UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

12/22/2020

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Ms. Anne Lee
Senior Technical Environmental Lead
Flint Hills Resources
Pine Bend, LLC
3120 117th St. E.
Inver Grove Heights, Minnesota 55077

Dear Ms. Lee:

I am writing in response to your letter to EPA Region 8 dated August 19, 2020. In that letter you request the use of an alternative test method on the Fluid Catalyst Cracking Unit (FCCU) at Flint Hills Resources Pine Bend Refinery (FHR) located in Rosemount, Dakota County, Minnesota. The request seeks use of an alternative method of measuring flow during the performance tests required for the FCCU found in 40 CFR part 60, Subpart Ja, Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007 (Subpart Ja). The Office of Air Quality Planning and Standards (OAQPS), as the delegated authority, must make the determination on any major alternatives to test methods and procedures required under 40 CFR parts 59, 60, 61, 63 and 65. Your proposed test method alternatives and our approval decisions are discussed below.

According to the information you provided, the FCCU at FHR is currently subject to 40 CFR part 60, Subpart J, Standards of Performance for Petroleum Refineries (Subpart J), along with 40 CFR part 63, Subpart UUU, National Emission Standards for Hazardous Air Pollutants for Petroleum Refineries: Catalytic Cracking Units, Catalytic Reforming Units, and Sulfur Recovery Units (Subpart UUU); however, you state that FHR has submitted a Title V permit application seeking to incorporate the requirements for an FCCU found Subpart Ja. Once the permit is modified to require compliance with the relevant sections of Subpart Ja, FHR is seeking an alternative test method to the performance test requirements for measuring flow prescribed by Subpart Ja. Section 60.104a(d)(4)(iv) of Subpart Ja states:

"During the performance test, the volumetric flow rate of exhaust gas from catalyst regenerator (Q_r) before any emission control or energy recovery system that burns auxiliary fuel is measured using Method 2 of appendix A-1 to part 60."

As an alternative to this requirement, you propose to calculate the flow instead, using a mass balance, as detailed in Section 63.1573(a)(2) of Subpart UUU, which states:

"You may use this alternative to calculating Q_r, the volumetric flow rate of exhaust gas for the catalytic cracking regenerator as required in Equation 1 of §63.1564, if you have a gas analyzer installed in the catalytic cracking regenerator exhaust vent prior to the addition of air or other gas streams. You may measure upstream or downstream of an electrostatic precipitator, but you shall measure upstream of a carbon monoxide boiler. You shall:

(i) Install and operate a continuous parameter monitoring system to measure and record the hourly average volumetric air flow rate to the catalytic cracking unit regenerator. Or, you can determine and record the hourly average volumetric air flow rate to the catalytic cracking unit regenerator using the catalytic cracking unit control room instrumentation.

(ii) Install and operate a continuous gas analyzer to measure and record the concentration of carbon dioxide, carbon monoxide, and oxygen of the catalytic cracking regenerator exhaust.

(iii) Calculate and record the hourly average flow rate using Equation 2 of this section as follows:

$$Q_r = \frac{79 \times Q_{air} + \left(100 - \%O_{xy}\right) \times Q_{oxy}}{100 - \%CO_2 - \%CO - \%O_2} \qquad \text{(Eq. 2)}$$

Where:

Q_r = Volumetric flow rate of exhaust gas from the catalyst regenerator before adding air or gas streams, dscm/min (dscf/min);

79 = Default concentration of nitrogen and argon in dry air, percent by volume (dry basis);

$\%O_{xy}$ = Oxygen concentration in oxygen-enriched air stream, percent by volume (dry basis);

Q_{oxy} = Volumetric flow rate of oxygen-enriched air stream to regenerator as determined from the catalytic cracking unit control room instrumentations, dscm/min (dscf/min);

$\%CO_2$ = Carbon dioxide concentration in regenerator exhaust, percent by volume (dry basis);

CO = Carbon monoxide concentration in regenerator exhaust, percent by volume (dry basis); and

$\%O_2$ = Oxygen concentration in regenerator exhaust, percent by volume (dry basis)."

As detailed in your request, you plan to use the continuous emissions monitoring system (CEMS) installed on the regenerator outlet that is used to measure CO/O_2. Your request also states "that all instrumentation proposed to be used for the Q_r measurements during NSPS Ja required performance testing follows the quality assurance requirements in accordance with

(Subpart) UUU Table 41… This includes instruments such as $CO_2/O_2/CO$ CEMS, pressure drop sensors, air flow rate monitors and temperature sensors."

You state that you are seeking this request to avoid performing an integrated analysis of the catalyst regenerator flue gas outlet composition by using Method 3 (40 CFR part 60, Appendix A). Instead you seek to use the CEMS currently used in accordance with Section 63.1573(a)(2)(ii) of Subpart UUU. You further state in your request that you seek these proposed alternative test methods out of concern for the safety of your laborers and stack testers. According to the information provided, the flue gas temperature at the catalyst regenerator outlet is 1300°F and the sampling ports are under positive pressure which creates a burn risk. You also explain that an additional safety risk is associated with the assembly and disassembly of the scaffolding necessary to sample directly at the regenerator outlet.

Based on the information provided regarding the safety concerns associated with conducting Method 2 on the FCCU outlet at FHR, and to allow the use of the CEMS-based flow measurement already in use on this unit and facilitate consistency with Subpart UUU, we approve your request for the alternative to flow measurement requirement in Section 60.104a(d)(4)(iv) of Subpart Ja, as described above, with the following provisions:

- This alternative is contingent on the approval of the permit application, discussed above, which will incorporate the requirements of Subpart Ja.
- When conducting the annual performance testing, a copy of this approval letter must be included in the test report detailing the use of this alternative test method.

This approval is only applicable to the FCCU at FHR as discussed above. If you have any questions regarding this determination, please contact Kim Garnett at 919-541-1158 or *garnett.kim@epa.gov*.

Sincerely,

STEFFAN JOHNSON Digitally signed by STEFFAN JOHNSON Date: 2020.12.22 11:09:56 -05'00'

Steffan M Johnson

Steffan M. Johnson, Leader
Measurement Technology Group

cc:
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