

CONTENT/FORMAT OF STACK TEST REPORTS

Source Test Guidance

Test plans are required to be submitted to SWCAA prior to testing. Generally the plans must be submitted 2 weeks prior to testing but may be different based on individual facility permit conditions. Generally, source test reports are to be submitted to SWCAA not more than 45 calendar days from the end of testing. This is a permit condition and is enforceable. Tune up test reports are generally to be submitted to SWCAA no later than 15 calendar days after completion.

If the source test is being performed on a piece of equipment that has combustion exhaust gases in the air stream, the fuel consumption rate should be monitored and recorded during the testing. These values should then be recorded in the test report data sheets and in the summary. To the extent practical, EPA Method 19 should not be utilized instead of EPA Methods 1-4 to determine firing rates or other process parameters unless specifically identified or allowed in the Air Discharge Permit or a pre-approved modified plan.

Source Test Report Guidance

The Source Test Report should:

- have a “date performed” and “date report issued” identified on the report;
- be signed by a responsible individual representing the test company;
- be provided in electronic PDF format as well as hardcopy;
- identify source test witnesses;
- report all values in English units – not metric units; both English and metric units should be reported only if an EPA standard such as a MACT or NSPS standard has limits specified in metric units;
- be clear that NO_x is monitored and reported as NO₂ unless otherwise indicated;
- identify VOC values as monitored and then as corrected to propane, hexane or as the main VOC component measured but not reported as methane because methane is not a VOC; propane is the preferred correction VOC lacking other specific instructions; an alternative is to report the VOC in units as measured of itself. The permit will generally specify the correction basis. If in question, contact SWCAA for guidance;
- include a copy of the SWCAA test protocol from the Air Discharge Permit in an appendix to the test report;
- identify the SWCAA Air Discharge Permit (not Title 5 Permit) for the facility that requires the testing in the summary;
- include a column on the summary page that identifies the permit limit for individual pollutants;
- include stack height (feet), diameter (inches), temperature (deg F), O₂ and CO₂ % values, and flowrates (both acfm and dscfm);
- include relevant process data such as firing rate (MMBtu/hr) or process/production rates to be able to correlate to maximum design values (number of parts produced or volume processed) to determine if testing was performed at maximum or near maximum conditions or as specified in the Air Discharge Permit. Firing rate should be calculated both by fuel consumption rate and Btu value and using EPA Method 19;
- data should be reported to 2 non-zero significant figures – data should not be manipulated to account for accuracy of the test equipment – these values should be included in supporting data in test report appendices;

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I. Introduction – Background information pertinent to the test should be presented in this section, including but not limited to:

- A. Reasons for conducting test (permit requirement, NSPS requirement, permit application, etc.).
- B. Concise statement of applicable regulations and permits, including permit numbers and issuance dates.
- C. Test date(s).
- D. Startup date, and maximum production rate achieved date for the source being tested.
- E. If the test is not done within 60 calendar days after achieving the maximum production rate at which the source will operate or within 180 calendar days after the initial startup of the source (if maximum production rate was not achieved), or not within the time period specified in the permit, then explain why not.
- F. Brief description of plant process and pollutant points being sampled.
- G. Company name, contact person, mailing address, telephone number.
- H. Facility name and physical location.
- I. Name of testing organization, contact person, mailing address, telephone number.
- J. Name of each person present at the test and each person's affiliation.
- K. Unit description(s) and permitted capacity(ies) (use derated horsepower for IC engines). Include unit make, model number, serial number, and location within plant. Identify each unit as it is identified in the permit and within the plant (plant names and numbers).
- L. Control equipment description. Include make, model number, and serial number.
- M. A photograph of the emission unit and/or stack configuration where the sampling was performed.

II. Summary – This section should summarize in tabular form the test results for each unit tested:

- A. For each run, show velocities (stack velocity in feet/second), flows (stack exhaust flow in actual cubic feet/minute and dry standard cubic feet/minute), concentrations, emission rates including the average of the emission rates from all runs, allowable emission limits, stack temperature and pressure as measured at the sampling probe, sampling times, pitot tube average results, etc. Include opacity reading if applicable. Also show the results of cyclonic flow determination.
- B. Unit operating parameters at time of test:
 - For engines include: actual horsepower (at test time), engine speed (rpm), ignition timing, intake manifold pressure, fuel consumption rate (if available), A/F ratio controller setting.
 - For turbines include: actual horsepower (at test time), turbine speed (rpm), fuel consumption rate, turbine exhaust temperature, ambient temperature, relative humidity. For steam injected turbines also include fuel to water ratio.
 - If the engine or turbine drives a compressor or pump, include suction and discharge pressures and temperatures, inter-stage pressures and temperatures, suction volume and type of fluid pumped or compressed. If the engine or turbine drives a generator, include output voltage, current, and power.
 - For heaters, boilers, or furnaces include: fuel consumption rate, feedstock rate, and firebox temperature and O₂ concentration.
 - Unit operating level at time of test. If the unit was not operated at 90% of permitted capacity (derated horsepower for IC engines) provide an explanation. If testing a turbine using Method 20, include the four required operating loads unless otherwise specified in the permit or approved test protocol.
- C. Control Equipment Operating Parameters at Time of Test
Include, as applicable, pressure drops, inlet and outlet temperatures, T/R readings for electrostatic precipitators, water flow rates for scrubbers, etc.

III. Test Procedures - This section describes the test procedures, including any variations from EPA test methods. This section should include, but is not limited to:

- A. Schematic drawing of the process being tested showing emission points, sampling sites, and stack cross section. The sampling points should be labeled and dimensions indicated.
- B. Schematic drawing of the sampling device/train used. Each component should be labeled and explained in a legend.
- C. A brief description of the EPA reference methods used to operate the sampling train and the procedures used to recover and analyze the samples. Include sampling durations, number of test runs, calibration procedures, leak checks, cyclonic flow checks, etc.

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- D. Any deviation from EPA reference methods or from the original protocol and who at SWCAA approved the deviation.
- E. Make and model of test instrumentation and specifications including sensitivity, interferences, response time, linearity, span and range, calibration dates/method.
- F. A brief description of the methods used to obtain plant or unit operating parameters/ conditions. Measured parameters must be clearly distinguished from derived parameters.

IV. Data and Calculations- This section should include copies of all raw data and at least one example calculation for every derived number showing all equations used. This section should include, but is not limited to:

- A. All raw data used in the emissions calculations:
 - 1. Plant operating parameters.
 - 2. Unit operating parameters.
 - 3. Stack parameters (including cyclonic flow data). Include diagram showing test location on stack, dimension from test port locations to upstream and downstream disturbances, identification of test port location relative to final discharge to ambient air, photo preferred.
 - 4. Control equipment operating parameters.
 - 5. Isokinetic calculations, if applicable.
- B. Laboratory data, including blanks, tare weights, and results of analysis.
- C. Labeled copies of strip charts.
- D. An example calculation for every calculated result showing how the result was derived from the raw data. Show all equations used and any approximations. Carry out to completion the calculations for at least one test run.
- E. Analysis and certification documents for calibration gases. List expiration dates. (Warning: transferring the gas to a secondary container voids the certification.)
- F. Audit sample results (if applicable).
- G. Visible emissions field sheets (Method 9) where applicable.
- H. Sample chain of custody, if applicable. Show names of custodians, method of transportation, departure and arrival times/locations.
- I. Quality Assurance documentation.

V. Appendix – Place any additional information in this section, including but not limited to:

- A. Any complications during the tests or with plant operations and how these might have biased the results.
- B. Any special information that might be helpful for performing future tests at this site.
- C. Brief resumes including experience of test personnel.
- D. Copies of pertinent pages from the facility/equipment air discharge permit.

Table 1 - Summary
SUMMARY OF RESULTS – METHODS 1, 2, 3, 4, 5/202, 7, 10, 25 and 9
(equipment name)
(test company name)

File name:
Client:
Location:

Equipment Location Tested	Units	RUN #1	RUN #2	RUN #3	AVG	Limit
Lab No						
Date						
Start Time						
End Time						
Sample Length	Minutes					
Sample Volume	ft ³					
Sample Volume	Dscf					
Sample weight	Mg					
Isokinetics	%					
SOURCE PARAMETERS						
O ₂	%					
CO ₂	%					
Stack moisture (BWS)	%					
Stack temperature	deg F					
Stack diameter	inches					
Stack area	sq ft					
Stack height (approx)	ft AGL					
Test location diameter	inches					
Flow rate (Dry Standard)	dscf/min					
Flow rate (Actual)	acf/min					
Stack gas velocity	ft/sec					
Fuel type						
Firing rate	MMBtu/hr					
Process/Production rate	(specify units)					
Control Equipment rate	(specify units)					
SAMPLING RESULTS						
CO concentration - uncorrected	ppm					
CO rate / hr	lb/hr					
CO rate / production	lb/MMBtu					
CO concentration - corrected	ppm@xx% O ₂					
VOC concentration – uncorrected (C ₃ H ₈)	ppm					
VOC rate / hr (C ₃ H ₈)	lb/hr					
VOC rate / production (C ₃ H ₈)	lb/MMBtu					
VOC concentration – corrected (C ₃ H ₈)	ppm@xx% O ₂					
NOx concentration - uncorrected	ppm					
NOx rate / hr	lb/hr					
NOx rate / production	lb/MMBtu					
NOx concentration - corrected	ppm@xx% O ₂					
PM concentration – uncorrected (front)	gr/dscf					
PM rate / hr (front)	lb/hr					
PM rate / production (front)	lb/MMBtu					
PM concentration – corrected (front)	gr/dscf@xx% O ₂					

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SUMMARY OF RESULTS – METHODS 1, 2, 3, 4, 5/202, 7, 10, 25 and 9
 (equipment name)
 (test company name)

PM concentration – uncorrected (back)	gr/dscf					
PM rate / hr (back)	lb/hr					
PM rate / production (back)	lb/MMBtu					
PM concentration – corrected (back)	gr/dscf@xx% O ₂					
PM concentration – uncorrected (total)	gr/dscf					
PM rate / hr (total)	lb/hr					
PM rate / production (total)	lb/MMBtu					
PM concentration – corrected (total)	gr/dscf@xx% O ₂					
SO ₂ concentration – uncorrected	ppm					
SO ₂ rate / hr	lb/hr					
SO ₂ rate / production	lb/MMBtu					
SO ₂ concentration – corrected	ppm@xx% O ₂					
Opacity	%					
NH ₃ concentration – uncorrected	ppm					
NH ₃ rate / hr	lb/hr					
NH ₃ rate / production	lb/MMBtu					
NH ₃ concentration – corrected	ppm@xx% O ₂					
(Other pollutants below)						