



REGION 5

CHICAGO, IL 60604

MEMORANDUM

SUBJECT: CLEAN AIR ACT INSPECTION REPORT
Solae LLC, 124 South Route 47, Gibson City, Illinois

FROM: Karyn DeFranco, Physical Scientist
AECAB (MN/OH)

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

TO: File

BASIC INFORMATION

Facility Name: Solae, LLC

Facility Location: 124 South Route 47, Gibson City, Illinois 60936

Date of Inspection: September 16, 2024

EPA Inspector(s):

1. Karyn DeFranco, Physical Scientist
2. Virginia Galinsky, Environmental Engineer

Other Attendees:

1. Jeffrey Anderlik, Extraction Unit Manager and interim Plant Manager
2. Kenneth Holmes, EHS Manager
3. Tim Garrett, Production Supervisor
4. Karl Defries, Protein Operations Supervisor

Contact Email Address: jeffrey.anderlik@iff.com

Purpose of Inspection: To investigate a reported increase in annual VOC emissions.

Facility Type: Soybean processing facility

Facility Name: Solae, LLC
Facility Location: 124 South Route 47, Gibson City, Illinois 60936
Date of Inspection: September 16, 2024

Regulations Central to Inspection: National Emission Standards for Hazardous Air Pollutants (NESHAP) for Solvent Extraction for Vegetable Oil Production (Subpart GGGG) and CAAPP Permit, specifically Condition 3(a)(i)(B) and Condition 4.4.2(c)(ii)(C).

Arrival Time: 12:44 PM

Departure Time: 3:50 PM

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 Solae, LLC unless otherwise noted.

Company Ownership: Legal entity has been Solae, LLC for at least the past 5 years. The Facility was wholly owned by DuPont until February 2021 when it was sold to International Flavors and Fragrances (IFF).

Process Description:

Soybeans are transported to the facility via truck and then are stored for processing. The milling process removes the hulls and flakes the soybean. The facility has two extractors where hexane is added to the flaked soybeans to strip the soy oil from the soybean flakes. The oil and solids are then steam-heated in an evaporator to approximately 220°F in the hexane separation process to flash off hexane. The flashed hexane exhausts to a condenser, where it is recovered and reused. The remaining hexane not recovered in the condenser is exhausted through a mineral oil scrubber/absorber. Hexane absorbed in the mineral oil is flashed off and reused.

At this point in the process, some of the solid flakes remaining after hexane separation are ground into meal and solid as animal feed, but some moves to an ethanol-water extraction process to remove the sugar (creating a molasses byproduct), and then to a grinder and #1 extruder to create a high-protein (up to 70%) solid as the final product. Emissions from the ethanol-water extraction process are vented through a water absorber to control remaining ethanol in vapor stream. There is a #2 extruder which makes a soy nugget product using a high-protein (up to 90%) soy flour produced by a different facility.

The soybean oil has lecithin removed but no additional processing. The lecithin is separated with a centrifuge and a filter press at a slightly elevated temperature.

Wastewater is produced throughout the process. Wastewater streams include, but are not limited to, cooling tower blowdown, extraction, and concentrate from ethanol-water extraction process.

Wastewater is treated onsite in two aeration basins and one clarifier.

Staff Interview:

- Normally the soybeans would be dried at the facility after receiving them, but their dryer burned down earlier in the year so they are having them dried off-site prior to receiving them until a new dryer is built;
- The facility receives hexane shipments approximately once per month;
- The hexane and ethanol raw material storage tanks at the facility have conservation vents that are not routed to a vapor recovery system during loading;
- When the hexane work tank is full, it overflows to the hexane dump tank (underground);
- Unlike other soybean processing plants, where the main product is the soybean oil, Solae's main product is a soy protein powder for human consumption;
- The facility stated it uses different emission factors for specialty vs conventional products to calculate mass balance loss of hexane pursuant to Subpart GGGG. The facility stated they believed previous emissions reporting were underestimating the specialty production in its calculations.
- EPA noted that the facility reported annual VOC emissions in 2022 about 935.9 tons, compared to prior years which were 820 tons per year and lower. EPA asked if they knew the reason for the reported increase and they stated that they did not know.

TOUR INFORMATION

EPA Toured the Facility: Yes

Data Collected and Observations:

At the time of the EPA tour, the facility was shut down for its planned annual outage. EPA toured the facility and saw the meal grinders, the hexane extraction unit, the mineral oil absorber column, the work tank, hexane and ethanol storage tanks, a hot well associated with the lecithin removal process, the 6 protein meal grinders and the #1 extruder and its dryer. EPA spoke with Garrett and Defries during the tour about the lecithin extraction process and the purpose of the hot well.

Subpart GGGG at 40 CFR 63.2862(d)(1) requires Solae to, among other things to record the 12 operating months rolling sum of the actual solvent loss in gallons. As part of this inspection, EPA requested Solae's internal hexane mass balance calculations.

The CAAPP permit at Condition 3(a)(i)(B) requires Solae to keep volatile organic compound (VOC) emissions below 1,460 tons/year from the entire facility as a rolling 12-month basis. As part of this inspection, EPA requested Solae's VOC emission calculations. The CAAPP permit at Condition 4.4.2(c)(ii)(C) requires Solae to keep and maintain a record containing the information on the hourly VOC emission rate(s) for verifying compliance with 35 IAC 215.301 (lbs/hr on a 30-day average), with

supporting operating data and calculations. As part of this inspection, EPA requested Solae's record for compliance with Condition 4.4.2(c)(ii)(C).

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:

- Internal Hexane mass balance calculations (monthly) for November 2022 through September 2024;
- Internal VOC emission calculations for January 2021-September 2024;
- Follow-up calculations and explanation of how much hexane the process can hold; and
- Permit condition 4.4.2(c)(ii)(C) record for compliance with 35 IAC 215.301 for January 2021-September 2024;

DIGITAL SIGNATURES

Report Author: **KARYN DEFRANCO**
 Digitally signed by KARYN DEFRANCO
Date: 2024.11.07 12:41:07 -06'00'

Section Supervisor: **BRIAN DICKENS**
 Digitally signed by BRIAN DICKENS
Date: 2024.11.07 12:51:54 -06'00'