



TRUSTED.  
RESPONSIVE.  
RELIABLE.

OTTAWA ● NIAGARA FALLS ● MISSISSAUGA ● SARNIA

# STATEMENT OF QUALIFICATIONS

## 2009

**1-800-749-1947**  
**[www.paracellabs.com](http://www.paracellabs.com)**

---

### ***Ottawa***

2319 St. Laurent Blvd., Suite 300  
Ottawa, Ontario, Canada K1G 4J8  
p: (613) 731-9577  
e: [paracel@paracellabs.com](mailto:paracel@paracellabs.com)

### ***Niagara Falls***

5415 Morning Glory Court  
Niagara Falls, Ontario, Canada L2J 0A3  
p: (905) 354-6250  
e: [dbarton@paracellabs.com](mailto:dbarton@paracellabs.com)

### ***Mississauga***

6645 Kitimat Road, Unit #27  
Mississauga, Ontario, Canada L5N 6J3  
p: (905) 612-7787  
e: [kkuzniar@paracellabs.com](mailto:kkuzniar@paracellabs.com)

### ***Sarnia***

123 Christina Street North  
Sarnia, Ontario, Canada N7T 5T7  
p: (519) 337-8555  
e: [rjones@paracellabs.com](mailto:rjones@paracellabs.com)

---

## TABLE OF CONTENTS

<b>1</b>	<b>COMPANY BACKGROUND</b> .....	<b>3</b>
<b>2</b>	<b>SERVICE AND QUALITY COMMITMENT</b> .....	<b>3</b>
<b>3</b>	<b>LABORATORY FACILITIES AND DEPOT LOCATIONS</b> .....	<b>4</b>
<b>4</b>	<b>LABORATORY CAPABILITIES AND RELEVANT EXPERIENCE</b> .....	<b>4</b>
4.1	AREAS OF EXPERTISE .....	5
4.2	ROUTINE LABORATORY SERVICES - TABLE 1 .....	7
<b>5</b>	<b>TOTAL QUALITY MANAGEMENT</b> .....	<b>8</b>
5.1	ACCREDITATION .....	8
5.2	PROFICIENCY .....	9
5.2.1	<i>External Proficiency Testing</i> .....	9
5.2.2	<i>Internal Proficiency Testing</i> .....	10
<b>6</b>	<b>CLIENT SERVICE</b> .....	<b>10</b>
6.1	SAMPLING SUPPLIES .....	10
6.2	TURNAROUND TIME .....	11
6.2.1	<i>Regular (Standard) Turnaround Time</i> .....	11
6.2.2	<i>High Priority Turnaround Time - Table 2</i> .....	12
6.2.3	<i>Emergency Response</i> .....	12
6.3	HANDLING WORK DISRUPTIONS .....	13
6.3.1	<i>Resolving Sample Submission Issues</i> .....	13
6.3.2	<i>Technical Difficulties</i> .....	13
6.4	TECHNICAL SUPPORT STAFF .....	13
<b>7</b>	<b>SAMPLE MANAGEMENT</b> .....	<b>15</b>
7.1	SAMPLE RECEIPT .....	15
7.1.1	<i>Laboratory Information Management System (LIMS)</i> .....	15
7.2	SAMPLE PREPARATION .....	16
7.3	SAMPLE ANALYSIS .....	16
7.3.1	<i>Instrumentation</i> .....	16
7.3.2	<i>Methods</i> .....	17
7.4	SAMPLE QA/QC .....	18
<b>8</b>	<b>DATA MANAGEMENT</b> .....	<b>18</b>
8.1	ANALYSIS REPORTS.....	18
8.2	DATA TRANSMISSION.....	19
8.3	RECORD KEEPING .....	19
<b>9</b>	<b>WASTE MANAGEMENT</b> .....	<b>20</b>

## 1 COMPANY BACKGROUND

Paracel Laboratories Ltd. (Paracel) was founded in 1985 to study and develop new methodologies for the determination of fungal toxins in cereal grains. These toxins included deoxynivalenol (vomitoxin), zearalenone, and aflatoxin. This research led to the development of economical and efficient analytical methods for the accurate detection of these toxins at trace levels in grains. This development was of critical importance due to the particularly adverse impact of these toxins on animal husbandry and humans, depending on the grain and/or toxin involved.

Some of the methods that Paracel developed for the Ontario Ministry of the Environment (MOE) in the late 1980's became the standard for Ontario. **In 1990, the MOE awarded Paracel their Award for Excellence in Research of Analytical Methods for their development.**

During the late 1980's, Paracel also developed a full service environmental laboratory equipped with modern analytical instruments and a completely integrated Laboratory Information Management System (LIMS). Paracel routinely analyzes environmental sample matrices such as air, soil, surface water, groundwater, oil and sludges according to the most exacting government standards and regulations.

Over the years we have developed into a state-of-the-art microbiological indoor air quality (IAQ) laboratory capable of isolating and identifying fungal contaminants to the species level. Since 1996, we have been analyzing various matrices such as air, building materials, surface swabs and dust samples for fungal and bacterial components as well as allergen analysis.

## 2 SERVICE AND QUALITY COMMITMENT

**Paracel's Client Service Commitment:** Paracel recognizes that exceptional client service is an integral part of sustainable business success. The management and laboratory staff are committed to providing the most cost-competitive quality analytical services, turnaround times, and client support in the business. In keeping with Paracel's service-oriented business philosophy, clients are welcome and often encouraged to inspect and audit the laboratory operations and to submit blind quality control check samples to ensure that data produced by the laboratory meet their project specifications.

**Paracel Commitment (Mission Statement):** *Paracel Laboratories provides analytical services and technical support with a commitment to meet or exceed client expectations. Through sound science, quality management and innovative thinking, our goal is to consistently produce legally defensible data within turnaround times that set new industry standards.*

We support our professional clients in all sectors of the environmental field nationally and around the world. Our main client base is located in the areas of Toronto, Niagara, Ottawa, Eastern and Southwestern Ontario, as well as Calgary and Vancouver.

Our experts in chemistry, microbiology, quality systems, client service, data management and IT are available to assist clients with the most challenging problems.

---

### 3 LABORATORY FACILITIES AND DEPOT LOCATIONS

**Laboratory Facilities:** 300-2319 St. Laurent Blvd.  
Ottawa, ON K1G 4J8  
p: 1-800-749-1947  
e: parcel@paracellabs.com

Size: 4000 square feet  
Current Staff: 35 employees

Laboratory Director: Dale Roberston  
Microbiology Laboratory Director: Heather McGregor

Our laboratory facilities are always open to tours, external inspections and quality audits. Clients are encouraged to audit our facilities to ensure Paracel's technical capabilities meet their project requirements.

#### Additional Locations:

**Mississauga**  
6645 Kitimat Rd., Unit #27  
Mississauga, Ontario  
Canada L5N 6J3  
p: (905) 612-7787  
Manager: Katrina Kuzniar  
kkuzniar@paracellabs.com  
(Asbestos laboratory)

**Niagara Falls**  
5415 Morning Glory Court  
Niagara Falls, Ontario  
Canada L2J 0A3  
p: (905) 354-6250  
Manager: Dan Barton  
dbarton@paracellabs.com  
(Depot)

**Sarnia**  
123 Christina Street North  
Sarnia, Ontario  
Canada N7T 5T7  
p: (519) 337-8555  
Manager: Rachel Jones  
rjones@paracellabs.com  
(Depot)

### 4 LABORATORY CAPABILITIES AND RELEVANT EXPERIENCE

Paracel has been providing analytical services to the industry since 1985. Over the years we have developed into a multidisciplinary analytical facility and have performed projects from all over North America. Major Canadian client sectors include:

- Government Agencies - Health Canada, Public Works and Government Services Canada (PWGSC) and Canada Mortgage and Housing Corporation (CMHC)
- Environmental Consultants
- Health & Safety Coordinators
- Indoor Air Quality Consultants and Industrial Hygienists
- Industry

Our broad range of analysis experience includes:

- Analytical methods research
- Site assessment and remediation (Regulation 153/04)
- Water quality programs (drinking water, surface water and groundwater studies)
- Municipal/Industrial Strategy for Abatement (MISA)
- Sewer use by-law
- Solid waste management (Regulation 558)

- 
- PCB emergency response
  - Indoor air quality
  - Microbial investigations (molds and fungi)
  - Forensic investigations (fire accelerants)

## **4.1 AREAS OF EXPERTISE**

### **Site Assessment and Remediation Analysis**

The majority of Paracel's workload is provided by environmental consultants through site assessments and site remediation activities. Typical sites include petroleum facilities (retail and distribution), dry cleaners, industrial properties, truck depots, and government properties. Our company has performed thousands of analytical projects pertaining to the MOE *Guidelines for Contaminated Sites in Ontario* (as amended by MOE Regulation 153/04- Record of Site Condition under the Environmental Protection Act) as well as the CCME *Canadian Environmental Quality Criteria for Contaminated Sites*.

### **Hazardous Building Materials**

Hazardous building materials can impact all building industries from residential to commercial and industrial. The management of these hazardous materials may be a major concern and potential financial loss whether for renovation, demolition, sale or new construction.

Hazards include asbestos, lead, silica, mold, PCBs and volatile organic compounds (VOCs). Environmental consultants routinely submit samples from site decommissioning/building demolition projects and remedial activities to assess the potential risk of these hazardous materials. We also receive samples from occupational hygienists performing indoor air quality and building hazard studies.

### **Solid Waste Management Analysis**

Paracel offers complete analytical services for the classification and registration of solid waste materials. Complete packages are available for:

- Regulation 558 Leachate Quality and Waste Classification
- Landfill Acceptance Criteria
- Sediment Quality
- Lakefill Analysis
- Sewage Sludge Utilization

### **Sewer Use By-Law**

Industries discharging treated or untreated effluents to municipal sanitary or storm sewer works must comply with applicable Regional Sewer Use By-Laws. Paracel can provide analytical packages that cover the provincial model sewer use By-Law as well as individual municipal By-Laws.

### **Water Quality Packages**

Water quality analyses comprise a significant portion of our workload. Samples are submitted from a variety of environmental programs such as landfill monitoring, site assessment and site remediation, drinking water plumbing surveillance programs, and basic surface and groundwater quality monitoring programs.

Paracel has a great deal of experience with both federal and provincial water quality guidelines used for assessing water quality.

### **Municipal/Industrial Strategy for Abatement (MISA)**

Paracel has been involved in several on-going projects pertaining to the MOE's MISA effluent monitoring program. We have provided analytical services for the:

- Organic Chemical Manufacturing Sector
- Iron and Steel Sector
- Metal Casting Sector

Under the MISA program each participating contract laboratory must meet exacting standards prior to joining the program and undergo MOE inspection during the life of the project. Paracel has met all MISA requirements and passed all MOE inspections without difficulty.

### **Indoor Air Quality (IAQ)**

Our IAQ analytical capabilities include:

- Microbials (fungi, endotoxins, allergens, bacteria, etc.)
- Allergens (cat, rat, cockroach, mouse, dog, dust mite)
- Volatile Organics (accredited for VOCs in soil and water only)
- Metals

Since 1997, Paracel has been supplying several government agencies including Health Canada, with microbial indoor air quality analyses and is therefore experienced with the technical and service related aspects to the Request for Standing Offer Scope of Work.

Paracel has worked closely with Health Canada and PWGSC for over ten years, providing microbial analysis services relating specifically to government building IAQ monitoring programs. Typical testing requirements have included microscopic examination and genus identification for fungal propagules recovered from bulk materials, tape lifts and sticky surface air samples (AOC, Burkard and Allergenco). Our laboratory has also provided full speciation of fungal isolates recovered from RCS air samples, bulk materials, Biotest contact plates and surface swab samples. Dust samples have also been analysed for cell wall constituents (endotoxin and B-glucan) and allergens (dust mites, cat and cockroach).

We have been recognized as American Industrial Hygiene Association (AIHA) Environmental Microbiology Proficiency Analytical Testing (EMPAT) participants since 1999, the longest participation by a Canadian laboratory. The methods we follow are those outlined by AIHA and the Standard Operating Procedures are maintained in-house as outlined by our Canadian Association for Laboratory Accreditation Inc. (CALA) accreditation.

## 4.2 ROUTINE LABORATORY SERVICES

### Routine Laboratory Services by Matrix

Test Group	Analytes	Matrix	
		Soil/Sed	GW/SW
Organic – Purgeables	VOCs BTEX PHCs – F1	x x x	x x x
Organic – Semi-VOCs	PHCs – F2 to F4 PHCs – F4(g) PAHs PCBs Oil & Grease	x x x x	x  x x x
Inorganic – Anions	Anions by Ion Chromatography	x	x
Inorganic – Metals	Boron (Hot Water Extractable) Hexavalent Chromium Mercury by CVAA Metals by ICP/MS	x x x x	 x x x
Inorganic – Conventionals	Alkalinity Ammonia/TKN BOD COD Chlorine Colour Conductivity Cyanide (free) DOC/TOC pH Phenols (4AAP) Solids (TSS/TDS) Sulphide TOC/DOC Total Phosphorus Turbidity	     x x  x	x x x x x x x x x x x x x x x
Asbestos	PCM – NIOSH 7400 A PLM – EPA 600/R-93/116 (1000 point count) PLM – NIOSH 9002 (400 point count) PLM – Vermiculite Chatfield Method	Air Bulk Bulk Bulk	
Microbiological	Bacteria – E. Coli and Total Coliform Bacteria – Fecal Coliform Bacteria – Heterotrophic Plate Count Fungi in Air – Microscopic Genus Fungi in Air – Culturable Species Fungi in Bulk Samples – Culturable Species	   Air Air Bulk	x x x

---

## 5 TOTAL QUALITY MANAGEMENT

The value of chemical measurements depends upon the level of confidence that can be placed in the results. Increasingly, the laboratory community is adopting Quality Management Systems which, while not guaranteeing the quality of the data produced, increase the likelihood that results will be soundly based and fit for purpose. Appropriate Quality Management can enable a laboratory to show that it has adequate facilities and equipment for carrying out chemical analysis and that the work is carried out by competent staff in a controlled and documented manner.

Parcel's Quality Management System has been modeled after and standardized through the adoption of **ISO/IEC 17025:2005 Standard**. Laboratories meeting the requirements of this Standard comply, for testing activities, with the relevant requirements of the ISO 9000 Series of Standards, including those of the model described in ISO 9002 when they are acting as suppliers producing test results. Parcel is accredited to the ISO/IEC 17025:2005 Standard by the Canadian Association for Laboratory Accreditation Inc. (CALA) and the National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program (NIST/NVLAP).

The management and staff of Parcel are committed to good professional practice, quality of its service and compliance with the quality objectives of ISO/IEC 17025:2005.

The objective of ISO accreditation is to ensure client satisfaction through quality of products and services while reducing costs. Total quality management involves all the people in the organization. At Parcel, each individual participates in the development, implementation, monitoring and refining of all programs that drive our operations. Monitoring and refining quality programs and objectives form the basis of Continuous Improvement which is the emphasis of Total Quality Management. The efficacy of each program is reviewed annually by the following:

- Employee Policies and Programs
- Marketing and Business Development Program- Customer Satisfaction
- QA/QC Program- Methods, QC, Instrumentation
- Health & Safety Program
- Maintenance Program
- Waste Management Program
- Training Programs

These programs are supported by a series of policies, standard operating procedures, compliance and audit logs, and reference documents, all comprising Parcel's Quality System.

### 5.1 ACCREDITATION

Parcel is accredited by CALA for specific environmental tests listed in the scope of accreditation registered with this association. Parcel is also accredited by CALA for asbestos in air by PCM and NIST/NVLAP for asbestos in bulk samples by PLM.

Parcel's drinking water accreditation includes metals and major anions and is held through CALA. A copy of our CALA Scope of Accredited Tests and Registered Proficiency Tests can be downloaded from CALA's website at [www.cala.ca/scopes/1262.pdf](http://www.cala.ca/scopes/1262.pdf) and our NIST/NVLAP scopes can be located at <http://ts.nist.gov/standards/scopes/2008120.htm> for the Ottawa location and <http://ts.nist.gov/standards/scopes/2008630.htm> for our Mississauga location.

### **Drinking Water License:**

Paracel is licensed by the MOE to perform specific drinking water analyses in accordance with the *Safe Drinking Water Act, 2002* (SDWA) and Regulation 170/03. Licensed parameters include metals and major ions.

### **Laboratory Audits:**

Paracel undergoes external biennial quality system audits performed by CALA and NVLAP and semi-annual MOE audits for all drinking water testing. Paracel has also undergone other less formal on-site audit/lab inspections performed by private sector environmental consulting companies as well as government agencies such as the MOE (MISA Program, Regulation 153/04 PHCs), Environment Canada (on-going research) and PWGSC (indoor air quality - microbial analyses).

## **5.2 PROFICIENCY**

### **5.2.1 External Proficiency Testing**

#### **Routine Environmental Analyses:**

Paracel has participated in CALA's proficiency testing (PT) program since 1992. Our current scope includes volatiles, Canadian Council of Ministers of the Environment (CCME) hydrocarbons, PAHs, PCBs, metals, inorganic conventionals and bacteria in various matrices. Asbestos analysis by PLM and PCM was added to our scope in 2008 and we participate in the NIST/NVLAP and CALA PT programs for this analysis.

#### **Microbial Analyses:**

Paracel has been recognized as AIHA Environmental Microbiology Proficiency Analytical Testing (EMPAT) participants since 1999 and remains one of its longest standing participants. Paracel meets all of the laboratory selection criteria pursuant to the Canada Labour Code, Part II, for the identification of microbials in indoor air for the Workplace Health and Public Safety Programme (WHPSP). We are also one of the most experienced Canadian laboratories in the identification of fungi to species level.

The AIHA EMPAT program involves the analysis and identification of fungi isolates. There are 3 sets of EMPAT Proficiency Testing (PT) samples per year.

#### **Bacteria Analyses:**

Paracel participates in semi-annual proficiency studies for bacteria including *Escherichia coli*, fecal coliforms, heterotrophic plate count and total coliforms in water through CALA.

#### **Loss of Proficiency:**

In the event of loss of proficiency, Paracel will immediately notify all affected clients. A fast-track system for re-establishing proficiency is offered by CALA, AIHA and NVLAP and involves obtaining and analyzing PT samples from another ISO 17025 PT provider containing the analyte(s) in question. Data is then immediately reviewed by the accrediting body and proficiency re-established upon approval.

---

### 5.2.2 Internal Proficiency Testing

Before an analyst is permitted to perform reportable work, competence in the analysis must be demonstrated. This can be accomplished using one or more of the following techniques:

- i) determination of the Method Detection Limit (MDL), precision and bias as outlined in the SOP B3 - *Determination of Method Detection Limit*
- ii) analyzing unknown CALA, Standard Reference Materials (SRM), EPA, National Institute of Standards and Technology (NIST) or EMPAT proficiency samples
- iii) analysis of independently prepared standards at 5 times and 50 times the MDL.

This data can be directly compared to internal historical data as well as the statistical performance data as provided by the reference method and/or the method QC file.

Proficiency monitoring is performed on an annual basis for each analyst and consists of (as a minimum) the determination of the MDL, precision and bias, as well as analyzing certified reference materials. On an annual basis, SRMs are purchased for many routine tests and submitted to analysts as blind proficiency samples. Proficiency data is retained in the analyst's proficiency file.

## 6 CLIENT SERVICE

Client service is the key to Paracel's success. Our Service Team is accessible and responsive and performs a number of functions to ensure client satisfaction including:

- Review sample submissions to ensure all documentation and instructions are clear and correct
- Ensure that analyses and QA/QC procedures are conducted according to ISO 17025:2005 requirements and in accordance with all codes of Federal, Provincial and Municipal applications
- Monitor the progress of your samples through the laboratory
- Ensure that holding times are met and that tests subject to rapid degradation are given priority
- Review final reports to ensure that all analyses have been completed as specified in the relevant Chain of Custody document(s)
- Check final reports for QC, data logistics and formatting
- Ensure that sample handling and disposal is performed in accordance with Ontario regulations and documented health and safety procedures
- Answer any questions pertaining to sampling, supplies, results, job status, or provide direction on the technical aspects of project management

### 6.1 SAMPLING SUPPLIES

Paracel will provide sampling supplies including sample containers, media, coolers and packaging materials as requested.

**Direct Supplier Shipping:** To maintain adequate inventories of certified containers, stock can be ordered and shipped directly from Paracel's container supplier free of charge.

## 6.2 TURNAROUND TIME

Paracel is committed to the quickest turnaround time (TAT) possible without impairing the integrity and quality of the data.

Paracel has a proven track record for providing the most responsive analytical services in the business.

### 6.2.1 Regular (Standard) Turnaround Time

Paracel defines TAT as the time elapsed from shipment of the samples, submission to a depot or sample pick up by Paracel to issuance of final approved results. Paracel provides a standard TAT for all routine analyses of **4 business days** with the exception of those tests requiring longer incubation periods such as BOD (TAT of 6 business days) and culturable microbial analyses (TAT of 15 business days). Large scale projects may also require extended TATs due to high volume of samples.

Microbial: Written certified reports are issued within three weeks from sample submission for the speciation of culturable samples, and within 3-4 days for regular TAT of genus identification of sticky surface samples and Air-O-Cells.

### 6.2.2 High Priority Turnaround Time

In 2008, approximately 15% of the samples submitted to our lab were analyzed on an expedited basis (i.e. 1 day or 2 day TAT). We have worked closely with project managers and their on-site staff to fine-tune all communication efforts such as the delivery of sampling supplies and samples and the transmission of timely analytical data.

Most routine analyses can be performed within 1 day from sample receipt. Table 2 on the following page illustrates Paracel's priority service capabilities. An "x" indicates an analysis that can be performed within the timeframe described.

**Table 2 - Turnaround Time for Priority Service \***

Test Category	Analyte Group	Matrix			
		Soil/Sed/Bulk/Air		GW/SW	
		1 Day	2 Days	1 Day	2 Days
Organic – Purgeables	VOCs	x		x	
	BTEX	x		x	
	PHCs – F1	x		x	
Organic – Semi-VOCs	PHCs – F2 to F4	x		x	
	PHCs – F4(g)	x		x	
	PAHs	x		x	
	PCBs	x		x	
	Oil & Grease	x		x	
Inorganic – Anions	Anions by Ion Chromatography			x	
Inorganic – Metals	Boron (Hot Water Extractable)	x		x	
	Hexavalent Chromium	x		x	
	Mercury by CVAA	x		x	
	Metals by ICP/MS	x		x	
Inorganic – Conventionals	Alkalinity			x	
	Ammonia/TKN			x	
	BOD			-	-
	COD			x	
	Chlorine			x	
	Colour			x	
	Conductivity			x	
	Cyanide (free)			x	
	DOC/TOC			x	
	pH			x	
	Phenols (4AAP)			x	
	Solids (TSS/TDS)			x	
	Sulphide			x	
	Total Phosphorus			x	
Turbidity			x		
Asbestos	PCM – NIOSH 7400 A	x			
	PLM – EPA 600/R-93/116 (1000 point count)	x			
	PLM – NIOSH 9002 (400 point count)	x			
	PLM – Vermiculite Chatfield Method	x			
Microbiological	Bacteria- E. Coli and Total Coliform			x	
	Bacteria- Fecal Coliform			x	
	Bacteria- Heterotrophic Plate Count				x
	Fungi in Air- Microscopic- Genus			x	
	Fungi in Air- Culturable- Species			-	-
	Fungi in Bulk Samples- Culturable			-	-

\* 1 day service will require prior laboratory notification. Samples must be received by the lab by 5:00 pm. Data will be available by end of day, next day.

### 6.2.3 Emergency Response

Parcel currently provides emergency response testing services for specific analytes. Emergency testing refers to same day or off-hours testing.

The lab provides emergency response analytical services to several environmental consulting companies performing spill response and site cleanup activities throughout Ontario and Quebec.

Paracel routinely provides same-day results on air and bulk samples for microscopic genus-level fungi identification. Our standard TAT for these analyses is 3-4 days. Additionally, Paracel can also provide same day TAT for asbestos analysis with results reported within 2 – 8 hours. For any project requiring same-day TAT, please contact the laboratory prior to submission to schedule the analytical specifications.

## 6.3 HANDLING WORK DISRUPTIONS

### 6.3.1 Resolving Sample Submission Issues

Samples received by Paracel's Sample Custodian are inspected upon receipt to ensure that bottles and jars are in good condition and that sample integrity and holding times have not been compromised. Disruptions due to compromised samples will be communicated immediately to clients by phone. Details of the problem with any changes that are made to work instructions will be noted on the chain of custody and on the analysis report as applicable.

Samples will be inspected for:

- Container integrity
- Labelling correlation to the chain of custody
- Sample condition (cooler temperature, volume, container type, etc.)
- Sample preservation (as required)
- Sample hold time by parameter

**Sample Submission Tracking Reports:** Paracel can provide sample submission reports detailing the condition of samples delivered by clients or couriers. The integrity of each submission will be compared against a comprehensive list of receiving criteria and a report filed. Quarterly summary reports are available to all clients upon request. These reports enable project managers to track trends and implement corrective actions.

### 6.3.2 Technical Difficulties

Turnaround times are closely monitored by the Laboratory Director. Potential delays and/or problems with completing testing with prescribed turnaround times, either from staffing issues or technical difficulties (equipment or facilities), will be communicated by the Laboratory Director (or delegate) immediately to the client by phone. Samples affected by extended delays due to major malfunctions may require subcontracting to an accredited laboratory pending client approval.

## 6.4 TECHNICAL SUPPORT STAFF

Our experts in chemistry, microbiology, quality systems, client service, data management and IT are available to assist clients with the most challenging problems.

### **Chemistry Laboratory:**

**Mr. Dale Robertson** has over seventeen years experience in environmental chemistry and is Paracel's Environmental Laboratory Director. He has overall responsibility of the daily operations of the laboratory involving both administrative and production management. Mr. Robertson has

an extensive background in analytical measuring systems, test method validation, QC protocols, and information technologies.

**Mr. Dan Barton** is a Registered Environmental Chemist (Chartered Chemist) with the Ontario Association of the Chemical Profession of Ontario (ACPO), and has over twenty eight years experience in analytical chemistry and environmental consulting. He is very familiar with federal, provincial and municipal regulations and guidelines and how they are applied to sampling and analytical programs. Mr. Barton also provides Sales and Technical support to the Service Team, staff of Paracel and our clients as well as acting in an advisory role to our corporate Quality Management System and Joint Health & Safety Committee.

**Ms. Katrina Kuzniar** is the Laboratory Manager for Paracel's Mississauga office. Ms. Kuzniar is an Environmental Scientist with over sixteen years experience working in laboratories in both Canada and the USA. She has been involved in a number of projects including Air Quality Monitoring and Environmental Site Assessments which have helped her achieve a comprehensive understanding of federal and provincial legislation. Ms. Kuzniar's responsibilities include the daily management of our Mississauga office and the analysis of asbestos in this facility.

**Mr. Mark Foto** obtained his M.Sc. in Chemistry with a specialization in Environmental and Chemical Toxicology at Carleton University. Upon completion of his graduate studies, Mr. Foto joined the team at Paracel where he has over eight years experience in environmental chemistry. Currently, he holds the position of Lab Manager, Environmental, and is responsible for production management, reporting, client requests as well as technical supervision of all Environmental staff. He also has extensive bio-analytical knowledge involving endotoxins and 1,3- $\beta$ -glucans.

**Ms. Janet Tessier** has her B. Sc. in Biology and a diploma in Animal Health Technology. Ms. Tessier is Paracel's QA/QC Officer and Health & Safety Officer and has eight years experience as a Quality manager in an analytical laboratory. In this capacity, Ms. Tessier is responsible for the overall design and implementation of Paracel's Quality System and laboratory QA/QC including the authorization of all edits, deletions, and additions to quality system documentation. Ms. Tessier routinely performs internal quality system and health & safety audits for the laboratory to ensure that all analytical testing is performed in accordance with ISO/IEC 17025 requirements.

#### **Microbiology Laboratory:**

**Mrs. Heather McGregor** has over seventeen years experience in environmental microbiology and is Paracel's Laboratory Director of Microbiology. Mrs. McGregor worked at Agriculture Canada in fungal identifications for four years under the direct guidance of Dr. David Miller and Dr. Keith Seifert as well as having extensive experience and training in fungal identification and microbiology. Her responsibilities include the daily operations within Paracel's microbiology laboratory including both administrative and production management.

#### **Client Service and Business Development:**

**Ms. Rachel Jones** is an Environmental Technologist and has ten years of experience in the environmental laboratory sector. Ms. Jones is the Client Services Manager for Paracel and also manages the Sarnia depot of Paracel Laboratories. Her main focus is servicing the clients of Southwestern Ontario as well as management and continuous improvement of the Client Services program for Paracel.

**Mr Shawn Howard** has over ten years of experience in the environmental laboratory industry. He has working knowledge of federal, provincial and municipal regulations. Mr. Howard holds the position of Business Development for Eastern Ontario. His main focus is to maintain and develop Paracel's market share in eastern Ontario.

**Mr. Tim Das** has over six years experience in the environmental laboratory industry. He has extensive knowledge of environmental site assessment, legislation, and how they relate to analytical requirements. Mr. Das holds the position of Business Development for the Greater Toronto Area. His responsibilities include servicing the Mississauga depot and developing Paracel's market share within the GTA.

## 7 SAMPLE MANAGEMENT

### 7.1 SAMPLE RECEIPT

The Sample Custodian is responsible for preparing and shipping sample containers as well as sample receiving. Sample tracking from the time of receipt to the time of disposal, is also the responsibility of the Sample Custodian.

Our Ottawa laboratory is open from 07:30 to 20:00 weekdays and Saturday mornings between 10:00 and 12:00 during Summer/Fall. The laboratory is closed on Saturdays of holiday weekends. Our Ottawa hours of operation for Winter/Spring are 07:30 to 18:00, weekdays. Throughout the year, our Mississauga, Niagara Falls and Sarnia locations are open between 09:00 and 17:00, Monday through Friday. We also regularly schedule weekend pickups, deliveries, and analytical work which is co-ordinated by the Laboratory Director, Sample Custodian and your local Service Team staff upon request.

Samples received by Paracel's Sample Custodian are inspected upon receipt to ensure that samples are in good condition and that sample integrity and holding times have not been compromised. When compromised samples are found clients will be notified immediately to discuss the issue. Details of the issue with any changes that are made to work instructions will be noted on the chain of custody and on the analysis report as applicable. Information contained on the client's sample chain of custody is correlated to the samples received. If the shipment is intact and complete, the chain of custody is signed and scanned into Adobe PDF format and transferred to the LIMS for inclusion on the final report.

Samples not destined for immediate preparation or analysis are stored at 4°C in holding refrigerators (where applicable) until time of analysis.

#### 7.1.1 Laboratory Information Management System (LIMS)

Paracel utilizes a LIMS called the Element Data System which is produced by Promium, a leading laboratory Information Technology (IT) company. Their systems are used in over 100 small to large environmental laboratories throughout North America including several US EPA Contract Laboratories.

**Element Data System:** Our LIMS provides a number of key features including sample tracking, automatic data entry and review, live control charting, historical data tracking and an audit trail. Reports from the Element Data System are available in a wide range of hard copy and electronic formats, all of which are completely customizable using Crystal Reports. The reporting software has the ability to compare sample data to regulatory criteria and provide automated flagging of individual exceedances, as well as any non-conformances that may have affected data quality. As well, we have provided our clients with the Element Web program, which provides online Internet access through our Element Web program so clients are able to view and obtain their data from our LIMS system in real time.

**Feature Highlights:** The Element Data System has the capability of generating customized electronic reports, highly tailored to the individual specifications of the client, providing as seamless and transparent integration as possible with the client's own information system.

Some key features include:

- Reports containing comparison guidelines with data flagging
- Sample bar coding - tracking from sample reception throughout reporting and invoicing
- Quotations tied into the sample tracking, reporting and invoicing process
- Contact Management - also tied into the complete sample tracking process
- Built-in quality control charts and statistic including uncertainty calculations
- Multiple validation levels ensures that only completed, verified and defensible data is released
- Multiple security levels will ensure that client data remain confidential but easily retrievable by authorized personnel
- Customizable hardcopy and electronic reports
- Online web access

**Sample Log-in and Traceability:** The LIMS automatically generates sequentially numbered work order labels for each sample container submitted for analysis. These unique sample identification numbers are used to track the samples through the various laboratory stages such as storage before analysis, sample preparation/culturing/analysis, long-term storage after analysis and final disposal. All analysis reports and invoices display the Parcel sample work order number.

A database of all samples and required testing is maintained. Daily analysis worksheets are generated and prioritized by holding times and by due date.

## 7.2 SAMPLE PREPARATION

Culturable agar strips are immediately processed by being placed in a 24 degree Celsius incubator.

Sample extractions and digestions on virtually all matrices are usually performed within 24 hours of sample receipt.

**Long term Storage:** After extraction and analysis, remaining samples (extracts, digestates and slides) are moved to archive refrigerated storage at 4°C according to detailed Standard Operating Procedures. Samples and extracts are stored for three months (90 days) from time of receipt and slides are kept for 5 years, unless otherwise specified by the client. A disposal log is maintained for long term sample storage. This log is maintained for 5 years. Samples are stored at no charge.

## 7.3 SAMPLE ANALYSIS

### 7.3.1 Instrumentation

Parcel possesses a full array of analytical instrumentation dedicated to the analysis of environmental samples. Most instruments are equipped with autosamplers and linked to Parcel's LIMS electronic data acquisition software for greater analytical efficiency. This software was specifically designed for Parcel and integrates most of our analytical systems thereby

greatly reducing the amount of technician time required for data interpretation, calculations, QA/QC documentation, and report formatting. Paracel's unique instrument configurations and LIMS network have proven to be significant in reducing turnaround times.

### **7.3.2 Methods**

Paracel maintains an in-house methods manual that includes reference methods from the MOE, United States Environmental Protection Agency (US EPA) CFR and SW-846, American Public Health Association (APHA) (Standard Methods), AIHA, and the National Institute for Occupational Safety and Health (NIOSH). All methods are validated before laboratory implementation and then reviewed annually to ensure that the performance criteria (i.e. MDL, precision, accuracy, uncertainty, fit for purpose, etc.) meet or exceed those documented in the reference method. There are also Paracel bench methods incorporating step-by-step method procedures as well as all QC performance criteria for data validation purposes.

All methods have been validated as fit for purpose for the types of matrices described in Paracel's CALA Scope of Accreditation. In the case of methods used for petroleum hydrocarbons (PHCs) F1-F4, Paracel meets all of the performance and prescriptive elements of the CCME PHC Tier I method. Our PHC methods are accredited and have been audited by the MOE for prescriptive element compliance. For Ontario Regulation 153/04 site investigations, Paracel performs all work in accordance with the methods and QC defined by the MOE's *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*.

#### **Determination of Method Detection Limit:**

The determination of method detection limits is a complex undertaking and often varies from one laboratory to the next. Paracel uses the protocols established by the US EPA and the MOE for calculating method detection limits. The MDL is calculated from the standard deviation of replicate measurements, and is defined as the minimum concentration of a substance that can be identified, measured and reported with 99% confidence that the analyte concentration is greater than zero.

A reference standard is prepared at approximately ten times the estimated MDL and analyzed eight times. The MDL is then calculated by multiplying the standard deviation of the data set by 3 (approx. Student t value for an eight point data set) representing the 99% confidence level.

#### **Microbials:**

All protocols followed in the analysis of microbial samples are those set out by the AIHA in their handbook, *Field Guide for the Determination of Biological Contaminants In Environmental Samples*. Upon receipt, dust samples will be sieved to the two specified fractions weighed. An interim report containing fraction weights will be generated for approval of subsequent analyses based on the mass of dust recovered, which can sometimes be limiting. Technical assistance in understanding our report is always available to all of our clients.

#### **Bacteria Methods:**

All E. coli and coliform bacteria methods are performed in accordance with the *Ontario Safe Drinking Water, 2002 Act* and O. Regulation 170/03. Methods follow the MOE's recommended procedures for the measurement of bacteria in drinking water samples. Heterotrophic plate count and standard plate count methods follow APHA *Standard Methods for the Examination of Water and Wastewater*, SM21, method 9215C - Spread Plate Method.

---

## 7.4 SAMPLE QA/QC

Data quality objectives are accomplished in part through the use of quality control samples such as blanks, duplicates, spikes, surrogates, and reference standards. All QC data are compared to established acceptance criteria. Any QC data failing established control limits immediately invokes analyst intervention and cause analysis procedures. All non-conformances affecting data quality are recorded along with all corrective measures taken to mitigate the problem.

**Operation Daily QA/QC:** Monitoring is accomplished through a series of systematic checks including:

- QC samples- routine comparison to established QC limits
- water purity
- volumetric traceability
- gravimetric traceability
- critical temperature checks

**Method QA/QC Analyses:** Paracel's QA/QC analyses include external QC samples such as blind sample checks, certified reference standards, proficiency samples, as well as internal QA/QC data monitoring and data validation. Typical internal QC analyses for environmental samples typically include continuous calibration standards, method/extraction blanks, spiked blanks, surrogate spikes, matrix spikes, and duplicates. These control analyses are performed with each analytical run consisting of 15 to 20 samples. Details are outlined in the following sections. Quality control analyses for fungi methods may include background air monitoring, method blanks and replicate enumeration analysis.

**QC Inspections:** The major components of the QA/QC Program are monitored by the Laboratory Director through the use of quarterly QC inspections performed by the QA/QC Officer. Completed QC inspection forms (with action items and follow up corrective measures) are filed for auditing purposes.

## 8 DATA MANAGEMENT

**Data System Verification:** All calculations and data manipulations performed by the Element Data System are verified annually in conjunction with the annual method review process. As a minimum, reference materials (SRMs where available) are submitted to analysts as blind check samples for analysis. Analysis reports are generated and data compared to actual values by the Laboratory Director and QA/QC Officer.

### 8.1 ANALYSIS REPORTS

**Analysis Reports:** Final reports are generated when all tests have been completed and QA/QC parameters have been accepted. All final reports are reviewed by the Laboratory Director (or designate) and approved prior to issuing data to the client. Electronically signed copies of certified reports are transmitted via email to clients within specified project turnaround times. Reports can also be mailed, couriered, or faxed at the client's discretion.

Reports from Element Data System are available in a wide range of hard copy and electronic formats, all of which are completely customizable using Crystal Reports. The reporting software

has the ability to compare sample data to regulatory criteria and provide automated flagging of individual exceedances, as well as any non-conformances that may have affected data quality.

## 8.2 DATA TRANSMISSION

**Test Reports and Data Transmission:** Data can be transmitted in several formats:

- verbal (uncertified) and handwritten (uncertified)
- certified hardcopy (mailed, faxed)
- certified electronic (emailed Adobe Acrobat® PDF files)
- emailed spreadsheets (Excel or Lotus)

Clients denote their preference by checking the appropriate box in the data transmission section located at the top of Parcel's sample chain of custody form. Clients can also provide written descriptions of their reporting requirements using the comment section of the chain of custody.

**Electronic Data Transfer:** All reports are available in electronic Adobe Acrobat® PDF files. Parcel also offers a number of various electronic spreadsheet formats (i.e. Excel, Lotus, Quattro, etc.) and can also provide data as Comma Separated Value (CSV) files for importing into custom databases. Parcel's SQL data based system has the capability of generating customized electronic reports, highly tailored to the individual specifications of the client, providing as seamless and transparent integration possible with the client's own information system.

All emailed and faxed reports are tracked internally. For each transmission, the system records the report work order number, date and time of transmission, email/fax number and receiver's name. Electronic data required for generation of client reports are transferred from various lab workstations to the main data server via our internal network system. Note that our network is secure from outside contact as no computer is connected directly to any outside servers or the Internet. The server databases, including reporting and LIMS files, are backed up daily onto CD.

Calls and/or emails to clients regarding notification of interim data (verbal results), changes to data, QC problems, etc., are documented on the chain of custody and/or in the Element Data System file notes. Information such as date and time of call, client's name, and a brief description of the discussion are all recorded. Chain of custody forms and any documentation are all attached to the final report and filed.

**Report Storage:** Hardcopy analytical reports and supporting QC data are stored for 5 years. Electronic data files are backed up onto CD format and stored indefinitely.

## 8.3 RECORD KEEPING

All internal records related to sample analysis are also maintained in accordance with established ISO Quality System protocols.

**Storage Policy:** All test records, including all relevant QC data, whether the data exists as chart recordings, chromatograms, notebooks, or in electronic format, are stored in such a manner that they can be easily retrieved and that the original report can be reconstructed at a later date without change. All reports and QC are stored for 5 years.

**Storage:** Analytical reports are stored for a period of 5 years. This includes supporting hard copy data sheets. Analytical reports and supporting documentation (i.e. chain of custody, subcontractor reports, etc.) are stored by the Sample Custodian. Supporting QC documents (technical records, printouts, etc.) are stored by the analysts by work order number.

## 9 WASTE MANAGEMENT

All wastes, including soil and water samples, extracts, and spent reagents are bulked and stored on-site and disposed of routinely as per SOP *Waste Management Plan*. This SOP details the safe transfer, storage, treatment (where applicable) and disposal of all waste streams; such as, acid waste, base waste, chlorinated solvents, non-chlorinated solvents, solid waste, PCB waste and contaminated waters.

**Disposal:** Paracel is a registered waste generator and has an on-going contract with a local licensed waste hauler for solid and liquid waste disposal. All waste materials including samples, sample extracts, and residues, are disposed accordance with Federal, Provincial and Municipal environmental and safety regulations and legislation.