



REGION 5

CHICAGO, IL 60604

MEMORANDUM

SUBJECT: CLEAN AIR ACT INSPECTION REPORT
Nouryon Surface Chemistry LLC, Morris, Illinois

FROM: Victoria Nelson, Environmental Engineer
AECAB (MI/WI)

THRU: Sarah Marshall, Section Supervisor
AECAB (MI/WI)

TO: File

BASIC INFORMATION

Facility Name: Nouryon Surface Chemistry LLC (Nouryon)

Facility Location: 8005 North Tabler Road, Morris, Illinois

Date of Inspection: July 9, 2024

EPA Inspector(s):

1. Victoria Nelson, EPA Region 5, Environmental Engineer
2. Karyn DeFranco, EPA Region 5, Physical Scientist
3. Philip Myers, EPA National Enforcement Investigation Center (NEIC)
4. Conor Goulding, EPA NEIC

Other Attendees:

1. Jarrod Hager, Nouryon, HSE&S Manager
2. Colin Jepsen, Nouryon, Operations Team Lead
3. Brandon Sieve, Nouryon, Production Manager

Contact Email Address: Jarrod Hager – jarrod.hager@nouryon.com

Purpose of Inspection: On-site EPA NEIC Geospatial Measurement of Air Pollution, Remote Emissions Quantification (GMAP) survey

Facility Type: Miscellaneous chemical production and manufacturing

Facility Name: Nouryon Surface Chemistry LLC
Facility Location: 8005 North Tabler Road, Morris, IL
Date of Inspection: July 9, 2024

Regulations Central to Inspection: The Illinois State Implementation Plan; the National Emission Standards for Hazardous Air Pollutants for Miscellaneous Organic Chemical Manufacturing at 40 C.F.R. Part 63, Subpart FFFF; and the facility's Title V Permit

Arrival Time: 2:30 PM Central Time

Departure Time: 4:45 PM Central Time

Inspection Type:

- ☒ Unannounced Inspection
- ☐ Announced Inspection

OPENING CONFERENCE

- ☒ Presented Credentials
- ☒ Stated authority and purpose of inspection
- ☒ Small Business Resource Information Sheet not provided. Reason: Not a Small Business.
- ☒ Provided CBI warning to facility

The following information was obtained verbally from Nouryon staff unless otherwise noted.

Process Description:

Nouryon is a manufacturing facility that produces primary, secondary and tertiary amines, diamines, esteramines, and quarternary ammonium compounds. These intermediates and products are used as surfactants in detergents, fabric softeners, agricultural products, and personal care products. The raw materials include fatty acids from animal fats, hydrogen, anhydrous ammonia, methyl chloride, acrylonitrile and formaldehyde in a methanol-based solution. The processing units include the fat splitter, nitrile unit, continuous and batch hydrogenation units, amine and fatty acid distillation units, amine esterification unit and a quaternization unit.

Animal fats and soybean oil are processed in the fat splitter, distillation column and an esterification unit where fatty acids and glycerin are produced. Emissions from the distillation column are controlled by a forced draft combustion chamber (FDCC) incinerator. The esterification unit is controlled by thermal oxidizer (TO). The fatty acids are transferred to the nitrile unit and reacted with ammonia in the presence of a catalyst to form fatty nitriles. Emissions from the nitrile unit are also controlled by the FDCC. The fatty nitriles are reacted with hydrogen in the presence of a catalyst in either the continuous or the batch hydrogenation units to form primary, secondary, or tertiary amines. Acrylonitrile or formaldehyde solutions are also added in the batch hydrogenation unit to form secondary and tertiary amines. Emissions from the continuous hydrogenation units are vented to the FDCC. Finally, in the quaternization unit (also referred to as the "Arquad" unit) tertiary amines or ethoxylated materials are reacted in batch reactors with methyl chloride and ethanol to form quarternary ammonium compounds.

The quaternization units are controlled by the TO and three scrubbers that control emissions from the various reactors. Furthermore, the methyl chloride unloading process emissions are routed to the TO. The facility also has a flare that is used as a backup control to the FDCC incinerator.

Staff Interview: The Arquad unit processes approximately with tertiary amines for 80 percent of production and with ethoxylated material for 20 percent. Arquad batch lengths range from 7.5 to 24 hours. The splitting tower was down for planned maintenance and not operating at the time of the inspection.

TOUR INFORMATION

EPA Toured the Facility: Yes

Data Collected and Observations:

EPA drove the GMAP through the facility in the rain. The GMAP detected potential ethylene oxide emissions in the Arquad unit. At the time, a batch was in process in Reactor 2 and a batch was being held in Drop Tank 3 post-reaction.

Photos and/or Videos: were taken during the inspection and are listed in Appendix A.

Field Measurements: were taken during this inspection but are included in a separate report.

CLOSING CONFERENCE

☒ Provided U.S. EPA point of contact to the facility

Requested documents:

- Piping and instrumentation diagrams for the splitter, Arquad reactors, and the FDCC incinerator
- Production data for the day of the inspection, July 9, 2024
- SDS and quantities used for all raw materials and final products for each batch produced at the Arquad Unit on the date of the inspection (the Reactor 2 batch that was in process and the batch in Drop Tank 3)
- Block flow diagrams for all processes with operating temperatures and pressures

Concerns: EPA noted the potential presence of ethylene oxide in the Arquad area.

DIGITAL SIGNATURES

Report Author: **VICTORIA NELSON**
Digitally signed by VICTORIA NELSON
Date: 2024.09.04 15:04:10 -05'00'

Section Supervisor: **SARAH MARSHALL**
Digitally signed by SARAH MARSHALL
Date: 2024.09.05 08:18:55 -05'00'

APPENDICES

1. Appendix A: Digital Image Log and Digital Video Log

Facility Name: Nouryon Surface Chemistry LLC
Facility Location: 8005 North Tabler Road, Morris, IL
Date of Inspection: July 9, 2024

APPENDIX A: DIGITAL IMAGE LOG AND DIGITAL VIDEO LOG

Inspector Name: Victoria Nelson **Archival Record Location:** R5 Electronic Record Center -
ECAD>AECAB Library>Enf_Nouryon_IL_22>Inspection Report
2024>Photos

Image Number	File Name	Date and Time (Central Time)*	Latitude and Longitude	Description of Image
1	IMG_0587.JPG	7/9/2024 4:12 PM		DEEMA and MDEA tanks near railcar unloading in the Arquad unit
2	IMG_0588.JPG	7/9/2024 4:12 PM		MDEA tank and railcar unloading rack in the Arquad unit
3	IMG_0589.JPG	7/9/2024 4:12 PM		Tank A15 and portable tank in the Arquad unit
4	IMG_0590.JPG	7/9/2024 4:13 PM		Railcar unloading and truck unloading racks in the Arquad unit

*Note: Recorded times were adjusted to reflect local time.