

May 23, 2025

Illinois Environmental Protection Agency
Division of Air Pollution Control – Permit Section
2520 West Iles Avenue
P.O. Box 19276
Springfield, IL 62794-9276

RE: Construction Permit Revision Application – Permit No. 19100015
Vantage Specialties, Inc. - Gurnee, Illinois (Facility ID 097035AAQ)

To Whom It May Concern:

Vantage Specialties, Inc. (Vantage Specialties) is submitting this construction permit application for its facility located in Gurnee, Illinois (Gurnee Facility). The purpose of this application is to request a revision to Construction Permit No. 19100015.

This construction permit application includes the following elements:

- Discussion of the relevant emission units and air pollution control equipment
- Process flow diagrams for the relevant equipment
- Discussion of ongoing compliance with the emission cap, which Vantage is not proposing to increase
- Regulatory applicability discussion
- Illinois EPA Bureau of Air application forms (199-CAAPP, 197-FEE, two 220-CAAPP forms, and one 260-CAAPP form)
- A summary of air dispersion modeling results for the equipment included (and proposed to be included) in the revised construction permit.

If you have any questions about this application, please do not hesitate to contact Mr. Ryan Robotham, EHSS Manager for the Gurnee Facility, at (847) 249-6357.

Sincerely,

VANTAGE SPECIALTIES INC.

A handwritten signature in black ink, appearing to read "William Nothvogel".

William Nothvogel
Site Manager

Application Overview

With this permit application, Vantage Specialties is requesting a revision to Construction Permit No. 19100015. Vantage is requesting authorization for various process improvements, including authorization to route emissions from certain existing negligible/insignificant emission points and from two new wastewater handling units into the existing scrubber system at the Gurnee Facility. This application also includes a request to repurpose an existing, insignificant activity vessel at the Gurnee Facility into a vessel that will treat the facility's wastewater, and a request to restore to service an idled wastewater storage tank (which will qualify as an insignificant activity). Vantage Specialties is not proposing any change to the annual cap on emissions of EO at the Gurnee Facility, but is adding to the list of equipment that is subject to the cap.

As outlined in the cover letter, in addition to application forms (found in Attachment A), Vantage Specialties is including a process description of the relevant emission units and air pollution control equipment, process flow diagrams, information regarding emissions (including calculations in Attachment B), and regulatory applicability for the new or modified equipment. Vantage is also submitting (in Attachment D) a summary report of air dispersion modeling results for the emission units included (or proposed to be included) in the cap.

Process Overview

Vantage Specialties' Gurnee Facility produces surfactants, cleaning products, lubricants, and food-grade ingredients. The products from the Gurnee Facility are used in a wide variety of applications such as food emulsifiers, shampoo, conditioner, liquid and bar soaps, cleaning agents, and degreasers. Many of these products are made in the Alkoxylation Area of the facility, which is where EO is used as a raw material. The significant emission units in this area consist of two (2) premix tanks (FT4, FT7), six (6) reactors (R1, R3, R4, R5, R6, and R7), and seven (7) finishing vessels (R30, R31, R32, R33, R34, R42, and also R8). In the Alkoxylation Area, EO is added through hard piping directly to the sealed reactors (not into the premix tanks). Other raw materials are also added, either directly into the reactors or via the premix tanks. The EO reacts with the other raw materials in the reactor, which are typically low-vapor pressure organic materials, to form the desired polymeric product. The reactors are sealed when EO is introduced, and remain completely closed and are not opened or vented when unreacted EO is in the reactor. In the reactors, EO quickly reacts with the other raw materials, creating the surfactant product.

At the completion of the reaction process, a very small amount of unreacted EO is found in the nitrogen gas in the headspace of the reactor. These vapors are vented from the reactors to a wet scrubber air pollution control device (R37), followed in series by a Dry Bed System (R37V1A-D). The R37 Scrubber contains a packed bed, a nozzle to spray low pH scrubbing solution into the top of the bed (counter-current to the gas flow), and a pump to recirculate the scrubbing solution. The Dry Bed System uses adsorption to further reduce emissions, with an adsorption media that is specifically designed to control EO. The Dry Bed System consists of two pairs of dry beds in parallel (total of four beds), with one pair on-line and the other pair in reserve.

The Alkoxylation Area also generates wastewater and operates a research and development (R&D) laboratory, which is an insignificant activity in the site's Title V permit pursuant to 35 IAC 201.210(b)(27)(D).

Project Description

Vantage's proposed permit updates involve additional emission controls for certain process vents, additional wastewater treatment and emission controls, and other miscellaneous updates at the Gurnee Facility (for equipment components, the wastewater system, and the R&D laboratory). The updates are described in the following sections.

Process Emission Control Updates

With this application, Vantage is proposing that the air emissions from the Alkoxylation finishing vessels that are not removed by the existing control equipment (condensers) will be routed to the R37 Scrubber, followed by the Dry Bed System, for further emissions control. The handling of liquid collected from the finishing vessel condensers, which is a mixture of water and organic liquids, is further described below (under "Process Water/Wastewater Updates").

The stripping that occurs in the finishing vessels is achieved through the use of vacuum systems. The liquid in these vacuum systems contacts the process gases from the finishing vessel. This process water from finishing vessels R30, R31, R32, R33, R34 and R42 collects in the (insignificant activity) hotwell that is associated with Alkoxylation Area finishing vessels (Hotwell #2). With this application, Vantage is proposing to route the Hotwell #2 (finishing vessel hotwell) emissions to the R37 Scrubber followed by the Dry Bed System.

In a similar fashion, the vacuum system liquid for the R8 finishing vessel is currently routed to (insignificant activity) Hotwell #5. With this application, Vantage is proposing to route the process water from the R8 vacuum system directly to Hotwell #2 instead of to Hotwell #5. As described in the prior paragraph, the emissions from Hotwell #2 will be controlled by the R37 Scrubber followed by the Dry Bed System.

The process vent changes described in this section may result in an increase in actual emissions measured at the Dry Bed System stack that is less than 0.1 pounds per year. The additional incremental load to the R37 Scrubber and Dry Bed System that would result from the proposed new tie-ins can be handled by these systems with no changes to the scrubber design or operation. Emissions from the outlet of the Dry Bed System will continue to be monitored continuously for the concentration of EO. The overall removal efficiency of the R37 Scrubber and Dry Bed System in series was demonstrated to be greater than 99%.

Process Water/ Wastewater / Emission Control Updates

Vantage is proposing to treat the process water stream originating from Hotwell #2 with acid (such as phosphoric acid) to convert any possible EO in the water into ethylene glycol. Vantage proposes to repurpose existing Blend Reactor R-24 (from the insignificant activity list in the Gurnee Facility's Clean Air Act Permit Program (CAAPP) permit, Permit No. 96030159) into this wastewater process/conversion tank.¹ Although the new purpose of the R-24 tank will be to treat any dissolved EO by converting it into ethylene glycol, emissions from R-24 will nonetheless be tied into the R37 Scrubber and Dry Bed System.

After acid treatment in R-24, the wastewater exiting the conversion tank will then be routed to T-50 and subsequently the Tolan™ wastewater concentrator (R-36).

The process water originating from the finishing vessels' condenser systems is also routed to T-50 and then the R-36 wastewater concentrator. The concentrated wastewater from R-36 is transferred into T-11 and then shipped off as liquid waste by tank truck. Emissions from T-50 and R-36 are currently each routed through a condenser (T-50HX1 and R36HX1, respectively) and then to atmosphere (combined via a vessel called V-36A). Vantage is proposing to route the

¹ In addition to using R-24 for this new purpose, Vantage will also use two totes of the acid reagent to provide the materials needed to convert the EO to ethylene glycol. These totes will be exempt from permitting per 35 IAC 201.146(bbb).

emissions from V-36A, and also from T-11, to the R-37 Scrubber and Dry Bed System. Vantage also has plans to replace condenser T-50HX1, but this change is authorized by the construction permit exemption found in 35 IAC 201.146(hhh) and Vantage may elect to proceed with the replacement in advance of the other proposed changes described in this application.

The liquid from condensers T-50HX1 and R36HX1 also collects in V-36A. Vantage is proposing to install a new air stripper column (V-36B) that will use air to continuously strip any residual contaminants from the liquid in V-36A. Emissions from V-36B will also be routed to the R37 Scrubber and Dry Bed System. The stripped liquid from V-36B will be routed into the "Snake Pit," which is mostly enclosed containment for wastewater and is an insignificant activity.

As described above, Vantage is proposing to treat water from Hotwell #2 in repurposed R-24. This water will then be routed to T-50 and the R-36 wastewater concentrator. Previously, Hotwell #2 water was routed to the North Shore Water Reclamation District (NSWRD), but this will no longer be possible because the acid used in R-24 to convert any trace EO into ethylene glycol would cause an exceedance of the Gurnee Facility's water permit. Because additional volume will be routed from Hotwell #2, Vantage is also proposing to construct an additional wastewater evaporator/concentrator (R-36B) system. Existing concentrator R-36 will be renamed R-36A. After being received in T-50, wastewater would be routed to the new concentrator first. After several passes through new R-36B and its associated non-contact heat exchangers (which are not emission units), a reduced (concentrated) volume of wastewater would then be routed from R-36B to the original R-36A concentrator.² The concentrated liquid (with acid, ethylene glycol, and potentially some other trace organics) will be transferred into holding tank T-11 and then will exit the plant as liquid waste in tank trucks. As noted above, Vantage plans to route the vent from tank T-11 to the R-37 Scrubber and Dry Bed System. Steam from R-36B that condenses would be routed to existing V-36A. As set forth above, any emissions from V-36A (which includes emissions from the condensers for T-50 and R-36A) will be routed to the scrubber system. Vantage also plans to replace condenser R36HX1 to accommodate both R-36A and new R-36B.

The wastewater changes described in this section may result in an increase in actual emissions that is less than 0.01 pounds per year measured at the Dry Bed System stack.

The additional incremental load to the R37 Scrubber and Dry Bed System that would result from the proposed new tie-ins can be handled by these systems with no changes to the scrubber design or operation. Emissions from the outlet of the Dry Bed System will continue to be monitored continuously for the concentration of EO. The overall removal efficiency of the R37 Scrubber and Dry Bed System in series was demonstrated to be greater than 99%.

Miscellaneous Updates

The wastewater routed from V-36A (to be V-36B after the proposed installation of this new stripper column) to the Snake Pit is then routed through closed piping to the point where wastewater exits the Gurnee Facility and enters the piping sewer system of the NSWRD. As described above, this wastewater will have a reduced concentration of pollutants after Vantage's proposed process improvements, because the wastewater that was originally generated at Hotwell #2 will have been treated in R-24 and stripped in V-36B, and the wastewater that was originally generated by the finishing vessel condensers will have been stripped in V-36B. While still on Vantage property, the wastewater will be routed from the Snake Pit into T-145 and through sewer systems covered by manholes (Manholes 1, 2, and 3). These emissions, which are not routed to the R-37 Scrubber and Dry Bed, will be counted towards the 60 pound emission cap for the Gurnee Facility, which Vantage is not proposing to increase.³

² Note that the new R-36B system also will include a tote of surfactant, which will be added into R-36B to ensure the liquid does not foam. This tote will be exempt from permitting per 35 IAC 201.146(bbb) and 201.146(n)(2).

³ To help minimize emissions from the manholes, Vantage will be installing gaskets or sealant around the manhole cover and will cover the underside of the manhole cover where a tool can be inserted to lift the manhole cover.

Vantage has another wastewater-related project that is under review for the Gurnee Facility that Vantage would like to address with this proposed revision to the EO construction permit. The CAAPP permit currently reflects T-144 as an insignificant activity wastewater tank. The tank has been empty/idle in recent years. Vantage would like to put this tank back in service for occasional use if the wastewater at the plant is off-specification with respect to phosphorous concentration and/or phenol concentration. (Both of these parameters are limited by the site's wastewater discharge permit.) Under the proposed new configuration, Vantage would be able to isolate in existing tank T-145 any off-spec water that has been generated until this water could be managed on-site or shipped off as waste. When T-145 is holding off-spec wastewater, on-spec wastewater that the Gurnee Facility continues to generate would be routed into T-144, and then to the manholes and to the NSWRD. Vantage will be replacing the floor in T-144 and relining the vessel prior to its return to service. T-144 would, therefore, be a reactivated emission unit at the Gurnee Facility. Like T-145, T-144's air emissions would be vented directly to atmosphere. Also like T-145, VOM and HAP emissions from the reactivated tank will meet the emissions thresholds of 35 IAC 201.211, so the reactivated T-144 will qualify as an insignificant activity.⁴ T-144 would be equipped with a level controller to minimize the amount of vapor displaced from the tank. Vantage will also install a conservation vent on the vent of T-144.⁵ Any emissions from these two tanks, which are not routed to the R-37 Scrubber and Dry Bed, will be counted towards the 60 pound emission cap for the Gurnee Facility, which Vantage is not proposing to increase.

Vantage would also like to note that the research and development (R&D) laboratory at the Gurnee Facility, which is an insignificant activity per 35 IAC 201.210(b)(27) may emit up to 0.2 lb/year of EO in the process of testing production technologies in bench-scale equipment found within the lab. These emissions are controlled by lab-scale scrubbers in series. Vantage will begin counting the R&D laboratory emissions towards the 60 pound emission cap.

The increase in actual reported emissions, relative to the 60 pound emission cap, due to Manholes 1, 2 and 3; the Snake Pit; T-144 and T-145; and the R&D lab is not expected to exceed 1.62 pounds per year. As discussed later in this application, these emissions will fall within the 60 pound emission cap; Vantage is not proposing to increase the cap by this, or any, amount.

Equipment Components

The piping for EO in the Alkoxylation Area includes equipment components (pumps, valves, flanges, etc.), which can also be a source of emissions. The piping within the Alkoxylation Area is all hard piping without flexible hoses or removable connections. As noted above, Vantage is proposing to route emissions (finishing vessel non-condensables, Hotwell #2 vapors, V-36A vapors, V-36B vapors, R-24 vapors, and T-11 vapors) to the R37 Scrubber and Dry Bed System. To accomplish this change, additional piping will be needed. Vantage will use welded connections as much as possible to avoid new piping components.

Vantage will also add piping in liquid service to route wastewater to R-24 for acid treatment, and from R-24 to T-50. There will also be additional pumps, valves, and flanges associated with new wastewater concentrator R-36B and the new air stripper for wastewater condensate, V-36B.⁶ This piping for process water/wastewater will also be welded as much as possible.

Vantage Specialties currently monitors the Alkoxylation Area equipment components for leaks according to applicable state and federal regulations and according to Construction Permit No. 19100015, and promptly repairs any such leaks.

⁴ Based on its low emission rates (< 0.1 lb/hr HAP and < 1 lb/hr VOM), the tank's reactivation is exempt from construction permitting pursuant to 35 IAC 201.146(kkk) and 35 IAC 201.210(a)(1) and 201.211. Based on the tank being an insignificant activity and construction permit-exempt, Vantage is omitting a 232-CAAPP form for the reactivated tank and has excluded it from the 197-FEE calculation.

⁵ Vantage is planning a similar conservation vent on existing T-145.

⁶ Vantage is planning for no increase in components when replacing condenser T-50HX1.

None of the new components that Vantage is now proposing to add will be "in ethylene oxide service" as defined in Condition 19.a.i of Construction Permit No. 19100015.

The increase in actual reported emissions, relative to the 60 pound emission cap, due to the additional piping components is not expected to exceed 1.50 pounds per year. As discussed later in this application, these emissions will fall within the 60 pound emission cap; Vantage is not proposing to increase the cap by this amount.

A process flow diagram of the portion of the Alkoxylation Area in which EO is used and emitted and its emission control system is provided in Figure 1 below.⁷ The diagram includes the new connections to the R-37 Scrubber and Dry Bed. Figure 2 provides additional details on the new/modified wastewater equipment within the Gurnee Facility, including the proposed repurposed R-24, T-144 returned to service, and proposed new wastewater concentrator R-36B and air stripper V-36B. Figure 3 presents the equipment within the R&D laboratory where EO is used, including the lab's scrubber system for this activity.

⁷ This diagram does not include the area of the Gurnee Facility where EO is unloaded from railcars into a pressurized storage tank that does not vent. This part of the facility operations is not impacted by any of the proposed updates described in this permit application.

Figure 1 – Alkoxylation Area Process Flow Diagram

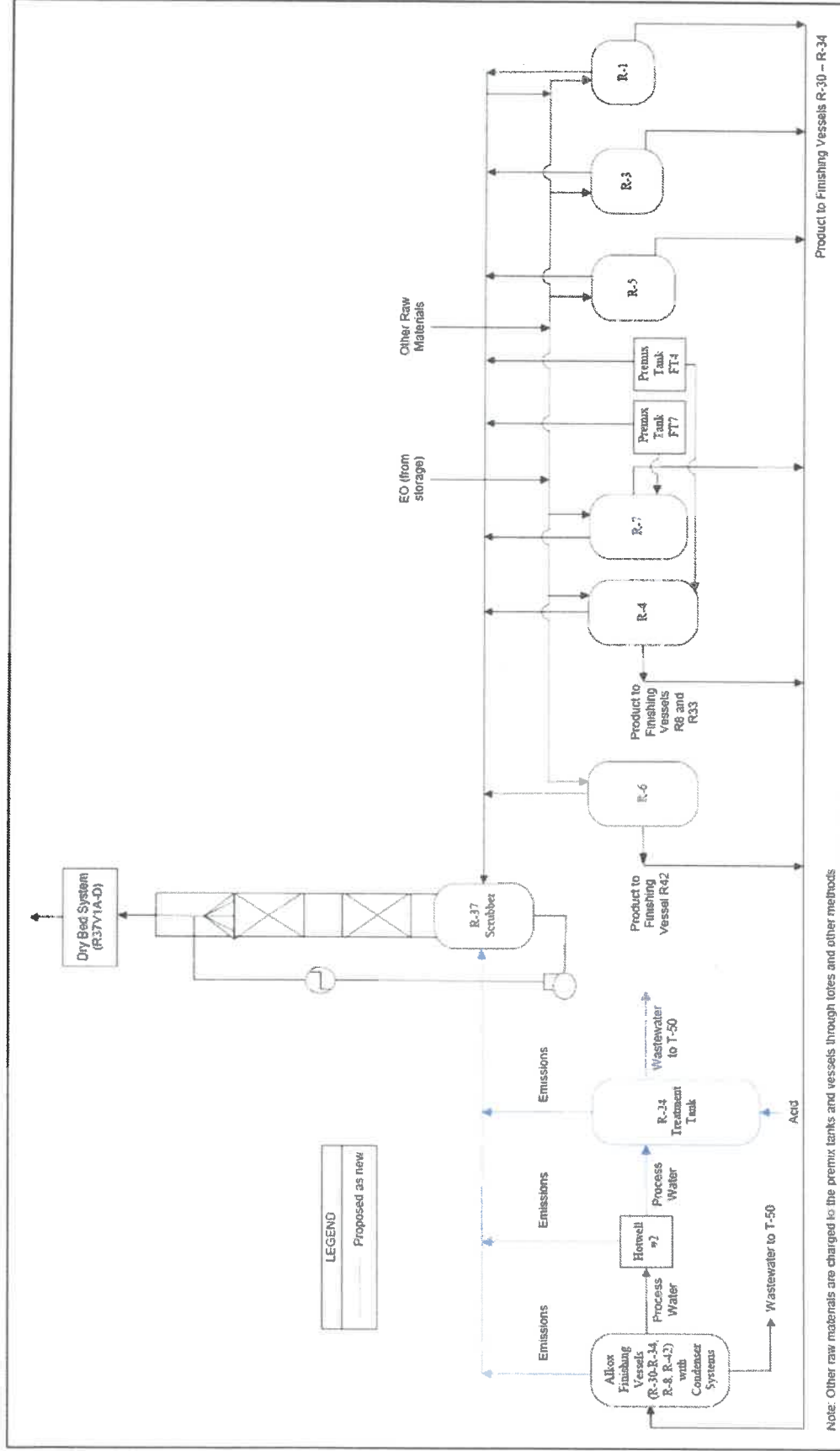


Figure 2 – Process Flow Diagram for New/Modified Wastewater Equipment

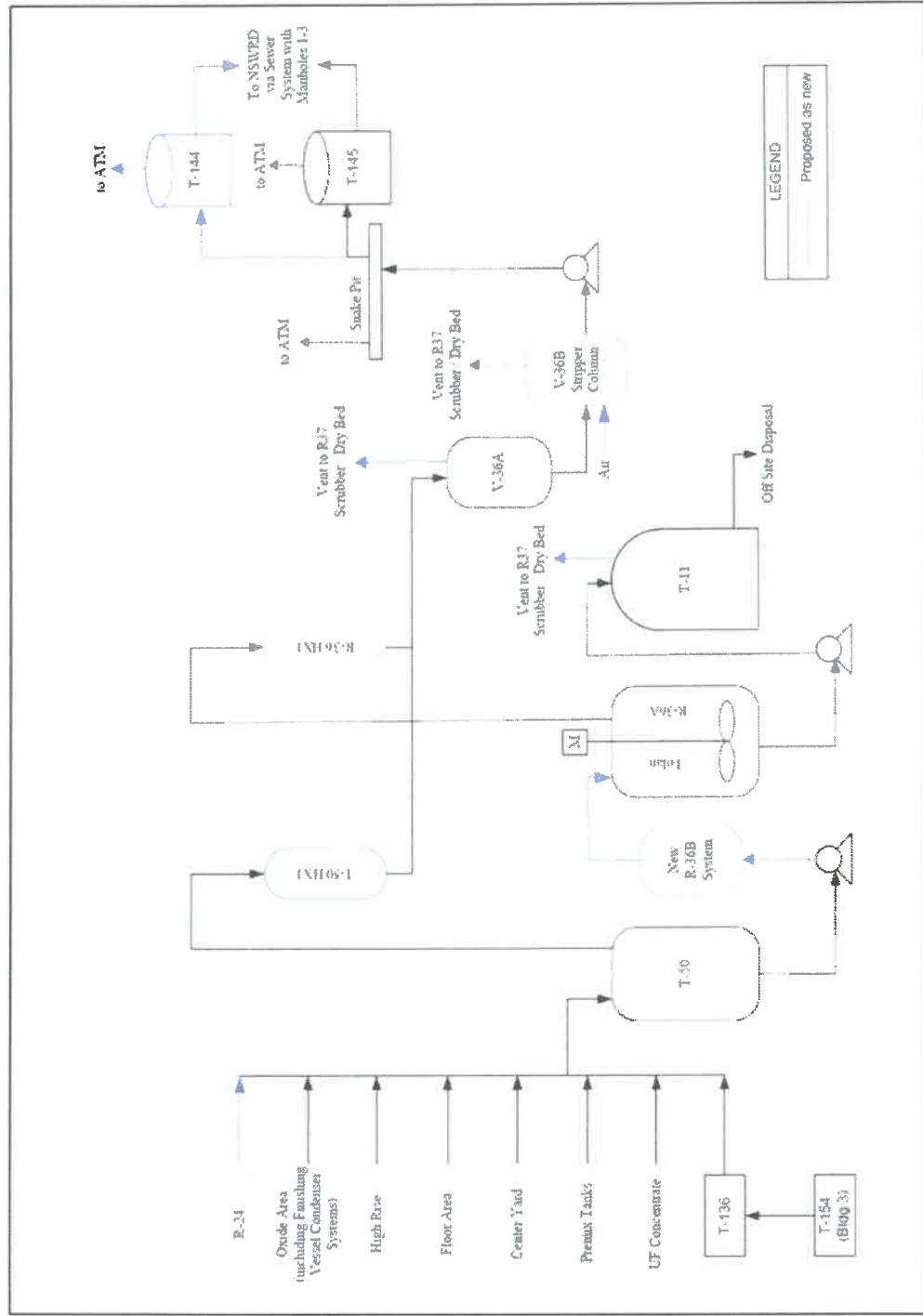
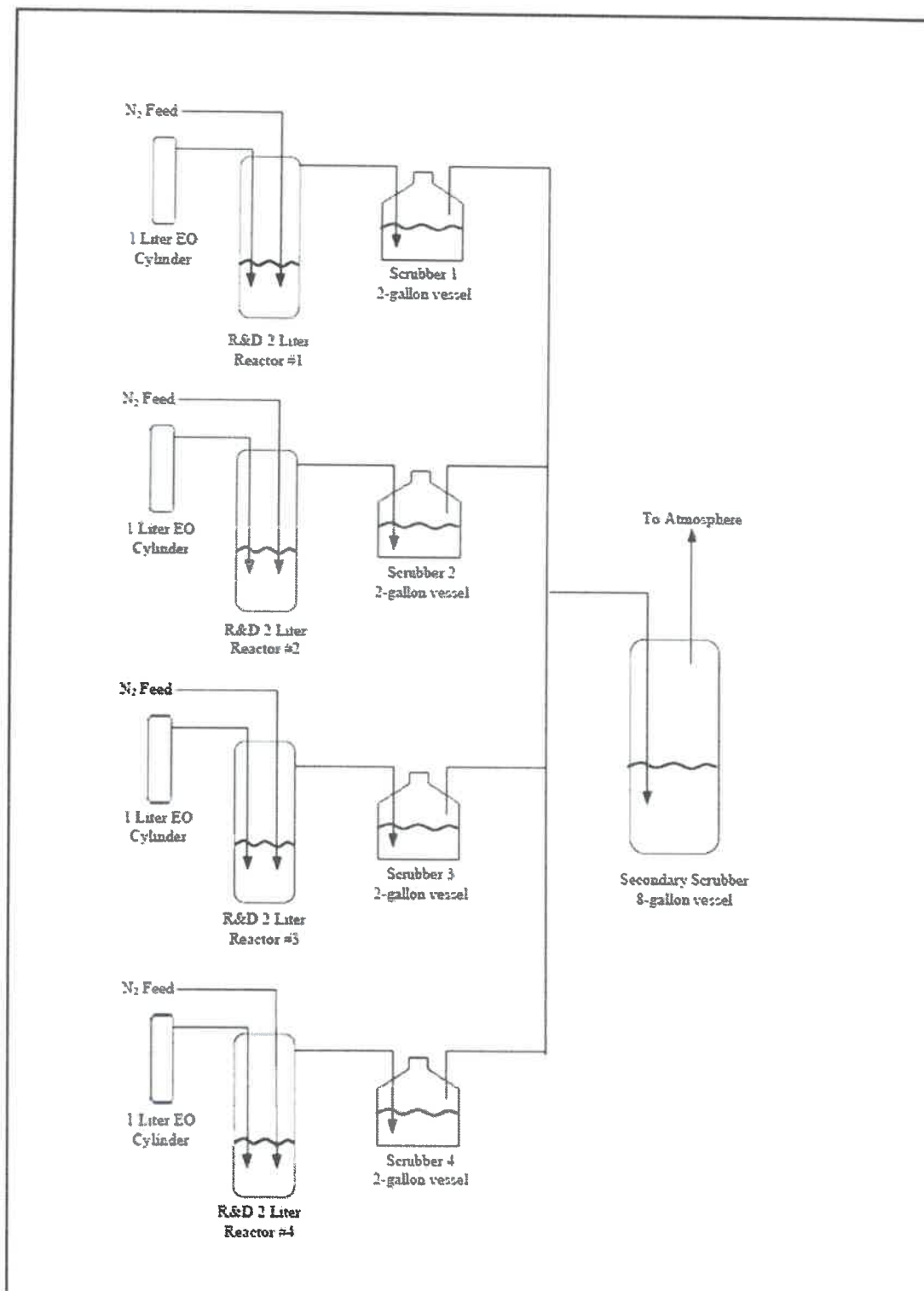


Figure 3 – Applicable Research & Development Equipment for Permit No. 19100015



Emissions Information

The current cap on EO emissions is 110 pounds per year, of which no more than 60 pounds per year can be emissions from piping equipment components. Vantage is not proposing to increase these caps as part of this permitting effort. As shown through the Gurnee Facility's quarterly reports, currently the EO emissions reported are well below the 110 pound cap. Additional tie-ins from the above-referenced emission sources to the R37 Scrubber and Dry Bed System can be made without an increase to the 110 pound cap, and there will still be ample compliance margin below the cap. The piping component emissions reported for the Gurnee Facility have also been substantially less than 60 pounds per year, and other miscellaneous sources (wastewater emissions, new piping component emissions, and the R&D lab) can be added/counted toward the cap without any change to this portion of the cap (and with ample compliance margin below the cap). Additional details are provided below on how Vantage proposes to show continued compliance with the emissions caps on an ongoing basis.

R-37 Scrubber and Dry Bed Stack Emissions Monitoring

To demonstrate that the 110-pound emissions cap can remain unchanged after the negligible point sources that Vantage will route to the R37 Scrubber and Dry Bed System, Vantage will continue using the CEMS that is already in place on the stack for the scrubbers. The highest EO emissions result that Vantage has reported for calendar years 2020 through 2024 (i.e., since issuance of Construction Permit No. 19100015) is 62.4 lbs EO per year. Therefore, Dry Bed emissions can easily remain within the existing site-wide cap of 110 lbs per calendar year.

Other Emissions Monitoring

Vantage has determined that the proposed new piping components (in both vapor and liquid service) are not expected to be "in ethylene oxide service" as defined in Construction Permit No. 19100015. To determine ongoing emissions from these new components, Vantage will calculate emissions using a count of the additional components, USEPA emission factors (e.g. the "SOCMI average" factors), and the composition expected in the liquid or vapor streams. Vantage calculated the maximum expected emission rate of 1.50 lbs/year using this method. The calculations are provided in Attachment B of this application.

The calculated emission rate from the Snake Pit and Manhole 1, 2 and 3 wastewater emission sources is also extremely low (less than 0.02 lbs/year, combined). Nonetheless, Vantage is willing to conduct ongoing vapor space monitoring after the permit is issued to confirm the negligible emissions.⁸

Similarly, T-145 and T-144 (when the latter is returned to service) emissions will not exceed 1.4 lbs/year, combined.^{9, 10} Vantage is proposing to count the emissions from these wastewater tanks towards the 60-pound emissions cap for the Gurnee Facility. Although the emissions will be negligible, Vantage is willing to conduct ongoing vapor space monitoring of T-145 after the permit is issued to confirm the negligible concentrations in the tank's vapor space.¹¹ Vantage will also monitor the liquid level in T-145 on an ongoing basis. The concentration and liquid level (vapor displacement) information will be used for monthly emission calculations. To determine emissions from T-144 if/when it is used, Vantage will use the most recent vapor space monitoring from T-145 and liquid level data for T-144.

⁸ Vantage expects to find concentrations below the detection limit of the instrument. However, Vantage proposes that vapor space monitoring for the Snake Pit and manholes in the revised permit shall be completed monthly.

⁹ Vantage has determined emissions from T-145 based on a level controller for this tank that will maintain the liquid level nearly constant rather than fluctuating in a way that causes tank vapors to be displaced.

¹⁰ Vantage has also accounted for emissions from initial filling of the out-of-service tank, based on the number of times per year Vantage estimates T-144 may be needed.

¹¹ Vantage proposes the same frequency as with the wastewater sources (i.e., monthly) although no detectable emissions are expected.

Vantage calculated maximum expected EO emissions of 0.2 lb/year for the R&D lab based on the maximum number of research "batches" that will be run in the lab during the year, the amount of EO emissions generated per research batch, and a conservatively low efficiency for the scrubber system in the R&D lab (50% reduction assumed for two scrubbers in series). To validate the (conservatively low) lab scrubber system removal efficiency assumed in the calculations, Vantage conducted in-house emissions monitoring/testing of the lab scrubbers. The test method and results, which show actual removal efficiency of at least 90%, are provided in Attachment C of this application. For the ongoing reporting of emissions from the R&D lab, Vantage will track the number of R&D batches. Vantage will also document the lab scrubber monitoring activities (namely quarterly monitoring of scrubbing liquid pH of the volume of scrubbing liquid in each scrubber).

The highest EO emissions result that Vantage has reported for calendar years 2020 through 2024 (i.e., since issuance of Construction Permit No. 19100015) relative to the 60 pound emission cap is 47.26 lbs EO per year. Based on calculated estimated emission rates, the updated wastewater equipment emissions and piping component emissions and R&D lab can be accommodated within the existing emissions cap of 60 lbs per calendar year, with an adequate compliance margin below the cap.

Although Vantage is not proposing to increase the existing emission caps, Vantage has updated the previous air dispersion modeling exercise for EO sources at the Gurnee Facility to reflect the most recent version of the modeling software, most recent meteorological data, and updated source information within the caps. Results are included in Attachment D.

Regulatory Applicability

There are no changes being proposed at this time to the Alkoxylation Area reactors and finishing vessels, so those vessels will continue to be subject to the applicable regulations specified in Section 4.3 of CAAPP permit No. 96030159.

The new emission sources being proposed with this application are as follows:

- Additional wastewater concentrator R-36B;
- New packed column air stripper V-36B; and
- Various equipment components associated with the piping to route existing emission sources to the R-37 Scrubber and Dry Bed System and to route process water and wastewater to R-24 for acid treatment and associated with new R-36B and V-36B.

Vantage is also proposing to repurpose insignificant activity R-24 to become an acid treatment tank for wastewater, and to put T-144 (an insignificant activity identified in the CAAPP permit) back in service. (T-144 was previously a wastewater storage tank and would again be a wastewater storage tank; there is not any change to its service or function. However, Vantage will replace the tank floor and re-line the tank.)

Regulatory applicability for these new or repurposed emission sources is addressed below.

State Regulatory Applicability

35 IAC 218 Subpart B – Organic Emissions from Storage and Loading Operations

Subpart B regulates VOM emissions from storage and loading operations. Specifically, Sections 218.119, 218.120, 218.122(b), and 218.128 have requirements that are potentially applicable to volatile organic liquid storage tanks. With this permit application, Vantage is proposing to bring wastewater tank T-144 back into service. The tank will store water that may still contain trace amounts of VOL. The definition of VOL, per 35 IAC 211.7110 is, "any substance which is liquid at storage conditions and which contains volatile organic material". As such, there is no minimum concentration specified. Vantage considers T-144 to be a water storage tank and not a VOL storage tank. However, if Illinois EPA considers it to be a VOL storage tank, the tank is larger than 40,000 gallons (i.e., the capacity threshold in 35 IAC

218.119). However, the maximum true vapor pressure of the tank (not considering the vapor pressure of water, which is not regulated), will be less than 0.5 psia.

Per 35 IAC 218.122(b), a storage tank with a capacity greater than 250 gallons cannot be filled with organic material "unless such tank is equipped with a permanent submerged loading pipe or an equivalent device approved by the Agency". There is an exception to this requirement in 35 IAC 218.122(c), which specifies that the VOL added to the tank must have a vapor pressure of 2.5 psia or greater (at 70 degrees F) to be subject to the requirement. Tank 144 is larger than 250 gallons, but will not have a vapor pressure greater than 2.5 psia.

35 IAC 218 Subpart C – Organic Emissions from Miscellaneous Equipment

Within Subpart C, 35 IAC 218.141 regulates organic emissions from single or multiple compartment effluent water separators. Repurposed R-24 for wastewater acid treatment will not be an "effluent water separator" as defined in 35 IAC 211.1870, as organic material is not being physically separated from the water in the concentrator. Wastewater Concentrator R-36B will also not be an "effluent water separator", per the same definition. Therefore, this rule will not be applicable to R-24 or R-36B.

35 IAC 218 Subpart G – Use of Organic Material

Within Subpart G, 35 IAC 218.301 specifies that no emission unit can emit more than 8 lbs/hour of organic material, except as provided in Sections 218.302 – 304. None of the new or repurposed equipment in this application [R-36B, V-36B, R-24, or T-144 (which is a storage tank)] will emit more than 8 lbs/hour of organic material. (Additionally, the emissions from R-36B, V-36B, and R-24 will be routed to air pollution control equipment that exceeds the removal efficiency specified in Section 218.202). Therefore, the proposed project will be in compliance with this rule.

35 IAC 218 Subpart Q – Leaks from Synthetic Organic Chemical and Polymer Manufacturing Plants

Subpart Q contains two distinct sections: 218.421 through 218.429 address equipment leaks from certain chemical manufacturing plants, and 218.431 through 218.436 address emissions from reactors and distillation units at certain chemical manufacturing plants. Vantage is not proposing any new reactors or distillation units within the Alkoxylation Area with this application. R-24 is a wastewater treatment vessel that is outside the chemical manufacturing process. Additionally, the new air Stripper Column V-36B is outside the chemical manufacturing unit (and is not creating two exit streams by vapor/liquid equilibrium, and therefore is not a distillation unit). As such, the provisions of 218.431 through 218.436 do not apply to the Alkoxylation Area.

The equipment leak provisions found in 218.421 through 218.429 apply to synthetic organic chemical plants that manufacture a chemical listed in Appendix A of Part 218 and that process more than 4,033 tons/year gaseous and light liquid VOM. The Alkoxylation Area manufactures polyethylene glycols and polypropylene glycols, which are listed in Appendix A, and the Alkoxylation Area uses more than 4,033 tons/year of EO and PO (both light liquid VOM). Therefore, all components in the Alkoxylation Area are potentially subject to the equipment leak provisions of Subpart Q, depending on exclusions from the rule (as outlined below).

Pursuant to 218.421, Subpart Q leak provisions are applicable only to components containing 10 percent or more by weight VOM. None of the components that Vantage is proposing to add within the Alkoxylation Area at this time (i.e., components on vapor service piping that will route finishing vessel non-condensables and Hotwell #2 emissions to the R-37 Scrubber and Dry Bed), will contain/contact streams with a VOM concentration that is 10 percent or more. Therefore, the provisions of Subpart Q will not apply to any of these proposed new vapor service piping components. Vantage is also proposing additional components in vapor service to route emissions from R-24, R-36B, V-36B, and T-11 to the R-37 Scrubber and Dry Bed. These vapor service components are all downstream of the Alkoxylation manufacturing process unit (as all relate to wastewater handling equipment), and also will not contain/contact vapor streams with a VOM

concentration that is 10 percent or more. Therefore, these components will also not be subject to Subpart Q. Finally, Vantage is planning additional components in liquid service for routing process water/wastewater to/from R-24 for acid treatment, and for the installation of new R-36B and V-36B. These components are also outside the Alkoxylation manufacturing process unit (because all relate to wastewater handling). Therefore, these components will not be subject to Subpart Q.

35 IAC 218 Subparts RR and TT – Miscellaneous Organic Chemical Manufacturing Processes and Other Emission Units

Subparts RR and TT address organic material emissions from organic chemical manufacturing processes that are not otherwise regulated in Part 218 and other emission units not otherwise regulated by Part 218. Vantage considered both of these rules for potential applicability to repurposed R-24, new R-36B, and new V-36B.

Subpart RR regulates “miscellaneous organic chemical manufacturing process emission units”, and a “manufacturing process” is defined in 35 IAC 211.2630 as “a method whereby a process emission unit or series of process emission units is used to convert raw materials, feed stocks, subassemblies, or other constituent parts into a product, either for sale or for use in a subsequent manufacturing process”. Treatment of wastewater is not involved in converting raw materials into a product, and is therefore outside the manufacturing process. Therefore, R-24, R-36B, and V-36B will not be subject to Subpart RR.

Within Subpart TT, the rule specifies in 218.980(b)(2)(B) that – for sources subject to the rule based on VOM potential to emit - emission units associated with industrial wastewater are not regulated by Subpart TT. Therefore, R-24, R-36B, and V-36B would not be subject to Subpart TT based on 35 IAC 218.980(b). With respect to the applicability in 35 IAC 218.980(a), VOM emissions at the Gurnee Facility may exceed the “maximum theoretical emissions” thresholds in 35 IAC 218.980(a)(1). However, pursuant to 35 IAC 218.980(d), there are no applicable Subpart TT limits for emission units that emit less than 2.5 tons of VOM per calendar year, provided that all emission units using this exemption have total emissions less than 5.0 tons of VOM per calendar year. R-24 will emit substantially less than 2.5 tons of VOM per year, especially when accounting for the fact that its emissions will be routed to the R-37 Scrubber and Dry Bed System (although not required by Subpart TT). Combined emissions from R-24, R-36B, and V-36B will be less than 2.5 tons of VOM per year. Additionally, all of these vents will be routed to the R-37 Scrubber and Dry Bed System (although not required by Subpart TT). Vantage already tracks total emissions of existing units at the Gurnee Facility using this Subpart TT exemption. Vantage will include these emissions in the total emissions of units exempt from Subpart TT.¹²

Federal Regulatory Applicability

40 CFR 60 Subpart Kc – Volatile Organic Liquid Storage Tanks (After October 4, 2023)

NSPS Subpart Kc regulates volatile organic liquid (VOL) storage tanks that are new, modified, or reconstructed after October 4, 2023. With this permit application, Vantage is proposing to bring wastewater tank T-144 back into service. The tank will store water that may still contain trace amounts of VOL. The definition of VOL, per 40 CFR 60.111c is, “any organic liquid which can emit volatile organic compounds (as defined in 40 CFR 51.100) into the atmosphere.” Vantage considers T-144 to be a water storage tank and not a VOL storage tank. Nonetheless, if Illinois EPA considers it to be a VOL storage tank, the tank is larger than 20,000 gallons (i.e., the capacity threshold in 40 CFR 60.110c(a)). However, the maximum true vapor pressure of the tank (not considering the vapor pressure of water, which is not regulated), will be less than 3.4 kilopascals (0.5 psia), which is the vapor pressure applicability threshold in 40 CFR 60.110c(c)(1). Therefore, T-144 will not be subject to the control requirements of Subpart Kc, unless/until the tank is used to store VOL with a vapor pressure above this threshold, as determined using the methods described in 40 CFR 60.113c(d).

¹² The other emission units at the Gurnee Facility using the exemption in 35 IAC 218.980(b) are the Snake Pit, the South Pit, cooling towers, T-50 and the R-36A wastewater concentrator, and another wastewater concentrator (T-154).

40 CFR 60 Subpart NNNa – VOC Emissions from SOCMI Distillation Operations (After April 25, 2023)

NSPS Subpart NNNa regulates the vent streams from distillation units (and their recovery systems, where applicable) within process units that produce a chemical listed in 40 CFR 60.667a, where the distillation unit was constructed, reconstructed, or modified after April 25, 2023. With this application, Vantage is proposing to install R-36B and V-36B for wastewater processing. This wastewater equipment is not a distillation unit, as defined in 40 CFR 60.661a. Additionally, it falls outside of the Alkoxylation Area process unit (which is a batch process unit). Additionally, the Alkoxylation Area process unit does not manufacture a chemical listed in 60.667a. Therefore, new R-36B and V-36B will not be subject to Subpart NNN.

40 CFR 60 Subpart VVb – Equipment Leaks of VOC in the SOCMI Industry (After April 25, 2023)

As noted above, this application includes installation of additional components (flanges and valves) associated with new piping that will route several vapor streams to the R-37 Scrubber and Dry Bed and various components that will route several process wastewater streams to/from R-24 for acid treatment and for installation of R-36B and V-36B wastewater processing equipment. Therefore, the applicability of NSPS Subpart VVb must be considered. Subpart VVb applies to “affected facilities” that are new, modified or reconstructed after April 25, 2023.

The Alkoxylation Area at the Gurnee Facility is already subject to Subpart VVa. The rule’s requirements apply to “equipment”, which is defined as “each pump, compressor, pressure relief device, sampling connection system, open-ended valve or line, valve, and flange or other connector in VOC service”, where “in VOC service means that the piece of equipment contains or contacts a process fluid that is at least 10 percent VOC by weight.” The new components that Vantage proposes to add in vapor service will not become subject to the facility’s existing Subpart VVa requirements because they will not be “in VOC service” based on the low concentration of VOC in the vapor streams routed to the R-37 Scrubber. Additionally, the proposed new components handling wastewater will not become subject to the facility’s existing Subpart VVa requirements because either they will not be “in VOC service” and/or they will be outside of the Alkoxylation Area “process unit”.¹³

Subpart VVb would be triggered for the entire Alkoxylation Area if Vantage modifies the existing Subpart VVa affected facility. As noted in 40 CFR 60.480b(c), “addition or replacement of equipment for the purpose of process improvement which is accomplished without a capital expenditure shall not by itself be considered a modification under this subpart”. Although Vantage is proposing to add vapor service components within the Alkoxylation Area process unit, those vapor service flanges are not “equipment” because they will not be “in VOC service”. The liquid service components will be outside of the affected facility because they are associated with conveying wastewater and not associated with producing a listed chemical. Therefore, the proposed project is not a modification that will trigger the requirements of Subpart VVb.

¹³ Per 40 CFR 60.480a(a)(2), “the group of all equipment (as defined in 60.481a) within a process unit is an affected facility.” Per 40 CFR 60.480a(f)(2)(i), “process unit means components assembled to produce, as intermediate or final products, one or more of the chemicals listed in Section 60.489 of this part.” The piping associated with R-24, R-36B, and V-36B is not involved with producing a listed chemical; the piping is associated with conveying wastewater streams.

Attachment A

197-Fee Form

199-CAAPP Form

220-CAAPP Forms (R-24, R-36B/V-36B)

260-CAAPP & 260E-CAAPP Forms (R36-HX1)



Illinois Environmental Protection Agency

Bureau of Air • 1021 North Grand Avenue East • P.O. Box 19506 • Springfield • Illinois • 62794-9506

FEE DETERMINATION FOR CONSTRUCTION PERMIT APPLICATION

FOR AGENCY USE ONLY

ID Number: _____ Permit #: _____
☐ Complete ☐ Incomplete Date Complete: _____
Check Number: _____ Account Name: _____

This form is to be used to supply fee information that must accompany all construction permit applications. This application must include payment in full to be deemed complete. Make check or money order payable to the Illinois Environmental Protection Agency, Division of Air Pollution Control - Permit Section at the above address. Do NOT send cash. Refer to instructions (197-INST) for assistance.

Source Information

1. Source Name: Vantage Specialties, Inc.
2. Project Name: Alkoxylation and Wastewater Process Improvements 3. Source ID #: (if applicable) 097035AAQ
4. Contact Name: Ryan Robotham 5. Contact Phone #: 847-249-6357

Fee Determination

6. The boxes below are automatically calculated.

Section 1 Subtotal \$0.00 + Section 2, 3 or 4 Subtotal \$6,000 = \$6,000.00
Grand Total

Section 1: Status of Source/Purpose of Submittal

7. Your application will fall under only one of the following five categories described below. Check the box that applies. Proceed to applicable sections. For purposes of this form:

- **Major Source** is a source that is required to obtain a CAAPP permit.
- **Synthetic Minor Source** is a source that has taken limits on potential to emit in a permit to avoid CAAPP permit requirements (e.g., FESOP).
- **Non-Major Source** is a source that is not a major or synthetic minor source.

- ☒ Existing source without status change or with status change from synthetic minor to major source or vice versa. Proceed to Section 2.
- ☐ Existing non-major source that will become synthetic minor to major source. Proceed to Section 4.
- ☐ New major or synthetic minor source. Proceed to Section 4. \$0.00
- ☐ New non-major source. Proceed to Section 3. Section 1 Subtotal
- ☐ AGENCY ERROR. If this is a timely request to correct an issued permit that involves only an agency error and if the request is received within the deadline for a permit appeal to the Pollution Control Board. Skip Sections 2, 3 and 4. Proceed directly to Section 5.

This agency is authorized to require and you must disclose this information under 415 ILCS 5/39. Failure to do so could result in the application being denied and penalties under 415 ILCS 5 ET SEQ. It is not necessary to use this form in providing this information. This form has been approved by the forms management center.

Section 2: Special Case Filing Fee

8. **Filing Fee.** If the application only addresses one or more of the following, check the appropriate boxes, skip Sections 3 and 4 and proceed directly to Section 5. Otherwise, proceed to Section 3 or 4 as appropriate.

- ☐ Addition or replacement of control devices on permitted units.
- ☐ Pilot projects/trial burns by a permitted unit
- ☐ Land remediation projects
- ☐ Revisions related to methodology or timing for emission testing
- ☐ Minor administrative-type change to a permit
- Other: _____

\$ _____

Section 3: Fees for Current or Projected Non-Major Sources

9. ☐ This application consists of a single new emission unit or no more than two modified emission units. (\$500 fee) 9. _____
10. ☐ This application consists of more than one new emission unit or more than two modified units. (\$1,000 fee) 10. \$0.00
11. ☐ This application consists of a new source or emission unit subject to Section 39.2 of the Act (i.e., Local Siting Review); a commercial incinerator or a municipal waste, hazardous waste, or waste tire incinerator; a commercial power generator; or an emission unit designated as a complex source by agency rulemaking. (\$15,000 fee) 11. _____
12. ☐ A public hearing is held (see instructions). (\$10,000 fee) 12. _____
13. Section 3 subtotal. (lines 9 through 12 - entered on page 1) 13. \$0.00

Section 4: Fees for Current or Projected Major or Synthetic Minor Sources

Application contains modified emission units only	14. For the first modified emission unit, enter \$2,000.	14. _____
	15. Number of additional modified emission units = _____ x \$1,000.	15. _____
	16. Line 14 plus line 15, or \$5,000, whichever is less.	16. <u>\$0.00</u>
Application contains new and/or modified emission units	17. For the first new emission unit, enter \$4,000.	17. <u>\$4,000</u>
	18. Number of additional new and/or modified emission units = 2 x \$1,000.	18. <u>\$2,000</u>
	19. Line 17 plus line 18, or \$10,000, whichever is less.	19. <u>\$0.00</u>
Application contains netting exercise	20. Number of individual pollutants that rely on a netting exercise or contemporaneous emissions decrease to avoid application of PSD or nonattainment area NSR = _____ x \$3,000.	20. <u>\$0.00</u>
Additional Supplemental Fees	21. If the new source or emission unit is subject to Section 39.2 of the Act (i.e. siting); a commercial incinerator or other municipal waste, hazardous waste, or waste tire incinerator; a commercial power generator; or one or more other emission units designated as a complex source by Agency rulemaking, enter \$25,000.	21. _____
	22. If the source is a new major source subject to PSD, enter \$12,000.	22. _____
	23. If the project is a major modification subject to PSD, enter \$6,000.	23. _____
	24. If this is a new major source subject to nonattainment area (NAA) NSR, enter \$20,000.	24. _____
	25. If this is a major modification subject to NAA NSR, enter \$25,000.	25. _____
	26. If the application involves a determination of MACT for a pollutant and the project is not subject to BACT or LAER for the related pollutant under PSD or NSR (e.g., VOM for organic HAP), enter \$5,000 per unit for which a determination is requested or otherwise required. _____ x \$5,000.	26. <u>\$0.00</u>
	27. If a public hearing is held (see instructions), enter \$10,000.	27. _____
28. Section 4 subtotal (line 16 and lines 19 through 28) to be entered on page 1		28. <u>\$6,000</u>

Section 5: Certification

NOTE: Applications without a signed certification will be deemed incomplete.

29. I certify under penalty of law that, based on information and belief formed after reasonable inquiry, the information contained in this fee application form is true, accurate and complete.

by: William Nothvogel

Signature

William Nothvogel

Typed or Printed Name of Signatory

Site Manager

Title of Signatory

5/22/25

Date



Illinois Environmental Protection Agency
Division Of Air Pollution Control -- Permit Section
P.O. Box 19506
Springfield, Illinois 62794-9506

Construction Permit Application for a Proposed Project at a CAAPP Source	For Illinois EPA use only
	ID No.:
	Appl. No.:
	Date Rec'd:
Chk No./Amt:	

This form is to be used to supply general information to obtain a construction permit for a proposed project involving a Clean Air Act Permit Program (CAAPP) source, including construction of a new CAAPP source. Detailed information about the project must also be included in a construction permit application, as addressed in the "General Instructions For Permit Applications," Form APC-201.

Proposed Project
1. Working Name of Proposed Project: Alkoxylation and Wastewater Process Improvements
2. Is the project occurring at a source that already has a permit from the Bureau of Air (BOA)? ☐ No ☒ Yes If Yes, provide BOA ID Number: <u>097035AAQ</u>
3. Does this application request a revision to an existing construction permit issued by the BOA? ☐ No ☒ Yes If Yes, provide Permit Number: <u>19100015</u>
4. Brief Description of Proposed Project: Vantage Specialties is applying for a revision to Permit No. 19100015. See application for additional details. No increase to the annual emissions cap is proposed.

Source Information		
1. Source name:* Vantage Specialties, Inc.		
2. Source street address:* 3938 Porett Drive		
3. City: Gurnee	4. County: Lake	5. Zip code:* 60031
ONLY COMPLETE THE FOLLOWING FOR A SOURCE WITHOUT AN ID NUMBER.		
6. Is the source located within city limits? ☐ Yes ☐ No If no, provide Township Name:		
7. Description of source and product(s) produced:		8. Primary Classification Code of source: SIC: _____ or NAICS: _____
9. Latitude (DD:MM:SS.SSSS):		10. Longitude (DD:MM:SS.SSSS):

* Is information different than previous information? ☐ Yes ☒ No

If yes, then complete Form CAAPP 273 to apply for an Administrative Change to the CAAPP Permit for the source.

Identification of Permit Applicant	
1. Who is the applicant? ☐ Owner ☒ Operator	2. All correspondence to: (check one) ☐ Source ☐ Owner ☒ Operator
3. Applicant's FEIN: 16-1090809	4. Attention name and/or title for written correspondence: Ryan Robotham, SSHE Manager

This Agency is authorized to require and you must disclose this information under 415 ILCS 5/39. Failure to do so could result in the application being denied and penalties under 415 ILCS 5 et seq. It is not necessary to use this form in providing this information. This form has been approved by the forms management center.

Owner Information*		
1. Name: Vantage Specialties, Inc.		
2. Address: 3938 Porett Drive		
3. City: Gurnee	4. State: IL	5. Zip code: 60031

* Is this information idifferent than previous information? ☐ Yes ☒ No

If yes, then complete Form CAAPP 273 to apply for an Administrative Change to the CAAPP Permit for the source.

Operator Information (if different from owner)*		
1. Name Vantage Specialties, Inc.		
2. Address: 3938 Porett Drive		
3. City: Gurnee	4. State: IL	5. Zip code: 60031

* Is this information different than previous information? ☐ Yes ☒ No

If yes, then complete Form CAAPP 273 to apply for an Administrative Change to the CAAPP Permit for the source.

Technical Contacts for Application	
1. Preferred technical contact: (check one) ☒ Applicant's contact ☐ Consultant	
2. Applicant's technical contact person for application: Ryan Robotham	
3. Contact person's telephone number(s): 847-249-6357	4. Contact person's e-mail address: Ryan.Robotham@vantagegrp.com
5. Consultant for application: Chloe Reece	
6. Consultant's telephone number(s): (630) 495-1470	7. Consultant's e-mail address: creece@trinityconsultants.com

Other Addresses for the Permit Applicant	
ONLY COMPLETE THE FOLLOWING FOR A SOURCE WITHOUT AN ID NUMBER.	
1. Address for billing Site Fees for the source: ☐ Source ☐ Other (provide below):	
2. Contact person for Site Fees:	3. Contact person's telephone number:
4. Address for Annual Emission Report for the source: ☐ Source ☐ Other (provide below):	
5. Contact person for Annual Emission Report:	6. Contact person's telephone number:

Review Of Contents of the Application	
NOTE: ANSWERING "NO" TO THESE ITEMS MAY RESULT IN THE APPLICATION BEING DEEMED INCOMPLETE	
1. Does the application include a narrative description of the proposed project?	☒ Yes ☐ No
2. Does the application clearly identify the emission units and air pollution control equipment that are part of the project?	☒ Yes ☐ No
3. Does the application include process flow diagram(s) for the project showing new and modified emission units and control equipment, along with associated existing equipment and their relationships?	☒ Yes ☐ No
4. Does the application include a general description of the source, a plot plan for the source and a site map for its location?	☐ Yes ☐ No ☒ N/A* * Material previously provided
5. Does the application include relevant technical information for the proposed project as requested on CAAPP application forms (or otherwise contain all relevant technical information)?	☒ Yes ☐ No
6. Does the application include relevant supporting data and information for the proposed project as provided on CAAPP forms?	☒ Yes ☐ No
7. Does the application identify and address all applicable emission standards for the proposed project, including: State emission standards (35 IAC Chapter I, Subtitle B); Federal New Source Performance Standards (40 CFR Part 60)?	☒ Yes ☐ No
8. Does the application address whether the project would be a major project for Prevention of Significant Deterioration, 40 CFR 52.21?	☐ Yes ☐ No ☒ N/A
9. Does the application address whether the project would be a major project for "Nonattainment New Source Review," 35 IAC Part 203?	☐ Yes ☐ No ☒ N/A
10. Does the application address whether the proposed project would potentially be subject to federal regulations for Hazardous Air Pollutants (40 CFR Part 63) and address any emissions standards for hazardous air pollutants that would be applicable?	☐ Yes ☐ No ☒ N/A* * Source not major ☒ Project not major ☒
11. Does the application include a summary of annual emission data for different pollutants for the proposed project (tons/year), including: 1) The requested permitted emissions for individual new, modified and affected existing units*, 2) The past actual emissions and change in emissions for individual modified units* and affected existing units*, and 3) Total emissions consequences of the proposed project? (* Or groups of related units)	☒ Yes ☐ No ☐ N/A * The project does not involve an increase in emissions from new or modified emission units.
12. Does the application include a summary of the current and requested potential emissions of the source (tons/year)?	☒ Yes ☐ No ☐ N/A* * Applicability of PSD, NA NSR or 40 CFR 63 to the project is not related to the source's emissions.
13. Does the application address the relationships and implications of the proposed project on the CAAPP Permit for the source?	☒ Yes ☐ No ☐ N/A* * CAAPP Permit not issued
14. If the application contains information that is considered a TRADE SECRET, has it been properly marked and claimed and all requirements to properly support the claim pursuant to 35 IAC Part 130 been met? Note: "Claimed" information will not be legally protected from disclosure to the public if it is not properly claimed or does not qualify as trade secret information.	☐ Yes ☐ No ☒ N/A* * No information in the application is claimed to be a TRADE SECRET
15. Are the correct number of copies of the application provided? (See Instructions for Permit Applications, Form 201)	☒ Yes ☐ No
16. Does the application include a completed "FEE DETERMINATION FOR CONSTRUCTION PERMIT APPLICATION," Form 197-FEE, a check in the amount indicated on this form, and any supporting material needed to explain how the fee was determined?	☒ Yes ☐ No

Signature Block

Authorized Signature:

I certify under penalty of law that, based on information and belief formed after reasonable inquiry, the statements and information contained in this application are true, accurate and complete and that I am a responsible official for the source, as defined by Section 39.5(1) of the Environmental Protection Act.

BY:



AUTHORIZED SIGNATURE

William Nothvogel

TYPED OR PRINTED NAME OF SIGNATORY

Site Manager

TITLE OF SIGNATORY

5/22/25

DATE



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL -- PERMIT SECTION
P.O. BOX 19506
SPRINGFIELD, ILLINOIS 62794-9506

FOR APPLICANT'S USE

Revision #: _____
Date: ____ / ____ / ____
Page ____ of ____
Source Designation: _____

**PROCESS EMISSION UNIT
DATA AND INFORMATION**

FOR AGENCY USE ONLY

ID NUMBER: _____

EMISSION POINT #: _____

DATE: _____

SOURCE INFORMATION

1) SOURCE NAME:

Vantage Specialties, Inc.

2) DATE FORM

PREPARED: **May 2025**

3) SOURCE ID NO.

(IF KNOWN): **097035AAQ**

GENERAL INFORMATION

4) NAME OF EMISSION UNIT:

R-24 Wastewater Conversion Tank

5) NAME OF PROCESS:

Wastewater pre-treatment

6) DESCRIPTION OF PROCESS:

Using an inorganic acid (such as phosphoric acid) to convert ethylene oxide dissolved in wastewater from batch-making on-site into ethylene glycol, prior to wastewater concentrator equipment.

7) DESCRIPTION OF ITEM OR MATERIAL PRODUCED OR ACTIVITY ACCOMPLISHED:

Conversion of dissolved ethylene oxide into ethylene glycol

8) FLOW DIAGRAM DESIGNATION OF EMISSION UNIT: *

R-24

9) MANUFACTURER OF EMISSION UNIT (IF KNOWN):

Five Star Industrial Services

10) MODEL NUMBER (IF KNOWN):

N/A -- custom vessel

11) SERIAL NUMBER (IF KNOWN):

N/A

12) DATES OF COMMENCING CONSTRUCTION,
OPERATION AND/OR MOST RECENT MODIFICATION
OF THIS EMISSION UNIT (ACTUAL OR PLANNED)

a) CONSTRUCTION (MONTH/YEAR):

1988

b) OPERATION (MONTH/YEAR):

1988

c) LATEST MODIFICATION (MONTH/YEAR):

January 2026 (tentative)

13) DESCRIPTION OF MODIFICATION (IF APPLICABLE):

Repurpose Blend Reactor R-24 (currently an insignificant activity in the CAAPP permit) to be a wastewater process/conversion tank.

THIS AGENCY IS AUTHORIZED TO REQUIRE THIS INFORMATION UNDER ILLINOIS REVISED STATUTES, 1991, AS AMENDED 1992, CHAPTER 111 1/2, PAR. 1039.5. DISCLOSURE OF THIS INFORMATION IS REQUIRED UNDER THAT SECTION. FAILURE TO DO SO MAY PREVENT THIS FORM FROM BEING PROCESSED AND COULD RESULT IN THE APPLICATION BEING DENIED. THIS FORM HAS BEEN APPROVED BY THE FORMS MANAGEMENT CENTER.

APPLICATION PAGE _____

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220-CAAPP

FOR APPLICANT'S USE

14) DOES THE EMISSION UNIT HAVE MORE THAN ONE MODE OF OPERATION? ☐ YES ☒ NO

IF YES, EXPLAIN AND IDENTIFY WHICH MODE IS COVERED BY THIS FORM (NOTE: A SEPARATE PROCESS EMISSION UNIT FORM 220-CAAPP MUST BE COMPLETED FOR EACH MODE):

15) PROVIDE THE NAME AND DESIGNATION OF ALL AIR POLLUTION CONTROL EQUIPMENT CONTROLLING THIS EMISSION UNIT, IF APPLICABLE (FORM 260-CAAPP AND THE APPROPRIATE 260-CAAPP ADDENDUM FORM MUST BE COMPLETED FOR EACH ITEM OF AIR POLLUTION CONTROL EQUIPMENT):

R-24 will vent to the R-37 Scrubber, followed by the Dry Bed System

16) WILL EMISSIONS DURING STARTUP EXCEED EITHER THE ALLOWABLE EMISSION RATE PURSUANT TO A SPECIFIC RULE, OR THE ALLOWABLE EMISSION LIMIT AS ESTABLISHED BY AN EXISTING OR PROPOSED PERMIT CONDITION? ☐ YES ☒ NO

IF YES, COMPLETE AND ATTACH FORM 203-CAAPP, "REQUEST TO OPERATE WITH EXCESS EMISSIONS DURING STARTUP OF EQUIPMENT".

17) PROVIDE ANY LIMITATIONS ON SOURCE OPERATION AFFECTING EMISSIONS OR ANY WORK PRACTICE STANDARDS (E.G., ONLY ONE UNIT IS OPERATED AT A TIME):

N/A

OPERATING INFORMATION				
18) ATTACH THE CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSION RELATED, FROM WHICH THE FOLLOWING OPERATING INFORMATION, MATERIAL USAGE INFORMATION AND FUEL USAGE DATA WERE BASED AND LABEL AS EXHIBIT 220-1. REFER TO SPECIAL NOTES OF FORM 202-CAAPP.				
19a) MAXIMUM OPERATING HOURS	HOURS/DAY:	DAYS/WEEK:	WEEKS/YEAR:	
8760	24	7	52	
b) TYPICAL OPERATING HOURS	HOURS/DAY:	DAYS/WEEK:	WEEKS/YEAR:	
20) ANNUAL THROUGHPUT	DEC-FEB(%)	MAR-MAY(%)	JUN-AUG(%)	SEP-NOV(%)
	25	25	25	25

MATERIAL USAGE INFORMATION				
21a) RAW MATERIALS	MAXIMUM RATES		TYPICAL RATES	
	LBS/HR	TONS/YEAR	LBS/HR	TONS/YEAR
Wastewater with dissolved EO				
Phosphoric Acid				

APPLICATION PAGE

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220-CAAPP

21b) PRODUCTS	MAXIMUM RATES		TYPICAL RATES	
	LBS/HR	TONS/YEAR	LBS/HR	TONS/YEAR
Wastewater with dissolved ethylene glycol				

21c) BY-PRODUCT MATERIALS	MAXIMUM RATES		TYPICAL RATES	
	LBS/HR	TONS/YEAR	LBS/HR	TONS/YEAR
N/A				

FUEL USAGE DATA – N/A		
22a) MAXIMUM FIRING RATE (MILLION BTU/HR): N/A	b) TYPICAL FIRING RATE (MILLION BTU/HR):	c) DESIGN CAPACITY FIRING RATE (MILLION BTU/HR):
d) FUEL TYPE: ☐ NATURAL GAS ☐ FUEL OIL: GRADE NUMBER _____ ☐ COAL ☐ OTHER _____ IF MORE THAN ONE FUEL IS USED, ATTACH AN EXPLANATION AND LABEL AS EXHIBIT 220-2.		
e) TYPICAL HEAT CONTENT OF FUEL (BTU/LB, BTU/GAL OR BTU/SCF):	f) TYPICAL SULFUR CONTENT (WT %, NA FOR NATURAL GAS):	
g) TYPICAL ASH CONTENT (WT %, NA FOR NATURAL GAS):	h) ANNUAL FUEL USAGE (SPECIFY UNITS, E.G., SCF/YEAR, GAL/YEAR, TON/YEAR):	
23) ARE COMBUSTION EMISSIONS DUCTED TO THE SAME STACK OR CONTROL AS PROCESS UNIT EMISSIONS? IF NO, IDENTIFY THE EXHAUST POINT FOR COMBUSTION EMISSIONS:		

APPLICABLE RULES

24) PROVIDE ANY SPECIFIC EMISSION STANDARD(S) AND LIMITATION(S) SET BY RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT (E.G., VOM, IAC 218.204(j)(4), 3.5 LBS/GAL):

REGULATED AIR POLLUTANT(S)	EMISSION STANDARD(S)	REQUIREMENT(S)
VOM	35 IAC 218.980(d)	Emissions < 2.5 tpy and all exempt emissions < 5 tpy
VOM	35 IAC 218.301	VOM < 8 lb/hr

25) PROVIDE ANY SPECIFIC RECORDKEEPING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	RECORDKEEPING RULE(S)	REQUIREMENT(S)

26) PROVIDE ANY SPECIFIC REPORTING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	REPORTING RULE(S)	REQUIREMENT(S)
VOM	35 IAC 218.990	Submit records documenting Subpart TT exemption upon request
VOM	35 IAC Part 254	Submit Annual Emission Report

27) PROVIDE ANY SPECIFIC MONITORING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	MONITORING RULE(S)	REQUIREMENT(S)

28) PROVIDE ANY SPECIFIC TESTING RULES AND/OR PROCEDURES WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	TESTING RULE(S)	REQUIREMENT(S)

29) DOES THE EMISSION UNIT QUALIFY FOR AN EXEMPTION FROM AN OTHERWISE APPLICABLE RULE?

☒ YES

☐ NO

IF YES, THEN LIST BOTH THE RULE FROM WHICH IT IS EXEMPT AND THE RULE WHICH ALLOWS THE EXEMPTION. PROVIDE A DETAILED EXPLANATION JUSTIFYING THE EXEMPTION. INCLUDE DETAILED SUPPORTING DATA AND CALCULATIONS. ATTACH AND LABEL AS EXHIBIT 220-3, OR REFER TO OTHER ATTACHMENT(S) WHICH ADDRESS AND JUSTIFY THIS EXEMPTION. **See application narrative**

COMPLIANCE INFORMATION

30) IS THE EMISSION UNIT IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS? (Emission unit has not yet been modified to its new purpose, but will be in compliance upon startup.)

☒ YES

☐ NO

IF NO, THEN FORM 294-CAAPP "COMPLIANCE PLAN/SCHEDULE OF COMPLIANCE -- ADDENDUM FOR NON COMPLYING EMISSION UNITS" MUST BE COMPLETED AND SUBMITTED WITH THIS APPLICATION.

31) EXPLANATION OF HOW INITIAL COMPLIANCE IS TO BE, OR WAS PREVIOUSLY, DEMONSTRATED:

Emission calculations

32) EXPLANATION OF HOW ONGOING COMPLIANCE WILL BE DEMONSTRATED:

Operating and maintaining equipment per good air pollution control practices

Emission calculations

Recordkeeping of emission unit inspection/maintenance/repair

Records documenting unit exempt from Subpart TT controls

TESTING, MONITORING, RECORDKEEPING AND REPORTING

33a) LIST THE PARAMETERS THAT RELATE TO AIR EMISSIONS FOR WHICH RECORDS ARE BEING MAINTAINED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE UNIT OF MEASUREMENT, THE METHOD OF MEASUREMENT, AND THE FREQUENCY OF SUCH RECORDS (E.G., HOURLY, DAILY, WEEKLY):

PARAMETER	UNIT OF MEASUREMENT	METHOD OF MEASUREMENT	FREQUENCY
pH	pH	Electronic	Ongoing

33b) BRIEFLY DESCRIBE THE METHOD BY WHICH RECORDS WILL BE CREATED AND MAINTAINED. FOR EACH RECORDED PARAMETER INCLUDE THE METHOD OF RECORDKEEPING, TITLE OF PERSON RESPONSIBLE FOR RECORDKEEPING, AND TITLE OF PERSON TO CONTACT FOR REVIEW OF RECORDS:

PARAMETER	METHOD OF RECORDKEEPING	TITLE OF PERSON RESPONSIBLE	TITLE OF CONTACT PERSON
pH	Electronic	Operations Staff	Environmental Engineer
Emissions	Calculations	Environmental Staff	Environmental Engineer

c) IS COMPLIANCE OF THE EMISSION UNIT READILY DEMONSTRATED BY REVIEW OF THE RECORDS? IF NO, EXPLAIN:	☒ YES ☐ NO
d) ARE ALL RECORDS READILY AVAILABLE FOR INSPECTION, COPYING AND SUBMITTAL TO THE AGENCY UPON REQUEST? IF NO, EXPLAIN:	☒ YES ☐ NO
34a) DESCRIBE ANY MONITORS OR MONITORING ACTIVITIES USED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE: pH of liquid entering and exiting R-24 Emission calculations Maintenance, inspections and repair operating logs for affected equipment. Records documenting units exempt from Subpart TT controls [Also additional monitoring on air pollution control equipment]	
b) WHAT PARAMETER(S) IS(ARE) BEING MONITORED (E.G., VOM EMISSIONS TO ATMOSPHERE)? pH of liquid entering and exiting R-24 Monthly and 12-month rolling emission rates Maintenance, inspections and downtime [Also additional monitoring on air pollution control equipment]	
c) DESCRIBE THE LOCATION OF EACH MONITOR (E.G., IN STACK MONITOR 3 FEET FROM EXIT): pH meters in piping entering and exiting the tank	

34d) IS EACH MONITOR EQUIPPED WITH A RECORDING DEVICE?

☐ YES

☒ NO

IF NO, LIST ALL MONITORS WITHOUT A RECORDING DEVICE:

Records of inspections and maintenance are generated manually.

e) IS EACH MONITOR REVIEWED FOR ACCURACY ON AT LEAST A QUARTERLY BASIS?

☐ YES

☒ NO

IF NO, EXPLAIN:

N/A for maintenance and inspections

f) IS EACH MONITOR OPERATED AT ALL TIMES THE ASSOCIATED EMISSION UNIT IS IN OPERATION?

☒ YES

☐ NO

IF NO, EXPLAIN:

N/A for maintenance and inspections

35) PROVIDE INFORMATION ON THE MOST RECENT TESTS, IF ANY, IN WHICH THE RESULTS ARE USED FOR PURPOSES OF THE DETERMINATION OF FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE TEST DATE, TEST METHOD USED, TESTING COMPANY, OPERATING CONDITIONS EXISTING DURING THE TEST AND A SUMMARY OF RESULTS. IF ADDITIONAL SPACE IS NEEDED, ATTACH AND LABEL AS EXHIBIT 220-4:

TEST DATE	TEST METHOD	TESTING COMPANY	OPERATING CONDITIONS	SUMMARY OF RESULTS
N/A				

36) DESCRIBE ALL REPORTING REQUIREMENTS AND PROVIDE THE TITLE AND FREQUENCY OF REPORT SUBMITTALS TO THE AGENCY:

REPORTING REQUIREMENTS	TITLE OF REPORT	FREQUENCY
35 IAC 218.990	Subpart TT exemption documentation	Upon request
35 IAC 254	Annual Emission Report	Annual
CAAPP Compliance Certification	Annual Compliance Certification	Annual
CAAPP Monitoring Results	Semi-Annual Monitoring Report	Semi-Annual

(37) EMISSION INFORMATION

REGULATED AIR POLLUTANT	1 ACTUAL EMISSION RATE				ALLOWABLE BY RULE EMISSION RATE				2 PERMITTED EMISSION RATE	
	LBS PER HOUR (LBS/HR)	TONS PER YEAR (TONS/YR)	3 OTHER TERMS	4 DM	5 RATE (UNITS)	APPLICABLE RULES	TONS PER YEAR (TONS/YR)	RATE (UNITS)	TONS PER YEAR (TONS/YR)	
CARBON MONOXIDE (CO)	See Application Narrative									
LEAD					()					
NITROGEN OXIDES (NOx)					()					
PARTICULATE MATTER (PART)					()					
PARTICULATE MATTER <= 10 MICROMETERS (PM10)					()					
SULFUR DIOXIDE (SO2)					()					
VOLATILE ORGANIC					()					
MATERIAL (VOM)					()					
OTHER, SPECIFY:					()					

IMPORTANT: ATTACH CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH EMISSIONS WERE DETERMINED AND LABEL AS EXHIBIT 220-5.

1 CHECK UNCONTROLLED EMISSION RATE BOX IF CONTROL EQUIPMENT IS USED, OTHERWISE CHECK AND PROVIDE THE ACTUAL EMISSION RATE TO ATMOSPHERE, INCLUDING INDOORS. SEE INSTRUCTIONS.

2 PROVIDE THE EMISSION RATE THAT WILL BE USED AS A PERMIT SPECIAL CONDITION. THIS LIMIT WILL BE USED TO DETERMINE THE PERMIT FEE.

3 PLEASE PROVIDE ANY OTHER EMISSION RATE WHICH IS COMMONLY USED, REQUIRED BY A SPECIFIC LIMITATION OR THAT WAS MEASURED (E.G. PPM, GR/DSCF, ETC.)

4 DM - DETERMINATION METHOD: 1) STACK TEST, 2) MATERIAL BALANCE, 3) STANDARD EMISSION FACTOR (AP-42 OR AIRS), 4) ENGINEERING ESTIMATE, 5) SPECIAL EMISSION FACTOR (NOT AP-42 OR AIRS)

5 RATE - ALLOWABLE EMISSION RATE SPECIFIED BY MOST STRINGENT APPLICABLE RULE.

APPLICATION PAGE

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220-CAAPP

(38) HAZARDOUS AIR POLLUTANT EMISSION INFORMATION						
HAP INFORMATION		☒ ¹ ACTUAL EMISSION RATE ☐ ¹ UNCONTROLLED EMISSION RATE			ALLOWABLE BY RULE	
NAME OF HAP EMITTED	² CAS NUMBER	POUNDS PER HOUR (LBS/HR)	TONS PER YEAR (TONS/YR)	³ OTHER TERMS	⁴ DM	⁵ RATE OR STANDARD APPLICABLE RULE
See Application Narrative		MAXIMUM:				
		TYPICAL:				
		MAXIMUM:				
		TYPICAL:				
		MAXIMUM:				
		TYPICAL:				
		MAXIMUM:				
		TYPICAL:				
		MAXIMUM:				
		TYPICAL:				
EXAMPLE: Benzene	71432	MAXIMUM:	10.0	1.2	2	98% by wt control device leak-tight trucks CFR 61 61.302(b),(d)
		TYPICAL:	8.0	0.8	2	

IMPORTANT: ATTACH CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH EMISSIONS WERE DETERMINED AND LABEL AS EXHIBIT 220-6.

¹PROVIDE UNCONTROLLED EMISSIONS IF CONTROL EQUIPMENT IS USED. OTHERWISE, PROVIDE ACTUAL EMISSIONS TO THE ATMOSPHERE, INCLUDING INDOORS. CHECK BOX TO SPECIFY.

²CAS - CHEMICAL ABSTRACT SERVICE NUMBER.

³PLEASE PROVIDE ANY OTHER EMISSION RATE WHICH IS COMMONLY USED, REQUIRED BY A SPECIFIC LIMITATION OR THAT WAS MEASURED (E.G., PPM, GR/DSCF, ETC.).

⁴DM - DETERMINATION METHOD: 1) STACK TEST, 2) MATERIAL BALANCE, 3) STANDARD EMISSION FACTOR (AP-42 OR AIRS), 4) ENGINEERING ESTIMATE, 5) SPECIAL EMISSION FACTOR (NOT AP-42 OR AIRS).

⁵RATE - ALLOWABLE EMISSION RATE OR STANDARD SPECIFIED BY MOST STRINGENT APPLICABLE RULE.

EXHAUST POINT INFORMATION (See 260 CAAPP)		
THIS SECTION SHOULD NOT BE COMPLETED IF EMISSIONS ARE EXHAUSTED THROUGH AIR POLLUTION CONTROL EQUIPMENT.		
39) FLOW DIAGRAM DESIGNATION OF EXHAUST POINT: Dry Bed System		
40) DESCRIPTION OF EXHAUST POINT (STACK, VENT, ROOF MONITOR, INDOORS, ETC.). IF THE EXHAUST POINT DISCHARGES INDOORS, DO NOT COMPLETE THE REMAINING ITEMS. Stack of Dry Bed System		
41) DISTANCE TO NEAREST PLANT BOUNDARY FROM EXHAUST POINT DISCHARGE (FT):		
42) DISCHARGE HEIGHT ABOVE GRADE (FT):		
43) GOOD ENGINEERING PRACTICE (GEP) HEIGHT, IF KNOWN (FT):		
44) DIAMETER OF EXHAUST POINT (FT): NOTE: FOR A NON CIRCULAR EXHAUST POINT, THE DIAMETER IS 1.128 TIMES THE SQUARE ROOT OF THE AREA.		
45) EXIT GAS FLOW RATE	a) MAXIMUM (ACFM):	b) TYPICAL (ACFM):
46) EXIT GAS TEMPERATURE	a) MAXIMUM (°F):	b) TYPICAL (°F):
47) DIRECTION OF EXHAUST (VERTICAL, LATERAL, DOWNWARD):		
48) LIST ALL EMISSION UNITS AND CONTROL DEVICES SERVED BY THIS EXHAUST POINT:		
NAME		FLOW DIAGRAM DESIGNATION
a) R-24 Wastewater Conversion Tank	R-24	
b)		
c)		
d)		
e)		
THE FOLLOWING INFORMATION NEED ONLY BE SUPPLIED IF READILY AVAILABLE.		
49a) LATITUDE:		b) LONGITUDE:
50) UTM ZONE:	b) UTM VERTICAL (KM):	c) UTM HORIZONTAL (KM):



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL -- PERMIT SECTION
P.O. BOX 19506
SPRINGFIELD, ILLINOIS 62794-9506

FOR APPLICANT'S USE

Revision #: _____
Date: ____ / ____ / ____
Page ____ of ____
Source Designation: _____

**PROCESS EMISSION UNIT
DATA AND INFORMATION**

FOR AGENCY USE ONLY

ID NUMBER: _____

EMISSION POINT #: _____

DATE: _____

SOURCE INFORMATION

1) SOURCE NAME:

Vantage Specialties, Inc.

2) DATE FORM

PREPARED:

May 2025

3) SOURCE ID NO.

(IF KNOWN):

097035AAQ

GENERAL INFORMATION

4) NAME OF EMISSION UNIT:

New (Additional) Wastewater Concentrator System; Air Stripper Column

5) NAME OF PROCESS:

G08: Wastewater concentrator system

6) DESCRIPTION OF PROCESS:

Processing wastewater from batch-making on-site prior to release or disposal

7) DESCRIPTION OF ITEM OR MATERIAL PRODUCED OR ACTIVITY ACCOMPLISHED:

Wastewater

8) FLOW DIAGRAM DESIGNATION OF EMISSION UNIT: *

R-36B, V-36B

9) MANUFACTURER OF EMISSION UNIT (IF KNOWN):

Various / Custom Fabricated

10) MODEL NUMBER (IF KNOWN):

Various

11) SERIAL NUMBER (IF KNOWN):

N/A

12) DATES OF COMMENCING CONSTRUCTION,
OPERATION AND/OR MOST RECENT MODIFICATION
OF THIS EMISSION UNIT (ACTUAL OR PLANNED)

a) CONSTRUCTION (MONTH/YEAR):

August 2025 (tentative)

b) OPERATION (MONTH/YEAR):

August 2026 (tentative)

c) LATEST MODIFICATION (MONTH/YEAR):

N/A

13) DESCRIPTION OF MODIFICATION (IF APPLICABLE):

N/A (new equipment within larger wastewater system, G08)

THIS AGENCY IS AUTHORIZED TO REQUIRE THIS INFORMATION UNDER ILLINOIS REVISED STATUTES, 1991, AS AMENDED 1992, CHAPTER 111 1/2, PAR. 1039.5. DISCLOSURE OF THIS INFORMATION IS REQUIRED UNDER THAT SECTION. FAILURE TO DO SO MAY PREVENT THIS FORM FROM BEING PROCESSED AND COULD RESULT IN THE APPLICATION BEING DENIED. THIS FORM HAS BEEN APPROVED BY THE FORMS MANAGEMENT CENTER.

APPLICATION PAGE

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220-CAAPP

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14) DOES THE EMISSION UNIT HAVE MORE THAN ONE MODE OF OPERATION? ☐ YES ☒ NO

IF YES, EXPLAIN AND IDENTIFY WHICH MODE IS COVERED BY THIS FORM (NOTE: A SEPARATE PROCESS EMISSION UNIT FORM 220-CAAPP MUST BE COMPLETED FOR EACH MODE):

15) PROVIDE THE NAME AND DESIGNATION OF ALL AIR POLLUTION CONTROL EQUIPMENT CONTROLLING THIS EMISSION UNIT, IF APPLICABLE (FORM 260-CAAPP AND THE APPROPRIATE 260-CAAPP ADDENDUM FORM MUST BE COMPLETED FOR EACH ITEM OF AIR POLLUTION CONTROL EQUIPMENT):

New (Additional) Wastewater Concentrator System R-36B will vent into existing R-36A, which will vent through replacement condenser R-36HX1 and ultimately to the R-37 Scrubber followed by the Dry Bed System.

Air Stripper Column V-36B will vent directly to the R-37 Scrubber, followed by the Dry Bed System

16) WILL EMISSIONS DURING STARTUP EXCEED EITHER THE ALLOWABLE EMISSION RATE PURSUANT TO A SPECIFIC RULE, OR THE ALLOWABLE EMISSION LIMIT AS ESTABLISHED BY AN EXISTING OR PROPOSED PERMIT CONDITION? ☐ YES ☒ NO

IF YES, COMPLETE AND ATTACH FORM 203-CAAPP, "REQUEST TO OPERATE WITH EXCESS EMISSIONS DURING STARTUP OF EQUIPMENT".

17) PROVIDE ANY LIMITATIONS ON SOURCE OPERATION AFFECTING EMISSIONS OR ANY WORK PRACTICE STANDARDS (E.G., ONLY ONE UNIT IS OPERATED AT A TIME):

N/A

OPERATING INFORMATION				
18) ATTACH THE CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSION RELATED, FROM WHICH THE FOLLOWING OPERATING INFORMATION, MATERIAL USAGE INFORMATION AND FUEL USAGE DATA WERE BASED AND LABEL AS EXHIBIT 220-1. REFER TO SPECIAL NOTES OF FORM 202-CAAPP.				
19a) MAXIMUM OPERATING HOURS	HOURS/DAY:	DAYS/WEEK:	WEEKS/YEAR:	
8760	24	7	52	
b) TYPICAL OPERATING HOURS	HOURS/DAY:	DAYS/WEEK:	WEEKS/YEAR:	
20) ANNUAL THROUGHPUT	DEC-FEB(%):	MAR-MAY(%):	JUN-AUG(%):	SEP-NOV(%):
	25	25	25	25

MATERIAL USAGE INFORMATION				
21a) RAW MATERIALS	MAXIMUM RATES		TYPICAL RATES	
	LBS/HR	TONS/YEAR	LBS/HR	TONS/YEAR
Wastewater				

21b) PRODUCTS	MAXIMUM RATES			TYPICAL RATES	
	LBS/HR			LBS/HR	TONS/YEAR
N/A					

21c) BY-PRODUCT MATERIALS	MAXIMUM RATES			TYPICAL RATES	
	LBS/HR			LBS/HR	TONS/YEAR
N/A					

FUEL USAGE DATA – N/A		
22a) MAXIMUM FIRING RATE (MILLION BTU/HR): N/A	b) TYPICAL FIRING RATE (MILLION BTU/HR):	c) DESIGN CAPACITY FIRING RATE (MILLION BTU/HR):
d) FUEL TYPE: ☐ NATURAL GAS ☐ FUEL OIL: GRADE NUMBER _____ ☐ COAL ☐ OTHER _____ IF MORE THAN ONE FUEL IS USED, ATTACH AN EXPLANATION AND LABEL AS EXHIBIT 220-2.		
e) TYPICAL HEAT CONTENT OF FUEL (BTU/LB, BTU/GAL OR BTU/SCF):	f) TYPICAL SULFUR CONTENT (WT %, NA FOR NATURAL GAS):	
g) TYPICAL ASH CONTENT (WT %, NA FOR NATURAL GAS):	h) ANNUAL FUEL USAGE (SPECIFY UNITS, E.G., SCF/YEAR, GAL/YEAR, TON/YEAR):	
23) ARE COMBUSTION EMISSIONS DUCTED TO THE SAME STACK OR CONTROL AS PROCESS UNIT EMISSIONS? IF NO, IDENTIFY THE EXHAUST POINT FOR COMBUSTION EMISSIONS:		

APPLICABLE RULES

24) PROVIDE ANY SPECIFIC EMISSION STANDARD(S) AND LIMITATION(S) SET BY RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT (E.G., VOM, IAC 218.204(j)(4), 3.5 LBS/GAL):

REGULATED AIR POLLUTANT(S)	EMISSION STANDARD(S)	REQUIREMENT(S)
VOM	35 IAC 218.980(d)	Emissions < 2.5 tpy and all exempt emissions < 5 tpy
VOM	35 IAC 218.301	VOM < 8 lb/hr

25) PROVIDE ANY SPECIFIC RECORDKEEPING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	RECORDKEEPING RULE(S)	REQUIREMENT(S)

26) PROVIDE ANY SPECIFIC REPORTING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	REPORTING RULE(S)	REQUIREMENT(S)
VOM	35 IAC 218.990	Submit records documenting Subpart TT exemption upon request
VOM	35 IAC Part 254	Submit Annual Emission Report

27) PROVIDE ANY SPECIFIC MONITORING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	MONITORING RULE(S)	REQUIREMENT(S)

28) PROVIDE ANY SPECIFIC TESTING RULES AND/OR PROCEDURES WHICH ARE APPLICABLE TO THIS EMISSION UNIT :

REGULATED AIR POLLUTANT(S)	TESTING RULE(S)	REQUIREMENT(S)

APPLICATION PAGE

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220-CAAPP

29) DOES THE EMISSION UNIT QUALIFY FOR AN EXEMPTION FROM AN OTHERWISE APPLICABLE RULE?

☒ YES ☐ NO

IF YES, THEN LIST BOTH THE RULE FROM WHICH IT IS EXEMPT AND THE RULE WHICH ALLOWS THE EXEMPTION. PROVIDE A DETAILED EXPLANATION JUSTIFYING THE EXEMPTION. INCLUDE DETAILED SUPPORTING DATA AND CALCULATIONS. ATTACH AND LABEL AS EXHIBIT 220-3, OR REFER TO OTHER ATTACHMENT(S) WHICH ADDRESS AND JUSTIFY THIS EXEMPTION. **See application narrative**

COMPLIANCE INFORMATION

30) IS THE EMISSION UNIT IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS? (Emission units are not yet constructed, but will be in compliance upon startup.)

☒ YES ☐ NO

IF NO, THEN FORM 294-CAAPP "COMPLIANCE PLAN/SCHEDULE OF COMPLIANCE -- ADDENDUM FOR NON COMPLYING EMISSION UNITS" MUST BE COMPLETED AND SUBMITTED WITH THIS APPLICATION.

31) EXPLANATION OF HOW INITIAL COMPLIANCE IS TO BE, OR WAS PREVIOUSLY, DEMONSTRATED:

Emission calculations

32) EXPLANATION OF HOW ONGOING COMPLIANCE WILL BE DEMONSTRATED:

Operating and maintaining equipment per good air pollution control practices

Emission calculations

Recordkeeping of emission unit inspection/maintenance/repair

Records documenting units exempt from Subpart TT controls

TESTING, MONITORING, RECORDKEEPING AND REPORTING

33a) LIST THE PARAMETERS THAT RELATE TO AIR EMISSIONS FOR WHICH RECORDS ARE BEING MAINTAINED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE UNIT OF MEASUREMENT, THE METHOD OF MEASUREMENT, AND THE FREQUENCY OF SUCH RECORDS (E.G., HOURLY, DAILY, WEEKLY):

PARAMETER	UNIT OF MEASUREMENT	METHOD OF MEASUREMENT	FREQUENCY
Operating time	Hours	Electronic	Ongoing

33b) BRIEFLY DESCRIBE THE METHOD BY WHICH RECORDS WILL BE CREATED AND MAINTAINED. FOR EACH RECORDED PARAMETER INCLUDE THE METHOD OF RECORDKEEPING, TITLE OF PERSON RESPONSIBLE FOR RECORDKEEPING, AND TITLE OF PERSON TO CONTACT FOR REVIEW OF RECORDS:

PARAMETER	METHOD OF RECORDKEEPING	TITLE OF PERSON RESPONSIBLE	TITLE OF CONTACT PERSON
Operating time	Computer control system (DCS)	Operations Staff	Environmental Engineer
Emissions	Calculations	Environmental Staff	Environmental Engineer

c) IS COMPLIANCE OF THE EMISSION UNIT READILY DEMONSTRATED BY REVIEW OF THE RECORDS? IF NO, EXPLAIN:	☒ YES ☐ NO
d) ARE ALL RECORDS READILY AVAILABLE FOR INSPECTION, COPYING AND SUBMITTAL TO THE AGENCY UPON REQUEST? IF NO, EXPLAIN:	☒ YES ☐ NO
34a) DESCRIBE ANY MONITORS OR MONITORING ACTIVITIES USED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE: Emission calculations Maintenance, inspections, and repair operating logs for affected equipment. Records documenting units exempt from Subpart TT controls [Also additional monitoring on air pollution control equipment]	
b) WHAT PARAMETER(S) IS(ARE) BEING MONITORED (E.G., VOM EMISSIONS TO ATMOSPHERE)? Monthly and 12-month rolling emission rates Maintenance, inspections and downtime [Also additional monitoring on air pollution control equipment]	
c) DESCRIBE THE LOCATION OF EACH MONITOR (E.G., IN STACK MONITOR 3 FEET FROM EXIT): N/A	

34d) IS EACH MONITOR EQUIPPED WITH A RECORDING DEVICE? IF NO, LIST ALL MONITORS WITHOUT A RECORDING DEVICE:	☐ YES ☒ NO			
Records of inspections and maintenance are generated manually.				
e) IS EACH MONITOR REVIEWED FOR ACCURACY ON AT LEAST A QUARTERLY BASIS? IF NO, EXPLAIN: N/A for maintenance and inspections	☐ YES ☒ NO			
f) IS EACH MONITOR OPERATED AT ALL TIMES THE ASSOCIATED EMISSION UNIT IS IN OPERATION? IF NO, EXPLAIN: N/A for maintenance and inspections	☒ YES ☐ NO			
35) PROVIDE INFORMATION ON THE MOST RECENT TESTS, IF ANY, IN WHICH THE RESULTS ARE USED FOR PURPOSES OF THE DETERMINATION OF FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE TEST DATE, TEST METHOD USED, TESTING COMPANY, OPERATING CONDITIONS EXISTING DURING THE TEST AND A SUMMARY OF RESULTS. IF ADDITIONAL SPACE IS NEEDED, ATTACH AND LABEL AS EXHIBIT 220-4:				
TEST DATE	TEST METHOD	TESTING COMPANY	OPERATING CONDITIONS	SUMMARY OF RESULTS
N/A				
36) DESCRIBE ALL REPORTING REQUIREMENTS AND PROVIDE THE TITLE AND FREQUENCY OF REPORT SUBMITTALS TO THE AGENCY:				
REPORTING REQUIREMENTS	TITLE OF REPORT	FREQUENCY		
35 IAC 218.990	Subpart TT exemption documentation	Upon request		
35 IAC 254	Annual Emission Report	Annual		
CAAPP Compliance Certification	Annual Compliance Certification	Annual		
CAAPP Monitoring Results	Semi-Annual Monitoring Report	Semi-Annual		

(37) EMISSION INFORMATION

REGULATED AIR POLLUTANT	☒ 1 ACTUAL EMISSION RATE ☐ 1 UNCONTROLLED EMISSION RATE					ALLOWABLE BY RULE EMISSION RATE			2 PERMITTED EMISSION RATE	
	LBS PER HOUR (LBS/HR)	TONS PER YEAR (TONS/YR)	3 OTHER TERMS	3 OTHER TERMS	4 DM	5 RATE (UNITS)	APPLICABLE RULES	TONS PER YEAR (TONS/YR)	RATE (UNITS)	TONS PER YEAR (TONS/YR)
CARBON MONOXIDE (CO)	MAXIMUM	See Application Narrative								
	TYPICAL									
	MAXIMUM									
	TYPICAL									
LEAD	MAXIMUM					()				
	TYPICAL					()				
	MAXIMUM					()				
NITROGEN OXIDES (NOx)	TYPICAL					()				
	MAXIMUM					()				
PARTICULATE MATTER (PART)	TYPICAL					()				
	MAXIMUM					()				
PARTICULATE MATTER <= 10 MICROMETERS (PM10)	TYPICAL					()				
	MAXIMUM					()				
SULFUR DIOXIDE (SO2)	TYPICAL					()				
	MAXIMUM					()				
VOLATILE ORGANIC MATERIAL (VOM)	TYPICAL					()				
	MAXIMUM					()				
OTHER, SPECIFY:	TYPICAL					()				
	MAXIMUM					()				

IMPORTANT: ATTACH CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH EMISSIONS WERE DETERMINED AND LABEL AS EXHIBIT 220-5.

1 CHECK UNCONTROLLED EMISSION RATE BOX IF CONTROL EQUIPMENT IS USED, OTHERWISE CHECK AND PROVIDE THE ACTUAL EMISSION RATE TO ATMOSPHERE, INCLUDING INDOORS. SEE INSTRUCTIONS.

2 PROVIDE THE EMISSION RATE THAT WILL BE USED AS A PERMIT SPECIAL CONDITION. THIS LIMIT WILL BE USED TO DETERMINE THE PERMIT FEE.

3 PLEASE PROVIDE ANY OTHER EMISSION RATE WHICH IS COMMONLY USED, REQUIRED BY A SPECIFIC LIMITATION OR THAT WAS MEASURED (E.G. PPM, OR/DSCF, ETC.)

4 DM - DETERMINATION METHOD: 1) STACK TEST, 2) MATERIAL BALANCE, 3) STANDARD EMISSION FACTOR (AP-42 OR AIRS), 4) ENGINEERING ESTIMATE, 5) SPECIAL EMISSION FACTOR (NOT AP-42 OR AIRS)

5 RATE - ALLOWABLE EMISSION RATE SPECIFIED BY MOST STRINGENT APPLICABLE RULE.

(38) HAZARDOUS AIR POLLUTANT EMISSION INFORMATION

HAP INFORMATION		☒ ¹ ACTUAL EMISSION RATE ☐ ¹ UNCONTROLLED EMISSION RATE				ALLOWABLE BY RULE	
NAME OF HAP EMITTED	² CAS NUMBER	POUNDS PER HOUR (LBS/HR)	TONS PER YEAR (TONS/YR)	³ OTHER TERMS	⁴ DM	⁵ RATE OR STANDARD	APPLICABLE RULE
See Application Narrative		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
EXAMPLE: Benzene	71432	MAXIMUM: 10.0	1.2		2	98% by wt control device leak-tight trucks	CFR 61 61.302(b),(d)

IMPORTANT: ATTACH CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH EMISSIONS WERE DETERMINED AND LABEL AS EXHIBIT 220-6
¹ PROVIDE UNCONTROLLED EMISSIONS IF CONTROL EQUIPMENT IS USED. OTHERWISE, PROVIDE ACTUAL EMISSIONS TO THE ATMOSPHERE, INCLUDING INDOORS. CHECK BOX TO SPECIFY.

² CAS - CHEMICAL ABSTRACT SERVICE NUMBER.

³ PLEASE PROVIDE ANY OTHER EMISSION RATE WHICH IS COMMONLY USED, REQUIRED BY A SPECIFIC LIMITATION OR THAT WAS MEASURED (E.G. PPM, GR/DSCF, ETC.).

⁴ DM - DETERMINATION METHOD: 1) STACK TEST, 2) MATERIAL BALANCE, 3) STANDARD EMISSION FACTOR (AP-42 OR AIRS, 4) ENGINEERING ESTIMATE, 5) SPECIAL EMISSION FACTOR (NOT AP-42 OR AIRS).

⁵ RATE - ALLOWABLE EMISSION RATE OR STANDARD SPECIFIED BY MOST STRINGENT APPLICABLE RULE.

EXHAUST POINT INFORMATION (See 260 CAAPP)		
THIS SECTION SHOULD NOT BE COMPLETED IF EMISSIONS ARE EXHAUSTED THROUGH AIR POLLUTION CONTROL EQUIPMENT.		
39) FLOW DIAGRAM DESIGNATION OF EXHAUST POINT: Dry Bed System		
40) DESCRIPTION OF EXHAUST POINT (STACK, VENT, ROOF MONITOR, INDOORS, ETC.). IF THE EXHAUST POINT DISCHARGES INDOORS, DO NOT COMPLETE THE REMAINING ITEMS. Stack of Dry Bed System		
41) DISTANCE TO NEAREST PLANT BOUNDARY FROM EXHAUST POINT DISCHARGE (FT):		
42) DISCHARGE HEIGHT ABOVE GRADE (FT):		
43) GOOD ENGINEERING PRACTICE (GEP) HEIGHT, IF KNOWN (FT):		
44) DIAMETER OF EXHAUST POINT (FT): NOTE: FOR A NON CIRCULAR EXHAUST POINT, THE DIAMETER IS 1.128 TIMES THE SQUARE ROOT OF THE AREA.		
45) EXIT GAS FLOW RATE	a) MAXIMUM (ACFM):	b) TYPICAL (ACFM):
46) EXIT GAS TEMPERATURE	a) MAXIMUM (°F):	b) TYPICAL (°F):
47) DIRECTION OF EXHAUST (VERTICAL, LATERAL, DOWNWARD):		
48) LIST ALL EMISSION UNITS AND CONTROL DEVICES SERVED BY THIS EXHAUST POINT:		
NAME		FLOW DIAGRAM DESIGNATION
a) New (Additional) Wastewater Concentrator R-36B	R-36B	
b) Air Stripper Column V-36B	V-36B	
c)		
d)		
e)		
THE FOLLOWING INFORMATION NEED ONLY BE SUPPLIED IF READILY AVAILABLE.		
49a) LATITUDE:		b) LONGITUDE:
50) UTM ZONE:	b) UTM VERTICAL (KM):	c) UTM HORIZONTAL (KM):



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL -- PERMIT SECTION
P.O. BOX 19506
SPRINGFIELD, ILLINOIS 62794-9506

FOR APPLICANT'S USE

Revision #: _____

Date: ____ / ____ / ____

Page ____ of ____

Source Designation: _____

**AIR POLLUTION CONTROL
EQUIPMENT
DATA AND INFORMATION**

FOR AGENCY USE ONLY

ID NUMBER: _____

CONTROL EQUIPMENT #:

DATE: _____

THIS FORM MUST BE COMPLETED FOR EACH AIR POLLUTION CONTROL EQUIPMENT. COMPLETE AND PROVIDE THIS FORM IN ADDITION TO THE APPLICABLE ADDENDUM FORM 260-A THROUGH 260-K. A SEPARATE FORM MUST BE COMPLETED FOR EACH MODE OF OPERATION OF AIR POLLUTION CONTROL EQUIPMENT FOR WHICH A PERMIT IS BEING SOUGHT.

SOURCE INFORMATION

1) SOURCE NAME:

Vantage Specialties, Inc.

2) DATE FORM
PREPARED:

May 2025

3) SOURCE ID NO.
(IF KNOWN):

097035AAQ

GENERAL INFORMATION

4) NAME OF AIR POLLUTION CONTROL EQUIPMENT AND/OR CONTROL SYSTEM:

Replacement R-36HX1 Wastewater Concentrator Condenser

5) FLOW DIAGRAM DESIGNATION OF CONTROL EQUIPMENT AND/OR CONTROL SYSTEM:

Condenser R-36HX1

6) MANUFACTURER OF CONTROL EQUIPMENT (IF KNOWN):

Custom Fabricated

7) MODEL NUMBER (IF KNOWN):

N/A - Custom

8) SERIAL NUMBER (IF KNOWN):

NA - Custom

9) DATES OF COMMENCING CONSTRUCTION,
OPERATION AND/OR MOST RECENT MODIFICATION
OF THIS EQUIPMENT (ACTUAL OR PLANNED)

a) CONSTRUCTION (MONTH/YEAR):

August 2025 (tentative)

b) OPERATION (MONTH/YEAR):

August 2026 (tentative)

c) LATEST MODIFICATION (MONTH/YEAR):

N/A

10) BRIEFLY DESCRIBE MODIFICATION (IF APPLICABLE):

N/A (replacement of existing condenser)

THIS AGENCY IS AUTHORIZED TO REQUIRE THIS INFORMATION UNDER ILLINOIS REVISED STATUTES, 1991, AS AMENDED 1992, CHAPTER 111 1/2, PAR. 1039.5. DISCLOSURE OF THIS INFORMATION IS REQUIRED UNDER THAT SECTION. FAILURE TO DO SO MAY PREVENT THIS FORM FROM BEING PROCESSED AND COULD RESULT IN THE APPLICATION BEING DENIED. THIS FORM HAS BEEN APPROVED BY THE FORMS MANAGEMENT CENTER.

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11) LIST ALL EMISSION UNITS AND OTHER CONTROL EQUIPMENT DUCTING EMISSIONS TO THIS CONTROL EQUIPMENT:

NAME	DESIGNATION OR CODE NUMBER
Wastewater Concentrator R-36A (Tolan)	R-36A
New (Additional) Wastewater Concentrator R-36B	R-36B

12) DOES THE CONTROL EQUIPMENT HAVE MORE THAN ONE MODE OF OPERATION?

☐ YES ☒ NO

IF YES, EXPLAIN AND IDENTIFY WHICH MODE IS COVERED BY THIS FORM (NOTE: A SEPARATE AIR POLLUTION CONTROL EQUIPMENT FORM 260-CAAPP MUST BE COMPLETED FOR EACH MODE):

13) IDENTIFY ALL ATTACHMENTS TO THIS FORM RELATED TO THIS AIR POLLUTION CONTROL EQUIPMENT (E.G., TECHNICAL DRAWINGS):

260E-CAAPP form

OPERATING SCHEDULE

14) IDENTIFY ANY PERIOD WHEN THE CONTROL EQUIPMENT WILL NOT BE OPERATING DUE TO SCHEDULED MAINTENANCE AND/OR REPAIRS WHEN THE FEEDING EMISSION UNIT(S) TO THIS CONTROL EQUIPMENT IS/ARE IN OPERATION:

Maintenance or repairs are done as needed. Emission unit is not operated if control device is off-line.

15a) IDENTIFY ANY PERIODS DURING OPERATION OF THE FEEDING EMISSION UNIT(S) WHEN THE CONTROL EQUIPMENT IS/ARE NOT USED:

NA

b) IS THIS CONTROL EQUIPMENT IN OPERATION AT ALL OTHER TIMES THAT THE FEEDING EMISSION UNIT(S) IS/ARE IN OPERATION?

☒ YES ☐ NO

IF NO, EXPLAIN AND PROVIDE THE DURATION OF THE CONTROL EQUIPMENT DOWNTIME:

APPLICATION PAGE

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APPLICABLE RULES

16) PROVIDE ANY SPECIFIC EMISSION STANDARD(S) AND LIMITATION(S) SET BY RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT (E.G., VOM, IAC 218.207(b)(1), 81% OVERALL & 90% CONTROL DEVICE EFF.):

REGULATED AIR POLLUTANT(S)	EMISSION STANDARD(S)	REQUIREMENT(S)
VOM	35 IAC 218.980(d)	Emissions < 2.5 tpy and all exempt emissions < 5 tpy
VOM	35 IAC 218.301	VOM < 8 lb/hr

17) PROVIDE ANY SPECIFIC RECORDKEEPING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	RECORDKEEPING RULE(S)	REQUIREMENT(S)

18) PROVIDE ANY SPECIFIC REPORTING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	REPORTING RULE(S)	REQUIREMENT(S)
VOM	35 IAC 218.990	Submit records documenting Subpart TT exemption upon request
VOM	35 IAC Part 254	Submit Annual Emission Report

19) PROVIDE ANY SPECIFIC MONITORING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	MONITORING RULE(S)	REQUIREMENT(S)

20) PROVIDE ANY SPECIFIC TESTING RULES AND/OR PROCEDURES WHICH ARE APPLICABLE TO THIS EMISSION UNIT :

REGULATED AIR POLLUTANT(S)	TESTING RULE(S)	REQUIREMENT(S)

APPLICATION PAGE

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COMPLIANCE INFORMATION

21) IS THE CONTROL SYSTEM IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS?



YES



NO

IF NO, THEN FORM 294-CAAPP "COMPLIANCE PLAN/SCHEDULE OF COMPLIANCE -- ADDENDUM FOR NON COMPLYING EMISSION UNITS" MUST BE COMPLETED AND SUBMITTED WITH THIS APPLICATION.

22) EXPLANATION OF HOW INITIAL COMPLIANCE IS TO BE, OR WAS PREVIOUSLY, DEMONSTRATED:

Emission calculations

23) EXPLANATION OF HOW ONGOING COMPLIANCE WILL BE DEMONSTRATED:

- Emission calculations
- Continuous monitoring & recording of cooling water system supply & exit temperatures
- Routine preventive maintenance cleaning of the condensers to ensure they are not becoming fouled
- Records of condenser inspection, maintenance and repairs
- Records documenting units exempt from Subpart TT controls

TESTING, MONITORING, RECORDKEEPING AND REPORTING

24a) LIST THE PARAMETERS THAT RELATE TO AIR EMISSIONS FOR WHICH RECORDS ARE BEING MAINTAINED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE UNIT OF MEASUREMENT, THE METHOD OF MEASUREMENT, AND THE FREQUENCY OF SUCH RECORDS (E.G., HOURLY, DAILY, WEEKLY):

PARAMETER	UNIT OF MEASUREMENT	METHOD OF MEASUREMENT	FREQUENCY
Cooling water supply & exit temperatures	Degrees	Electronic	Hourly

24b) BRIEFLY DESCRIBE THE METHOD BY WHICH RECORDS WILL BE CREATED AND MAINTAINED. FOR EACH RECORDED PARAMETER INCLUDE THE METHOD OF RECORDKEEPING, TITLE OF PERSON RESPONSIBLE FOR RECORDKEEPING, AND TITLE OF PERSON TO CONTACT FOR REVIEW OF RECORDS:

PARAMETER	METHOD OF RECORDKEEPING	TITLE OF PERSON RESPONSIBLE	TITLE OF CONTACT PERSON
Cooling water supply & exit temperatures	Electronic	Operations Staff	Environmental Staff

c) IS COMPLIANCE OF THE CONTROL EQUIPMENT READILY DEMONSTRATED BY REVIEW OF THE RECORDS? IF NO, EXPLAIN:	☒ YES ☐ NO
d) ARE ALL RECORDS READILY AVAILABLE FOR INSPECTION, COPYING AND/OR SUBMITTAL TO THE AGENCY UPON REQUEST? IF NO, EXPLAIN:	☒ YES ☐ NO
25a) DESCRIBE ANY MONITORS OR MONITORING ACTIVITIES USED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE: - Emission calculations - Continuous monitoring & hourly recording of cooling water system supply & exit temperatures - Records of condenser inspection, maintenance and repairs	
b) WHAT OPERATING PARAMETER(S) IS(ARE) BEING MONITORED (E.G., COMBUSTION CHAMBER TEMPERATURE)? - Emissions - Cooling water system supply & exit temperatures - Condenser inspection, maintenance and repairs	
c) DESCRIBE THE LOCATION OF EACH MONITOR (E.G., EXIT OF COMBUSTION CHAMBER): Inlet & outlet water supply lines. There will also be a local digital gauge for reading the temperatures.	
25d) IS EACH MONITOR EQUIPPED WITH A RECORDING DEVICE? IF NO, LIST ALL MONITORS WITHOUT A RECORDING DEVICE:	☒ YES ☐ NO

e) IS EACH MONITOR REVIEWED FOR ACCURACY ON AT LEAST A QUARTERLY BASIS? IF NO, EXPLAIN: Temperature gauges are not typically calibrated. Probes will be replaced, as needed.	☐ YES ☒ NO																									
f) IS EACH MONITOR OPERATED AT ALL TIMES THE CONTROL EQUIPMENT IS IN OPERATION? IF NO, EXPLAIN: If the monitor for cooling water temperature fails while the control equipment is operating, manual temperature readings will be taken instead.	☒ YES ☐ NO																									
26) PROVIDE INFORMATION ON THE MOST RECENT TESTS, IF ANY, IN WHICH THE RESULTS ARE USED FOR PURPOSES OF THE DETERMINATION OF FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE TEST DATE, TEST METHOD USED, TESTING COMPANY, OPERATING CONDITIONS EXISTING DURING THE TEST AND A SUMMARY OF RESULTS. IF ADDITIONAL SPACE IS NEEDED, ATTACH AND LABEL AS EXHIBIT 260-1:																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">TEST DATE</th> <th style="width: 15%;">TEST METHOD</th> <th style="width: 15%;">TESTING COMPANY</th> <th style="width: 15%;">OPERATING CONDITIONS</th> <th style="width: 40%;">SUMMARY OF RESULTS</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td>N/A</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		TEST DATE	TEST METHOD	TESTING COMPANY	OPERATING CONDITIONS	SUMMARY OF RESULTS					N/A															
TEST DATE	TEST METHOD	TESTING COMPANY	OPERATING CONDITIONS	SUMMARY OF RESULTS																						
				N/A																						
27) DESCRIBE ALL REPORTING REQUIREMENTS AND PROVIDE THE TITLE AND FREQUENCY OF REPORT SUBMITTALS TO THE AGENCY:																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">REPORTING REQUIREMENTS</th> <th style="width: 33%;">TITLE OF REPORT</th> <th style="width: 33%;">FREQUENCY</th> </tr> </thead> <tbody> <tr> <td>35 IAC 254</td> <td>Annual Emission Report</td> <td>Annual</td> </tr> <tr> <td>CAAPP Compliance Certification</td> <td>Annual Compliance Certification</td> <td>Annual</td> </tr> <tr> <td>CAAPP Monitoring Results</td> <td>Semi-Annual Monitoring Report</td> <td>Semi-Annual</td> </tr> </tbody> </table>		REPORTING REQUIREMENTS	TITLE OF REPORT	FREQUENCY	35 IAC 254	Annual Emission Report	Annual	CAAPP Compliance Certification	Annual Compliance Certification	Annual	CAAPP Monitoring Results	Semi-Annual Monitoring Report	Semi-Annual													
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CAAPP Monitoring Results	Semi-Annual Monitoring Report	Semi-Annual																								

CAPTURE AND CONTROL
28) DESCRIBE THE CAPTURE SYSTEM USED TO CONTAIN, COLLECT AND TRANSPORT EMISSIONS TO THE CONTROL EQUIPMENT. INCLUDE ALL HOODS, DUCTS, FANS, ETC. ALSO INCLUDE THE METHOD OF CAPTURE USED AT EACH EMISSION POINT. (IF ADDITIONAL SPACE IS NEEDED, ATTACH AND LABEL AS EXHIBIT 260-2): Process ducts

29) ARE FEATURES OF THE CAPTURE SYSTEM ACCURATELY DEPICTED IN THE FLOW DIAGRAM CONTAINED IN THIS APPLICATION?

☒ YES ☐ NO

IF NO, A SKETCH SHOWING THE FEATURES OF THE CAPTURE SYSTEM SHOULD BE ATTACHED AND LABELED AS EXHIBIT 260-3:

30) PROVIDE THE ACTUAL (MINIMUM AND TYPICAL) CAPTURE SYSTEM EFFICIENCY, CONTROL EQUIPMENT DESTRUCTION/REMOVAL EFFICIENCY, AND THE OVERALL REDUCTION EFFICIENCY PROVIDED BY THE COMBINATION OF THE CAPTURE SYSTEM AND CONTROL EQUIPMENT FOR EACH REGULATED AIR POLLUTANT TO BE CONTROLLED. ATTACH THE CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH THESE EFFICIENCIES WERE BASED AND LABEL AS EXHIBIT 260-4:

a) CONTROL PERFORMANCE:

	REGULATED AIR POLLUTANT	CAPTURE SYSTEM EFFICIENCY (%)		CONTROL EQUIPMENT EFFICIENCY (%)		OVERALL REDUCTION EFFICIENCY (%)	
		(MIN)	(TYP)	(MIN)	(TYP)	(MIN)	(TYP)
i	VOM		100		Unknown		Unknown
ii							
iii							
iv.	EXPLAIN ANY OTHER REQUIRED LIMITS ON CONTROL EQUIPMENT PERFORMANCE SUCH AS OUTLET CONCENTRATION, COOLANT TEMPERATURE, ETC.:						

b) METHOD USED TO DETERMINE EACH OF THE ABOVE EFFICIENCIES (E.G., STACK TEST, MATERIAL BALANCE, MANUFACTURER'S GUARANTEE, ETC.) AND THE DATE LAST TESTED, IF APPLICABLE:

EFFICIENCY DETERMINATION METHOD		DATE LAST TESTED
CAPTURE:	Hard-piped	
CONTROL:	Engineering estimate	
OVERALL:	Engineering estimate	

c) REQUIRED PERFORMANCE:

	REGULATED AIR POLLUTANT	CAPTURE SYSTEM EFFICIENCY (%)	CONTROL EQUIPMENT EFFICIENCY (%)	OVERALL REDUCTION EFFICIENCY (%)	APPLICABLE RULE
		(%)	(%)	(%)	
i	VOM	NA	NA	N/A	35 IAC 218.980(d)
ii					
iii					
iv	EXPLAIN ANY OTHER REQUIRED LIMITS ON CONTROL EQUIPMENT PERFORMANCE SUCH AS OUTLET CONCENTRATION, COOLANT TEMPERATURE, ETC.:				

(31) EMISSION INFORMATION

(31)EMISSION INFORMATION												
REGULATED AIR POLLUTANT		1ACTUAL EMISSION RATE					ALLOWABLE BY RULE EMISSION RATE			2PERMITTED EMISSION RATE		
		LBS PER HOUR (LBS/HR)	TONS PER YEAR (TONS/YR)	3OTHER TERMS	3OTHER TERMS	4DM	5RATE (UNITS)	APPLICABLE RULES	TONS PER YEAR (TONS/YR)	RATE (UNITS)	TONS PER YEAR (TONS/YR)	
CARBON MONOXIDE (CO)	MAXIMUM:						()					
	TYPICAL:						()					
LEAD	MAXIMUM:						()					
	TYPICAL:						()					
NITROGEN OXIDES (NOx)	MAXIMUM:						()					
	TYPICAL:						()					
PARTICULATE MATTER (PART)	MAXIMUM:						()					
	TYPICAL:						()					
PARTICULATE MATTER <= 10 MICROMETERS (PM10)	MAXIMUM:						()					
	TYPICAL:						()					
SULFUR DIOXIDE (SO2)	MAXIMUM:						()					
	TYPICAL:						()					
VOLATILE ORGANIC MATERIAL (VOM)	MAXIMUM:	Emissions from R-36HX1 are routed into V-36A, which subsequently vents to the R-37 Scrubber and Dry Bed System.					()					
	MAXIMUM:											
OTHER, SPECIFY:	MAXIMUM:						()					
	TYPICAL:						()					
EXAMPLE: PARTICULATE MATTER	MAXIMUM:	5.00	21.9	0.3 GR/DSCF		1	6.0 (LBS/HR)	212.321	26.28	5.5 LBS/HR	22	
	TYPICAL:	4.00	14.4	0.24 GR/DSCF		4	5.5 (LBS/HR)	212.321	19.80			

IMPORTANT: ATTACH CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH EMISSIONS WERE DETERMINED AND LABEL AS EXHIBIT 260-5.

1) PROVIDE CONTROLLED EMISSIONS (E.G., THE EMISSIONS THAT WOULD RESULT AFTER ALL CONTROL AND CAPTURE EFFICIENCIES ARE ACCOUNTED FOR).

2) PROVIDE THE EMISSION RATE THAT WILL BE USED AS A PERMIT SPECIAL CONDITION. THIS LIMIT WILL BE USED TO DETERMINE THE PERMIT FEE.

3) PLEASE PROVIDE ANY OTHER EMISSION RATE WHICH IS COMMONLY USED, REQUIRED BY A SPECIFIC LIMITATION OR THAT WAS MEASURED (E.G. PPM, GR/DSCF, ETC.)

4) DM - DETERMINATION METHOD: 1) STACK TEST, 2) MATERIAL BALANCE, 3) STANDARD EMISSION FACTOR (AP-42 OR AIRS), 4) ENGINEERING ESTIMATE, 5) SPECIAL EMISSION FACTOR (NOT AP-42 OR AIRS)

5) RATE - ALLOWABLE EMISSION RATE SPECIFIED BY MOST STRINGENT APPLICABLE RULE.

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(32) HAZARDOUS AIR POLLUTANT EMISSION INFORMATION									
HAP INFORMATION		1 ACTUAL EMISSION RATE				ALLOWABLE BY RULE			
NAME OF HAP EMITTED	2CAS NUMBER	POUNDS PER HOUR (LBS/HR)	TONS PER YEAR (TONS/YR)	3OTHER TERMS	4DM	5RATE OR STANDARD	APPLICABLE RULE		
Emissions from R-36HX1 are routed into V-36A, which subsequently vents to the R-37 Scrubber and Dry Bed System.		MAXIMUM:							
		TYPICAL							
		MAXIMUM:							
		TYPICAL							
		MAXIMUM:							
		TYPICAL							
		MAXIMUM:							
		TYPICAL							
		MAXIMUM:							
		TYPICAL							
		MAXIMUM:							
		TYPICAL							
		MAXIMUM:							
		TYPICAL							
		MAXIMUM:							
		TYPICAL							
EXAMPLE: Benzene	71432	MAXIMUM:	10.0	1.2		2	98% by wt control device		
		TYPICAL:	8.0	0.8		2	leak-tight trucks		

IMPORTANT: ATTACH CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH EMISSIONS WERE DETERMINED AND LABEL AS EXHIBIT 260-6.

1 PROVIDE CONTROLLED EMISSIONS (E.G., THE EMISSIONS THAT WOULD RESULT AFTER ALL CONTROL AND CAPTURE EFFICIENCIES ARE ACCOUNTED FOR).
2 CAS - CHEMICAL ABSTRACT SERVICE NUMBER.
3 PLEASE PROVIDE ANY OTHER EMISSION RATE WHICH IS COMMONLY USED, REQUIRED BY A SPECIFIC LIMITATION OR THAT WAS MEASURED (E.G., PPM, GR/DSCF, ETC.).
4 DM - DETERMINATION METHOD: 1) STACK TEST; 2) MATERIAL BALANCE; 3) STANDARD EMISSION FACTOR (AP-42 OR AIRS); 4) ENGINEERING ESTIMATE; 5) SPECIAL EMISSION FACTOR (NOT AP-42 OR AIRS).
5 RATE - ALLOWABLE EMISSION RATE OR STANDARD SPECIFIED BY MOST STRINGENT APPLICABLE RULE.

EXHAUST POINT INFORMATION		
33) DESCRIPTION OF EXHAUST POINT (STACK, VENT, ROOF MONITOR, INDOORS, ETC.). IF THE EXHAUST POINT DISCHARGES INDOORS, DO NOT COMPLETE THE REMAINING ITEMS. Dry Bed System		
34) DISTANCE TO NEAREST PLANT BOUNDARY FROM EXHAUST POINT DISCHARGE (FT): Stack of Dry Bed System		
35) DISCHARGE HEIGHT ABOVE GRADE (FT):		
36) GOOD ENGINEERING PRACTICE (GEP) HEIGHT, IF KNOWN (FT):		
37) DIAMETER OF EXHAUST POINT (FT): NOTE: FOR A NON CIRCULAR EXHAUST POINT, THE DIAMETER IS 1.128 TIMES THE SQUARE ROOT OF THE AREA.		
38) EXIT GAS FLOW RATE	Maximum (scfm):	
39) EXIT GAS TEMPERATURE	Maximum (F):	
40) DIRECTION OF EXHAUST (VERTICAL, LATERAL, DOWNWARD):		
41) LIST ALL EMISSION UNITS AND CONTROL DEVICES SERVED BY THIS EXHAUST POINT:		
NAME		FLOW DIAGRAM DESIGNATION
a) Wastewater Concentrator R-36A (Tolan)		R-36A
b) New (Additional) Wastewater Concentrator R-36B		R-36B
c)		
d)		
e)		
f)		
g)		

42) WHAT PERCENTAGE OF THE CONTROL EQUIPMENT EMISSIONS ARE BEING DUCTED TO THIS EXHAUST POINT (%)? 100
43) IF THE PERCENTAGE OF THE CONTROL EQUIPMENT EMISSIONS BEING DUCTED TO THE EXHAUST POINT IS NOT 100%, THEN EXPLAIN WHERE THE REMAINING EMISSIONS ARE BEING EXHAUSTED TO:

THE FOLLOWING INFORMATION NEED ONLY BE SUPPLIED IF READILY AVAILABLE.		
44a) LATITUDE:	b) LONGITUDE:	
45a) UTM ZONE:	b) UTM VERTICAL (KM):	a) UTM HORIZONTAL (KM):



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL -- PERMIT SECTION
P.O. BOX 19506
SPRINGFIELD, ILLINOIS 62794-9506

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Date: ____ / ____ / ____
Page ____ of ____
Source Designation: _____

**SUPPLEMENTAL FORM
AIR POLLUTION CONTROL
EQUIPMENT
CONDENSER (260E)**

FOR AGENCY USE ONLY

ID NUMBER: _____

CONTROL EQUIPMENT #: _____

DATE: _____

DATA AND INFORMATION

1) FLOW DIAGRAM DESIGNATION OF CONDENSER:

R-36HTX1 (replacement)

2) CONDENSER SURFACE AREA (SQUARE FEET):

To be determined

3) REFRIGERATION CAPACITY (TONS):

N/A

4) DESCRIBE ANY PRETREATMENT OF THE EMISSION STREAM GAS:

None

5) COOLANT(S) USED:

Cooling water

6) AVERAGE TEMPERATURE OF CONDENSED REGULATED AIR POLLUTANT (DEGREES FAHRENHEIT):

< 212

THIS AGENCY IS AUTHORIZED TO REQUIRE THIS INFORMATION UNDER ILLINOIS REVISED STATUTES, 1991, AS AMENDED 1992, CHAPTER 111 1/2, PAR. 1039.5. DISCLOSURE OF THIS INFORMATION IS REQUIRED UNDER THAT SECTION. FAILURE TO DO SO MAY PREVENT THIS FORM FROM BEING PROCESSED AND COULD RESULT IN THE APPLICATION BEING DENIED. THIS FORM HAS BEEN APPROVED BY THE FORMS MANAGEMENT CENTER.

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7) BRIEFLY DESCRIBE WHAT HAPPENS TO THE CONDENSED PRODUCT:

Condensed material will go into V-36A, followed by V-36B, and then to Snake Pit.

8) IS THIS A REFLUX CONDENSER, I.E., DOES CONDENSED MATERIAL RETURN DIRECTLY TO THE PROCESS FROM WHICH IT WAS GENERATED?

☐

YES

☒

NO

9) INLET EMISSION STREAM PARAMETERS:

	MAX	TYPICAL
PRESSURE (mmHG):	800	760
OXYGEN CONTENT:	0-21 %	0-21 %
MOISTURE CONTENT:	0 - 100%	0 - 100%
RELATIVE HUMIDITY:	100%	100%

ARE HALOGENATED ORGANICS PRESENT?

☐

YES

☒

NO

10) CONDENSER OPERATING PARAMETERS:

	DURING MAXIMUM OPERATION OF FEEDING UNIT(S)	DURING TYPICAL OPERATION OF FEEDING UNIT(S)
INLET GAS TEMPERATURE (DEGREES FAHRENHEIT):	250	220
OUTLET GAS TEMPERATURE (DEGREES FAHRENHEIT):	212	212
INLET GAS FLOW RATE (SCFM):	3,200	1,300 - 3,200
INLET COOLANT TEMPERATURE (DEGREES FAHRENHEIT):	100	100
OUTLET COOLANT TEMPERATURE (DEGREES FAHRENHEIT):	120	120
COOLANT FLOW RATE (GAL/HR):	30,000	15,000 - 30,000
CONDENSED PRODUCT (LB/HR):	TBD	TBD
EFFICIENCY (VOM REDUCTION):	Unknown	Unknown

Emission Rate Calculations for Proposed New Piping Components

**Attachment B -
Emission Rate Calculations for Proposed New Piping Components**

Component Type	# of New Components ¹	SOCMI Average Emission Factor ² (kg/hr/component)	Hourly Emissions of Process Material ³ (kg/hr)	Hourly Emissions of Process Material (lb/hr)	Maximum EO Concentration ⁴ (wt fraction)	Maximum Hourly EO Emissions ⁵ (lb/hr)	Maximum Annual EO Emissions ⁶ (tpy)
Vapor Service Connectors/Flanges	60	0.00183	0.1098	0.2421	0.00009	2.1786E-05	0.0001
Liquid Service Connectors/Flanges (Pre R24)	30	0.00183	0.0549	0.1210	0.000198	2.3965E-05	0.0001
Liquid Service Connectors/Flanges (Post R24)	88	0.00183	0.16104	0.3550	0.000099	3.5148E-05	0.0002
Vapor Service Valves	19	0.00597	0.11343	0.2501	0.00009	2.2506E-05	0.0001
Light Liquid Service Valves	34	0.00403	0.13702	0.3021	0.000198	5.9811E-05	0.0003
Pump Seals (Pre R24)	1	0.0199	0.0199	0.0439	0.000198	8.6867E-06	0.00004
Pump Seals (Post R24)	1	0.0199	0.0199	0.0439	0.000099	4.3433E-06	0.00002
Notes:						tpy EO lb EO/year	0.00077 1.5

- 1) Number of new components estimated by Gurnee Facility personnel.
- 2) SOCMI Average emission factors from Table 2-1 of the U.S. EPA's "Protocol for Equipment Leak Emission Estimates" (EPA-453/R-95-017), November 1995.
- 3) Hourly emissions (of unspiciated process vapors or process liquids) calculated as emission factor (kg/hr/component) x (# of components). The convert from kg/hr to lb/hr is based on 2.2046 lb/kg.
- 4) Weight fraction of EO in the process vapors or process liquids is based on sampling of these materials performed by the Gurnee Facility in recent months. To simplify the calculations, Vantage is conservatively applying the maximum vapor phase concentration of EO that was detected during this sampling to all components in vapor service, rather than applying different concentrations to different segments of proposed new piping in vapor service. For new components in liquid service that will be installed upstream of the R-24 wastewater conversion tank, Vantage has conservatively applied the maximum liquid phase concentration of EO that was detected during the sampling. For new components in liquid service that will be installed downstream of the R-24 wastewater conversion tank, Vantage has conservatively assumed that the maximum EO concentration in the liquid phase will be reduced by only 50% by the R-24 treatment process. (The actual expected conversion rate is much higher than this.)
- 5) Hourly emissions of EO = (# of new components) x (kg/hr/component) x (2.2046 lb/kg) x (wt fraction EO)
- 6) Annual emissions based on hourly emission rate and 8,760 hours per year. Conversion from lbs to tons is 2,000 lbs per ton.

Example for vapor service valves:

(19 vapor service valves) x	0.00597 kg	x	2.2046 lb	x	0.0009 lb EO	x	8,760 hrs	x	ton	=	0.0001	ton EO/year
	hr-valve		kg		lb process material		yr		2,000 lbs			from vapor service valves

Lab Scrubber Internal Testing Summary

Title: R&D Oxide Scrubber test

Primary Researcher: Al Smetana, Kevin McAvey

Date Completed: 5/24/2024

Scope: Run a test on the efficiency of the oxide scrubbers in the R&D laboratory.

Laboratory procedure:

The EO sensor (Forensic Detectors, Model FD-90A, Serial Number 23122165) was connected directly to the standard tank of 10 ppm EO in nitrogen (GASCO PN X02NI99CA34335M5, Lot 304-403042956-1) for a bump test/calibration check. The pressure in the tank as received was 500 psi. The valve on the tank was then opened and the gas stream was allowed to flow through the sensor. The sensor was bump tested and readings from the sensor were between 9.2 and 10.8 ppm. The numerical reading on the sensor in this situation fluctuates between 9.2 and 10.8 ppm of EO under these conditions. The precision of the meter was determined to be +/- 1 ppm. The valve to the EO tank was then closed.

During normal operation of the laboratory reactors and scrubber equipment a flow rate of 1-4 L/min through the scrubber system is used. This rate was measured using a rotameter positioned in line after the second scrubber (see diagram). To ensure no other gases were in the scrubber system and there was no chance of a false positive reading a control was run. The scrubbers were connected to plant nitrogen and flushed with a flow of 4 L/min. The volume of free air in the system (i.e. above the scrubber solution and ¼" lines connecting them is 3 L. Thus, at flow rate of 1L/min, the system is purged after 3 minutes.

The sensor was connected to a sampling pump (Forensic Detectors, Model FD-Pump, SN 2401158) that pulls 0.5 L/min and was connected to the EO sensor. This pump was connected to the system at a tee fitting at the outlet of the scrubber after the rotameter (see diagram). The pump was then able to pull the gas flow and sample this flow to the sensor. The sensor read 0.0 ppm during flow of plant nitrogen through the scrubber system.

The 10 ppm EO tank was then connected to feed the scrubber system. 450 PSI remained in the tank after the bump test. The valve on the tank was opened until a flow rate of 1 L/min was seen at the rotameter after the second scrubber. When the flow was initially observed at the rotameter a timer was started. The reading at the EO sensor was recorded every 15 seconds. The flow rate was kept constant for 5 minutes at this state with the EO meter reading 0.0 ppm for the entire 5 minutes (5 L total). After the 1 L/min flow, the rate was increased to 2 L/min for an additional 3 minutes while recording the reading of the EO sensor every 15 seconds. The reading of the EO meter was 0.0 ppm for every measurement after an additional 6 L of gas standard (11 L total). At the 8-minute mark, the flow rate was increased to 4 L/min for 2 additional minutes with the EO measurement again being recorded every 15 seconds. All readings were 0.0 ppm after an additional 8 L of gas standard (18 L total). The pressure in the cylinder after the testing was 100 psi.

The EO tank was then disconnected from the scrubber system and connected again directly to the EO sensor. As a second bump test the valve on the EO tank was then opened and allowed the gas to flow through the EO sensor. The sensor gave readings between 9.2 and 10.8 ppm of EO. The pressure of the tank after this bump test was 50 psi.

Conclusion:

The sensor was shown to be functional at reading the presence of ethylene oxide in the 10 ppm calibration gas purchased from Forensic Detectors through GASCO. This sensor was bump tested with the 10 ppm calibration gas and then connected to the stream of gas at the outlet of the scrubber. No EO readings were recorded at the outlet of the scrubber during the conditions run in the experiment. The sensor was then again bump tested after the test and again read 10 ppm of EO +/- 1ppm. Since the sensor can be considered to be accurate to 1 ppm the efficiency of the scrubber system can be estimated to be > 90% by the following equation:

$$\frac{\text{Outlet EO Concentration (< 1 ppm EO)}}{\text{Inlet concentration of EO (10 ppm)}} = >90\%$$

A diagram of the experimental setup is below:

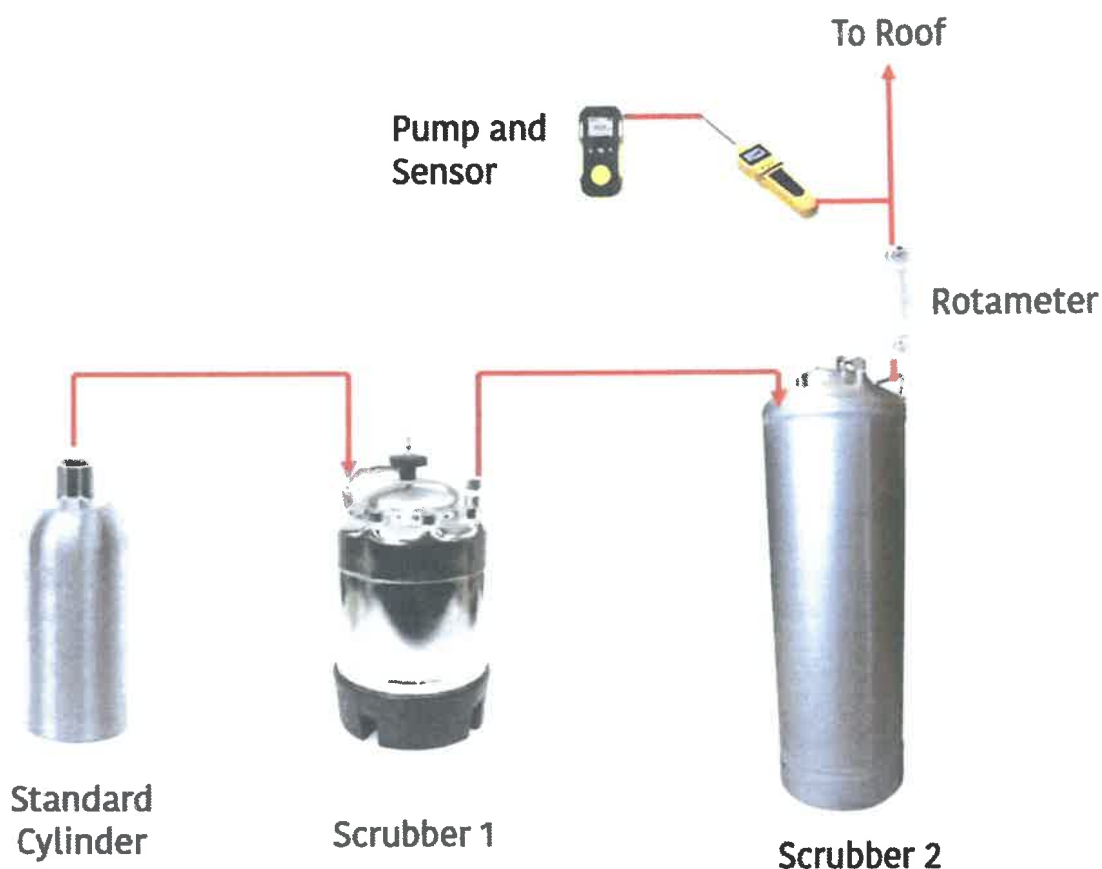


Table of EO measurements after the scrubber.

Flow rate (L/min)	Time (Seconds)	Reading on EO meter (ppm)
1	15	0.0
1	30	0.0
1	45	0.0
1	60	0.0
1	75	0.0

1	90	0.0
1	105	0.0
1	120	0.0
1	135	0.0
1	150	0.0
1	165	0.0
1	180	0.0
1	195	0.0
1	210	0.0
1	225	0.0
1	240	0.0
1	255	0.0
1	270	0.0
1	285	0.0
1	300	0.0
2	315	0.0
2	330	0.0
2	345	0.0
2	360	0.0
2	375	0.0
2	390	0.0
2	405	0.0
2	420	0.0
2	435	0.0
2	450	0.0
2	465	0.0
2	480	0.0
4	495	0.0
4	510	0.0
4	525	0.0
4	540	0.0
4	555	0.0
4	570	0.0
4	585	0.0
4	600	0.0
4	615	0.0
4	630	0.0
4	645	0.0
4	660	0.0

Summary of Air Dispersion Modeling Results

Summary of Vantage Specialty Chemical Dispersion Modeling

Vantage Specialties, Inc ("Vantage Specialties" hereafter), located at 3938 Porett Drive in Gurnee, Illinois, is a chemical manufacturing facility (the Gurnee Facility) that produces surfactants, cleaning products, lubricants, and food-grade ingredients. Many of these products are made in the facility's Alkoxylation Area, where ethylene oxide (EO) is used as a raw material. EO is primarily emitted from the single stack associated with the scrubber system [the wet scrubber air pollution control device (R37), followed in series by a Dry Bed System (R37V1A-D)], with additional emissions originating from product transfer, piping components, and vent losses (referred to here as "Other Emission Sources"). The Gurnee Facility's EO emissions are limited to be no more than 110 pounds per year (lb/yr), of which no more than 60 lb/yr shall be associated with Other Emission Sources per the emission cap set in Construction Permit No. 19100015.

The processes associated with emissions of EO will be updated to route emissions from certain existing negligible/insignificant emission points and from two new wastewater handling units into the existing scrubber system at the Gurnee Facility. Additionally, an existing, insignificant activity vessel at the Gurnee Facility will be repurposed into a vessel that will treat the facility's wastewater, and an idled wastewater storage tank will be restored to service.

Under the proposed design, the sources of EO emissions at the Gurnee Facility are listed as follows:

- Existing Scrubber Stack
- Other Emission Sources
 - South Fugitive Sources (existing)
 - Unload 1
 - Unload 2
 - Unload 3
 - North Fugitive Sources (existing)
 - React 1
 - React 2
 - Additional North Fugitive Components
 - Wastewater Snake Pit
 - Manholes 1 – 3
 - Wastewater Tanks T-144 and T-145
 - Research and Development (R&D) Laboratory

Vantage Specialties is not proposing any change to the annual cap on emissions of EO at the Gurnee Facility. The emissions of EO from Additional North Fugitive Components, Wastewater Snake Pit, Manholes 1 – 3, Tanks T-144 and T-145, and R&D Laboratory will be counted towards the 60 lb/yr emission cap for Other Emission Sources.

This document provides a summary of the modeling conducted to approximate air quality concentrations from the above listed EO sources.

Physical Configuration

The physical and operational configuration of the stack are provided in Table 1. The modeling assessment considers two alternative stack heights: a 64-foot stack and a 113.3-foot stack. A 113.3-foot stack has been considered for the purpose of reducing concentration enhancement caused by downwash from nearby structures. The structures, facility fence line, and emission sources that are included in the model are shown in Figure 1.

Table 1. Scrubber Stack Parameters

Parameter	64' Stack	113.3' Stack
Emission Rate	50 lb/yr	50 lb/yr
Release Height	64 ft	113.3 ft
Stack Diameter	0.998 ft	0.998 ft
Exit Temperature	70 °F	70 °F
Exit Velocity	23.82 ft/s	23.82 ft/s

Stack Location (UTM 16N; NAD83): 425956.32 m E, 4692840.63 m N

Product transfer and piping loss emissions were approximated using data from the Leak Detection and Repair (LDAR) program. Product transfer activities occur on the south side of the facility and are modeled as three distinct area sources that capture three aspects of loading operations: railcar unloading, storage tank, and piping. On the north side of the facility two area sources are modeled to characterize emissions from the reactor room – an unsealed structure comprised of reactor equipment and piping. The above-described product transfer and piping loss emissions are permitted in Construction Permit No. 19100015 with an emission cap of 60 lb/yr.

As part of the proposed process updates, the Gurnee Facility is proposing to route emissions from certain existing emission points and two wastewater handling units to the R37 Scrubber and Dry Bed System. To accomplish this change, additional piping will be needed, which is modeled as an area source to characterize emissions from the additional equipment components (pumps, valves, flanges, etc., referred to here as “Additional North Fugitive Components”).

Vantage is proposing to install a new air stripper column (V-36B) to treat multiple process water and wastewater streams. The stripped liquid from V-36B will be routed to the existing “Snake Pit,” which is mostly enclosed containment for wastewater and is an insignificant activity. From the Snake Pit, the wastewater will be further routed into an existing insignificant activity tank T-145 and through sewer systems covered by manholes (Manholes 1, 2, and 3). Additionally, an existing, currently idled, insignificant activity wastewater tank T-144 will be restored to service for occasional use if the wastewater at the plant is off-specification with respect to phosphorous concentration and/or phenol concentration. Under the proposed new configuration, Vantage would be able to isolate in T-145 any off-spec water that has been generated until this water could be managed on-site or shipped off as waste. When T-145 is holding off-spec wastewater, on-spec wastewater that the Gurnee Facility continues to generate would be routed into T-144, and then to the manholes and to the North Shore Water Reclamation District (NSWRD).

The Snake Pit and three manholes are also modeled as area sources.

Area sources were identified as the most appropriate source-type for the above-described sources. The emissions would be poorly characterized by a point source because the emissions are diffuse, have no plume rise, or exit velocity – characteristics typical of a stack. Volume sources were not selected because they are commonly used to characterize the emissions from roads, roof vents, or storage piles and because the algorithms exclude calculation of concentrations at near-source receptors. The coordinates and dimensions of the area sources are provided in Table 2a.

Tanks T-144 and T-145 are modeled as point sources.

Additionally, the R&D Laboratory at the Gurnee Facility may emit up to 0.2 lb/year of EO in the process of testing production technologies in bench-scale equipment found within the laboratory. The exhaust from the laboratory through a vent to the atmosphere is modeled as a point source.

The coordinates of the point sources T-144, T-145, and R&D Laboratory are provided in Table 2b.

Table 2a. Other Emission Sources - Area Sources Coordinates

Other Emission Sources	Source Coordinates UTM 16N		Length	Width
	Easting (m)	Northing (m)	X (m)	Y (m)
<i>Area Sources</i>				
Unload 1	425955.7	4692552.3	9.6	9.6
Unload 2	425971.7	4692559.0	9.6	9.6
Unload 3	425971.5	4692574.7	9.6	9.6
React 1	425941.9	4692834.6	18.9	14.2
React 2	425960.6	4692826.0	11.8	6.3
Additional North Fugitive Components	425953.1	4692825.0	11.8	8.8
Wastewater Snake Pit	425976.1	4692743.6	16.0	10.9
Manhole 1	425879.1	4692649.7	0.65	0.65
Manhole 2	425879.4	4692655.4	0.65	0.65
Manhole 3	425880.0	4692737.2	0.65	0.65

Table 2b. Other Emission Sources - Point Sources Coordinates

Other Emission Sources	Source Coordinates UTM 16N		Length	Width
	Easting (m)	Northing (m)	X (m)	Y (m)
<i>Point Sources</i>				
Wastewater Tank T-144	425923.7	4692638.5	see Table 3	
Wastewater Tank T-145	425923.9	4692623.3	see Table 3	
R&D Laboratory	425802.3	4692694.6	see Table 3	

Coordinates correspond to zone 16N UTM projection with a NAD83 datum

Length and Width represent maximum lateral dimensions of area sources

Tanks 144 and 145 and R&D Laboratory are parameterized and modeled as point sources, see Table 3

Vantage has been subject to LDAR requirements under state regulations (35 IAC Part 218, Subpart Q), federal regulations (40 CFE Part 60, Subpart VVa), and voluntary permit requirements (per 40 CFR Part 63, Subpart H). EO emissions were initially allocated between the permitted northern and southern

sources based on emission estimates derived from the LDAR program with an emission cap of 60 lbs/yr. Those newly identified sources are counted towards the 60 lb/yr emission cap. Vantage is not proposing to increase the emission cap set in Construction Permit No. 19100015.

The characteristics of the above listed area sources and point sources, as modeled, are provided in Table 3. The release heights of the unloading area sources were determined based on the height of pipe racks where the loading occurs. The reactor area release heights are based on the heights where emissions are expected to escape the structure.

The release heights of Additional North Fugitive Components and Wastewater Snake Pit are estimated based on the heights where emissions are expected to escape their structures, respectively. The release height of the three manholes is estimated to be "0" (ground level).

The release heights of the point sources, T-144, T-145, and R&D Laboratory, are based on the heights of their exhaust vents above ground.

Table 3. Other Emission Sources Parameters

Other Emission Sources		Emissions (lb/yr)	Source ID	Source Area (ft ²)	Release Height (ft)	Sigma Z (ft)	Structure Height (ft)
<i>Area Sources</i>							
Unloading Area		31,284	LOADA1	993.5	12	0.7	3
			LOADA2	994.1	12	0.7	3
			LOADA3	993.5	12	0.7	3
Reactor Room		25,596	RRFA1	2,994.3	15.4	14.3	30.7
			RRFA2	810.0	16.2	15.1	32.5
Additional Fugitive Components North		1,500	FUG_COMP	780.6	17.7	16.5	35.4
Wastewater Snake Pit		0.010	SNAKE_PIT	1,752.0	14.0	13.0	18.5/28
Manhole 1		0.0033	MHOLE1	4.6	0	0	n/a
Manhole 2		0.0033	MHOLE2	4.6	0	0	n/a
Manhole 3		0.0033	MHOLE3	4.6	0	0	n/a
Other Emission Sources		Emissions (lb/yr)	Source ID	Release Height (ft)	Stack Diameter (ft)	Exit Temperature (F)	Exit Velocity (ft/s)
<i>Point Sources</i>							
Wastewater Tank 144		1,400	VT144	41	0.5	80	0.033
Wastewater Tank 145			VT145	41	0.5	80	0.033
R&D Laboratory		0.200	RD_VENT	20.1	0.0417	104	0.0072
Total Emissions		60,000					

Dispersion Model Setup

The AERMOD modeling system is the preferred near-field dispersion model recommended by the Environmental Protection Agency's (EPA) Guideline on Air Quality Models (codified as Appendix W to 40 CFR Part 51; "Appendix W" hereafter) for complex source configurations, sources subject to building downwash, and situations where there is the potential for exhaust plumes to interact with complex terrain. The most recent version of AERMOD (version 23132) was used to model EO from the Vantage facility. Calculated concentrations are dependent on local meteorological data, regional upper air data, source-to-building configuration, and the physical characteristics of the land surrounding the facility.

The Building Profile Input Program (BPIPPRM, version 04274) was used to incorporate building structures into the dispersion model. Buildings are included in the model to assess whether building downwash will cause an increase in downwind concentrations. Vantage's design drawings were reviewed to determine the building specifications and were incorporated into the model via BPIPPRM.



Figure 1. Modeled Structures, Emission Sources, and Facility Fence Line

Meteorology

Meteorological data for calendar years 2019 through 2023 were provided by the Illinois EPA and were prepared to adhere to the requirements of Appendix W using AERMET (version 23132). Surface meteorological conditions were taken from the Waukegan National Airport (WBAN 14880) and regional upper air data were taken from the Davenport Municipal Airport in Iowa (WBAN 94982). The physical land use parameters that affect dispersion were characterized by processing 2021 National Land Cover Dataset (NLCD) data with the AERSURFACE preprocessor (version 20060). The data were processed in

accordance with the United States Environmental Protection Agency's Region V and States Meteorological Data Processing Protocol (May 2018).

Urban Option Evaluation

NLCD data were also used to determine whether AERMOD's urban option should be used. The urban option is designed to characterize urban heat island effects, primarily those driven by increased temperature and the influence on atmospheric stability in urban settings. A method to determine whether a region should be considered urban was identified by August Auer in 1978.¹ This methodology was updated and related to 2011 NLCD data to provide an approach for determining whether a region should be considered "urban", or not, for dispersion modeling.² The method requires analyzing land cover data within 3 kilometers of a facility and determining whether the predominant land class is high and medium density developed land. If so, the urban option is selected and modeling is performed using urban dispersion coefficients.

As shown in Figure 2, the land use in the vicinity of Vantage facility is determined to be predominantly rural with urban land use (categories 23 and 24) representing 32% of the total area. Modeling is therefore conducted using rural dispersion coefficients.

¹ Auer, August H., "Correlation of Land Use and Cover with Meteorological Anomalies", American Meteorological Society, 1978. <https://journals.ametsoc.org/doi/pdf/10.1175/1520-0450%281978%29017<0636%3ACOLUAC>2.0.CO%3B2>

² "Use of USGS Land Cover Data as an Alternative to the Auer Land Use Analysis for Air Dispersion Modeling", December 2014. <http://arapenv.com/doc/auer-usgs-land-use-23dec2014.pdf>

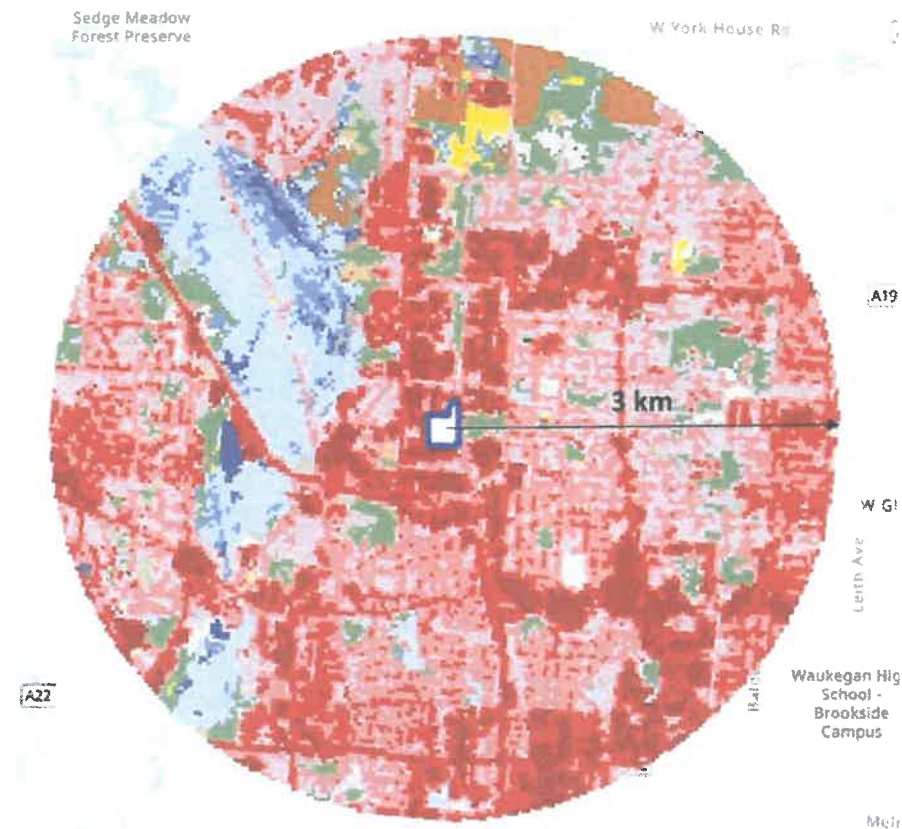
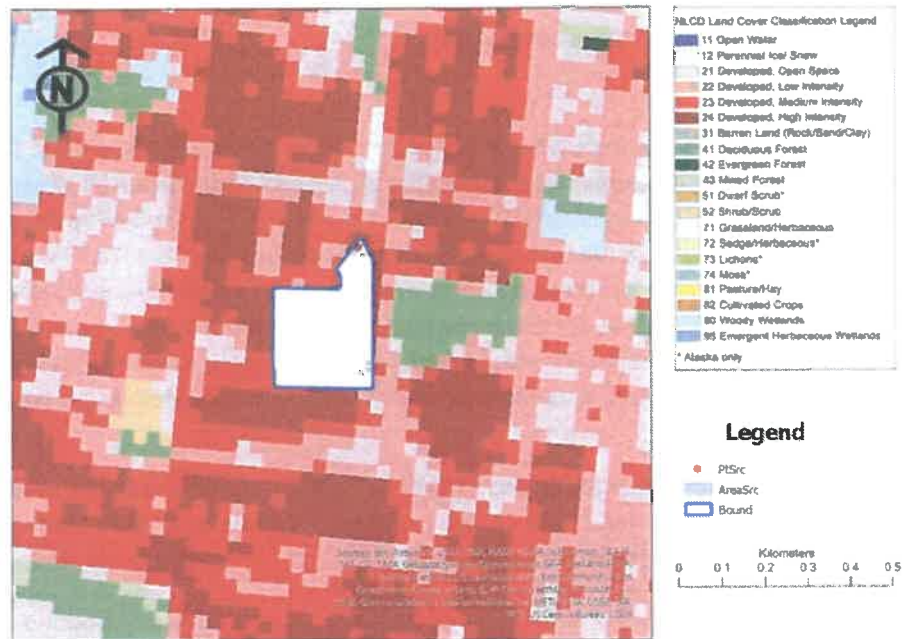


Figure 2. 2021 NLCD High and Medium Density Developed Land (red) and A 3-kilometer Buffer Around Vantage

Receptors

The dispersion modeling system estimates concentrations at each receptor location provided to the model. The receptors for modeling the Vantage facility were developed based on the specifications provided in Illinois Public Act 101-0023 (SB 1854). The rule requires a 50-meter grid spacing from the non-negligible EO sources out to 500-meters, 100-meter grid spacing out to 1-kilometer and must include the area of maximum impact. Receptors were modeled within the facility fence line to adhere to the rule text requiring assessment of concentrations from non-negligible EO sources. In addition to these requirements, receptors were also placed around the facility boundary at 10-meter spacing. Receptor elevations were obtained using the AERMAP (version 18081) preprocessor program and 1-arc-second elevation data from the United States Geologic Survey's 3D Elevation Program.³

Modeled Concentrations

The AERMOD modeling system was used to estimate the 5-year average concentrations at each receptor. Given the varied land uses in the region, the model results are reported with a distinction between residential and non-residential concentrations. Zoning data were taken from the Lake County, Illinois Open Data and Record Hub's Tax Parcel data set and used to determine whether each receptor should be classified as residential or non-residential.⁴ Receptors in regions that are not clearly defined (e.g., roadways) and that are near residential areas were generally identified as residential. The model-estimated maximum 5-year average concentrations for the 64-foot and 113.3-foot stacks are shown in Table 4 and Table 5, respectively.

³ USGS 3D Elevation Program, 1-arc-second data: <https://www.usgs.gov/core-science-systems/ngp/3dep/about-3dep-products-services>

⁴ Lake County Illinois Open Data and Record Hub, Tax Parcel Boundaries and Associated Data, <http://data-lakecountyil.opendata.arcgis.com/datasets/tax-parcels?geometry=-87.915%2C42.375%2C-87.878%2C42.386>

Table 4. Modeled Maximum 5-year Average EO Concentrations for A 64-foot Stack

Source	Land Use	Location of Maximum		Maximum Predicted 5-year Average Concentration ($\mu\text{g}/\text{m}^3$)
		Easting (m)	Northing (m)	
64' Stack	Residential	426402.06	4693102.06	0.00198
	Industrial	425989.41	4692760.83	0.02054
Other emission sources with T-144 *	Residential	426327.44	4692614.54	0.01177
	Industrial	425980.44	4692828.57	0.23247
Other emission sources with T-144 & T-145 *	Residential	426327.44	4692614.54	0.01177
	Industrial	425980.44	4692828.57	0.23247
Other emission sources with T-145 *	Residential	426327.44	4692614.54	0.01177
	Industrial	425980.44	4692828.57	0.23246
All emission sources with T-144 *	Residential	426327.44	4692614.54	0.01343
	Industrial	425980.44	4692828.57	0.23353
All emission sources with T-144 & T-145 *	Residential	426327.44	4692614.54	0.01343
	Industrial	425980.44	4692828.57	0.23352
All emission sources with T-145 *	Residential	426327.44	4692614.54	0.01343
	Industrial	425980.44	4692828.57	0.23351

* The estimated EO emissions from the two wastewater tanks T-144 and T-145 (1.4 lb/yr combined) can be emitted from either tank or both. The modeling was conducted for three tank emission scenarios:

1. 1.4 lb/yr tank emissions coming from T-144 only,
2. 1.4 lb/yr tank emissions coming from T-145 only, and
3. 0.7 lb/yr tank emissions coming from T-144 and 0.7 lb/yr tank emissions coming from T-145.

Table 5. Modeled Maximum 5-year Average EO Concentrations for A 113.3-foot Stack

Source	Land Use	Location of Maximum		Maximum Predicted 5-year Average Concentration (µg/m ³)
		Easting (m)	Northing (m)	
113.3' Stack	Residential	426327.44	4692614.54	0.00048
	Industrial	426137.82	4692626.42	0.00120
Other emission sources with T-144 *	Residential	426327.44	4692614.54	0.01177
	Industrial	425980.44	4692828.57	0.23247
Other emission sources with T-144 & T-145 *	Residential	426327.44	4692614.54	0.01177
	Industrial	425980.44	4692828.57	0.23247
Other emission sources with T-145 *	Residential	426327.44	4692614.54	0.01177
	Industrial	425980.44	4692828.57	0.23246
All emission sources with T-144 *	Residential	426327.44	4692614.54	0.01225
	Industrial	425980.44	4692828.57	0.23250
All emission sources with T-144 & T-145 *	Residential	426327.44	4692614.54	0.01225
	Industrial	425980.44	4692828.57	0.23249
All emission sources with T-145 *	Residential	426327.44	4692614.54	0.01226
	Industrial	425980.44	4692828.57	0.23249

* The estimated EO emissions from the two wastewater tanks T-144 and T-145 (1.4 lb/yr combined) can be emitted from either tank or both. The modeling was conducted for three tank emission scenarios:

1. 1.4 lb/yr tank emissions coming from T-144 only,
2. 1.4 lb/yr tank emissions coming from T-145 only, and
3. 0.7 lb/yr tank emissions coming from T-144 and 0.7 lb/yr tank emissions coming from T-145.