UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

February 3, 2022

Travis Dalton, Manager,
Environmental Health and Safety
Toray Composite Materials America, Inc.
2202 Moore-Duncan Highway
Moore, South Carolina 29369

Dear Mr. Dalton:

On September 13, 2021, the South Carolina Department of Health and Environmental Control (SCDHEC) received Toray Composite Materials America's (Toray) Title 40, Code of Federal Regulations, Part 63, Subpart LLLLLL, National Emission Standards for Hazardous Air Pollutants (NESHAP) for Acrylic and Modacrylic Fibers Production Area Sources, alternative monitoring procedures (AMPs) requests (Requests: 1, 2, and 3). On October 5, 2021, the SCDHEC initiated consultation with the U.S. Environmental Protection Agency to confirm the delegated authority responsible for reviewing and responding to the requests. Due to the nature of the requests, it is necessary for the EPA to respond to Toray. On October 7, 2021, the EPA received your requests from the SCDHEC.

The EPA requested additional information from you on October 20, 2021, October 25, 2021, November 4, 2021, November 8, 2021, November 9, 2021, November 16, 2021, and December 15, 2021, and received information on October 22, 2021, October 29, 2021, November 8, 2021, November 10, 2021, November 12, 2021, November 19, 2021, and December 15, 2021. On November 19, 2021, you withdrew Request 3. In Request 3, Toray proposed a monitoring plan for equipment controlling emissions of storage vessels, but under §63.985, the storage vessel control device monitoring plan is required to be submitted with the notification of compliance status. As a result, your request is for two specific alternative monitoring procedures, and these proposals are summarized along with our determination in the remainder of this letter.

Overview of Toray Processes

The polyacrylonitrile (PAN) fiber manufacturing process at Toray consists of three processes: (1) polymerization; (2) spinning; and (3) recovery. PAN fiber is produced in Toray's reactors by solution polymerization of acrylonitrile (AN) monomer in the presence of the solvent dimethyl sulfoxide (DMSO). After the production of PAN is achieved, the majority of DMSO and AN are removed from the resultant solution by processing the post reaction solution through a distillation process, which renders the PAN into a spin-dope. The PAN spin-dope is sent to the fiber spinning process where the spin-dope is spun into PAN fibers. During the fiber spinning process, deionized water is used to wash residual DMSO and AN from the spun fiber, and clean PAN fiber exits the washing station. The flow of deionized water provided to the wash station is proportionally controlled by the mass of PAN sent to the

spinning process. The liquid solution resulting from the washing operation is characterized as the solvent-recovery-system (SRS) water. In the recovery operations, DMSO is recovered from the polymerization and spinning processes solutions for reuse within the manufacturing process.

Request 1 – AMP for AP-1-1 – Polymerization Scrubber

Vapor evolving from the AN polymerization reactor(s) is captured by a closed process vent system and routed to the polymerization reactors' scrubber. The influent liquid (scrubbant) to the scrubber is proposed as a raw material solution of DMSO (99.3 weight percent (Wt%) + purity) with the balance being deionized water (DIW). DMSO is received on site as a raw material and stored at ambient storage temperature. DMSO is also recovered by the solvent recovery process and recycled to the DMSO storage tank. DMSO exhibits a boiling point of 372 Fahrenheit (°F) and a specific gravity (SG of 1.10, and readily absorbs AN vapor. Scrubber liquid effluent (containing absorbed AN) is sent to the polymerization recovery tank where it is stored until it is processed through the SRS, which strips excess AN from the liquid and recovers DMSO for recyling to the polymerization reactors.

You propose to monitor the scrubbant flow rate and temperature in lieu of monitoring SG or organic concentration of the scrubbant. You assert this alternative is necessary because SG is not a good indicator of scrubber performance and an organic monitor would provide an indication of all organics in the scrubbant.

Request 2 – AMP for RS-1 – Solvent Recovery System AN Scrubbers (2 units)

Vapor evolving from the DMSO SRS is controlled by two scrubbers. Each scrubber utilizes a once-through flow of SRS water as scrubbant. In the solution polymerization process at Toray, AN is mixed with DMSO to form a solution. The solution is then heated, and an initiator is added to the solution to initiate the polymerization reactions. Once polymerization is completed, the majority of unreacted AN and excess DMSO is stripped from the resulting PAN polymer solution by distillation. The distilled PAN polymer (spin-dope) is sent to the fiber-spinning process.

During the PAN spin-dope spinning process, the spun PAN fiber is washed with 100% DIW to absorb excess DMSO within the fiber, which remains after the distillation operation. The flow of DIW to the fiber washing station is proportionally controlled relative to the mass flow of spin-dope sent to the fiber spinning process. The target DMSO concentration resulting from the wash is 30 Wt% (± 5 Wt%) DMSO in solution. Residual AN contained within the spun fiber is also absorbed in the wash and the maximum anticipated AN concentration in the water/DMSO/AN-monomer solution (SRS water) exiting the fiber wash station is proposed to be approximately 8 parts-per-million by weight (ppmw). The temperature of the SRS water is higher than room temperature, but non-contact cooling is provided to the scrubbant to decrease its temperature to approximately 77 °F. Toray proposes to use a portion of the SRS water as scrubbants for DMSO SRS AN scrubbers. The remaining portion of the SRS water is sent to the DMSO recovery process and the tank-farm AN scrubber(s). Non-contact cooling is also provided in the scrubber(s) bottom's recirculation loops to maintain operational temperatures in the scrubbers at approximately 77 °F.

You propose to monitor the scrubbant flow rate and temperature in lieu of monitoring SG or organic concentration of the scrubbant. You assert this alternative is necessary because SG is not a good indicator of scrubber performance and an organic monitor would provide an indication of all organics in the scrubbant.

EPA Review of Applicable Standards

Under §63.11393(b)(2), affected sources in Toray's operations are subject to new source requirements since construction commenced after April 4, 2007 (construction began in October 2015).

Under §63.11396(a), owners or operators of process vents, where the AN concentration of the vent stream is equal to or greater than 50 ppm by volume (ppmv) and the average flow rate is equal to or greater than 0.005 cubic meters per minute, as determined by the applicability and assessment procedures in §63.1104, must either: (1) reduce emissions of AN by 98 Wt%, or (2) limit the concentration of AN in the emissions to no more than 20 ppmv, whichever is less stringent, by: (1) venting emissions through a closed vent system to any combination of control devices meeting the requirements for process vents in §63.982(a)(2), or (2) reducing emissions of AN by using a flare that meets the requirements of §63.987.

Under §63.11396(b), owners or operators of each fiber spinning line that uses a spin dope produced from either a suspension polymerization process or solution polymerization process must either: (1) reduce the AN concentration of the spin dope to less than 100 ppmw; (2) design and operate a fiber spinning line enclosure according to the requirements in §63.1103(b)(4) and reduce AN emissions by 85 Wt% or more by venting emissions from the enclosure through a closed vent system to any combination of control devices meeting the requirements in §63.982(a)(2); or (3) reduce AN emissions from the spinning line to less than or equal to 0.5 pounds of AN per ton of acrylic and modacrylic fiber produced.

Under §63.11396(f), owners and operators of affected sources must comply with all testing, monitoring, recordkeeping, and reporting requirements in 40 CFR 63 Subpart SS for process vents. Under §63.990(c)(1), when an absorber is used as a control device for process vents, either an organic monitoring device capable of providing a continuous record, or a scrubbing liquid temperature monitoring device and a SG monitoring device, each capable of providing a continuous record, shall be used. If the difference between the SG of the saturated scrubbant and the SG of the fresh scrubbant is less than 0.02 SG units, an organic monitoring device capable of providing a continuous record shall be used.

Under §63.996(d)(2), an owner or operator may request approval to monitor a different parameter than those established in §63.990(c)(1). Under §63.996(c)(6), the owner or operator shall establish a range for monitored parameters that indicates proper operation of the control device. Under §63.996(b)(1) and §63.11399(b)(3), the EPA Administrator retains the authority to review and respond to requests involving major changes to monitoring under §63.8(f). Under §63.8(f)(4)(ii), the application must contain a description of the proposed alternative monitoring system which addresses the four elements contained in the definition of monitoring in §63.2: (i) Indicator(s) of performance, (ii) measurement techniques, (iii) monitoring frequency, and (iv) averaging time, and a performance evaluation test plan, if required, as specified in §63.8(e)(3). In addition, the application must include information justifying

the owner or operator's request for an alternative monitoring method, such as the technical or economic infeasibility, or the impracticality, of the affected source using the required method.

EPA's Determination

Toray's request for the AMPs was submitted under the provision of §63.996(d)(2) that allows an owner or operator to request approval for monitoring of a different parameter than those established in §63.990(c)(1). Based upon our review, the proposed AMPs are unacceptable to the EPA and are therefore denied. The reasons for our decision are provided below:

1. The AMP requests are based on the standards in effect for existing sources. New source standards demand more stringent monitoring requirements and differ significantly from the existing source standards. The requests do not provide adequate justification and supporting data to support the use of existing source monitoring standards at a new source.
2. Sufficient evidence of justification was not provided regarding the technical or economic infeasibility, or the impracticality of using either a SG monitoring device or an organic monitoring device.
3. The concentration of residual AN in the scrubbant is dependent on the operations and specifications of other processes not addressed, or included, in the request (e.g., post PAN polymerization reactions solution distillation).
4. Flow rate and temperature monitoring of the scrubbant(s) would not provide an adequate means to assess the concentration of AN in the scrubbant (scrubbant quality), which would affect the emissions from the scrubber.
5. Monitoring of flow rate would not provide information related to spikes of concentration in the scrubbant like SG monitors provide. In the absence of detailed information and data to demonstrate the AN concentration in the scrubbant, the EPA must assume that there could be circumstances for which the AN concentration in the scrubbant could produce noncompliance with the emission standards.
6. The scrubbant may potentially contain an AN concentration that may significantly inhibit the scrubber's efficiency for removing AN. Monitoring of flow rate would not provide information related to saturation condition of the scrubbant as would monitoring of SG or organics.

Please note, that in addition to meeting the applicable requirements of Subpart LLLLLL, Toray is required to meet all other applicable NESHAP requirements, including, but not limited to the following NESHAP General Provisions:

a. The requirement to maintain and operate affected facilities and associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions, per 40 CFR 63.6 (e)(3); and

b. The prohibition against concealing emissions which would otherwise constitute a violation of an applicable standard, including the use of gaseous diluents to achieve compliance with a standard which is based on the concentration of a pollutant in the gases discharged to the atmosphere, per 40 CFR 63.4(b).

This response was coordinated with the EPA's Office of Enforcement and Compliance Assurance and Office of Air Quality Planning and Standards. If you have any questions about this approval, please contact Tracy Watson at (404) 562-8998, or by email at watson.marion@epa.gov.

Sincerely,

CAROLINE FREEMAN

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Date: 2022.02.03 13:46:14 -05'00'

Caroline Y. Freeman
Director
Air and Radiation Division

cc: Jennifer Caparoso, EPA OAQPS
John Cox, EPA OECA
Gerri Garwood, EPA OAQPS
Denise Hall, SCDHEC
Njeri Moeller, EPA OAQPS
Todd Russo, EPA Region 4 ECAD