



## OFFICE OF TRANSPORTATION AND AIR QUALITY

WASHINGTON, D.C. 20460

September 4, 2024

Mr. Chris Northington  
Red Leaf RNG, LLC  
435 Joe Hall Drive  
Ypsilanti, MI 48197

Dear Mr. Northington:

This letter is in response to your alternative measurement protocol (AMP) submission of March 11, 2024, under 40 CFR 80.155(a)(3). In your letter, you requested that EPA approve the use of thermal dispersion mass flow meters that meet the voluntary consensus standard board method ASME MFC-21.2 as an alternative to the flow meters specified at 40 CFR 80.155(a)(2).

The regulations at 40 CFR 80.155(a) specify that the volume of biogas, renewable natural gas, and renewable compressed natural gas or liquified natural gas must be continuously measured using specified flow meters. The regulations allow for EPA to approve an alternative measurement protocol under 40 CFR 80.155(a)(3) if a party demonstrates that they are unable to continuously measure using the specified methods and the party demonstrates that the alternative measurement protocol is at least as accurate and precise as the specified methods. The regulations at 40 CFR 80.135(c)(3)(iii) and (d)(3)(iii) outline the requirements for biogas production and RNG production facilities, respectively, to request an alternative measurement protocol under 40 CFR 80.155(a)(3).

Your submission included information that described how thermal dispersion mass flow meters that meet ASME MFC-21.2 conduct measurement, listed applicable voluntary consensus standards bodies, described routine maintenance and calibration for thermal dispersion mass flow meters, described the measurement frequency of thermal dispersion mass flow meters, and included a comparison with supporting data between the accuracy, precision, and reliability of the alternative measurement protocol and the requirements specified in 40 CFR 80.155(a)(2).

Based on our review of your March 11, 2024, submission and the voluntary consensus standards listed in your AMP submission, the EPA approves your March 11, 2024 AMP submission and a biogas producer or RNG producer may register its facility to use thermal dispersion mass flow meters that meet ASME MFC-21.2 under 40 CFR 80.155(a)(3) so long as the producer meets the conditions

specified in the attachment and all other applicable regulatory requirements at 40 CFR part 80, subpart E.

We note that your submission and this AMP approval do not address whether a specific facility satisfies the criteria for the approval of an AMP under 40 CFR 80.155(a)(3)(i). A facility that intends to use thermal dispersion mass flow meters covered under this AMP approval must address this criterion in its registration submission as described in the regulations at 40 CFR 80.135(c)(3)(iii)(A) or (d)(3)(iii)(A), as applicable.

If you have any questions related to this general AMP approval, please contact Robert Anderson at [anderson.robert@epa.gov](mailto:anderson.robert@epa.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Byron Bunker", is positioned above the typed name.

Byron Bunker, Director  
Implementation, Analysis and Compliance Division  
Office of Transportation and Air Quality

## **EPA Determination that thermal dispersion mass flow meters that meet ASME MFC-21.2 meet the requirements for an alternative measurement protocol under 40 CFR 80.155(a)(3)(ii)**

### **Summary**

On March 11, 2024, Red Leaf RNG, LLC submitted an alternative measurement protocol request under 40 CFR 80.155(a)(3)(ii). The regulations at 40 CFR 80.155(a) specify that the volume of biogas, renewable natural gas (RNG), and renewable compressed natural gas (CNG) or liquified natural gas (CNG) must be continuously measured using specified flow meters. The regulations allow for EPA to approve an alternative measurement protocol under 40 CFR 80.155(a)(3) if a party demonstrates that they are unable to continuously measure using the specified methods and the party demonstrates that the alternative measurement protocol is at least as accurate and precise as the specified methods. The regulations at 40 CFR 80.135(c)(3)(iii) and (d)(3)(iii) outline the requirements for biogas production and RNG production facilities, respectively, to request an alternative measurement protocol under 40 CFR 80.155(a)(3).

Based on EPA staff review of the March 11, 2024, and EPA has determined that thermal dispersion mass flow meters are as precise, accurate, and reliable as meters specified at 40 CFR 80.155(a)(2) so long as a facility installs, operates, calibrates, and maintains the meter consistent with ASME MFC-21.2.

The following sections describe how the March 11, 2024, submission satisfies the applicable regulatory requirements at 40 CFR 80.135 and 80.155, and how biogas and RNG production facilities using thermal dispersion mass flow meters must submit as part of their registration submissions under 40 CFR 80.135.

### **Description and VCSB standards**

The regulations at 40 CFR 80.135(c)(3)(iii)(B)-(C) and 80.135(d)(3)(iii)(B)-(C) require a description of how measurement would be conducted under the alternative measurement product and a description of any standards or specifications that apply for the measurement of biogas and RNG, respectively. Any thermal dispersion mass flow meter submission under the ASME MFC-21.2, must include a description of the specific thermal dispersion mass flow meters and data that demonstrate how the meter meets specification in ASME MFC-21.2 and any other flow meter standards. A list of standards could include:

- ASME MFC-21.2 2010 (Reaffirmed in 2018) ASME MFC-21-2 Measurement of Fluid Flow by Means of Thermal Dispersion Mass Flowmeters
- ISO 14511:2019 Measurement of fluid flow in closed conduits – Thermal mass flowmeters
- ISO 14164 Stationary source emissions – Determination of the volume flowrate of gas streams in ducts – Automated method
- OIML R-137 Gas meters Part 1 : Metrological and technical requirements and Part 2 : Metrological controls and performance tests
- ISO 17025 General requirements for the competence of testing and calibration laboratories

Any facility wishing to utilize this general AMP approval must note in their registration submission under 40 CFR 80.135 that they are using a thermal dispersion mass flow meter as described in this AMP approval letter and must note in their registration submission under 40 CFR 80.135 that they intend to

use thermal dispersion mass flow meters that meets at a minimum ASME MFC-21.2 installed at their facility.<sup>1</sup>

### **Calibration and maintenance**

The regulations at 40 CFR 80.135(c)(3)(iii)(D) and 80.135(d)(3)(iii)(D) require a description of all routine maintenance and the frequency that such maintenance will be conducted for an alternative measurement protocol.

Based on our review of the VCSB standards cited in your March 11, 2024, submission, calibration must be performed according to procedures in ASME MFC 21.1 Appendix I or a similar standard such as or ISO/IEC 14511 at a competent calibration laboratory (e.g., ISO/IEC 17025). Any facility wishing to utilize this general AMP approval must note in their registration submission under 40 CFR 80.135 that the facility intends to meet the calibration specifications in ASME MFC 21.1, ISO/IEC 14511 and ISO/IEC 17025 or describe an alternative maintenance and calibration procedure. If the thermal mass flow meter is calibrated with a fluid not identical to RNG, the equivalency to RNG flow must be demonstrated. If utilizing an alternative calibration procedure, the facility must describe how the alternative will ensure proper operation of the meter in their registration submission.

Based on our review of your submission, the maintenance procedures you specified in ASME MFC 21.1 Sections 5 - 8 should help ensure reliable operation of thermal dispersion mass flow meters if followed. Any facility wishing to utilize this AMP approval must note that they intend to follow the ASME MFC 21.1 Sections 5 – 8 specifications. If utilizing an alternative maintenance procedure, the facility must describe how the alternative will ensure proper operation of the meter in their registration submission.

### **Measurement frequency**

The regulations at 40 CFR 80.135(c)(iii)(E) and 80.135(d)(iii)(E) require facilities to submit a description of the frequency of all measurements and how often such measurements will be recorded under the alternative measurement protocol. ASME MFC-21.2 does not state a frequency of measurement protocol. Producers utilizing ASME MFC-21.2 for acceptance for use of a thermal dispersion mass flow meter must demonstrate in their registration submissions that their thermal dispersion mass flow meter(s) can measure and record data at a minimum of every one (1) second consistent within the definition of continuous measurement at 40 CFR 80.2.<sup>2</sup>

Any facility wishing to utilize this general AMP approval must include a description of the frequency of measurement and how often such measurements will be recorded as part of their registration submission under 40 CFR 80.135. If the facility intends to meet the frequency specified in the definition of continuous measurement at 40 CFR 80.2, the facility should note that. If the facility wishes to use a

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<sup>1</sup> Note, the facility should not submit copies of referenced VCSB standards as part of their registration submission.

<sup>2</sup> The regulations at 40 CFR 80.2 define “continuous measurement” as “the automated measurement of specified parameters of biogas, treated biogas, or natural gas as follows: (1) For in-line GC meters, automated measurement must occur and be recorded no less frequent than once every 15 minutes. (2) For flow meters, automated measurement must occur no less frequent than once every 6 seconds, and weighted totals of such measurement must be recorded at no more than 1 minute intervals. (3) For all other meters, automated measurement and recording must occur at a frequency specified at registration.”

less frequent measurement or recording frequency, the facility must specify what that frequency is and include a demonstration over how that frequency will result in measurement equivalent or better than the specified measurement and recording rates for continuous measurement at 40 CFR 80.2.

### **Accuracy, precision, and reliability comparison**

The regulations at 40 CFR 80.135(c)(3)(iii)(F) and 80.135(d)(3)(iii)(F) require a comparison between the accuracy, precision, and reliability of the alternative measurement protocol and the requirements specified in 40 CFR 80.155(a)(1) and (2), as applicable, including any supporting data. In your March 11, 2024, submission, you included information including supporting data that compared the accuracy, precision, and reliability of thermal dispersion mass flow meters and meters specified at 40 CFR 80.155(a)(2).

Based on our review of your March 11, 2024, submission, the listed VCSB standards, and other submissions requesting AMPs for thermal dispersion mass flow meters, we have determined that thermal dispersion mass flow meters that meet ASME MFC-21.2, along with performance characteristics in ISO 14164 Appendix B, OIML R-137 Section 5 are as accurate, precise, and reliable as flow meters specified at § 80.155(a)(2) as long as producer demonstrates that the thermal dispersion mass flow meters are selected for use, as per the guidelines in ASME MFC-21.2, and are compliant with the minimum accuracy and repeatability specifications in ISO 14164 Appendix B or OIML R-137 Section 5.

Any facility using thermal dispersion mass flow meters covered under this AMP approval should note in their registration submission under 40 CFR 80.135 that they are relying on EPA's determination in this letter to demonstrate the comparison of accuracy, precision, and reliability of thermal dispersion mass flow meters specified at 40 CFR 80.155(a)(2) and describe how their thermal dispersion mass flow meters comport with ASME MFC-21.2 and specifications in ISO 14164 Appendix B or OIML R-137 Section 5.