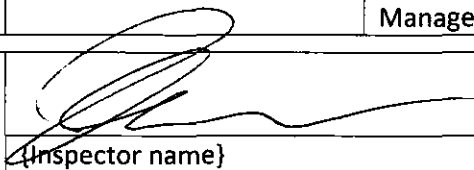
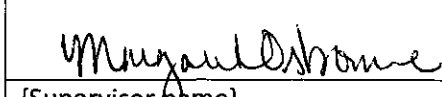


**Region 6 Compliance Assurance and Enforcement Division
INSPECTION REPORT**

Inspection Date(s):	10/25/2017		
Media:	Air		
Regulatory Program(s)	NESHAP NSPS Title V Clean Air Act		
Company Name:	Total Petrochemicals & Refining USA, Inc.		
Facility Name:	Carville Polystyrene Plant		
Facility Physical Location:	6225 Hwy 75		
(city, state, zip code)	Carville, LA, 70721		
Mailing address:	PO Box 98		
(city, state, zip code)	Carville, LA, 70721		
County/Parish:	Iberville Parish		
Facility Contact:	Jill Lamberth	Environmental Group Leader	
	jill.lamberth@total.com		
FRS Number:	110000597319; 110020042808		
Identification/Permit Number:	AI 5176		
Media Number:	AFS 2204700036		
NAICS:	325211		
SIC:	2821		
Personnel participating in inspection:			
Justin Chen	EPA 6EN-AT	Environmental Engineer	214-665-2273
James Haynes	EPA 6EN-AT	Physical Scientist	214-665-6569
James Leathers	EPA 6EN-AT	Environmental Engineer	214-665-8545
Prince Nfodzo	EPA 6EN-AA	Environmental Engineer	214-665-7491
Ashlie LeBlanc	LDEQ	Environmental Scientist	225-219-3361
Cory Lormand	LDEQ	Environmental Scientist	225-219-3040
Jill Lamberth	TPRI	Environmental Group Leader	225-642-4772
David Shaw	TPRI	Polystyrene Operations Manager	225-642-4625
EPA Lead Inspector Signature/Date			12-13-17
	{Inspector name}		Date
Supervisor Signature/Date			12-13-17
	{Supervisor name}		Date

Section I – INTRODUCTION

PURPOSE OF THE INSPECTION

EPA Region 6 inspectors Justin Chen (lead inspector), James Haynes, James Leathers, and Prince Nfodzo arrived at the Total Petrochemicals & Refining USA, Inc.—Carville Polystyrene Plant at 8:30 AM on 10/25/2017 for an announced inspection. We met with Jill Lamberth (Environmental Group Leader), David Shaw (Polystyrene Operations Manager), Russell Watts (Polystyrene General Supervisor), Michael Roussel (Environmental Engineer), Lance Martin (Health Safety, Security and Environmental Manager), and Donna Schlotzhauer, P.E. (Environmental Engineer) at the Opening Conference. Prince Nfodzo presented his credentials to facility staff and I informed them that this was an EPA inspection to determine compliance with the facility's Title V Air Permit and the Clean Air Act. The scope of the inspection was a partial compliance evaluation (PCE) that included evaluation of the compliance of the facility with its Title V operating permit and Louisiana State Implementation Plan (SIP) regulations, specifically focusing on flaring operations. This inspection was prompted by the National Enforcement Initiative: Cutting Hazardous Air Pollutants and its associated Enforcement Alert concerning Flaring Efficiency Violations. The inspection was conducted in coordination with the Louisiana Department of Environmental Quality (LDEQ), with Ashlie LeBlanc (Environmental Scientist) and Cory Lormand (Environmental Scientist) of LDEQ attending the inspection. See Appendix 2 for Opening Conference Sign-in Sheet.

FACILITY DESCRIPTION

Total Petrochemicals & Refining USA, Inc. (TPRI), owns and operates the Carville Polystyrene Plant in Carville, Louisiana. The facility was established in 1984 and operates 8760 hours per year. It has a rated annual production of approximately 1.55 billion pounds of polystyrene, and it is contiguous with the Cos-Mar Styrene Monomer Plant. The plant produces polystyrene by continuous polymerization of styrene monomer in liquid phase reactor systems. Unreacted styrene is flashed off in vacuum devolatilizers and the molten polymer is extruded and pelletized.

There are 4 active production lines, with an annual production capacity of approximately 200 million pounds for Polystyrene Line 1000 (Line 2000 is permanently shut down), 400 million pounds for Polystyrene Line 3000, 350 million pounds for Polystyrene Line 4000, and 600 million pounds for Polystyrene Line 5000.

Regulated Clean Air Act (CAA) units includes hot oil heaters, cooling towers, wastewater collection systems, storage tanks for raw materials, additives and finished products, and thermal oxidizers (3 total) and flares (2 total) for control of air emissions.

Section II - OBSERVATIONS

At the opening conference, TPRI staff provided documents as requested from Appendix 3 for review. TPRI staff told me that the facility produces 2 grades of polystyrene, one with rubber and one without rubber. I was told that the 2 flares are emergency use only with no continuous venting. All continuous venting is to the 3 thermal oxidizers, where Polystyrene Line 1000 and 3000 share TO-3010, Polystyrene Line 4000 uses TO-4010, and Polystyrene Line 5000 uses TO-5010. For the flares, TPRI staff said that Polystyrene Lines 1000 and 3000 share flare FL-1100, and Polystyrene Lines 4000 and 5000 share flare

FL-4100, and that the flares are used 1 to 2 times a year as they're only operated when associated rupture disks are breached. TPRI explained that 1 rupture disk had been breached in 2013, 2014, and 2017, 2 rupture disks had been breached in 2015, and a larger event occurred in 2016.

I asked the TPRI staff what were the back up control devices for the thermal oxidizers if they were not operable, and they said that each thermal oxidizer had a carbon canister system for back up. TPRI said that there were eight (8) 1000-pound carbon canister vessels, 2 per production line, and if a thermal oxidizer were to fail, the carbon canisters would be automatically routed to from the production lines.

When I asked about the details of the flare operations and whether or not performance tests had ever been conducted on either flare, TPRI staff told me that there has been no performance testing because it would require a simulated rupture disc breach scenario, which is potentially hazardous to staff working in the vicinity. TPRI staff told me that flare steam assist injection occurs only during active flare use and if there are visual emissions observed, and that steam injection is controlled from the board of the control room. TPRI staff explained that if a power outage were to occur during flare usage, steam would be injected at its maximum rate, where TPRI staff assume that the steam injection would not snuff out the flame. TPRI staff told me that they assume that, in the event of a rupture, the vent gas being sent to the flare would be of inherently high heat content from the production line. I was also told that each flare monitors if its pilot flame is lit with 2 thermocouples for each flare. I continued to review the TPRI-provided data, including an approved waiver request (Appendix 4) waiving requirements for conducting performance tests on its 2 flares. As part of this waiver request, engineering calculations for the heat content and flare tip velocity were included, substantiating those requirements from 40 CFR §63.11(b)(7).

I participated in a site tour of the facility with TPRI staff following the opening conference. We first visited Polystyrene Line 5000 and were shown its thermal oxidizer TO-5010 as well as its backup carbon canister system at surge drum T5007. TPRI staff said that only styrene and ethylbenzene vapor would be sent to the flare in a rupture disc breach scenario. Using a forward looking infrared (FLIR) camera, I observed flare FL4100 and saw no emissions. I observed a steam leak from the flare and informed facility staff. I also observed Polystyrene Line 3000's cooling tower with the FLIR camera and observed no significant emissions. The inspection team moved on to flare FL1100, where I observed the flare with the FLIR camera and observed no emissions. Neither flare FL1100 or FL4100 were in use at the time of inspection.

The inspection team returned from the field to have a departure conference from the facility. I requested flare usage data from 2014 to 2017 and Jill Lamberth stated she would send it to me by email.

Section III – AREAS OF CONCERN

I observed no areas of concern (AOCs) at the time of the inspection. At the departure conference I requested flare usage data from 2014 to 2017 for both flares, but had no areas of concern to share with TPRI staff at the departure conference. I received signed Confidentiality Notices from TPRI management for Confidential Business Information (CBI) provided by the facility, and copies of photographs taken at the facility were given to TPRI management at the departure conference. Photos taken during the inspection are located in Appendix 1.

Section IV – FOLLOW UP

The following information was received by EPA after exiting the Facility on October 25 2017:

- 2014-2017 SUMMARY OF FLARE EVENTS.xlsx (Appendix 5)
- 2014-2017 EMISSIONS SUMMARY OF FLARE EVENTS REV 1.xlsx (Appendix 6)

These 2 documents provided expanded detail on the periods of time where flare FL1100 and FL4100 were used because rupture disc breaches had occurred. I found no additional AOCs after reviewing these documents.

Section V – LIST OF APPENDICES

Appendix 1 – Photo Log – 2 photos taken 10/25/2017

Appendix 2 – Opening Conference Sign-in Sheet

Appendix 3 – Documents Request

Appendix 4 – Request for Waiver of Flare Performance Test & LDEQ Approval

Appendix 5 – 2014-2017 SUMMARY OF FLARE EVENTS.xlsx

Appendix 6 – 2014-2017 EMISSIONS SUMMARY OF FLARE EVENTS REV 1.xlsx

**Region 6 Compliance Assurance and Enforcement Division
INSPECTION REPORT**

Appendix 1

Photograph Log



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 1

Location: Total Petrochemicals & Refining USA, Inc./Carville Polystyrene Plant		
City: Carville	County/Parish: Iberville Parish	State: Louisiana



Photo File Name:	DSCN0203.JPG
Date of Photo:	10/25/2017
Time of Photo:	10:37AM
Photographer:	Justin Chen
Description:	Flare FL4100



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 2

Location: Total Petrochemicals & Refining USA, Inc./Carville Polystyrene Plant		
City: Carville	County/Parish: Iberville Parish	State: Louisiana



Photo File Name:	DSCN0204.JPG
Date of Photo:	10/25/2017
Time of Photo:	10:49AM
Photographer:	Justin Chen
Description:	Flare FL1100

**Region 6 Compliance Assurance and Enforcement Division
INSPECTION REPORT**

Appendix 2

Opening Conference Sign-in Sheet

Total Petrochemicals & Refining USA, Inc./ Carville Polystyrene Plant
Inspection Date 10/25/2017

		Meeting with <u>Total Polystyrene Carville, La</u> Purpose of meeting: <u>CAA Inspection</u>		Date: <u>10, 25, 17</u>	
	Name	Title	Representing	e-Mail	Phone
1	Justin Chen	Env. Engineer	U.S. EPA RG	Chen, Justin@epa.gov	214-665-7273
2	James Haynes	Physical Scientist	US EPA RG	haynes.james@epa.gov	214-665-6516
3	James Leathers	Env. Engineer	US EPA RG	James.Leathers@epa.gov	214-665-6569
4	Prince Nforozo	Env. Engineer	US EPA RG	nforozo.prince@epa.gov	214-665-7491
5	Jill Lamberth	Env. Group Leader	TPRI	jill.lamberth@total.com	225-642-4772
6	David Shaw	PS Operations Mgr.	TPRI	david.shaw@total.com	225-642-4625
7	Russell Watts	PS General Supervisor	TPRI	russell.watts@total.com	225-642-4528
8	Ashlie LeBlanc	Env. Scientist	LD&R	ashlie.leblanc@ldr.com	225-314-3361
9	Michael Roussel	Env. Engineer	TPRI	michael.roussel@total.com	225-642-4580
10	Lance Martin	HSE Manager	TPRI	lance.martin@total.com	225-642-4341
11	Cory Lormand	Environmental Scientist	LD&R	Cory.Lormand@ldr.com	225-314-3040
12	Donna Schlotehauer	Env. Engineer	TPRI	donna.schlotehauer@total.com	225-642-4763
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Region 6 Compliance Assurance and Enforcement Division
INSPECTION REPORT

Appendix 3

Documents Request

Total Petrochemicals & Refining USA, Inc. – Carville Polystyrene Plant
Carville, Louisiana
E.P.A. 6EN-AT Records/Documents Request

GENERAL PROCEDURE

During the focused Clean Air Act compliance investigation at Total Petrochemicals & Refining USA, Inc. (TPRI) – Carville Polystyrene Plant in Carville, Louisiana, inspectors will be reviewing records kept for your facility. In order to expedite this portion of the investigation, EPA is providing you advanced notification of the records that will likely be reviewed on-site. For most documents, EPA will review the records on-site and request copies, as needed. In certain cases, document copies will be requested for later review by EPA.

In preparation for this focused multimedia compliance investigation, EPA has divided this record and document request into two sections. The first section consists of documents that EPA would like available and copies prepared (only as noted) on October 25, 2017. The second section consists of general and media specific documents that will most likely be reviewed by EPA inspectors during the inspection. Other documents may also be requested that are not listed. During the investigation, EPA will work with TPRI to develop a schedule to review these documents.

PART 1 - Please have these documents available on October 25, 2017

1. Descriptions for all process areas including the following information:
 - a. Process flow diagrams (4 copies) with attached written descriptions
 - b. Material balances
 - c. Pollution control equipment
 - d. Raw materials used and annual usage
 - e. Products made
2. Site map of the facility (4 copies)
3. Facility organizational chart (including overall responsibilities and environmental department) (1 copy)
4. Monthly production for each type of product manufactured from 2014 to present (1 copy)

Clean Air Act (CAA)

5. Most recent Title V operating permit (1 copy)
6. Identification of emission sources subject to MACT requirements
7. Provide the following information for flares at the facility:
 - a. Date of installation
 - b. Manufacturer and model number
 - c. Purpose (e.g., emergency only, routine, intermittent process waste gas)

- d. General design type (*e.g.*, ground or elevated, multi-tip or single tip, assisted or non-assisted; if assisted, indicate whether flare is steam, air, or pressure assisted)
 - i. Minimum assist steam (in lb/hr) or assist air (in scf/hr) rate at all locations on each flare, and means of control of steam or air (*e.g.*, valve, bypass orifice);
- e. Please describe how the amount of waste gas, purge gas, sweep gas, supplemental gas, assist steam, and assist air is measured or monitored
- f. Please provide a diagram that shows the locations of each:
 - i. Measurement or monitoring point for pressure, flow, net heating value, molecular weight, and constituent concentration
 - ii. Injection point for purge gas, sweep gas, and supplemental gas
- 8. All stack test/performance test reports for the flare(s) describing methods used, test data, calculations, test results and process information. Include all test data from tests done by the company, consultants or regulatory agencies.
- 9. For all continuous monitoring systems (i.e. COMS, CEMS, etc.), provide a description of monitoring data for each monitored parameter used to demonstrate continuous compliance with any applicable emission standard or permit requirement.

Part 2 – Documents to be provided post inspection

General

- 1. Enforcement Actions/Notices of Violations (NOVs)
- 2. Consent Decrees/Orders/Agreements and related correspondences

Clean Air Act

- 3. For periods when waste gas is sent to the flare(s), please provide the following information for each flare in searchable and editable electronic format (*e.g.*, spreadsheet):
 - a. The hourly average net heating value, in British Thermal Units per standard cubic foot (BTU/scf), of the vent gas for the period beginning 3 years prior to the date of receipt of this request.
 - b. The hourly average concentration of each constituent of the vent gas for the period beginning 3 years prior to the date of receipt of this request.
 - c. The hourly average mass flow rate, in lb/hr, of the vent gas for the period beginning 3 years prior to the date of receipt of this request.
 - d. The hourly average rate at which assist steam and/or assist air was added to the flare, in lb/hr for steam, or scf/hr for air, at all locations on each flare (i.e., the sum of seal, upper, lower, winterizing, etc.) for the period beginning 3 years prior to the date of receipt of this request.

If the hourly averages for any or all of the subsections above are measured, but data is not available, provide an explanation for each time period missing hourly data (*e.g.*, flare not in service, instrumentation malfunction, etc.).

If the requested data is not measured or otherwise monitored, use the best means available to calculate/estimate the hourly averages. Provide a narrative explanation and example calculations describing how you arrived at your response. Such methods of calculation/estimation include, but are not limited to, the use of calculations from an online, intermittent, or continuous gas chromatograph (whether at the flare or upstream of the flare), estimating flow from pressure measurements or from valve position data, periodic samples/analysis of gas flowing to the flare, and/or process knowledge.

If the requested data was not measured or cannot be calculated or estimated (*e.g.*, lack of equipment, equipment malfunction, and/or maintenance at a flare), provide an explanation of why no data is available and why the data cannot be calculated or estimated.)

4. For each flare (if applicable), provide the hourly average Steam-to-Vent Gas Ratio (lb Steam/lb Vent Gas) for the period beginning 3 years prior to the date of receipt of this request. If the rate at which steam added is not measured, use the best means available to estimate it. Provide a narrative explanation, including considerations for seasonal variations and minimum flow, with example calculations describing how you arrived at your response. All steam (including minimum or bypass steam) should be included in ratio calculation.
5. For each flare, describe how the pilot flame is monitored and how the monitoring data is recorded. Provide the monitoring data for the flare pilot flame for the period beginning 3 years prior to the date of receipt of this request.
6. For each flare, provide copies of documents in your possession, custody, or control pertaining to operating procedures, monitoring procedures, and flare performance testing.
7. For each flare, state whether the flare is configured to receive gases/vapors from one or more pressure relief device(s), which is a safety device used to prevent pressures from exceeding the maximum allowable working pressure of the process equipment.

Region 6 Compliance Assurance and Enforcement Division
INSPECTION REPORT

Appendix 4

Request for Waiver of Flare Performance Test & LDEQ Approval

March 17, 2017

Yanfu Zhou
Air Permits Administrator
Louisiana Department of Environmental Quality
602 N. 5th Street
Baton Rouge, LA 70802

Re: Request for Waiver of Flare Performance Test
Total Petrochemicals & Refining USA, Inc.
Carville Polystyrene Plant
Agency Interest #5176

Dear Mr. Zhou:

On behalf of our client, Total Petrochemicals & Refining USA, Inc. (TPRI), SLR International Corporation (SLR) is providing this waiver request to the Louisiana Department of Environmental Quality (LDEQ) for the testing of two flares at TPRI's polystyrene manufacturing facility located in Carville, LA. The waiver is being requested for safety reasons.

TPRI's Polystyrene Plant is subject to the requirements of 40 CFR Part 63 Subpart JJJ – National Emissions Standards for Hazardous Air Pollutants: Group IV Polymers and Resins. The facility produces polystyrene resin using a continuous process on four separate production lines. Each production line is equipped with pressure relief devices (PRDs) which are routed to two steam-assisted emergency use only flares (F1100 and F4100) through individual closed vent systems. The PRDs are a safety feature designed to relieve to the closed vent system only when process equipment experiences significantly higher than normal operating pressure.

A Request for Waiver was submitted to the US Environmental Protection Agency (EPA) Region 6 on September 6, 2016. However, due to the fact that LDEQ is the duly delegated authority for administering the Group IV Polymers and Resins NESHAP in the State of Louisiana, Region 6 has deferred the decision and directed TPRI to seek approval of the waiver through LDEQ. SLR has provided the original request submitted to Region 6 with this letter as Attachment 1. We ask that LDEQ consider this original request, and all representations and calculations contained therein, as a request of LDEQ for the same waiver consideration.

Should you have any questions about this matter, please call me directly at (225) 288-5250, or email me at tdesselles@slrconsulting.com.

Sincerely,
SLR International Corporation

Timothy Desselles, PE
Managing Principal

cc Jill Lamberth
Attachment

Attachment 1
Request for Waiver Letter to EPA Region 6



TOTAL
COMMITTED TO BETTER ENERGY

TOTAL PETROCHEMICALS & REFINING USA, INC.

Carville Styrenics Site

September 6, 2016

MEL-39-16

CERTIFIED MAIL 7015 0640 0002 7234 7677

U.S. Environmental Protection Agency (EPA) Region 6
Director, Air, Pesticides and Toxics
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Re: Request for Waiver of Flare Performance Test
Total Petrochemicals & Refining USA, Inc.
Carville Polystyrene Plant
Agency Interest #5176

Dear Sir or Madam:

This letter is a request by Total Petrochemicals & Refining USA, Inc. (TPRI) for a waiver of the requirement to conduct a performance test on two flares at its polystyrene resin manufacturing facility located in Carville, Louisiana. TPRI requests this waiver for safety reasons.

TPRI's Polystyrene Plant is subject to the requirements of 40 CFR Part 63 Subpart JJJ National Emission Standards for Hazardous Air Pollutant Emissions: Group IV Polymers and Resins. The facility produces polystyrene resin using a continuous process on four separate production lines. Each production line is equipped with pressure relief devices (PRDs) which are routed to two steam-assist emergency use only flares (F1100 and F4100) through individual closed vent systems. The PRDs are a safety feature designed to relieve to the closed vent system only when process equipment experiences significantly higher than normal operating pressure.

Each production line contains PRDs subject to the requirements of 40 CFR §63.1331(a)(9)(iv), which specifies that both the closed vent system and control device must meet the requirements of 40 CFR §63.172. Section 63.172(d) requires flares used to comply with the subpart to meet the requirements of 40 CFR §63.11(b), pertinent provisions of which are referenced below:

Citation	Requirement
§63.11(b)(7)(ii)	Steam-assisted and non-assisted flares designed for and operated with an exit velocity, as determined by the method specified in paragraph (b)(7)(i) of this section, equal to or greater than 18.3 m/sec (60 ft/sec) but less than 122 m/sec (400 ft/sec), are allowed if the net heating value of the gas being combusted is greater than 37.3 MJ/scm (1,000 Btu/scf).
§63.11(b)(7)(iii)	Steam-assisted and non-assisted flares designed for and operated with an exit velocity, as determined by the method specified in paragraph (b)(7)(i) of this section, less than the velocity V_{max} , as determined by the method specified in this paragraph, but less than 122 m/sec (400 ft/sec) are allowed.

U.S. Environmental Protection Agency (EPA) Region 6
Director, Air, Pesticides and Toxics
September 6, 2016
Page 2

Engineering calculations, provided in Attachment A, demonstrate that in a worst scenario emergency relief to flares F1100 and F4100, the net heating value of the gas combusted will be greater than 37.3 MJ/scm. TPRI's engineering calculations also demonstrate that the flare tip velocity in the worst case scenario is 179.62 ft/sec, well within the range specified in 40 CFR §63.11(b)(7)(ii). As further demonstrated in Attachment A, the flare tip exit velocity will not exceed velocity V_{max} in a worst case scenario relief to the flares. TPRI's engineering calculations demonstrate that flares F1100 and F4100 are in compliance with 40 CFR §63.11(b) and 63.1333(e).

To create representative conditions for a performance test of flares F1100 and F4100, TPRI would have to simulate an emergency condition necessitating a significant overpressure of equipment on one or more production lines. Such a simulation of extreme operating conditions would create an unsafe situation and a potential safety risk for facility employees, testing personnel, and site contractors.

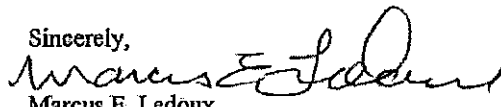
We have included, as Attachment B, copies of EPA approvals of flare performance test waivers due to safety concerns in Applicability Determination Index Nos. M050039 (hydrogen cyanide vent gas unsafe for stack sampling) and Z990002 (conditional waiver under 40 CFR §61.13(h)(1)(iii) for safety reasons). TPRI requests similar consideration of TPRI's safety concerns for testing of flares F1100 and F4100.

In requesting this performance test waiver, TPRI notes that 40 CFR Part 63 Subpart YY (NESHAP For Source Categories: Generic MACT Standards) §63.1103(g)(5)(iv) provides for submission of engineering calculations for net heating value and flare exit velocity if a performance test "would create an unreasonable hazard for testing personnel." Section 63.1103(g)(5)(iii) provides that "if a facility controls process vent emissions during startup, shutdown, and malfunction by using a flare, an owner or operator is not required to perform flow rate and heat content testing as specified in §63.987(b)(3)(ii) and (iii)." Furthermore, 40 CFR §63.1103(g)(5)(iii) provides that "in lieu of performing flow rate and heat content testing, an owner or operator is required to submit engineering calculations that substantiate that a flare meets the applicable heat content or flow rates, or provide data from a compliance assessment that the flare is in compliance under worst case conditions (e.g., maximum operating conditions)." Although 40 CFR §63.1103 is not directly applicable to the Carville Polystyrene Plant, we are referencing these provisions to show that engineering calculations may be used in lieu of actual performance testing under circumstances directly relevant to the facility's polystyrene production line, closed vent system and flares.

Based on the authorities and concerns for facility safety cited above, TPRI requests pursuant to 40 CFR §63.7(h)(2) that the attached engineering calculations be used to demonstrate compliance with the parameter limits specified in 40 CFR §63.11(b)(7)(ii) and (iii), and that performance test requirements for flares F1100 and F4100 be waived.

Thank you for your consideration of this waiver request. If you have any questions, or require additional information, please contact Jill Lamberth at (225) 642-4772 or Donna Schlotzhauer at (225) 642-4763.

Sincerely,


Marcus E. Ledoux
Site Manager

cc: LTM, TPRI
PYS, TPRI
DFS, TPRI

FLARE TIP VELOCITY

Serge Scenario #2

Diameter =	16.0 inches	BTU/lb =	17767
Design Max flow =	244,446.0 lbs./hr as styrene	BTU/mole =	1847768
MW =	104.0	BTU/scf =	4793.173
cross section area =	1.4 sq. ft.		
		P	14.7 psia
		n	0.7 moles/sec
		R	10.73 ft ³ *psi/(lbmole-°R)
		T	68 °F
		T	527.67 °R

$$V = nRT/P$$

$$V = 251.5 \text{ ft}^3/\text{s}$$

$$\text{velocity} = V/\text{area}$$

$$\text{velocity} = 179.6 \text{ ft/sec}$$

This scenario is specific to the FL4100 flare. The FL1100 flare is expected to have a much lower worst case release scenario, but in the absence of that data it will be assumed to be the same as FL4100.

VMAX

$$H_T = 177.28 \text{ MJ/scm}$$

$$\log_{10}(V_{\max}) = (H_T + 28.9) \cdot 31.7$$

$$\log_{10}(v_{\max}) = 6.50$$

$$v_{\max} = 3,168,377 \text{ ft/sec}$$

HEAT CONTENT

$$H_T = K \sum_{i=1}^n C_i H_i \quad 1.740 \times 10^{-7} \left(\frac{1}{\text{ppmv}} \right) \left(\frac{\text{g - mole}}{\text{scm}} \right) \left(\frac{\text{MJ}}{\text{kcal}} \right)$$

$$K = 1.74\text{E-}07 (1/\text{ppm}_v) * (\text{gmol/scm}) * (\text{MJ/kcal})$$

Assumptions: In flaring events, only styrene monomer will be destructed by flare.

$$\begin{aligned} &4265.64 \text{ kJ/gmol} \quad \text{http://www.styrenemonomer.org/2.2.html} \\ &0.2388459 \text{ kcal/kJ} \end{aligned}$$

$$H_{\text{sty}} = 1018.83 \text{ kcal/gmol}$$

$$100 \% \text{ styrene} = 1000000 \text{ ppm}_v$$

$$H_T = 177 \text{ MJ/scm}$$

ATTACHMENT B

**COPIES OF EPA APPROVALS OF PERFORMANCE TEST WAIVERS
ADINOS. M050039 AND Z990002**



U.S. Environmental Protection Agency Applicability Determination Index

Control Number: M050039

Category: MACT
EPA Office: Region 6
Date: 09/20/2004
Title: Waiver of Flare Performance Testing
Recipient: W. Dennis Isaacs
Author: Mark Hansen
Comments:

Subparts: Part 63, A, General Provisions

References: 63.11
63.7(e)(2)(iv)

Abstract:

Q: Does EPA waive a performance test requirement for vent streams that contain hydrogen cyanide (HCN) and allow the use of an alternative method of demonstrating compliance, under 40 CFR part 63, subpart A, at DuPont Chemical Solutions Enterprise's facility in Beaumont, Texas?

A: Yes. EPA grants the waiver of performance testing under MACT subpart A for flow measurement and heat content because the facility has demonstrated compliance using alternate means.

Letter:

AI/AI/RA

161

September 20, 2004

Mr. W. Dennis Isaacs
Environmental Team Leader

DuPont Chemical Solutions Enterprise
PO Box 3269
Beaumont, TX 77704

Re: Request for Waiver of Flare Performance Testing DuPont Chemical Solutions Enterprise
TCEQ Account No. JE-0033-C

Dear Mr. Issacs:

This letter is in response to your letter dated November 18, 2002. Your letter requests a waiver of testing from for your aniline (ANI/PRC373-NOx) and acrylonitrile (ACR-FLR57, ACRN ISBL) flares, which are subject to 40 CFR 63.11, located at your Beaumont facility in Beaumont, TX, owned and operated by DuPont Chemical Solutions Enterprise ("DuPont"). This letter addresses the ISBL flare.

You stated in your request that the ACRN ISBL flare receives vent gases from eight equipment vents and twenty relief valves. The primary component of the normal vent gas streams is hydrogen cyanide (HCN). This makes the stack sampling for net heating value and exit velocity an unsafe procedure. Your submittal included engineering calculations for net heating value base on composition, and exit velocity. Based on these reasons, you requested a waiver of testing for the requirements of 63.11(b) for the Method 18 measurement of stack gas composition and Method 2 exit velocity determination.

You stated that ISBL flare has a flow meter installed in the stack that will monitor the waste gas flow rate on a continuous basis. The flare operates under two different scenarios:

- (1) Steam assisted. This occurs when the vent gas to the flare is pure propylene from a propylene proving meter truck. The heating value of propylene is 2,333 Btu/scf. The flow monitor will be used to ensure it stays with the exit velocity limits.
- (2) Non assisted. During normal operations, the organic loading in the vent gas stream is sufficient to meet the 200 Btu/scf requirement. During startup conditions, the vent gas stream organically lean and is mostly nitrogen. A sample is taken from the flare knockout drum liquid to determine the organic content of the gas. The supplemental natural gas feed is controlled based upon the vent gas flow rate and the Btu value of the waste gas to meet 200 Btu/scf.

Pursuant to 40 CFR 63.7(e)(2)(iv), EPA grants the waiver of performance testing for flow measurement and heat content for the ISBL since the facility has demonstrated compliance using alternate means.

1. As a condition of this waiver, DuPont must record the supplemental natural gas flow rate during the non-assisted scenario.
2. As a condition of this waiver, DuPont must record the daily heating value calculated of the vent gas stream based upon the sample taken at the flare knockout drum.
3. As a condition of the waiver, DuPont must report any one hour periods in which the average velocity of the stream exceeds the velocity limit as calculated using the equation in 40 CFR 63.11(b)(7) for either scenario.

This approval of an AMP is based on the information submitted to EPA Region 6 on November 18, 2002. If any information is found that would reverse this determination, then it would become invalid and a new determination would be needed.

If you have any questions concerning this determination, please contact Ms. Anupa Ahuja of my staff at (214) 665-2701.

Sincerely yours,

Mark Hansen
Acting Chief
Air/Toxics and Inspection
Coordination Branch

cc: Jeff Greif (TCEQ)



U.S. Environmental Protection Agency
Applicability Determination Index

Control Number: Z990002

Category: NESHAP
EPA Office: Region 6
Date: 01/06/1997
Title: Conditional Waiver of Flare Performance Testing
Recipient: E.G. Fiesinger
Author: John R. Hepola

Subparts: Part 61, A, General Provisions
Part 61, V, Equipment Leaks/Fugitive Emission Sources

References: 61.13(h)(1)(iii)
61.242-11(d)

Abstract:

Q: Will EPA grant a waiver pursuant to 40 CFR 61.13(h)(1)(iii) from the requirement to conduct performance testing of a flare for safety reasons?

A: Yes, EPA will grant a waiver pursuant to 40 CFR 61.13(h)(1)(iii) from the requirement to conduct performance testing of a flare for safety reasons if compliance with the requirements of 40 CFR 60.18 is demonstrated by other means.

Letter:

January 6, 1997

Mr. E. G. Fiesinger
Manufacturing Technologist
Monsanto Company
P.O. Box 711
Alvin, TX 77512-9888

Re: Conditional Waiver of Flare Performance Testing Monsanto Company, TNRCC Account No. BL-0038-U

Dear Mr. Fiesinger:

By letter dated April 4, 1994, the Texas Natural Resource Conservation Commission (TNRCC) forwarded a request from Monsanto Company for a waiver of the requirements for performance testing that are specified in section 60.18(f)(3) and in section 60.18(f)(4) of Title 40, Code of Federal Regulations (CFR) Part 60 for the determination of net heating value and flare tip velocity, respectively. The waiver of testing requirements was requested since Monsanto has determined that it is unsafe to sample the flare header. The subject flare is located in your alkyl benzene facility in Alvin, Texas. The alkyl benzene facility is subject to Subpart V of 40 CFR Part 61 - National Emission Standard for Equipment Leaks (Fugitive Emission Sources). The flare is required to comply with the general control device requirements for flares in 40 CFR 60.18 by section 61.242-11(d) of Subpart V of 40 CFR Part 61.

You submitted engineering calculations demonstrating that the net heating value of the gas being combusted in the flare is 290 Btu/scf under normal operating conditions when the NESHAP stripper is venting to the flare. Since the flare is non-assisted, a minimum net heating value of 200 Btu/scf is required by 40 CFR 60.18(c)(3). You also submitted engineering calculations for the flare exit velocity. The actual exit velocity of 2.2 ft/sec under normal operating conditions when the NESHAP stripper is venting to the flare is 3.7 percent of the maximum permitted velocity of 60 ft/sec in 40 CFR 60.18(c)(4)(i) for a non-assisted flare which is combusting a gas with the minimum net heating value of 200 Btu/scf.

We are granting a conditional waiver pursuant to 40 CFR 61.13(h)(1)(iii) for safety reasons of the requirements for performance testing of the flare in your alkyl benzene facility for net heating value and flare exit velocity. Natural gas is added to the gas being combusted in this flare. The waiver is contingent upon the addition of a minimum of 30 standard cubic feet per minute of natural gas to the gas being combusted in this flare.

If you have any questions concerning this waiver, please contact Mr. George V. Marusak of my staff at (214) 665-8388.

Sincerely yours,

John R. Hepola
Chief
Air/Toxics and Inspection
Coordination Branch

cc: Jeanne Philquist, TNRCC
Jeffrey P. Greif, TNRCC
Karen Atkinson, TNRCC Region 12 - Houston

JOHN BEL EDWARDS
GOVERNOR



CHUCK CARR BROWN, PH.D.
SECRETARY

State of Louisiana
DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL SERVICES

Certified Mail No. 7013 1090 0002 2608 67997

Agency Interest (AI) No. 5176
Activity No. PER20170001

Mr. Marcus E. Ledoux
Site Manager

Total Petrochemicals & Refining USA, Inc. REC'D MAR 27
P. O. Box 98
Carville, LA 70721

RE: Letter of Response
Total Petrochemicals & Refining USA, Inc. – Carville Polystyrene Plant
Carville, Iberville Parish, Louisiana

Dear Mr. Ledoux:

By letter dated March 17, 2017, Total Petrochemicals & Refining USA, Inc. (TPRI) requests a waiver of the requirement to conduct a performance test on two flares at the Carville Polystyrene Plant (Carville). TPRI is requesting this waiver for safety reasons.

The two steam-assisted flares, F-1100 Flare [EQT065] and F-4100 Flare [EQT 066], operate to control emissions received from the emergency release of pressure relief devices (PRDs) through a closed vent system. To comply with Specific Requirement # 264 – NESHAP 40 CFR Subpart JJJ – *National Emission Standards for Hazardous Air Pollutant Emissions: Group IV Polymers and Resins*, the flares are subject to performance testing under MACT Subpart A for the exit velocity and net heating value measurements [§11(b)(7)(i)-(iii), §172, and §1331(a)(9)(iv) of 40 CFR Part 63]. TPRI expresses safety concerns simulating an emergency relief to create representative conditions for a performance test on the flares in efforts to demonstrate compliance. In lieu of flow rate and heating content testing, TPRI proposes submittal of engineering calculations to substantiate compliance under worst case conditions.

Based on the information provided, the Air Permits Division has no objection for the request. LDEQ grants the waiver for performance testing under MACT Subpart A for flow measurement and heat content on the two flares because the facility has demonstrated compliance using alternate means.

Sincerely,

A handwritten signature in black ink, appearing to read "Elliott B. Vega".

Elliott B. Vega
Assistant Secretary
EBV: mat

3/22/17
Date

**Region 6 Compliance Assurance and Enforcement Division
INSPECTION REPORT**

Appendix 5

2014-2017 SUMMARY OF FLARE EVENTS.xlsx

SUMMARY OF FLARE EVENTS 2014-2017 YTD

Flare F-1100

8/5/2014	A horizontal reactor pump P-1004 shut down, which led to overpressure and failure of rupture disk.
9/12/2015	A vertical reactor pump P-3101 tripped, which led to overpressure and failure of rupture disk.
10/13/2015	Plugged spillback line on horizontal reactor R-3002 led to overpressure and failure of rupture disk.
2/2/2016	Horizontal reactor R-2002 rupture disk failed prematurely.
6/24/2016	Power outage led to overpressure of vertical reactors and failure of corresponding rupture disks.
1/14/2017	Horizontal reactor R-2004 spillback line overpressured due to operator error, causing rupture disk to fail.

Flare F-4100

6/24/2016	Power outage led to overpressure of vertical reactors and failure of corresponding rupture disks.
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**Region 6 Compliance Assurance and Enforcement Division
INSPECTION REPORT**

Appendix 6

2014-2017 EMISSIONS SUMMARY OF FLARE EVENTS REV 1.xlsx

SUMMARY OF FLARE EVENTS 2014-2017 YTD

Date	Flare F-1100	PSE #	Equip #	HAP Emissions (lb)
8/5/2014	A horizontal reactor pump P-1004 shut down, which led to overpressure and failure of rupture disk.	1446	R-1004	8.9
9/12/2015	A vertical reactor pump P-3101 tripped, which led to overpressure and failure of rupture disk.	3915	R-3001	4.5
10/13/2015	Plugged spillback line on horizontal reactor R-3002 led to overpressure and failure of rupture disk.	3916	R-3002	8.9
2/2/2016	Horizontal reactor R-2002 rupture disk failed prematurely.	2434	R-2002	8.9
6/25/2016	Power outage led to overpressure of vertical reactors and failure of corresponding rupture disks.	2827A	R-2100	8.8
		2830	R-2101	14.8
		3937	R-3101	14.8
1/14/2017	Horizontal reactor R-2004 spillback line overpressured due to operator error, causing rupture disk to fail.	2446	R-2004	4.5

Date	Flare F-4100	PSE #	Equip #	HAP Emissions (lb)
6/25/2016	Power outage led to overpressure of vertical reactors and failure of corresponding rupture disks.	4986	R-4100	14.8
		4937	R-4101	14.8
		5986	R-5100	14.8
		5937	R-5101	14.8