



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604**

DATE: See Date of Section Chief Signature Below

MEMO SUBJECT: Redacted Confidential Business Information
Corteva Agriscience, Harbor Beach, MI

This report was originally completed and shared with Corteva Agriscience on October 15th, 2021. Upon review, Corteva Agriscience claimed additional Confidential Business Information (CBI) beyond the original claims made during the August 18th, 2021 inspection. All CBI has been redacted from this report and all copies of the previous report have been deleted.

DIGITAL SIGNATURES

Report Author: **EMMA
LEEDS**  Digitally signed by EMMA
LEEDS
Date: 2021.11.16
15:27:52 -06'00'

Section Chief: _____



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604**

DATE: See Date of Section Chief Signature Below

SUBJECT: CLEAN AIR ACT INSPECTION REPORT
Corteva Agriscience, Harbor Beach, MI

FROM: Emma Leeds, Environmental Engineer
AECAB (IL/IN)

THRU: Nathan Frank, Section Chief
AECAB (IL/IN)

TO: File

BASIC INFORMATION

Facility Name: Corteva Agriscience (“Corteva”)

Facility Location: 305 N Huron Ave, Harbor Beach, MI

Date of Inspection: August 18th, 2021

EPA Inspector(s):

1. Emma Leeds, Environmental Engineer
2. Kosta Loukeris, Environmental Engineer
3. Brianna Fenzl, Environmental Engineer
4. Daniel Heins, Environmental Engineer

Other Attendees:

1. Jim McGee, EHS Manager - Corteva
2. Lisa Callender, Site Leader - Corteva
3. Kevin Soper, Production Leader - Corteva
4. Andrew Volmering, Operations Leader - Corteva
5. Scott Grekowicz, Fermentation and TTU Engineer - Corteva
6. Jessica Sekerak, Improvement Engineer - Corteva
7. Alyssa Gehring, EH&S Data Technician - Corteva
8. Angela Hughes, Operations Leader - Corteva
9. Kris Wolschlager, Technical Advisor and Extraction Coordinator - Corteva
10. Dwane Mogg, Leak Detection and Repair (LDAR) Technician – Corteva

11. Randy Reinke, Environmental Technician – AECOM
12. Shyanna Laus, Chemical Engineer - AECOM
13. Adam Shaffer, Environmental Quality Analyst - Michigan Department of Environment, Great Lakes, and Energy (EGLE)

Contact Email Address: James.McGee@corteva.com

Purpose of Inspection: CAA compliance

Facility Type: Pesticides active ingredient manufacturer

Regulations Central to Inspection: 40 C.F.R. Part 63, Subpart MMM – National Emission Standards for Hazardous Air Pollutants (NESHAP) for Pesticide Active Ingredient Production, 40 C.F.R. Part 63, Subpart EEEE – NESHAP for Organic Liquids Distribution, and Title V Permit Requirements

Arrival Time: 10:20 AM ET

Departure Time: 4:00 PM ET

Inspection Type:

- Unannounced Inspection
- Announced Inspection

OPENING CONFERENCE

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

The following information was obtained verbally from Corteva unless otherwise noted.

Company Ownership: Corteva separated from DowDuPont in 2019. The site officially changed name from Dow AgroScience to Corteva Agriscience at the start of 2021. There have been no operational or continuity changes at Harbor Beach due to this.

Process Description:

The Corteva Harbor Beach facility (“the Facility”) is a pesticides production plant. The facility uses bacteria to produce spinosad and spinetoram (“product”) in fermenters and then extracts the product for packaging and sale. Methanol is a hazardous air pollutant (HAP) byproduct of fermentation, and xylene is a HAP raw material used during extraction.

Bacteria arrive on site and are cultured in seed tanks before being transferred to the fermentation tanks. Sugar, flour, yeast, and other raw materials are fed to the fermentation tanks to aid the

bacteria in first multiplying and then creating the product, creating methanol as a byproduct. The liquid mixture of water, product, bacteria, and methanol (“whole broth”) is then mixed with a non-HAP solvent that picks up the product. One of two demulsifiers containing 5 – 30% xylene are then added to separate the enriched solvent from the spent broth. Enriched solvent [REDACTED] produce the final crystallized product.

Spent solvent (including xylene) goes to recovery, where distillation columns and a vacuum pump return the solvent to storage for reuse. Wastewater from this process and spent broth (including methanol and xylene) are sent to two evaporation units to further remove solvents and waste slurry, followed by carbon beds to remove any remaining pesticides. After the carbon beds, 40% of wastewater is routed to a bioreactor digester bed, which uses anaerobic bacteria to reduce Biological Oxygen Demand (BOD) and to remove methanol for MACT compliance. The effluent from the bioreactor and the remaining 60% of wastewater untreated for HAP or BOD are then routed to the head tank and then the City of Harbor Beach publicly owner treatment works.

Gases from the bioreactor (primarily methane and CO₂, along with any volatilized methanol) are vented to a non-assisted enclosed flare. The carbon beds and head tank are also vented to the flare. Process vents from the seed tanks, fermenters, extraction units, and evaporators are directed to a common manifold to then go to the five thermal treatment units (TTUs). Four TTUs (#850, 855, 860, and 865) are catalytic oxidizers, while the fifth is a regenerative thermal oxidizer (RTO).

Staff Interview:

On the day of the inspection, AECOM was performing periodical stack testing on the five TTUs. The facility is permitted to run a minimum of three TTUs at once, but typically runs any combination of four TTUs. The newest TTU uses ceramics and has a significantly higher recover rate than the other TTUs. Each of the four catalytic converters typically receive 18% of emissions with the RTO receives approximately 26%.

TOUR INFORMATION

EPA Tour of the Facility: Yes

Data Collected and Observations:

EPA and EGLE inspectors toured the facility with Mr. McGee and Mr. Covich, first observing the raw materials silos and warehouse, followed by the powerplant, which consists of two boilers to create steam for bacteria growth and two turbines to create air flow for the TTUs. Inspectors then entered the fermentation control room, where Corteva determines when to convey bacteria from the seed tanks to fermentation, and monitors parameters for the TTUs. Bacteria is typically conveyed to the seed tanks [REDACTED], and fermentation [REDACTED]. Emissions from [REDACTED] seed tanks and the fermenters all collect into a manifold and are sent to the TTUs.

Inspectors then observed the testing being conducted on the TTUs. AECOM was measuring vapor phase organic and inorganic emissions using Fourier Transform Infrared, following Method 320. Inspectors observed the real-time data in the middle of Run 2, reading 50 parts per million (ppm) formaldehyde at the inlet of TTU 850 and 20 ppm formaldehyde and 8 ppm methanol at the outlet.

After pausing for lunch, inspectors continued the tour in the extraction control room. Corteva personnel shared that the lower xylene-containing demulsifier, "DEM3", was in use that day, stored in tank V405. EPA conducted comparative Method 21 LDAR monitoring for V405 with two TVA2020 Thermal Vapor Analyzers. LDAR monitoring data for V405 is included in Appendix A. EPA also performed Method 21 LDAR monitoring on the wastewater treatment bioreactor and found that the pressure relief valve and vacuum relief valve were both venting organic gas to the atmosphere. TVA readings from the bioreactor are included in Appendix A. EPA showed Corteva staff the TVA readings during monitoring.

EPA also observed sample ports at the carbon beds that were not capped.

EPA observed the extraction process and the TTU outlets with a Forward Looking Infrared (FLIR) camera but did not record any videos.

Photos and/or Videos: were not taken during the inspection.

Field Measurements: were taken during this inspection.

TVA calibration data and Method 21 monitoring data are provided in Appendix A.

CLOSING CONFERENCE

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

Requested documents:

- Dates of the most recent two TTU changeout dates
- Preliminary results from TTU testing
- Most recent compliance tests
- Update on process condenser

Concerns: U.S. EPA expressed concerns that all emissions from the bioreactor were not being captured and controlled because the pressure and vacuum relief valves were venting to the atmosphere.

DIGITAL SIGNATURES

Report Author: **EMMA
LEEDS**

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LEEDS
Date: 2021.10.15
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Section Chief: **NATHAN
FRANK**

Digitally signed by
NATHAN FRANK
Date: 2021.10.15
14:00:32 -05'00'

Facility Name: Corteva Agriscience

Facility Location: 305 N Huron Ave, Harbor Beach, MI

Date of Inspection: August 18, 2021

APPENDICES AND ATTACHMENTS

1. Appendix A

Facility Name: Corteva Agriscience
Facility Location: 305 N Huron Ave, Harbor Beach, MI
Date of Inspection: August 18, 2021

APPENDIX A: FIELD MEASUREMENT DATA

TVA calibration at 1:05 PM EST on 8/18/21:

Span Gas (ppmv)	TVA #A56575 (ppm methane)	TVA #A56584 (ppm methane)
500	476	496
2000	1,976	2,006
9800	10,000	9,937

Components monitored on xylene storage tank V405 during the inspection:

Component Type	Number of Components
Valves	19
Connectors	14
Plug	2

Note: background readings during LDAR monitoring of V405 were 1.5 and 0.5 ppm methane.

Method 21 LDAR readings on bioreactor:

Equipment	TVA #A56575 Readings (ppm methane)	TVA #A56584 Readings (ppm methane)
PRV 722A	3200	3500
VRV 722A	2900	1900
Vacuum recovery line	50	60
Pressure relief line	3400	2400