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 Vantage Corn Processors LLC, Peoria, Illinois
FROM:	Emma Leeds, Environmental Engineer AECAB (IL/IN)
THRU:	Nathan Frank, Section Chief AECAB (IL/IN)
TO:	File

BASIC INFORMATION

Facility Name: Vantage Corn Processors LLC (Vantage)

Facility Location: 1 Edmund St, Peoria, IL 61602

Date of Inspection: 8/10/2021

EPA Inspector(s):
1. Emma Leeds, Environmental Engineer
2. Brianna Fenzl, Environmental Engineer
3. Dakota Prentice, Environmental Engineer
4. Kosta Loukeris, Environmental Engineer

Other Attendees:
1. Taylor Pellerin – Environmental Manager, Vantage
2. Jeff Filson, LDAR Technician, Vantage
3. Brianna Kalous, Ethanol Engineer, Vantage

Contact Email Address: taylor.pellerin@adm.com

Purpose of Inspection: To determine compliance with applicable New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), and Title V permit, and to perform Method 21 leak detection and repair (LDAR) survey

Facility Type: Dry corn mill

Regulations Central to Inspection: 40 C.F.R. Part 60 Subpart VV - Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry; 40 C.F.R. Part 63 Subpart FFFF – National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical (MON) Manufacturing; 40 C.F.R. Part 63 Subpart UU – National Emission Standards for Equipment Leaks – Control Level 2 Standards

Arrival Time: 8:30 AM ET
Departure Time: 12:45 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 Vantage personnel unless otherwise noted.

Company Ownership: Archer Daniel Midlands (ADM) has owned the facility since 1980. In January 2020, ADM moved the facility into a wholly owned subsidiary named Vantage Corn Processors LLC.

Process Description:
Yellow corn and corn screenings are received at the facility by truck and occasionally by rail, both track and rail unloading operations having independent baghouses. Corn is stored in silos, with a total corn storage capacity of 1,100,000 bushels, until an elevator conveys the corn through grain cleaning, a grind tank, and then into a hammermill to convert the corn into a flour.

After grinding, flour is conveyed to a mixing tank, where it is combined with heated process water, alpha-amylase enzyme, and a caustic substance for pH adjustment to create a mash. From the mixing tank, mash moves through a set of four jet cookers which use steam to heat the mash for approximately one hour to aid in the breakdown of the corn. If necessary, mash moves through a set of three flash coolers to bring the temperature down to approximately 85 degrees Fahrenheit, before it is conveyed to two liquefication tanks in the series. Process water is added to the liquefication tank, where mash is held for the starch to hydrolyze into glucose.

In order to increase the process rate, there are two identical and separate production lines of the mix tanks, cookers, coolers. The two lines rejoin at the liquefication tanks. After liquification,

mash moves through four coolers and then enters the batch fermentation process, which involves twenty fermentation tanks of three different sizes. Some mash from the coolers is also used to supplement the yeast propagation system, which utilizes glucose enzymes, bacterial control, a nitrogen source, and yeast to continuously propagate yeast to be added to the fermentation process. Glucose enzyme, bacterial control, and nitrogen source are also added directly to the batch fermentation process. The process from grain receiving up to fermentation takes approximately three hours.

Following the approximately 60-hour fermentation tank retention time, the contents of the fermentation tanks empty into the beerwell one at a time, which supplies three beerstills. With the addition of steam, the beerstills create an ethanol and water vapor that leave the stills from the top and move to the three rectifiers, while the separated solids leave from the bottom of the stills to the solids feedhouse. The solids feedhouse creates distiller's dried grains with solubles (DDGS) using 10 centrifuges to separate solids from the wet feed. The solids then move through one of four driers and are sold as animal feed. DDGS is shipped via barge, rail, and truck, each with their own baghouse.

The three rectifiers are used to increase the ethanol concentration (or proof) of the vapors from the beerstills. Liquids from the rectifiers are sent to the fuel ethanol process, which blends 1% gasoline with the ethanol to create a final product. Liquids from the rectifiers are also sent to one of two beverage feed tanks, which also receive recirculated liquids from the molecular sieves and proof and grade (P&G) tanks from later in the process. From the beverage feed tanks, material flows to the two beverage units, which are used to mix in a caustic processing aid and a citric cleaning acid before materials flow to one of eleven P&G tanks. Material is condensed in the P&G tanks, producing 192 proof ethanol. Ethanol is then further processed and stored as 190 proof J Grade ethanol, 192 proof beverage ethanol, or 190 proof pure and United States Pharmaceutical (USP) ethanol, or sent to the molecular sieve for water absorption to produce 200 proof pure and USP ethanol. The 200 proof ethanol and 192 proof beverage ethanol are also combined with denaturants and reverse osmosis water to create USP ethanol and specially denatured alcohol (SDA) blends.

All final ethanol products flow through either a horizontal high flow filter, a multiple-filter bank, or both before being loaded out via truck, rail, or barge. There are 10 tracks used for rail loadout, using submerged loading for emission controls, while the truck loadout uses a load-out flare.

Emissions from the four DDGS driers are controlled by a scrubber followed by one of two wet electrostatic precipitators (WESPs) followed by one of two regenerative thermal oxidizers (RTO) for the feedhouse. A third RTO is used to control emissions from the yeast propagation tanks, the twenty batch fermentation vessels, and the three rectifiers.

Staff Interview: The original facility was built in 1928 and operated as a whiskey distillery until 1980, when it was purchased by ADM. ADM continued to use the existing dry mill equipment and also installed a wet mill system, which was in operation until 2015. The dry mill employs 145 people and 30 – 40 on-site contractors. Approximately 1 – 1.5 million bushels of corn are ground per day, producing 3 – 4 million gallons of ethanol per month. The facility produces three different grades of ethanol: food, industrial, and fuel. In 2020, production of fuel

grade dropped to 0% of the total ethanol produced at the facility while industrial grade ethanol (hand sanitizer) increased substantially. At the time of the inspection, about 20% of the ethanol production was beverage grade (vodka), and the remaining ethanol was evenly split between industrial and fuel grade.

Nine of the twenty fermentation tanks are 330,000 gallons in size, three are 550,000 gallons, and nine are 770,000 gallons. All of the fermentation tanks were built in 1980, except Fermenters 43 – 45, which were built in 1994.

All fermentation vessels have pressure relief valves (PRVs) and vacuum relief valves (VRVs) that are continuously monitored from the control room and visually monitored every four hours. Emissions from the fermentation vessels go through a CO_2 scrubber before reaching the RTO. If the RTO shuts down, all the rectifiers also have CO_2 scrubbers that will go online. CO_2 scrubbers use a 316 stainless steel packing material. The RTO shuts down a few times per quarter, and downtime records are reported in the semi-annual MON NESHAP reports.

An LDAR survey is completed at the facility once a quarter on approximately 5,000 components. The production of ethanol and acetaldehyde during yeast propagation and fermentation trigger applicability of NESHAP Subpart UU, with a 500 parts per million (ppm) leak definition for all parts on applicable miscellaneous organic chemical manufacturing process units (MCPUs). Vantage performs LDAR on 116 valves, 16 agitators, and 48 pumps involved in yeast propagation and fermentation under NESHAP Subpart UU. Meanwhile, MCPUs after fermentation in the facility's process are subject to NSPS Subpart VV LDAR monitoring, with a 10,000 ppm leak definition. There are 4,265 valves and a 200 – 300 pumps on which Vantage performed NSPS Subpart VV LDAR monitoring.

TOUR INFORMATION

EPA Tour of the Facility: Yes

Data Collected and Observations:
EPA conducted LDAR monitoring at the facility using two TVA2020 Thermal Vapor Analyzers to take Method 21 readings for approximately 1.5 hours. EPA also utilized a Forward Looking Infrared (FLIR) camera for taking digital photos and imaging hydrocarbon gas leaks while walking through the site.

EPA began by monitoring components in the Rectifier 3, 6, and 7 systems with the two TVA's. Approximately 22 valves and 13 pump components were monitored on Rectifier 3, and 61 valves and 2 pump components were monitored on Rectifier 6. Process material (identified as purges from sampling systems through the process) was identified in various spots on the ground, including in the enclosure for Rectifier 6. This dike containment around Rectifier 6 partially contained with sandbags was reading around 22,000 ppm methane using Method 21. This caused a high background concentration in the surrounding area which included units in the LDAR program. EPA was thus unable to take accurate LDAR measurements in this area. The process material on the ground can be seen in images DC066 and DC069, and hydrocarbon emissions

volatilizing to the atmosphere are seen in FLIR videos MOV0065 and MOV0065. EPA learned from a Vantage sampling engineer that the spill was created from product sampling during which process fluid is purged directly onto the facility floor. Reportedly, this is the standard procedure for sampling at 78 ports throughout the site, which are sampled either once every two hours or once per 12-hour shift.

After performing partial LDAR monitoring on the Rectifiers, one group of EPA inspectors with TVA A56584 went to the beverage tank farm while another group with TVA A56575 moved to the yeast propagation and fermentation tanks. LDAR was performed in these areas for approximately 30 minutes. At the beverage tank farm, which is one of three tank farms for final product at the facility, inspectors monitored approximately 50 valves and found 0 detectable leaks above 10,000 ppm. At yeast propagation and fermentation, inspectors monitored components on Fermenters 33, 41, 42, and 39, and Propagators 15 and 13, and detected 10 leaks above 500 ppm, summarized in Appendix B.

EPA also observed numerous open-ended valves and lines without a cap, blind flange, plug, or second valve throughout the facility. EPA recorded some of the open-ended valves and lines observed in Appendix B. Some valves were missing tags, so approximate location is provided.

Photos and/or Videos: were taken during the inspection.
See Appendix A – Digital Image Log for digital images and FLIR videos.

Field Measurements: were taken during this inspection.
See Appendix B – Field Measurement Data for TVA calibration data, LDAR monitoring leaks, and open-ended lines data.

CLOSING CONFERENCE

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

Requested documents:
EPA requested the following information and records via email on August 13th, 2021:

Information:

- Corn storage capacity (bushels)
- Construction date of fermenters (large, jumbo, mumbo old, and mumbo new)
- Average pressure drop across the CO_2 scrubber – six months of average pressure drop across scrubber (averaging period should be what you use for compliance or standard operation)
- Methanol storage capacity
- CO_2 scrubber packing – random or structured.

Records:

- Total fermenter PRV/VRV lift times for the last 6 months – broken down by individual fermentation tanks.
- MON Notice of Compliance Status (NOCS) – on a process flow diagram, show the boundaries of the MON MCPU (if not shown in NOCS).
- Last 2 years of semiannual reports for MON and LDAR.

- Documentation of last compliance check to ensure we are not subject to Subpart VVa.
- MS Access version of Guideware database for review.
- Visual Pump Inspection forms for each week in July 2020 and February 2021.
- Number of VV or MON sample ports on site and the frequency of the sample taken at each port.
- Most recent performance test for all pollution control devices.
- The process flow diagrams used during the inspection while discussing operations.
- 2020 Annual Emissions Report

Concerns: EPA expressed concern that Vantage is not complying with the closed purge, closed loop, or closed vent sampling requirements in NSPS Subpart VV for sampling connection systems. EPA also expressed concern about the number of open-ended lines observed.

DIGITAL SIGNATURES

Report Author: EMMA LEEDS Digitally signed by EMMA LEEDS Date: 2021.10.08 16:02:46 -05'00'

Section Chief: NATHAN FRANK Digitally signed by NATHAN FRANK Date: 2021.10.13 22:39:39 -05'00'

Facility Name: Vantage Corn Processors LLC
Facility Location: 1 Edmund St, Peoria, IL 61602
Date of Inspection: August 10, 2021

APPENDICES AND ATTACHMENTS

1. Appendix A – Digital Image Log
2. Appendix B – Field Measurement Data

Facility Name: Vantage Corn Processors LLC
Facility Location: 1 Edmund St, Peoria, IL 61602
Date of Inspection: August 10, 2021

APPENDIX A: DIGITAL/ IMAGE LOG

1. **Inspector Name:** Dakota Prentice	2. **Archival Record Location:** https://usepa.sharepoint.com/:f:/r/sites/R5_Work/r5erc/ecad/AECAB%20Library/Enf_ADM-Peoria_IL_21_InspRep/Digital%20Image%20Log?csf=1&web=1&e=FDeKAE

Image/Video Number	File Name	Date and Time (CT)	Description of Image
Image 1	DC_0066	8/10/21, 11:14 AM	Sandbag enclosure for sample purge to ground in Rectifier 6 enclosure
Image 2	DC_0069	8/10/21, 11:17 AM	Extent of sample purge to ground in Rectifier 6 enclosure
Video 1	MOV_0065	8/10/21, 11:10 AM	Hydrocarbon emissions from sample purge on ground in Rectifier 6 enclosure
Video 2	MOV_0067	8/10/21, 11:16 AM	Hydrocarbon emissions from sample purge on ground in Rectifier 6 enclosure
Video 3	MOV_0068	8/10/21, 11:16 AM	Digital video of sample purge on ground in Rectifier 6 enclosure
Video 4	MOV_0070	8/10/21, 11:47 AM	PRV venting on Fermenter 33
Video 5	MOV_0071	8/10/21, 12:15 PM	Leak on connection to PRV on propagator 13

APPENDIX B: FIELD MEASUREMENT DATA

TVA calibration data:

8/10/21 Morning Calibration		
Span Gas (ppm methane)	TVA A56575	TVA A56584
500	500	501
2000	1918	1901
10,000	9860	9960
8/10/21 Afternoon Drift Check		
Span Gas (ppm methane)	TVA A56575	TVA A56584
500	550	516
2000	1880	2040
10,000	9450	1.1%

Summary table of LDAR leak detections at fermenters and yeast propagators:

Tank	Component Type	Reading (ppm methane)
Fermenter 39	Old sample port	1,050
Fermenter 41	Old sample port	820
Fermenter 41	PRV	1,950
Fermenter 42	Old sample port	1,980
Fermenter 42	PRV	3,200
Propagator 15	PRV	5,600
Propagator 15	VRV	680
Propagator 13	PRV	620
Propagator 13	Connector	810
Propagator 13	Left of Connector mentioned above	2,300

Notes: all readings taken with TVA A56575

Open-ended lines summary table:

Component	Issue
valve left of Valve 97A	open-ended line
valve right of Valve 196	open-ended line
Valve 238	open-ended line - plug hanging
Valve 101	open-ended line - missing plug
Valve 212	open-ended line
Valve 263	open-ended line - plug hanging