Ethylene Oxide: Technical Review
Taminco (Eastman Corp.) - St. Gabriel, 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 Taminco in St. Gabriel, LA, to update and document work conducted 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 Taminco, and to assist with the update of technical assessments.

- EPA obtained updated facility emissions and control information on EtO from the State of Louisiana.
- The EPA NATA estimate was based on annual emissions data from 2014. EPA obtained 2019 annual routine EtO emissions data for Taminco which showed a reduction of 92 percent. Reported emissions were reduced through emission reductions and/or re-evaluation of actual emission levels.
- EPA and LDEQ held a conference call with Taminco on March 22, 2021 and discussed facility efforts to reduce reported ethylene oxide emissions and obtain additional technical information. On April 12, 2021, Taminco sent documentation of the information they shared on the call.

How EtO is Used at the Facility

The facility does not produce ethylene oxide. Ethylene oxide is used to produce other chemicals on site.

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 Taminco indicates that:

- From 2014-2020, through emission reductions and/or re-evaluation of actual emission levels, reported EtO annual emissions at the Taminco facility were reduced approximately 92 percent.

Progress on Emission Reporting

The changes to the Taminco EtO reported emissions are not due to physical or operational changes at the Taminco facility. They are the result of refinements to the engineering estimates of the emissions.

The reduction in the reported EtO emissions estimates from the scrubber are due to two refinements:

(1) the volume of EtO sent to the scrubber from line purges was overestimated by a factor of 2.4; and

(2) the efficiency of the scrubber, which was assumed to be 98%, was actually 99.99% based on vendor information and confirmed with a performance stack test.

Taminco's St. Gabriel's site refined their fugitive emissions estimates utilizing recommended settings in the facility's LDAR software. The calculation methodology utilizes current year readings a well as the most recent historical reading to develop the full year estimate. The majority of the reductions in reported EtO emissions were from the EtO scrubber.

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 Taminco. 2018 data was chosen for its general availability and data quality. The revised increased cancer risk number based on 2018 emission data is 30 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

[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.

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 Taminco. Our results indicate the estimated maximum individual cancer risk (the single highest estimated additional cancer risk for an individual in the area) decreased about 98 percent from the previous NATA risk estimate based on 2014 emissions (from 1,330 in 1 million to 30 in 1 million).

Preliminary 2020 annual EtO emissions are slightly higher than the 2018 EtO emissions assessed by EPA.

Future Actions Planned

There is an expected small increase in actual EtO emissions once a new Choline Hydroxide Unit commences operation later in 2021. Taminco estimates a 1 lb/year increase in EtO scrubber emissions and a 70 lb/year increase in fugitive equipment leak emissions.

The 2018 estimated cancer risk due to emissions from Taminco is well below the EPA guideline of a 100 in 1 million (or 1 in 10,000); no further investigation or action is recommended at this time.

With the anticipated 2021 emissions increase summarized above, EPA believes the estimated maximum individual estimated risks from emissions will remain below the EPA guideline of a 100 in 1 million.

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-taminco-us-st-gabriel-la.