TRIBAR
TECHNOLOGIES INC.

February 29, 2024 *Sent electronically only*

Mr. Mark Dziadosz
EGLE, Air Quality Division
Warren District Office
27700 Donald Court
Warren, MI 48092
DziadoszM@michigan.gov

Re: Tribar Technologies Plant 3 – Response to Violation Notice Dated February 8, 2024

Dear Mr. Dziadosz:

Tribar Technologies Inc. (Tribar) has prepared this letter with assistance from Barr Engineering Co. to timely address the issues outlined in the Air Quality Division's Violation Notice for Plant 3 dated February 8, 2024. The Violation Notice alleged the following:

Process Description	Rule/Permit Condition Violated	Comments
FG-COATINGLINE	R 336.1910 (Rule 910); SC 1.7- The permittee shall not operate any portion of EU-COATINGLINE unless the zeolite concentrator and catalytic oxidizer are both installed, maintained, and operated in a satisfactory manner.	Temperature differential of the catalyst inlet and outlet indicate an issue with the control device beginning in February 2023 (differential less than 20°F and at times negative). During the initial performance test, the temperature differential was approximately 75°F. During routine operation, the catalyst bed outlet temperature should be 50°F to 200°F higher than the catalyst inlet temperature because the oxidation reactions are exothermic.

As discussed during several calls with you in January and on February 22, 2024, the only temperature monitoring requirement in Permit to Install ("PTI") 243-02 is to demonstrate the destruction performance of the catalyst oxidizer is the catalyst inlet bed temperature as cited in special condition ("SC") 1.7 of FG-COATINGLINE. As stated in PTI 243-02 SC 1.7 ***[emphasis added]***:

> *The permittee shall not operate any portion of EU-COATINGLINE unless the zeolite concentrator and the catalytic oxidizer are both installed, maintained and operated in a satisfactory manner. Satisfactory operation of the zeolite concentrator and the catalytic oxidizer includes a minimum overall VOC control efficiency (combined adsorption and destruction efficiency) of 90.25 percent (by weight),* ***a minimum***

> ***catalyst bed inlet temperature of 550°F or the temperature documented during the most recent acceptable compliance test (whichever is greater)**, and a maximum space velocity in the catalytic oxidizer of 40,125 inverse hours.*

According to the stack testing, performed on June 16, 2004 and the results provided in the July 20, 2004 test report, the minimum temperature to demonstrate satisfactory operation is 684°F.

The catalyst oxidizer operates by oxidizing the volatile organic compounds ("VOC") of the exhaust stream which would generally cause an increase in temperature during steady production rates, especially at higher production rates. However, normal operation may typically not involve steady or maximum production rates. Therefore, Tribar maintains that the differential temperature is not an effective performance indicator of the catalytic oxidizer operation and is, in fact, a poor indicator due to a number of variables as listed below. Instead, the minimum temperature (as documented during testing) provides the most direct measure of effective emissions control (i.e., as noted in S.C. 1.7).

As we have discussed, the catalyst bed temperature will vary during normal operation due to fluctuating production rates and VOC concentrations of the coatings applied, which results in inconsistent VOC loading to the catalytic oxidizer. The inconsistent VOC loading to the catalytic oxidizer results in varying outlet catalyst bed temperatures, thereby affecting the differential temperature regardless of the minimum temperature.

As explained in Tribar's preventive maintenance plan, the stack test was completed during the middle of a production shift after the system had achieved "steady state" at maximum production rate. This steady state was achieved and maintained during the performance test as required by the testing protocol. The maximum production steady state rate was achieved after 1-2 hours when consistent and constant coating application resulting in the consistent loading of VOCs vented to the oxidizer. This is often not the case in normal operations. Therefore, the temperature differential is an inadequate performance indicator during normal operations because the temperature differential is based on the varying VOC load to the oxidizer, which can oscillate significantly over the course of a production shift depending on the inherent changes of the production rate, coating use, and VOC concentration of the coatings applied.

This inherent variation of the temperature differential is recognized in various places. For example, this point is recognized in the article by Products Finishing (Catalytic Oxidizers and Title V Requirements), which is dated February 1, 2000.[1] An excerpt of that article states:

> *In many cases, it has been assumed that an ideal indicator of compliance for a catalytic oxidizer is the temperature increase across the catalyst bed (DT), which does provide an indication of the heat release from the VOCs converted in the process. Unfortunately, this is an ideal indicator only for those applications where the VOC concentration is consistent. Many applications have varying VOC loading as process operational parameters vary. This situation becomes further complex when more than one process is controlled by a single emission control system. Here the potential for variation in DT is even greater and using such an indicator would prove to be misleading for anyone using DT for compliance purposes.*

[1] https://www.pfonline.com/articles/catalytic-oxidizers-and-title-v-requirements

This situation has been addressed by EPA in its Compliance Assurance Monitoring rule where it states that "other information such as historical monitoring data and engineering assessments can be used in combination with parameter data collected during performance testing to establish indicator ranges that are representative of normal operating conditions. As long as changes are not made to the control device settings used during normal operation (e.g., changes to oxidizer temperature set points), the results of performance tests can be used in combination with historical monitored data collected during periods of normal operation and engineering assessments to establish indicator ranges indicative of normal operation."

The compliance assurance monitoring guidance document referenced in the article states, in Append B, B.7.2 (**emphasis** added):

Temperature rise across catalyst bed. The temperature rise across the catalyst bed provides an indication of the degree of combustion that is occurring in the unit. The greater the level of combustion, the greater the rise in temperature. Because the temperature rise is dependent on the degree of combustion occurring across the catalyst, the temperature rise is dependent upon the inlet VOC loading to the catalyst. In other words, if the VOC loading to the oxidizer is reduced, the temperature rise across the catalyst will decrease. Consequently, ***a decrease in temperature rise across the catalyst is not necessarily an indication of reduced performance****, but may simply be an indication of reduced VOC loading to the oxidizer.*

In addition, while Plant 3 is not a major source of hazardous air pollutants ("HAPs"), and is therefore not subject to 40 CFR Part 63 Subpart PPPPP ("MACT PPPP"), Tribar reviewed the supporting add-on control device requirements in that NESHAP, see §63.4567. While the subpart requires monitoring and recording of the inlet and outlet temperatures during stack testing, there is no requirement to monitor the differential temperature as a performance indicator during operation.

Thus, despite some older communications by prior Tribar staff that cited temperature differential in addition to temperature, the temperature differential provides an indirect indicator rather than a direct indicator of proper performance by the catalytic oxidizer. Combined with the language in the PTI, Tribar will continue monitoring and recording the oxidizer inlet temperature according to PTI 243-02 to document proper control.

As always, please advise if you have questions or concerns with Tribar's response.

Sincerely,

Alexandria Muench, Tribar Technologies Inc. EHS Manager

c: Jon Gifford, Tribar
Joyce Zhu, EGLE
Scott Venman, Barr Engineering Co.
Kurt Kissling, Warner Norcross + Judd