From: Contractor, Bharat
To: Braganza, Bonnie
Cc: Buckman, Peter G.
Subject: RE: Input required ASAP
Date: Monday, March 04, 2013 5:28:04 PM
Attachments: image005.png
image006.png

Bonnie—

Thank you for your time today. As we discussed this afternoon, INVISTA has reviewed EPA's proposal from Friday, March 1, for interim BACT limits for the INVISTA boilers during the course of this construction project. INVISTA has confirmed applying the 235 lbs CO2/thousand lbs of 550 psig steam BACT limit to the boilers as they are modified will be acceptable. As discussed, the limit will apply to the combination of already modified boilers after the performance test for each boiler has been completed (i.e., first applicable to 1 boiler, then 2 boilers, then 3 boilers and finally all four boilers). INVISTA is planning to install CEMS on each boiler duct with the above BACT limit.

At this time, INVISTA believes that compliance with this limit will be possible when averaged across the modified boilers. In the interest of advancing the permitting process to meet its Consent Decree deadlines, INVISTA has assessed this new condition in a compressed time period. However, as this limit is set by calculations but compliance will be demonstrated using CO2 CEMS, there is a possibility, however remote, that the CO2 CEMS data will be materially higher than the calculations via which the limits were set. If this occurs, INVISTA will submit a permit amendment, supported by actual CO2 CEMS data, seeking a modification to the emission limits.

Thanks. Please send us revised permit(if you can) and let us know when the public notice is scheduled.

Bharat Contractor
Global Air Compliance Manager
Office Phone: (281) 690-4704
Cell/BB: (832) 524-6342

From: Braganza, Bonnie [mailto:Braganza.Bonnie@epa.gov]
Sent: Monday, March 04, 2013 11:41 AM
To: Contractor, Bharat; Buckman, Peter G.
Subject: Input required ASAP

This is what I am planning to propose to management. If you have comments please let me know soon. Thanks. Also please fill in the required data.

1. The BACT limit of 235 lbs CO_2 /thousand pounds of 550 psig steam is based on a rolling 12- month average and will be obtained by using the 12-month sum of monthly CO2 emissions from the continuous CO_2 stack analyzer and the stack/duct flow meters divided by the 12-month sum of the monthly steam production from the boilers and is equal to:

$$\text{BACT } Limit = \frac{\sum(\text{monthly CO2 lbs from each WPH boiler } \frac{\text{duct}}{\text{stack}})}{\sum(\text{monthly Mlbs of 550 psig Steam output from each WPH boiler})}$$

2. Until the boiler project is completed with all four boilers in operation, the Permittee shall demonstrate compliance with an initial BACT test to determine compliance with a 76% boiler efficiency within 180 days after commencing operations (See VI.A.3.) of each modified boiler. Boiler work practice standards as in IV.4 will be used to demonstrate continuous compliance with BACT. Once the WPH project is completed and the initial tests VI.B completed the Permittee is not required to demonstrate compliance with the boiler efficiency limit; however, the Permittee may use the interim boiler efficiency BACT as an alternative or in addition to the BACT limit of 235 lbs CO_2 /thousand pounds of 550 psig steam, provided the Permittee has earlier notified EPA Region 6 of this election in writing.

$$Boiler\ Efficiency = \frac{Steam\ Flow\ Rate \times (Steam\ Enthalpy - feed\ water\ enthalpy)}{\sum 1-n(fuel\ firing\ rate \times High\ Heating\ Value)}$$

where 1-n is the sum of the (HHV) heat value for each fuel fired at the boiler.

3. Boiler Work Practice Standards.

   a. Maintain and calibrate the Oxygen analyzers to ensure boiler efficiencies per the manufacturers recommendations. Oxygen analyzers should be maintained and calibrated using 40 CFR 60 Appendix, Spec.3. Oxygen levels will be maintained at < x%
   b. Perform regular inspections and maintenance on the air preheater to maintain optimum heat transfer per the manufacturer's recommendations . Pressure drop? Inlet temperature to boilers will be > ?
   c. Perform regular inspection and tune-ups of the boiler burners and equipment to include cleaning of the burner tips.

   Perform regular tube cleanings via the automatic soot blower systems. Sootblowing is performed when heat transfer as demonstrated by xxx temperature of the tubes is < or >

   Perform regular maintenance on the soot blower systems per the manufacturer's recommendations. Regular maintenance is done on a xxxxx frequency.

From:	Contractor, Bharat
To:	Bonnie Braganza/R6/USEPA/US@EPA
Cc:	Buckman, Peter G.
Subject:	INVISTA Victoria GHG PSD Permit - Additional Information
Date:	12/03/2012 04:35 PM
Attachments:	West Powerhouse Diagram for EPA 12-03-2012.pptx

Bonnie:

This is in response to your email dated November 19, and the follow-up telephone discussions on November 20.
The additional information for each item discussed is provided below:

1. ***New plant manager contact***

   Paul B. Hughes has replaced Stephen W. Harvill as Plant Manager of the INVISTA Victoria Site. His contact information is P.O. Box 2626 Victoria, Texas 77902-2626; Phone: (361) 572-1201; email: Paul.B.Hughes@INVISTA.com.

2. ***Nearest Class I Area***

   The nearest Class I Area to the INVISTA Victoria Site is Big Bend National Park (TX) at an approximate distance of 590 kilometers.

3. ***Boiler rated firing capacity – for each boiler MMBTU/hr***

   We will provide this information in the next day or two.

4. ***Monitoring requirements***

   CO2 CEMS and flue gas flow monitors will be installed in the WPH boiler stacks or in the ductwork to the stacks to determine the quantity of CO2 emitted from the WPH boilers. The CO2 CEMS will be installed and operated in accordance with 40 CFR Part 60, appendix B Performance Specification 3 as applicable. The stack gas flow monitors will be installed and operated in accordance with Performance Specification 6 as applicable. The CO2 CEMS will meet the appropriate quality assurance requirements specified in 40 CFR Part 60, Appendix F. A data acquisition and handling system (DAHS) will be used to measure and record the CO2 emissions and demonstrate compliance with the annual emission rates and BACT limits.

5. ***Method for calculating BACT limit***

   Compliance with the BACT limit for the WPH boilers (235 lb CO2/lb 550 psig steam produced) shall be demonstrated through a calculation as follows:

   - CO2 emissions (pounds emitted) shall be calculated monthly in the DAHS based on the CO2 CEMS and stack gas flows from the combined WPH boilers.
   - Steam (pounds of 550 psig steam) produced from the combined WPH boilers shall be calculated monthly by summing the steam quantity from each boiler as determined by flow monitors (orifice plate, venturi tube, pressure transmitters, or other similar instrumentation) for each WPH boiler.
   - Each calendar month, the total monthly CO2 emissions (lbs/month) shall be added to the previous eleven months of CO2 emissions to determine a 12-month total quantity of CO2 emitted from the WPH boilers.

- The total quantity of steam produced (lbs/month) shall be added to the previous eleven months to determine a 12-month total quantity of steam produced from the WPH boilers.

- A calculation of the 12-month rolling average lbs CO2/lb steam shall be made by dividing the 12-month total CO2 quantity emitted (pounds) by the 12-month total quantity of steam produced (pounds).

6. Boiler schematic drawing

Please see attached drawings depicting the fuel flows to the WPH boilers, the basic boiler operation (including air-preheater), and the soot blower locations.

7. Calculation of N2O emissions from Adipic Acid and C12 Off Gas and Nitric Acid Fume Sweep

N2O from Adipic Acid Off Gas and Nitric Acid fume Sweep are calculated from the quantity of these streams combusted at the WPH boilers, an emission factor based typical N2O composition of each stream, and destruction efficiency for N2O based on stack sampling.

8. Boiler efficiencies on natural gas firing basis

The WPH boilers will be refurbished in order to restore lost efficiency and enable them to operate in a manner consistent with their design efficiency. The WPH boiler efficiency design ratings are based on firing on natural gas at full steaming rate:

Boiler 1: 83.2%
Boiler 2: 83.2%
Boiler 3: 83.0%
Boiler 4: 83.1%

The purpose of the WPH boiler project is to refurbish the boilers and does not involve a redesign of the boilers. Thus, the refurbishment project is intended to restore the original boiler efficiency ratings (on a natural gas firing basis). Actual efficiencies will differ based on firing of waste fuels and operation of SNCR NOx controls.

As noted above, we will send you information on item # 3 soon.
Meanwhile, if you have any follow-up question please call Pete or myself.
Thanks.

Bharat Contractor
Global Air Compliance Manager
Office Phone: (281) 690-4704
Cell/BB: (832) 524-6342

INVISTA™

INVISTA S.a r.l.
Victoria Site
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361-572-1200 Tel
www.INVISTA.com

Via Email and FedEx

October 11, 2012

Ms. Bonnie Braganza
Air Permit Section
U. S. Environmental Protection Agency, Region VI
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Dear Ms. Braganza:

Re: Response to Questions – EPA/INVISTA Conference Call September 20, 2012
In Snpport of INVISTA S.á r.l. Victoria Site's West Powerhouse
Greenhouse Gas Prevention of Significant Deterioration Permit Application
Required by Consent Decree between EPA and INVISTA, entered July 28, 2009

This letter is in response to a conference call between EPA Region 6 and INVISTA on September 20, 2012, in which EPA requested additional information in support of INVISTA S.á r.l.'s Victoria, TX Site (INVISTA Victoria) West Powerhouse (WPH) Greenhouse Gas (GHG) Prevention of Significant Deterioration (PSD) Permit Application, submitted March 16, 2012. Below is INVISTA's response to the items discussed during the call.

PROJECT TIMING:

What is the timing of the West Powerhouse project?

As discussed previously, INVISTA needs to start construction of the WPH project on or about May 1st 2013 in order to complete the first WPH boiler NOx control installation and commence operation of those NOx controls by December 31, 2013 as required by the Consent Decree. To receive the GHG permit by the end of April, 2013, and to allow sufficient time for the public notice process and other administrative steps, INVISTA anticipates that EPA will need to issue notice of a draft permit by January, 2013.

COMPLETENESS DETERMINATION:

Would INVISTA prefer for EPA to prepare a completeness determination at this time considering it will take permitting staff time away from preparing the GHG permit?

While this letter responds to EPA's request for additional information, INVISTA reiterates its position that it submitted a complete application on March 16, 2012 in accordance with EPA's guidance on what constitutes a complete application. Although INVISTA would prefer to see EPA's concurrence in a written completeness determination, based on our conversation we acknowledge EPA's position that substantial time would be required on behalf of the permitting staff to prepare the completeness determination letter and that this effort could delay EPA's preparation of the draft permit. Therefore, with the primary

goal of receiving a final GHG permit in time to meet the Consent Decree deadline for commencing operation of the WPH boiler NOx controls, INVISTA requests that EPA continue to focus on drafting the GHG permit at this time.

BOILER CAPACITY:

Can INVISTA provide the heat input capacity for each of the West Powerhouse boilers?

The boilers are rated by their nominal steam production capacity that was provided in the WPH GHG permit application:

Boiler 1 – 300,000 pounds per hour of steam at 550 pounds per square inch (psig)
Boiler 2 – 300,000 pounds per hour of steam at 550 pounds per square inch (psig)
Boiler 3 – 400,000 pounds per hour of steam at 550 pounds per square inch (psig)
Boiler 4 – 400,000 pounds per hour of steam at 550 pounds per square inch (psig)

The quantity of heat input to the boilers can vary depending upon the fuels fired and boiler thermal efficiency. For the purposes of the WPH GHG permit application, the following heat input values were used based on typical WPH fuels and thermal efficiencies:

Boiler 1 – 434 Million Btu/hour
Boiler 2 – 434 Million Btu/hour
Boiler 3 – 579 Million Btu/hour
Boiler 4 – 579 Million Btu/hour

On a peak firing basis, the WPH boilers may reach higher heat inputs, however, each of the heat input values above represents a nominal "heat input capacity" for the purposes of describing the WPH boilers. These values should not be considered short term firing limits for the WPH boilers.

BACT Limits:

Can INVISTA provide the boiler efficiency basis for its proposed BACT limit?

As described in our letter dated September 14, 2012, INVISTA is proposing a BACT limit of 235 pounds of CO_2 per thousand pounds of 550 pounds per square inch (psig) steam produced for the combined WPH boilers, calculated monthly as a 12-month rolling average. The proposed BACT limit is based on the range of expected WPH boiler fuels, expected operating scenarios, an average 76% boiler thermal efficiency, and the installation of NO_x controls. As described previously, refurbishment is expected to return the boilers to a more efficient condition. The cumulative range of expected benefit from refurbishing the boilers is difficult to predict; however, an average improvement of up to 3 percent is expected. As noted previously, the NO_x controls reduce energy efficiency and may offset the efficiencies gained from refurbishment. Of course, without boiler refurbishment, energy efficiency losses from NO_x controls would be worse.

Can INVISTA provide any benchmarking data for the WPH boiler efficiency?

As discussed previously, the WPH boilers are unique in that they burn a combination of hazardous wastes. The boilers maximize energy recovery by generating steam from the energy generated by combustion of the wastes. The process is, therefore, inherently energy efficient. Further, due to the unique nature of the boilers and their fuels, energy efficiency benchmarking against fossil fuel boilers or process furnaces is not appropriate, and would not produce meaningful data. To provide a meaningful benchmark, we examined the efficiency of Boiler 8 at the INVISTA Victoria facility. Boiler 8 burns hazardous wastes, though different process waste streams than the WPH boilers, and recently underwent similar refurbishment and installation of low NO_x burners and SNCR in 2011. Based on recent operating data, Boiler 8 experienced an estimated efficiency improvement of approximately 2-3 percent compared to operation prior to refurbishment and installation of NO_x controls.

Is INVISTA requesting any alternate BACT limits to apply during certain alternate operating scenarios?

INVISTA has evaluated the need for alternate BACT limits considering the range of expected operating scenarios and is not requesting an alternate BACT limit. We developed the proposed BACT limit of 235 lbs. CO_2/lb. 550 psig steam produced calculated monthly as a 12-month rolling average for the combined WPH boilers after considering the historical range of boiler fuels and operating scenarios, including startup and shutdown. Upon further consideration of the range of expected WPH boiler operations, we have concluded that the proposed BACT limit is sufficient to capture this range, given that the proposed BACT limit is a combined WPH 12-month rolling average. As noted in INVISTA's September 14, 2012 letter to EPA, a combined WPH limit and 12-month averaging period are essential elements of the proposed WPH BACT limit. Since these elements have been incorporated into proposed BACT limit, we do not believe an alternate BACT limit is necessary.

GHG REPORTING:

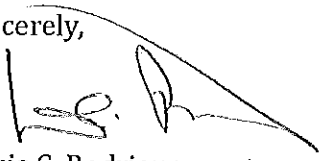
Are the WPH boilers subject to the GHG reporting rule?

The WPH boilers are subject to GHG reporting under Subpart C of 40 CFR Part 98, as applicable. Because the boilers combust hazardous waste, they are subject to GHG reporting only for fuels listed in Subpart C that are co-fired with hazardous waste. For the WPH boilers, natural gas is the only fuel listed in Subpart C that is co-fired with hazardous waste. Accordingly, the WPH boilers are subject to GHG reporting for natural gas only.

We trust that this letter has addressed EPA Region VI's additional questions regarding INVISTA Victoria's WPH GHG PSD Permit Application. We look forward to continuing to work closely with EPA towards issuance of this permit.

In the event that you have additional questions or would like to discuss further, please contact Pete Buckman at 361-580-5954 or Bharat Contractor at 281-690-4704.

Sincerely,



Louis G. Rodriguez
INVISTA Victoria, Environmental, Health and Safety Manager

LGR/pb

cc: Jeff Robinson – EPA Region VI

The operating scenario addressed in these calculations for the CO_2 BACT limit is based on actual operating data for the month of March 2012 and is representative of operation with a low proportion of high-Btu gaseous fuels and natural gas.

TABLE 1: SUMMARY OF EMISSION FACTORS

Fuel	Carbon Content Factors (lb Carbon/ lb Fuel)	CO_2 Emission Factors Due to Combustion (lb CO_2/ lb Fuel)	CO_2 Emission Factors Due to Urea Use in SNCR (lb/lb Fuel)	CO_2 Total Emission Factors (lb/lb Fuel)
LIQUID FUELS	0.5888	2.1575	0.001402	2.1589
GASEOUS FUELS (Low BTU)	0.0377	0.1383	0.000635	0.1389
GASEOUS FUELS (High BTU)	0.6427	2.3549	0.001199	2.3561
NATURAL GAS (including MS REGEN)	0.7298	2.6741	0.000861	2.6750

Note: The values shown represent a potential scenario, are used to estimate maximum emission rates, and are not intended to be permit limits. The permit limits are the emission rate limits.

Sample calculation for CO_2 emission factors for combustion:

CO_2 factor for combustion of liquids = $\frac{0.5888 \text{ lbs of carbon}}{\text{lb fuel}} \times \frac{\text{lb-mole of carbon}}{12.011 \text{ lbs of carbon}} \times \frac{1 \text{ lb-mole CO2}}{1 \text{ lb-mole of carbon}} \times \frac{44.01 \text{ lbs CO2}}{1 \text{ lb-mole CO2}} =$ 2.1575 lbs CO2/lb fuel

Sample calculation for CO_2 emission factors for Urea use in SNCR Systems:

CO_2 from SNCR urea for liquid fuels = $\frac{0.004343 \text{ lbs NOx produced}}{\text{lb fuel}} \times \frac{0.450 \text{ lbs NOx reduced}}{1 \text{ lb NOx produced}} \times \frac{1 \text{ lb-mole NOx}}{46.006 \text{ lbs of NOx}} \times \frac{0.75 \text{ lb-mole urea}}{1 \text{ lb-mole NOx}} \times \frac{1 \text{ lb-mole CO2}}{1 \text{ lb-mole urea}} \times \frac{44.01 \text{ lbs CO2}}{1 \text{ lb-mole CO2}} =$ 0.001402 lbs CO2/lb fuel

TABLE 2: SUMMARY OF PROPOSED WPH ANNUAL MAXIMUM PARAMETERS AND EMISSION RATES

Fuel	Scenario Average Flow Rates to Boilers (Mpph)	CO_2 Emissions Due to Combustion (TPY)	CO_2 Emissions Due to Urea in the SNCR (TPY)	CO_2 Total Emissions (TPY)	550# Superheated Steam Output (M lbs/yr)	CO_2 Total Emission Factors (lbs CO_2 / M lbs of 550# SH Steam)
LIQUID FUELS	20.21	190,951	124	191,075	1,299,192	294
GASEOUS FUELS (Low BTU)	105.34	63,814	293	64,107	87,571	1464
GASEOUS FUELS (High BTU)	1.95	20,127	10	20,137	192,972	209
NATURAL GAS (including MS REGEN)	32.04	375,215	121	375,336	3,954,020	190
Total Projected Actual Emission (PAE) Rates		**650,107**	**548**	**650,656**	**5,533,755**	235

Note: Mpph = 1000 pounds per hour, TPY = tons per year, and M lbs = 1000 pounds.

Calculated Heat Input Rate (MMBTU/hr) 914

Estimated Energy Input Required for 550# SH Steam (BTU/lb) 1447

Sample calculations for CO_2 produced from combustion:

CO_2 from combustion of liquids = $\frac{20.21 \text{ M lbs of fuel}}{\text{hr}} \times \frac{1000 \text{ lbs}}{\text{M lbs}} \times \frac{2.1575 \text{ lbs CO2}}{\text{lb of fuel}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} =$ 190,951 tons/yr

Sample calculations for CO_2 produced from urea used to reduce NOx emissions:

CO_2 from SNCR urea for liquid fuels = $\frac{20.21 \text{ M lbs of fuel}}{\text{hr}} \times \frac{1000 \text{ lbs}}{\text{M lbs}} \times \frac{0.001402 \text{ lbs CO2}}{\text{lb of fuel}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} =$ 124 tons/yr

INVISTA Victoria GHG PSD Permit - Additional Information

Contractor, Bharat Monday, Decem

To: Bonnie Braganza
Cc: Buckman, Peter G.

Bonnie:

This is in response to your email dated November 19, and the follow-up telephone discussions on November 20.
The additional information for each item discussed is provided below:

1. ***New plant manager contact***

   Paul B. Hughes has replaced Stephen W. Harvill as Plant Manager of the INVISTA Victoria Site. His contact information is P.O. Box 2626 Victoria, Texas 77902-2626; Phone: (361) 572-1201; email: Paul.B.Hughes@INVISTA.com.

2. ***Nearest Class I Area***

   The nearest Class I Area to the INVISTA Victoria Site is Big Bend National Park (TX) at an approximate distance of 590 kilometers.

3. ***Boiler rated firing capacity – for each boiler MMBTU/hr***

   We will provide this information in the next day or two.

4. ***Monitoring requirements***

   CO2 CEMS and flue gas flow monitors will be installed in the WPH boiler stacks or in the ductwork to the stacks to determine the quantity of CO2 emitted from the WPH boilers. The CO2 CEMS will be installed and operated in accordance with 40 CFR Part 60, appendix B Performance Specification 3 as applicable. The stack gas flow monitors will be installed and operated in accordance with Performance Specification 6 as applicable. The CO2 CEMS will meet the appropriate quality assurance requirements specified in 40 CFR Part 60, Appendix F. A data acquisition and handling system (DAHS) will be used to measure and record the CO2 emissions and demonstrate compliance with the annual emission rates and BACT limits.

5. ***Method for calculating BACT limit***

   Compliance with the BACT limit for the WPH boilers (235 lb CO2/lb 550 psig steam produced) shall be demonstrated through a calculation as follows:

   - CO2 emissions (pounds emitted) shall be calculated monthly in the DAHS based on the CO2 CEMS and stack gas flows from the combined WPH boilers.
   - Steam (pounds of 550 psig steam) produced from the combined WPH boilers shall be calculated monthly by summing the steam quantity from each boiler as determined by flow monitors (orifice plate, venturi tube, pressure transmitters, or other similar instrumentation) for each WPH boiler.

Via Email and FedEx

September 14, 2012

INVISTA™

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Ms. Bonnie Braganza
Air Permit Section
U.S. Environmental Protection Agency, Region VI
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Re: Response to Questions – EPA/INVISTA Conference Call August 30, 2012
In Support of INVISTA S.a r.l. Victoria Site's West Powerhouse
Greenhouse Gas Prevention of Significant Deterioration Permit Application
Required by Consent Decree between EPA and INVISTA, entered July 28, 2009

Dear Ms. Braganza:

This letter is in response to a conference call between EPA and INVISTA on August 30, 2012, in which EPA requested additional information in support of INVISTA S.a r.l.'s Victoria, TX Site (INVISTA Victoria) West Powerhouse (WPH) Prevention of Significant Deterioration (PSD) Permit Application, submitted March 16, 2012. Below is INVISTA's response to the items discussed during the call. As we stated in the call, we urge EPA to deem the application complete and process it as expeditiously as possible because the permit is needed to allow INVISTA to meet its Consent Decree deadlines for installation of NO_x controls.

PROPOSED BACT:

Can INVISTA provide a proposed BACT limit in terms of "output based" measures?

In the WPH GHG permit application, INVISTA originally proposed a BACT limit in terms of tons CO_2e per 12-month period, which INVISTA considers an appropriate metric for the WPH boilers given their unique fuels and operation. However, based on recent discussion with EPA, INVISTA is proposing an "output based" BACT limit in terms of pounds of CO_2 per thousand pounds of 550 pounds per square inch ("psi") steam produced from the combined WPH boilers calculated monthly as a 12-month rolling average. INVISTA proposes CO_2 rather than CO_2e as a more direct measure of boiler efficiency. Of the six GHGs, the WPH boilers emit CO_2, N_2O and methane. Methane emissions are primarily

associated with the natural gas used for pilot gas or supplemental fuel while the majority of the N_2O emissions are associated with nitrogen in the fuels or are produced by operation of the SNCR. As such, neither is reflective of boiler efficiency, unlike CO_2 of which nearly all emissions are related to combustion and boiler efficiency. Further, INVISTA is proposing to measure CO_2 directly via CO_2 CEMS.

INVISTA proposes to calculate this output-based emission rate by adding the pounds of CO_2 emitted from each WPH boiler stack as determined by CO_2 CEMS and measured flue gas flow and dividing the sum by the total quantity of 550 psi steam produced by the WPH boilers as measured by steam flow meters. INVISTA proposes a BACT limit of 235 lbs. CO_2/1000 lbs. steam based on an evaluation of the following data:

1. Projected annual average boiler thermal efficiency;
2. Range of projected boiler fuel compositions based on actual operating data; and
3. Estimated lbs. CO_2/1000 lbs. steam from recent operating data (boiler fuel firing rates, typical fuel characteristics, and steam production rates).

INVISTA considers this limit to be BACT for these waste-fired boilers based on the unique fuel characteristics, regulatory requirements (i.e. RCRA and MACT Subpart EEE), and operating scenarios for the INVISTA Victoria site. For reference, INVISTA has prepared the following table comparing the proposed WPH BACT limit (lbs. CO_2/1,000 lbs. steam) with estimated CO_2 emissions rates of other types of fuels.

Fuel	Factor* (kg CO_2/mmBtu)	Estimated Emissions (lbs. CO_2/ 1,000 lbs. of Steam)**
Anthracite Coal	103.54	330
Coke	102.04	326
Bituminous Coal	93.40	298
Municipal Solid Waste	90.70	289
Residual Fuel Oil No. 6	75.10	240
Distillate Fuel Oil No. 2	73.96	236
INVISTA's proposed BACT Limit	**N/A**	**235**
Weighted U.S. Average Natural Gas	53.02	169

*Factors are from 40 CFR Part 98, Subpart C, Table C-1.

**Estimated CO_2 emissions per 1,000 lbs. of steam based on a constant boiler efficiency for all fuels.

As indicated by the table above, the proposed WPH boiler BACT limit compares favorably with calculated output-based emission rates for other liquid fuels.

What efficiency improvements are being made to the boilers? Include an estimate of improved efficiency for each measure, if possible.

As a preliminary matter, INVISTA observes that the fundamental business purpose of the boilers—both before and after this project—will be the operation of the boilers as hazardous waste combustion sources under the terms of the facility's RCRA permit and the MACT Subpart EEE provisions. As discussed in more detail in INVISTA's GHG permit application, the WPH boilers are unique in that they burn combinations of low-BTU gaseous fuels, high-BTU gaseous fuels, liquid wastes and supplemental natural gas, which vary significantly on a short term basis. The boilers maximize energy recovery by generating steam from process-derived waste streams. In addition to destroying the process wastes, the boilers recover the energy generated by the combustion of the process wastes (also referred to as 'fuels' herein) and supplemental natural gas, as needed, and use that energy to generate steam required by the process units at the Victoria Plant. The process is, therefore, inherently energy efficient. Further, due to the unique nature of the boilers and their fuels, energy efficiency benchmarking with other sources is not practical, nor would it produce meaningful data. Accordingly, efficiency measures that would "redefine the source" by altering INVISTA's ability to utilize these boilers for the purposes for which they were designed are not "available" under top-down BACT Step 1, and have not been included as elements of the project or of the BACT analysis. Additional information regarding the energy efficiency improvements that would not redefine the source has been included below.

As discussed during the call, estimating the improvement in energy efficiency for each measure is not feasible. The boilers currently employ the majority of the energy efficiency measures discussed below, and, while estimates can be made regarding the impact of these measures on a new boiler installation, estimating the baseline efficiency impact of each measure independent of the other measures that are currently installed on the existing boilers is not possible. Without a separate baseline for each existing energy efficiency measure, separately estimating the increase in energy efficiency resulting from each improved measure is not possible either. However, based upon similar improvements made previously on another boiler at the INVISTA Victoria site, INVISTA expects to see an overall improvement in energy efficiency of up to 3% associated with the following improvements made on the boilers as part of this project:

Improved Burners and Burner Management Systems:

New burners will be installed in the WPH boilers. The new burners are being designed to reduce NO_x emissions. Boiler SNCR NO_x controls, required by the Consent Decree, will be optimized to reduce NO_x. SNCR operation will negatively impact boiler efficiency due to the quantity of water used in the SNCR reagent (urea) and may offset a portion of the efficiency gain that would otherwise result from the installation of new burners.

The boilers will receive improved burner management systems to ensure proper combustion is maintained and to maximize waste gas combustion in the boilers, to the extent possible, in lieu of burning natural gas in the boilers and flaring waste gas. Excess oxygen and carbon monoxide are currently, and will continue to be, monitored to ensure complete combustion of all fuels.

Improved Boiler Insulation

Firebox insulation will be repaired or replaced to maintain or restore efficiency, as well as provide personnel protection from hot surfaces. The new insulation is a mineral wool-based fiberboard insulation which meets current ASTM guidelines and has an "R" value of approximately 12.

Automatic Soot Blowers

New automatic soot blowers will be installed which are designed to be more reliable than the current soot blowers to improve soot blowing capability and maintain boiler tube heat transfer efficiency.

Air Preheaters

The WPH boiler air preheaters are Ljungstrom type preheaters. The Ljungstrom air preheater absorbs waste heat from the flue gas, and transfers this heat to the incoming ambient air by means of continuously rotating heat transfer elements of specially formed metal plates. Thousands of these high efficiency elements are spaced and compactly arranged within compartments of a radially divided cylindrical shell, called a rotor. The housing surrounding the rotor is equipped with duct connections at both ends, and is sealed by radial and circumferential sealing members – forming an inlet air passage through one half of the preheater, and a flue gas passage through the other. As the rotor slowly revolves the mass of elements alternately through the flue gas and inlet air passages, heat is absorbed by the element surfaces passing through the hot flue gas stream; then as these same surfaces are carried through the inlet combustion air stream, they release the stored heat to the inlet combustion air.

As part of the boiler refurbishment project, the preheater rotor assemblies will be repaired or replaced as needed to restore full functionality, and rotor seals will be replaced to limit air leakage. Improvements will also be made to the preheaters that allow for more effective cleaning to maintain heat transfer efficiency. The energy efficiency improvement from these measures is difficult to quantify as it is dependent upon the condition of the preheater prior to refurbishment, however, the project will restore lost efficiency and help to maintain preheater efficiency.

Boiler Tubes

The WPH boilers will be retubed as part of the refurbishment project. The retubing will increase each boiler's efficiency over its current efficiency by replacing plugged tubes in each of the boilers and restoring the tubes to their "as designed" heat transfer capability. The intent of the retubing is to replace the tubes in kind and not to redesign or rebuild the boilers. The primary goal of the retubing is to

maintain/improve the boilers' reliability while not impacting the boilers' combustion characteristics, including their very high destruction removal efficiency (DRE) for hazardous components in the fuels as required by the WPH RCRA permit and MACT Subpart EEE. More significant changes to the design of the boiler tubes are precluded by the firebox volume, retention time requirements, and material of construction of the tubes. The existing boiler tubes are constructed of carbon steel, which is expected to have the best heat transfer properties of any material that is considered suitable for the WPH boilers. Replacement tubes will also be constructed of carbon steel. Any more substantial changes to the tube design would require a major modification under RCRA and potentially other regulatory programs, and redesign the source, which is beyond the scope of this project and EPA's BACT analysis.

How is thermal efficiency determined for the West Powerhouse boilers?

WPH boiler efficiency is difficult to precisely determine due to a number of factors:

1. The boilers may fire a large number of fuels at any given time, and firing rates for any particular fuel can vary at any time;
2. The boiler fuel compositions and higher heating values (HHV) can vary and so typical HHV values are used as estimates; and
3. Steam enthalpy and boiler feedwater enthalpy can vary and so typical values are used as estimates.

For the purpose of this application, thermal efficiency for the WPH boilers is estimated as follows:

$$\text{Boiler efficiency} = \frac{\text{(steam flow rate x (steam enthalpy - feedwater enthalpy))}}{\sum_{1\text{-}n} \text{(fuel firing rate x Higher Heating Value (HHV))}} \times 100$$

where $\sum_{1\text{-}n}$ is the sum of the heat input from each of the fuels fired at the WPH boilers

The fuel firing rates, boiler feedwater flow rate, steam flow rate, steam pressure and steam temperature are measured. Steam enthalpy can be calculated from the measured parameters. The higher heating values of individual fuels are either periodically sampled or estimated. Feedwater enthalpy is estimated because feedwater temperature is not measured at each individual boiler and can vary depending on the boiler feedwater source.

Can INVISTA provide an estimate of expected thermal efficiency improvement from boiler refurbishment?

Refurbishment is expected to return the boilers to a more efficient condition through, for example, clean boiler tubes, fresh insulation, and repaired air preheaters. The cumulative range of expected benefit from refurbishing the boilers is difficult to predict; however, as discussed above, an average improvement of up to 3 percent is expected as compared with historical efficiency. As noted previously, the NO_x controls reduce energy efficiency and may offset the efficiencies gained from refurbishment. Of course, without boiler refurbishment, energy efficiency losses from NO_x controls would be worse.

What is the boiler fuel sampling frequency for BTU content?

Hazardous waste liquid fuels are sampled and analyzed for BTU content at least quarterly as required by the WPH RCRA permit and MACT Subpart EEE requirements. Gaseous fuels are not sampled, however pipeline natural gas HHV is determined pursuant to 40 CFR Part 98.

ADDITIONAL IMPACTS ANALYSIS

Can INVISTA provide more information regarding Additional Impacts Analysis under 40 CFR Part 52.21(o)?

Greenhouse gases. Though INVISTA's proposed modification triggers PSD review for greenhouse gases, that review does not extend to the requirement to prepare an Additional Impacts Analysis under Section 52.21(o) for GHGs. This conclusion is consistent with EPA guidance, which states:

> Furthermore, consistent with EPA's statement in the Tailoring Rule, EPA believes it is not necessary for applicants or permitting authorities to assess impacts from GHGs in the context of the additional impacts analysis or Class I area provisions of the PSD regulations . . . .[1]

Non-GHG NSR-regulated pollutants. INVISTA's proposed modification does not trigger PSD review for non-GHG NSR-regulated pollutants, and is therefore not subject to the Section 52.21(o) Additional Impacts Analysis requirement. EPA has been clear since 1979 that additional impacts analyses need only be performed for NSR-regulated pollutants with project emissions increases in excess of the relevant significance levels. The preamble to the original form of the PSD regulations makes the following statement in the context of establishing *de minimis* exemptions from PSD review:

> Even if a modification cannot be shown to be minor, [the significance levels in] Table I can be used to limit the pollutants for which BACT must be applied or an air quality analysis

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[1] ENVTL. PROT. AGENCY, PSD AND TITLE V PERMITTING GUIDANCE FOR GREENHOUSE GASES at 48 (2011) [hereinafter "GHG Guidance"].

> done. If a modification to a source is subject to review because it results in a significant net increase in potential emissions of a pollutant for which the source is major, or a new source is subject to review because it will have the potential to emit a regulated pollutant in major amounts, the source may still avoid BACT or an air quality analysis for other pollutants it emits if it emits such pollutants in *de minimis* amounts. Table 1 identifies the emission cutoffs that would trigger the need for control technology and ambient review for those other pollutants. *Thus, when a major stationary source or modification is subject to PSD review because of potential emissions of one or more pollutants the review would apply to only those other pollutants which the source would have the potential to emit in amounts above those proposed in Table 1.*[2]

EPA has carried forward this understanding of PSD applicability to the GHG PSD permitting program. In the Tailoring Rule, EPA states very explicitly that PSD review in the GHG context is limited to NSR-regulated pollutants emitted in excess of the relevant significance levels:

> There are currently no NAAQS or PSD increments established for GHGs, and therefore these PSD requirements would not apply for GHGs, even when PSD is triggered for GHGs. However, if PSD were triggered for a GHG emissions source, all regulated NSR pollutants, which the new source emits *in significant amounts*, would be subject to PSD requirements. Therefore, if a facility triggers review for regulated NSR pollutants that are non-GHG pollutants for which there are established NAAQS or increments, the air quality, additional impacts, and Class I requirements would apply to those pollutants.[3]

EPA makes the same point in its GHG Guidance:

> Applicants and permitting authorities should note that, while we are not recommending these analyses [including 52.21(o)] for GHG emissions, the incorporation of GHGs into the PSD program does not change the need for sources and permitting authorities to address these requirements for other regulated NSR pollutants. Accordingly, if PSD were triggered for a GHG emissions source, all regulated NSR pollutants, *which the source emits in significant amounts*, would be subject to these other PSD requirements. Therefore, if a facility triggers review for regulated NSR pollutants that are non-GHG pollutants for which there are established NAAQS or increments, the air quality, additional impacts, and Class I requirements must be satisfied for those pollutants and the applicant and permitting authority are required to conduct the necessary analysis.[4]

In fairness, EPA's 1990 Workshop Manual is not as clear as the 1979 and 2010 preambles. There, EPA stated:

> All PSD permit applicants must prepare an additional impacts analysis for each pollutant subject to regulation under the Act. This analysis assesses the impacts of air, ground and water pollution on soils, vegetation, and visibility caused by *any increase* in emissions of any

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[2] 44 Fed. Reg. 51,923, 51,937 (1979) (emphasis added).

[3] 75 Fed. Reg. 31,514, 31,520 (2010) (emphasis added).

[4] GHG Guidance at 48–49 (emphasis added).

regulated pollutant from the source or modification under review, and from associated growth.[5]

The word "significant" was left out of the phrase "any increase." However, the Workshop Manual frequently uses the phrase—as it did in that passage—"source or modification under review" as a shorthand for "new major stationary source or major modification at an existing stationary source."[6] In other words, the phrase "source or modification under review" necessarily implies that PSD is applicable to the source, and that project emissions are in excess of the significance levels. The phrase "any increase" cannot mean that additional impacts analyses are required for emissions increases below the significance levels—otherwise, this section would apply to all *de minimis* increases nation-wide, something the applicability provisions of the PSD regulations since 1979 have excluded.

In accordance with EPA's long-standing application of the *de minimis* significance thresholds to new and modified sources, INVISTA is not required to perform an additional impacts analysis under Section 52.21(o) for non-GHG NSR-regulated pollutants for which there are insignificant emissions increases. However, if EPA Headquarters asserts that an additional impacts analysis is required for increases in criteria pollutants below the significance level, INVISTA will supplement this response with such an analysis for purposes of this particular project.

Biological Assessment:

In a separate call with Bonnie Braganza, she indicated there were some questions regarding the Biological Assessment INVISTA has provided in support of this permit application, potentially with respect to impacts to water. INVISTA's wastewater discharges are permitted under the Texas Pollutant Discharge Elimination System (TPDES), Permit Number TX0006050. This permit was originally issued as an NPDES permit prior to delegation of the NPDES program to Texas.

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[5] ENVTL. PROT. AGENCY, DRAFT NEW SOURCE REVIEW WORKSHOP MANUAL at D.1 (1990) (emphasis added).

[6] *See, e.g., id.* at 4 (using the phrase "source or modification under review" as a shorthand for the applicability provisions described in the preceding three paragraphs).

We trust that this letter has addressed EPA Region VI's additional questions regarding INVISTA Victoria's WPH GHG PSD Permit Application. We look forward to continuing to work closely with EPA towards issuance of this permit.

In the event that you have additional questions or would like to discuss further, please contact Pete Buckman at 361-580-5954 or Bharat Contractor at 281-690-4704.

Sincerely,

Stephen W. Harvill
INVISTA Victoria, Site Manager

SWH/pb

cc: Jeff Robinson – EPA Region VI

INVISTA™

Via Email and FedEx

July 16, 2012

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Melanie Magee
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Re: Response to EPA Letter Dated May 29, 2012
In Support of INVISTA S.a r.l. Victoria Site's West Powerhouse
Greenhouse Gas Prevention of Significant Deterioration Permit Application
Required by Consent Decree between EPA and INVISTA, entered July 28, 2009

Dear Ms. Magee:

This letter is in response to your May 29, 2012, letter, requesting additional information in support of INVISTA S.a r.l.'s Victoria, TX Site (INVISTA Victoria) West Powerhouse (WPH) Prevention of Significant Deterioration (PSD) Permit Application, submitted March 16, 2012 and as a follow up to our discussions of May 30, 2012. The scope of the WPH Project includes the installation of the SNCR, as well as Low NOx Burners (LNB), for NOx control on the four existing, hazardous waste boilers in the West Powerhouse. In addition, boiler retubing and other boiler refurbishment and modernization improvements will be performed as part of the overall project.

As you are aware, the WPH Project is driven by the requirement to install NOx controls (SNCR or SCR depending on the results of pilot testing) on the WPH boilers, with the installation on the first boiler required to be completed by December 31, 2013, pursuant to the Consent Decree between EPA and INVISTA, dated July 28, 2009. To meet this deadline, INVISTA must begin construction by May 1, 2013, and requests EPA Region VI issue this permit before that date.

Limits of energy efficiency improvements. Throughout the attached response, INVISTA has addressed the specific questions raised by EPA, clarifying the information provided in the original application. As additional explanation, INVISTA provides this overall summary regarding the issue of energy efficiency as applied to this unique project and the WPH boilers. In evaluating the BACT for this project, the scope and purpose of the project, as well as the function and design of these existing boilers must be considered.

The primary purpose of this project is to install NOx controls on the four, existing WPH boilers pursuant to the Consent Decree between EPA and INVISTA. The function of these

boilers is to take process waste streams generated in the manufacture of organic and inorganic chemicals at the INVISTA Victoria site and recover the energy in these waste streams. Energy recovery from waste streams is an inherently efficient design. Due to the characteristics of the liquid and gaseous waste streams, these boilers are subject to RCRA and MACT EEE requirements, which mandate very high destruction and removal efficiencies (e.g., > 99.99% DRE for organic compounds) and place certain restrictions on the boilers (e.g., minimum combustion temperatures, minimum residence time, etc.). While these restrictions negatively impact energy efficiency, they are nonetheless inherent in the design and purpose of the boilers. Modifying the boilers to incorporate energy efficiency measures beyond those described in our attached response would constitute "redefining the source," which, as discussed in INVISTA's original application, is not appropriate.

Additionally, while one aspect of energy efficiency is a reduction in greenhouse gas emissions, another aspect is cost savings through a reduction in fuel necessary to produce, in this case, each pound of steam. As a result, INVISTA Victoria has, over the history of these boilers, taken various measures to maximize the energy efficiency of these boilers to the extent economically and technically feasible, while still meeting the requirements of RCRA and MACT EEE regarding destruction and removal efficiencies. As part of this project, INVISTA will be repairing and upgrading certain energy efficiency elements (e.g., repairing of the air preheaters and improving insulation). As addressed specifically in questions 3 and 5 of the Attachment, INVISTA believes it has previously installed or included in this project all available energy efficiency steps, given the additional constraints of the installation of the NOx control measures and the requirements of RCRA and MACT EEE on these boilers. Additional energy efficiency measures would be inconsistent with the underlying requirements of the Consent Decree and existing environmental requirements, and should not be included in Step 1 of the Best Available Control Technology (BACT) top-down approach because they would improperly redefine the goal, objectives, purpose, or basic design of the project.

Completeness of application. Finally, while this letter responds to EPA's request for additional information to make a completeness determination, we believe that EPA's guidance on what constitutes a complete application demonstrates that a complete application was submitted on March 16, 2012. Specifically, the original application included each of the following elements of a complete application listed in EPA Region IV's "Prevention of Significant Deterioration Permit Application Requirements," updated February 2010.

(1) Applicant information (such as company name and contact information);
(2) A description of the project (e.g., location, 4-digit SIC code, description of processes, description of emission control systems, etc.);
(3) Information needed to make an applicability determination (potential to emit, enforceable restrictions, etc.);
(4) BACT analyses for each emission unit that emits pollutants that are emitted from the project in a "significant amount";

(5) Ambient air quality and meteorological conditions, if applicable;
(6) Source impact analyses, if applicable (air quality, visibility, soils and vegetation, growth, Class I); and
(7) Emission rates in tpy.

It is our hope that this letter and the associated Attachment have addressed EPA Region VI's questions regarding INVISTA Victoria's WPH GHG PSD Permit Application. We look forward to continuing to work closely with EPA towards issuance of this permit.

In the event that you have additional questions or would like to discuss further, please contact Pete Buckman at 361-580-5954 or Bharat Contractor at 281-690-4704.

Sincerely,

Stephen W. Harvill
INVISTA Victoria, Site Manager

SWH/rj

Attachment

cc: Jeff Robinson – EPA Region VI
Bonnie Braganza – EPA Region VI
Pete Buckman
Bharat Contractor

INVISTA Response to EPA Letter of May 29, 2012

Process Description

1. **On page 3, the application indicates that there are four tangentially fired water-tube boilers (Combustion Engineering Model VU-60). Please provide additional numerical energy efficiency rating(s). Please provide additional numerical technical data and benchmarking data to detail each boiler's capacity and energy efficiency rating(s).**

   The West Powerhouse original boiler design capacities and original design energy efficiency ratings are provided below:

Boiler	*Vintage*	*Original Design Capacity (MPPH Steam)[1]*	*Original Design Energy Efficiency Rating (%)[2]*
1	*1965*	*300*	*83.2*
2	*1965*	*300*	*83.2*
3	*1966*	*400*	*83.0*
4	*1973*	*400*	*83.1*

   (1) MPPH = thousand pounds per hour of 550 psig superheated steam

   (2) Efficiency rating based on firing 100% natural gas at full steaming rate

   Although the West Powerhouse boilers were designed to primarily combust various liquid and gaseous fuels with natural gas as a supplementary fuel, the original boiler design manuals provided energy efficiency ratings for combustion of natural gas. Energy efficiency ratings were not provided for the boilers firing such various combinations of liquid and gaseous fuels. Due to the characteristics of the liquid and gaseous fuels and combinations of liquid and gaseous fuels fired in the West Powerhouse boilers, specific energy efficiency ratings are difficult to determine.

   In addition, as described in Sections 2.0 and 4.0 of the INVISTA West Powerhouse GHG permit application, in order to combust the liquid fuels, the West Powerhouse boilers must meet strict emissions standards and destruction efficiency requirements as dictated by the facility's RCRA permit and by Hazardous Waste Combustion MACT (40 CFR Part 63, subpart EEE). The West Powerhouse boilers have relatively large fireboxes that provide the increased residence times necessary to provide complete combustion of the waste fuels (> 99.99% DRE) at the expense of optimal energy efficiency for any one given fuel. By contrast, boilers designed to combust natural gas only, because the fuel does not vary, are typically designed to maximize energy efficiency. Since the West Powerhouse boilers are waste fired boilers, it is not appropriate to compare their efficiencies to those of natural gas fired boilers.

   As described in Section 1.0 of the permit application, combusting the waste fuels is inherently energy efficient. Were the Victoria facility to dispose of the wastes in a different manner (e.g. send to a fuel blender or incinerator) they would be combusted anyway, and the West

Powerhouse boilers would need to make up for the loss in steam generation by increasing use of natural gas or other liquid fossil fuels (i.e., diesel fuel).

Finally, as described in Sections 1.0, 1.3, and 3.0 of the INVISTA West Powerhouse GHG permit application, the purpose of the West Powerhouse project is to install NOx emission controls, including Selective Non-Catalytic Reduction (SNCR) as required by INVISTA's Consent Decree with EPA and low-NOx burners (LNB). The objective of the NOx control installation is to optimize NOx reduction efficiency. The LNB are designed to reduce NOx emissions and, therefore, are not necessarily the most energy efficient burners available. In addition, water used to dilute and provide optimal mixing of urea for SNCR necessarily has an adverse impact on efficiency due to the additional energy needed to vaporize the water in the firebox. Therefore, the impact of the required NOx controls that are the driving force for the project must be considered when comparing the predicted West Powerhouse boiler efficiencies to baseline data or to any other boiler efficiency data.

2. **In your process description, please clarify if each boiler is dedicated to a specific fuel or fuel blends and if this design configuration was optimized to provide the most efficient results. To assist in the drafting of the permit, please provide additional information about boiler operations. Specifically, if a boiler is dedicated to run high BTU or low BTU fuel and any additional operational restrictions that may need to be included from additional regulatory standards from the Clean Air Act or Resource Conservation and Recovery Act (RCRA).**

Although a number of different liquid and gaseous fuels are combusted in the boilers, the fuels can be grouped into four basic categories: liquid waste fuels, high BTU gaseous fuels, low BTU gaseous fuels, and natural gas. Each of the four boilers may be operated on a combination of the four fuel types. As a result, the efficiency for each boiler varies depending on the particular fuel mix combusted and load at any given time.

The boilers can combust the following fuels:

Boilers	Fuel Category	Fuel[1]
1 and 2	Liquid Waste	Adipic Acid/C12 Non-Volatile Residue (NVR) ADN Low Boiler Waste (LBW)
	High BTU Gas	Natural Gas ADN and C12 Regeneration Gas
	Low BTU Gas	Adipic Acid Off Gas C12 Low BTU Off Gases Nitric Acid Fume Sweep
3 and 4	Liquid Waste	Adipic Acid/C12 Non-Volatile Residue (NVR) ADN Low Boiler Waste (LBW) C12 "A" Oil (Boiler 3 only)
		C12 Wiped Film Evaporator (WFE) Tails
	High BTU Gas	Natural Gas ADN and C12 Regeneration Gas C12 High BTU Vent Gas ADN Unit Off Gas
	Low BTU Gas	Adipic Acid Off Gas Nitric Acid Fume Sweep Adipic Acid Scrubber Off Gas (SOG) C12 Low BTU Off Gases

(1): At any given time, fuels are combusted in different combinations and quantities by each boiler.

Boiler efficiency is typically calculated by dividing the heat content of the steam produced by the heat content of the fuel supply. The efficiencies of the West Powerhouse boilers vary due in part to the varying heat content of the liquid waste fuels and process gas fuels and the varying combinations of such fuels that are combusted. The combination of fuels combusted in any given boiler at any given time is based on fuel availability, boiler availability, fuel compatibility, and steam demand. As indicated in the above table, other than natural gas, the fuels fired in the boilers are generated by four separate process units (ADN, Adipic Acid, C12, and Nitric Acid). The

process unit production rates determine the rate at which each fuel is generated and the steam demand for each unit. The process unit operations also determine the heat content of the liquid waste fuels and process gas fuels that are combusted. The fuels are shifted among the boilers so that each boiler can operate in its normal operating range. This method of operation is generally more efficient than operating one or more boilers at very low or very high firing rates.

Additionally, some waste fuels are not compatible and must be combusted in different boilers. Therefore, unlike traditional fossil fuel fired units, at any given time, each boiler may be firing a different fuel mix. During periods when higher than normal quantities of low BTU gaseous fuels are sent to the boilers, the low BTU gaseous fuels must be blended with a high BTU gaseous fuel or liquid waste fuel to provide sufficient heat value to support proper combustion and to generate steam. As described in Sections 2.0 and 4.1.5 of the INVISTA West Powerhouse GHG permit application, if sufficient liquid waste and process derived gaseous fuels are not available to meet process unit steam demand, additional supplemental natural gas is fed to the boilers to make up the difference.

As described above, and in in Sections 2.0 and 4.0 of the INVISTA West Powerhouse GHG permit application, the West Powerhouse boilers are subject to a RCRA permit and to MACT EEE standards. These regulations require destruction of organic compounds and HAPs at 99.99%, necessitating longer residence times in the fireboxes and, consequently, larger fire boxes than boilers constructed to maximize thermal efficiency. Additionally, these boilers are subject to periodic testing under these regulations which establishes various limits the boilers must comply with whenever firing waste liquid fuels (e.g., minimum combustion temperature, maximum combustion air flow rate, maximum hazardous waste feed rates, etc.) . Although those limits and other RCRA and MACT EEE requirements impact boiler operations, they do not need to be included in the Greenhouse Gas permit because they are currently enforceable under those other programs.

Additional Impacts Analysis

3. **40 C.F.R. Part 52.21(o), Additional Impacts Analysis, requires an applicant to provide an analysis of the impairment to the soils and vegetation that would occur as a result of the modification. Please provide an assessment to support this requirement.**

As explained in Section 3.3 of the INVISTA West Powerhouse GHG permit application, according to EPA's PSD Guidance for Greenhouse Gases, "EPA believes it is not necessary for applicants or permitting authorities to assess impacts from GHGs in the context of the additional impacts analysis or Class I area provisions of the PSD regulations."[1] Of course, as EPA explained when it adopted the Tailoring Rule, "if a facility triggers [PSD] review for regulated NSR pollutants that are non-GHG pollutants for which there are established NAAQS or increments, the air quality, additional impacts, and Class I requirements would apply to those pollutants."[2]

As explained in Section 3.0 of INVISTA's permit application, "[t]he proposed project/changes to the [West Powerhouse] will not result in any criteria pollutant (NO_x, CO, $PM/PM_{10}/PM_{2.5}$, VOC and SO_2) emission rate increases that are greater than the PSD significance thresholds." Therefore, because it is not necessary to assess impacts from GHGs in the context of the additional impacts analysis, and because the project does not trigger PSD review for any other pollutant, an additional impacts analysis is not required.

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1 U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Air Quality Policy Division, *PSD and Title V Permitting Guidance for Greenhouse Gases* (March 2011) at 48.

2 75 Fed. Reg. 31,520 (June 3, 2010).

BACT for the Boilers

4. **On page 10, the BACT analysis for the boilers notes that a search was completed of EPA's RACT/BACT/LAER Clearinghouse (RBLC) for similar sources. This is not the only source of information for BACT determinations. BACT determinations should be based on current technology available for similar units and from most recent regulatory decisions made in actual issued permits by State and Federal permitting authorities as well as additional sources of information from literature searches. Please identify and clarify if additional sources of information were reviewed as comparable available control options, and if none reviewed, please provide such an analysis.**

   In addition to the RBLC, INVISTA has reviewed Greenhouse Gas BACT analyses from more than 75 permit applications or final permits issued by approximately 20 state permitting authorities and 9 EPA regions to determine if the sources covered by those permits were similar to INVISTA's West Powerhouse boilers, and as such could be appropriate for consideration in the BACT analysis for this permit application. In addition, as described in various parts of Section 4 of the INVISTA West Powerhouse GHG permit application, we have reviewed the following information:

   1. *"Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Industrial, Commercial, and Institutional Boilers," U.S. EPA Office of Air and Radiation, October 2010.*
   2. *"Report of the Interagency Task Force on Carbon Capture and Storage"*
   3. *The U.S. Department of Energy National Energy Technology Laboratory (NETL) document "Estimating Carbon Dioxide Transport and Storage Costs"*
   4. *"Industrial Design and Optimization of CO2 Capture, Dehydration, and Compression Facilities" by A. Aboudheir and G. McIntyre.*

   In reviewing these materials, including other GHG permit applications and permits, INVISTA did not identify any similar liquid/gas waste fuel fired boilers for which BACT for greenhouse gases has been established. INVISTA did review and consider the information with respect to how energy efficiency BACT was applied to other combustion sources in general, and INVISTA has applied any such technically feasible measures to its boilers (see response to #5 below).

5. **The BACT analysis for the boilers notes on page 15 of the application that the boilers "already employ energy efficiency measures." The application continues by stating "Refurbishing and modernizing the boilers will restore and improve the energy efficiency measures that are already in place." Please explain what is meant by refurbishing and modernizing the boilers and if they will be considered as "reconstructed" for NSPS purposes. Also, please provide a numerical efficiency for each boiler and the anticipated numerical efficiency associated with each GHG emission reduction measure included as a BACT analysis. Additionally, please provide any numerical technical analysis that may have been completed to ensure that the most efficient boiler configuration was considered.**

Because these are existing boilers, INVISTA Victoria already employs several of the energy efficiency measures described in the permit application at the West Powerhouse boilers and throughout the Victoria site. The boilers will be "refurbished" in that they will receive significant maintenance, including retubing and repairs to existing components. The boilers are planned to be "modernized" in that they will be outfitted with modern burner management systems and other measures to meet current National Fire Protection Association (NFPA) boiler codes. Based upon cost analyses, the boiler projects will not trigger reconstruction as defined in 40 CFR 60.15.

Because of the number of fuels combusted in each boiler and the variability in fuel composition and heat value, the efficiency of each boiler is difficult to measure. In order to calculate boiler efficiencies, the measured flow of each fuel combusted and an estimated fuel composition and heat value of the fuel are used. Given the number of fuels, the accuracy of flow and heat value data, and the combination of fuels to each boiler at any time, calculating boiler efficiency is an approximation only. Over a long-term (annual) averaging period, the boilers are estimated to operate in the range of 75% - 78% efficient as a group, although the estimated efficiency range for each individual boiler or for any short-term period varies much more widely.

The specific numerical efficiency gained from each individual energy efficiency measure is difficult to determine as there are several measures that will be employed in combination, or that will be employed in an improved or enhanced manner, and the efficiency gains are not necessarily additive. However, a summary of the energy efficiency improvement range typically anticipated for each improvement to be implemented at the West Powerhouse Boilers is provided in the table below. A table of existing energy efficiency measures that are already implemented in the West Powerhouse boilers is also provided below.

Table of West Powerhouse Boiler Improved Energy Efficiency Measures

GHG Emission Reduction Measure	Efficiency Improvement [1, 2] (%)	Notes/Issues [1]	INVISTA Boilers 1-4
Replace/ Upgrade Burners	Up to 4-5%.	Site-specific considerations (retrofit ability)	Installing Low NOx burners for NOx control [3]
Optimization	0.5% – 3.0%	Neural network-based	CD requires boilers to be optimized for NOx control [3]
Instrumentation & Controls	0.5% – 3.0% (in addition to optimization)	System integration, calibration, and maintenance	Improved burner management systems to be installed
Air Preheater	A 300°F decrease in gas temperature represents about 6% improvement	Use in large boilers, not widely used in ICIs due to increase in NOx	Existing air preheater will be repaired
Insulation	Dependent on surface temperature	Radiation losses increase with decreasing load	Existing insulation to be repaired /upgraded
Reduce slagging and fouling of heat transfer surfaces	1% to 3%; Site specific; fuel quality/operating condition have large impact	Downtime/economic factors, regain lost capacity	Existing soot blowers will be replaced

1. *The efficiency ranges are estimated from Table 1 in "Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Industrial, Commercial, and Institutional Boilers," U.S. EPA Office of Air and Radiation, October 2010. The Notes/Issues are based on the same source. The EPA document states "[i]n many cases, the impacts of these measures are highly site specific and benefits will vary."*
2. *Generally, efficiency gains are a function of the difference between the new and old technologies or processes and are expressed in percent.*
3. *As stated in the response to Item 1, the Low NOx burners are designed to reduce NOx emissions and, therefore, are not necessarily the most energy efficient burners available. In addition, water used to dilute and provide optimal mixing of urea for SNCR necessarily has an adverse impact on efficiency due to the additional energy needed to vaporize the water in the firebox.*

Table of West Powerhouse Boiler Existing Energy Efficiency Measures

GHG Emission Reduction Measure	Efficiency Improvement [1, 2] (%)	INVISTA Boilers 1-4
Tuning	CO from 1000-2000 to < 200 ppm Unburned carbon (UBC) from 20-30% to 10-15%	CO currently managed under 100 ppm per RCRA/MACT EEE
Economizer	40°F decrease in flue gas temperature = 1% improvement	No economizer, however, stage heaters pre-heat boiler feed water with any excess steam
Reduce air leakages	1.5 – 3% potential (similar to reducing excess air)	RCRA/MACT EEE require monthly monitoring for air leaks and repairs
Capture energy from boiler blowdown	Site specific depending on steam conditions; Up to ~ 7%	Already implemented
Condensate return system	Site specific - depends on condensate temperature and % recovery	INVISTA Victoria has an extensive condensate recovery system
Insulating jackets	Dependent on surface temperature	Utilized throughout the steam system on critical pieces of equipment
Reduce steam trap leaks	Dependent on leak rates	INVISTA Victoria has a program to maintain and repair steam traps

1. *The efficiency ranges are estimated from Table 1 in "Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Industrial, Commercial, and Institutional Boilers," U.S. EPA Office of Air and Radiation, October 2010. The Notes/Issues are based on the same source. The EPA document states "[i]n many cases, the impacts of these measures are highly site specific and benefits will vary."*
2. *Generally, efficiency gains are a function of the difference between the new and old technologies or processes and are expressed in percent.*

Refurbishment is expected to return the boilers to a more efficient condition through, for example, clean boiler tubes, fresh insulation, and repaired air preheaters. The cumulative range of expected benefit from refurbishing the boilers is difficult to predict; however, an average improvement of 1 to 3 percent is expected as compared with historical efficiency. As noted earlier, the NOx controls reduce energy efficiency and may offset the efficiencies gained from

refurbishment. Of course, without boiler refurbishment, energy efficiency losses from NOx controls would be worse.

Regarding an analysis to ensure that the most efficient boiler configuration was selected, such an analysis is not applicable to the existing West Powerhouse boilers whose primary purpose is to recover energy from process-generated waste fuels. As discussed previously in this document and in Section 1.0 of the INVISTA West Powerhouse GHG permit application, recovering energy from a waste that would otherwise be disposed of (i.e., waste liquid fuels and waste gases) is inherently energy efficient. Were the Victoria facility to dispose of the wastes in a different manner (e.g. send liquid fuels to a fuel blender or incinerator, or gaseous fuels to a flare or thermal oxidizer), the fuels would be combusted anyway, and the West Powerhouse boilers would need to make up for the loss in steam generation by increasing use of natural gas or other fossil liquid fuels, resulting in an overall increase in emissions of both criteria pollutants and greenhouse gases. The configuration of the boilers and the slate of fuels fired has been optimized to ensure complete combustion (as required by RCRA and MACT EEE), meet the energy demand of the site, and accommodate the variability of available fuels inherent to process generated waste fuel streams, all in an efficient manner.

6. **In addition to the longer-term CO2e emissions limit provided in the application, please provide a proposed BACT limit for each boiler based on the unit's efficiency or short term emission limits. If an emission limit is not possible to establish, please provide a technical justification to support your conclusion.**

As discussed in the cover letter to this response, the CO2e emission limits proposed in the original permit application are adequate to consider this application complete. As is typical in all permitting actions, final determination of compliance limits and compliance demonstration methodology are negotiated during the permitting process. INVISTA is anticipating working cooperatively with EPA to establish appropriate permit conditions as part of this permitting process.

During the preparation of the original application and the development of this response, INVISTA has relied heavily on upon EPA's "PSD and Title V Permitting Guidance for Greenhouse Gases," dated March 2011, ("GHG Permitting Guidance") and other GHG permits, draft and final, issued by or commented on by the various EPA regions.

Short Term Emission Limits

Based upon the GHG Permitting Guidance, page 46, which states "... since the environmental concern with GHGs is with their cumulative impact in the environment, metrics should focus on longer-term averages ... rather than short-term averages ...,"and due to the high variability in short-term fuel mix inherent in the INVISTA West Powerhouse Boiler operation, INVISTA is not proposing short-term emission limits.

West Powerhouse Compliance

As described above and in Section 1.0 of the INVISTA West Powerhouse GHG permit application, the Victoria waste-fired boilers are unique in their operation and, based upon INVISTA's review, the first hazardous waste combustors to seek a GHG permit. Energy efficiency, fuel heat value, and fuel combinations can vary widely. In addition, the fuels vary widely in carbon content and some fuels contain nitrogen compounds, including N_2O. The NOx reduction technology required by the EPA Consent Decree to be installed on these boilers, SNCR, also contributes to some additional GHG emissions via increased CO_2 and N_2O emissions and efficiency reduction inherent in operation of that technology. Given the large number of variables that impact GHG emissions, determination of an appropriate BACT limit is difficult.

For these reasons, INVISTA proposed in its permit application in Section 4.1.5 to implement the BACT energy efficiency measures by meeting an annual CO_2e emission limit based on boiler firing rate, efficiency and fuels. Also, since the combination of fuels combusted in each boiler can vary and each set of boilers shares a common stack, a boiler specific BACT limit is not appropriate. An annual (12-month or 365-day rolling) total West Powerhouse CO_2e emission limit is an

appropriate limit for the unique operation of these boilers. Any emission limit for individual stacks or individual boilers, as opposed to one limit across all four boilers, would necessarily need to be set at a high level to address the worst-case fuel slate at each compliance point independently. INVISTA believes that its proposal for a limit set to reflect a realistic overall mix of fuels for the four boilers together is most appropriate and meets the requirements for BACT.

Output-based or Efficiency Limits

INVISTA has reviewed numerous draft and final permits. The BACT limits included in the various permits can generally be grouped into four classes:

- *Output based limits (i.e., lbs of CO2e/MW, lbs of CO2e/lbs of steam or production);*
- *Mass limits (i.e., tons per year of CO2e);*
- *Mass limits in combination with output based limits; or*
- *Mass limits in combination with efficiency limits (i.e., % efficiency).*

Numerous permits have been issued with mass limits only. INVISTA has provided, in Attachment 1, a listing of those permits by permitting authority. INVISTA is proposing a mass only limit for the WPH Boilers based upon the following technical justification.

First, an assumption regarding the efficiency of the boilers is inherent in the annual CO2e emissions calculations when determining the amount of heat required to produce a unit of steam. In the case of the WPH Boilers, INVISTA has assumed an efficiency at maximum capacity for those calculations. The actual efficiency of the boilers varies over the operating range of the boilers based on steam demand and available fuels. The assumed efficiency at maximum capacity also takes into considerations the improvements in energy efficiency discussed above in response to question #5, as well as the reduction in efficiency inherent in the NOx control measures, as discussed above in response to question #1. Because energy efficiency is inherent in the annual emission estimate, an additional annual requirement for boiler efficiency is redundant.

Second, as discussed in detail in response to Questions 1 & 2, due to the wide variability in heating value and fuel mix of the various fuels sent to the WPH Boilers, development of a meaningful (not overly conservative) output based limit or boiler efficiency limit is not practical. The WPH Boilers, as hazardous waste boilers with a highly varied fuel mix, are distinguishable from all other combustion sources for which GHG permits have been issued to date.

Finally, while an efficiency measure may be appropriate for natural gas or coal-fired boilers, it is not appropriate for hazardous waste boilers. Unlike traditional boilers, hazardous waste boilers are not designed with energy efficiency as the paramount concern. Rather, ensuring complete destruction of the hazardous constituents in the waste fuels is the primary purpose. Therefore, as discussed previously, these boilers employ higher temperatures and longer residence times than traditional boilers, necessarily reducing their efficiency. The INVISTA boilers are equipped with numerous energy efficiency measures, as discussed in response to Question #5, to make

them as efficient as possible. However, implementation of a measure, such as a maximum flue gas temperature, to monitor energy efficiency is contrary to the primary purpose of the hazardous waste boilers, whose operation under RCRA and MACT EEE require a ***minimum*** *combustion gas temperature to ensure appropriate destruction efficiency.*

For the above reasons, it is technically impractical to include boiler efficiency limits in the INVISTA WPH GHG Permit. As such, INVISTA is proposing, consistent with EPA GHG Permitting Guidance and various issued GHG Permits, an annual (12-month or 365-day rolling) CO2e mass-based emission limit for the WPH Boilers, using a CO2 CEMS and appropriate calculations for non-CO2 GHGs (e.g., methane and N2O).

Basis of Emission Calculations

7. **On page 19 of the permit application, the projected actual emission rate from the boilers was calculated based on the projected actual emission rates. To establish whether a new or modified source is major, the maximum capacity of a stationary source to emit a pollutant under its physical and operational design must be established. Please provide the potential to emit calculations for the various emission units within the permit application.**

   The projected actual emissions are the potential to emit or "PTE" for GHG emissions from the four West Powerhouse boilers. The PTE rates were based on all four boilers operating at full rated steam capacity, 8760 hours per year, with a combination of waste fuel rates that is expected to result in the maximum GHG emissions and sufficient supplemental natural gas to operate the boilers at full capacity. The PTE calculations were provided in Section 6 of the permit application submitted March 13, 2012.

Attachment 1

FINAL PSD GHG PERMITS ISSUED WITH ONLY GHG MASS LIMITS

Facility/Project Name	Permitting Authority / Issuance Date	Type of Project	Emission Unit(s)/ Fuel Source	GHG BACT Limits (Emission Limits and Work Practices)
Effingham County Power	Georgia Department of Natural Resources 5/30/2012	Modification -- Expansion of existing power plant	Auxiliary Boiler	• 2,528 tpy CO2e (12 consecutive months) • 2,500 hours of operation (12 consecutive months) • Use of pipeline quality natural gas with a sulfur content not to exceed 0.5 grains per 100 standard cubic feet (12 consecutive months)
			Combustion turbine and duct burner	• Combustion Turbines firing natural gas: 863,953 tpy per turbine • Combustion Turbines firing fuel oil, with fuel oil combustion limited to 1,000 hours and 159,603 tpy CO2e per turbine • Each duct burner firing natural gas limited to 4,000 hours and 111,837 tpy CO2e per duct burner
			Fuel Gas Heater	• 4,560 tpy CO2e (12 consecutive months) • Good Combustion Practice • Pipeline quality natural gas
Indiana Gasification	Indiana Department of Environmental Management 6/26/2012	New Construction -- New facility to convert coal and petroleum coke into synthetic natural gas and liquefied CO2	Emergency diesel engines and firewater pumps	• 84 tpy CO2 (12-month rolling average)
			AGR vents	• 4,690,000 tpy CO2 during first year of operation (12-month rolling average) • 6,430,000 tpy CO2 during second year of operation (12-month rolling average) • 1,290,000 tpy CO2 thereafter (12-month rolling average)
			Wet Sulfuric Acid Plant	• 474,000 tpy CO2 (12-month rolling average)
			Auxiliary boiler	• 88,167 tpy CO2 (12-month rolling average)

Facility/Project Name	Permitting Authority / Issuance Date	Type of Project	Emission Unit(s)/ Fuel Source	GHG BACT Limits (Emission Limits and Work Practices)
				• Use of natural gas or SNG • Energy efficient boiler design • 81% thermal efficiency
			Gasifier preheat burners	• 6,438 tpy CO2 (12-month rolling average) • Good engineering design • Natural gas or SNG
			Zero Liquid Discharge Spray Dryer	• 2,884 tpy CO2 (12-month rolling average) • Good engineering design • Natural gas or SNG
			Electrical circuit breaker	• Use of pressurized SF6 circuit breakers with leak detection
			Natural gas and SNG piping	• LDAR program including weekly audio/visual inspection of the CO2 compressors in any week in which there are at least 24 hours of operation • Repair of leaks within time frames specified in 40 CFR 63.164(g)
			Syngas hydrocarbon and acid gas flare	• Flare Minimization Plan
Westlake Vinyls Co.	Louisiana Department of Environmental Quality 12/06/2011	Modification -- Add new process to cogeneration plant at SOCMI facility	Turbines and duct burners (natural gas)	• 55,576.77 lb/hr CO2e (hourly maximum) • 243,426.26 tpy CO2e (established in Title V permit) • Use of natural gas as fuel and good combustion practices
			Heat Recovery Steam Generator Engines (natural gas)	• 1,509.23 lb/hr CO2e (hourly maximum) • 39.24 tpy CO2e (established in Title V permit) • Use of natural gas as fuel and good combustion practices
Sabine Pass LNG Terminal	Louisiana Department of Environmental	Modification -- Construct 4 natural gas	Standby Generator Engines (natural gas)	• 412 tpy CO2e (annual maximum) • Use of natural gas as fuel and good

Facility/Project Name	Permitting Authority / Issuance Date	Type of Project	Emission Unit(s)/ Fuel Source	GHG BACT Limits (Emission Limits and Work Practices)
	Quality 12/06/2011	liquefaction trains for LNG export at existing facility		combustion/operating practices
			• Simple and Combined Cycle Refrigeration Compressor Turbines (natural gas) • Simple Cycle Generation Turbines	• 4,872,107 tpy CO2e (annual maximum from the facility-wide emissions) • Good combustion/operating practices and use natural gas fired GE LM2500+G4 turbines
			Acid Gas Vents	• 39.29 lb/hr CO2e (hourly maximum) • 172.09 tpy CO2e (annual maximum)
			Marine Flare (natural gas)	• 2,909 tpy CO2e (annual maximum) • Proper plant operations to minimize flare gas
			Wet/Dry Gas Flares (natural gas)	• 133 tpy CO2e (annual maximum) • Proper plant operations to minimize flare gas
			Fugitive Emissions	• 89,629 tpy CO2e (annual maximum) • Implementing a LDAR program to minimize methane emissions
Essar Steel Minnesota	Minnesota Pollution Control Agency 4/6/2012	Modification -- Modify a project under construction for previously permitted Minnesota Steel Industries	Pellet Furnace (natural gas)	• 710,000 tpy CO2e (12-month rolling sum)
US Steel Keetac	Minnesota Pollution Control Agency 12/06/2011	Modification -- Reactivate phase 1 indurating furnace	Induration – Phase III (fluid bed scrubber, ESP, grate kilns, duct burners)	• 114,000 tpy CO2 (12-month rolling sum) • 186,400 tpy CO2e (12-month rolling sum) • Fuel usage of 26,100 tpy (12-month rolling sum)
Showa Denko	South Carolina	Modification	Facility-wide	• Maximum production rate =

Facility/Project Name	Permitting Authority / Issuance Date	Type of Project	Emission Unit(s)/ Fuel Source	GHG BACT Limits (Emission Limits and Work Practices)
	Department of Health and Environmental Control 6/8/2012	-- Expand graphite electrode manufacturing facility	Limits	85,000 tpy of graphite electrodes • All combustion sources (except for the diesel emergency generator) are permitted to burn only natural gas or propane as fuel
			Pitch Impregnation – Preheater	• 7,424 tpy CO2e (12-month rolling sum) • Good Combustion Practices • Natural gas and propane as sole fuels • Annual Tune Up
			Pitch Impregnation – Hot Oil Heater	• 3,093 tpy CO2e (12-month rolling sum) • Good Combustion Practices • Natural gas and propane as sole fuels • Annual Tune Up
			Autoclave/spray cooler/cooling bath thermal oxidizer	• 8,973 tpy CO2e (12-month rolling sum) • Good Combustion Practices • Natural gas and propane as sole fuels • Annual Tune Up
			Carbottom Furnaces	• 200,009 tpy CO2e • Good Combustion Practices; Natural gas and propane as sole fuels • Annual Tune Up • Thermal Oxidizer • Process optimization
			Graphitizing Furnaces	• 32,852 tpy CO2e insulating media carbon content 90% • Insulating media carbon content of 90% or less • Process optimization
			Emergency	• Good Combustion Practices

Facility/Project Name	Permitting Authority / Issuance Date	Type of Project	Emission Unit(s)/ Fuel Source	GHG BACT Limits (Emission Limits and Work Practices)
			Generator (diesel)	• 100 hours per year operation
U.S. Nitrogen	Tennessee Division of Air Pollution Control 1/4/2012	New Construction -- New facility to manufacture nitric acid, ammonia, and liquid ammonium nitrate solution	Anhydrous ammonia production plant	• 135,592 tpy CO2e (12-month rolling total)
			Nitric acid plant	• 9,021 tpy CO2e (12-month rolling total)
			Flare	• 2,851 tpy CO2e (12-month rolling total)
			Boiler	• 50,110 tpy CO2e (12-month rolling total)
			Diesel fueled emergency firewater pump	• 24 tpy CO2e (12-month rolling total)
Kennecott Repowering Project	Utah Department of Environmental Quality 11/22/2011	Modification -- Replace 3 coal-fired boilers with a new combined-cycle, natural gas fired combustion turbine	Turbine (natural gas)	• 1,090,736 tpy CO2e (12-month rolling period)

INVISTA S.à r.l.
600 14th Street, NW
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By Federal Express and Electronic Mail

Mr. Jeff Robinson
Chief, Air Permits Section
U.S. Environmental Protection Agency, Region 6 (6PD)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

February 14, 2013

Re: Draft Greenhouse Gas Prevention of Significant Deterioration Permit
INVISTA S.à r.l. Victoria Plant West Powerhouse

Dear Mr. Robinson:

I am writing to provide comments on, and request review of, the draft greenhouse gas (GHG) prevention of significant deterioration (PSD) permit for the INVISTA Victoria Plant West Powerhouse (WPH) project that is, in part, mandated by a Consent Decree between EPA and INVISTA.

As you know, INVISTA has been working with Bonnie Braganza and other EPA Region 6 staff to ensure that the draft permit accurately reflects the unique nature of the West Powerhouse operations as reflected in INVISTA's permit application, to clarify INVISTA's obligations under the permit, and to strengthen the administrative record. INVISTA very much appreciates the staff's efforts to address INVISTA's comments on the draft permit. We understand that the draft permit has moved on to management review without the few remaining INVISTA comments below having been addressed, although we have not been provided an updated draft of the permit to review. These few remaining items are important to INVISTA. Accordingly, we are further explaining the basis for our remaining comments and requesting the opportunity to review the draft permit before Region 6 proceeds to public notice. We can conduct our review expeditiously (within 24 hours). This will help ensure that the final permit is issued so that the WPH boiler NOx controls can be installed by the deadlines set out in the Consent Decree.

<u>Section VI.1 – Initial Performance Testing</u>
As initially drafted, this permit condition would require INVISTA to perform an initial stack test to establish the actual quantities of emissions from the two boiler stacks. The condition does not, however, state when the testing must be performed. Because the permit contains a single set of emissions limits for all four boilers, performance testing will only be meaningful if it is

performed after the project has been completed on all four boilers. That is, while testing of a single boiler or even a pair of boilers sharing a single stack could be performed, there are no individual boiler or stack emission limits to compare the performance test results against. Instead, for the performance test results to meaningful, the testing must be performed after the project has been completed on all four boilers, which are subject to combined emissions limits. Therefore, INVISTA requests that EPA revise Section VI.1 to specify that performance testing is required to be conducted only after the project has been completed on all four boilers. This change will clarify INVISTA's obligations under the permit, eliminate the potential for conflicting interpretations of the provision once the permit is issued, and ensure that the performance test results are meaningful.

Section VI.6 – Evaluation of Boiler Thermal Efficiency

This section of the initial draft permit would require INVISTA to perform an evaluation of boiler thermal efficiency. Simply put, this evaluation would not serve any purpose and is not necessary to ensure that the boilers are operated efficiently. Rather, under the permit, INVISTA will be required to continuously measure both boiler CO_2 emissions and boiler steam rates and demonstrate compliance with an output-based CO_2 emission limit (235 lbs CO_2/Mlbs 550 psig steam). INVISTA agreed to EPA's request to establish this output-based emission limit to ensure that the boilers are operated efficiently. Thus, the separate requirement to perform an evaluation of boiler thermal efficiency is not needed and should be removed from the draft permit or, alternatively, revised so that it is clear that the efficiency testing is to be conducted for information purposes only and that the test results are not to be utilized to evaluate compliance.

Section III.A.2 and III.A.3 – Periodic Fuel Sampling

As initially drafted, these permit conditions would require INVISTA to perform semiannual testing of the natural gas and quarterly sampling of the liquid waste fuels fired in the WPH boilers, presumably to establish the carbon content of the fuels (Section III.A.3 is not clear as to the purpose of the waste fuel sampling). Although INVISTA recognizes that periodic fuel sampling has been included in other GHG permits issued by Region 6, such testing should not be required in this case where boiler CO_2 emissions will be directly measured using continuous emissions monitors (CEMS). As INVISTA's permit application made clear, the carbon content of the waste fuels fired in the WPH boilers varies based on the operations of the processes that generate the fuels. Therefore, rather than limit the carbon content of the fuels and use carbon content to calculate or estimate boiler CO_2 emissions, INVISTA has agreed to install CEMS to directly measure boiler CO_2 emissions. Accordingly, periodically sampling the fuels to determine their carbon content would serve no purpose. INVISTA, therefore, requests that the fuel sampling requirements be deleted. Alternatively, INVISTA requests that EPA revise the requirement to make it clear that the fuel sampling is to be conducted for informational purposes only and that the test results are not to be utilized to evaluate compliance.

Again, we appreciate both your and Region 6 staff's consideration of our comments regarding the draft permit. We believe that these remaining items are critical to ensuring that each of the permit terms is meaningful and that INVISTA's obligations under the permit are clear. We also request the opportunity to review the draft permit a final time before Region 6 proceeds with public notice. We are committed to performing our review expeditiously and are hopeful that such review can prevent delays during the public notice process, thereby helping to ensure that

the boiler NOx controls can be installed by the deadlines set out in the Consent Decree that drives this permitting action.

Should you have any questions or need additional information, please contact me at (202) 879-8542, Chris Thiele of Bracewell & Giuliani at (512) 542-2109, or Bharat Contractor of INVISTA at (281) 690-4704.

Very truly yours,

Lara Mathews
Associate General Counsel, Environmental, Health and Safety