UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1201 ELM STREET, SUITE 500
DALLAS, TEXAS 75270-2102

November 9, 2022

Transmitted Via Email: ty.hastriter@exxonmobil.com

Ty Hastriter
Environmental and Regulatory Advisor
ExxonMobil Corporation
22777 Springwoods Village Parkway, E1.2B.284
Spring, Texas 77389

Re: Alternative Monitoring Plan (AMP) – ExxonMobil Corporation – National Emission Standards for Hazardous Air Pollutants (NESHAP) for Petroleum Refineries, 40 Code of Federal Regulations (CFR) Part 63 Subpart CC, Flare Vent Gas Composition Monitoring, High Pressure (HP) and Low Pressure (LP) Flares – Beaumont, Texas Refinery

Dear Mr. Hastriter:

This correspondence is provided in response to ExxonMobil's request, dated January 28, 2022, for approval to utilize existing process instrumentation for measuring and determining hydrogen content in flare vent gas subject to 40 CFR § 63.6700, instead of installing an additional hydrogen analyzer at each flare vent gas line header. According to § 63.6700, a monitoring system capable of continuously measuring, calculating, and recording the hydrogen concentration in the flare vent gas stream can be installed if there is an existing flare vent gas continuous net heating value monitor. This enables the heat content of hydrogen to be incorporated into the net heating value of the total vent gas stream. Continuous net heating value monitors have been installed for HP and LP Flares in accordance with the requirements of § 63.6700. Based on the information provided, the U.S. Environmental Protection Agency (EPA) approves your AMP request, as summarized in this response letter and the attached Enclosure.

Summary of the AMP Request

ExxonMobil seeks the approval of the AMP to allow venting and combustion of hydrogen at the HP and LP flares as a replacement for commercial natural gas and refinery fuel gas during state-wide curtailment of natural gas due to extreme weather conditions. The flexibility to combust hydrogen in the HP and LP flares will allow ExxonMobil to divert its available natural gas and refinery fuel gas byproduct supplies to respond to the state's emergency needs, while still complying with the requirements of Subpart CC.

EPA Analysis

Part 63 Subpart CC contains the following requirements and options for monitoring vent gases routed to a flare for combustion:

- § 63.6700(j). Flare vent gas composition monitoring. The owner or operator shall determine the concentration of individual components in the flare vent gas using either the methods provided in

paragraph (j)(1) or (2) of this section, to assess compliance with the operating limits in paragraph (e) of this section and, if applicable, paragraphs (d) and (f) of this section. Alternatively, the owner or operator may elect to directly monitor the net heating value of the flare vent gas following the methods provided in paragraphs (j)(3) of this section and, if desired, may directly measure the hydrogen concentration in the flare vent gas following the methods provided in paragraphs (j)(4) of this section. The owner or operator may elect to use different monitoring methods for different gaseous streams that make up the flare vent gas using different methods provided the composition or net heating value of all gas streams that contribute to the flare vent gas are determined.

- § 63.6700) (4). Flare vent gas composition monitoring. If the owner or operator uses a continuous net heating value monitor according to paragraph (j)(3) of this section, 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.

EPA determined that approval of the AMP is appropriate because the provisions of the AMP as proposed will comply with the applicable requirements with no change, except for the additional monitoring needed to determine hydrogen content and concentration in the vent gas streams combusted at each flare. This will be accomplished using the existing continuous measuring analyzers, which are located in the hydrocracker unit, reformer units, and SAM unit, upstream of the flare vent gas knock out drums.

AMP Approval Requirements

EPA's approval of the AMP is based upon the following representations made for operating and maintaining the hydrogen concentration monitoring system:

- Maintenance and calibration of each measuring device used in calculating hydrogen flow will be consistent with the requirements of the facility's air permit and Table 13 of the Appendix to Part 63 Subpart CC, Calibration and Quality Control Requirements for Continuous Parameter Monitoring Systems.
- Each measuring device used in calculating hydrogen will maintain the required accuracy outlined in Table 13 of the Appendix to Part 63 Subpart CC.
- While in use, the measurement devices used for hydrogen flow calculation will include controller logic to ensure material balance of all hydrogen and non-hydrogen vent gas stream flows to the flares.

ExxonMobil shall retain the minute-basis data from the hydrogen concentration measuring devices and monitoring system components, and the output data from the instruments and devices used for completing the vent stream gas flow and heat input calculations, in a suitable database format for a minimum of five calendar years, consistent with Title V and other similar Clean Air Act recordkeeping requirements. Upon request of the delegated state or EPA, ExxonMobil shall provide the hydrogen concentration heat input and flow data calculations in an Excel workbook, similar to the format furnished for review and approval of the AMP.

EPA will furnish a copy of the AMP approval to Texas Commission on Environmental Quality (TCEQ) for attachment to the facility's new source review and Title V air permits, as appropriate. Although the State is delegated Part 63 Subpart CC, the implementation of this AMP must be consistent with the facility's federally enforceable permit conditions. This approval applies only to the ExxonMobil

Beaumont facility. If ExxonMobil wishes to add facilities for coverage under a similar AMP, the company must submit a written request to the appropriate EPA region with the locations and addresses

for each facility, and site-specific supporting data and other documentation, consistent with data submitted for this AMP. EPA Region 6 may approve the AMPs for additional facilities in Region 6 states (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas).

This response has been coordinated with the EPA Office of Air Quality Planning and Standards (OAQPS), which provided input on the AMP request and technical data used for the response. Questions regarding this conditional approval may be directed to Diana Lundelius of my staff at 214-665-7468 or Lundelius.diana@epa.gov.

Sincerely,

STEVEN THOMPSON

Digitally signed by STEVEN THOMPSON
Date: 2022.11.09 16:02:02 -06'00'

Steve Thompson
Chief,
Air Enforcement Branch

Ecc: Anthony Borgobello, ExxonMobil, anthony.borgobello@exxonmobil.com
Brenda Shine, USEPA OAQPS, Shine.Brenda@epa.gov
Michael Delacruz, TCEQ, Michael.Delacruz@tceq.texas.gov

ENCLOSURE
ExxonMobil Corporation
Beaumont, Texas Facility
Flare Vent Gas Composition Monitoring
High Pressure (HP) and Low Pressure (LP) Flares
NESHAP for Petroleum Refineries-40 CFR Part 63 Subpart CC

Purpose of AMP Request

ExxonMobil Corporation (ExxonMobil) requests approval of an AMP to utilize existing process instrumentation for measuring and determining hydrogen content in flare vent gas subject to 40 CFR § 63.6700, instead of installing additional hydrogen analyzers at the flare vent gas line headers. As discussed with EPA Region 6 and the EPA Office of Air Quality, Planning, and Standards (OAQPS) in October 2020 and March 2021, ExxonMobil seeks approval of the AMP to allow venting and combustion of hydrogen at the HP and LP flares as a replacement for commercial natural gas and refinery fuel gas during state-wide curtailment of natural gas due to extreme weather conditions. During extreme cold weather conditions, natural gas lines may freeze, limiting gas supply to homes and businesses. During extreme heat conditions, the amount of natural gas being supplied to electric generating facilities may not allow them to keep up with electricity demand. The flexibility to combust hydrogen in the HP and LP flares will allow ExxonMobil to divert its available natural gas and refinery fuel gas byproduct supplies to respond to the state's emergency needs, while still complying with the requirements of Subpart CC.

Summary

In support of its request, ExxonMobil provided a process overview of the continuous catalytic reformer and stand-alone methanator (SAM) units that produce hydrogen product off-gas, the locations and configurations of the hydrogen analyzers to be employed, an overview of the calculation methodology for determining hydrogen vent gas flow rate and concentration in the vent gas streams to the flares, and the calculation methodology for determining the total net heating value of the vent gas streams to flares, inclusive of hydrogen concentration ranges up to 100 percent. The calculation methodology was tested on both flares using data collected during Winter Storm Uri in February 2021, which ExxonMobil furnished to EPA in April 2022.

Alternative Monitoring Plan

Continuous net heating value monitors have been installed for HP and LP Flares in accordance with the requirements of § 63.6700, but these instruments cannot speciate the hydrogen content (i.e., H_2 versus H, H^+ or H_3O). Total vent gas flow meters are also installed in the header lines leading to each flare. There are no separate flow meters installed to measure the hydrogen vent gas flow sent to the HP and/or LP Flare. However, there are pressure control valves that relieve the pressure of the hydrogen produced in the refinery units. This hydrogen gas flow cannot be consumed by downstream units, nor during unit maintenance or downtime period where there is venting to the HP and LP flare blowdown systems. The area of a pressure control valve opening is considered to be analogous to a controlled orifice, in which the area of the opening is readily adjustable. This allows an accurate hydrogen flow rate calculation by using the variable amount displaced through the control valve orifice, based on the control valve's characteristics, and known process conditions measured by existing instrumentation. The control valves to be employed are noted in the following table, based on their control valve characteristics, and known process conditions from existing instrumentation:

Unit	Control Valve	H_2Analyzer
Hydrocracker	37PCS0O	34AI001 or 35Al600
Reformer 3	35PC621	34Al426
Reformer 3	35PC051	34AI001
Reformer 3	35FC001	34Al001 or 35Al600
Reformer4	34PC0478	34Al426
Reformer4	34PC482	34Al426
Reformer4	34PC696B	34AI001
SAM	38PC038	38AI003 or Al4305H2

As part of the AMP request, ExxonMobil furnished the following monitoring condition limits and quality assurance provisions that it will implement, as well as other supporting data:

- If a measuring device's reading fails to meet the required accuracy set forth in NESHAP CC Appendix Table 13, alarms will automatically activate, and an appropriate priority will be assigned to the repair of that device.
- A malfunctioning measuring device's last good value will be automatically substituted into the hydrogen flow calculation in lieu of the device's live readings until the measuring device returns to normal operation. If conditions exist such that the measuring device's last good value is no longer representative of actual process data, a conservative override value will be substituted into the hydrogen flow calculation in lieu of the device's last good value. A "fail safe" option will be available as a last resort, which will assume zero hydrogen flow and revert back to original net heating value calculations without hydrogen.
- To avoid overestimating hydrogen flow, the controller logic will ensure that hydrogen flow cannot exceed total flare flow and that all other known non-hydrogen flare flows are accounted for.
- Process flow diagrams for the Continuous Platinum Reformer, SAM, hydrogen system, control valve example, and standard meter and flow valve calculation formulas.
- Control design and accuracy calculations that correlated to the data collected during Winter Storm Uri from February 3 to March 3, 2021.