

Panagiotis Tsigotis, Director of EPA's Office of Air Quality Planning & Standards, signed the following notice on 9/18/2020, and EPA is submitting it for publication in the *Federal Register* (FR). While we have taken steps to ensure the accuracy of this Internet version of this notice, it is not the official version. Please refer to the official version in a forthcoming FR publication, which will appear on the Government Printing Office's govinfo website (<https://www.govinfo.gov/app/collection/fr>) and on Regulations.gov (<https://www.regulations.gov>) in Docket No. EPA-HQ-OAR-2014-0738. Once the official version of this document is published in the FR, this version will be removed from the Internet and replaced with a link to the official version.

6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

[EPA-HQ-OAR-2014-0738; FRL-10014-68-OAR]

Notice of Final Approval for an Alternative Means of Emission Limitation

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice; final approval.

SUMMARY: This document announces our approval of the alternative means of emission limitation (AMEL) request under the Clean Air Act (CAA) submitted by Lyondell Chemical Company (Lyondell) to operate multi-point ground flares (MPGFs) at its Channelview chemical plant in Houston, Texas. The U.S. Environmental Protection Agency (EPA) received no adverse comments on the request. This approval document specifies the operating conditions and monitoring, recordkeeping, and reporting requirements that this facility must follow to demonstrate compliance with the approved AMEL.

DATES: The approval of the AMEL request from Lyondell to operate MPGFs at the Lyondell Channelview chemical plant, as specified in this document, is effective on **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: The EPA has established a docket for this action under Docket ID No. EPA-HQ-OAR-2014-0738. All documents in the docket are listed on the <https://www.regulations.gov/> website. Although listed, some information is not publicly available, *e.g.*, Confidential Business Information or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in

hard copy form. Publicly available docket materials are available either electronically through <https://www.regulations.gov/>.

Out of an abundance of caution for members of the public and our staff, the EPA Docket Center and Reading Room are closed to the public, with limited exceptions, to reduce the risk of transmitting COVID-19. Our Docket Center staff will continue to provide remote customer service via email, phone, and webform. For further information and updates on EPA Docket Center services, please visit us online at <https://www.epa.gov/dockets>. The EPA continues to carefully and continuously monitor information from the Center for Disease Control, local area health departments, and our Federal partners so that we can respond rapidly as conditions change regarding COVID-19.

FOR FURTHER INFORMATION CONTACT: For questions about this final action, contact Ms. Angie Carey, Sector Policies and Programs Division (E143-01), Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; telephone number: (919) 541-2187; fax number: (919) 541-0516; and email address: carey.angela@epa.gov.

SUPPLEMENTARY INFORMATION:

Preamble acronyms and abbreviations. We use multiple acronyms and terms in this preamble. While this list may not be exhaustive, to ease the reading of this preamble and for reference purposes, the EPA defines the following terms and acronyms here:

AMEL	alternative means of emission limitation
BTU/scf	British thermal units per standard cubic foot
CAA	Clean Air Act
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
Eqn	equation
MPGF	multi-point ground flare
NESHAP	national emission standards for hazardous air pollutants

NHV_{cz}	net heating value of combustion zone gas
NHV_{vg}	net heating value of flare vent gas
NSPS	new source performance standards
OAQPS	Office of Air Quality Planning and Standards
POTBA	propylene oxide tertiary butyl alcohol unit
scf	standard cubic feet

Organization of this document. The information in this document is organized as follows:

- I. Background
 - A. Summary
 - B. Regulatory Flare Requirements
- II. Summary of Public Comments on the AMEL Request
- III. AMEL for the MPGFs

I. Background

A. Summary

In a **Federal Register** notice published on May 29, 2020, the EPA provided public notice and solicited comment on the request under the CAA by Lyondell to operate MPGFs at its Channelview chemical plant in Houston, Texas (see 85 FR 32382). In that document, the EPA solicited comment on all aspects of the AMEL request, including the operating conditions specified in that document that are necessary to achieve a reduction in emissions of volatile organic compounds and organic hazardous air pollutants at least equivalent to the reductions required under the applicable CAA section 111(h)(1) or 112(h)(1) standards. Lyondell requested the AMEL for MPGFs to be used at a new propylene oxide tertiary butyl alcohol (“POTBA”) unit at its Channelview chemical plant. According to Lyondell, the POTBA unit is subject to the new source performance standards (NSPS) and national emission standards for hazardous air pollutants (NESHAP) for source categories identified in Table 1 below. These NSPS and NESHAP incorporate the flare design and operating requirements in the 40 CFR parts 60 and 63 General Provisions (*i.e.*, 40 CFR 60.18(b) and 63.11(b)) into the individual subparts. Lyondell submitted an AMEL request to operate a flare with tip exit velocities greater than those allowed

in 40 CFR 60.18 and 63.11 while achieving ≥ 96.5 -percent combustion efficiency and 98-percent destruction efficiency.

This action provides a summary of our approval of this AMEL request.

B. Regulatory Flare Requirements

Provided below in Table 1 is a list of regulations, by subpart, that Lyondell has identified as applicable to the new POTBA unit's MPGFs described above. The middle column identifies the requirement in each cited NSPS or NESHAP that requires flares used to satisfy the NSPS or NESHAP meet the flare design and operating requirements in the 40 CFR parts 60 and 63 General Provisions (*i.e.*, 40 CFR 60.18(b) and 63.11(b)). Lyondell is seeking an AMEL for these flare requirements.

TABLE 1 — SUMMARY OF APPLICABLE RULES TO EMISSIONS CONTROLLED BY MPGFs FOR THE POTBA

Applicable rules with vent streams going to control device(s)	Emission Reduction Requirements (Allowing for Use of a Flare)	Provisions for Alternative Means of Emission Limitation
NSPS subpart Kb	60.112b(a)(3)(ii)	60.114b
NSPS subpart VV	60.482-1 60.482-10(d)	60.484
NSPS subpart VVa	60.482-1a 60.482-10a(d)	60.484a
NSPS subpart III	60.612(b)	
NSPS subpart NNN	60.662(b)	
NSPS subpart RRR	60.702(b)	
NESHAP subparts F, G	63.102, 63.112(e), 63.113(a)(1)(i), 63.116(a)(2), 63.116(a)(3), 63.119(e)(1), 63.120(e)(1) through (4), 63.126(b)(2)(i), 63.128(b), 63.139(c)(3), 63.139(d)(3), 63.145(j)	63.6(g)
NESHAP subpart H	63.162 63.172(d), 63.180(e)	63.162(b) 63.177
NESHAP subpart V	61.242-1 61.242-11(d)	63.6(g)

Lyondell is seeking an AMEL to operate MPGFs during both routine and emergency vent gas flows. Lyondell provided the information specified in the flare AMEL framework for pressure assisted MPGFs that was published in the **Federal Register** on April 21, 2016 (see 81 FR 23486), to support its AMEL request. Accordingly, the request followed the 2016 flare AMEL framework.

II. Summary of Public Comments on the AMEL Request

The Agency received no comments on this action. No adverse comment was received on the request.

III. AMEL for the MPGFs

The EPA is approving the AMEL request by Lyondell to operate MPGFs with tip exit velocities greater than those allowed in 40 CFR 60.18 and 63.11 while achieving ≥ 96.5 -percent combustion efficiency and 98-percent destruction efficiency. We are also establishing in this document the operating conditions for this MPGFs as part of this approval. These operating conditions, which are the same as those set forth in the May 29, 2020, **Federal Register** document, will ensure that these flares will achieve emission reductions at least equivalent to the reductions required under the applicable CAA section 111(h)(1) or 112(h)(1) standards. The operating conditions are as follows:

(1) All MPGFs must be operated such that the combustion zone gas net heating value (NHV_{cz}) is ≥ 800 British thermal units per standard cubic foot (BTU/scf). Owners or operators must demonstrate compliance with the applicable NHV_{cz} on a 15-minute block average. Owners or operators must calculate and monitor for the NHV_{cz} according to the following:

(a) Calculation of NHV_{cz}

(i) If an owner or operator elects to use a monitoring system capable of continuously measuring (*i.e.*, at least once every 15 minutes), calculating, and recording the individual component concentrations present in the flare vent gas, the net heating value of flare vent gas (NHV_{vg}) shall be calculated using the following equation:

$$NHV_{vg} = \sum_{i=1}^n x_i NHV_i \quad (\text{Eqn. 1})$$

where:

NHV_{vg} = Net heating value of flare vent gas, BTU/scf.

Flare vent gas means all gas found just prior to the tip. This gas includes all flare waste gas (*i.e.*, gas from facility operations that is directed to a flare for the purpose of disposing the gas), flare sweep gas, flare purge gas, and flare supplemental gas, but does not include pilot gas.

i = Individual component in flare vent gas.

n = Number of components in flare vent gas.

x_i = Concentration of component i in flare vent gas, volume fraction.

NHV_i = Net heating value of component i determined as the heat of combustion where the net enthalpy per mole of offgas is based on combustion at 25 degrees Celsius (°C) and 1 atmosphere (or constant pressure) with water in the gaseous state from values published in the literature, and then the values are converted to a volumetric basis using 20 °C for “standard temperature.” Table 3 summarizes component properties including net heating values.

(ii) If the owner or operator uses a continuous net heating value monitor, the owner or operator may, at their discretion, install, operate, calibrate, and maintain a monitoring system capable of continuously measuring, calculating, and recording the hydrogen

concentration in the flare vent gas. The owner or operator shall use the following equation to determine NHV_{vg} for each sample measured via the net heating value monitoring system.

$$NHV_{vg} = NHV_{measured} + 938x_{H2} \quad (\text{Eqn. 2})$$

where:

NHV_{vg} = Net heating value of flare vent gas, BTU/scf.

$NHV_{measured}$ = Net heating value of flare vent gas stream as measured by the continuous net heating value monitoring system, scf.

x_{H2} = Concentration of hydrogen in flare vent gas at the time the sample was input into the net heating value monitoring system, volume fraction.

938 = Net correction for the measured heating value of hydrogen (1,212 -274), BTU/scf.

(iii) NHV_{cz} shall be calculated using Equation 3.

$$NHV_{cz} = \frac{Q_{vg} \times NHV_{vg} + Q_{ag} \times NHV_{ag}}{(Q_{vg} + Q_{ag})} \quad (\text{Eqn. 3})$$

where:

NHV_{cz} = Net heating value of combustion zone gas, BTU/scf.

NHV_{vg} = Net heating value of flare vent gas for the 15-minute block period as determined according to (1)(a)(i), BTU/scf.

Q_{vg} = Cumulative volumetric flow of flare vent gas during the 15-minute block period, scf.

Q_{ag} = Cumulative volumetric flow of assist gas during the 15-minute block period, standard cubic feet flow rate, scf.

NHV_{ag} = Net heating value of assist gas, BTU/scf; this is zero for air or for steam.

(b) For all flare systems specified in this document, the operator shall install, operate, calibrate, and maintain a monitoring system capable of continuously measuring the volumetric flow rate of flare vent gas (Q_{vg}), the volumetric flow rate of total assist steam (Q_s), the volumetric flow rate of total assist air (Q_a), and the volumetric flow rate of total assist gas (Q_{ag}).

(i) The flow rate monitoring systems must be able to correct for the temperature and pressure of the system and output parameters in standard conditions (*i.e.*, a temperature of 20 °C (68 °Fahrenheit) and a pressure of 1 atmosphere).

(ii) Mass flow monitors may be used for determining volumetric flow rate of flare vent gas provided the molecular weight of the flare vent gas is determined using compositional analysis so that the mass flow rate can be converted to volumetric flow at standard conditions using the following equation:

$$Q_{vol} = \frac{Q_{mass} \times 385.3}{MW_t} \quad (\text{Eqn. 6})$$

where:

Q_{vol} = Volumetric flow rate, scf/second (sec).

Q_{mass} = Mass flow rate, pounds per sec.

385.3 = Conversion factor, scf per pound-mole.

MW_t = Molecular weight of the gas at the flow monitoring location, pounds per pound-mole.

(c) For each measurement produced by the monitoring system used to comply with (1)(a)(ii), the operator shall determine the 15-minute block average as the arithmetic average of all measurements made by the monitoring system within the 15-minute period.

(d) The operator must follow the calibration and maintenance procedures according to Table 3. Total time spent on maintenance, instrument adjustments or checks to maintain precision and accuracy, and zero and span adjustments may not exceed 5 percent of the time the flare is receiving regulated material.

TABLE 2— INDIVIDUAL COMPONENT PROPERTIES

Component	Molecular Formula	MW_i (pounds per pound-mole)	NHV_i (BTU/scf)	LFL_i (volume %)
Acetylene	C ₂ H ₂	26.04	1,404	2.5
Benzene	C ₆ H ₆	78.11	3,591	1.3
1,2-Butadiene	C ₄ H ₆	54.09	2,794	2.0
1,3-Butadiene	C ₄ H ₆	54.09	2,690	2.0
iso-Butane	C ₄ H ₁₀	58.12	2,957	1.8
n-Butane	C ₄ H ₁₀	58.12	2,968	1.8
cis-Butene	C ₄ H ₈	56.11	2,830	1.6
iso-Butene	C ₄ H ₈	56.11	2,928	1.8
trans-Butene	C ₄ H ₈	56.11	2,826	1.7
Carbon Dioxide	CO ₂	44.01	0	∞
Carbon Monoxide	CO	28.01	316	12.5
Cyclopropane	C ₃ H ₆	42.08	2,185	2.4
Ethane	C ₂ H ₆	30.07	1,595	3.0
Ethylene	C ₂ H ₄	28.05	1,477	2.7
Hydrogen	H ₂	2.02	1,212*	4.0
Hydrogen Sulfide	H ₂ S	34.08	587	4.0
Methane	CH ₄	16.04	896	5.0
Methyl-Acetylene	C ₃ H ₄	40.06	2,088	1.7
Nitrogen	N ₂	28.01	0	∞
Oxygen	O ₂	32.00	0	∞
Pentane+ (C5+)	C ₅ H ₁₂	72.15	3,655	1.4
Propadiene	C ₃ H ₄	40.06	2,066	2.16
Propane	C ₃ H ₈	44.10	2,281	2.1
Propylene	C ₃ H ₆	42.08	2,150	2.4
Water	H ₂ O	18.02	0	∞

*The theoretical net heating value for hydrogen is 274 BTU/scf, but for these flares, a net heating value of 1,212 BTU/scf shall be used.

TABLE 3 — ACCURACY AND CALIBRATION REQUIREMENTS

Parameter	Accuracy Requirements	Calibration Requirements
Flare Vent Gas Flow Rate	<p>± 20 percent of flow rate at velocities ranging from 0.1 to 1 foot per sec.</p> <p>± 5 percent of flow rate at velocities greater than 1 foot per sec.</p>	<p>Evaluate performance biennially (every 2 years) and following any period of more than 24 hours throughout which the flow rate exceeded the maximum rated flow rate of the sensor, or the data recorder was off scale. Check all mechanical connections for leakage monthly. Visually inspect and check system operation every 3 months, unless the system has a redundant flow sensor.</p> <p>Select a representative measurement location where swirling flow or abnormal velocity distributions due to upstream and downstream disturbances at the point of measurement are minimized.</p>
Flow Rate for All Flows Other Than Flare Vent Gas	<p>± 5 percent over the normal range of flow measured or 1.9 liters per minute (0.5 gallons per minute), whichever is greater, for liquid flow.</p>	<p>Conduct a flow sensor calibration check at least biennially (every 2 years); conduct a calibration check following any period of more than 24 hours throughout which the flow rate exceeded the manufacturer's specified maximum rated flow rate or install a new flow sensor.</p>
	<p>± 5 percent over the normal range of flow measured or 280 liters per minute (10 cubic feet per minute), whichever is greater, for gas flow.</p>	<p>At least quarterly, inspect all components for leakage, unless the continuous parameter monitoring system (CPMS) has a redundant flow sensor.</p>
	<p>± 5 percent over the normal range measured for mass flow.</p>	<p>Record the results of each calibration check and inspection.</p> <p>Locate the flow sensor(s) and other necessary equipment (such as straightening vanes) in a position that provides representative flow; reduce swirling flow or abnormal velocity distributions due to upstream and downstream disturbances.</p>
Pressure	<p>± 5 percent over the normal range measured or 0.12</p>	<p>Review pressure sensor readings at least once a week for straight-line</p>

	kilopascals (0.5 inches of water column), whichever is greater.	<p>(unchanging) pressure and perform corrective action to ensure proper pressure sensor operation if blockage is indicated.</p> <p>Evaluate performance annually and following any period of more than 24 hours throughout which the pressure exceeded the maximum rated pressure of the sensor, or the data recorder was off scale. Check all mechanical connections for leakage monthly. Visually inspect all components for integrity, oxidation, and galvanic corrosion every 3 months, unless the system has a redundant pressure sensor.</p> <p>Select a representative measurement location that minimizes or eliminates pulsating pressure, vibration, and internal and external corrosion.</p>
Net Heating Value by Calorimeter	± 2 percent of span	<p>Calibrate according to manufacturer's recommendations at a minimum.</p> <p>Temperature control (heated and/or cooled as necessary) the sampling system to ensure proper year-round operation.</p> <p>Where feasible, select a sampling location at least 2 equivalent diameters downstream from and 0.5 equivalent diameters upstream from the nearest disturbance.</p> <p>Select the sampling location at least 2 equivalent duct diameters from the nearest control device, point of pollutant generation, air in-leakages, or other point at which a change in the pollutant concentration or emission rate occurs.</p>
Net Heating Value by Gas Chromatograph	As specified in Performance Standard (PS) 9 of 40 CFR part 60, appendix B.	Follow the procedure in PS 9 of 40 CFR part 60, appendix B, except that a single daily mid-level calibration check can be used (rather than triplicate analysis), the multi-point calibration can be

		conducted quarterly (rather than monthly), and the sampling line temperature must be maintained at a minimum temperature of 60 °C (rather than 120 °C).
Hydrogen Analyzer	± 2 percent over the concentration measured, or 0.1 volume, percent, whichever is greater.	Specify calibration requirements in your site specific CPMS monitoring plan. Calibrate according to manufacturer's recommendations at a minimum. Specify the sampling location at least 2 equivalent duct diameters from the nearest control device, point of pollutant generation, air in-leakages, or other point at which a change in the pollutant concentration occurs.

(2) The flare system must be operated with a flame present at all times when in use.

Additionally, each stage must have at least two pilots with a continuously lit pilot flame. Each pilot flame must be continuously monitored by a thermocouple or any other equivalent device used to detect the presence of a flame. The time, date, and duration of any complete loss of pilot flame on any of the burners must be recorded. Each monitoring device must be maintained or replaced at a frequency in accordance with the manufacturer's specifications.

(3) The MPGF system shall be operated with no visible emissions except for periods not to exceed a total of 5 minutes during any 2 consecutive hours. A video camera that is capable of continuously recording (*i.e.*, at least one frame every 15 seconds with time and date stamps) images of the flare flame and a reasonable distance above the flare flame at an angle suitable for visible emissions observations must be used to demonstrate compliance with this requirement.

The owner or operator must provide real-time video surveillance camera output to the control room or other continuously manned location where the video camera images may be viewed at any time.

(4) The operator of the MPGF system shall install and operate pressure monitor(s) on the main flare header, as well as a valve position indicator monitoring system capable of monitoring and recording the position for each staging valve to ensure that the flare operates within the range of tested conditions or within the range of the manufacturer's specifications. The pressure monitor shall meet the requirements in Table 3. Total time spent on maintenance periods, instrument adjustments or checks to maintain precision and accuracy, and zero and span adjustments may not exceed 5 percent of the time the flare is receiving regulated material.

(5) Recordkeeping Requirements

(a) All data must be recorded and maintained for a minimum of 3 years or for as long as required under applicable rule subpart(s), whichever is longer.

(6) Reporting Requirements

(a) The information specified in sections III(6)(b) and (c) below must be reported in the timeline specified by the applicable rule subpart(s) for which the MPGFs will control emissions.

(b) Owners or operators shall include the final AMEL operating requirements for each flare in their initial Notification of Compliance status report.

(c) The owner or operator shall notify the Administrator of periods of excess emissions in their Periodic Reports. The notification shall include:

(i) Records of each 15-minute block for both MPGFs during which there was at least 1 minute when regulated material was routed to the flare and a complete loss of pilot flame on a stage of burners occurred, and for both MPGFs, records of each 15-minute block during which there was at least 1 minute when regulated material was routed to the flare and a complete loss of pilot flame on an individual burner occurred.

- (ii) Records of visible emissions events (including the time and date stamp) that exceed more than 5 minutes in any 2-hour consecutive period.
- (iii) Records of each 15-minute block period for which an applicable combustion zone operating limit (*i.e.*, NHV_{cz}) is not met for the flare when regulated material is being combusted in the flare. Indicate the date and time for each period, the NHV_{cz} operating parameter for the period, the type of monitoring system used to determine compliance with the operating parameters (*e.g.*, gas chromatograph or calorimeter), and also indicate which high-pressure stages were in use.
- (iv) Records of when the pressure monitor(s) on the main flare header show the flare burners are operating outside the range of tested conditions or outside the range of the manufacturer's specifications. Indicate the date and time for each period, the pressure measurement, the stage(s) and number of flare burners affected, and the range of tested conditions or manufacturer's specifications.
- (v) Records of when the staging valve position indicator monitoring system indicates a stage of the flare should not be in operation and is or when a stage of the flare should be in operation and is not. Indicate the date and time for each period, whether the stage was supposed to be open, but was closed, or vice versa, and the stage(s) and number of flare burners affected.

Dated: September 18, 2020.

Panagiotis Tsirigotis,
Director, Office of Air Quality Planning and Standards.