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August 30, 2022

Colorado Department of Public Health and Environment (CDPHE)
4300 Cherry Creek S. Drive
Denver, CO 80246

Air Pollution Control Division,

This letter has been generated to provide a review and comment on the provided DRAFT Performance Test Protocol for the performance testing of enclosed combustion devices (ECDs) subject to CDPHE Regulation No. 7, Part D, Section II.B.

Erthwrks Inc. have tested enclosed combustion devices (ECDs) and vapor combustion units (VCUs) for more than 20 years. The unique nature of the ECDs subject to the new rule require a specific, customized approach to testing. We have gathered our senior staff to review the CDPHE's ECD Draft Performance Test Protocol and have compiled several comments on the technical aspects of testing the ECDs subject to the new rule.

In Erthwrks initial review of the protocol, it appears the testing requirements seem to evolve throughout the document and the testing objectives are not consistently defined. This review, and subsequent comments, are based on the assumption that the testing objectives are to demonstrate compliance with the testing requirements and limitations as defined in the CDPHE Regulation No. 7, Part D, Section II.B.2.h. Please see our comments below.

Comment No. 1:
< 1.0 Introduction, Paragraph 1 >

This paragraph states that this protocol may be used to meet the requirements for the performance testing on an ECD as required by Regulation No. 7, Part D, Section II.B.2.h. This means the performance test should be required to only demonstrate the ECD's control efficiency of total hydrocarbons as required by the regulation. **Why would other pollutants and parameters, not required or specified by the regulation, be required to be measured and reported under this protocol?**

Comment No. 2:
< 3.0 Process Overview >

This section states that the test program must determine:

- Control Efficiency of Hydrocarbons (total hydrocarbons)
- Total Hydrocarbons emission rate (lb/hr)
- CO emission rate (lb/hr)
- Heat content (LHV and HHV) of the inlet gas (Btu/scf)
- Minimum flowrate of the waste gas to inlet of the ECD (scf/hr)
- Combustion temperature

This is confusing, because to determine the control efficiency of the ECD as required under Reg. 7, Part D, Section II.B.2.h, you only need to determine the following:

- Total Hydrocarbon mass rate inlet to the ECD (lb/hr)
- Total Hydrocarbon mass rate exhaust of the ECD (lb/hr)

It is understandable that minimum flow rate of waste gas to inlet of ECD and combustion temperature may be used for operational data purposes, but for this information to have any value, the facility would need to measure and record these items on a continuous basis. Otherwise, what value do these measurements provide if there is no flowrate or temperature requirement that the facility must continuously comply with? Also, why would CO emission rate in lb/hr and inlet gas Heat Content (btu/scf) be required to be measured when it is not required to demonstrate compliance with Reg. 7, Part D, Section II.B.2.h?

Comment No. 3:

< 3.0 Process Overview, Table 1, **Inlet Test Methods** >

Table 1 defines the Testing Methodologies to be used. This test protocol defines the inlet methods as follows:

Volumetric Flow Rate:	USEPA Method 1 and 2D
CO:	USEPA Method 10
THC:	USEPA Method 25A or 18

Our specific comments are as follows:

Comment 3.1: EPA Method 2B for exhaust flow rate requires the use of EPA Method 2A for inlet flow rate. Erthwrks does believe EPA Method 2D can be used for this purpose, as a deviation to Method 2B, but that a meter calibration in accordance with Method 2D, Section 10.1 is impossible due to the nature of the waste gas, but the protocol should allow for USEPA Method 2A or USEPA Method 2D (calibrated in accordance with the procedures in Method 2A).

Comment 3.2: USEPA Method 1 is not applicable for Method 2A or 2B and should be removed from the volumetric flowrate determination.

Comment 3.3: USEPA Method 10 for CO concentration of the inlet waste stream is not required to be determined by any method or regulation pertaining to this protocol and should be removed from the protocol.

Comment No. 4:

< 3.0 Process Overview, Table 1, **Outlet Test Methods** >

Table 1 defines the Testing Methodologies to be used. This test protocol defines the outlet methods as follows:

Volumetric Flow Rate:	USEPA Method 1, 2B and 4
O_2 & CO_2:	USEPA Method 3A
CO:	USEPA Method 10
THC:	USEPA Method 25A or 18

Our specific comments are as follows:

Comment 4.1: Erthwrks agrees that the EPA Method 2B is the proper method for calculating the exhaust flowrate of an ECD. EPA Method 1 and 4 are not applicable to calculate exhaust flowrate via Method 2B and can be removed from the protocol.

Comment 4.2: Exhaust CO_2 and CO concentrations are used in the 2B calculation. Oxygen determination is not required to determine the THC exhaust mass rate and can be removed from the protocol.

Comment 4.3: The table lists Method 18 as an option to determine the THC (as TOC), but with a note stating that Method 25A must only be used in the calculation of THC DRE and another note stating that Method 18 must be used in greenhouse gas emissions testing. Greenhouse Gas Emissions Testing are not defined in Section 3.0 as the test program objectives, nor is it listed as a requirement in the Regulation No. 7, Part D, Section II.B.2.h that this testing protocol is written for.

Comment 4.4: The table lists EPA Method 25A for THC (as TOC). It is almost certain that the inlet hydrocarbon concentration will be higher than the capabilities of a flame ionization analyzer as specified in EPA Method 25A. The only way to use Method 25A in this application is to use a dilution probe to dilute the sample down into the range of these analyzers. Alternatively, EPA Method 25B measures total hydrocarbons using Nondispersive Infrared Technology that is more capable of measuring hydrocarbons in the range of the expected inlet concentrations. This is the most common methodology used for inlet concentration determinations for ECD testing. EPA Method 25B should be added to the testing methodology option for inlet THC determination along with Method 25A with dilution probe option.

Comment No. 5:

< 3.0 Process Overview, Table 1, **Greenhouse Gas Emissions - Outlet** >

As stated above in Comment 4.3, Greenhouse Gas Testing is not a requirement of testing for the determination of compliance with the standards set forth in the CDPHE Regulation No. 7, Part D, Section II.B.2.h.

Comment No. 6:

< 4.0 Methods >

This paragraph states the approved test methods that must be used and lists them as:

- EPA Method 1 or 1A
- EPA Method 2B
- EPA Method 2D
- EPA Method 3A
- EPA Method 4
- EPA Method 10
- EPA Method 25A and 18
- EPA Method 22
- EPA Method 205

This is inconsistent because Table 1 in Section 3.0 already lists the test methods to be used. This section adds more methodologies that have nothing to do with the testing objectives. EPA Method 1A is for velocity traverses is small stacks. The protocol has already defined that Method 2D (or 2A)

will be used for the inlet volumetric flow determination making Method 1A not applicable. This list also includes EPA Method 22, which is for the visual determination of Fugitive Emissions. This is not a requirement of performance testing of ECDs under Regulation No. 7, Part D, Section II.B.2.h. Why would these methods be listed as approved methods to be used in this protocol?

Comment No. 7:

< 4.1.1 EPA Method 1 or 1A >

EPA Method 1 and 1A is not applicable to this scope of work, see Comments 3.2 and 6 above.

Comment No. 8:

< 4.1.2 Inlet Flow Rate: Flow Meter (EPA Method 2D) >

As stated above, EPA Method 2D would be deviation for the Method 2B calculations, but Erthwrks does believe this is an appropriate deviation if utilized properly and calibrated in accordance with EPA Method 2A. Method 2A should also be listed as an approved method for this testing. See Comment 3.1 above.

Comment No. 9:

< 4.1.3 Inlet THC: Method 25A or EPA Method 18 >

As stated above in Comment 4.4, EPA Method 25A is not appropriate for the level of inlet concentration typically observed in ECD's without an appropriately utilized dilution probe system. In addition, because the inlet sample is not from a combustion source, and therefore NOT a hot, wet sample, there is no need to use a heated sampling system. It is also not advisable to heat a flammable waste gas stream which would create a potentially explosive environment. Method 25B should be listed and an appropriate method to use.

Comment No. 10:

< 4.1.3 Inlet THC: Method 25A or EPA Method 18, Paragraph 4 and 5 >

The paragraph that details the calibration procedures and QAQC requirements for 25A is not correct. The protocol should follow the procedures and criteria in EPA Method 25A, Section 8.4 and 8.6.2.

Comment No. 11:

< 4.2.1 Outlet Sample Location >

This section details the procedures for performing volumetric flow traverses, cyclonic flow, etc. The protocol has already defined multiple times that EPA 2B must be used for exhaust volumetric flow so why would the protocol need to describe these procedures?

Comment No. 12:

< 4.2.1 Outlet Sample Location >

The primary purpose of this testing program is to determine the hydrocarbon concentrations and mass emission rates. The sampling location should follow EPA Method 25A, and be located in the centroidal area in the stack, as defined by Method 25A §6.1 and §8.2

Comment No. 13:

< 4.2.2.1 EPA Method 2 >

The protocol has already defined multiple times that EPA 2B must be used for exhaust volumetric flow so why would the protocol need to describe these procedures of Method 2?

Comment No. 14:

< 4.2.2.2 EPA Method 2B >

The protocol is incomplete in describing EPA Method 2B, which is the primary driver behind 80% of the analytical activities to be conducted for this testing program.

EPA Method 2B requires the simultaneous measurements from EPA Method 2A (flow) and 25A/B (TOC) from the inlet source and EPA Methods 3A (CO_2), 10 (CO) and 25A/B (TOC) from the exhaust of the ECD. Method 2B is advantageous in that it is able to calculate exhaust flow on a minute-by-minute basis, which is important for variable flow and intermittent flow units in accurately calculating the exhaust mass rates.

Comment No. 15:

< 4.2.3.1 Stratification Testing >

The Method 7E stratification test should not be required for this testing program. Because the majority of these units do not have a consistent flow of waste gas, as well as the variability of waste gas composition, the combustion zone is constantly changing. Therefore, the combustion products are not stable in their concentration and a stratification test would provide inconclusive results. Typically, these units have vertical burners in a vertical stack of sufficient height to meet EPA Method 1 sampling location and gaseous stratification is not expected.

Comment No. 16:

< 4.2.3.3 Stack Gas Moisture Content: EPA Method 4 >

EPA Method 4 is not applicable for this testing program. Stack gas molecular weight is not required for EPA Method 2B. In addition, EPA 40CFR60, Subpart XX is the most commonly used methodology for the testing of ECD's at gasoline terminals and EPA Method 4 is not used for any calculation to determine TOC mass emission rates or DRE.

Comment No. 17:

< 4.2.3.5 Methane and Ethane: EPA Method 18 >

Again, as stated above, the quantification of methane and ethane is not required by the applicable regulations.

Comment No. 18:

< 5.3.9 EPA Method 2B Equations >

Erthwrks would propose to use the appropriate equations located in EPA Method 2B, specifically Equation 2B-1 to calculate Exhaust Gas Volume (V_{es}).

$$V_{es} = \frac{K_i * HC_i}{K_e * HC_e + (CO_{2e} - CO_{2a}) + CO_e}(V_{is})$$

Comment No. 19:

< 7.1 Full Test Report >

This section describes what to report as the results of the testing and includes the following:

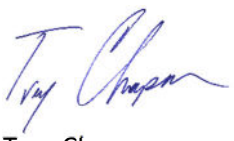
- Hydrocarbon Percent Control Efficiency
- Outlet Emission Rates of THC, VOC, CO and Methane in lb/hr
- Calibration DATA (analyzer and equipment)
- Combustion Chamber Temperature

This is inconsistent with the previously defined testing requirements and the testing objectives of Reg. 7, Part D, Section II.B.2.h. This section includes additional reporting requirements to the reporting requirements already defined in Section 3.0 of the protocol. **Please see Comment No. 2 above**.

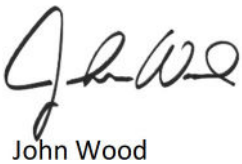
The regulatory requirement to test the emissions from ECD's subject to this protocol are only required, under the CDPHE Regulation No. 7, Part D, Section II.B.2.h, to demonstrate compliance with the 95% Total Hydrocarbon Control Efficiency. At the time of formulated these comments, Erthwrks knows of no other testing regulations, and the protocol cites no other source, that would require the reporting of outlet emission rates of VOC, CO, and Methane in lb/hr.

Thank you for considering the comments that we have discussed in this letter.

Sincerely,



Trey Chapman
CEO



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August 30, 2022

Colorado Department of Public Health & Environment
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4300 Cherry Creek Drive South
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Submitted via email to cdphe.commentsapcd@state.co.us

Re: Comments on Draft Enclosed Combustion Devices Performance Test Protocol

Rocky Mountain Natural Gas, LLC dba Black Hills Energy (BHE) appreciates the opportunity to provide comments on the voluntary draft enclosed combustion device (ECD) performance test protocol. Providing guidance for emissions testing required by Colorado Air Quality Regulation Number 7, Part D, Section II.B.2.h. helps companies prepare and may streamline the protocol approval process. Not all companies operate ECD in the same way and allowing companies to propose alternative performance test protocols is necessary and appreciated. BHE provides the following comments based upon operational experience and conversations with emissions testing companies.

BHE's ECDs are control devices which combust waste hydrocarbon vapors, waste gas, from sources including tank, dehydrators, and assist gas, natural gas required to combust the waste gas. The ECDs typically control intermittent flow and low-flow equipment and the inlet piping is approximately 2" in diameter. Intermittent flow is when waste gas from the controlled equipment is sent to the ECD non-continuously, such as from periodic dump events from a storage tank. Due to operational limitations, we are anticipating it will be difficult to adhere to the draft test protocol. BHE provides the following comments:

- In section 2.0, How to Use This Protocol, the protocol states that *You may use this protocol for testing of ECDs controlling intermittent or low-flow equipment, however the required run duration total (3x21 minutes = 63 minutes) must be met which could mean multiple days of testing*. Can the Division please clarify if their intent is to only allow data points to be collected while waste gas is flowing to the ECD? This would be very challenging for intermittent flow and low-flow devices. BHE proposes that the emissions limit be mass based. If mass based, then the test should allow for 3x21minute runs with no pauses for low or intermittent flow.
- In Table 1, BHE proposes that methods RM2/2B and 2C be added as options to the Inlet and Outlet Volumetric Flow Rate test methods. These are approved EPA methods and viable options for this type of application.

- In Section 3.0 Process Overview, the protocol states *If a dilution system is used, an EPA Method 205 gas dilution system certification must be performed onsite prior to the start of testing.* Method 205 is for providing calibration to an analyzer with a gas divider which is outside the scope of ECD testing. This method does not apply to the dilution sampling system. BHE recommends that the Division clarify this section.
- EPA Method 22 is listed in Section 4.0 Methods; however, it is not referenced again within the document. BHE recommends removing this method to limit confusion or clarify the reason for including it.
- In 4.1.1 Inlet Sample Location the protocol references EPA Method 1 or 1A. This method is not likely applicable to the inlet locations. Inlet locations for BHE equipment are typically 2" in diameter. Installing a sample port at the inlet would lead to sample loss and a decrease in test accuracy. BHE recommends using procedures 2D due to them being safer and more appropriate.
- BHE asks the Division to clarify why EPA Method 320 and ASTM D6348 are not allowed under this protocol. FTIR, Method 320, is an approved EPA method for this type of application and would work well. Additionally, it could be used for outlet only emissions testing as it provides the ability to accurately measure CO_2, CO, and unburned hydrocarbons.
- BHE recommends that language on the test protocol, test reporting and other CO Reg 7 requirements be removed. Including this language could potentially lead to errors if the regulation is updated or amended. Focusing the test protocol solely on test methods will simplify the document and improve consistency.
- EPA is considering publishing a conditional test method to allow for outlet only testing. BHE recommends including a statement in the protocol that any type of EPA approved method applicable to ECD testing be allowed.
- In Construction Permit 13WE1771, condition 22, APCD approved an outlet only test method for the facility's initial testing requirements. BHE recommends that an outlet only option be included in the performance test protocol.

BHE appreciates the opportunity to comment on the proposed performance test protocol. Please don't hesitate to contact me at 303-566-3504 to discuss the proposed protocol further.

Sincerely,

Shannon Pollmiller

Shannon Pollmiller
Sr. Environmental Professional

VIA EMAIL

August 31, 2022

Colorado Air Pollution Control Division
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80246
cdphe.commentsapcd@state.co.us

Re: API CO and COGA ECD Performance Testing Protocol Comments

To whom it may concern:

In response to the Division's July 29, 2022, request for public comments on the ECD Performance Test Protocol, the American Petroleum Institute Colorado (API CO) and the Colorado Oil and Gas Association (COGA) respectfully submit the following comments. API CO and COGA thank the Division for its work on developing the Protocol and appreciate the opportunity to submit comments. Development of workable testing protocols is critical to the successful implementation of the ECD testing program, and API CO and COGA appreciate the Division's development of the Protocol.

In addition to our engagement on this Protocol, we look forward to any opportunity to engage with the Division on development of an intermittent/low flow testing protocol, which the Commission directed the Division to develop in the December 2021 rulemaking. As the Division acknowledges, the draft Protocol may not be appropriate or workable for all operations, and we believe a separate, Division-approved protocol to address intermittent/low-flow systems is necessary to ensure operators can meet the ECD testing deadlines. In addition, we look forward to engaging with the Division on development of an outlet-only testing protocol that might be more safely applied in a variety of operational scenarios, including low and/or intermittent flow systems.

We provide the below comments to enhance the useability of this protocol for intermittent flow conditions when an Operator can collect 21 total minutes of intermittent flow during a continuous sampling session. We also hope these comments can be incorporated to allow for more accurate testing, broaden the test methods and collection parameters used, and ensure its use on a more broadly applicable scale across the State.

A. Draft Protocol Comments

1. *Technical Issues*

a. *Inlet Volumetric Flow Rates*

Section 4.1.1 states that prior to performing volumetric flow traverses, operators "check for the presence or absence of cyclonic flow." This would require the use of Section 11.4 of EPA Method 1, which specifically requires the placement of measurement equipment inside of open-to-atmosphere piping

that carries flammable gas. This creates significant safety concerns and COGA/API CO would request that Operators instead rely on manufacturer specifications for each flow meter.

Section 4.1.2 – Inlet Volumetric Flow Rate: Flow Meter (EPA Method 2D) – calls for EPA Method 2D. COGA/API CO suggest that the Division allow for inlet flow measurement using both EPA Methods 2B and 2D. Method 2B provides more flexibility in measuring flow without sacrificing accuracy, as Method 2B, in conjunction with the inlet methods suggested below, allows for a full gas chromatography assessment of the carbon chains going through the combustion unit.

Section 4.1.2 states that "[t]he protocol requires one (1) reading per minute for the duration of the test run." COGA/API CO suggest revising this language to allow for readings that can be more or less frequent than once per minute as it is our understanding that some units read less frequently than every 60 seconds. EPA Reference Method 2D, Section 8.2.1 applies to continuous, steady flow applications and provides that the tester must "[m]ake a minimum of 12 equally spaced readings of each parameter during the test period." Using a 21-minute test period in a continuous, steady flow application, the tester must space readings to no less frequently than every 105 seconds. EPA Reference Method 2D, Section 8.2.2 applies to noncontinuous and nonsteady flow applications and provides that the tester must apply the procedure in Section 8.2.1 while also recording parameters "on a time interval frequency sufficient to adequately profile each process cyclical or noncontinuous event." For a noncontinuous or nonsteady application (*i.e.,* intermittent flow), we believe taking a reading at least once during every combustion event and no less frequently than every 105 seconds during each continuous combustion event would be in accordance with EPA Reference Method 2D. Providing this additional flexibility to allow for lower or higher frequencies would add more tools to the toolbox for operators and testing companies given the large number of combustion units that are required to be tested and would remain compliant with EPA Reference Method 2D.

b. Flow monitors

Section 4.1.2 – Inlet Volumetric Flow Rate: Flow Meter (EPA Method 2D) – states that a flow meter must be installed at the inlet to each ECD. Many sites have banks of ECDs. COGA/API CO request the Division revise the protocol to clarify that it will allow isolation of each ECD or multiple ECDs in a bank for performance testing. COGA/API CO also request that the Protocol allow use of a single flow meter at the inlet to the ECD bank where all flow can be directed to an isolated ECD. If isolating multiple ECDs, each ECD in the isolated group must have a dedicated flow meter.

Section 4.1.3 – Inlet Total Hydrocarbons (THC): EPA Method 25A or EPA Method 18 – proposes methods that are acceptable for steady-state sources (*i.e.*, continuous, predictable flow); however, these methods do not operate in a manner that provides quick response if used on intermittent flow sources. Due to the longer response time of these methods, the detection and measurement of the target pollutants for intermittent flow sources will result in increased measurement error by missing short-duration events. As such, the proposed methods are not suitable for intermittent flow.

Additionally for Section 4.1.3, the EPA-approved Method 320 and ASTM D6348 are capable of providing measurement of CO, H_2O, Methane, and Ethane (see below why we believe methane and ethane should be excluded) and have response times that are more appropriate for intermittent sources. These methods can be augmented with EPA Methods 25A and 3A for measurement of THC and O_2/CO_2, respectively. Combined, this would allow for continuous measurement of all constituents and provide data across broader periods of time to catch intermittent events. Specifically, COGA/API CO request the Division also allow the use of additional methods such as, but not limited to, ASTM 1945 and 1946 and GPA 2261. We also believe that any methods that are allowable under 40 CFR § 98.254 (Subpart Y)

should be allowed under the Protocol, and the language in the Protocol should reflect this flexibility. We believe these methods, when coupled with other EPA methods, to be more accurate than the traditional EPA methods proposed singly and request that they also be included to allow operators and testing companies enough flexibility to enhance their tests with other standard methods. For example, ASTM 1945 allows for a grab sample which can be taken into a lab for a full gas chromatography analysis allowing for a full composite breakdown inclusive of low carbon chain (C1-6) analysis. Unlike Method 18, which calls for a dilution sample at the inlet, and which gets to approximately 83 to 87 percent of the mean of carbon in the gas, these newer methods provide a more accurate mass balance of gas combustion in the unit. This doesn't mean the EPA methods are wrong or inaccurate, and a passing test with these methods is still valid; however, operators would again prefer the full suite of tools in the toolbox given the large number of tests that will need to be conducted.

c. Outlet Measurements

Section 4.2.1 – Outlet Sample Location: EPA Method 1 or EPA Method 1A – states that an acceptable sample location is to be located "at least two stack or duct equivalent diameters downstream and half equivalent diameter upstream from any flow disturbance." ECDs come in a wide variety of diameters and heights which could render this requirement difficult or impossible to meet. For example, there are likely hundreds of units in the field that are 4 feet in diameter, and only 7 feet in height above the burner tray. Because of the diameter of the unit, an inlet port would have to be installed 2 feet above the burner tray and the outlet port subsequently 8 feet above the tray. This would require some form of extension of the unit to get the outlet height to meet the protocol. This is roughly 5 feet higher than the designed height of the unit. COGA/API CO request that the Division allow an operator to slightly modify the use of Method 1 or 1A in these instances by providing adequate explanation and technical justification on their Form 1, or through other means. To allow for broader use of this protocol, we suggest the Division allow for deviation from the sample locations so long as the deviation is described in the testing notification.

Section 4.2.3.4 – Outlet total hydrocarbons (THC): EPA Method 25A – calls for the use of Method 25A; however, COGA/API CO request that the Division allow the use of Method 25B as an alternative. Method 25B provides accurate results, and some testing companies may not have readily available equipment to conduct Method 25A. Adding Method 25B allows for flexibility that will mitigate potential resource constraints without sacrificing testing accuracy.

Sections 4.2.3.5 and 7.1 require determining methane and ethane emissions levels. These constituents add cost to the testing and aren't necessary to determine the total hydrocarbon efficiency required by Regulation No. 7, Part D § II.B.2.h. Additionally, EPA Method 18 requires use of a gas chromatograph, and not all laboratories utilize a gas chromatograph, meaning laboratory resources may serve as a bottleneck to testing. Given that demonstration of methane and ethane efficiency does not further a regulatory purpose, comes at added cost, and requires use of equipment not available in all laboratories, COGA/API CO respectfully request that the Division remove this section from the Protocol.

d. Failed test

Section 9.3 – Failure Criteria – states "[a]n incomplete or stopped test is a failed test." A test may be stopped short for any number of reasons that should not constitute a failed test that triggers regulatory requirements – *e.g.*, failed test notification and corrective action. For example, testing equipment could malfunction, or severe weather may preclude safe testing from continuing, resulting in cutting the test short. The Division should not treat these instances as a failed test.

Additionally, under normal operating conditions, source gas flow to the combustion unit is rarely continuous for 21 straight minutes. We request the Division clarify that testers may stop and start the clock during a 21-minute run when flow to the ECD stops and starts. This would allow testers to achieve 21 minutes of ECD combustion for each required run and ensure the Protocol is workable for many ECDs. If 21 continuous minutes of combustion is necessary to meet the conditions of the protocol, the Protocol would be workable for only a small percentage of ECDs.

e. Testing replacement ECDs

Draft Protocol Section 9.4(3) notes that an ECD replacing an ECD that failed a performance test must undergo a performance test "upon commencement of operation." Upon installation, an ECD may require an operations optimization period to bring the ECD into normal operations. Industry requests that the Division clarify that it intends for operators to test a replacement ECD after this performance optimization period. This is consistent with performance testing of equipment in other contexts – *e.g.*, the Division affords an engine two weeks after commencement of operation to allow the operator to optimize the engine's performance during normal operations prior to performance testing.

2. Streamlining Notifications

f. The proposed notification form (Form 1) requests information that goes beyond regulatory requirements and does not request all necessary information.

The proposed Form 1 requests dates and results of all prior performance tests. Regulation No. 7, Part D § II.B.2.j.(ii) requires reporting of performance test results. Requiring operators to also report this information in Form 1 duplicates this reporting requirement and is unnecessary. We respectfully request the Division utilize the information submitted under Section II.B.2.j.(ii) rather than request operators report the same information again in each performance test notification.

The proposed Form 1 also requests automation and/or data logging capabilities. Regulation No. 7 does not require reporting of this information, and it is not clear to us how this information relates to or informs ECD performance. Given the large number of ECD notifications that operators will submit, we respectfully request the Division limit its informational requests to only the information necessary to inform ECD performance. If this request cannot be granted, we request that an extension or supplemental form be submitted past the 60-day expiration of the conditional approval. Many operational issues, timing stipulations, and resource constraints may impact an operator's ability to test within a 60-day time window.

g. Bulk test notifications

We request the Division develop a notification format that allows operators to submit notice of multiple ECD performance tests in one form. Operators will submit notifications covering thousands of ECDs, and requiring operators to fill out and submit a notification form for every ECD is unduly burdensome and unnecessary in every instance. Here, an opportunity for efficiency exists and would facilitate more successful implementation of the program. We suggest the Division develop a notification form that will allow operators to submit one notification per ECD testing event that will cover multiple ECDs – *i.e.,* where Regulation No. 7, Part D § II.B.2.h.(i)(B) requires one testing event for all ECDs controlling a single piece of equipment. If the Division is amenable to this request, we are willing to help the Division develop the notification form.

B. Conclusion

COGA/API CO appreciate the opportunity to comment on the draft Protocol and look forward to engagement opportunities in the development of the intermittent/low-flow protocol in the coming weeks. We realize the tremendous effort that goes into development of these protocols and thank the Division for its efforts.

As emphasized at the outset of this letter, COGA/API CO are eager to work closely with Division staff on an adequate and safe protocol for intermittent flow devices which do not flow for 21 minutes straight, which is the majority of the devices in basins throughout the State. As stated above, allowing start/stop during a 21-minute testing run when flow to the ECD starts/stops will alleviate concerns for some ECDs controlling intermittent/low-flow, depending on how intermittent or low the flow might be. COGA/API CO also request the expansion of this protocol in the sections identified above to allow for additional standards and methods to improve the accuracy of testing, but also expand upon the options operators and testing companies can use to get the large volumes of devices tested within the time frames established by Regulation 7. We have also suggested relying on flow meter manufacturer specifications instead of EPA Method 11.4 for safety in lieu of checking for cyclonic flow.

As noted above, a slight expansion of the data collection timeframes to allow for lesser and slightly higher frequencies of 30 seconds and 105 seconds is also requested. The testing requirements for multiple in-line combustion units also needs revision to ensure safe, adequate, and accurate flow metering. Site specific conditions and variances will also be required for sites that a cannot physically support the equipment or installation of accurate flow monitoring devices and ports. COGA/API CO also require clarity or removal of Section 4.2.3.5 and its reference in Section 7.1, as methane and ethane are not required standalone constituents in the determination of total hydrocarbon efficiency.

For broader applicability of this standardized protocol, it is critical the Division clarify that stopping a testing event does not constitute a failed test in every instance. We believe the Protocol should allow for stopping and starting in accord with flow to the ECD, as noted above. Further, safety or operational reasons, including testing equipment malfunction, may necessitate stopping a test run and should not constitute a failed test. Finally, testing of replacement ECD's will need to allow for an adequate combustion optimization period.

We believe the regulated community and the Division share in the desire to see successful implementation of the ECD testing program. In addition to the technical comments, we believe streamlining the notification requirements, as we suggest, will build the path toward this success.

In addition to the written comments above, we have attached suggested redlines to the draft Protocol for the Division's consideration, along with explanatory comments where necessary. Not all comments raised above are incorporated as redlines in the attached redline document. COGA/API CO explanatory comments are highlighted in yellow.

After reviewing our comments and others, we encourage the Division to dialogue with us and others prior to finalizing the Protocol and look forward to any opportunity to discuss our comments with you.

Sincerely,

eSigned/ Christy Woodward

Christy Woodward
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August 31, 2022

Via Email

Colorado Department of Public Health and Environment
Air Pollution Control Division
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530
cdphe.commentsapcd@state.co.us

Re: Civitas and PDC Comments on the Draft Performance Test Protocol, Enclosed Combustion Devices

To Whom it May Concern:

Davis Graham & Stubbs LLP ("DGS"), on behalf of our clients Civitas Resources, Inc. ("Civitas") and PDC Energy, Inc. ("PDC"), submits the following comments on the Air Pollution Control Division's ("Division") Draft Performance Test Protocol for Enclosed Combustion Devices (the "Draft Protocol").

We appreciate the Division's work on the Draft Protocol and are submitting various technical comments below for the Division's consideration. We note, however, that an adequate protocol to test low-flow or intermittent-flow ECDs is still necessary to allow operators to meet the rigorous ECD testing requirements and deadlines adopted in the December 2021 Regulation No. 7 rulemaking. The Commission understood the urgency and need to develop these protocols and directed the Division to develop "an alternative protocol to a traditional stack test for low-flow ECDs where appropriate." *See* Regulation No. 7, Statements of Basis, Specific Statutory Authority and Purpose, Section X, December 17, 2021 (Revisions to Part D, Sections I., II., III., V., and VI.).

The Colorado Oil & Gas Association ("COGA") has been actively working with the Division to develop an adequate protocol for these low-flow and intermittent-flow facilities, and Civitas and PDC have been heavily involved in those efforts. We remain committed to working with the Division to develop an adequate protocol as soon as possible. Indeed, Civitas has already submitted various outlet-only draft protocols to the Division for review and consideration.

TECHNICAL COMMENTS ON THE DRAFT PROTOCOL

Section 4.1.1

Section 4.1.1 of the Draft Protocol requires that prior to performing volumetric flow traverses, operators "check for the presence or absence of cyclonic flow" in accordance with "Section 11.4 of EPA Method 1[.]" This would require placing measurement equipment inside of open-to-atmosphere piping that carries flammable gas and could create significant safety hazards. Instead, operators should be permitted to rely on manufacturer specifications for each flow meter, which dictate proper location requirements to obtain accurate measurements. Indeed, manufacturers of flow meters design and

operate their equipment to operate as specified at the outlined temperatures, locations, and gas types. Accordingly, we request that the specified language above regarding cyclonic flow be deleted from the Draft Protocol.

Section 4.1.2

Section 4.1.2 of the Draft Protocol requires that the flow meter take "one (1) reading per minute for the duration of the test run." Some flow meters, however, might log data at slightly greater frequencies. For example, some flow meters might take one reading every 90 seconds, which could result in logging less than 63 data points and then result in an artificially failed test. We recommend revising this sentence as follows: "This protocol requires one (1) reading per minute, or a reading at the minimum data interval the flow meter is capable of recording if the minimum data interval is greater than once per minute, for the duration of the test run." According to EPA Method 2A, there is no set time, other than the initial and final data points, that are required to adequately calculate volumetric flow. Indeed, the only values that are used in the calculations of the volumetric flow are the initial and final volume. Utilizing the maximum data points per hour or once per minute, whichever is less, will provide the initial and final volumes, as well as allow for multiple data logging software and devices.

Section 4.1.3

Section 4.1.3 of the Draft Protocol requires that inlet total hydrocarbons be measured in accordance with EPA Method 25A or EPA Method 18. We believe that other methodologies, including ASTM 1945 and GPA 2261, are also valid and adequate methods that are commonly used by laboratories to conduct extended gas analyses for natural gas. These methods are specific to natural gas and commonly approved for use by regulatory agencies.

Section 4.2.3.4

Section 4.2.3.4 of the Draft Protocol requires that outlet total hydrocarbons be measured in accordance with EPA Method 25A. We recommend that EPA Method 25B, which also measures total hydrocarbons and is equally as accurate, also be identified as an option. Some vendors may not have the equipment to conduct EPA Method 25A and limiting this Draft Protocol to that methodology will narrow the number of vendors that operators may utilize. EPA Method 25B follows the same requirements of 25A but describes the use of a Non-dispersive Infrared Analyzer in lieu of a Flame Ionization Analyzer. Both are viable and accurate Total Organic Compounds analyzer types with the same sensitivity for the analytes.

Section 4.2.3.5 and 7.1

Sections 4.2.3.5 and 7.1 require measurement of methane and ethane emission levels in accordance with EPA Method 18. It is not necessary, however, to measure for methane and ethane emission levels to complete the calculations for total hydrocarbons destruction rate efficiency. Both methane and ethane are hydrocarbons and will have been included in the total hydrocarbon measurement as part of EPA Method 25A or 25B. Additionally, EPA Method 18 requires use of a gas chromatograph, which is not utilized by all laboratories, thereby limiting the number of laboratories available to operators.

CONCLUSION

Again, Civitas and PDC greatly appreciate the Division's efforts on the Draft Protocol. Both companies remain committed to working with the Division to improve this Draft Protocol and to develop additional protocols for low-flow and intermittent-flow facilities. If you have any questions regarding these comments, Civitas and PDC representatives would be happy to meet with the Division to discuss further.

Sincerely,

Randy Dann
Davis Graham & Stubbs LLP

August 31, 2022

cdphe.commentsapcd@state.co.us (via email only)

Re: Comments of Alliance Technical Group, LLC on Colorado Air Pollution Control Division DRAFT Performance Test Protocol, Enclosed Combustion Devices, Version 1

To Whom it May Concern:

Thank you for the opportunity to comment on the DRAFT Performance Test Protocol, Enclosed Combustion Devices, Version 1 (the "Protocol"). Alliance Technical Group, LLC is a leading environmental services provider in the United States. We employ engineers and scientists familiar with the processes and methods outlined in the Protocol, and based on our review submit the following comment for your consideration:

Comment: Section 4.1 Inlet Measurements

We respectfully request that ASTM-D1945 be included as an acceptable method for determining inlet stream concentrations for the sampling period. We submit that this standard would more accurately account for the make-up of the inlet stream. Utilizing this standard would eliminate the need for inlet dilution sampling, which would improve overall accuracy of sample data. Accordingly, including this method will allow for improved results of Method 2B mass balance calculations. Method 2B requires a complete analysis of carbon in the gas streams and the dilution method adds variance in the result. A composite sample taken and analyzed by ASTM D-1945 will deliver a more exact number of carbons, thereby improving calculations and subsequent emissions rates and DRE. Finally, we submit that this method may allow for more cost-effective means to conduct the required testing, introducing less variables that could go wrong in testing (requiring less manpower, equipment and materials) while achieving more accurate results.

In summary, we submit that the inclusion of ASTM-D1945 as an acceptable method for inlet sampling measurements would improve accuracy of measurements required by the Protocol and improve efficiencies in performing the Protocol. Accordingly, we respectfully request that the

Protocol be amended to include ASTM-D1945 for inlet gas sampling. We appreciate the opportunity to submit these comments.

Very truly yours,

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SOURCE TESTING
stacktest.com

EMISSIONS MONITORING
alliance-em.com

ANALYTICAL SERVICES
allianceanalyticalservices.com

August 22, 2022

Re: CDPHE Air Quality Control Commission
Public Comment Opportunity
ECD Performance Test Protocol Comments

Below are comments by Greg Cenac and Nathan Kelly, GCO Oilfield Services LLC regarding the Colorado ECD Performance Test Protocol (Draft, dated 7/29/2022)

GCO Oilfield Services LLC proposes to use the Sauermann Group's Si-CA 8500 (Model 8500) Portable Industrial Combustion Flue Gas & Emissions Analyzer to conduct the testing.

1. Page 4 → The gas measurements performed by the proposed Model 8500 are done in a dry volumetric basis (not by weight).
2. Page 6, Section 3.0 Process Overview → The CxHy hydrocarbon sensor (using NDIR technology) in the Model 8500 measures alkanes such as methane, butane, propane, and ethane. The VOC sensor (using PID - photoionization technology) used in the Model 8500 can measure VOCs with an ionization potential of 10.6 eV or less. Methane, butane, propane, and ethane all have ionization potentials greater than 10.6 eV so they are not measured with the VOC sensor in the Model 8500. The VOC sensor can be viewed as a way to measure NMHC (non-methane hydrocarbons).
3. Page 7, Table 1. Testing methodologies → Add "or USEPA 2". Method 2 is for using the S-type Pitot tube for stack gas velocity and volumetric flow rate. This also applies below to volumetric flow rate in the OUTLET gas.
4. Page 7, Table 1. Testing methodologies → Delete requirement to measure CO in the inlet gas stream. There should be no need or relevant reason to measure CO in the inlet natural gas that flows to the unit.
5. Page 7, Table 1. Testing methodologies → Add "or USEPA 25B also". Method 25B is for using NDIR (non-dispersive infrared) technology for measuring hydrocarbons. This also applies below to hydrocarbons in the OUTLET gas. Method 25A calls for using flame ionization technology while Method 18 calls for using gas chromatography technology – neither of which are practical for use in the field to obtain quick results.
6. Page 7, Table 1. Testing methodologies → The draft protocol lists Method 3A for measuring O2 and CO2 using a continuous instrumental analyzer (CEMS). According to section 4.2.3.2.1 (on page 11) of the document, the recommended technologies for measuring these gases are paramagnetic for O2 and NDIR for CO2.

   We request that the methods used by the Model 8500 be acceptable. The Model 8500 uses electrochemical technology to measure O2 and NDIR technology to measure CO2. We request that USEPA Conditional Test Methods CTM-030 and CTM-034 be allowed as methods for O2 and CO. These two test methods are more relevant and practical as they call for measuring O2 from combustion equipment with electrochemical gas sensor technology. CTM-034 specifically addresses using electrochemical gas sensors in a portable measuring instrument.
7. Page 7, Table 1. Testing methodologies → The draft protocol lists Method 10 for measuring CO using a continuous instrumental analyzer (CEMS). We request that USEPA Conditional Test Method CTM-030 and CTM-034 be allowed as a method for CO. These two procedures are more relevant and practical as they call for measuring CO (as well as O2, NO, & NO2) from combustion equipment with electrochemical gas sensors. In addition to CO, it is recommended to also measure NO and NO2 (nitrogen oxides) that are also pollutant gases in the ECD's outlet exhaust gas. USEPA CTM-022 also calls for measuring NO and NO2 from combustion equipment with electrochemical gas sensors.

8. Page 7, Table 1. Testing methodologies → Instead of measuring Methane/Ethane following Method 18 (using a GC) which is not practical for quick results in the field, measure VOCs using photoionization detection technology in a portable measuring instrument to quantify NMHC (non-methane hydrocarbons).
9. Page 9 Section 4.1.3. (and other locations) → We request an alternative sample train. A practical alternative to a heated Teflon line whose purpose is to prevent condensation in the line and possible bubbling of water-soluble gases is to remove the H2O from the sampled gas before it travels through the line and enters the measuring instrument as suggested in the last paragraph of section 4.2.3.2 on page 11. An option on the Model 8500 is the SCU (sample conditioning unit) that can perform this gas drying. Please see the attachment that provides more SCU details. Many of the gases listed on this document have little or no solubility in water such as O2, CO, CO2, NO, methane, and ethane. NO2 is water soluble, so it is relevant to prevent condensate in the sample line when measuring NO2. For further and more efficient cooling and drying of the gas before being measured, it would be best to specify the requirement of using a Peltier thermoelectric chiller (in addition to the SCU).

   Instead of specifically mentioning using Teflon material for the line/hose, either remove the comment about line/hose material or mention that the hose material should be tested to ensure that it will not affect the chemical composition of the target measured gases via absorption or any chemical reaction.
10. In lieu of the calibration procedures listed in the draft protocol, we suggest the following:
    a. The instruments used must meet or exceed the calibration recommendations of the manufacturer of the testing devices as stated by the manufacturer in the operations manual and/or in a signed document from the manufacturer.
    b. The frequency for a factory performed calibration by the device manufacturer such as every 3 or 6 months (with calibration certificate).
    c. Electrochemical sensors used in the measuring device should be not more than 2 years old.

Attachments

Attachment 1 – The E Instruments Sample Conditioning Unit (SCU) for Low NOx & Low SO2 measurements

USEPA References

https://www.epa.gov/sites/default/files/2017-08/documents/method_2.pdf
https://www.epa.gov/sites/default/files/2017-08/documents/method_3a.pdf
https://www.epa.gov/sites/default/files/2017-08/documents/method_10.pdf
https://www.epa.gov/sites/default/files/2017-08/documents/method_25b.pdf
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