

Source Emissions Testing Services

Statement of Qualification



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SECTION 1**INTRODUCTION TO BEST ENVIRONMENTAL**

BEST ENVIRONMENTAL (BE) responds to industry needs for affordable, quality emissions monitoring for compliance requirements or in-house engineering projects.

BE is located in Livermore, California. Our facility occupies 3,000 square feet of office space, and workshop space and 800 square feet of laboratory space. It is both modern as well as functional and gives BE the ability to respond quickly and efficiently to a wide spectrum of source testing needs.

BE is an approved contractor for the California Air Resources Board (CARB), which is a national leader in the development and implementation of progressive toxic emissions monitoring and documentation programs. BE is also affiliated with the Air and Waste Management Association (AWMA), Professional Environmental Marketing Association (PEMA), Source Evaluation Society (SES) and Air Pollution Training Institute (APTI). These affiliations are an example of the commitment we have made to provide our clients with the most up-to-date information and technology available.

BE serves clients ranging from public utilities and governmental entities to industrial, institutional and commercial businesses, plus large and small consulting firms. As can be seen from our project references, BE services the entire spectrum of stationary emission sources. A large percentage of our business is from repeat clients who appreciate our experience, speedy response and cost effectiveness.

The key personnel at BE have source test experience, including toxic emissions testing. The majority of our test programs are conducted for compliance purposes such as:

- Initial source tests in an Authority to Construct phase
- Annual tests as part of a Permit to Operate
- Tests following violations notices
- RATA verification of CEM systems
- Test for engineering research and development
- Toxic emissions reporting
- Control device efficiency verification testing
- Documentation of emission reductions for emissions credits

Many of our other tests are conducted for in-house studies or research and development projects that assess various parameters in order to optimize process operations.

SECTION 2**EMISSIONS TESTING CAPABILITIES AND EXPERIENCE**

BEST ENVIRONMENTAL has a proven track record with the California Air Resources Board (CARB) and the Bay Area Air Quality Management District (BAAQMD). We have worked extensively with many of the Air Pollution Control Districts (APCDs) and Air Quality Management Districts (AQMDs) in the State of California. Within the Western United States and Hawaii, we have a solid history with the Environmental Protection Agency (EPA), the Department of Health (DOH), and the Department of Toxic Substance Control (DTSC).

Our professional staff has performed thousands of source tests, using EPA, CARB and AQMD-approved procedures and equipment. The range of testing experience at BE runs the spectrum of facility and source types. These have included units such as: scrubbers for acids, bases, VOCs, metals, including hexavalent chromium and solvents; ESP's; low NO_x burners; catalyst systems, boilers, combustion turbines, catalytic crackers, cokers, process heaters, autoclaves/sterilizers, vacuum plasma coaters, ovens, furnaces, dryers, crematories, bulk-loading terminals, calciners, flares, IC engines, distillers, and incinerators for municipal, hazardous, medical, organic and sewage sludge wastes.

Some of the emission testing services we offer are:

- *Speciation/quantitation of toxic source emissions from industrial process.*
- *Evaluation of emission control equipment.*
- *EPA Modified Method 5/CARB 428, 429 for dioxins, PCBs, PAHs, phenols and other volatile organics.*
- *EPA VOST procedures for semi-volatile organics.*
- *VOC capture efficiency, fugitive emission calculations and destruction efficiency testing.*
- *Continuous emission monitoring (CEM), utilizing one of our three mobile CEM vans.*
- *Relative Accuracy Test Audits (RATA) for NO_x, CO, TRS, H₂S, SO₂, THC, O₂, CO₂, Opacity & Flow.*
- *AB2588/SARA Title III Toxic Air Emission Inventory.*
- *Resource recovery and hazardous waste incineration trial burns.*
- *Visible Emissions Evaluations.*
- *Input / Output, Boiler Efficiency Testing*
- *NO_x Reduction Testing*
- *CEMS Maintenance and CEMS Temporary Replacement*

BE offers our large inventory of gases to clients for rent, to use in their CEMS or testing CGA's. This enables clients to quickly and economically obtain EPA Protocol 1 calibration gases for almost any range they may require.

In addition to regulatory agency source test methods, BE offers custom methods and equipment to suit special needs. The following table shows some of the most common source test methods we perform:

Continuous Emissions Monitoring	CARB	EPA	BAAQMD
NO _x , SO ₂ , THC, CO, CO ₂ , O ₂	100	3A, 3B, 6C, 7E, 10, 20 & 25A	13A, 19A, 5, 6 & 14
VOC	100	25A	ST-7
TRS	16	16	
Relative Accuracy Test Audit		40 CFR, Part 60, Appendix B Performance Spec. 1 through 7 and Part 75	Field Accuracy Test
Non-Continuous Emissions Monitoring			
Total Particulates, PM ₁₀	5, 17	5, 17, 201A, 202	ST-15
Particulate Sizing	501		
Visual Emissions Evaluation (VEE)		9	
SO ₄ , SO ₃ , SO ₂	6, 8	6, 8	ST-20
HCl, HF, HNO ₃ , H ₃ PO ₄ , Acids, Cl ₂	421	26	ST-25
Hydrogen Sulfide	11	11	ST-28
Multiple Metals	436	29	
Ethylene Oxide (on-site GC)	431		
Benzene	410	110	
Total Reduced Sulfur	16A	15, 16	ST-21
PAHs	429		
PCDDs, PCDFs, PCBs	428	23	
Phenols	429	TO Methods	ST-16
Total and Hexavalent Chromium	425	306	ST-35
Halogenated Organics	422	18	
Vinyl Chloride	106	106	ST-29
Butadiene (on-site GC)	422.102		
Ethanol			ST-32
Ammonia			ST-1B
VOST		0030	
Semi-Volatiles		0010	
VOC	422	204	
Cyanide	426		
Formaldehyde, Acetaldehyde & Acrolein	430		
Ambient Air Sampling	CFR, NIOSH, OSHA, ASME, ACS, AIChE		
Total Suspended Particulate		EPA	
Dioxins, PAH's and PCB's		EPA	

Other Source Test Methods: Volume 1-3 (CARB)\Code of Federal Regulations (CFR)\South Coast AQMD or other specialized test methods can be used or adapted as necessary.

SECTION 3

FACILITIES AND EQUIPMENT

Operating out of over 3,000 square foot building in Livermore, our facility is both modern as well as functional. BE presently has three (3) fully equipped Continuous Emissions Monitoring vans, plus one additional van that can perform multiple functions including continuous monitoring.

We have our own LAN with 11 workstations plus a full array of other support hardware. This gives BE the ability to respond quickly and efficiently to a wide spectrum of source testing needs.

Following is a list of analyzer types BE uses in each CEM van to monitor Oxygen (O₂), Oxides of Nitrogen (NO_x), Carbon Dioxide (CO₂), Carbon Monoxide (CO), Sulfur Dioxide (SO₂) and Hydrocarbons (HC):

**NO_x Analyzers
Chemiluminescent/NDIR**

Make	Model	Quantity
Thermo Environmental	10S	1
Thermo Environmental	42C	1
California Analytical	600CLD	2

**CO Analyzers
Non Dispersive Infrared (NDIR)**

Make	Model	Quantity
Horiba	VIA510	1
Thermo Environmental	48	3

**CO₂ Analyzers
Non Dispersive Infrared (NDIR)**

Make	Model	Quantity
Horiba	PIR-2000	5
California Analytical	100	1

**CO/CO₂ Analyzers
Non Dispense Infrared (NDIR)**

Make	Model	Quantity
Infrared	702D	1

**O₂ Analyzers
Paramagnetic and Fuel Cell**

Make	Model	Quantity
Horiba	PMA200	1
California Analytical	100P/110P	2
Illinois Instruments	3000	1

THC Analyzers

Flame Ionization Detector and Non Dispersive Infrared (NDIR)

Make	Model	Quantity
Ratfish FID	RS 55	1
California Analytical	300M	3

SO₂ Analyzers

Make	Model	Quantity
Ametek	921	1

Other Analyzers

Make	Model	Quantity
IMAAC	FTIR	1
Infrared	IR-703D	1

Miscellaneous Continuous Monitoring Equipment

- 1 - Thermo Environmental Model 300 Molybdenum NO_x converter
- 1 - BAAQMD Combustion Tube Furnace (VOC, BAAQMD ST-7)
- 1 - Bacharach portable gas detector Pro125

Isokinetic and Integrated Sample Test Equipment

- Anderson Samplers, Inc. EPA Model SU-4 Method 5 test trains
- RAC Method 5 Isokinetic Sampling equipment
- Lear Siegler PM-100 Method 5 Isokinetic Sampling Trains
- Integrated Organic Sampler (VOST)
- Ace Glass midget impingers
- Cascade impactors (PM-10, PM-5 and particle size distribution)
- Orsat analyzer
- Fyrite

Ambient Sampling Equipment

- Anderson Samplers, Inc. High Volume Samplers
- Thermo Environmental NO_x analyzers

SECTION 4**QUALITY ASSURANCE & QUALITY CONTROL PROGRAM**

All quality assurance and quality control procedures (QA/QC) are followed as prescribed in the appropriate methods, technical guidance manuals or written test protocols (i.e., EPA 40 CFR, EPA QA Handbook 600/4-77/027b, CARB Volumes I, III and VI, Hazardous Waste Incineration Measurement Guidance Manual EPA/625/6-89/021 and Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration EPA/625/6-89/023.

Adherence to QA/QC procedures during field test preparation and field sampling is the responsibility of the QA/QC Officer and Sampling Coordinator. Each test program includes all QA/QC procedures specified in the test methods &/or test protocols (equipment calibration, field data recording, blanks, replicate samples, spike samples, sample custody documentation, contamination control and record keeping). Analytical QA/QC is the responsibility of the Project Manager, and the Laboratory Manager or QA/QC Coordinator assigned to the program by the laboratory we have subcontracted. Compliance test protocols are approved by the governing regulatory agency prior to testing, and any deviations from stated protocols would be discussed with the appropriate individuals prior to implementation.

Monthly staff meetings are held where QA/QC procedures are covered. The QA/QC coordinator goes over any changes or updates in the procedures with all company personnel. This helps to insure consistent quality data is provided to our clients

Chain of Custody (C.O.C.): A sample is considered to be under a person's custody if:

1. If it is in a person's physical possession;
2. In view of the person after he has taken possession;
3. Secured by that person so that no one can tamper with the sample; or
4. Secured by that person in an area that is restricted to authorized personnel.

The following steps are taken to ensure sample identification and integrity:

- Sample labels (identity, number, date, time)
- C.O.C. seals (with sample number)
- Field sample log book with field notes
- C.O.C. record and analysis request sheet
- Shipping (courier, Federal Express)
- Receiving/Log-in (signed receipt of samples and their condition)

Once the sample has been received in the laboratory and the status of the sample integrity has been determined, the laboratory QA/QC supervisor is responsible for care and custody. The laboratory should be prepared to testify to the possession and security of the sample until analysis is complete. In addition to the QA/QC procedures mentioned, BE regularly participates in EPA audits and uses EPA protocol calibration gases.

Data Reduction/Reporting Procedures: All data reduction is performed using Microsoft-Excel spreadsheet programs developed by BE. The reports are written by a Project Manager experienced in reporting, and are reviewed by his peers. The report includes all pertinent data gathered during the test program, tables, supporting calculations, field data sheets, laboratory results, equipment and gas calibrations and chain of custody.

Reports are normally produced in triplicate with two bound copies and one unbound. This allows for easy reproduction by the client as needed. BEI's policy requires the express written consent from the client before releasing the confidential information contained in our source test reports to anyone but the

client. Due to this policy, it is the client's responsibility to submit a copy of the report to the proper regulatory agency within the time deadlines set forth in their permit to operate or other regulatory paperwork.

QUALITY ASSURANCE PROGRAM SUMMARY

Best Environmental (BE) ensures the quality and validity of its emission measurement and reporting procedures through a rigorous quality assurance (QA) program. The program is developed and administered by an internal QA Officer and encompasses seven major areas:

1. Development and use of an internal QA manual.
2. QA reviews of reports, laboratory work, and field testing.
3. Equipment calibration and maintenance.
4. Chain of custody.
5. Training.
6. Knowledge of current test methods.
7. Agency certification.

Each of these areas is discussed individually below.

Quality Assurance Manual. BE has prepared a QA Manual according to EPA guidelines. The manual serves to document and formalize all of BE's QA efforts. The manual is constantly updated, and each member of the Source Test Division is required to read and understand its contents. The manual includes details on the other six QA areas discussed below.

QA Reviews. BE's review procedure includes review of each source test report by the QA Officer, and spot check reviews of laboratory and field work.

The most important review is the one that takes place before a test program begins. The QA Officer works closely with Source Test Division personnel to prepare and review test protocols. Test protocol review includes selection of appropriate test procedures, evaluation of any interferences or other restrictions that might preclude use of standard test procedures, and evaluation and/or development of alternative procedures.

Equipment Calibration and Maintenance. The equipment used to conduct the emissions measurements is maintained according to the manufacturer's instructions to ensure proper operation. In addition to the maintenance program, calibrations are carried out on each measurement device according to the schedule outlined by the California Air Resources Board (CARB). The schedule for maintenance and calibrations are given in Tables B-1 & B-2. Quality control checks are also conducted in the field for each test program. The following is a partial list of checks made as part of each CEM system test series.

- Sample acquisition and conditioning system leak check.
- 2-point analyzer calibrations (all analyzers).
- 3-point analyzer calibrations (analyzers with potential for linearity errors).
- Complete system calibration check ("dynamic calibration" through entire sample system).
- Periodic analyzer calibration checks (once per hour) are conducted at the start and end of each test run. Any change between pre- and post-test readings are recorded.

- All calibrations are performed using gases certified by the manufacturer to be + 1% of label value (EPA Protocol Gas).

Calibration and CEM performance data are fully documented, and are included in each source test report.

Chain of Custody. BE maintains full chain of custody documentation on all samples and data sheets. In addition to normal documentation of changes between field sample custodians, laboratory personnel, and field test personnel, BEI documents every individual who handles any test component in the field (e.g., probe wash, impinger loading and recovery, filter loading and recovery, etc.).

Samples are stored in a locked area to which only Source Test Division personnel have access. Neither other BEI employees nor cleaning crews have keys to this area.

Data sheets are copied immediately upon return from the field, and this first generation copy is placed in locked storage. Any notes made on original sheets are initialed and dated.

Training. Personnel training is essential to ensure quality testing. BE has formal and informal training programs which include:

1. Attendance at EPA-sponsored training courses.
2. Enrollment in EPA correspondence courses.
3. A requirement for all technicians to read and understand BE's QA Manual.
4. In-house training and QA meetings on a regular basis.
5. Maintenance of training records.

Knowledge of Current Test Methods. With the constant updating of standard test methods and the wide variety of emerging test methods, it is essential that any qualified source tester keep abreast of new developments. BE subscribes to services which provide updates on EPA and CARB reference methods, and on EPA, CARB and SCAQMD rules and regulations. Additionally, source test personnel regularly attend and present papers at testing and emission-related seminars and conferences. BE personnel maintain membership in the Air Pollution Control Association, the Source Evaluation Society, and the ASME Environmental Control Division.

AGENCY CERTIFICATION

BE is certified by the CARB as an independent source test contractor for gaseous and particulate measurements. BE also participates in EPA QA audit programs for Methods 5, 6 and 7.

TABLE B-1
 SAMPLING INSTRUMENTS AND EQUIPMENT CALIBRATION SCHEDULE
 As Specified by the CARB

Instrument	Frequency of Calibration	Standard of Comparison or Method of Calibration	Acceptance Limits
Orifice Meter (large)	12 months	Calibrated dry test meter	$\pm 2\%$ of volume measured
Dry Gas Meter	12 months or when repaired	Calibrated wet test meter	$\pm 2\%$ of volume measured
S-Type Pitot (for use with EPA-type sampling train)	6 months	EPA Method 2	Cp constant (+5%) over working range; difference between average Cp for each leg must be less than 2%
Vacuum Gauges Pressure Gauges	6 months	Manometer	$\pm 3\%$
Field Barometer	6 months	Mercury Barometer	$\pm 0.2''$ Hg
Temperature Measurement	6 months	NBS mercury thermometer or NBS calibrated platinum RTD	$\pm 4^\circ\text{F}$ for $<400^\circ\text{F}$ $\pm 1.5\%$ for $>400^\circ\text{F}$
Temperature Readout Devices	6 months	Precision potentiometer	+ 2% full scale reading
Analytical Balance	12 months (check prior to each use)	Should be preformed by manufacturer or qualified laboratory	± 0.3 mg of stated weight
Probe Nozzles	12 months	Nozzle diameter check micrometer	Range $<\pm 0.10$ mm for three measurements
Continuous Analyzers	Depends upon use, frequency and performance	As specified by manufacturers operating manuals, EPA NIST gases and/or reference methods	Satisfy all limits specified in operating specifications

TABLE B-2
Source Test Equipment Calibration and Frequency
 With corrective actions as performed in-house

Apparatus	Acceptance Limit	Frequency and Method of Measurement	Corrective Action
Wet test meter	Capacity >3.4 m ³ /hr, accuracy within 1.0%	Calibrate initially and then yearly by liquid displacement	Adjust until specification are met
Dry gas meter	$Y_i = Y = 0.02Y$ 2% accuracy	Calibrate vs. wet test meter initially, and when post test check exceeds 5% accuracy $Y = 0.05Y$	Repair or replace, and then replicate
Thermometers	Impinger thermometer within 1°C; dry gas meter thermometer within 3°C; stack temperature sensor within 1.5% of absolute	Calibrate each initially as a separate component against a mercury thermometer, then before each field trip compare each as part of the train with the mercury thermometer	Adjust, determine a constant correction factor, or reject
Probe heating system	Capable of maintaining 120°C at a flow rate of 21 liters/min.	Calibrate component initially by APTD-0576(11), or use published calibration curves	Repair or replace, and then re-verify calibration
Barometer	Within 2.5 mm Hg of mercury barometer	Calibrate initially vs. mercury barometer, check before and after each field test	Adjust to agree with a certified barometer, repair or replace
Probe Nozzle	Average of three ID measurements of nozzle difference between high and low <0.1 mm	Use a micrometer to measure to nearest 0.025 mm	Recalibrate, reshape, and Sharpen when nozzle becomes nicked dented or corroded
Analytical Balance	Within 1 mg of Class-S weights	Check with Class-S weights upon receipt	Adjust or repair
Stack gas thermocouple	Capable of measuring within 1.5% of minimum absolute stack temperature	Calibrate initially and after each field test	Adjust to agree with a mercury thermometer, or construct a calibration curve to correct readings
Differential pressure gauge	Agree within 5% of inclined manometer	Initially and after each field use	Reject test results, or consult administrator if post-test calibration is out of specification

SECTION 5

BE CLIENT REFERENCES

References can be provided upon request.

SECTION 6

GENERAL PROJECT REFERENCES - 2010

BE performs testing on many stationary sources on an annual basis.

This includes full compliance test programs on boilers, engines, power plants and a wide variety of other types of businesses, primarily located in Northern and Central California.

SPECIFIC PROJECT EXPERIENCE: (Examples can be provided upon request)

SECTION 7

CALIFORNIA AIR RESOURCES BOARD (CARB) CERTIFICATION

Available on website

SECTION 8

KEY PERSONNEL RESUMES

Available on website