OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

MEMORANDUM **December 20, 2018**

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FROM: David Schutz, P.E., New Source Permits Section

SUBJECT: **Guidelines for Conducting Air Quality Stack Tests in Oklahoma**

The attached document is a first draft of a state policy affecting emissions testing which is not subject to superseding federal guidance.

Copies of this were provided to the three stack testing companies who do the most testing in Oklahoma, and their comments have been incorporated.

Guidelines for Conducting Air Quality Stack Tests in Oklahoma
(December 20, 2018)

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1. INTRODUCTION

The purpose of this document is to provide guidance for companies and individuals conducting air-quality performance tests for compliance determinations in the State of Oklahoma. It is intended to serve as a reference guide. It will assist in planning and preparing for testing, conducting the test, and preparing a complete and accurate report. This document will help ensure consistent quality and documentation for stack tests conducted in Oklahoma.

This guidance is not intended to, and does not, supersede any specific requirements of the Environmental Protection Agency's (EPA's) test methods. Testing for compliance with New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) remains subject to 40 CFR Part 60.8, 40 CFR 63.7, and any EPA guidance issued regarding emissions testing for those regulations. In addition, this guidance is not applicable to portable engine analyzer (PEA) testing conducted on stationary engines except as described in Section 3.18 of this document which discusses when PEA testing is allowed under NSPS.

Many of the concepts underlying this guidance come from the EPA's "Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III. Stationary Sources Specific Methods," document number EPA/600/R-94/038c, dated April 1994. Test companies are encouraged to become familiar with this document.

2. TEST PLANNING

The purpose of performance tests (a.k.a. source tests, compliance tests or stack tests) is to extract a sample that is representative of emissions from a stack or emission point during representative operating conditions at the source. For compliance determinations, representative conditions should include a worst-case scenario that will allow the source to demonstrate compliance at all times of operation.

2.1 Testing Notification – In accordance with OAC 252:100-43, notification of planned testing must be submitted to the Division 30 calendar days prior to testing.

Effective 90 calendar days following issuance of this guidance, it will no longer be acceptable to provide notifications for multiple facilities covering the same time span. This style of notification effectively precludes having AQD observers for testing. Testing notification must be specific to one single facility, date of commencement, and expected duration.

2.2 Test Protocols - The test protocol is a complete and detailed description of the production processes and associated operating parameters, proposed test methods, proposed test date, and specific details about the sampling site. Any proposed deviations (minor modifications) from the federal reference testing methods should also be identified. Rejection of the test results may occur if the test method requirements are not met. Attachment 1 identifies the minimum documentation that the Division recommends in a test protocol. The protocol should follow this format and input provided for each item. In accordance with OAC 252:100-43, the test protocol must be submitted at least 30 calendar days prior to the test unless otherwise specified in an applicable subpart, permit condition, or enforcement action.

2.3 Pre-Test Meeting – A pre-test meeting may be necessary for a complex test and/or if requested by the source or AQD. During the meeting, representatives from the Division, facility and testing company can discuss the test protocol, testing methods, and sampling location that are proposed in the protocol. If a meeting is necessary, it should be completed approximately 14 calendar days before the test date.

2.4 EPA Test Methods - The EPA test methods are designed to provide representative and reliable data. EPA Test Methods are found in the Code of Federal Regulations (CFR), Title 40, Part 60, Appendix A. Continuous emission monitor (CEM) performance specifications are located in 40 CFR Part 60 (NSPS), App B. Additional EPA test methods may be found in other sections of the CFR, such as Part 51 (PSD), Appendix M and Part 63 (NESHAP), Appendix A. Adherence to these standardized procedures for sampling and analyses is essential. Documentation of tests by maintaining complete and accurate records is of paramount importance. The requirements of 40 CFR 60.8 will need to be met. All tests will consist of a minimum of 3 one-hour runs unless otherwise specified in an applicable subpart, permit or prior Division approval is given, or *force majure* is encountered.

EPA test methods must be used when they exist for a particular pollutant unless prior approval is given. *OAC 252:100-43* Prior approval is required to use Other Test Methods or Conditional Test Methods of EPA. In the absence of a specific EPA method, the methods of the National Institute of Occupational Health & Safety (NIOSH) or American Society for Testing and Materials (ASTM) may be used.

2.5 Certification of Testers – Although certification of testers and laboratories is strongly recommended, it is not currently mandatory unless required by a federal regulation (such as 40 CFR Part 75) or an enforcement action. Such certifications include Qualified Individual (QI), Qualified Stack Test Individual (QSTI), and National Environmental Laboratory Accreditation (NELAC).

2.6 Alternative Procedures - At present, only EPA can grant alternative test methods or procedures when testing for compliance with NSPS or NESHAP standards. Contact Robin Segall at EPA for such allowances: Segall.Robin@epa.gov, 919-541-0893.

Broadly acceptable alternatives have been pre-approved by EPA as shown on web site: https://www3.epa.gov/ttn/emc/broadly-applicable-approved-test-methods.html.

For those operations where moisture or temperature overloads a Method 202 train, the older versions of Method 202 may be used for condensable PM testing if there is no conflict with a federal regulation.

Whenever a method says “shall” or “mandatory,” the Division has no discretion in waiving it. However, when a method says “should” or “must,” the testers may justify a departure from it. For example, a Method 202 test was being performed in 2^{o}F with a 30 mph wind, and the sample train did not reach its recommended minimum temperature. Since the temperature specification was

stated as "should," and lower temperature results in a positive bias, the lower temperature was allowed as an acceptable deviation.

3. PERFORMANCE TESTING

When conducting a performance test, great care must be taken collecting the data. The goal is to collect complete and accurate data at representative conditions. In order to accomplish this, it is essential to coordinate testing with production and maintain contact between the facility and the test team throughout the test. The following items are considered additional guidance for the data collection phase beyond the requirements provided in the individual test methods.

Facilities will routinely conduct "engineering tests" prior to performance tests to ensure that a unit will pass its performance tests. These are best conducted prior to the day on which compliance testing has been scheduled for commencement. While "tweaking" just prior to commencing compliance testing is generally beneficial, it should be completed such that it does not preclude test observation.

3.1 Representative Testing Conditions
(Cited from Clean Air Act National Testing Guidance dated April 27, 2009)

Since the CAA requires continuous compliance with emissions limits except where explicitly excused, EPA interprets applicable regulations to require that any stack test that is conducted within the scope of this guidance must demonstrate that a facility is capable of complying with the applicable emissions standards at all times. The NSPS and Maximum Achievable Control Technology (MACT) programs require that performance tests be conducted under such conditions as the Administrator specifies based upon the representative performance of the affected facility. *40 CFR §§ 60.8(c) and 63.7(e).* The MACT program further defines representative performance as normal operating conditions. *40 CFR § 63.7(e).* Operations during periods of startup, shutdown and malfunction do not constitute representative conditions for the purposes of a performance test.

The Part 61 NESHAP program requires that emission tests be conducted "under such conditions as the Administrator shall specify based on design and operational characteristics of the source." *40 CFR § 61.13(e).* Individual standards may more specifically define operating conditions under which performance tests should be conducted. In the absence of such specifications, the question often arises as to what operating conditions should be used when conducting a stack test. If operating conditions are not indicated by the applicable requirements in individual standards, they should be developed as part of the site-specific test plan.

In light of the fact that: (a) the Act requires that facilities continuously comply with emission limits; (b) the NSPS, MACT, and NESHAP programs all require that performance tests be conducted under such conditions as the Administrator specifies; and (c) the NSPS and Maximum Achievable Control Technology (MACT) programs further require that such tests be conducted under representative operating conditions; EPA recommends that performance tests be performed under those representative (normal) conditions that: represent the range of combined process and control measure conditions under which the facility expects to operate (regardless of the frequency

of the conditions); and are likely to most challenge the emissions control measures of the facility with regard to meeting the applicable emission standards, but without creating an unsafe condition.

The following are factors that should be considered in developing the plan for a performance test that challenges to the fullest extent possible a facility's ability to meet emissions limits.

- For a facility operating under an emission rate standard (e.g., lb/hr) or concentration standard (e.g., $\mu g/m^3$), normal process operating conditions producing the highest emissions or loading to a control device would generally constitute the most challenging conditions with regard to the emissions standard. If operating at allowable/permitted capacity would result in the highest levels of emissions, operating at this level would not create an unsafe condition, and the facility expects to operate at that level at least some of the time, EPA recommends that the facility should conduct a stack test at maximum capacity or the allowable/permitted capacity.

- For a facility operating under a control or removal efficiency standard (e.g., 98 percent control or removal of a specified pollutant), lower emissions loading at the inlet of a control device within the range of expected process operating conditions may often be the most challenging emissions control scenario for purposes of achieving the applicable standard. For facilities required to achieve such control or removal efficiency standards, EPA recommends that the performance test include operating the facility under such expected lower emissions loading conditions.

The test plan should generally include use of fuel, raw materials, and other process/control equipment that the facility expects to use during future operations that would present the greatest challenge in meeting applicable emissions standards. To demonstrate the facility's ability to meet concentration standards and emissions rate standards, for example, the facility generally should use the fuel or raw materials that it expects to use and that have the highest emissions potential for the regulated pollutant(s) being tested. In instances where alternative processing materials are expected to be used by the facility and those materials are known to adversely impact emissions quality or the functioning of control measures, the facility generally should use the material that is likely to cause the greatest challenge in meeting applicable emissions standards. For concentration and emissions rates standards, the facility generally should process the material that it expects to use during future operations that is likely to cause the highest emissions. For control or removal efficiency standards, other factors may apply such as using fuels or raw materials that contain or produce pollutants that are more difficult to combust or otherwise remove.

If a Relative Accuracy Test Audit (RATA) is being performed the facility will need to run their plant production at 50% or greater. It is common to do RATAs on the same set-up as compliance testing; the compliance testing portion must be conducted at loads approaching maximum, and once it is completed, the facility operation may slow to 50% or greater to complete the RATA.

If test results are not credible (e.g., a cement kiln reporting 0 ppm SO_2 or a stationary engine reporting 0 ppm formaldehyde), the testing may be required to validate the low result using a certified calibration gas into the sample train.

Certification documents for calibration gases should be printed and available for each test in which the calibration gases are used.

3.2 Implications with Sampling and Permit Limits - A facility is not required automatically to retest if the initial test does not represent the range of combined process and control measure conditions under which the facility expects to operate, or if the test does not challenge to the fullest extent possible the facility's ability to meet applicable emission standards without creating an unsafe condition. Furthermore, the facility is not required automatically to retest if the facility's operating conditions subsequently vary from those in place during the performance test. The Division must determine whether retesting is warranted; however, in all instances, the facility is responsible for demonstrating to the satisfaction of the delegated agency that the facility is able to continuously comply with the emissions limits when operating under expected operating conditions, taking into consideration the factors discussed above in this section.

This guidance does not affect the ability of the Division to prohibit a facility from operating at levels of capacity different from the level used during the stack test, or to restrict production to reflect conditions equivalent to those present during the stack test.

3.3 Units - Units of data collection should be consistent with the test method, the test report, and the facility's permit. Example: facility's permit limit is in pounds/hour, the test results will need to be reported as pounds/hour.

3.4 Traverse Distances - The traverse point locations must be clearly marked on the probe or pitot tube and should include the port length, when applicable.

3.5 Cyclonic Flow – For each performance test that requires measurements with pitot tubes, cyclonic flow will need to be checked before testing even if another performance test was conducted in the past.

3.6 Permanent Data Record Keeping – Non-erasable ink must be used to record data. In the event of an error, the data collector crosses through the erroneous value with a single line, records the correct value above it, and initials and dates the change.

3.7 Strip Charts/ Data Loggers – All strip charts and data logger printouts must be legible and clearly annotated, and must clearly distinguish the concentration trace from each pollutant. The date of each run must be clearly marked. The start/stop time of each run must be clearly marked. The introduction point of calibration gases should be clearly marked.

3.8 Sample Identification and Handling – All samples and filters must be labeled and uniquely numbered to ensure positive identification throughout the sampling and analysis procedures. Identification must be provided for each container with the number of the container recorded on the field forms, the chain of custody sheets, and the analysis data form. Chain of custody sheets must be updated any time a sample changes hands. This includes samples taken to an in-house laboratory. Samples with limited hold times or requiring special handling, such as refrigeration, must have this information available on the chain of custody sheet.

3.9 Reagent/Filter Preparation – Reagents and pre-weighed filters must have a maintenance record, which lists the date, the person who prepared it, and any standardization calculations of reagents. This documentation must be included in the test report.

3.10 Audit Samples – Most all federal regulations requiring performance testing also require audit samples if available. The audit sample provider will contact AQD of scheduled audit samples. The Division expects 15 days to approve audit samples.

3.11 Leak Checks – Immediately following every sampling run and prior to any change in sampling train components, a leak check of the entire sampling train must be conducted. Post-test pitot tube leak checks are also required. Pretest leak checks are recommended, but not mandatory. For isokinetic sampling, the leakage rate at the highest vacuum during the run must not exceed the lesser of 0.02 cfm or 4% of the average sampling rate. For constant rate sampling, the leakage rate at the highest vacuum must not exceed 2% of the sampling rate. If the leakage rate does not meet these criteria, the run must be voided. No correction of the sample volume is permitted except as noted below.

A. The measured leakage rate and vacuum for all leak checks (mandatory or voluntary) must be reported in the test report. All leak checks must be conducted as specified in the approved test method.
B. The emissions should be presented both with and without the correction of the sample volume.
C. The test run should be "flagged" indicating that it is invalid, but it may be an acceptable indicator of compliance, after correction for the leakage rate.
D. The Division will evaluate the claim on a case-by-case basis, using the following criteria:
    1. The reason for the excessive leakage (if known);
    2. The measured leakage rate versus the allowable leakage rate;
    3. The average vacuum during testing versus that during the leakage rate determination;
    4. The number of test runs in the series that have leakage rates in excess of the allowable limits.

3.12 Number of Test Runs – In accordance with 40 CFR 60 Section 60.8, each performance test is to consist of three separate test runs, and the arithmetic mean of the results applies when determining compliance with permit limitations unless *force majure* is encountered.

3.13 Data Witnessing –In the event that a change to the test procedures is necessary without a regulatory observer present, the facility or test company should contact the Division prior to proceeding with the methodology. This is an attempt by the Division to prevent unapproved methodologies from being used. Ultimately it is the source's responsibility to conduct proper tests in demonstrating compliance with applicable requirements.

3.14 Time Keeping – All field data sheets must document the exact starting and stopping times for each set of data collected.

3.15 Sample Time/Sample Volume - The minimum sample time is 60 minutes per test run unless otherwise specified in an applicable subpart, test method, permit conditions or written approval. When sample volumes are not indicated in the subpart, test method, or permit, the test company should sample at least 30 dry standard cubic feet (dscf) for each test run.

3.16 Detection Limits – A reasonable attempt should be made to obtain results that are greater than the method detection limit. There are several ways to potentially increase the pollutant concentration above the detection limit, including (1) increasing the sample volume, (2) concentrating the sample, and (3) using high-sensitivity analytical techniques. If appropriate steps are not taken, the results that are below the detection limit could be considered unacceptable. If reasonable attempts are made and results still come in below detection limits EPA guidance dictates that the detection limit should be used as the emission factor and used to calculate emissions.

AQD's detection limit policy for an instrumental method (real time analyzer).

A. Any compound seen during testing that has a value below the detection limit during any test run will result in the tester/source using the detection limit for that one the test run. The detection limit for any method or instrument must be documented on the test report.

B. Testers may establish the Practical Limit of Quantification (PLQ) for a method, and if any test run is below the PLQ, the results of the test run may be reported as the PLQ. The PLQ must be documented and justified in the test report.

If stack velocity pressure is below 0.05 inch water column (WC) (approximately 7,500 ft/min), the minimum measurable by Methods 1-4, alternative velocity measurements may be used.

3.17 Particulate (PM) Testing – All facilities testing for total particulate matter must review their permit and/or the regulation to determine if condensable particulate matter (back half) needs to be accounted for. If the facility feels that condensable particulate matter does not exist, the facility will need to submit a detailed letter explaining the reasoning to the Division for determination on a case-by-case basis.

Method 201A for $PM_{2.5}$ requires a 6" diameter sampling port. The operator is ultimately responsible for proving ports adequate for the methods.

There are new methods for PM sampling which rely on Scanning Electron Microscope (SEM) analysis. These methods are good at particle sizing, but rely on assumed particle densities. They may be used when a determination of particle size is necessary.

3.18 Volatile Organics Compounds (VOC) Testing – Volatile organics compounds must be tested and reported as mass VOC. It is strongly recommended that the source contact the Division to utilize appropriate reference methods.

3.19 Portable Analyzers – Portable electrochemical cells are acceptable for compliance determinations in very few regulations; however, they may be used for NOx and CO testing to verify continued compliance as directed by rule or permit. The analyzer must be operated in accordance with the manufacturer's specifications and calibrated over an appropriate range with a certified gas standard as specified in rule.

3.20 Stoppages
(Cited from Clean Air Act National Testing Guidance dated April 27, 2009)
The primary issue is whether it is appropriate to stop a stack test being conducted to determine and demonstrate compliance once it has been started, and if so, under what circumstances.

There are no regulatory provisions in the NSPS, NESHAP, or MACT programs that address whether a facility is allowed to stop a stack test once it has been started. Depending on the circumstances surrounding the stoppage, the facility may be found in violation of the requirement to conduct a stack test, the underlying regulatory requirement, or both. For example:

- If a facility stopped the stack test because it was exceeding applicable emission standards and would have failed the test, it would be considered in violation of both the requirement to conduct a stack test (if it does not complete a performance test by the applicable deadline) and to comply with the underlying regulatory requirement or permit condition. Consistent with 40 CFR §§ 60.11 and 61.12, any credible evidence may be used to demonstrate non-compliance. For major sources, the test should be reported in the Title V semi-annual deviation reports, and taken into consideration as part of the annual compliance certifications.

- Test runs may be suspended and re-started following unexpected unit shutdowns without re-starting the entire run or entire test provided that the shutdown is not lengthy enough to require re-establishing normal operations. If the shutdown is lengthy enough to require a full unit re-start, the test must be re-started.

- If a facility is forced to stop a test due to a *force majeure* event, the facility shall provide written or electronic notification to the Administrator in accordance with the applicable stack tests required by 40 CFR Parts 60, 61, and 63.

However, under 40 CFR § 63.7(e), the results of a test run may, upon approval from the Administrator, be replaced with the results of an additional test run in the event that a test run is discontinued because of forced shutdown or other circumstances discussed in the regulation. Under 40 CFR § 60.8(f), if a sample is accidentally lost or conditions occur in which one of the three runs must be discontinued for certain types of circumstances beyond the owner or operator's control, the results of two runs may be used with the Administrator's approval.

The performance test shall be conducted as soon as practicable after the *force majeure* occurs. Whether to grant an extension to the performance test deadline is solely within the discretion of the Administrator. Until an extension has been approved by the Administrator, the facility remains strictly subject to the performance test requirements of the applicable regulations. 40 CFR §§ 60.8(a)(1-4), 61.13(a)(3-6), 63.7(a)(4).

3.21 Force Majure - *Force majure* is limited to circumstances beyond the control of the operator which result in the necessity to shorten, delay, postpone, or stop testing completely. Examples of *force majure* include tornadoes, thunderstorms, floods, and wildfires. Testing may be shortened to two runs, or if necessary, delayed up to one week; such delayed testing is not required to submit an additional notice, but the Division should be notified of the *force majure* re-scheduling promptly.

3.22 Outliers – "Outliers" are test run results which are significantly different from the other test runs or from the mean. Outliers cannot be excluded from test report results, but they can be replaced by a later test run with Division approval.

4. TEST REPORTING

The AQD reviews data taken during a performance test to verify the test was performed under representative conditions, and also reviews all calculations and QA/QC data to verify the accuracy of the data. The report should include: copies of all original hand written field data sheets (computer generated copies of the field data may be included but not substituted for original hand-written sheets), clearly labeled strip chart records (may require color copies for clarity), laboratory analyses, calculations and instrument calibrations. In accordance with EPA guidance, non-detect sample results must be reported as the detection limit and this value must be used in emissions calculations.

4.1 Test Reports - Attachment 2 provides a summary of the **minimum** documentation that the Division recommends in a test report submitted for review. This listing applies to all relevant performance tests conducted for regulatory compliance, but review of the regulatory and/or permit requirements should be followed. The test report should follow this format and input provided for each item. A separate test report should be submitted for each piece of equipment tested. The test report must be submitted within 60 calendar days of the last day of testing unless otherwise specified in an applicable subpart, enforcement action, permit or prior Division approval is given.

Any deviations from normal procedures should be stated on a cover letter to the test report.

5. CONFIDENTIALITY CLAIMS

Any confidentiality claims should be accompanied by a notice of confidentiality. The notice should contain sufficient supporting information to allow the Division to evaluate whether such information satisfies the requirements related to trade secrets or how the information could cause substantial harm to the facility's competitive edge. If claiming confidentiality, two copies of the test report must be submitted: one complete copy with the confidential information and a second copy for the public record with the confidential information removed.

The Division understands that there are circumstances where it may not be possible to fulfill the items in this guidance document. In those cases, the facility will need to submit for approval any variances or unfulfilled items listed in this document a minimum of 30 days prior to testing.

ATTACHMENT 1
PERFORMANCE TEST PROTOCOL RECOMMENDATIONS

1. COVER INFORMATION
- Facility name, source ID number, location, and mailing address (if different). Unit identifications must match what is being listed in a facility's permit or permit application.
- Manufacturer, model number and unit identification number of equipment tested.
- Test company name and address.

2. FACILITY INFORMATION
- Facility name, mailing address and physical address of equipment (if different).
- Facility contact name and telephone number.
- General description of overall facility operations.
- Safety precautions and equipment required on site.

3. TEST COMPANY INFORMATION
- Test company name and address.
- Test company contact name and telephone number.
- Laboratory name, address and telephone number.

4. TEST INFORMATION
- Reason for testing (permit condition, MACT, NSPS, etc.) and list of all applicable regulations and regulatory requirements.
- Test schedule to include the proposed date and estimated start time of test.
- Types of pollutants to be sampled including applicable emission limits and demonstration requirements.
- Test methods and analysis procedures including methods to be performed concurrently. (Provide a synopsis of each test method, not a copy of each entire test method.)
- Documentation of any proposed variations from the specified procedures and the reason necessary.
- Sampling equipment to be utilized including a schematic diagram of the sampling trains.

5. EMISSION POINT INFORMATION
- Drawing with actual dimensions indicating the exhaust gas flow direction from the process, through the control equipment, and to the emission point.
- Diagram of the stack showing actual dimensions, the sampling locations, and the distances downstream and upstream from flow disturbances per EPA Test Method 1.
- Cross-sectional sketch of the stack at the sampling locations that include the sampling traverse points and port lengths.

6. CONTROL EQUIPMENT INFORMATION

- Complete description of the emission control system including the manufacturer, model number, rated capacity, rated efficiency and unit identification number.
- Control equipment data to be monitored and recorded during the test to ensure representative operation, who will be responsible for recording the data (facility or test team), the interval over which the data will be recorded and the proposed format. (Ex: Field data sheets, computer print outs)
- Minimum acceptable values of control equipment operating parameters.
- Description of any gas conditioning prior to the control equipment.

7. PROCESS EQUIPMENT INFORMATION

- Complete description of the process operation including a process flow sheet.
- Type and quantity of raw material being used or products being manufactured by the process.
- Maximum rated capacity of the process.
- Actual maximum achieved capacity of the process.
- Process data to be monitored and recorded during the test to ensure representative operation.

8. QUALITY CONTROL INFORMATION

- Copies of all field data sheets to be used during the test.
- Description of the procedures and forms to be utilized in order to maintain the integrity of the samples collected. The description must include a sample container numbering scheme, how these numbers are identified on the data sheets, chain of custody records, and what sample holding times (if any) are applicable.
- Quality assurance for the analytical procedures to be used in the analyses of test samples.

ATTACHMENT 2
PERFORMANCE TEST REPORT RECOMMENDATIONS

1. COVER INFORMATION
- Facility name, source ID number, location, and mailing address (if different).
- Manufacturer, model number and unit identification number of equipment tested.
- Test date.
- Test company name and address.

2. CERTIFICATION
- Certification by test team leader as to authenticity of test data.
- Certification by reviewer as to accuracy of test results.

3. TEST INFORMATION
- Reason for testing (permit condition, MACT, NSPS, etc.) and list of all applicable regulations and regulatory requirements.
- Type of process and control equipment.
- Type of pollutants sampled.
- List of all applicable regulations and regulatory requirements.
- Test date.
- Project participants and titles (facility representatives, test team members, consultants and regulatory observers).

4. SUMMARY OF RESULTS
- Summary table that includes: (1) run number, (2) the test date, (3) the volumetric flow rate, (4) the emission concentration, (5) the emission rate in lbs/hour and the units of any applicable emission standard(s).
- Summary table of all process parameters (including the units) recorded during the actual testing period to verify that each source was operating at maximum levels or other specified approved levels.
- Audit sample results, if applicable.
- Discussion of any errors or anomalies that occurred during the test (facility- or test-related).

5. PROCESS AND CONTROL EQUIPMENT INFORMATION
- Complete description of the emission control system including the manufacturer, model number, rated capacity, rated efficiency and unit identification number.
- Complete description of the process operation including a process flow sheet, if helpful.
- Actual capacity of the process during the test.

6. SAMPLING AND ANALYTICAL PROCEDURES
- Brief description of test methods utilized.
- Brief description of analytical procedures.
- Description of any procedures that deviated from the specified procedures.

7. APPENDICES

- Complete test results with one complete set of example calculations for each test method or pollutant using actual data.
- Raw field data (copies of originals; computer copies are optional).
- Laboratory reports including chain of custody forms and contact name and phone number.
- Process and control equipment data.
- Test equipment calibration sheets for the dry gas meter, pitot tube, nozzle, calibration gases and any other test equipment utilized.