

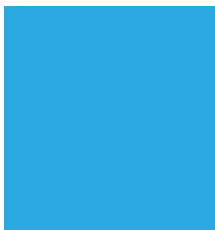


MONTROSE

ENVIRONMENTAL



Stack Services Guide





The Future of Environmental Solutions

An Introduction to Montrose



WHO WE ARE

Montrose is a leading provider of environmental solutions, we apply the latest technologies in practical ways to solve difficult environmental challenges and support thousands of environmental projects across the United States, Canada and Australia.

Clients pick us, time and time again, because of our technical and professional expertise to swiftly handle complex environmental projects of all sizes. Whether it's environmental or regulatory permitting, planning and compliance, ecological assessments, or environmental liability management, Montrose is right there.

We support government and commercial organizations with a diverse range of services, from comprehensive air measurement and laboratory services to regulatory compliance, permitting, engineering, and remediation.

You'll eliminate logistical headaches and gain access to the best technology for each project. More importantly, you'll be working with the people who truly know how to put it to good use to get the job done. No matter what industry you're in, you'll get the benefit of innovative and integrated thinking—with planners, engineers and implementers working together to turn the best ideas into successful real-world solutions.



We can handle the big projects.



An Introduction to Montrose



We have the resources.

OUR LOCATIONS

Montrose has 1,700 employees working diligently to support client projects across the United States, Canada, and Australia. We have 70 offices, with headquarters in Orange County, California. The graphical map above illustrates our office locations.



Our Solutions



Air Quality Services



WHY MAQS?

UNPARALLELED EXPERTISE

With over 500 MAQS consultants, project managers, technicians and engineers located in more than 30 offices in North America, we have the presence, the resources and the stability to combine personalized service with regional expertise.

SERVICE EXCELLENCE

Commitment to quality and delivering integrated solutions in a cost-effective manner is what our clients have come to expect from us.

TRUSTED PROVIDER

Experienced technical personnel who can expertly handle projects, even in the most stringent regulatory markets worldwide.

OUR SERVICES AND SOLUTIONS

- Air Toxic Contaminants & HAPs Testing
- Combustion Engineering & Emissions Profiling
- FTIR Spectroscopy Services
- Power Plant Commissioning Test
- Ambient Monitoring
- Leak Detection & Repair
- Control & Destruction Efficiency Specialists
- Regulatory Compliance Testing
- CEMS Certification & Auditing
- Diagnostic Performance Testing
- Particulate Matter Experts
- SCR & SNCR Optimization Expertise

OUR OPERATIONS

We leverage our regulatory insight, technical expertise and integrated thinking to help clients comply with state and federal regulations.



Source Testing



OUR CAPABILITIES

Montrose companies have conducted some of the most visible and important testing programs in the country where regulatory and public scrutiny are at their highest. We can perform any type of source testing program and at any size or sophistication.

- 3-D Pitot Flow Studies
- Abatement Device Control System Efficiency
- Air Toxic Contaminants and HAPS Testing
- Capture Efficiency (CE) Determinations
- Combustion Engineering & Emissions Profiling
- Control and Destruction Efficiency
- Emission Factor Verification
- EPA, State and Local Methods
- Engineering, R&D and Diagnostic Testing
- Fourier Transform Infrared Spectroscopy (FTIR)
- HAPs Speciation Studies
- HCl by Titration
- Leak Detection and Repair (LDAR)
- Method Development and Evaluation On-Site
- Chemistry
- NESHAPS, MACT and ICR Programs Test Procedures
- NIOSH, NCASI, ASTM and ISO Methods
- On-Site Analysis using Ion Chromatography and FTIR for NH₃ & HCl
- On-Site Gas
- On-Site Mercury (Ohio Lumex Analyzer)
- Performance Data Evaluation
- Performance Specification
- Pilot Plant Studies
- Particular Matter (F_{1/2}, B_{1/2})
- Total Suspended Particulate (TPM) by Gravimetry
- PM₁₀, PM_{2.5}, Particle Size Distribution
- PM Dilution Tunnel Testing (CTM-039)
- Power Plant Commissioning Test Programs
- Predictive Emissions Monitoring (PEMS) Modeling & RATA
- RATA (O₂, CO₂, CO, NO_x, SO₂, THC, HCl, Hg)
- RCRA/TSCA Trial Burn
- Regulatory Compliance Tests- Criteria Pollutants
- SCR and SNCR Optimization
- SO₂, SO₃, SO₄, H₂S by Titration
- Spectroscopy (GC/MS)
- SW846 Hazardous Waste Methods
- Thermal Oxidizer Temperature Optimization
- Toxic Release Inventory (TRI) Ultra-Low PM Detection & Ambient TO Methods
- Vapor Recovery Unit Testing (VRU)



Source Testing



SUMMARY OF EXPERIENCE

We have extensive experience in virtually every EPA, state specific and NCASI emission test method. Montrose clients are among the largest corporations in America including industry leaders in the following areas:

- Alternative Fuels Production (ethanol)
- Manufacturing
- Reciprocating Engine Generators
- Automobile Manufacturing
- Petrochemical Services
- Refineries (downstream)
- Chemical Production
- Pipelines and Transportation Facilities (midstream)
- Semiconductor Industry
- Combined Cycle Turbines
- Portland Cement Plants
- Simple Gas Turbines
- Drilling and Production Facilities (upstream)
- Power Production
- Thermal Solar Electric Power Generation
- Glass Container Production
- Primary and Secondary Metals
- Utility Boilers



Source Testing



ACCREDITATIONS

Montrose is accredited by the American Association for Laboratory Accreditation (A2LA) and Stack Testing Accreditation Council (STAC) for ASTM D7036 – Standard Practice for Competence of Air Emissions Testing Bodies.

- ASTM D 7036 -04 Standard Practice for Competence of Air Emission Testing Bodies
- Louisiana Environmental Laboratory Accreditation Program (LELAP) - LAC 33, Part I, Subpart 3 (Laboratory Accreditation), Chapters 45 – 59
- Virginia Environmental Laboratory Accreditation Program (VELAP) – Commonwealth of Virginia Environmental Laboratory Certification Regulation (1 VAC 30, Chapter 46)
- California Air Resources Board (CARB) - California Code of Regulations, Title 17, Section 91207
- South Coast Air Quality Management District Laboratory Approval Program (SCAQMD LAP)
- New Jersey Department of Environmental Protection (NJDEP) Environmental Laboratory Certification Program

EMERGING TECHNOLOGIES DIVISION

MAQS has a team of experts dedicated to investigating and promoting the newest measurement technologies to keep us and our customers on the cutting edge of environmental monitoring. We have the industry's leading experts in all markets served and technologies used to deliver the fastest and most cost-effective solutions. The services and data provided is more sensitive, more selective, and clearly delivered to ensure we meet our customer's unique data quality objectives.

Reach
out!



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Ambient Air



OUR CAPABILITIES

The Ambient Monitoring Services (AMS) group includes engineers, scientists, analysts and technicians, all with extensive experience in a wide range of ambient monitoring applications.

- Siting Analysis and Instrument Specifications
- Networking and Remote Communications
- Field Performance and System Audits
- Complete Maintenance, Operations and Documentation
- Data Acquisition, Validations and Reporting
- Data Hosting – Web Based
- Network design, equipment procurement, system integration, field installation, startup and routine operation and maintenance, and quality assurance audits
- Compliance with state and local agency regulations – SCAQMD Rules 1420.1, 1420.2, and CARB fugitive emissions
- Refinery MACT for benzene fenceline monitoring
- Monitoring programs for determination of designation status for SO₂, PM₁₀ and PM_{2.5} National Ambient Air Quality Standards (NAAQS)
- Special purpose, client-specific monitoring for nuisance and toxic pollutants other than the EPA criteria.

Reach
out!



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Leak Detection and Repair



OUR CAPABILITIES

Our Leak Detection and Repair (LDAR) division includes regulatory experts, project managers, engineers, scientists, technicians, and quality analysts, all with extensive experience in a wide range of leak detection monitoring applications. We've invested in state-of-the-art technology and developed a custom LDAR reporting software accessible from any Internet connection. Trained LDAR professionals perform routine leak inspections of piping components and process units pursuant to Regional, State, and Federal requirements, utilizing equipment and procedures conforming to EPA Reference Method 21 and the Alternative Work Practice.

- Inspection and Maintenance Plans
- Custom Regulatory Training
- Emissions Inventory Solutions
- Leak Detection and Repair via Method 21
- Optical Gas Imaging via FLIR Camera
- Greenhouse Gas Inspections
- Visible Emissions Evaluations
- Smoke Infused Leak Detection
- Tank Seal Inspections
- DOT Pipeline Surveys
- Online Database Management
- Gas and Wastewater Sampling
- HRVOC Sampling
- Tank Maintenance Solutions
- Vapor Recovery Troubleshooting
- Emissions Quantification via High Flow Sampler
- Fugitive Mass Emissions Calculations
- Third Party Audits/Gap Assessments

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Regulatory & Compliance



OUR CAPABILITIES

Achieving and maintaining regulatory compliance is crucial. That's why Montrose takes a big-picture view, adding value by combining a rock-solid understanding of regulations with practical and cost-effective methods for meeting them. Our consultants, engineers, and scientists have decades of experience delivering solutions for environmental challenges that make a meaningful long-term difference for our clients and their communities.

Montrose provides a full range of air quality regulatory consulting services for industrial, commercial, and governmental facilities — from planning and site selection through the permitting process and ongoing compliance.

- Title V Part 70 Permits
- Air Dispersion Modeling and Air-Quality Impact Analysis
- Air Records Management (ARMS) & Environmental Management Information Systems (EMIS) & Support
- Emission Inventories, Tracking, Reporting and Reduction Projects
- Health Risk Assessments
- Impact Mitigation and Offset Strategies
- Maximum Achievable Control Technology (MACT) Permits
- Minor, Synthetic Minor and Conditional Major Permits, Permits by Rule, and No-Permit-Required Documentation
- New Source Review (NSR) and Prevention of Significant Deterioration (PSD) Permits
- NPRI, Alberta AMD Chapter 9 Reporting, NERM and Greenhouse Gas Reviews and Reporting
- Odor Investigations
- Canadian National Pollutant Release Inventory
- Alberta Air Monitoring Directive
- Ontario Environmental Compliance Approval Applications
- Ontario Regulation 419/05
- Technology Applicability Analyses

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Case Studies





LOW LEVEL PARTICULATE MATTER COMPLIANCE ISSUE

Opportunity

During a routine periodic test, our client was unable to demonstrate compliance of a PM₁₀ emission limit on a unit at a gas fired combustion turbine electric generator. Units like these are often subjected to emission limits that tax the equipment and skills of the testers to eliminate contamination and/or losses and provide the sensitivity needed to demonstrate compliance. After extensive investigation, both internally and with the help of another contractor, our client eliminated any obvious potential causes and was unable to pinpoint what the actual root cause of failure was. The client had to pause normal operations.

Challenge

The Montrose team was brought in to help determine what could be causing the issue and create a solution. The difference between pass and fail is a minuscule amount which leaves little room for error in these tests. Prior to Montrose becoming involved, the most obvious and common causes had been investigated and ruled out with no indication of causing these issues. On top of normal challenges, this instance was further complicated with less than ideal sampling locations, abnormal sample port locations and exhaust system irregularities, high exhaust gas velocity and temperatures, positive pressures, large dimensions, and limited access for sampling from permanent platforms.

Solution

Due to the many abnormal complications with the sample locations, it was suspected that potential contamination was occurring and contributing to the failures to demonstrate compliance. The Montrose team worked with the project participants and did an in-depth analysis of prior testing details which pointed out the room for contamination in the samples. Though a root cause had not previously been determined, our team suspected that — due to the size of the sampling ducts, the sampling probes, the gas velocity, and the potential for baffles to impart particulate matter into the exhaust stream — loose PM was being mixed in with the analysis collection. Once this was discovered, we took measures to minimize potential sources of contamination as much as possible. In a collaborative effort of experts from many departments at Montrose, we identified and implemented the following best practices: Rigid-ized probes, probe insertion alignment guides, unbreakable and inert probe liners, custom nozzle guards, extended sample durations and higher sample rates. Thanks to this, the regulatory agency accepted the results and all units are now operating normally, without restriction.





ACCURATE LOW-LEVEL MEASUREMENT OF FORMALDEHYDE EMISSIONS FROM GAS TURBINES

Opportunity

The EPA recently mandated the testing of formaldehyde emissions from gas turbines used for electric power generation, cogeneration, and natural gas transmission. The turbines affected by this mandate include any gas-fired, lean pre-mix, and diffusion flame units that were installed or reconstructed after January 2003, and the testing must be completed within 180 days of promulgation and annually, thereafter.

The actual emissions of formaldehyde from gas turbines are often much lower than the emission limit of 91 ppb, corrected to 15% O₂, and would therefore qualify a facility as a Minor Source of Hazardous Air Pollutants (HAPs), greatly simplifying permitting. However, standard test methods struggle to consistently measure concentrations at levels low enough to prove compliance with the emission limit due to inconsistent results and a tendency toward contamination. Furthermore, sample analysis using these standard techniques must be carried out at off-site labs, meaning results may not be received for two weeks or more.

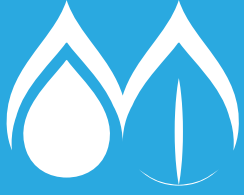
Challenge

Montrose was contracted to measure formaldehyde emissions from existing gas-turbines to demonstrate that the emissions were far below the emission limit, enabling the facility to downsize its operating permit and thereby decrease long-term costs.

Solution

Montrose used two emerging test methods to measure formaldehyde levels from these gas-turbines of less than 10 ppb at 15% O₂, far below the regulatory limit of 91 ppb, with both techniques producing nearly identical results. In addition, these results were produced at near-real-time. Because these two techniques follow the criteria established in existing EPA Reference Methods for emission measurement, state and local regulatory agencies may approve these techniques, enabling the facility to qualify as a secondary source of HAPs and eliminate the need for a costly “Title V” permit.





Blazing New Trails

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