



REGION 5

CHICAGO, IL 60604

MEMORANDUM

SUBJECT: CLEAN AIR ACT INSPECTION REPORT
ADM Mankato, Mankato, MN

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

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

TO: File

BASIC INFORMATION

Facility Name: ADM Mankato

Facility Location: 2019 3rd Ave, Mankato, MN 56001

Date of Inspection: August 13, 2024

EPA Inspector(s):

1. Emma Leeds, Environmental Engineer
2. Virginia Galinsky, Environmental Engineer
3. Brianna Fenzl, Environmental Engineer

Other Attendees:

1. John Wellmann – Plant Superintendent, ADM Mankato
2. John Kitmann – Environmental Coordinator, ADM Mankato
3. Michael Mikolich – Refinery Supervisor (refinery tour only)
4. Patrick Hecht – Environmental Specialist, Minnesota Pollution Control Association (MPCA)
5. Robert Schettler – Environmental Specialist, MPCA

Contact Email Address: John.Wellmann@adm.com ; John.Kitzmann@adm.com

Purpose of Inspection: Clean Air Act inspection

Facility Type: Soybean oil manufacturing

Regulations Central to Inspection: National Emission Standards for Hazardous Air Pollutants: Solvent Extraction for Vegetable Oil Production (NESHAP GGGG) and Part 70 permit, including volatile organic compound (VOC) solvent loss ratio (SLR) limit of 0.15.

Arrival Time: 1:30 PM

Departure Time: 5:35 PM

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 John Wellmann and John Kitzmann unless otherwise noted.

Process Description:

Soybeans arrive via truck and rail and are cleaned, heated, and dried before the hulls are removed using cracking rolls and aspirators. Cracked beans are then further heated and sent to the flaking rolls which mechanically remove some oil and flatten the beans to increase surface area for solvent extraction. Next, flakes and hexane rotate through the extractor where hexane extracts oil from the flakes, decreasing oil content in the flakes from 20% to 1% oil. The flakes are sent to the desolventizer-toaster-dryer-cooler (DTDC), where the desolventizer-toaster portion uses steam and hot steel plates to recover hexane from the flakes, and the dryer-cooler portion removes moisture from the flakes and denatures the proteins to create high protein feed product. The meal then gets screened and ground before being sold. Meanwhile, the oil-saturated hexane ("miscella") from the extractor is sent to the onsite refinery, where degumming, bleaching and deodorizing occurs to process the crude oil into food-grade soybean oil. Some oil is hydrogenated in the refinery.

A mineral oil scrubber system is used to control emissions from the extractor and the DTDC and recycle hexane back into the process.

Staff Interview:

Hexane emissions are calculated based off of how much hexane is used and how much grain is being processed. Hexane used is determined by checking the levels in the 4 hexane storage tanks and 8 other process tanks, and assuming the in-process hexane at any point is 30,000 gallons. This "in-process" value includes hexane in the solvent-water separator and was calculated based on the

dimensions of the process tanks. The value is updated when the facility adds new process tanks. Grain processed in the hexane emission calculation is determined by back-calculating from the daily amount of oil produced, and then adjusting the number monthly using actual inventory values. Each bushel of soybeans is estimated to produce 12 pounds of oil.

EPA asked about the new DTDC and silos included as part of the 2024 Major Amendment to the facility's Title 70 permit, and facility personnel stated that installation for neither project has begun. ADM is replacing the current DTDC because it was installed in 1996 and has reached its end of life, although the new DTDC isn't estimated to be installed or operational until 2026. Currently the facility is waiting for full approval from corporate ADM to make the purchase and then anticipates a 12-month lead time. The new system will include a vapor recovery train to put the system in vacuum and recover additional hexane. The current DTDC has 13 horizontal decks, with the top 8 decks for the desolventizer-toaster process, followed by 4 for drying and 1 for cooling.

EPA reviewed the most recent calculations of the SLR ratios at the Facility and observed that the preceding 12 months were in excess of the 0.15 limit. ADM personnel stated that leaks in the DTDC contributed to the exceedance, as well as a "bad shutdown in August 2023", where, in response to increasing SLR values, ADM shut down the plant and purged the DTDC in order to fix leaks with welding and other hot work. This shutdown did not bring the SLR back to compliance, although similar shutdowns and repairs had worked to reduce the SLR in the past.

EPA asked why the hexane emission values reported by ADM to various databases (Toxic Release Inventory, Air Emissions Inventory, MPCA inventory) did not match. ADM personnel believed the TRI values were lower because they only included n-hexane and not total hexane, and the MPCA values were different due to a reporting issue with the website.

The facility usually produces around 150,000 bushels per day on an annual average basis. Sometimes they have to shut down at the end of the year in order to maintain compliance with their Title V Permit limit on throughput (1.685000 million tons per year soybean and soybean meal throughput, 12-month rolling sum). Their maximum daily capacity is around 160 – 162,000 bushels per day.

TOUR INFORMATION

EPA Toured the Facility: Yes

Data Collected and Observations:

EPA toured the facility from the start of the process at soybean receiving, to the end of the process at oil refining. EPA observed the DTDC, and ADM explained that work had been done at the dome and inside of the DTDC during the August 2023 shutdown, but not at the lower decks of the DTDC, shown in Image 1. EPA also observed the meal grinders in this building. In the DTDC and mineral oil absorber control room, EPA observed the oil flow rate out of the stripper was 52 gallons per minute (gpm), the mineral oil temperature was 81° Fahrenheit (F), the temperature out of the cold-water condenser was

75° F, and the oil flow rate to the refinery and temperature after heat exchange was 170 gpm and 200° F, respectively.

Outside of the meal processing building, EPA observed the stack from the prep meal grind dust collector, which vents emissions from the meal grinders and the screener used prior to the grinders. The stack had recently been converted from horizontal to vertical and is tested for particulate matter emissions every 5 years. EPA observed the prep meal grind stack through a forward looking infrared (FLIR) camera and observed possible organic emissions (Video 1).

Next, EPA spoke to refinery superintendent Michael Mikolich, who explained the general refinery processes. Phosphoric acid is added to miscella from the DTDC, which is heated and mixed for 4 hours, then cooled and mixed with caustic and water to separate oil from gums. The removed gums make soapstock, while the refined oil is further processed in a bleacher and deodorizer. The deodorizer operates at a high temperature (500°F) and under vacuum (2 mmHg), and injects steam into trays of the oil to remove aldehydes and ketones. Currently around 750 pounds per hour of steam is used in the process; previously around 15,000 pounds per hour was used but a process change was made which reduced the amount of steam needed. Steam from the deodorizer is sent to a scrubber which condenses out distillate. The distillate is stored in a nitrogen-blanketed 200,000-pound tank with a vacuum vent valve and is sent to the Decatur ADM plant for further processing into Vitamin E. Air from the distillate scrubber and deodorizer vacuum jet is then sent to a dry condenser system and hot well, which uses a fan to vent through a stack to the atmosphere. An on-site dissolved air flotation (DAF) unit, as part of the facility's wastewater treatment system, is used to remove oils before sending the water to the city wastewater treatment plant.

Outside of the refinery, EPA observed the hot well stack through the FLIR camera and saw possible organic emissions (Video 2).

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

Field Measurements: were not taken during this inspection.

RECORDS REVIEW

EPA reviewed the 2023 emission calculation spreadsheet during the opening conference, but no physical copies were obtained.

CLOSING CONFERENCE

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

Requested documents:

- Maximum Achievable Control Technology (MACT) SLR emission calculation spreadsheets from 2021, 2022, and 2023
- Notification of Compliance Status for the MACT Subpart GGGG (per 40 CFR § 63.2860(d))
- Actual emissions (facility wide VOC) from 2009 – the present (as clarifications from the incorrect Emission Inventory Report numbers)
- Mineral oil flow rate 1-minute average records for 2022 and 2023
- 3-hr rolling average temperature readings of mineral oil entering the mineral oil scrubber for 2022 and 2023.

Concerns: EPA expressed concern that the facility has been exceeding its SLR limit for the past year and emitting excess hexane.

DIGITAL SIGNATURES

Report Author: Leeds,
Emma

Digitally signed by Leeds,
Emma
Date: 2024.10.03
17:18:25 -05'00'

Section Supervisor: NATHAN
FRANK

Digitally signed by
NATHAN FRANK
Date: 2024.10.07
12:07:31 -05'00'

APPENDICES

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

APPENDIX A: DIGITAL IMAGE LOG AND DIGITAL VIDEO LOG

DIGITAL IMAGE LOG

Inspector Name: Emma Leeds

Archival Record Location: [Digital Photo Log](#)

Image Number	File Name	Date and Time	Description of Image
1	IMG_0615.JPG	8/13/2024 17:00	Bottom of DTDC
2	IMG_0616.JPG	8/13/2024 17:05	Meal grinders
3	IMG_0617.JPG	8/13/2024 17:13	Mineral Oil Absorber electronic control board
4	IMG_0618.JPG	8/13/2024 17:19	DTDC electronic control board
5	IMG_0619.JPG	8/13/2024 17:28	Meal prep stack
6	IMG_0620.JPG	8/13/2024 17:41	Refinery electronic control board
7	IMG_0621.JPG	8/13/2024 17:42	Deodorizer electronic control board
8	IMG_0622.JPG	8/13/2024 17:43	Scrubber electronic control board
9	IMG_0623.JPG	8/13/2024 17:49	Wastewater electronic control board
10	IMG_0624.JPG	8/13/2024 17:59	Hot well
11	IMG_0625.JPG	8/13/2024 18:01	Hot well stack
12	IMG_0626.JPG	8/13/2024 18:03	Hydrogenated oil stack
13	IMG_0627.JPG	8/13/2024 18:06	DAF wastewater treatment tank (side)
14	IMG_0628.JPG	8/13/2024 18:07	DAF wastewater treatment tank (top)

FLIR VIDEO LOG

Inspector Name: Brianna Fenzl

Archival Record Location: [Digital Video Log](#)

FLIR Video Number	File Name	Date and Time	Description of Video
1	MOV_0017.mp4	8/13/2024 17:27	Meal prep stack
2	MOV_0018.mp4	8/13/2024 18:04	Hot well stack