Inspection Report: Chemisphere Corporation, Clean Air Act Stationary Source

Inspection Date(s): July 12, 2023

Facility Name: Chemisphere Corporation

Facility Address: 2101 Clifton Avenue, St. Louis, MO 63139

ICIS-Air #: MO0000002951000808

Federal Facility: No

NCI: Creating Cleaner Air for Communities

Facility size: Synthetic Minor

Activity: Partial Compliance Evaluation

State Referral: No

NAICS code: 424690 Other Chemical and Allied Products Merchant Wholesalers

Lead Inspector: Elizabeth Hubbard, ERG Inspector Trainee, 919-468-7894

Asst. Inspector: Steve Rapp, ERG Inspector, 339-364-4264

State Inspector: Suzanne Lamb, Missouri Department of Natural Resources (MoDNR)

Facility Contact: Lisa Ruiz, Quality Assurance Manager

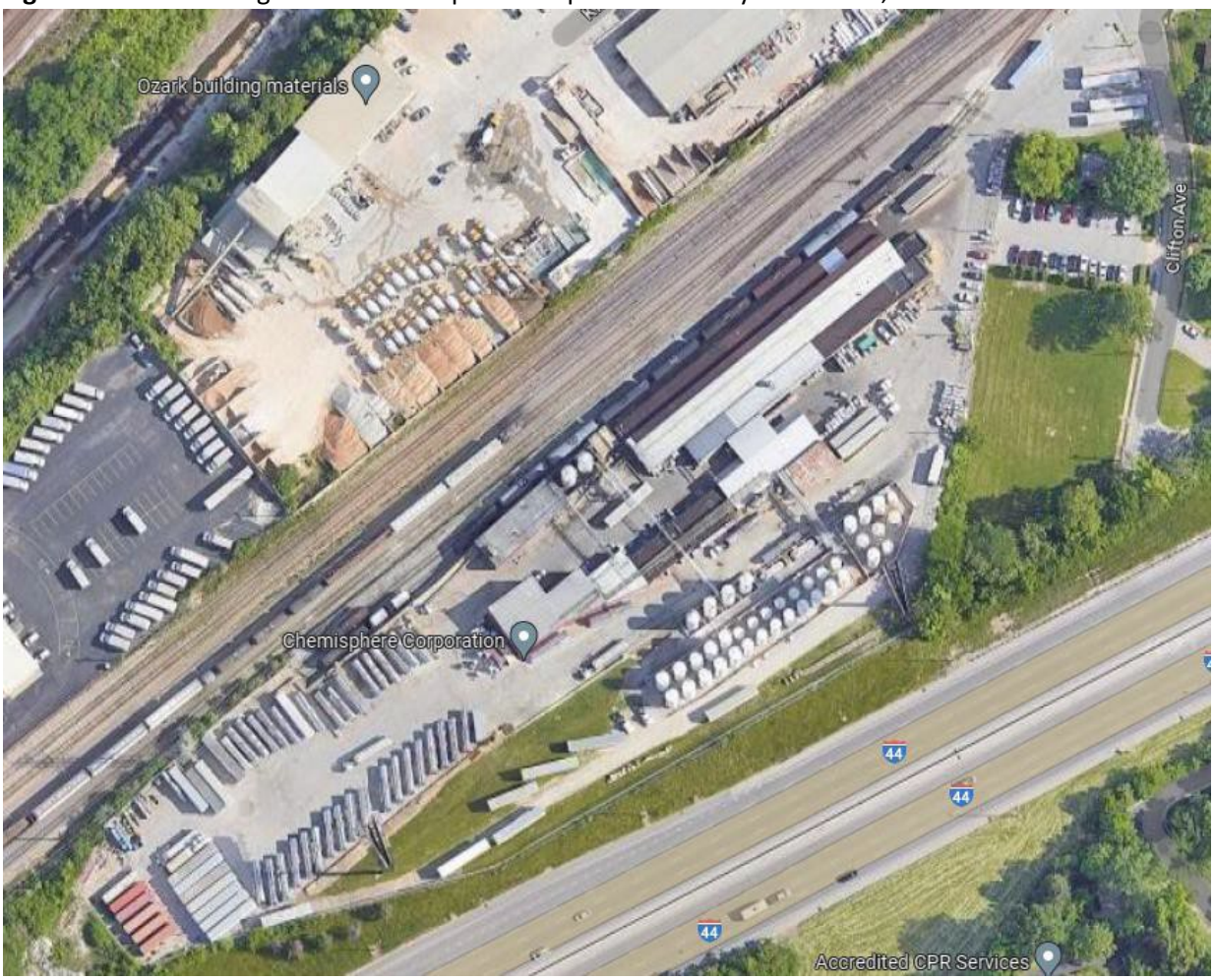
1. **Plant Description:**

The operating permit says, “Chemisphere Corporation is a chemical distribution facility that receives and ships chemicals for customers. The equipment at the installation includes various storage tanks, blending tanks, container filling operations, rail unloading racks, and truck loading/unloading racks.

The installation has the potential to be a major source for volatile organic compounds (VOCs) and hazardous air pollutants (HAPs). However, the installation, in their Intermediate Operating Permit application, is voluntarily limiting the plant wide emissions to less than 100 tons per year for VOCs, less than 10 tons per year for each HAP, and less than 25 tons per year for total HAPs, on a 12-month rolling average.”

The only National Emission Standards for Hazardous Air Pollutants (“NESHAP”) to which the facility is subject, according to their operating permit, is 40 C.F.R. Part 61, Subpart M, the NESHAP for asbestos.

Figure 1: Satellite image of the Chemisphere Corporation facility in St. Louis, MO.



2. Facility Entry:

The representatives of the United States Environmental Protection Agency ("EPA"), Elizabeth Hubbard and Steve Rapp from Eastern Research Group, Inc. ("ERG"), and a representative from the Missouri Department of Natural Resources ("MoDNR"), Suzanne Lamb, arrived at the Chemisphere Corporation facility at 2101 Clifton Avenue, St. Louis, MO ("Chemisphere" or "the facility") at approximately 8:30 am. The MoDNR and ERG representatives ("the inspectors") were met at the administration building by: Lisa Ruiz, Quality Assurance Manager; Dan Kuchler, Operations Manager; and Johnny Vogele, Quality Assurance Chemist ("the facility representatives"). The inspectors presented their identification credentials and provided an overview and scope of the inspection. The inspectors explained that ERG worked as contractors to conduct facility inspections for EPA. They provided a copy of EPA's "Small Business Resources Information Sheet."

3. Opening Conference/Technical Discussion:

The inspectors explained that they were at the facility to conduct a routine Clean Air Act ("CAA") inspection, including a focus on volatile organic compounds ("VOCs") and hazardous air pollutants ("HAPs"). The inspectors explained that during the facility walkthrough, they would take digital images of the facility's processes and emission points using a digital point and shoot camera, as well as an optical gas imaging, forward looking infrared ("FLIR") video camera, model GF320, that were not intrinsically safe. Therefore, they requested that the facility representatives inform them of any areas where there could be a potentially explosive atmosphere. Ms. Ruiz explained that there were areas of the facility where flammability would be a concern, so the inspectors would not be able to take the cameras to those areas.

The inspectors asked for background information about Chemisphere and the facility. The facility representatives provided an overview of the facility's history, as well as the chemical processing and general operations that take place at the facility. Chemisphere Corporation took ownership of the facility in 1974 and was a family-owned business until 2021. Prior to 1974, the site was a steel operation. In 2021, Chemisphere Corporation was purchased by Integrity Partners Group ("IPG"). The facility representatives explained that the facility operates 7:00 am to 4:30 pm, Monday through Friday, and had 49 employees at the time of the inspection. The equipment at the facility includes 52 storage tanks, 15 blending tanks, container filling operations, rail unloading racks, and truck loading/unloading racks. The facility makes and packages a multitude of chemical products including, but not limited to, brake cleaner, nail polish remover, hand sanitizer, industrial cleaner, paint thinners and strippers, sunscreen, and soap. Raw materials stored at the facility include aliphatics, ethers, hydrocarbons, xylene, toluene, isopropyl alcohol, methanol, acetone, perchloroethylene, and methylene chloride.

The facility representatives described the chemical handling processes at the facility. The facility receives some materials in totes, while others are received via tanker trucks or railcars. The facility unloads some raw materials from railcars but does not load railcars. They explained that many of the chemicals located at the facility have designated storage tanks, most of which are vertical storage tanks. Storage tanks are partially drained and filled daily as needed, with some chemicals being blended to create products such as cleaning agents, degreasers, and coating additives, while some materials, such as perchloroethylene, are repackaged and shipped to customers in the original form in which they were received by the facility. Storage tanks are not necessarily fully emptied before being refilled with the same chemical. The inspectors asked whether tanks are filled from the top or the bottom and facility

representatives indicated that they are filled from the bottom via above ground pipes that are typically 2 inches in diameter.

The facility representatives provided a storage tank inventory which lists each storage tank number, total volumetric capacity, and the name of the chemical and volume of chemical stored in each tank at the time of the inspection. See Appendix D.

The inspectors explained that they had questions related to the facility's 2017 operating permit, the associated Statement of Basis ("SOB"), Emission Inventory Questionnaire ("EIQ"), and Annual HAP and VOC Emissions Reports. The following is a summary of the discussion.

The inspectors explained that the facility's 2017 operating permit, as well as the NEI and TRI, indicate that methylene chloride is present at the site but that no related NESHAPs apply to the facility. The inspectors asked whether methylene chloride is used to process chemicals at the facility based on the definition of "chemical manufacturing process" provided in 40 C.F.R. Part 63, Subpart VVVVVV.[1] The facility representatives indicated that methylene chloride is used to process chemicals and is also sold in a straight-packaged form without being mixed with other chemicals. The facility representatives explained that methylene chloride is stored in dedicated storage tanks (R41 and R42).

The inspectors asked whether the facility produces or handles any chemicals containing benzene, cadmium, chromium, lead, manganese, or nickel. The facility representatives indicated that benzene is present as a contaminant in some petroleum materials handled at the facility, but the facility does not handle materials containing cadmium, chromium, lead, manganese, or nickel.

The inspectors asked whether any reactions occur at the facility. The facility representatives indicated that there are no reactors on site and the only reactions that occur in their mixing processes are naturally occurring, such as citric acid reacting with some materials in soap.

The inspectors asked whether HAP and VOC emissions are estimated for all tanks at the facility. The facility representatives responded that they use an environmental consulting firm, NPN, to calculate all emissions on site so they were uncertain whether emissions are calculated for all tanks at the facility or just for the storage tanks.

The inspectors explained that Permit Condition (F01, F02 and F03)-001 and Permit Condition (K15, K16 and K17)-001 limit the amount of VOC emissions from mixing tanks K15, K16, and K17 and fill lines F01, F02, and F03 to less than or equal to 27.08 tons in any consecutive 12-month period and limit the amount of HAP emissions from mixing tanks K15, K16, and K17 and fill lines F01, F02, and F03 to less than or equal to 4.24 tons in any consecutive 12-month period. The inspectors asked how much HAP is contained in the VOCs used in those mixing tanks and fill lines and how the amount of HAP is determined. The facility representatives reiterated that such calculations are handled by NPN so they were uncertain exactly how those numbers are determined. They stated that those tanks are generally used for personal care products so they likely would not contain as much HAP as the chemicals in some tanks. They assumed the amount of HAP in the VOC in those tanks was determined through a combination of looking at Safety Data Sheets and performing product testing. The facility representatives explained that they create a spreadsheet with all chemicals that go through the tanks which is sent to NPN to calculate the HAP and VOC content.

[1] 40 CFR 63.11502

The inspectors asked whether pressure and conservation vent settings are sent to NPN as well. The facility representatives responded that they have conservation vent settings for all tanks at the facility and those settings have been submitted to NPN in the past. The vents are of various sizes based on criteria such as tank capacity and chemicals used, and the tank maintenance contractor determines what the vent settings should be.

The inspectors explained that Permit Condition (F04 and F05)-001 and Permit Condition (K19 and K20)-001 limit the amount of VOC emissions from mixing tanks K19 and K20 and lance filling units F04 and F05 to less than or equal to two (2) tons in any consecutive 12-month period and limit the amount of HAP emissions from mixing tanks K19 and K20 and lance filling units F04 and F05 to less than or equal to two (2) tons in any consecutive 12-month period. The inspectors asked whether lance filling occurs from the top or bottom of the mixing tanks and how the amount of HAP and VOC from these emission units is determined. The facility representatives explained that lance filling occurs from the bottom into a closed container. They indicated that a contractor calculates HAP and VOC emissions based on information shared by Chemisphere. The facility representatives also stated that mixing tanks K19 and K20 are used for ethanol related products only, so they typically only contain water and ethanol with small amounts of other ingredients added sometimes, one of which is heptane.

The inspectors noted there are many references to "miscellaneous VOCs" in the facility's operating permit and asked whether any of those VOCs are also HAPs. As an example, the inspectors pointed to Permit Condition (K08 and K09)-001 which notes the contents of mixing tanks K08 and K09 as "Miscellaneous VOCs." The facility representatives were not sure which chemicals were being designated miscellaneous so they were unable to answer whether any of the miscellaneous VOCs are also HAPs. With regards to tanks K08 and K09, the facility representatives indicated that there are a lot of different chemicals that pass through those tanks so it is possible their contents were designated as "miscellaneous" to encompass everything.

The inspectors asked if the solvent storage tanks were refilled when they were partially empty, i.e., before they were completely drained of their contents, or if the facility waited until they were empty, i.e., the contents were completely used up before refilling. The facility representatives explained that tanks were re-filled when partially empty and the facility received shipments of various chemicals every day.

The inspectors asked what chemicals are used for cleaning at the facility and how tanks and process equipment are cleaned. The facility representatives stated that whenever possible, the same chemicals are kept in the same tanks so that cleaning is not required. If necessary, tanks are cleaned with either water and soap or with caustic soda for certain sticky materials.

The inspectors requested to see a copy of the most recent EIQ. The facility representatives indicated that the most recent EIQ from 2022 was a shortened version which does not show calculations because it had no changes from the previous year. They shared the EIQ submitted in 2021 with the inspectors instead, which includes data from 2020. The inspectors reviewed the EIQ pages for methylene chloride storage tanks R41 and R42 and methanol storage tanks R59 and R62. The facility representatives also provided hard copies of these pages to the inspectors, which are included as Appendix E. For methylene chloride storage tanks R41 and R42, the EIQ indicates a breathing loss emission factor of 97.9600 pounds HAPs per 1,000 gallons of methylene chloride throughput, which was determined using MODNR HAP Worksheet Form 2T, and a working loss emission factor of 10.8270 pounds HAPs per 1,000 gallons

of methylene chloride throughput, which was determined using the TANKS Program. For methanol storage tanks R59 and R62, the EIQ indicates a breathing loss emission factor of 4.0130 pounds VOC per 1,000 gallons of methanol throughput and a working loss emission factor of 1.0270 pounds per 1,000 gallons of methanol throughput, both of which were calculated using the TANKS Program. The inspectors noted that it was unusual that the working loss emission factor was higher than the breathing loss emission factor, but without seeing the underlying calculations, this raises questions about how these emission factors were determined and used.

4. Facility Tour/Walkthrough:

At approximately 10:20 am, the facility representatives led the inspectors on a walkthrough of the facility. They started at the outdoor storage tank area, proceeded to the blending building, the tanker truck loading area, the "back dock" loading area, the distilled spirits plant, the railcar unloading area, and the warehouse. The list of digital images and FLIR videos taken during the walkthrough are included in Appendix A.

At the outdoor storage tank area, the facility representatives informed the inspectors that the only two horizontal storage tanks, R41 and R42, are designated for methylene chloride storage; all other storage tanks are vertical tanks. The two methylene chloride tanks were being loaded at the time. The inspectors observed apparent emissions with the FLIR camera coming from tank R4 which contained isopropyl alcohol according to the facility representatives and the label on the tank. See videos MOV_2716.mp4 and MOV_2719.mp4. Additional evidence of emissions was observed with the FLIR camera coming from the piping between tank R4 and tank R5. See video MOV_2717.mp4. Tank R5 contained DRAKESOL 205 according to the storage tank inventory provided by the facility representatives (see Appendix D). Apparent emissions were also observed with the FLIR coming from tank R11 which contained heptane according to the facility representatives and the label on the tank. See video MOV_2718.mp4. The facility representatives indicated that two tanks were being filled at the time: one with isopropyl alcohol and one with ethanol.

While walking between the outdoor storage tank area and the blending building, inspectors observed evidence of VOC emissions with the FLIR that seemed to be coming from storage tank R57, which contained lacquer thinner. However, from another angle it became apparent that the emissions were coming from the building behind tank R57, not from the tank itself. See videos MOV_2720.mp4, MOV_2721.mp4, and MOV_2722.mp4. The facility representatives informed the inspectors that the building behind tank R57 was the back dock, which is where loading of barrels, totes, and tanker trucks takes place.

At the blending building, the facility representatives showed the inspectors the blending rooms where mixing of various products was occurring. The inspectors were shown four separate blending rooms with 12 mixing tanks between them (the "U," "S," "J," and "L" rooms). All of the blending rooms had large roll-up doors, most of which were open to the outside while blending was occurring. The U room housed mixing tanks K22, K15, K16, and K17; K22 and K17 were empty at the time, while K15 was mixing an ethanol blend and K16 was mixing sunscreen. See photo CBI_DSCN9676.JPG. The S room housed mixing tanks K13, K9, and K8; K13 was blending glaze, K9 was blending HD1 cleaner, and K8 was blending mastic remover. A steel tote at the back of the S room appeared to have a buildup of solidified material

on the outside where its contents had overflowed. See photos CBI_DSCN9677.JPG and CBI_DSCN9678.JPG. The L room housed three mixing tanks, all of which were empty at the time. See photo DSCN9682.JPG. The J room housed mixing tanks K4 and K12; K4 was blending a methylene chloride paint stripper, while K12 was empty. Tank K12 had visible corrosion on its exterior and there was residue built up on the exterior of tank K4. Ms. Ruiz opened the exterior door to the J room for the inspectors to look inside, but the door was closed prior to that and was closed again after. See photo CBI_DSCN9683.JPG.

Prior to entering the back dock, Ms. Ruiz informed the inspectors that it was an open product area and therefore they would not be able to take cameras into the area due to safety concerns. Mr. Rapp and Ms. Lamb stayed outside with Mr. Vogele while Ms. Ruiz led Ms. Hubbard into the back dock. Ms. Hubbard noted a strong solvent odor, which Ms. Ruiz said was the smell of hexenes. Ms. Hubbard observed barrels being top filled with no seals or other emission controls. Ms. Hubbard asked whether all containers are top filled and Ms. Ruiz responded that all barrels and totes are top filled, aside from steel totes which are easier to fill from the bottom. Ms. Ruiz informed the inspectors that the barrels were being loaded with brake cleaner which contained isopropyl alcohol and heptane. Just outside of the back dock, a tanker truck was being top filled with degreaser. See photo DSCN9681.JPG. From the side of the building where the tanker truck was being loaded, the inspectors observed VOC emissions again with the FLIR from the roof of the back dock. See video MOV_2723.mp4.

At the distilled spirits plant, the inspectors observed apparent emissions with the FLIR coming from the floor of the pumphouse building. See video MOV_2724.mp4. The inspectors noted that while the video appears to indicate the presence of a floor drain from which the emissions were coming, no drain was apparent to the naked eye. See photos DSCN9684.JPG and DSCN9685.JPG. The facility representatives informed the inspectors that the only chemicals present in the distilled spirits plant are ethanol and ethanol blends, but it is possible that there was a wastewater drain located in the pumphouse that was cemented over at some point.

At approximately 12:30 pm, the group took a break for lunch and left the facility. At approximately 2:00 pm, the inspectors returned to the facility and provided the facility representatives with a closing conference.

5. Closing Conference:

The inspectors thanked the facility representatives for their time and cooperation during the inspection.

The inspectors explained that they had follow-up questions related to observations made during the facility walkthrough. The following is a summary of the discussion.

- The inspectors asked whether emissions are calculated for the chemical loading and unloading areas at the facility. The facility representatives responded that all loading areas are included in throughput calculations that are input into spreadsheets and sent to NPN for emissions calculations.
- The inspectors asked whether the facility has a regular preventative maintenance program for tanks and associated piping and equipment. The facility representatives explained that they use a program called Fix which notifies the facility of when maintenance is due on various items. Managers can add items to Fix if they notice issues. Maintenance on smaller items is handled by the maintenance manager on site, while larger maintenance items such as tanks are contracted out. The facility representatives noted that the tanks were inspected earlier this year around January by an outside firm, but they still had not received the inspection report. They were not sure whether the inspection included piping or only the tanks, but noted that the inspection included measuring the tanks' wall thickness.

The inspectors summarized questions and concerns raised during the inspection. They noted that during the facility walkthrough, they observed indications of VOC emissions while using the FLIR camera, which raises questions about the accuracy of the emissions calculations the facility used to remain a minor source. Additionally, they explained that without the full set of emission calculations used to generate the EIQ being on site, they were not able to review the emissions estimates fully and continued to have questions about some of the inputs used to derive the facility's annual emissions. They provided the facility representatives with a Notice of Preliminary Findings form and explained that EPA may follow up with additional questions. See Appendix C.

The inspectors explained to the facility representatives that EPA would provide Chemisphere with an inspection report in approximately 60 days. They explained that the report would be available to the public through the Freedom of Information Act, and therefore, if the company wanted to claim any notes or digital images as confidential business information (CBI), they could do so today or within 10 days following the inspection. They provided Ms. Ruiz with EPA's confidentiality notice form. Ms. Ruiz filled out and signed the form. See Appendix B.

The inspectors took one copy of a storage tank inventory which lists each storage tank number, total volumetric capacity, and the name of the chemical and volume of chemical stored in each tank at the time of the inspection. See Appendix D. The inspectors also took two copies of 15 pages of the data year 2020 EIQ which includes information for tanks R41 MC, R42 MC, R59 MOH, and R62 MOH. See Appendix E. They provided the facility representatives with a receipt for the documents. See Appendix F.

At approximately 2:30 pm, the inspectors departed from the facility.

6. Appendices

A. Digital Image Log
B. Confidentiality Notice Form
C. Notice of Preliminary Findings Form
D. Storage Tank Inventory
E. Subset Of 2020 Data Year EIQ
F. Document Receipt Form

Inspection Report Sign-Off

Lead Inspector's Name: Elizabeth Hubbard, ERG

X Elizabeth Hubbard Digitally signed by Elizabeth Hubbard Date: 2023.08.28 14:02:08 -04'00'

Lead Inspector

Assisting Inspector's Name: Steven Rapp, ERG

X Steve Rapp Digitally signed by Steve Rapp Date: 14:07:48 -04'00'

Assisting Inspector

Supervisor's Name: Tracey Casburn, Air Branch Chief, ECAD

X TRACEY CASBURN Digitally signed by TRACEY CASBURN Date: 2023.09.04 06:53:38 -05'00'

Supervisor