Ethylene Oxide: Technical Review
Sasol Chemicals (USA), Lake Charles Chemical Complex – Westlake, 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 Sasol Chemicals (USA), Lake Charles Chemical Complex (Sasol Chemicals) in Westlake, 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 Sasol Chemicals, 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 for Sasol Chemical in Westlake, LA, which showed a decrease of 75 percent. Reported emissions were reduced through emission reductions and/or re-evaluation of actual emission levels.
- EPA and LDEQ held a conference call with Sasol Chemicals on April 8, 2021 and discussed facility efforts to reduce reported ethylene oxide emissions and obtained additional technical information. On May 6, 2021, Sasol Chemicals provided EPA and LDEQ a slide presentation of the information they shared on the call.

<u>The Facility and EtO Processes</u>

The Sasol Lake Charles Chemical Complex has multiple manufacturing units which produce various products and chemicals used to make other products. A research and development laboratory is also on site.

Manufacturing at the Lake Charles facility includes EtO production, as well as production of ethylene glycol and ethoxylated alcohol created by combining EtO with other substances on site in various processes.

Facility EtO Emissions Reporting Refinements

Sasol reviewed their historical emissions data to ensure its accuracy. The facility had initial estimates for EtO emission reporting, but emissions testing documented the emissions were lower than estimated, indicating there had been an over-reporting of EtO emissions from 2014-2018. Most of the reported EtO emission reductions come from this improvement due to testing.

Sasol then worked with LDEQ to correct the EtO emission data for the facility from 2014-2018, so the data would be accurate. The updated facility EtO emissions data decreased the previously reported annual EtO emissions from 2014 to 2018 approximately 82%.

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 Sasol indicates that:

- From 2014-2020, through emission reductions and/or re-evaluation of actual emission levels, reported EtO annual emissions at the Sasol facility were reduced approximately 63 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 Sasol. 2018 data was chosen for its general availability and data quality. The revised increased cancer risk number based on 2018 emission data is 300 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 10,000) 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 Sasol. Our results indicate the

[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.

estimated maximum individual cancer risk (the single highest estimated additional cancer risk for an individual in the area) decreased about 64 percent from the previous NATA risk estimate based on 2014 emissions (from 841 in 1 million to 300 in 1 million). Preliminary 2020 annual EtO emissions are about double the 2018 EtO emissions assessed by EPA.

Future Actions Planned

Sasol is evaluating the incorporation of the vapor control unit testing for destruction and removal efficiency and lowering of operating hours when the flare serves as a backup control; this action is anticipated to reduce reported EtO emissions based on more accurate data.

Sasol plans refinement of the West Lab emissions to reflect a decrease in EtO emissions estimates based on sampling activities.

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-sasol-chemicals-lake-charles-westlake-la.