



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

SUBJECT: CLEAN AIR ACT INSPECTION REPORT
Zeeland Farm Services, Zeeland, Michigan

FROM: Virginia Galinsky, Environmental Engineer
AECAB (MN/OH)

THRU: Brian Dickens, Section Supervisor
AECAB (MN/OH)

TO: File

BASIC INFORMATION

Facility Name: Zeeland Farm Services

Facility Location: 2468 84th Avenue, Zeeland, Michigan 49464

Date of Inspection: January 23, 2023

EPA Inspector(s):

1. Virginia Galinsky, Environmental Engineer
2. Karyn Defranco, Environmental Engineer

Other Attendees:

1. Brandon Larosa, Environmental Engineer, Zeeland Farm Services
2. Bridgette Rillema, Environmental Manager, Zeeland Farm Services
3. Hannah O'Toole, EHS Manager, Zeeland Farm Services (by phone)
4. Kathryn Devries, Environmental Quality Analyst, Michigan

Contact Email Address: hannaho@zfsinc.com, brandonl@zfsinc.com, and
bridgetter@zfsinc.com

Purpose of Inspection: to investigate VOC and hexane emissions

Facility Type: Soybean processing facility

Regulations Central to Inspection: ROP Permit Number MI-ROP-M4204-2018b and National Emission Standards for Hazardous Air Pollutants (NESHAP): Solvent Extraction for Vegetable Oil Production

Arrival Time: 1:35 PM

Departure Time: 4 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.
- ☒ Provided CBI warning to facility

The following information was obtained verbally from the facility personnel unless otherwise noted.

Company Ownership: Zeeland Farm Services has owned the facility for at least the last 5 years.

Process Description:

Soybeans are received by truck. They are held in storage bins until they go to the prep building, where they are dehulled, crushed, and eventually flaked. They have a grain dryer which is used to dry beans which are wet before the extraction process.

The flakes then go to the extraction building, where hexane is used to remove the oil. The leftover flakes are called meal at this point in the process, and they proceed to the desolventizer/toaster/dryer/cooler (DTDC) to remove residual hexane. After the desolventizer, the flakes are toasted and then go to the dryer/cooler and are then stored in silos until they are loaded out as product (animal feed). The desolventizer flashes off the hexane with heat, and the hexane is recovered using a mineral oil absorber. The recovered hexane is sent back into the work tank. Wastewater from steam heating also goes into the work tank, where hexane is separated out, and the water drains to a reboiler where additional residual hexane is removed. The water from the reboiler then goes to the skim pit, and the removed hexane goes to the work tank.

After separation of the hexane from the oil, the crude oil then proceeds to the refinery in order to get it to food-grade quality. The refining process does not have any stacks. The crude oil goes into a day tank first. Phosphoric acid is added in a retention mixer. It uses filters (silica, sand),

centrifuges, and a deodorizer to remove impurities. The deodorizer is operated at a high vacuum and high temperature and the residence time of the oil in the deodorizer is 2-4 hours. Not all of the oil processed at the facility goes through the deodorizer. After the deodorizer, citric acid is added. The refinery also has a vacuum dryer (to remove water) and vacuum bleacher. The materials removed through the filtration and deodorizers is termed soap stock.

The facility also has some wastewater pretreatment on site. Water goes into a hot well and then a dissolved air flotation unit before going to a pit. Aluminum sulfate is used for coagulation in the DAF. After the DAF, wastewater is discharged to the city.

Staff Interview: The vertical seed conditioner (VSC) in the prep building is controlled with a cyclone, and the rest of the equipment in the prep building is controlled with a baghouse.

Hexane is received by truck and unloaded into storage tanks. The storage tanks are kept under vacuum and vent to the scrubber and mineral oil absorber before venting to atmosphere.

The level of hexane in the work tank is measured daily to determine usage for their MACT mass balance calculations. They also monitor the temperature at the sparge deck pursuant to their permit, which requires a minimum temperature of 195°F. They showed us some recent data that showed that they were operating around 225°F.

The DTDC was replaced around 2015. It was previously two separate units with two stacks, and the new design is a single unit with one stack.

Twice per year they have a maintenance outage. They don't always do a full purge of the extraction unit during this outage.

They have a permit throughput limit of 1,050 tons per day of beans. If not for that limit, they could process more beans.

They are working on scheduling performance testing which will take place later in 2023. They plan on testing both receiving pits, the main vent in extraction (for VOCs only, using Method 25), the grain dryer, and engines 1 and 2. In 2020, the facility tested 3 boilers and the DTDC.

The deodorizer has a capacity of 4.2 million pounds per week. The refinery processes oil from the company's Ithaca location as well.

The facility generally operates 24/7 and has two 5-day shutdowns per year. Approximately 67 employees work on-site.

TOUR INFORMATION

EPA Tour of the Facility: Yes

Data Collected and Observations:

We saw the bean unloading pits 2 and 3. We saw the meal loadout area. We went to operation room in the prep building, which also covers extraction. We observed the extractor operating at 147°F and a vacuum of -0.33 inches of water. We went into the extraction building. We saw the prep building baghouse stack. We then went to the extraction unit where we saw the work tank, the DTD vessel, the dryer cooler (which was outside the building), the DTDC stack, and the 2 hexane storage tanks. We saw the open wastewater skim pit which was located adjacent to the extraction building. We went back into the operator room and saw the work tank level was at 19.48 inches.

We then proceeded to the refinery operating room. We saw that the deodorizer was 500°F at the top of the vessel and 250°F at the bottom where the oil leaves the vessel. The vacuum was -0.34 mmHg at the top and -5.77 mmHg in the middle of the vessel. We also observed a reading of 142.8 PSIG and 10.66 pH. The operator estimated that the deodorizer has been processing about 3 million pounds per week of oil.

We saw that the vacuum dryer was operating at 200°F and -19 Hg, and the vacuum bleacher was operating at 237°F and -9.8 Hg. We also saw that the hot well was receiving about 10 gallons per minute of water.

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

Field Measurements: were not taken during this inspection.

CLOSING CONFERENCE

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

Requested documents:

- Copies of the test reports for the VOC tests conducted at the facility in 2018 and 2020
- Copies of the MAP and PMP required by the permit
- Copy of the most recent MACT Subpart GGGG semiannual report

DIGITAL SIGNATURES

Report Author: VIRGINIA GALINSKY Digitally signed by VIRGINIA GALINSKY
Date: 2023.03.21 10:37:28 -05'00'

Section Supervisor: Brian Dickens Digitally signed by Brian Dickens
Date: 2023.03.21 10:39:56 -05'00'