination. EPA and the State air agencies are working together to better understand emissions in areas that NATA identified as potentially having elevated risk. State air agency partners are in discussions with individual facilities to identify opportunities for reducing EtO emissions from those facilities. EPA is reviewing its national regulations for industrial facilities that emit EtO. Actual risks today may be lower or higher than NATA estimated due to several factors, including updated or more refined facility emissions information or recent facility changes including the installation of pollution controls.

The information below describes the technical analyses conducted for Evonik Materials Corp. (formerly Air Products Performance Manufacturing Inc.) in Reserve, LA, since NATA was issued in August 2018. EPA is providing this information to address, in part, the EPA Office of Inspector General's Management Alert (dated March 31, 2020).

Initial Actions Conducted

On October 15, 2020, EPA Region 6 requested assistance from the State of Louisiana in gathering the most current information on ethylene oxide emitting facilities, including Evonik, and to assist with the update of technical assessments.

- EPA obtained updated facility emissions and control information on EtO for Evonik from the State of Louisiana.
- The EPA NATA estimate was based on annual emissions data from 2014. EPA obtained 2019 annual routine emissions data for Evonik in Reserve, LA which showed a decrease of 51 percent. Reported emissions were reduced through emission reductions and/or re-evaluation of actual emission levels.
- EPA and LDEQ conducted a conference call with Evonik on March 30, 2021, to discuss EPA EtO activities and plans. EPA and LDEQ conducted a follow-up call with Evonik on May 6, 2021 to discuss facility efforts to reduce reported ethylene oxide emissions and obtain additional technical information. On May 10, 2021, Evonik provided documentation of the information they shared on the call.

Fugitive Emissions Reductions (non-stack process equipment leaks):

The Evonik facility has a Leak Detection and Repair (LDAR) program to reduce emissions leaks. From 2014 to 2020, there was about a 92% reduction in fugitive EtO emissions from the facility.

Point Source Emissions

The site stack actual EtO emissions in 2020 are down 21.6 % from 2014. The facility uses a batch process operation, so this change is attributed to annual production changes.

Preliminary 2020 Annual Emissions Data Update

The 2020 emissions inventory data updates from facilities were due for submissions to LDEQ on April 1, 2021. While an LDEQ quality assurance/quality control review of this new 2020 emissions data continues, the preliminary review of this data, along with information received from Evonik indicate that:

- From 2014-2020, through emission reductions and/or re-evaluation of actual emission levels, reported EtO annual emissions at the Evonik facility were reduced approximately 48 percent.

Updated EPA Risk Assessment

Based on 2018 emission inventory data, EPA is updating the estimated inhalation public health risk from ethylene oxide in the community near Evonik. 2018 data was chosen for its general availability and data quality. The revised increased cancer risk number based on 2018 emission data is 600 in 1 million[1].

EPA modeling of estimated risks is very conservative. It provides a threshold recommendation to warrant a closer look at facility operations and emissions and is not a "bright-line" regulatory action limit for required action. EPA uses a general 100 in 1 million (1 in 10,00) increased risk of cancer as a guideline for further investigation. It assumes a continuous, 24 hours per day inhalation exposure to hazardous pollutants, including EtO, for a lifetime of 70 years.

Based on 2018 data, EPA reassessed and updated the estimated inhalation public health risk from hazardous air pollutants, including EtO, in the community near Evonik. Our results indicate the estimated maximum individual cancer risk (the single highest estimated additional cancer risk for an individual in the area) decreased about 28 percent from the previous NATA risk estimate based on 2014 emissions (from 831 in 1 million to 600 in 1 million). Preliminary 2020 annual EtO emissions are slightly below the 2018 EtO emissions assessed by EPA.

[1] In a letter dated June 17, 2021, pursuant to CAA section 307(d)(7)(B), the Agency will grant reconsideration on the following aspects of the final Miscellaneous Organic NESHAP (MON) rule to provide an additional opportunity for public comment: (1) the use of EPA's Integrated Risk Information System (IRIS) value for ethylene oxide in assessing cancer risk for the source category; and (2) the use of the TCEQ risk value for ethylene oxide as an alternative risk value to EPA's IRIS value. Reconsideration is being granted on this topic on the basis that the TCEQ risk value for ethylene oxide was finalized after the comment period closed and because the risk posed by ethylene oxide is of central relevance to EPA's determination that risks from sources in the Miscellaneous Organic Chemical Manufacturing source category are unacceptable and that more stringent standards are required.

Potential Future Facility Actions Planned

Future EtO Fugitive Emission Reduction Plans

The facility is assessing an option with the state to possibly implement a more stringent LDAR program and establish a quarterly monitoring schedule of all components to further reduce fugitive EtO emissions from the site.

Future EtO Stack Emission Reduction Plans

The facility is evaluating the scrubber for potential technical enhancement to increase removal efficiency and further reduce EtO emissions.

Additional information will be provided at a community outreach event currently being planned by EPA in coordination with LDEQ, and at the following website after the outreach event is conducted: https://www.epa.gov/hazardous-air-pollutants-ethylene-oxide/status-report-air-products-performance-manufacturing-inc.