

January 30, 2023

cc: Mohr  
107173

Illinois Environmental Protection Agency  
Bureau of Air, Compliance Section (#40)  
1021 North Grand Avenue, East  
P.O. Box 19276  
Springfield, IL 62794-9276  
Telephone: 217/782-5811

097035AAQ  
10K

RE: *Construction Permit No. 19100015 Quarterly Report – Q4 2022*  
*Vantage Specialties Inc., Gurnee, IL (Facility ID 097035AAQ)*

RECEIVED  
STATE OF ILLINOIS  
JAN 31 2023  
ENVIRONMENTAL PROTECTION AGENCY  
BUREAU OF AIR

To Whom It May Concern:

Vantage Specialties Inc. (Vantage Specialties) hereby submits the Quarterly Report for Construction Permit No. 19100015, for our plant located in Gurnee, Illinois (Facility ID 097035AAQ). On December 17, 2019, Vantage Specialties received Construction Permit No. 19100015, which sets an annual cap on the Gurnee Facility's emissions of Ethylene Oxide (EO) beginning in calendar year 2020. This report is submitted pursuant to Condition 7(a) of the Construction Permit. The Construction Permit conditions that specify quarterly report details are included below, shown in *italics*, with our responses to each condition following in **bold**.

#### General Conditions

Construction Permit No. 19100015 requires the following:

##### Condition 7 (a):

*The Permittee shall submit quarterly reports to the Illinois EPA that include the following information. These reports shall be submitted within 30 days of the end of each calendar quarter.*

**This quarterly report covers the period of October 1, 2022, to December 31, 2022. This quarterly report is being submitted within 30 days of the end of the calendar quarter (i.e., by January 30, 2023).**

*(i). The information required to be reported in these quarterly reports by other conditions of this permit.*

**This quarterly report includes the information required by Conditions 7(a), 17(b), 17(c)(ii), 22(a), and 22(b)(ii) of Construction Permit No. 19100015.**

*(ii). A summary of the notifications required to be submitted by other conditions of this permit for deviations from the requirements of this permit, if any, during the quarter.*

**Please refer to the discussion of Condition 17(c)(ii) below.**

*(iii). For the first, second and third quarters for a calendar year:*

- 1) *The cumulative emissions of ethylene oxide in the calendar year from the affected facility in total and from affected components based on emission data collected through such period(s) and,*

**This permit condition does not apply to this quarterly report.**

- 2) If cumulative emissions are more than 25, 50 or 75 percent, respectively, of the emission cap in Condition 3(a), a discussion of whether these cumulative emissions were the result of circumstances that are expected to be present in the remainder of the calendar year.

**This permit condition does not apply to this quarterly report.**

(iv). With the quarterly report for the fourth quarter in each calendar year:

- 1) Emissions of ethylene oxide of the affected facility and from affected components for the calendar year, and

**Cumulative Emissions of Ethylene Oxide for the Calendar Year of 2022**

	Emission Cap (lbs/year) *	Cumulative Emissions (lbs for year-to- date)	Cumulative Emissions/ Emission Cap (%)
Affected Facility	110	47.81	43.46%
Affected Components	60	25.76	42.94%

**Note:** \* Emission Cap per Condition 3(a) of Construction Permit No. 19100015. The cap limits emissions per calendar year.

- 2) If emissions exceed the emission cap in Condition 3(a), provide the notification for the deviation from this cap pursuant to Condition 7(b)(i) in this quarterly report.

**The cumulative emissions for the calendar year are not more than the emission cap in condition 3(a).**

**Affected Process Equipment**

Construction Permit No. 19100015 requires the following:

**Condition 17 (b):**

In the quarterly reports required by Condition 7 (a), the Permittee shall provide information describing changes to the monitoring systems that are required by Conditions 13(a) and (b), if any, to improve the limit of quantification of these systems, including a description of the changes, the rationale for the changes, a description of the expected and actual result of the changes, and confirmation that the changes did not negatively affect the performance of the monitoring systems.

**No changes were required by Conditions 13(a) and (b) to improve the limit of quantification of these systems during the reporting period.**

**Condition 17 (c)(ii):**

Notifications for other deviations shall be submitted with the quarterly report.

**December 11/12, 2022**

On Sunday December 11, 2022, the daily calibration did not occur. The reactor room audible horn sounded toward the end of the shift at 3:28 am indicating one of three fault conditions were present; CEMS software is either in pause or stop mode, or CEMS software has closed. On the morning of Monday December 12, 2022, the Production Manager was able to access the CEMS analyzer computer software and discovered the software was closed. The Production Manager was able to reset the program. Due to the critical nature of the CEMS equipment, access to the



software is restricted to select management level personnel. When the CEMS analyzer was reset on December 12<sup>th</sup>, the daily calibrations passed that day and all readings were within normal range. Thermofisher has not been able to determine the cause of the CEMS software shutdown, as no one from Vantage or Thermofisher would have been on the system at 3:30 am on a Sunday morning. Vantage has asked Thermofisher to continue the investigation.

Per Condition 16(d) of Construction Permit No. 19100015, the compendium of emissions was used to calculate EO emissions for the December 11<sup>th</sup>/12<sup>th</sup> CEMS downtime event. During this downtime event, there was only one venting occurrence to the scrubber, for a total of 0.0010686 lb. of emissions.

Vantage is reporting this as a deviation from Condition 13(c)(ii), for that condition's reference to the daily calibration requirement of 40 CFR 63.8(c)(6).

#### December 13/14, 2022

On December 13, 2022, the daily calibration did not occur due to an error message indicating "System.OutOfMemoryException". The error message was discovered on the morning of December 14, 2022, and Vantage personnel began investigating the memory error. According to the error logs, an error occurred at 5:52 am on December 13, 2022, which prevented the MAX-Acquisition software from acquiring sample and calibration data. Vantage determined that the CEMS was running and measuring EO concentration and flow data, but data used to calculate emissions and calibration results were blank in the MAX-Acquisition software. This data recording failure is not a fault setting in the MAX-Acquisition software that triggers an audible alarm. Vantage personnel made numerous unsuccessful attempts to access the MAX-Acquisition software. Thermofisher was contacted and the MAX-Acquisition software was reset remotely by Thermofisher. The CEMS resumed normal data recording at 12:28 pm on December 14<sup>th</sup>. The daily calibration occurred successfully later that day. A Software Engineer from Thermofisher believes the error was caused by a MAX-Acquisition software issue, and they are working on addressing the issue in a software update. Until the software has been updated and tested, Thermofisher recommends that they remotely close and immediately reopen the MAX-Acquisition software for Vantage once per month at a scheduled time. Vantage has scheduled this service with Thermofisher to occur every 4 weeks.

Vantage's emission monitoring system consists of an EO FTIR analyzer and a stack thermal mass flowmeter. Both signals (ethylene oxide concentration and stack flow) are wired to the site's control system. Process data from the control system is saved in an ASPEN process data historian. The site used the EO concentration and flow data to calculate emissions from the timeframe the CEMS memory issue occurred on December 13<sup>th</sup> and 14<sup>th</sup>, using the formula used by the CEMS software. The calculated result of the emissions for this time period was 0.028 lb.

Vantage is reporting this as a deviation from Condition 13(c)(ii), for that condition's reference to the daily calibration requirement of 40 CFR 63.8(c)(6).

#### *Additional Measures*



As previously discussed with IEPA, Vantage inquired with the CEMS equipment vendor as to the availability of email notifications when the CEMS equipment is in a fault mode. The vendor was unable to provide a ready solution to this capability. Therefore, Vantage is working within its own data system (Aspen) to develop an email function to alert to the following scenarios:

- 1) Fault – email function is programmed and undergoing testing and optimization for all three fault modes (pause, stop, shutdown).
- 2) Failed calibration – not yet installed
- 3) Missed daily calibration – not yet installed

Vantage works closely with its CEMS vendor to ensure proper operation of the CEMS, which is an emerging technology. Where issues arise and the vendor is not able to provide a ready solution, Vantage is making every effort to develop its own solutions. The three e-mail notification solutions mentioned here would provide ready alerts to situations like the two events that occurred in December, as well as a possible scenario where a calibration did not pass.

#### Affected Components

Construction Permit No. 19100015 requires the following:

#### Condition 22(a):

*In the quarterly reports required by Condition 7(a), the Permittee shall include the following information for each monitoring campaign for affected components completed during the quarter. To the extent that the specified information is not yet available (e.g., maintenance of components in response to the campaign is not completed), such information shall be reported in the subsequent quarterly report.*

#### *(i). General information for each monitoring campaign, including*

- 1) Responsible entity;
- 2) Start and end dates;
- 3) Number of monitoring personnel;
- 4) Total number of components in the affected facility;
- 5) Number of components monitored; and
- 6) Numbers of components, by the applicable reason (e.g., not in operation or not in ethylene oxide service at the time of the campaign), that were not monitored.

Please see below for the general information for the monitoring campaigns during the reporting period.

	October	November	December
<b>Responsible entity</b>	Montrose Air Quality Services	Montrose Air Quality Services	Montrose Air Quality Services
<b>Start Date</b>	10/3/2022	11/1/2022	12/5/2022
<b>End Date</b>	10/4/2022	11/2/2022	12/5/2022
<b>Number of monitoring personnel</b>	1	1	1
<b>Total number of components in the affected facility</b>	782	782	782
<b>Number of components monitored</b>	782	773	773
<b>Numbers of components, by the applicable reason (e.g., not in operation or not in ethylene oxide service at the time of the campaign), that were not monitored</b>	0	9*	9*

*\*Tagged out of service, not in operation and not in ethylene oxide service at the time of the campaign.*

*(ii). Summary information for components that were not leaking for which maintenance was initiated as a result of the monitoring, including the numbers of components, by the type of component, for which maintenance was performed.*

**There were no components that were not leaking for which maintenance was initiated as a result of the monitoring during the reporting period.**

*(iii). Detailed information for each leaking component that was identified in the monitoring campaign, including:*

- 1) Component Identifier;*
- 2) Type of component;*
- 3) Dates and times when the initial repair was completed and follow-up monitoring was conducted;*
- 4) If further repairs were needed, dates and times when final repairs were completed and follow-up monitoring conducted, and*
- 5) A description of the repair(s) that were completed for the component.*

**There were no leaking components in all of Q4 2022. As such, no information is provided in the following table.**

**Detailed Information for Each Leaking Component in Q4 2022 Monitoring Campaigns**

Component Identifier (Tag Number)	Type of Component	Repair	Follow-up Monitoring	Repair Method
None	None	None	None	None

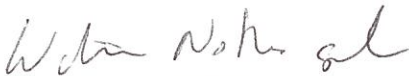
Condition 22 (b)(ii):

*Notifications for other deviations shall be submitted with the quarterly report.*

**There were no deviations from the affected component permit conditions in October, November, or December 2022.**

If there are any questions concerning this report, please do not hesitate to call me at (847) 249-6809.

Sincerely,



**William Nothvogel**  
Site Manager

1/30/2022

**Date**