CITY OF PHILADELPHIA
Department of Public Health
Public Health Services
Air Management Services

MEMO

TO Kassahun Sellassie, Program Director

FROM Ashraf Ahmed, Environmental Engineer A.A.

THRU Maryjoy Ulatowski, Chief of Source Registration M.U.

DATE November 3, 2023

RE AdvanSix Resins and Chemicals LLC (AdvanSix)
Title V Operating Permit No. OP16-000032
Philadelphia, Philadelphia County

Procedural History

As part of the RACT regulations codified at 25 Pa. Code §§ 129.111—129.115 (relating to additional RACT requirements for major sources of NO_x and VOCs for the 2015 ozone NAAQS) (RACT III), PA DEP has established a method under § 129.114(i) (relating to alternative RACT proposal and petition for alternative compliance schedule) for an applicant to demonstrate that the alternative RACT compliance requirements incorporated under § 129.99 (relating to alternative RACT proposal and petition for alternative compliance schedule) (RACT II) that are currently in force in the applicable operating permit continue to be RACT under RACT III.

The procedures to demonstrate that RACT II equals RACT III are specified in § 129.114(i)(1)(i), 129.114(i)(1)(ii) and 129.114(i)(2), that is, subsection (i), paragraphs (1) and (2). An applicant may submit an analysis, certified by the responsible official, that the RACT II permit requirements remain RACT for RACT III by following the procedures established under subsection (i), paragraphs (1) and (2). Paragraph (1) establishes cost-effectiveness thresholds of $7,500 per ton of NO_x emissions reduced and $12,000 per ton of VOC emissions reduced as ‘‘screening level values’’ to determine the amount of analysis and due diligence that the applicant shall perform if there is no new pollutant specific air cleaning device, air pollution control technology or technique available at the time of submittal of the analysis. Paragraph (1) has two subparagraphs.

Subparagraph (i) under paragraph (1) specifies that the applicant that evaluates and determines that there is no new pollutant specific air cleaning device, air pollution control technology or technique available at the time of submittal of the analysis and that each technically feasible air cleaning device, air pollution control technology or technique evaluated for the alternative RACT requirement or RACT emission limitation approved by the Department (or appropriate approved local air pollution control

agency) under § 129.99(e) had a cost effectiveness equal to or greater than $7,500 per ton of NO_x emissions reduced or $12,000 per ton of VOC emissions reduced shall include the following information in the analysis:

- A statement that explains how the owner or operator determined that there is no new pollutant specific air cleaning device, air pollution control technology or technique available.
- A list of the technically feasible air cleaning devices, air pollution control technologies or techniques previously evaluated under RACT II.
- A summary of the economic feasibility analysis performed for each technically feasible air cleaning device, air pollution control technology or technique in the previous bullet and the cost effectiveness of each technically feasible air cleaning device, air pollution control technology or technique as submitted previously under RACT II.
- A statement that an evaluation of each economic feasibility analysis summarized in the previous bullet demonstrates that the cost effectiveness remains equal to or greater than $7,500 per ton of NOx emissions reduced or $12,000 per ton of VOC emissions reduced.

Subparagraph (ii) under paragraph (1) specifies that the applicant that evaluates and determines that there is no new pollutant specific air cleaning device, air pollution control technology or technique available at the time of submittal of the analysis and that each technically feasible air cleaning device, air pollution control technology or technique evaluated for the alternative RACT requirement or RACT emission limitation approved by the Department (or appropriate approved local air pollution control agency) under § 129.99(e) had a cost effectiveness less than $7,500 per ton of NO_x emissions reduced or $12,000 per ton of VOC emissions reduced shall include the following information in the analysis:

- A statement that explains how the owner or operator determined that there is no new pollutant specific air cleaning device, air pollution control technology or technique available.
- A list of the technically feasible air cleaning devices, air pollution control technologies or techniques previously evaluated under RACT II.
- A summary of the economic feasibility analysis performed for each technically feasible air cleaning device, air pollution control technology or technique in the previous bullet and the cost effectiveness of each technically feasible air cleaning device, air pollution control technology or technique as submitted previously under RACT II.
- A statement that an evaluation of each economic feasibility analysis summarized in the previous bullet demonstrates that the cost effectiveness remains less than $7,500 per ton of NO_x emissions reduced or $12,000 per ton of VOC emissions reduced.
- A new economic feasibility analysis for each technically feasible air cleaning device, air pollution control technology or technique.

Paragraph (2) establishes the procedures that the applicant that evaluates and determines that there is a new or upgraded pollutant specific air cleaning device, air pollution control technology or technique available at the time of submittal of the analysis shall follow.

- Perform a technical feasibility analysis and an economic feasibility analysis in accordance with § 129.92(b) (relating to RACT proposal requirements).
- Submit that analysis to the Department (or appropriate approved local air pollution control agency) for review and approval.

The applicant shall also provide additional information requested by the Department (or appropriate approved local air pollution control agency) that may be necessary for the evaluation of the analysis submitted under § 129.114(i).

Facility Information

AdvanSix Resins and Chemicals LLC (formerly Honeywell International) – Frankford Plant owns and operates a chemical manufacturing facility located at 2501 Margaret Street, Philadelphia, PA 19137-1193. The Plant manufactures chemical intermediates including phenol, acetone, and alpha-methylstyrene. AdvanSix is operated in accordance with Title V Operating Permit No. V95-047 issued by the City of Philadelphia, Air Management Services (AMS) on April 17, 2003 and amended under OP16-000032 on October 26, 2016.

Phenol Tank Car Loading (PTC 1) is being evaluated under 25 Pa Code § 129.114(i)(1)(i). AdvanSix submitted the RACT II equals RACT III proposal on December 30, 2022, as part of their RACT III notification. The facility is a major source for both NOx and VOC.

The most recent full compliance evaluation for the facility was on August 17, 2021. Catalytic Oxidizer CR-601, which controls emissions for numerous units at the facility, did not pass an August 12, 2021 stack test to determine compliance with a VOC destruction efficiency limit. After the facility investigated and made repairs to the unit, CR-601 passed a stack test on April 27, 2022.

RACT III Analysis for NO_X and VOC applicability

AdvanSix is a major source of NO_X due to having potential NOx emissions greater than 100 tons per year, which is the major source threshold in Philadelphia County that is applicable to NOx RACT for the 2015 ozone NAAQS. This facility is also a major source of VOC having potential VOC emissions greater than 50 tons per year, which is the major source threshold in Philadelphia County that is applicable to VOC RACT for the 2015 ozone NAAQS.

There are no changes to emission factors and calculations used to determine NO_X and VOC emissions from the sources at the facility that would have an impact on the NO_X and VOC PTE for the facility.

Source ID	Source Name	New source or change to existing source?	NO_x (tpy)	VOC (tpy)
PTC 1	Phenol Tank Car Loading	No	0	7.93
TOTAL FACILITY PTE			>100	>50

Summary of RACT requirements for each source

The following conditions were 2008 VOC RACT for Phenol Tank Car Loading:

- Phenol Tank Car Loading shall be operated with good operating practices. During the loading process, if any issues occur, including spills, which could potentially cause excess VOC emissions, the process shall be stopped immediately by hitting the emergency stop mechanism. VOC emissions from Phenol Tank Car Loading shall not exceed 7.93 tons per rolling 12-month period.

RACT II conditions were approved under AMS Plan Approval No. IP16-000276 effective March 5, 2020. EPA approved the RACT II requirements in Federal Register §52.2064(f)(1). RACT II continues to be RACT for RACT III and therefore these requirements are not changing.

RACT II as RACT III

- In the RACT II analysis that was approved by AMS on March 5, 2020, AdvanSix evaluated known and available air cleaning devices, air pollution control technologies, and techniques, as well as the technical and economic analysis of available control technologies. Phenol Tank Car Loading (PTC 1) does not fit under any presumptive or CTG VOC RACT categories. In the RACT II analysis, AdvanSix proposed an alternative VOC RACT under 25 Pa Code §129.99(d). This includes a technical and economic analysis of available VOC control technologies. The following VOC control technologies are potentially available for PTC 1:
    - Good Operating Practices
    - Vapor Recovery/Absorption (Scrubber)
    - Carbon Adsorption
    - Thermal Oxidation
- From these VOC control technologies, only Good Operating Practices was determined to be technically and economically feasible. All other technologies including Vapor Recovery / Absorption (Scrubber), Carbon Adsorption, and Thermal Oxidation were considered technically feasible for other types of loading operations, but there are technical challenges with each of these technologies due to certain operating requirements for phenol tank car loading operations. Although Vapor Recovery/Absorption (Scrubber), Carbon Adsorption, and Thermal Oxidation VOC control technologies were technically infeasible for phenol tank car loading operations, AdvanSix evaluated these technologies for cost effectiveness. A summary of this evaluation can be found in the table below. AMS has reviewed and accepted the calculations in the table.
- After the approval of the RACT II analysis by AMS, there hasn't been any new technologies that can be evaluated for technical and economic feasibility. Searches of the RACT/BACT/LAER Clearinghouse by AdvanSix and AMS did not locate any new control options. AMS believes the analysis is sufficient.
- The cost of control for RACT II is summarized in the table below.
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Source ID	Source Name	Control	NOx ($/Ton)	VOC ($/Ton)
PTC 1	Phenol Tank Car Loading	Vapor Recovery/ Absorption	N/A	$25,518
PTC 1	Phenol Tank Car Loading	Carbon Adsorption	N/A	$22,730
PTC 1	Phenol Tank Car Loading	Thermal Oxidation	N/A	$36,919

- The cost analysis for each control technology was based on guidance included in U.S. EPA's OAQPS Control Cost Manual, 6th Edition (January 2002). All the control technologies in the table were considered economically unreasonable in the RACT II analysis since the cost of installation and operation is greater than the cost-effectiveness threshold of $12,000 per ton of VOC emissions reduced for each VOC control technology. AMS proposed good operating practices as RACT in the approved RACT II permit. Good operating practices includes operators utilizing an emergency stop mechanism if they observe any issues that could lead to excess VOC emissions, including spills. AMS also proposed the 7.93 TPY VOC baseline used in the cost effectiveness calculations as RACT. This baseline is higher than what AMS believed were the potential emissions during the 1997 8-hour RACT evaluation.
- AMS has reviewed source information, control technologies or measures evaluated by AdvanSix, and cost analysis performed by AdvanSix. AMS also performed an independent analysis which included, AMS's continuous review of permit applications since the applicability date of RACT II, internet searches, BACT/RACT/LAER Clearinghouse search, knowledge gained from the AMS permitting staff participating in technical presentations by several vendors and manufacturers of pollution control technology, and a review of EPA and MARAMA's documents. Based on our review of these documents, along with training and the expertise of the reviewing staff, AMS concludes that there are no new or updated air pollution control technologies available for the sources found at AdvanSix and determines that RACT II requirements for source ID PTC 1 at AdvanSix listed in the table assure compliance with requirement for RACT III for the § 129.111 - § 129.115.
- Since there hasn't been any new technologies that can be evaluated for technical and economic feasibility, the provisions of § 129.114(i)(2) are not used.

Comparison between RACT II and RACT III requirements

- Because RACT II requirements are being certified as continuing to be RACT, RACT III requirements are identical to RACT II and therefore are as stringent as RACT II.

Public discussion

- There were no discussions (not public comment periods) with the EPA, the company, or the public beyond the initial application, which materially impacted the Department's decision to include one or more sources under the RACT II is RACT III umbrella.