6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

[EPA-HQ-OAR-2014-0738 and EPA-HQ-OAR-2010-0682; FRL-9983-26-OAR]

Notice of Final Approval for an Alternative Means of Emission Limitation at ExxonMobil Corporation; Marathon Petroleum Company, LP (for itself and on behalf of its subsidiary, Blanchard Refining, LLC); Chalmette Refining, LLC; and LACC, LLC

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice; final approval.

SUMMARY: This notice announces our approval of the Alternative Means of Emission Limitation (AMEL) requests under the Clean Air Act (CAA) submitted from ExxonMobil Corporation; Marathon Petroleum Company, LP (for itself and on behalf of its subsidiary, Blanchard Refining, LLC); and Chalmette Refining, LLC to operate flares and multi-point ground flares (MPGFs) at several refineries in Texas and Louisiana, and from LACC, LLC to operate flares at a chemical plant in Louisiana. This approval notice specifies the operating conditions and monitoring, recordkeeping, and reporting requirements that these facilities must follow to demonstrate compliance with the approved AMEL.

DATES: The approval of the AMEL requests from ExxonMobil Corporation; Marathon Petroleum Company, LP (for itself and on behalf of its subsidiary, Blanchard Refining, LLC); Chalmette Refining, LLC; and LACC, LLC to operate certain flares at the refineries and a chemical plant, as specified in this notice, is effective on **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: The Environmental Protection Agency (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* Web site. Although listed, some information is not publicly

available, *e.g.*, confidential business information (CBI) 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 *http://www.regulations.gov* or in hard copy at EPA Docket Center, EPA WJC West Building, Room Number 3334, 1301 Constitution Ave., NW, Washington, DC. The Public Reading Room hours of operation are 8:30 a.m. to 4:30 p.m. Eastern Standard Time (EST), Monday through Friday. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Docket Center is (202) 566-1742.

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
CBI	confidential business information
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
Eqn	equation
g/mol	grams per gram mole
HAP	hazardous air pollutants
HP	high pressure

LFL	lower flammability limit
LFL_{cz}	lower flammability limit of combustion zone gas
LFL_{vg}	lower flammability limit of flare vent gas
LRGO	linear relief gas oxidizer
MPGF	multi-point ground flare
NESHAP	national emission standards for hazardous air pollutants
NHV	net heating value
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
scf	standard cubic feet
SKEC	steam-assisted kinetic energy combustor
TCEQ	Texas Commission on Environmental Quality
VOC	volatile organic compounds

Organization of This Document. The information in this notice is organized as follows:

I. Background

A. Summary

In a **Federal Register** notice dated April 25, 2018, the EPA provided public notice and solicited comment on the requests under the CAA from ExxonMobil Corporation; Marathon Petroleum Company, LP (for itself and on behalf of its subsidiary, Blanchard Refining, LLC's); and Chalmette Refining, LLC for the operation of flares and MPGFs at several refineries in Texas and Louisiana, and from LACC, LLC to operate flares at a chemical plant in Louisiana (see 83 FR 18034). This action solicited comment on all aspects of the AMEL requests, including the operating conditions specified in that action that are necessary to achieve a reduction in emissions of volatile organic compounds and organic hazardous air pollutants at least equivalent to the reduction in emissions required by various standards in 40 CFR parts 60,

61, and 63 that apply to emission sources that would be controlled by these flares and MPGFs. These standards incorporate the flare design and operating requirements in 40 CFR part 60 and 63 General Provisions (*i.e.,* 40 CFR 60.18(b) and 63.11(b)) into the individual new source performance standards (NSPS) and maximum achievable control technology (MACT) subparts, except for the Petroleum Refinery MACT, 40 CFR part 63, subpart CC, which specifies its flare requirements within the subpart (*i.e.,* 40 CFR 63.670). Four of the requests are for flares located at petroleum refineries, while the request from LACC, LLC is for a flare design at a chemical manufacturing facility. None of the flares located at petroleum refineries can meet the flare tip velocity limits in the Petroleum Refinery MACT, 40 CFR part 63, subpart CC. In addition, flares at these refineries and at LACC's chemical plant that are subject to other 40 CFR part 60 and 63 standards cannot meet the flare tip velocity limits contained in the applicable General Provisions to 40 CFR part 60 and 63.

This action provides a summary of the comments received as part of the public review process, our response to those comments, and our approval of these AMEL requests.

B. Regulatory Flare Requirements

ExxonMobil, Marathon, Blanchard, and Chalmette provided the information specified in the flare AMEL framework set forth in the Petroleum Refinery MACT at 40 CFR 63.670(r) to support their AMEL requests. LACC provided the information specified in the flare AMEL framework finalized on April 21, 2016 (81 FR 23486), to support its AMEL request. The ExxonMobil Corporation Baytown Refinery in Baytown, Texas, is seeking an AMEL to operate a gas-assisted flare, Flare 26, during periods of startup, shutdown, upsets, and emergency events, as well as during fuel gas imbalance events. Marathon Petroleum Company, LP's Garyville, Louisiana Refinery, and Blanchard Refining, LLC's Galveston Bay Refinery (GBR) in Texas

City, Texas, are seeking AMELs to operate their flares only during periods of startup, shutdown, upsets, and emergency events. Chalmette Refining, LLC in Chalmette, Louisiana, is seeking an AMEL to operate its flare, No. 1 Flare, during periods of upset and emergency events. LACC, LLC is seeking an AMEL to operate flares at its chemical plant in Lake Charles, Louisiana, during startups, shutdowns, upsets, and emergency events. See Table 1 for a list of regulations, by subparts, that each refinery and chemical plant has identified as applicable to the flares described above.

Table 1 – Summary of Applicable Rules that May Apply to Streams Controlled by Flares

Applicable Rules with Vent Streams Going to Control Device(s)	Exxon Mobil Baytown, Texas Flare 26	Marathon Garyville, LA MPGF	Blanchard Refining GBR MPGF	Chalmette No. 1 Flare	LACC	Rule Citation from Title 40 CFR that Allow for Use of a Flare	Provisions for Alternative Means of Emission Limitation
NSPS Subpart VV		x	x			60.482-10(d)	60.484(a)-(f)
NSPS Subpart VVa		x	x		x	60.482-10a(d)	60.484a(a)-(f)
NSPS Subpart NNN		x	x	x	x	60.662(b)	CAA section 111(h)(3)
NSPS Subpart QQQ		x	x			60.692-5(c)	42 U.S.C. 7411(h)(3)
NSPS Subpart RRR		x	x		x	60.702(b)	CAA section 111(h)(3)
NSPS Subpart Kb		x	x		x	60.112b(a)(3)(ii)	60.114b
NESHAP Subpart V		x	x		x	61.242-11(d)	40 CFR 63.6(g); 42 U.S.C. 7412(h)(3)
NESHAP Subpart J					x	61.242-11(d)	40 CFR 63.6(g); 42 U.S.C. 7412(h)(3)
NESHAP Subpart Y		x	x			61.271-(c)(2)	40 CFR 63.6(g); 40 CFR 61.273; 42 U.S.C. 7412(h)(3)
NESHAP Subpart BB		x	x			61.302(c)	40 CFR 63.6(g); 42 U.S.C. 7412(h)(3)
NESHAP Subpart FF		x	x		x	61.349(a)(2)	61.353(a); also see 61.12(d)
NESHAP Subpart F		x	x		x	63.103(a)	63.6(g); 42 U.S.C. 7412(h)(3)
NESHAP Subpart G		x	x		x	63.113(a)(1)(i), 63.116(a)(2),	63.6(g); 42 U.S.C. 7412(h)(3)

						63.116(a)(3), 63.119(e), 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)	
NESHAP Subpart H		x	x		x	63.172(d), 63.180(e)	63.177; 42 U.S.C. 7412(h)(3)
NESHAP Subpart SS		x	x		x	63.982(b)	CAA section 112(h)(3)
NESHAP Subpart CC	x	x	x	x		63.643(a)(1)	63.670(r)
NESHAP Subpart UU					x	63.1034	63.1021(a)-(d)
NESHAP Subpart YY					x	Table 7 to 63.1103(e) cross-references to NESHAP subpart SS above.	63.1113
NESHAP Subpart EEEE		x	x			63.2378(a), 63.2382, 63.2398	63.6(g); 42 U.S.C. 7412(h)(3)

The provisions for the NSPS and National Emission Standards for Hazardous Air Pollutants (NESHAP) cited in Table 1 that ensure flares meet certain specific requirements when used to satisfy the requirements of the NSPS or NESHAP were established as work practice standards pursuant to CAA sections 111(h)(1) or 112(h)(1). For standards established according to these provisions, CAA sections 111(h)(3) and 112(h)(3) allow the EPA to permit the use of an AMEL by a source if, after notice and opportunity for comment,[1] it is established to the Administrator's satisfaction that such an AMEL will achieve emission reductions at least equivalent to the reductions required under the CAA section 111(h)(1) or 112(h)(1) standard. As noted in Table 1, many of the NSPS and NESHAP in the table above also include specific regulatory provisions allowing sources to request an AMEL.

[1] CAA section 111(h)(3) specifically requires that the EPA provide an opportunity for a public hearing. The EPA provided an opportunity for a public hearing in the April 25, 2018, **Federal Register** action. However, no public hearing was requested.

II. Summary of Public Comments on the AMEL Requests

The EPA received four public comments on this action. Specifically, the EPA received suggested changes and clarifications from LACC, LLC, Marathon Petroleum Company, LP (for itself and on behalf of its subsidiary, Blanchard Refining, LLC), and ExxonMobil Corporation. The EPA also received one comment that does not mention any of the AMEL requests at issue and is, therefore, outside the scope of the action. As discussed in more detail below, we have modified or otherwise clarified certain operating conditions in response to comments.[2] All of the comments within the scope of the AMEL requests were supportive of the EPA approving the AMEL requests, and none of the comments raised issues with the EPA's authority to approve these AMEL requests under the CAA. None of the commenters asserted that the EPA lacked authority to approve the AMEL requests or that the AMEL requests would not achieve at least equivalent emissions reductions as flares that meet the standards in the General Provisions or in the Petroleum Refinery MACT at 40 CFR 63.670(r).

Comment: LACC, LLC commented that the monitoring requirement in section (3) to install a video camera capable of continuously recording (*i.e.*, at least one frame every 15 seconds with time and date stamps) images of the flare flame at a reasonable distance and suitable angle, will work for their MPGF, but not for their enclosed ground flare. LACC stated that it is not technically feasible to install a video camera and monitor the flare flame within the enclosed ground flare. Alternatively, LACC stated that it can monitor for the presence of visible emissions from the enclosed ground flare by using a video camera to monitor at the exit of the stack exhaust.

[2] As explained below, we have clarified the reporting requirements for Exxon's Flare 26 in response to a comment by Exxon. We have similarly clarified Marathon's Garyville's and GBR's MPGFs reporting requirements as a result of this comment.

Response: We agree that, although the camera would not be able to directly monitor visible emissions from the flare flame because of the enclosure, conducting visible emissions observations at the stack would be a reliable indicator of compliance with the requirements in section (3) below. Therefore, we accept this alternative and have made the appropriate change in section (3) below.

Comment: Marathon Petroleum Company, LP commented that the operating conditions in Table 2 do not reflect what they requested in their AMEL for the MPGF at their Garyville refinery. They stated that they needed separate NHV_{cz} limits for the pressure-assisted linear relief gas oxidizers (LRGO burners) and the steam-assisted steam kinetic energy combustors (SKEC burners) when both are being used simultaneously. Marathon explained that the SKEC burners would have a considerably different NHV_{cz} value because of steam assist. This is because the steam assist is included in the NHV_{cz} calculation for the SKEC burners, but not for the LRGO burners, given that the LRGO burners do not have steam assist.

Response: The EPA acknowledges that the April notice did not reflect Marathon Petroleum Company, LP's supplemental request for the Garyville MPGF to maintain separate burner limits such that the SKEC burners would meet the NHV_{cz} target from the SKEC equation and the LRGO burners would meet 600 British thermal units per standard cubic feet (BTU/scf). We discussed with Marathon its supplemental request upon receiving the comment. As we explained in that discussion, based on our review of the information provided by Marathon, the steam-to-vent gas ratio for the SKEC burners is not high enough to significantly affect the NHV_{cz} during the high pressure flaring scenario. Therefore, we conclude that the burner requirements as set out in the April 25, 2018, AMEL document are appropriate. Marathon concurred with this

conclusion in an email response after the comment period closed (available in Docket ID No. EPA-HQ-OAR-2014-0738 and EPA-HQ-OAR-2010-0682).

Comment: Marathon Petroleum Company, LP commented that the requirement should be $NHV_{vg} = NHV_{cz}$ with a limit of ≥600 BTU/scf for the LH burner, and NHV_{cz} ≥600 BTU/scf for LRGO burners. Marathon notes that, as explained in its February 2, 2018, and March 27, 2018, supplemental letters, since the LH burner is air-assisted, therefore, the LH burner limitations provided in its request correspond to the NHV_{vg} and not the NHV_{cz}. Marathon further notes that the Petroleum Refinery requirements at 40 CFR 63.670(m)(1) states that $NHV_{vg} = NHV_{cz}$ when there is no premix assist air flow.

Response: For the reasons provided in Marathon's comment, we agree that for the LH burner, which is perimeter air assisted and not pre-mix air assisted, the NHV_{vg} equals NHV_{cz}. We, therefore, made this change in Table 2 below.

Comment: ExxonMobil Corporation commented on a typographical correction in Table 2 for the Baytown, Texas, Flexicoker Flare 26. The proposed alternative operating condition was listed as ≥ 270 BTU/scf NHV_{cz} and velocity of < 361 feet per second (ft/sec). However, the performance test results for the Flare 26 demonstrate that the destruction efficiency met 98 percent at 361 ft/sec.

Response: We accept this correction and made the change in Table 2 to ≤ 361 ft/sec.

Comment: ExxonMobil Corporation commented that the EPA should include a default molecular weight for pipeline natural gas that corresponds to an NHV of 920 BTU/scf listed in 40 CFR 63.670 (j)(5).

Response: We agree and are specifying the molecular weight of pipeline natural gas as 16.85 grams per gram mole (g/mol). It would be burdensome for Exxon to take samples of

natural gas to determine molecular weight, when very little changes in molecular weight are expected. Therefore, we are specifying the molecular weight of natural gas of 16.85 can be used. This molecular weight is based on our default natural gas composition that was used to determine the net heating value in 40 CFR 63.670.

Comment: ExxonMobil Corporation commented that the accuracy and calibration requirements in section (1)(f) of the initial **Federal Register** document should apply only to flares at chemical plants seeking AMEL approval since flares such as Exxon's Flare 26 is already subject to the accuracy and calibration requirements in the Petroleum Refinery MACT at 40 CFR 63.671(a)(1) and (4) and Table 13.

Response: We agree and have clarified in section (1)(f) below that the accuracy and calibration requirements listed in Table 4 do not apply to refinery flares subject to requirements at 40 CFR 63.671(a)(1) and (4) and Table 13 of 40 CFR part 63, subpart CC.

Comment: ExxonMobil Corporation commented that the Flare 26 follows the Petroleum Refinery MACT requirement at 40 CFR part 63, subpart CC, for pilot flame operations and does not use cross-lighting for the flare operation. They stated that the EPA should clarify in section (2) that the Flare 26 is only required to maintain flare pilots per the Petroleum Refinery MACT requirements in 40 CFR 63.670(b).

Response: We agree that the requirements in section (2), which apply to flares that cross light, should not apply to Flare 26 because it does not use cross-lighting. We have made this change in section (2) below.

Comment: ExxonMobil Corporation commented that the EPA should clarify which reporting requirements apply to the Flare 26 in section (6) and clarify that the reporting

requirements for the flare tip velocity and NHV_{cz} are applicable when regulated material is routed to the flare for at least 15 minutes.

Response: While we believe that the records required in section (6)(c) are essentially the same as the reporting requirements in Petroleum Refinery NESHAP, 40 CFR part 63, subpart CC, section (6)(c) requires additional records related to the operation of MPGFs, which do not apply to Flare 26. Further, we agree that the operating limits for NHV_{cz} and V_{tip} apply whenever regulated material is routed to the flares for at least 15 minutes, as specified by 40 CFR part 63, subpart CC; Therefore, we are requiring that Flare 26 comply with the reporting requirements in the Petroleum Refinery NESHAP, 40 CFR part 63, subpart CC, instead of section (6) as part of this AMEL approval. However, MPGFs located at petroleum refineries must comply with the additional reporting requirements for MPGFs in (6)(c)(iv) and (v). To avoid other potential confusion, we are clarifying the applicability of section (6)(c) to all the flares covered in this notice. Specifically, section (6)(c) below provides that flares at refineries must meet the requirements in the Petroleum Refinery MACT in 40 CFR 63.655(g)(11)(i)-(iii), except that the applicable alternative operating conditions listed in Table 2 apply instead of the operating limits specified in 40 CFR 63.670(d) through (f). In addition, for refinery flares that are MPGFs, notification shall also include records specified in section (6)(c)(iv)-(v). For LACC MPGFs, the notification shall include the records specified in section (6)(c)(i)-(v).

III. AMEL for the Flares

Based upon our review of the AMEL requests and the comments received through the public comment period, we are approving these AMEL requests and are establishing operating conditions for the flares at issue. The AMEL and the associated operating conditions are specified in Table 2 and accompanying paragraphs. These operating conditions will ensure that

these flares will achieve emission reductions at least equivalent to flares complying with the flare requirements under the applicable NESHAP and NSPS identified in Table 1.

Table 2 – Alternative Operating Conditions

AMEL Submitted	Company	Affected Facilities	Flare Type(s)	Alternative Operating Conditions
11/7/17	ExxonMobil	Baytown, TX Flexicoker Flare 26	Elevated gas-assist flare	≥270 BTU/scf NHV_{cz} and velocity ≤ 361 (ft/sec)
10/7/17	Marathon	Garyville, LA	2 MPGFs	When both SKEC and LRGO burners are being used, the higher of ≥600 BTU/scf NHVcz or ≥127.27 ln(v_{vg})– 110.87 NHVcz. When only the SKEC burner is being used ≥127.27 ln(v_{vg})– 110.87 NHVcz.
10/7/17	Marathon/ Blanchard Refining	GBR (Texas City, TX)	MPGF	NHV_{vg} ≥600 BTU/scf for the LH burner, and NHV_{cz} ≥600 BTU/scf for LRGO burners.
9/19/17	Chalmette Refining	Chalmette, LA	Elevated multi-point flare	≥1000 BTU/scf NHV_{cz} or LFL_{cz}≤6.5 vol%
5/1/17	LACC	Lake Charles, LA	2 MPGFs	≥1075 BTU/scf NHV_{cz} for INDAIR Burners; ≥800 BTU/scf NHV_{cz} for LRGO only

(1) All flares must be operated such that the combustion zone gas net heating value (NHV_{cz}) or the lower flammability in the combustion zone (LFL_{cz}) as specified in Table 2 is met. Owners or

operators must demonstrate compliance with the applicable NHV_{cz} or LFL_{cz} specified in Table 2 on a 15-minute block average. Owners or operators must calculate and monitor for the NHV_{cz} or LFL_{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, NHV_{vg} shall be calculated using the following equation:

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

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 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, BTU/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) For non-assisted flare burners, and the GBR LH burner, $NHV_{vg} = NHV_{cz}$. For assisted burners, such as the Marathon Garyville MPGF SKEC burners, and the Exxon Flare 26 gas-assisted burner, NHV_{cz} is 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, scf flow rate, scf.

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

(b) Calculation of LFL_{cz}

(i) The owner or operator shall determine LFL_{cz} from compositional analysis data by using the following equation:

$$LFL_{vg} = \frac{1}{\sum_{i=1}^{n} \left(\frac{\chi_i}{LFL_i}\right)} \times 100\% \qquad \text{(Eqn. 4)}$$

where:

LFL_{vg} = Lower flammability limit of flare vent gas, volume percent (vol %).

n = Number of components in the vent gas.

i = Individual component in the vent gas.

χ_i = Concentration of component i in the vent gas, vol %.

LFL_i = Lower flammability limit of component i as determined using values published by the U.S. Bureau of Mines (Zabetakis, 1965), vol %. All inerts, including nitrogen, are assumed to have an infinite LFL (*e.g.*, $LFL_{N2} = \infty$, so that $\chi_{N2}/ LFL_{N2} = 0$). LFL values for common flare vent gas components are provided in Table 3.

(ii) For non-assisted flare burners, $LFL_{vg} = LFL_{cz}$.

(c) Calculation of V_{tip}

For the ExxonMobil Flare 26, the owner or operator shall calculate the 15-minute block average V_{tip} by using the following equation:

$$V_{tip} = \frac{Qvg}{Area \times 900} \quad \text{(Eqn. 5)}$$

where:

V_{tip} = Flare tip velocity, ft/sec.

Q_{vg} = Cumulative volumetric flow of vent gas over 15-minute block average period, scf.

Area = Unobstructed area of the flare tip, square ft.

900 = Conversion factor, seconds per 15-minute block average.

(d) For all flare systems specified in this document, the owner or 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/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.

(e) 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.

(f) The owner or operator must follow the accuracy and calibration procedures according to Table 4. Flares at refineries must meet the accuracy and calibration requirements in the Petroleum Refinery MACT at 40 CFR 63.671(a)(1) and (4) and Table 13. 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.

Table 3 – Individual Component Properties

Component	Molecular Formula	MW_i (pounds per pound-mole)	NHV_i (BTU/scf)	LFL_i (volume %)
Acetylene	C_2H_2	26.04	1,404	2.5
Benzene	C_6H_6	78.11	3,591	1.3
1,2-Butadiene	C_4H_6	54.09	2,794	2.0
1,3-Butadiene	C_4H_6	54.09	2,690	2.0
iso-Butane	C_4H_{10}	58.12	2,957	1.8
n-Butane	C_4H_{10}	58.12	2,968	1.8
cis-Butene	C_4H_8	56.11	2,830	1.6
iso-Butene	C_4H_8	56.11	2,928	1.8
trans-Butene	C_4H_8	56.11	2,826	1.7
Carbon Dioxide	CO_2	44.01	0	∞
Carbon Monoxide	CO	28.01	316	12.5
Cyclopropane	C_3H_6	42.08	2,185	2.4
Ethane	C_2H_6	30.07	1,595	3.0
Ethylene	C_2H_4	28.05	1,477	2.7
Hydrogen	H_2	2.02	1,212*	4.0
Hydrogen Sulfide	H_2S	34.08	587	4.0

Component	Molecular Formula	MW_i (pounds per pound-mole)	NHV_i (BTU/scf)	LFL_i (volume %)
Methane	CH_4	16.04	896	5.0
Methyl-Acetylene	C_3H_4	40.06	2,088	1.7
Nitrogen	N_2	28.01	0	∞
Oxygen	O_2	32.00	0	∞
Pentane+ (C5+)	C_5H_{12}	72.15	3,655	1.4
Propadiene	C_3H_4	40.06	2,066	2.16
Propane	C_3H_8	44.10	2,281	2.1
Propylene	C_3H_6	42.08	2,150	2.4
Water	H_2O	18.02	0	∞

*The theoretical net heating value for hydrogen is 274 BTU/scf, but for the purposes of the flare requirement in this subpart, a net heating value of 1,212 BTU/scf shall be used.

Table 4 – Accuracy and Calibration Requirements

Parameter	Accuracy Requirements	Calibration Requirements
Flare Vent Gas Flow Rate	±20 percent of flow rate at velocities ranging from 0.1 to 1 foot per second. ±5 percent of flow rate at velocities greater than 1 foot per second.	Performance evaluation 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. Checks of all mechanical connections for leakage monthly. Visual inspections and checks of system operation every 3 months, unless the system has a redundant flow sensor. 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.
Flow Rate for All Flows Other Than Flare Vent Gas	±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.	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.
	±5 percent over the normal range of flow measured or	At least quarterly, inspect all components for leakage, unless the

	280 liters per minute (10 cubic feet per minute), whichever is greater, for gas flow.	continuous parameter monitoring system (CPMS) has a redundant flow sensor.
	±5 percent over the normal range measured for mass flow.	Record the results of each calibration check and inspection. 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.
Pressure	±5 percent over the normal range measured or 0.12 kilopascals (0.5 inches of water column), whichever is greater.	Review pressure sensor readings at least once a week for straight-line (unchanging) pressure and perform corrective action to ensure proper pressure sensor operation if blockage is indicated. Performance evaluation 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. Checks of all mechanical connections for leakage monthly. Visual inspection of all components for integrity, oxidation, and galvanic corrosion every 3 months, unless the system has a redundant pressure sensor. Select a representative measurement location that minimizes or eliminates pulsating pressure, vibration, and internal and external corrosion.
Net Heating Value by Calorimeter	±2 percent of span	Calibration requirements - follow manufacturer's recommendations at a minimum. Temperature control (heated and/or cooled as necessary) the sampling system to ensure proper year-round operation. Where feasible, select a sampling location at least 2 equivalent

		diameters downstream from and 0.5 equivalent diameters upstream from the nearest disturbance. 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.
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. Calibration requirements - follow 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 shall be operated with a flame present at all times when in use. Additionally, each stage that cross-lights must have at least two pilots with a continuously lit pilot flame, except for Chalmette's No. 1 Flare, which has one pilot for each stage, excluding stages 8A and 8B. 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. The ExxonMobil flare, Flare 26, and GBR's LH flare must meet the requirements in the Petroleum Refinery MACT at 40 CFR 63.670(b) instead of the requirements herein in section (2).

(3) Flares at refineries shall comply with the Petroleum Refinery MACT requirements of 40 CFR 63.670(h). For LACC, LLC's MPGFs, the flare 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. For LACC's enclosed ground flare, LACC must install a video camera that is capable of continuously recording (*i.e.*, at least one frame every 15 seconds with time and date stamps) the stack exhaust exit at a reasonable distance and at an angle suitable for visible emissions observation in order 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) For the MPGFs and Chalmette's No. 1 Flare, the owner or operator of a flare 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. Flares at refineries must meet the accuracy and calibration requirements in the Petroleum Refinery MACT at 40 CFR 63.671(a)(1) and (4) and Table 13. The pressure monitor at LACC shall meet the accuracy and calibration requirements in Table 4.

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 section III (6)(b) and (c) below must be reported in the timeline specified by the applicable rule subpart(s) for which the flare 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 owner or operator of refinery flares shall meet the reporting requirements in the Petroleum Refinery MACT in 40 CFR 63.655(g)(11)(i)-(iii), except that the applicable alternative operating conditions listed in Table 2 apply instead of the operating limits specified in 40 CFR 63.670(d) through (f). In addition, for refinery flares that are MPGFs, notification shall also include records specified in section (iv)-(v) below. For LACC MPGFs, the notification shall include the records specified in section (i)-(v) below.

(i) Records of each 15-minute block for all flares 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 all flares, 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 condition (*i.e.*, NHV_{cz} or LFL_{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} and/or LFL_{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.

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