

# BROOKSAPPLIEDLABS

Statement of Qualifications



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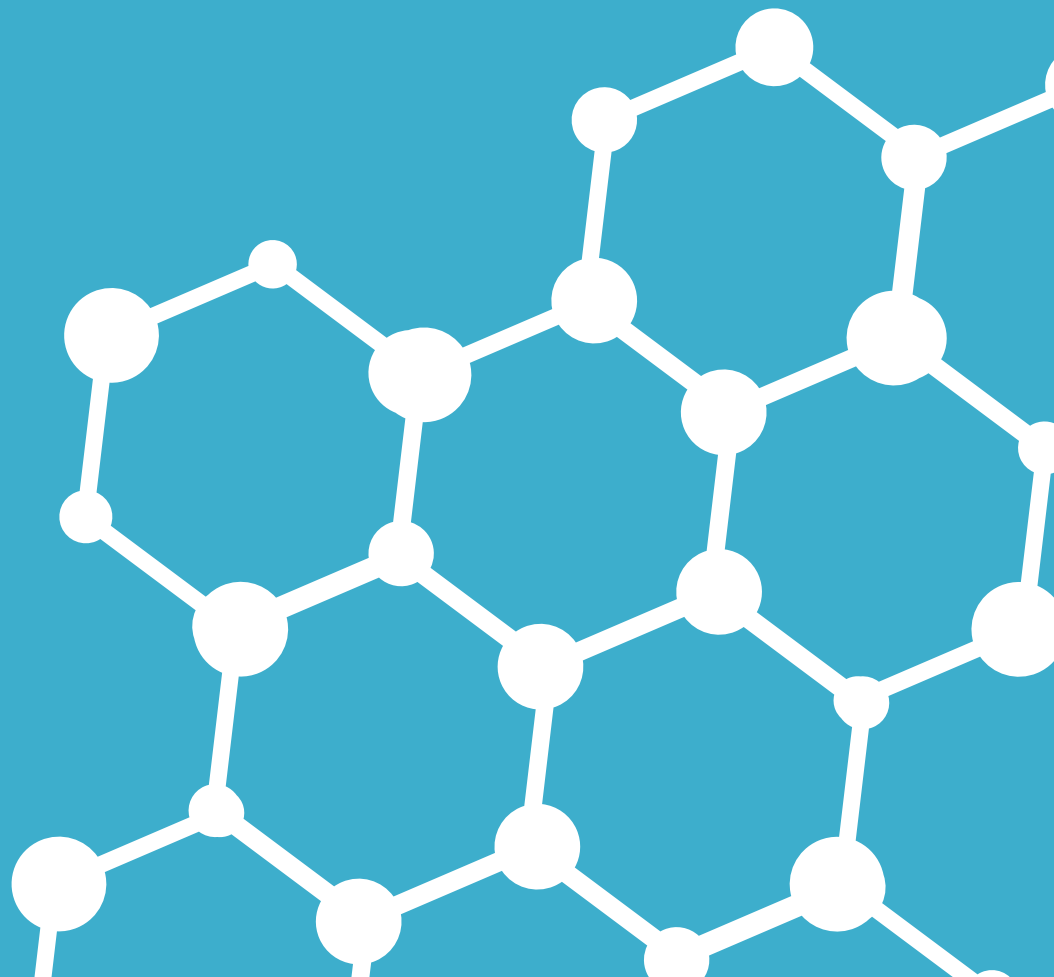
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# A Message From Our CEO

After over 23 years in this industry, including over 11 years as a leader at Brooks Rand Labs, the merger with Applied Speciation and Consulting to form Brooks Applied Labs is the proudest achievement of my career. This is a very exciting time for us!

One of the qualities here that I am most satisfied with is our enduring commitment to exceeding our clients' expectations. We're not just passionate about our data quality, but everything else that creates a rewarding analytical laboratory experience for our customers, from genuinely helpful and knowledgeable customer service to technical expertise you can be confident in.



At Brooks Applied Labs, we pride ourselves on our ultra-low detection limits, outstanding data quality, innovative method development, unparalleled customer service, and real passion for good science. It's these aspects that have established us as the premier specialty metals analytical laboratory in the country. Our tagline says it all: We don't just provide Meaningful Metals Data, but also Advanced Speciation Solutions!

It is our mission to provide the highest quality analytical services for trace metals and metals speciation customized to address the needs of our clients. Our vision is to support better environmental, human health, and scientific decision-making by providing high-quality analytical services for metals in a workplace that is healthy, respectful, fun, and intellectually stimulating for our employees.

We could not support our mission and vision without being extremely committed to supporting the professional development and well-being of our staff. As a small business with less than 50 people, we go above and beyond to offer our employees the best benefits possible and opportunities to enhance their knowledge of their craft through training courses and conference attendance. I am tremendously proud of the Brooks Applied Labs staff and of the company that we have created together!

*Michelle Briscoe*  
President/CEO



# Company Overview

Brooks Applied Labs was formed in 2015 through the merger of the two industry-leaders in the field of specialty trace metals analysis and metals speciation: Brooks Rand Labs & Applied Speciation and Consulting.

Since 1982, Brooks Rand Labs (BRL) specialized in providing the highest quality trace metals analytical services. While many labs have just recently begun to offer methods for low-level metals determination, BRL has been offering low-level mercury and methylmercury analytical services for well over three decades! Low detection limits, outstanding data quality, and unparalleled customer service established BRL as the premier specialty metals analytical services provider with the capability to accommodate complex deliverable requirements and conformance with EPA-approved methods. Throughout the late 1980's and 1990's, BRL contributed to the development and validation of many of the EPA 1600-series methods that are commonly used for low-level metals and metal speciation analyses today.

Applied Speciation and Consulting (ASC) was founded in 2004, immediately becoming the premier lab in the US for the speciation of metals using ion chromatography coupled to ICP-MS. Instead of a focus on conformance to promulgated methods, ASC emphasized scientific understanding and the development of the knowledge and experience necessary to ensure results were accurate and representative in even the most complex of matrices.

Today, Brooks Applied Labs provides Meaningful Metals Data and Advanced Speciation Solutions to hundreds of projects worldwide, and we are very dedicated to staying in our niche. Many members of our staff, from the Sample Disposal Technician to our CEO, are seasoned veterans in the world of ultra-trace metals analysis and metals speciation. Together we work to provide ultra-clean and pre-tested sampling equipment, fast turn-around-time options, high-quality validated data, and custom reporting packages at competitive prices to ensure that our clients receive the data and consulting they require to make critical decisions.



# Meet the Team



We are proud to employ a hard-working, talented, and dedicated staff of experienced chemists and managers, who take great pride in producing exceptionally high-quality data and providing outstanding customer service.

## Each Team Offers Unique Expertise to Clients:

### **Senior Management Team:**

With the combined experience of over 60 years in the Analytical Laboratories industry, our Senior Management team provides leadership and direction to the staff at Brooks Applied Labs.

### **Quality Assurance Team:**

Provides clients with accurate data that is scientifically sound, readily defensible, and useful for regulatory, litigation, and/or research purposes.

### **Business Development Team:**

As one of the first points of contact for our clients, our knowledgeable Business Development team offers a unique bridge between technical requirements and customer service.

### **Project Management Team:**

Offers clients an unparalleled level of support from start to finish for each new and existing project.

### **Laboratory Team:**

Our team of talented chemists provide the expert handling, preparation, and analysis of even the most complex matrices for ultra-trace metals and metals speciation analyses using the EPA 1600-series procedures as well as other cutting-edge methods.

### **Administration Team:**

From HR management to event planning and accurate invoicing, our administrative team ensures the operations of Brooks Applied Labs runs smoothly.

## Senior Management Team



Michelle Briscoe ✉  
President/CEO



Annie Carter ✉  
Vice President of Operations

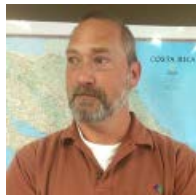


Hakan Gürleyük ✉  
Technical Director



Frank McFarland ✉  
Vice President of Quality

## Business Development Team



Russ Gerads ✉  
Business Development Director



Jamie Fox ✉  
Technical Sales Manager



Misty Kennard-Mayer ✉  
Technical Services Specialist



Elizabeth Madonick ✉  
Technical Services Specialist

## Project Management Team



Tiffany Stilwater ✉  
Client Services Manager



Lydia Greaves ✉  
Project Manager



Jeremy Maute ✉  
Project Manager



Amanda Royal ✉  
Project Manager



Margaret Shultz ✉  
Project Coordinator



Ben Wozniak ✉  
Project Manager

# Benefits of Our Specialized Lab



*We provide analyses using highly specialized “performance based” methods.*

By continuously refining our techniques for sample preparation and analysis, we are able to achieve some of the lowest detection and reporting limits commercially available.

Clients Who Partner with Brooks Applied Labs Can Expect:

- [State of the art facility](#)
- Ultra-clean laboratories
- [Professional, experienced, and dedicated staff](#)
- NELAP, DoD ELAP, ISO/IEC 17025:2005, and state accreditations
- [CLIA Certification](#)
- DOECAP Audited Laboratory
- [Experienced lab serving clients worldwide](#)
- Ultra-low reporting limits
- [Project confidentiality](#)
- Fast turn-around-time options
- [Custom reporting packages](#)
- Competitive prices
- [System redundancies to maximize our capacity and throughput](#)

# Project Management, Reporting, and Data

Our Project Management team provides clients with an unparalleled level of support.

We routinely produce report packages with three levels of increasing detail. In addition, we offer custom reports upon request. All of our reports are certified NELAP compliant and our Level IV reports are EPA CLP compliant.

## Report Packages

| Deliverables                     | Level II | Level III | Level IV |
|----------------------------------|----------|-----------|----------|
| Narrative*                       | X        | X         | X        |
| Sample Information               | X        | X         | X        |
| Sample Results                   | X        | X         | X        |
| Accuracy & Precision Summary     | X        | X         | X        |
| Method Blanks & Reporting Limits | X        | X         | X        |
| Sample Containers Summary        | X        | X         | X        |
| Shipping Containers Summary      | X        | X         | X        |
| Chain-of-Custody Forms           | X        | X         | X        |
| Waybill or Shipping Label        | X        | X         | X        |
| Instrument Calibration Results   |          | X         | X        |
| Full Sequence Information        |          |           | X        |
| Preparation & Bench Sheets       |          |           | X        |
| Instrument Printouts             |          |           | X        |

\* Level IV report narratives are more detailed than Level II/III



## Data Management

We know the importance of secure, high quality IT systems to our clients. Our redundant IT systems provide extensive security and backup capabilities to ensure that only those with proper authorization are capable of accessing our laboratory information management system (LIMS) and other client-related files. It is important to note that our automated daily computer backups preserve important data in the event of a catastrophe.



Brooks Applied Labs offers Electronic Data Deliverables (EDDs) in accordance to the specifications required by many environmental consulting firms and state/federal regulatory agencies. In most cases, client-specific custom EDDs can be designed to accommodate client specifications.

*"I appreciate all the up-front help and willingness to help try to understand and solve our problem, beyond just providing the analytical service."*

**-Gary Carter, AMPAC**

# The Brooks Applied Labs Difference



# Quality Assurance

We provide clients with accurate data that is scientifically sound, readily defensible, and useful for regulatory, litigation, and/or research purposes.

We achieve this through the implementation of the most effective analytical techniques, methods, procedures, and protocols available, as documented in our Comprehensive Quality Assurance Plan (CQAP). 🌐

All data produced by our laboratory is subjected to a rigorous, multi-level review process:

- Primary review by a highly qualified analyst
- Comprehensive review of every data point by our Quality Assurance team
- Final review by our Project Management team



To ensure the reliability of our analytical techniques, we submit biannual proficiency testing results of water, seawater, and soil samples to Environmental Resource Associates and Resource Technology Corporation for evaluation, as well as taking part in various interlaboratory comparison studies.

# Accreditations and Permits

Our primary NELAP accreditation is certified by the State of Florida, Department of Health, Bureau of Laboratories and is reciprocated by many other states across the United States. We also hold permits that allow us to work with international clients.

## Accreditations

- US Department of Defense ELAP (through ACLASS)
- California ELAP
- Florida Department of Health
- Maine Department of Health and Human Services
- New Jersey Department of Environmental Protection
- New York State Department of Health
- Oregon ELAP
- South Carolina
- Virginia
- Washington Department of Health (CLIA)
- Washington State Department of Ecology
- West Virginia

## Permits

- US Fish & Wildlife Service  
Migratory Bird Import Permit
- US Fish & Wildlife Service  
General Tissue Import Permit
- US Department of Agriculture Soil Import Permit
- State of Washington Radiological Materials License

*"In addition to being my go-to laboratory for arsenic speciation because of their technical expertise, Brooks Applied is also very customer oriented. Recently, the lab's staff went well beyond normal client service late on a Friday afternoon, helping me secure some much-needed lab equipment overnight to continue weekend work when all the sources we had in our time zone were already closed. I am now even happier to recommend Brooks Applied to my colleagues and clients for specialty analyses."*

Ruth Baker, ERM













# Capabilities and Services




Brooks Applied Labs offers analytical services specific to the trace metals and metal speciation arena.

With numerous accreditations and decades of experience with the EPA 1600-series methods, we have the experience required to provide the most meaningful metals data possible for diverse industries around the world.

## Testing Services:

- Total Elemental Analysis 
- Arsenic Speciation 
- Chromium Speciation 
- Selenium Speciation 
- Mercury Speciation 
- Rare Earth Elements 
- Speciation of Other Elements:  
Fe, Pb, Co, Tl, Sb, V, I, Br, S, Cl,  
W, Zn, Mn, CN Complexes 
- Analysis by EPA Method 1600 Series 
- Analysis using Interference  
Reduction Technology 
- Stable Isotopic Ratio Testing 

## Specialty Services:

- Pharmaceuticals 
- Clinical Studies
- Method Development/Contract Research 
- Consulting and Sampling Training 

## Common Matrices:

- Air
- Beverages
- Biological fluids (e.g. blood, plasma/serum, urine)
- Chemicals
- Coal
- Dietary Supplements
- Environmental
- Food
- Plankton
- Sediment
- Soil
- Tissues/Biota
- Water (Drinking, Ground , Sea, Surface, and Wastewater)

## Total Elemental Analysis

Brooks Applied Labs supports trace metals quantification using both promulgated and internally generated methods depending on the data

|                     |                      |                      |                  |
|---------------------|----------------------|----------------------|------------------|
| 33<br>As<br>Arsenic | 24<br>Cr<br>Chromium | 34<br>Se<br>Selenium | 26<br>Fe<br>Iron |
|---------------------|----------------------|----------------------|------------------|

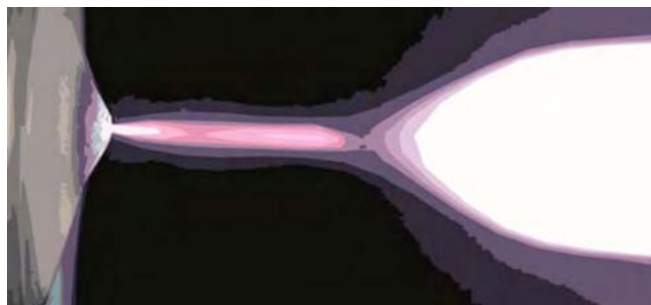
objectives and administrative requirements of the project. BAL uses state of the art, inductively coupled plasma mass spectrometry with various interference removal technologies, to accurately determine arsenic, selenium, iron, chromium and various other elements with previously unattainable detection limits while total mercury quantitation is supported by cold vapor introduction techniques. Current interference removal technologies supported at BAL includes: dynamic reaction cell (DRC), collision reaction cell (CRC), and triple quadrupole (QQQ). The availability of the different technologies allows us to choose the most appropriate approach to support the quality and data objective of nearly any project.

Conventional ICP-MS are prone to interferences from the matrix components that form polyatomic species in the plasma. Interference removal technologies are designed to reduce interferences and overcome many of these limitations. The end result is the elimination of false-positives and lowest detection limits for the toughest matrices. Different interference removal technologies have discrete benefits and limitations which is why Brooks Applied Labs offers as many options as possible.

The DRC (ICP-DRC-MS) is a quadrupole enclosed within a reaction chamber (or cell) that is between the ion lens system and the analyzing quadrupole. A reactive gas such as NH<sub>3</sub> or O<sub>2</sub> is introduced into the cell. The gas reacts with the ion beam through a number of ion-molecule reaction mechanisms, converting the interfering ions into species that will not interfere with the analyte. The analyte of interest, under the same conditions, remains stable and is able to proceed to the detector. This cleansing process is known as “chemical resolution”.

When operated in KED (kinetic energy discrimination) mode the ICP-CRC-MS acts as a general interference removal tool which is appropriate for most elements. The collision gas, typically helium or hydrogen, interacts with polyatomic interferences, in accordance

with their effective radius, to reduce their kinetic energy. The slower ions are rejected from the terminus of the CRC chamber while the faster, smaller ions are allowed to travel to the detector. Certain elements, such as arsenic and selenium, can require alternate interference removal technologies (CRC operated in reaction mode or DRC) to properly remove interferences associated with calcium, chlorine, and other lighter elements.



What sets the ICP-QQQ-MS analytical platform apart from other ICP-MS instruments is the tertiary mass filter before the CRC/DRC chamber. Most mass spectrometers only contain a quadrupole mass analyzer after the sample stream exits the CRC. Furthermore, the support

of mass filtering prior to the CRC/DRC allows our scientists to scan the periodic table during the analysis of a specific element to ascertain what, if any, interferences are caused by the plasma effects or the interaction of the reaction gases with the ion beam.

Total mercury analyses at BAL is supported by either cold vapor atomic fluorescence spectrometry (CV-AFS) or flow injection cold vapor inductively coupled plasma mass spectrometry (FI-CV-ICP-MS). Brooks Applied Labs offers both automated and manual CVAFS methods, both of which are compliant with EPA Method 1631E. Our approach to CVAFS generates some of the lowest method detection limits in the industry, well below 1ng/L. For more difficult matrices which can interfere with promulgated methods BAL we offer the robustness of FI-CV-ICP-MS. While the detection limit for FI-CV-ICP-MS is higher than CVAFS it can actually achieve lower detection limits for very complex chemical systems due to the reduced need for dilution.

# Arsenic Speciation Analysis

At Brooks Applied Labs, we have both the innovation and the expertise to provide you with ultra-low arsenic and arsenic speciation analyses for virtually any matrix type. Our focus has always been to support any data objective associated with regulatory, risk assessment, and research based projects. Our experience, knowledge, and technological capacity are expansive; therefore, if you have any questions please do not hesitate to contact us. Below are the methods and arsenic species that we have experience in and currently support:

## Arsenic Species Analyzed by EPA Method 1632

- Inorganic Arsenic (InorgAs)
- Arsenite/Trivalent Arsenic [As(III)]
- Arsenate/Pentavalent Arsenic [As(V)]
- Monomethylarsonic Acid (MMAs)
- Dimethylarsinic Acid (DMAs)



## Selected Arsenic Species Supported by Hyphenated ICP-MS Techniques

- |                                                   |                                       |
|---------------------------------------------------|---------------------------------------|
| • Inorganic Arsenic (InorgAs)                     | • Roxarsone                           |
| • Arsenite/Trivalent Arsenic [As(III)]            | • p-Arsanilic acid                    |
| • Arsenate/Pentavalent Arsenic [As(V)]            | • Arsenopropionate                    |
| • Monomethylarsonic Acid (MMAs)                   | • 4-Hydroxy phenylarsonic acid        |
| • Dimethylarsinic Acid (DMAs)                     | • 3-Amino-4-hydroxyphenylarsonic acid |
| • Arsenobetaine (AsB)                             | • 4-Aminophenylarsonic acid           |
| • Arsenocholine                                   | • Nitarsons                           |
| • Trimethylarsine oxide                           | • Phenylarsonic acid                  |
| • Tetramethylarsonium                             | • Various Arseno-thiols               |
| • Hexafluoroarsenate                              | • Others (Please inquire.)            |
| • Arsenolipids (polar and non-polar)              |                                       |
| • Arsenosugars (sulfur and phosphorous analogues) |                                       |



## Arsenic Selective Sequential Extraction

Brooks Applied Labs has adopted a selective sequential extraction (SSE) procedure to characterize arsenic in soil and sediment matrices culminating in cost savings and increased project efficiencies for our clients. Application of our technology helps eliminate assumptions when determining the fate and transport, risk assessment, and optimization of remediation efforts for arsenic contamination in solid substrates. Our approach has been applied extensively over the past decade assisting consulting firms, government agencies, and academics.



The properties of arsenic containing molecules are significantly different than transition metals. Most SSE methods are designed to support the transition metals (Tessier, BCR, etc) and are not appropriate for arsenic investigation. Mobile and labile arsenic is primarily in the form of oxyanions (arsenite and arsenate) which interact with different components in soil and sediment. By focusing on the pertinent chemical interactions BAL has the capacity to illuminate our clients on an otherwise obscure topic.

## Chromium Speciation Analysis

Brooks Applied Labs (BAL) offers an array of chromium speciation methods including EPA Methods 7196A and 7199 and our proprietary methods to meet nearly any project quality objective. Accurate hexavalent chromium testing to determine ng/L levels is a major challenge because the existing methods are either not selective or not sensitive enough.

For instance, the colorimetric determination of hexavalent chromium (EPA Method 7196A) is prone to interferences from molybdenum, vanadium, iron, suspended solids, humic compounds, and other organics that absorb light. In EPA Method 7199, anion chromatography is used to separate hexavalent chromium from the matrix and then is determined spectrophotometrically after a post column reaction with diphenylcarbazide. Even though most of the problems mentioned above are avoided with this technique, there are still problems when permanganate is present in the samples; thus, Brooks Applied Labs favors ICP-MS for detection instead of spectrophotometry.



Our experience at BAL covers topics ranging from chromium speciation in soil sediment, water, textiles, supplements, and pharmaceuticals to monitoring kinetic reactions within digestive systems of numerous organisms through experimentation. We offer both routine testing for regulatory compliance and monitoring as well as research based projects to better understand intrinsic chemical interactions.

# Selenium Speciation Analysis

Brooks Applied Labs offers highly advanced analytical services for the determination and characterization of selected selenium species by our customized methods coupling an array of chromatographic systems with inductively coupled plasma – mass spectrometry (ICP-MS), employing interference removal technologies (DRC, CRC, and QQQ). The chromatographic conditions are selected to the specific sample matrix and chemical properties of the target molecules (e.g. macromolecules, ionic, amino acids, proteins, volatile compounds, metabolic intermediates). Our scientific approach allows for multi-element and multi-isotopic detection, high sensitivity, a wide linear dynamic range, and minimal polyatomic interferences. This allows us to separate and quantify selected selenium species in even the most complex matrices while maintaining ultra-low detection limits.



Brooks Applied Labs performs selenium speciation by Hyphenated ICP-MS Techniques on the following species:

- Selenite [Se(IV)]
- Selenate [Se(VI)]
- Selenocyanate [SeCN]
- Selenomethionine [SeMe]
- Selenomethionine Oxide [SeMeO]
- Methylseleninic acid [MeSe(IV)]
- Selenosulfate [SeSO<sub>3</sub>]
- Dimethylselenide
- Dimethyldiselenide
- Methylselenocysteine
- Selenoproteins
- Elemental Selenium
- Selenocysteine
- Other unidentified Se species



Brooks Applied has additional technological resources for the characterization and speciation of selenium in soil, sediment, and other matrices.

# Mercury Speciation

The services offered by Brooks Applied Labs (BAL) to support the speciation and characterization of mercury in almost any sample type are unparalleled in the commercial, academic, and government laboratory environments. Brooks Applied Labs supports analyses using promulgated EPA methods (EPA Methods 1631E, 1630, and 3200) as well as novel analytical and preparatory approaches developed by our scientists. Our approach continues to focus on using the right scientific tool to support the data objectives of the project.



## Mercury Species Analyzed by EPA Method 1630

- Monomethyl Mercury [MMHg]
- Monoethyl Mercury [EtHg]

## Selected Mercury Species Supported by Hyphenated ICP-MS Techniques

- Monomethyl Mercury [MMHg]
- Monoethyl Mercury [EtHg]
- Inorganic Mercury [Hg(II)]
- Phenyl Mercury [PhHg]

## Mercury Species Associated with

- Humic Acids
- Fulvic Acids
- Proteins

## Additional Preparatory and Analytical Services Supporting Mercury Characterization:

- Total Volatile Mercury
- Acid-Labile Mercury
- Elutriate Generation
- Bioavailability in Sediments
- Selective Sequential Extractions



## Stable Isotopic Ratio Testing

Brooks Applied Labs currently offers stable isotope ratio testing of various elements for application to environmental forensic studies. Each element has a unique isotopic pattern and small differences in the ratios of these isotopes can help in identification of the source, transport and biogeochemical fate of elements in atmospheric bulk deposition, soils, freshwater, and seawater matrices.

Typically, accurate stable metal isotope measurement is achieved by thermal ionization mass spectrometry which can only be found in academic research environments. Applied Speciation and Consulting utilizes an Inductively Coupled Plasma Mass Spectrometer equipped with a Dynamic Reaction Cell (DRC) to achieve similar results with appropriate QA/QC. This specific instrument not only removes interferences for low level analysis of various matrices, but also allows extremely accurate and precise determination of isotopic ratios limited with counting statistics ( $<0.1\%$  most ratios). Standard ICP-MS platforms cannot overcome the sinusoidal signal generated from the peristaltic pump associated with the sample introduction system. The DRC technology facilitates “dynamic bandpass smoothing” which normalizes the ion beam after ionization and greatly reduces the internal variability and increases precision. The confidence in isotopic ratio testing is also typically limited to sample concentration and matrix interferences. By identifying these interferences and implementation of pre-concentration techniques and appropriate sample preparation methods the applicability of lead isotopic ratio testing for most matrices is now a reality. In addition, institution of proper sampling plans is a necessity to ensure all localized variables are identified to account for as many variables as possible.



Use of stable isotope ratio testing can often decrease the scope of work for investigative projects ultimately reducing the cost of the investigation and increasing the confidence in results due to the absolute nature of the testing procedure. This is especially important when dealing with tort and environmental forensic litigation cases.

## Clinical Studies

Brooks Applied Labs is a BSL-2 laboratory which can support all phases of clinical studies which are not associated with communicable diseases. By applying trace metals speciation analyses to clinical studies the drug efficacy can be optimized, lowering research cost and funding demand, and the final drug patent can be expanded to recognize the specific interactions which result in treatment.

Brooks Applied Labs also offers human diagnostic testing to support analyses of biological fluids to identify trace element impacts on a localized and systemic basis. Scientists at Brooks Applied Labs have extensive experience with metals and metalloid compound analyses and have numerous publications regarding cross validation and application of our technologies. Furthermore, our analytical approaches also offer advantages



compared to other laboratories with regards to detection limits, scientific project support, and publication formulations.

Whether your study requires human diagnostic testing, population monitoring, or pharmacokinetic modeling, Brooks Applied Labs can support almost any aspect of clinical studies.

## Pharmaceuticals

The pharmaceutical industry demands absolute results and extensive supportive documentation as the decisions based on the analytical results can have significant repercussions on public health, product quality, regulatory compliance, and the client's financial status. Services provided by Brooks Applied Labs have supported drug release testing, clean up efficiencies of catalysts, impurity identification, lot monitoring, and investigations into bioreactor performance variability.



- Through our experience with nearly all facets of the industry our involvement has significantly reduced resources expended by our clients on method development/validation, synthesis inefficiencies, side product formation, active pharmaceutical ingredients (API) stability, amongst a plethora of other topics.
- Collaboration with Brooks Applied Labs has also reduced overhead as the necessity to acquire costly capital equipment and train scientists is negated.
- Our scientific collaborations with the local universities provide access to an extensive list of analytical instrumentation for more complicated investigations.
- Intermediates, API, and delivered drugs including excipients can be quite complex requiring extensive knowledge regarding the target analyte and the applicable methodologies for dissolution and analysis of the materials. Scientists at Brooks Applied Labs have the knowledge and experience to identify the most appropriate techniques for analysis of the most complex pharmaceutical molecules and target elements as we have tested thousands of different materials over the years.

The science behind Brooks Applied Labs is complemented by the oversight of our experienced and dedicated quality assurance department. Brooks Applied Labs is continually being audited by our pharmaceutical clients to ensure cGMP compliance and implementation, as well as execution of quality requirements set forth by the Code of Federal Regulations (CFR) and the International Conference on Harmonization (ICH). We understand our compliance equates to a higher quality service and greater defensibility to support your processes.

Contact Brooks Applied Labs to find out how your quality and process objectives can be met more efficiently than ever.

# Environmental

Brooks Applied Labs' premise for environmental investigations identifies that marginal data quality and "accepted" methodologies can only provide a rudimentary representation of projected contaminant impacts on flora and fauna. True risk assessment and site interpretation necessitates qualitative and quantitative identification of the specific contaminants of interest accompanied by characterization of the contaminants' environment.

Analytical and professional services offered by Brooks Applied Labs can support all phases of contaminant investigations associated with trace metals. From regulatory compliance monitoring to bench scale treatability studies, Brooks Applied Labs scientists can support all of your analytical needs. We continually invest in some of the most advanced technologies available to the scientific community to stay one step ahead of any issues that can impact your project.



Our advanced analytical services set us apart from other routine environmental labs, to help you meet your goals for even the most challenging environmental testing projects. Furthermore, our team is experienced and knowledgeable about sampling protocols, field quality control requirements, and offers sampling training for our clients.

Brooks Applied Labs offers **ultra-low detection limits** (view our MDL & MRL Table) on:

- Seawater/Brackish Water 🌐
- Soils & Sediments - We specialize in "true" total metals quantification in solids, mercury & methylmercury, pore water extractions, elutriate generation, and bioavailability 🌐
- Tissues and Biological Samples 🌐
- Freshwater 🌐
- Air (Wet and Dry deposition) 🌐



## Food Testing

Brooks Applied Labs (BAL) continues to be at the forefront of measuring metals and metalloid compounds in food and other consumptive products for product safety, risk assessment, and contaminant abatement. BAL has applied internally developed and validated methods to support collaborations with agricultural groups, government agencies, academic institutions, distributors, manufacturers, toxicologists, and legal firms throughout the world. The recently published method by the Association of Analytical Chemists (AOAC) for the measurement of heavy metals in food by inductively coupled plasma - mass spectroscopy (ICP-MS) was authored by BAL further solidifying our position as leaders in the field. Coupling a high degree of technical expertise with our 3 tier quality assurance approach equated to an unprecedented level of data quality and defensibility.



Brooks Applied Labs has collaborated with the Food and Drug Administration, United States Department of Agriculture, and various department of justices. Our level of experience applying methods for trace metals and metals speciation analyses for conformance to regulatory affairs is unprecedented in the industry. From food safety, optimizing cost of goods for the industry, and identifying food adulteration BAL can support nearly any facet of food testing our clients may have.

At Brooks Applied Labs, we specialize exclusively in testing for heavy metals and molecular forms of metals at **ultra-low-levels** for:

- Food
- Beverages
- Dietary Supplements

Our laboratories, instruments, methods, and staff are all strictly committed to providing the most precise and accurate data for heavy metals available.

# Diverse Clientele and Projects

While Brooks Applied Labs is based in Bothell, WA, we are proud to serve clients worldwide. We hold permits for tissue importation and receiving soil from our international clients and USDA-regulated Fire Ant Quarantine areas within the U.S.

## Our Clients Include:

- Department of Energy
- Environmental Consulting Firms
- Federal Government Agencies
- Food & Supplement Industries
- Full-service Environmental and Food Testing Laboratories
- Law Firms
- Municipal POTWs
- Paper Mills
- Refineries
- Research Institutions
- State Government
- Universities
- Utility Companies

From monitoring air for mercury concentrations during a high-profile deconstruction demolition in lower Manhattan to analyzing methylmercury, lead, and arsenic species in biological samples for the Alliance for a Clean and Healthy Maine initiative, our projects experience is as diverse as our clients.

# Our Facilities

In addition to a highly qualified staff of dedicated scientific professionals, Brooks Applied Labs maintains a state-of-the-art facility with the dedicated equipment, instrumentation, and infrastructure necessary to provide the highest quality trace metals analytical services.

Located in Bothell, Washington, our approximately 18,000 square foot controlled-access facility includes all of our administrative and managerial offices, specialized analytical laboratories, and secured sample storage areas, providing our company with the capacity to process even large quantities of samples in a consistently effective and timely manner.



Our Laboratory in Bothell, WA

Comprising over half of our entire facility, our custom designed laboratories are ideally suited for preparing and analyzing samples for projects that require the most accurate and precise results for low-level metals and metals speciation. All possible precautions are taken to reduce potential metals contamination and all laboratory consumables, supplies, and reagents are constantly monitored for ultra-purity.

To ensure the integrity of our clients' samples and to protect the health and safety of our staff, sophisticated HEPA-filtered air handling systems supply all of our laboratories with closely monitored Class 100-equivalent quality air, and any potentially harmful fumes are quickly swept from laboratory areas by all-plastic fume hoods. To ensure that no interruptions in our water or gas supply can occur, ultra-pure gasses (argon, nitrogen,



helium, and hydrogen) are stored in bulk quantities and are monitored by our supplier, and ultra-pure deionized reagent water is supplied from a custom-built reverse osmosis system with a 250-gallon reservoir.

Brooks Applied Labs is constantly investing in and implementing methods that take advantage of the latest advanced analytical instrumentation and equipment in order to provide our clients with the highest quality data available. Multiple redundant IT systems provide extensive security and backup capabilities to ensure that only those with proper authorization are capable of accessing our laboratory information management system (LIMS) or other

client-related files and that regularly scheduled and automated daily backups occur to preserve data in the event of a catastrophe. Detailed security and emergency response procedures are in place for the protection of staff and samples, in addition to a comprehensive chemical hygiene plan.

**“Our systems provide the absolute best performance for our clients.”**

## Our Instrumentation & Equipment

|    |                                                                                                          |
|----|----------------------------------------------------------------------------------------------------------|
| 2  | BRI MERX® Automated Total Mercury CVAFS Systems                                                          |
| 2  | BRI MERX® Automated Methylmercury CV-GC-AFS Systems                                                      |
| 1  | BRI Model III Atomic Fluorescence Spectrophotometer<br>& Amalgamation Control Module for Manual Analyses |
| 2  | PerkinElmer ELAN DRC II ICP-MS with ESI SC-4 FAST Automated Sampler                                      |
| 1  | PerkinElmer Nexlon 300D ICP-MS with ESI SC-4DX FAST Automated Sampler                                    |
| 1  | PerkinElmer ELAN DRC II ICP-MS with Dionex ICS-3000 HPLC (IC) System                                     |
| 1  | Perkin Elmer ELAN DRC Plus (ICP-1) with Dionex GPM-2 HPLC (IC) System                                    |
| 2  | Perkin Elmer ELAN DRC-e with Dionex GP50 HPLC (IC) System                                                |
| 1  | Agilent 8800 Triple quad ICP-MS with ESI SC-4DX FAST Automated Sampler                                   |
| 2  | Agilent 7700 CRC ICP-MS with Dionex GP40 HPLC (IC) Systems                                               |
| 1  | Perkin Elmer Clarus 600 Gas Chromatograph                                                                |
| 1  | Dionex ED40 electrochemical detector                                                                     |
| 1  | Elemental Scientific seaFAST S2 Automated Sample Introduction System                                     |
| 1  | Buck Scientific 205 Atomic Absorption Spectrophotometer                                                  |
| 1  | Thermo Scientific Evolution 60S Colorimetric Spectrophotometer                                           |
| 1  | Thermo Genesys 20 Colorimetric Spectrophotometer                                                         |
| 1  | Berghof Speedwave Microwave Digestion System                                                             |
| 1  | Eppendorf 5810 Centrifuge                                                                                |
| 2  | Beckman Model TJ-6 centrifuge                                                                            |
| 1  | Thermo Centra CL3 centrifuge                                                                             |
| 5  | BRI Distillation Systems                                                                                 |
| 3  | Environmental Express SC100/154 Series Hot Block Digestion Systems                                       |
| 3  | Environmental Express Model SC196 Hot Block Digestion Systems                                            |
| 2  | Environmental Express Model SC150 Hot Block Digestion Systems                                            |
| 6  | Fischer-Scientific Digestion Ovens                                                                       |
| 4  | VWR Model 1320 economy ovens                                                                             |
| 1  | Thermolyne 62700 Muffle furnace                                                                          |
| 1  | Arrow-Tech 4007A Geiger Counter                                                                          |
| 1  | Oakton Con 510 Series pH/Conductivity/TDS/Temperature Meter                                              |
| 1  | Accumet AB15 pH/Conductivity/TDS/Temperature Meter                                                       |
| 1  | Hach PCSTestr35 pH/Conductivity/TDS/Temperature Meter                                                    |
| 1  | Oakton Salt 6 Acorn Series Salinity Meter                                                                |
| 11 | Scientific Balances                                                                                      |
| 2  | Branson Sonifier Cell Disrupter Model 185                                                                |
| 1  | Branson Sonifier Cell Disrupter Model 185D                                                               |



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