

Air Permit Review

Region: Wilmington Regional Office
County: New Hanover
NC Facility ID: 6500083
Inspector's Name: Ashby Armistead
Date of Last Inspection: 08/18/2010
Compliance Code: 3 / Compliance - inspection

Permit Issue Date:

Facility Data			Permit Applicability (this application only)
Applicant (Facility's Name): Invista, S.a.r.l. Facility Address: Invista, S.a.r.l. 4600 Highway 421 North Wilmington, NC 28401 SIC: 2824 / Organic Fibers, Noncellulosic NAICS: 325222 / Noncellulosic Organic Fiber Manufacturing Facility Classification: Before: Title V After: Title V Fee Classification: Before: Title V After: Title V			SIP: 2D .0503 NSPS: N/A NESHAP: N/A PSD: N/A PSD Avoidance: N/A NC Toxics: N/A 112(r): N/A Other: N/A
Contact Data			Application Data
Facility Contact	Authorized Contact	Technical Contact	Application Number: 6500083.10B Date Received: 06/09/2010 Application Type: Modification Application Schedule: TV-Significant Existing Permit Data Existing Permit Number: 00164/T43 Existing Permit Issue Date: 02/04/2011 Existing Permit Expiration Date: 07/31/2012
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Review Engineer: Fern Paterson, P.E. Review Engineer's Signature: _____ Date: _____		Comments / Recommendations: Issue 00164/T44 Permit Issue Date: Permit Expiration Date: 07/31/2012	

I. Purpose of Application

The North Carolina Division of Air Quality (NCDAQ) received Application No. 6500083.10B from INVISTA, S.à.r.l. (INVISTA), located in Wilmington, North Carolina, on June 9, 2010. INVISTA is requesting that NCDAQ revise the applicable particulate matter (PM) emission limitation for the existing Terate ® Resins heaters (**ID Nos. B7600 and B7602**) pursuant to 15A NCAC 2D .0503 to accurately reflect a division in the “plant site” as it is defined for the purposes of this rule.

II. Permit Modifications/Changes

The following table describes the modifications to the current permit.

Page(s)	Section	Description of Change(s)
1	Permit Cover Page	Amend permit revision numbers and issuance/effective dates.
23	Section 2.1.E., Table	Revise listed PM standards under 15A NCAC 2D .0503 to include independent emissions limits for the DMT and PTA production areas and the Terate® resins production area.

Page(s)	Section	Description of Change(s)
24	Section 2.1.E.1	Revise listed requirements pursuant to 15A NCAC 2D .0503 to: - List the independent emissions limits for the DMT and PTA production areas and the Terate® resins production area; and, - Include a testing requirement for the No. 6 fuel oil fired boilers and heaters at the DMT and PTA production areas.
74-83	Section 3	Update General Provisions with the most recent revision (v. 3.4)

III. Statement of Compliance

NC DAQ has reviewed the compliance status of this facility. On August 18, 2010, Mr. Ashby Armistead (WiRO) conducted a site inspection of the facility. At this time, the facility appeared to be in compliance with all applicable requirements. NC DAQ has reviewed this permit application and anticipates that the proposed modification will be in compliance with all applicable requirements as detailed in the following regulatory review.

IV. Description of Facility & Review of Proposed Changes

A. Facility Information

The INVISTA facility in Wilmington, NC manufactures DMT, PTA, and Terate® resins. Both DMT and PTA are used as feedstock in the production of polyethylene terephthalate (PET). PET is a raw material used in the manufacture polyester bottles, films, and fibers. Terate® resins are polyol resins produced through esterification of various high molecular weight by-products from the DMT process. Terate® resins are generally sold to insulation foam manufacturers.

B. Proposed Revision of PM Emissions Limitations for the Terate ® Resins Heaters (ID Nos. B7600 and B7602)

1. “Plant-Site” per 15A NCAC 2D .0503

15A NCAC 2D .0503(a)(3) defines “plant site” as “any single or collection of structures, buildings, facilities, equipment, installations, or operations which: (A) are located on one or more adjacent properties, (B) are under common legal control, and (C) *are functionally dependent in their operations.*” [Emphasis Added]

Appendix 5 of the NC air quality rules, “Particulate Emissions Standards,” expressly provides that “plant site” with respect to the applicability of this rule is not equivalent to the definition of “facility” for the purposes of the Title V or PSD permitting programs or North Carolina’s air toxics program. The Appendix provides that “plant site” is a common sense determination, and lists several factors that should be considered in determining what constitutes a “plant site,” including:

- Whether the combustion sources are physically interconnected by a common flue, steam lines, or air pollution controls.
- Whether the facility has historically had separate permits.
- The physical proximity of the combustion sources to one another.
- Whether the Permittee is attempting to circumvent control by asserting that boilers are not part of the same operation.

2. Terate® Resins Production Area as a Separate Plant Site

The Terate® resins process began operating six years following the startup of the DMT operations. It produces specialty chemicals from DMT production process residues as an alternative to burning the material in the plant’s energy systems. If the Terate® process were to shutdown, the DMT process would continue to operate and burn the residue as fuel or collect them to be sent off-site. Annually, total Terate® resins production totals between 60-90 million pounds. This is far below annual DMT production totals of 1.4 billion pounds.

Based on the definition described in Section IV.B.1. above, NC DENR has determined that the Terate® resins production area is a separate plant site from the DMT and PTA production areas. The Terate® resins production area is physically separate from the other production areas, and aside from the input of raw materials, the Terate® resins process is functionally independent from the rest of the facility. The Terate® Resins process does not share common process streams, flues, or stacks with the other production areas. The resins heaters (**ID Nos. B7600 and B7602**) only provide steam to the Terate® resins process and the process does not derive steam from any other permitted combustion source at the facility.

Further DMT production and Terates ® production fall within separate business units within INVISTA. The two products are associated with different Business Leaders and management teams and separate profit and loss statements.

Because the Terate ® resins process area is an independent plant site, the PM emissions limitation of the Terate ® resins heater (**ID No. B7600**) pursuant to 15A NCAC 2D .0503 should be estimated separately from the boilers and process heaters that are used to support the DMT and PTA process areas (**including ID Nos. B4040, BLR1, BLR4, BLR5, HTR3, HTR4, and HTR5**).

3. Revised 15A NCAC 2D .0503 Emission Limitation
15A NCAC 2D .0503 limits PM emissions from the firing of fuel in indirect heat exchangers (in lb/mmBtu) based on the total plant-site heat input. The allowable PM emission rate is calculated using the following equation:

$$E = 1.090 * Q^{-0.2594}$$

Where:

E = Allowable emission limit for particulate matter in lbs/MMBtu; and,

Q = Maximum heat input in MMBtu/hr.

The NCDAQ has revised the PM emissions limitations based on the determination that the DMT and PTA production areas and the Terates® Resin production area constitute individual plant sites.

DMT and PTA Production Areas

The total plant-site heat input is summed below:

<u>Boiler ID No.</u>	<u>Rated Capacity</u>
B4040	202 MMBtu/hr
BLR1	200 MMBtu/hr
BLR4	246 MMBtu/hr
BLR5	246 MMBtu/hr
HTR3	140 MMBtu/hr
HTR4	167 MMBtu/hr
HTR5	213 MMBtu/hr
Total	1,414 MMBtu/hr

Based on the plant site-wide heat input capacity, the PM limit for the indirect-fired heat exchangers at the DMT and PTA production area is 0.17 lbs/MMBtu.

All of these heat exchangers at the DMT & PTA productions areas are permitted to fire No. 6 fuel oil. Using AP-42 emission factors¹, total PM emissions from No. 6 fuel oil are estimated to be approximately 0.16 lb/MMBtu, as shown below:

¹ See AP-42, Table 1.3-4 (9/98)

$$Total .PM \left(in \frac{lb}{10^3 gal} \right) = 8.3 A$$

Where:

$$A = 1.12 S + 0.37$$

Where:

$$S = \text{Sulfur Content (in weight \%)} = 2.3$$

$$Total.PM = \frac{8.3 [1.12 S + 0.37] lb}{10^3 gal} * \frac{10^3 gal}{150MMBtu} = 0.16 lb/MMBtu$$

Because worst-case PM emission rates for the Terate® resins heaters are estimated to be approximately 95% of the allowable PM emission rate, the permit will require that one boiler (**ID No. B4040, BLR1, BLR4, or BLR5**) and one process heater (**ID No. HTR1, HTR4, and HTR5**) be tested within five years of permit issuance to demonstrate compliance with the emissions limit.

The Permittee is given five years to test because (1) this change to the permit is not associated with any physical change or change in the method of operations of the associated sources, (2) the allowable PM emissions limit is actually increasing slightly from 0.16 lbs/MMBtu to 0.17 lbs/MMBtu as a result of this permit modification, and (3) to allow INVISTA to combine testing efforts associated with the case-by-case MACT for boilers required in three years pursuant to 15A NCAC 2D .1109.

Terate® Resins Production Area

The total plant-site heat input is summed below:

<u>Boiler ID No.</u>	<u>Rated Capacity</u>
B7600	22 MMBtu/hr
B7602	4 MMBtu/hr
Total	26 MMBtu/hr

Based on the plant site-wide heat input capacity, the PM limit for the indirect-fired heat exchangers at the DMT and PTA production area is 0.47 lbs/MMBtu.

The larger heater (**ID No. B7600**) is permitted to fire No. 6 fuel oil. Using AP-42 emission factors², total PM emissions from No. 6 fuel oil are estimated to be less than 0.47 lb/MMBtu, as follows:

$$Total .PM \left(in \frac{lb}{10^3 gal} \right) = 8.3 A$$

Where:

$$A = 1.12 S + 0.37$$

Where:

$$S = \text{Sulfur Content (in weight \%)} = 2.3$$

² See AP-42, Table 1.3-4 (9/98)

$$Total.PM = \frac{8.3 \left[\frac{1.12 \times 10^3 \text{ gal}}{10^3 \text{ gal}} + 0.37 \frac{\text{lb}}{\text{lb}} \right] * \frac{10^3 \text{ gal}}{150 \text{ MMBtu}}}{10^3 \text{ gal}} = 0.16 \text{ lb/MMBtu}$$

The smaller heater (**ID No. B7602**) is permitted to fire natural gas, which is expected to emit significantly less PM than residual fuel oil. Because worst-case PM emission rates for the Terate® resins heaters are estimated to be less than 35% of the allowable PM emission rate, no monitoring, recordkeeping, or reporting shall be required to demonstrate compliance with this limitation.

4. PM-10 NAAQS Evaluation

Per the request of NCDAQ, INVISTA submitted air dispersion modeling to show that, with the revised emissions limitation, predicted PM emissions from all combustion sources affected by 15A NCAC 2D .0503 at the Wilmington facility would not contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS) for PM-10.

The modeling was submitted on June 9, 2010. Each of the permitted heat exchangers was included in the model. The modeled PM-10 emission rates were set at 71% of the allowable total PM emission rate pursuant to 15A NCAC 2D .0503 as revised in this permit. The 71% breakdown is consistent with Table 1.3-4 of U.S. EPA's AP-42. INVISTA also conservatively included direct-fired combustion sources that are permitted at the facility, including the thermal oxidizer (**ID No. TO**) and flare (**ID No. G4904R**).

The modeling was performed using AERMOD software and using five years (1988-1992) of meteorological data from Wilmington (surface) and Charleston (upper air). Using EPA's BPIP program, direction-specific building dimensions were input into the model to estimate building wake effect. Modeling receptors were located around the facility fenceline at 25-meter intervals and extended outward to a distance of 3 km using a nested grid. Terrain elevations and hill height parameters were calculated for each receptor by the AIRMAP preprocessor.

As shown in the summary table below, the modeled ambient air concentrations of PM-10 resulting from the combustion sources at the revised 2D .0503 limitations are well below the NAAQS.

Pollutant	Averaging Period	H6H Modeled Concentration (µg/m ³)	Background Concentration (µg/m ³)	Total Estimated Impact (µg/m ³)	NAAQS (µg/m ³)	% of NAAQS
PM-10	24-hour	25.29	27.00	52.59	150	35%

5. PSD Applicability

The proposed changes to the permit do not constitute a physical change or change in the method of operation at the facility. Therefore, the changes are not a modification for the purposes of the PSD permitting program pursuant to 15A NCAC 2D .0530.

³ See <http://www.epa.gov/ttnchie1/ap42/ch01/final/c01s03.pdf>.

V. Title V Permit History:

The following list provides a very brief summary of Title V permit revisions for this facility:

<u>Permit No.</u>	<u>Issuance Date</u>	<u>Description of Revision</u>
00164T43	February 2011	Case-by-case MACT for boilers and process heaters pursuant to 15A NCAC 2D. 1109 (CAA § 112(j)).
00164T42	March 2009	Minor modification accommodate a long-term shutdown of Line D, including allowing biogas firing in heater no. 4 (ID No. HTR4).
00164T41	March 2009	Minor modification to install a new oxidizer on each of two existing DMT lines: Line C and Line D.
00164T40	January 2009	State-only modification to meet state-enforceable “Last MACT” toxics requirements pursuant to 15A NCAC 2Q .0705.
00164T39	December 2008	Minor modification authorizing the construction and operation of a new enclosed wastewater tank (ID No. T1939AR).
00164T38	August 2007	Title V Permit Renewal. [PUBLIC NOTICE & EPA REVIEW]
00164T37	May 2004	Second-part significant modification pursuant to 15A NCAC 2Q .0501(c)(2) to retube Boiler No. 1 (ID No. BLR1) and a natural gas burner. [PUBLIC NOTICE & EPA REVIEW]
00164T36	April 2004	Ownership change from KOSA to INVISTA, S.a.r.l., effective April 30, 2004, and add capability to burn biogas from the anaerobic reactors in the No. 5 process heater.
00164T35	September 2003	Modification to revise of the source description of the purge evaporator tank (ID No. T4222) and add existing sources (ID Nos. R2203, A2414, A2204, and A220319) that were left out of the Initial Title V submittal.
00164T34	July 2003	First-part significant modification pursuant to 15A NCAC 2Q .0501(c)(2) to retube Boiler No. 1 (ID No. BLR1) and a natural gas burner.
00164T33	May 2003	Administrative amendment for clarifications to language in the previous permit.
00164T32	March 2003	Initial Title V Permit

VI. Other Regulatory Considerations

- The application fee of \$867.00 was received on June 9, 2010.
- The Reduction and Recycling Form was received on June 9, 2010.
- A Professional Engineers Seal is not required for this application.
- A zoning consistency determination is not required for this application.
- Public notice is required for this application.
- U.S. EPA review is required for this application.

VII. Draft Permit Review Summary

Mr. Ashby Armistead and Mr. Dean Carroll of the Wilmington Regional Office (WiRO) was provided a draft permit for review on March 29, 2011.

Dr. Charity Coury (INVISTA) was provided a draft permit for review for review on March 29, 2011.

Public notice of the proposed permit was posted on the NCDAQ website on **April 13, 2011**.

Ms. Katy Forney and Ms. Gracy DeNois (U.S. EPA, Region IV) were provided a draft permit for review on **April 13, 2011**.

VIII. Recommendations

The permit modification application for INVISTA, S.à.r.l., located in Wilmington, New Hanover County, North Carolina has been reviewed by NC DAQ to determine compliance with all procedures and requirements. NC DAQ has determined that this facility is complying or will achieve compliance, as specified in the permit, with all requirements that are applicable to the affected sources.

Issue Permit No. 00164T44