COLORADO
Air Pollution Control Division
Department of Public Health & Environment

Performance Test Protocol

Enclosed Combustion Devices
Version 1, Issuance October 31, 2022

Summary and Purpose

This protocol provides an option for performance testing of enclosed combustion devices subject to Regulation Number 7, Part D, Section II.B. to measure the combustion efficiency of hydrocarbons, as well as emission rates of other pollutants. This protocol is not appropriate for stack or performance testing conducted in accordance with permit requirements or other performance tests requested by the division or required in state or federal regulations unless expressly stated otherwise.

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1.0 Introduction

This protocol may be used to meet the requirements for performance testing of an enclosed combustion device (ECD) if required by Regulation Number 7, Part D, Section II.B.2.h. Testing is performed to measure the device's control efficiency for hydrocarbons, but other pollutants and parameters are also required to be measured by this protocol.

A performance test on an ECD conducted in accordance with this standard protocol (including required notifications to the Air Pollution Control Division (division)) meets the requirements of Regulation Number 7, Part D, Section II.B.2.h.(i)(C).

A site-specific and ECD-specific testing protocol – subject to division review and approval – is required if the owner or operator cannot comply with all applicable conditions of this protocol, or if the owner or operator chooses not to follow this protocol, or if the emitting equipment or activity is required to complete testing but is not subject to testing under Regulation Number 7, Part D, Section II.B.2.h. Refer to the Air Pollution Control Division Compliance Test Manual (CTM), available at the division's website, for information on developing a site-specific testing protocol.

The construction permit or operating permit for the emitting equipment or operation may contain additional testing, recordkeeping, and/or reporting requirements for the associated control device. Those requirements remain in effect and are not necessarily satisfied by adherence to this protocol.

1.1 Definitions for use of this protocol

The following definitions are used in this document to clarify how to demonstrate compliance with Regulation Number 7, Part D, Section II.B.2.h.,as they relate to performance testing for ECDs. For questions about definitions not listed here, please reference Permitting Section Memo No. 20-02: Oil & Gas Industry Enclosed Combustion Device Overall Control Efficiency Greater than 95%.

Control efficiency of a combustion device is the product of the destruction efficiency, often referred to as destruction and removal efficiency (DRE), and the process efficiency of the combustion device and vapor control system.

Destruction Efficiency - is the percent removal by weight of hydrocarbon by a combustion device. It represents the mass of pollutant that exits the combustion device relative to the mass of pollutant that enters the combustion device. The destruction efficiency metric is readily measurable on-site or by the manufacturer through defined test methods, as long as equipment on-site is adequately designed and installed to support the test methods. For the purposes of testing under this protocol, achievement of at least 95% destruction efficiency for

hydrocarbons satisfies Regulation Number 7, Part D, Section II.B.2.h. requirements for the enclosed combustion device to demonstrate at least 95% control efficiency for hydrocarbons.

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.

Low-flow - is when the waste gas has a small continuous volumetric flow rate from the controlled equipment that may make reaching full test-run time not possible.

2.0 How to Use This Protocol

The required schedule for initial and periodic ECD performance testing is provided in Regulation No. 7, Part D, Section II.B.2.h.(ii).

Testing must meet the requirements herein. If the equipment or location cannot meet the testing requirements, then a site-specific test protocol must be submitted for division review at least thirty (30) days prior to testing. For example, if the outlet of the ECD does not meet the Method 1 standards or if there are flow issues to the ECD, then a site-specific test plan must be developed.

This standard protocol may be used for ECDs controlling low-flow or intermittent flow equipment, as well as ECDs controlling continuous flow equipment. You may use this protocol for testing of ECDs controlling intermittent or low-flow equipment, however, the required run duration total (3 x 21 minutes = 63 minutes) must be met which could mean multiple days of testing. The division may publish an alternate protocol for the purposes of testing ECDs controlling intermittent flow equipment.

Use of this protocol is voluntary. To notify the division of intent to perform testing using this protocol, complete the online notification form (Form 1). All required fields on Form 1 must be completed, otherwise the notification will be nullified and the protocol submission requirement under the Compliance Test Manual and AQCC Common Provisions will not be fulfilled. The Form 1 notification to the division grants conditional approval of the use of this protocol, effective from the date the notification is received by the division.

Conditional approval of the use of this protocol for a given ECD expires 60 days after the date of Form 1 notification to the division. A new notification is required if the performance test is not completed before the expiration of the conditional approval.

If a performance test is approved for testing using this protocol but the applicable requirements of this protocol are not met, then the test results may be rejected.

Use of this protocol, and any conditional approval granted by the division, relies upon the accuracy and completeness of information supplied by the owner or operator and is

conditioned upon completion of the testing in accordance with this information. Conditional approval of the use of this protocol is valid only for the test instance and ECD(s) described in the required notification.

The owner or operator may withdraw a notification of intent to use this protocol by notifying the division at cdphe_apcd_ecd@state.co.us. If this standard protocol is not used, the owner or operator must submit a site- and device-specific protocol at least 30 days prior to testing, and that protocol is subject to division review and approval.

Records and results of testing performed under this protocol must be provided to the division upon request.

If this protocol is revised by the division, the owner or operator is required to complete performance testing in accordance with the version that was active at the date of test notification to the division.

3.0 Process Overview

Testing must be conducted during normal operation of the facility and the subject equipment/activity.

The test program must determine:

- control efficiency percentage for hydrocarbons (which includes but is not limited to VOCs, methane, and ethane)
- Total Hydrocarbons (THC) (as TOC) controlled emission rate (lb/hr) inlet and outlet
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- Minimum flow rate of waste gas to inlet of the ECD (scf/hr)
- Combustion temperature

Three (3) 21-minute test runs must be conducted at the inlet and outlet simultaneously.

Testing includes measurement/calculation of inlet composition, inlet flow volume, outlet composition, outlet flow volume, and other parameters. A summary of the testing methodology is provided in Table 1:

Table 1. Testing methodologies.

Parameter Measured	Test Method	No. of Runs	Run Duration
Inlet			
Volumetric Flow Rate	USEPA 1 & 2B/2D	3	21 min
THC (as TOC)	USEPA 25A[2], 25B, or 18[3]	3	21 min
Outlet			
Volumetric Flow Rate	USEPA 1, 2B/2C, & 4[1]	3	21 min
O_2 & CO_2	USEPA 3A	3	21 min
THC (as TOC)	USEPA 25A[2], 25B, or 18[3]	3	21 min

Note: This is not an all encompassing list, but as an example of testing set up. The full list is in section 4.0.

[1] EPA Method 4 requires 21 scf to be considered a valid test. The 21-minute test runs will not allow for this. Test companies may use one (1) 60 minute test run of EPA Method 4, instead of three (3) 21-minute test runs.

[2] EPA Method 25A must only be used in the calculation of THC DRE. Analyzer calibration will be performed using propane.

[3] EPA Method 18 must be used in greenhouse gas emissions testing; Methane/Ethane must not be subtracted from THC concentration.

The fuel consumption associated with the pilot light is NOT included in the hydrocarbon control efficiency (CE) calculation.

If a dilution system is used, an EPA Method 205 gas dilution system certification must be performed onsite prior to the start of testing.

4.0 Methods

All testing, sampling, analytical, and calibration procedures used for this test program must be performed in accordance with the EPA Methods referenced in 40 CFR Part 60, Appendix A, the American Society for Testing and Materials (ASTM) methods, and the Gas Producers Association (GPA) methods. EPA Methods, ASTM methods, and GPA methods approved for use in this standard protocol are:

- EPA Method 1 or 1A
- EPA Method 2, 2B, 2C, and 2D
- EPA Method 3A
- EPA Method 4
- EPA Method 25A, 25B, and 18
- EPA Method 205
- EPA Method 320
- ASTM 16348, 1945, and 1946
- GPA 2261 and 2286

4.1 Inlet Measurements

4.1.1 Inlet Sample Location: EPA Method 1 or 1A

This method must be used to demonstrate the location of the inlet sampling. Include all dimensions that would be included in Method 1/1A. Testers will not perform cyclonic flow check or any other activity that could cause serious injury at the inlet.

4.1.2. Inlet Volumetric Flow Rate

4.1.2.1 EPA Method 2B

The ratio of total carbon at the inlet and outlet is multiplied by the inlet volumetric flow rate to calculate the outlet volumetric flow rate.

4.1.2.2 EPA Method 2D

This method is applicable for the determination of the volumetric flow rates of gas streams in small pipes and ducts.

The inlet volumetric flow rate (VFR) must be measured by a flow meter at the inlet to each ECD. The flow meter must measure all flow streams to the ECD. The flow meter must be calibrated and read properly. A temporary flow meter may be used to meet this requirement.

This protocol requires a minimum of 12 flow rate readings in a test run, or once every one (1) min forty-five (45) seconds. The division encourages more readings throughout the test run to generate more accurate data.

Inlet VFR must be reported in units of dry standard (68 F, 1 atm) cubic feet per minute.

4.1.3. Inlet Total Hydrocarbons (THC): EPA Method 25A, 25B, or 18

Inlet THC must be equal to the total volatile organic compounds (TOC) measured in accordance with EPA Method 25A, 25B, or 18.

Each sampling period must consist of extracting a hot, wet gas sample at a constant flow rate of approximately two liters per minute using a heated (≥220 F) Teflon line. The gas must be directed into a flame ionization analyzer. THC concentrations must be displayed on the analyzer front panel in units of parts per million, wet volume basis (ppmvw – as propane) and logged to a computer data acquisition system (CDAS).

Prior to sampling, the analyzer must be challenged with the zero and high-level EPA Protocol G1 calibration gasses to linearize the instrument. Then, the low and mid-level calibration gasses must be introduced through the sampling system. The sampling system is acceptable if the linear relationship between the zero and high-level calibration gasses predict the low and mid-level calibration gas measurement system response within 5% of the respective

calibration gas values. The system response time must be determined with the triplicate average time required to reach a 95% step change when introducing the zero gas and then the high-level calibration gas through the sampling system.

After each sampling period, the measurement system must be challenged with the zero and mid-level calibration gas. If the analyzer drift exceeds 3% of the analyzer span (80-90% of high-level calibration gas), then the system must be re-linearized with the zero and high-level calibration gasses, and the measurement system verified with the low and mid-level calibration gasses. If the drift limits are exceeded, the results must be reported using both sets of calibration data.

If EPA Method 25B is chosen please follow the procedure within the method.

If EPA Method 18 is chosen please follow the description below in section 4.2.3.5.

4.1.3.1 ASTM 1945 & 1946 and GPA 2261 & 2286

ASTM 1945, 1946, and GPA 2261 and 2286 use gas chromatography to analyze and obtain concentrations of permanent gases and natural gas mixtures. The samples can be collected in canisters, Tedlar bags, or other approved containers. Analytes to be determined in a gaseous sample are physically separated by gas chromatography with a thermal conductivity detector (TCD) and compared to calibration data obtained under identical operating conditions. A fixed volume of the sample in the gaseous phase is isolated in a suitable inlet sample system and entered into the column of the GC. The methods for ASTM 1945, 1946, GPA 2261, and 2286 are the same, but there are different QC criteria and compounds specified for each method. The exact QA procedure should be followed depending on what method is utilized.

4.1.3.2 ASTM 6348 and EPA Method 320

A series of pre-test preparations and evaluations will be conducted on site prior to sampling as outlined in **ASTM D6348-03 sections 11.2.1 – 11.3.6.1** and within **EPA Method 320**. These procedures include determining a minimum detection limit (MDL), determining the sample system response time, developing a spectral background, and the introduction of a calibration transfer standard (CTS) to verify sample cell pathlength.

The calibration transfer standard will be introduced directly to the FTIR sampling cell and the results will be recorded. The measured response of the FTIR will be within 5% of the certificate value. Use an EPA Protocol 1 gas cylinder containing ethylene at approximately 100 ppm as the CTS.

Upon completion of all required pre-test measures and will perform a dynamic spike. A pollutant of known concentration will be introduced to the sample system at the tip of the probe, and will be mixed with the effluent gas at a ratio no greater than 10:1. A flowmeter and tracer gas (SF6) will be used to measure the spiking rate. Equations A5.1 – A5.4 from Annex 5 in ASTM D6348-03 will be used to calculate the spiking rate and percent recovery. A

recovery percentage between 70% -130% will be achieved before sampling commences. An additional dynamic spike will be performed daily at the completion of all sampling to ensure no sample system degradation has occurred during the sampling runs.

During sampling utilize a scanning rate of 16 scans/min and an averaging rate of 60 seconds. A spectrum will then be generated once every 60 seconds, and the resulting concentrations will be added to the cumulative data file. All spectra and raw interferograms will be appropriately named and saved.

4.2 Outlet Measurements

4.2.1 Outlet Sample Location: EPA Method 1 or EPA Method 1A

If performing a method in which traversing the stack is not needed, follow the method's procedure of selecting a sample location. If the method does not have a site selection procedure then follow EPA Method 1/1A procedure below.

These methods are applicable to gas streams flowing in ducts, stacks, and flues. They are designed to aid in the representative measurement of pollutant emissions and/or total volumetric flow rates from stationary sources. In order to qualify as an acceptable sample location, it must be located at a position at least two stack or duct equivalent diameters downstream and a half equivalent diameter upstream from any flow disturbance. The location of the ports in relation to upstream and downstream disturbances must be measured and recorded. The cross-section of the measurement site is divided into a number of equal areas, and the traverse points are then located in the center of these areas. The minimum number of points are determined Figure 1-2 (non-particulate) of EPA Method 1.

Prior to performing volumetric flow traverses, a check for the presence or absence of cyclonic flow must be performed in accordance with Section 11.4 of EPA Method 1 and recorded on the data sheet enclosed.

The applicability and principle of EPA Method 1A are identical to EPA Method 1, except its applicability is limited to small stacks or ducts. EPA Method 1A is applicable to flowing gas streams in ducts, stacks, and flues of less than about 0.30 meter (12 in.) in diameter, or 0.071 m^2 (113 $in.^2$) in the cross-sectional area, but equal to or greater than about 0.10 meter (4 in.) in diameter, or 0.0081 m^2 (12.57 $in.^2$) in the cross-sectional area. EPA Method 1A cannot be used when the flow is cyclonic or swirling.

4.2.2 Outlet Volumetric Flow Rate: EPA Method 2, 2B, or 2C

4.2.2.1 EPA Method 2/2C

EPA Method 2 is applicable for the determination of the average velocity and the volumetric flow rate of a gas stream.

The gas velocity head (P) and temperature (°F) is measured at the traverse points defined by EPA Method 1 or EPA Method 1A. The velocity head is measured with a Type S (Stausscheibe or reverse type) or a standard pitot tube and oil-filled manometer or equivalent electronic manometer. The gas temperature is measured with a Type K thermocouple. The average gas velocity in the flue is calculated based on:

- the gas density (as determined by EPA Method 3A and EPA Method 4);
- the flue gas pressure;
- the average of the square roots of the velocity heads at each traverse point; and
- the average flue gas temperature.

4.2.2.2 EPA Method 2B

The ratio of total carbon at the inlet and outlet is multiplied by the inlet volumetric flow rate to calculate the outlet volumetric flow rate.

4.2.3 Outlet Composition

4.2.3.1 Determination of the Concentration of Gaseous Pollutants Using a Multi-Pollutant Sampling System

Concentrations of the pollutants in the following sub-sections are determined using one sampling system.

A straight-extractive or dilution sampling system must be used. A data logger continuously records pollutant concentrations and generates one-minute averages of those concentrations. All calibrations and system checks must be conducted using EPA Traceability Protocol gasses. Three-point linearity checks must be performed prior to sampling and must be rechecked in the event of a failing system bias or drift test (and subsequent corrective action). System bias and drift checks are performed using the low-level gas and either the mid- or high-level gas prior to, and following, each test run.

The sampling system must consist of a stainless steel probe, Teflon sample line(s), gas conditioning system and appropriate gas analyzer. The gas conditioning system must be a non-contact condenser used to remove moisture from the stack gas. If an unheated Teflon sample line is used, then a portable non-contact condenser must be placed in the system directly after the probe. Otherwise, a heated Teflon sample line must be used.

4.2.3.1.1 Oxygen and Carbon Dioxide Concentrations: EPA Method 3A

EPA Method 3A is applicable for the determination of O_2 and CO_2 concentrations in controlled and uncontrolled emissions. The O_2 analyzer is equipped with a paramagnetic-based detector. The CO_2 analyzer is equipped with a non-dispersive infrared (IR) detector.

4.2.3.2 Stack Gas Moisture Content: EPA Method 4

EPA Method 4 is applicable for the determination of the moisture content of stack gas. For each test run, a sample of gas for moisture determination must be extracted from the stack at a constant flow rate of no more than 0.75 cubic feet per minute (cfm) and a minimum volume sampled of 21 dry standard cubic feet. The gas sample must pass through a stainless-steel probe, through a series of four (4) chilled glass impingers, and through a calibrated dry gas meter. In lieu of EPA Method 4 Section 8.1.1.1 requirements, a single sample point must be used for moisture determination.

Prior to sampling, the first two impingers each must be seeded with 100 milliliters of water. The third impinger must be empty. The fourth impinger must be seeded with 250 grams of dried silica gel. The sampling system must be leak checked pre and post each sampling period. Following sampling, the moisture gain in the impingers must be measured gravimetrically and compared to the total sample volume (standard conditions) to determine the moisture content of the gas.

4.2.3.3 Outlet total hydrocarbons (THC): EPA Method 25A

Description of EPA Method 25A is in section 4.1.3.

4.2.3.4 Outlet THC: EPA Method 25B

Outlet THC must be equal to the total volatile organic compounds (TOC) measured in accordance with EPA Method 25B.

EPA Method 25B follows the same procedures as EPA Method 25A.

4.2.3.5 Outlet THC: EPA Method 18

Once per sampling period an integrated sample must be collected in a clean, leak-free Tedlar bag using the direct pump sampling procedures outlined in EPA Method 18. Each bag sample must be analyzed in triplicate at an analytical lab or in the field using a gas chromatograph equipped with a flame ionization detector and appropriate software.

Gas phase calibration standards must be used to generate a three-point calibration curve for each analyte. Triplicate (minimum, more if required to meet the 5% agreement limit) injections must be conducted, and a calibration curve of peak area versus concentration must be prepared. A least squares line (y=mx) must be fit to each data set.

Following analysis of the samples, the mid-level calibration standard must be re-analyzed at the gas sampling valve in triplicate. If the average of the initial calibration response (triplicate average) and the post-test check response (triplicate average) are within 5% of their mean value, the initial calibration linear regression data must be used to quantify the emission levels. Otherwise, the low-level and high-level calibration standards must be re-analyzed in triplicate to generate a new six-point linear regression (using the initial and post-test data) for quantifying emission levels.

If methane and ethane are speciated out during testing, at no time will methane or ethane results be used in calculating VOC DRE.

4.2.3.6 Outlet THC: ASTM 1945, 1946, 6348; GPA 2261 & 2286; EPA Method 320

Descriptions of these test methods can be found in Section 4.1.3.1 and Section 4.1.3.2

4.2.3.7 Dilution: EPA Method 205

If a dilution system is used, an EPA Method 205 gas dilution system certification must be performed onsite prior to the start of testing.

A calibration gas dilution system field check must be conducted in accordance with EPA Method 205. Multiple dilution rates and total gas flow rates must be used to force the dilution system to perform two dilutions on each mass flow controller. The diluted calibration gasses must be sent directly to the analyzer, and the analyzer response recorded in an electronic field data sheet. The analyzer response must agree within 2% of the actual diluted gas concentration. A second Protocol G1 calibration gas, with a cylinder concentration within 10% of one of the gas divider settings described above, must be introduced directly to the analyzer, and the analyzer response recorded in an electronic field data sheet. The cylinder concentration and the analyzer response must agree within 2%. These steps must be repeated three (3) times.

5.0 Example Calculations/Equations

In using this standard protocol the testing company must follow all of the calculations specific to each method and use equations that have been previously approved by the division. When reporting test results, include every equation used to determine compliance with Regulation Number 7, Part D, Section II.B. requirements. The examples used in the final test report will be based on “Run 1”.

5.1 Determination Percent Destruction Rate Efficiency

$$\%DRE_{THC} = \left(\frac{M_{THC,i} - M_{THC,o}}{M_{THC,i}}\right) \times 100$$

Where:

$M_{THC,i} = Mass\ emission\ rate\ of\ THC\ @\ inlet$

$M_{THC,o} = Mass\ emission\ rate\ of\ THC\ @\ outlet$

6.0 Quality Control and Quality Assurance

The testing company must follow the quality assurance and quality control (QA/QC) requirements of each EPA Method used, the Air Pollution Control Division's Compliance Test Manual QA/QC requirements, and the testing company's QA/QC policies. The test company's QA/QC plan is subject to division review.

The testing company's plan must describe their methods and protocols regarding:

- Calibration practices
- Inspections of equipment
- Equipment control and maintenance/cleaning
- Replacement equipment availability
- Data management and protection
- Any other QA/QC practices

The list is not exhaustive, and the division reserves the right to request further information from the operator and/or the testing company regarding QA/QC policies and plans..

7.0 Test Reports

7.1 Full test report

A full and final test report must be produced, containing the information listed below and following all applicable requirements of the Air Pollution Control Division Compliance Test Manual (CTM). The full test report must be maintained for the life of the equipment being controlled (Section II.B.2.i.(ix)) even if ownership or control of the device is transferred. This record must be made available for the division upon request.

- Date of test
- Date of Form 1 notification to division
- Results of testing
    - Hydrocarbon % control efficiency
    - Outlet emission rates of THC (lb/hr)
    - Calibration data (O_2, CO_2, THC)
    - Calibration data of ALL equipment used
    - Combustion chamber temperature
- Methodology - description of the sampling and analytical methods used
- ALL calculations used to obtain the final result for each target parameter
- Copies of field data sheets (handwritten and electronic)
- Copies of laboratory reports and chain(s) of custody
- Quality control data (copies of instrument calibration data and/or calibration gas certificates)

In addition to producing and maintaining the full test report:

- If the test PASSED (i.e., demonstrated achievement of at least 95% control efficiency for hydrocarbons), you must submit Form 3 (Notification of Passing Test Results) within 30 days of the passing test;
- If the test FAILED, you must submit Form 2 by no later than the final day of the month after the failing test result. See Section 9.4 of this Protocol for a full list of the response actions required after a failed test.

8.0 Safety

Completing the requirements of this test protocol may involve hazardous materials, operations, and equipment. Testing is often performed in highly explosive areas. Caution and care should be exercised in choice of equipment, installation, and specific test procedures.

This protocol may not address all of the safety problems or risks associated with its use. It is the responsibility of the site owner/operator and the testing personnel to establish appropriate safety and health practices and policies for performance of activities specified by this testing protocol.

It is the responsibility of the site owner/operator and the testing personnel that all individuals on-site during testing are current with applicable OSHA or MSHA safety training and are equipped with appropriate personal protective equipment. Additionally, testing personnel should undergo site-specific safety training prior to testing at a given facility.

User's manuals and other manufacturer documentation should be consulted for specific precautions to be taken with regard to analytical procedures or testing processes.

9.0 Regulation No. 7 Information

9.1 Flow meter requirement

The performance test must include the use of a calibrated and properly-reading flow meter on the inlet to each ECD to be tested. (Regulation Number 7, Part D, Section II.B.2.h.(i)(D)). Temporary flow meter(s) may be used to meet this requirement.

9.2 Multiple ECDs controlling a single emitting source

If a single emitting source is controlled by multiple ECDs that are subject to the performance testing requirements of Regulation Number 7, Part D, Section II.B.2.h., all of those ECDs must be tested over the course of the same testing event. That testing event may span over multiple working days. (Regulation Number 7, Part D, Section II.B.2.h.(i)(B)).

Testing must replicate operational parameters consistent with representative conditions of the facility. Facility ECD configuration and ECD operating parameters must be described in

detail in Form 1. The ECDs must be tested as they are configured for normal operation. For example, if multiple ECDs operate in series and flow to each ECD is opened based on the pressure levels in the inlet pipe, the testing configuration for each individual ECD must mirror the actual operating parameters and inlet pressure for that ECD.

9.3 Failure criteria

A performance test that does not demonstrate that an ECD is achieving at least 95% control efficiency for hydrocarbons is a failing test. (R7.D.II.B.2.h.) An incomplete or stopped test can be considered a failed test. For further information about this section review CTM Section C.9.

9.4 Failed test response

Every failing test requires the following response actions:

1) Within 30 days, the owner or operator must (Regulation Number 7, Part D, Section II.B.2.h.(i)(F)):
    a) follow the manufacturer's repair instructions, if available, or best combustion engineering practices to return the device to compliant operation, OR
    b) shut-in all equipment or operations controlled by the ECD.

2) By no later than the final day of the month after the failing test result[1], the owner or operator must submit a notification of the failing test. If this standard protocol is used, this notification must be completed using Form 2. (Regulation Number 7, Part D, Section II.B.2.j.(i))

3) The owner or operator must either:
    a) Retest the ECD within 90 days of corrective action in response to a failed test, or within 30 days of return to operations if the equipment or operations were shut-in as a response to the failed test (Regulation Number 7, Part D, Section II.B.2.h.(i)(G)); OR
    b) Replace the failing ECD with a different ECD, and test the replacement ECD no sooner than seven (7) days after the optimization period is completed and no later than twenty one (21) days. The replacement ECD must be installed within 30 days of the failing test for the failing ECD or prior to recommencing operation of the equipment or operations controlled by the failing ECD, in accordance with Section II.B.2.h.(i)(F). The replacement ECD is not required to be tested if the device is newly manufactured (has never been in operation anywhere else) and has been tested by the manufacturer in accordance with

[1] All failing performance test notifications for a month are due by the last day of the following month. For example, by September 30, the operator must notify the division of all failing tests performed in August. The notifications may be submitted separately or together in bulk.

the requirements of 40 CFR Part 60, Subpart OOOOa, Section 60.5413a(d) (June 3, 2016) (Regulation Number 7, Part D, Section II.B.2.h.(i)(H)).

9.5 Recordkeeping

The owner or operator must maintain records of all performance tests, including failing and/or incomplete tests, for the life of the equipment that the ECD is used to control (even if ownership or control of the device is transferred). (Regulation Number 7, Part D, Section II.B.2.i.(ix)). These records must include, for each test event:

- Date of test
- Copy of the test protocol
- Certification by a Responsible Official that the test was conducted in accordance with this protocol
- Results of ECD parameter measurements taken during testing
- Documentation of methods and results of the test, including tested control efficiency and whether the device passed or failed
- If test failed, date and description of any actions taken in response

9.6 Additional reporting requirements

Additional reporting requirements are described in Regulation Number 7, Part D, Sections II.B.2.j.(ii) and (iii). These include:

- notification of dates/results of all tests, annually, due on the same date as annual emissions inventory report; and
- an annual (due July 31 of each year 2023-2027 inclusive) notification to update the list of ECDs and their initial testing schedule.

Forms

Form 1 – Notification of Intent to Use Standard Protocol & Site Specific information

Form 1 is used to notify the division of intent to perform testing using this protocol. Refer to Section 2.0 for more information.

- Facility information
  - Operator company name (must match company name used on most recent APEN)
  - Facility name
  - Owner/operator contact (name, email, phone)
  - Facility location (County, and decimal latitude/longitude)
  - Facility type (well production facility, compressor station, gas plant, etc.)
  - Facility AIRS ID (xxx-xxxx)
  - AIRS points (-xxx) of all emitting equipment controlled by the ECD
  - A process description of the process including the ECD; also, if multiple ECDs control a single point, a description of the tested ECD's operating configuration (e.g., are all ECDs in the bank active at all times; what operating parameters does this ECD operate under; is there a minimum inlet pressure at which flow to this ECD opens, etc.)
- Test and tester information
  - Anticipated date of test
  - Test company (name, address)
  - Testing company primary contact person (name, email, phone)
- ECD-specific info
  - Make/model for the tested ECD
  - Serial number or other unique identifier the tested ECD
  - Maximum design flow rate for ECD (Mscfd)
  - Minimum design flow rate for ECD (Mscfd)
  - ECD dimensions (height and diameter in inches)
  - Quantity of ports available for testing
  - Design heat release (MMBtu/hr) of ECD
  - Flame arrestor information (presence/absence; make/model)
  - Presence of any automation and/or data logging capabilities
  - Pilot fuel use rate
  - Supplemental fuel rate (if used)
  - Dates and results of previous performance testing

Form 2 – Notification of Failed Test

Form 2 is required to be submitted no later than the final day of the month after the faciling test result, per Section II.B.2.j.(i). See Section 9.4 for a description of all of the response actions required after a failed test.

- Company contact name and email
- Company name (must match company name used on most recent APEN)
- Facility name
- Facility location in decimal latitude and longitude
- Facility AIRS ID (xxx-xxxx)
- Point AIRS ID of all equipment controlled by ECD
- List of all equipment controlled by ECD
- ECD make and model
- ECD serial number or unique identifier
- Date of test
- Results of test (hydrocarbon control % measured)
- Monthly throughput for the equipment controlled by the tested ECD
- Actions taken (including timing) to return the ECD to proper operation (including whether operations were shut-in)
- Proposed date of re-test
- A statement of whether this standard protocol will be used for the re-test, or if a site-specific protocol will be developed

Form 3 – Notification of Passing Test Results

You must submit Form 3 within 30 days of each passing test result.

- Company contact name and email
- Company name (must match company name used on most recent APEN)
- Facility name
- Facility location in decimal latitude and longitude
- Facility AIRS ID (xxx-xxxx)
- Point AIRS ID of all equipment controlled by ECD
- List of all equipment controlled by ECD
- ECD make and model
- ECD serial number or unique identifier
- Date of test
- Overall hydrocarbon control % measured, and the results of each individual run
- Outlet emission rates of THC (lb/hr)
- Overall standard dry volumetric flow rate (dscfm), and the results of each individual run
- Overall moisture content measured, and the results of each individual run
- Inlet gas heat content (LHV and HHV) (Btu/scf)
- Combustion chamber temperature (degrees F) during each individual run and the average across all three runs