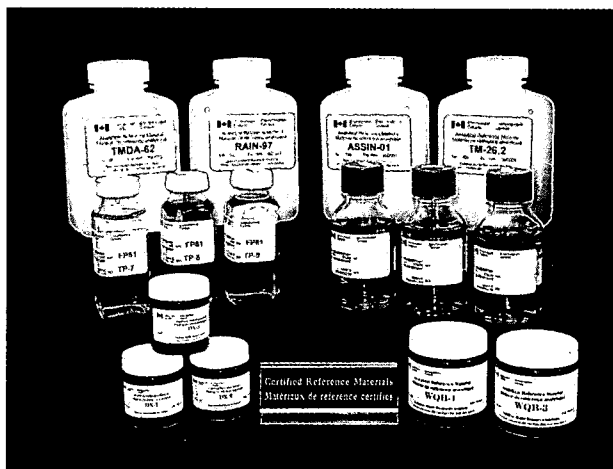
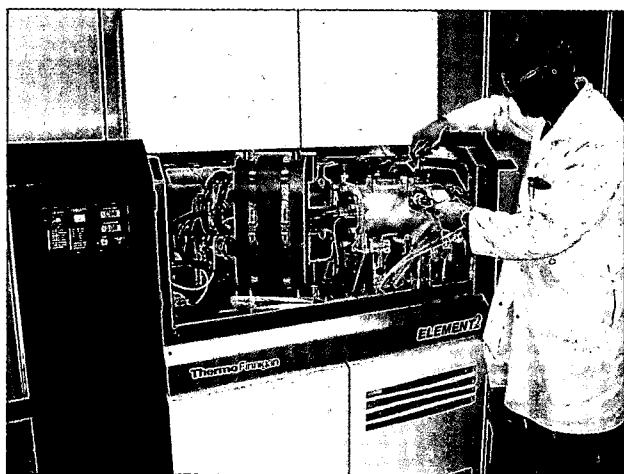
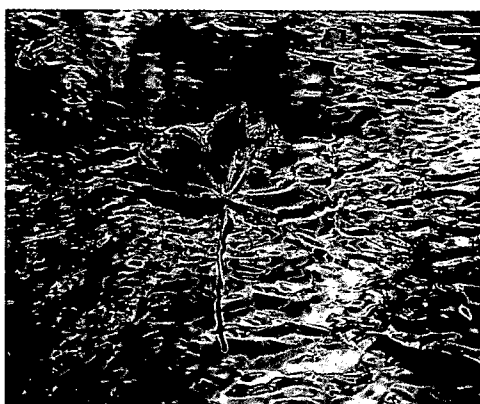


**NATIONAL WATER  
RESEARCH INSTITUTE**

**INSTITUT NATIONAL DE  
RECHERCHE SUR LES EAUX**

# **BUSINESS PLAN 2003-2008**



**National Laboratory for Environmental Testing  
National Water Research Institute  
Ecosystem Science Directorate  
Environmental Conservation Service  
Environment Canada**

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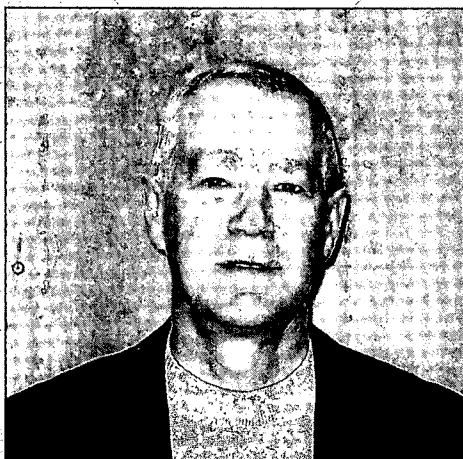
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EC Library  
Burlington

# **BUSINESS PLAN 2003-2008**

The National Laboratory for Environmental Testing  
National Water Research Institute  
Environment Canada

Design: Philip McColl, RSB Graphic Arts, NWRI



Dave Warry  
Director  
National Laboratory for Environmental Testing

The NLET Business Plan 2003-2008 is a synthesis of ideas expressed by the management, staff, clients and partners of the National Laboratory for Environmental Testing (NLET), National Water Research Institute over the last three years. It establishes a strategic framework within which the laboratory will conduct its business for the next 5 years. This framework has been carefully aligned with Environment Canada Business Line priorities.

The first NLET Business Plan 1997-2002 was used to transform the organization from a quasi-research laboratory with some client obligations into a first class client service laboratory that has the capability to perform selected, client driven laboratory development projects. The intent of this Business Plan is to move the laboratory from a service organization where the basic needs of customer satisfaction are all met, to a service organization where the customers of the laboratory are its greatest advocates. To do this, the laboratory needs to be viewed not only as a partner, but as a source of valuable advice.

The last five years have been exciting and challenging for the National Laboratory for Environmental Testing. I am very proud of all we have accomplished. With this plan as a guide, and the amazing energy, skill and dedication of our staff, I am even more enthusiastic about the opportunities that lie ahead of us.

I appreciate your interest in NLET, and look forward to sharing news of our continued progress throughout the next five years.

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# EXECUTIVE SUMMARY

The second Business Plan of the National Laboratory for Environmental Testing (NLET) sets out the strategic agenda for the Laboratory for the next five years. The plan uses an assessment of the historical role of the laboratory, and combines that with knowledge of the present needs and future requirements of its Environment Canada clients to establish the framework. The plan describes the role of NLET within the Environmental Conservation Service of Environment Canada, provides a business and financial analysis, specifies the strategic priorities that will be used to guide the laboratory, and establishes a framework to achieve the desired outcomes.

Strategic analysis of the business of the laboratory indicates that the greatest challenges facing the laboratory are to:

- 1) maintain all existing analytical and quality management capacity, services and expertise;
- 2) develop and expand its analytical and quality management capability and services to respond to changing science support needs of its clients; and
- 3) deliver (1) and (2) within a static resource envelope (it is decreasing in real terms due to inflation and departmental levies) having limited provision for essential capital investment.

# INTRODUCTION

*The National Laboratory for Environmental Testing (NLET) is located at the Canada Centre for Inland Waters (CCIW) in Burlington, Ontario and is one of seven branches of the National Water Research Institute (NWRI). NLET delivers a broad range of specialized and accredited analytical laboratory services, including sample characterization, quality management and laboratory information management systems development, in support of Environment Canada (EC). All work is delivered under Environment Canada's Management Framework, supporting monitoring, assessment and research programs across the country for the Nature and Clean Environment Business Lines.*

*Since its inception in 1983, NLET has provided a comprehensive laboratory support service and a center of analytical chemistry science to Environment Canada operational and research program managers on a national basis. In 1996, a second Business Activity, the Quality Management Project, was incorporated into NLET. Through this activity, NLET provides products, services and expertise to EC program managers and to analytical laboratory managers and quality assurance institutions around the world. Studies within the Quality Management Business Activity include: science and technological support to the Canadian Association for Environmental Analytical Laboratories (CAEAL) for the accreditation of laboratories by the Standards Council of Canada (SCC), the operation of national proficiency testing programs to support the Environment Canada Interlaboratory Quality Assurance Studies, the development and implementation of quality assurance programs supporting specific multiagency programs in which EC science managers have a significant interest (eg. Metals in the Environment), and the development of proficiency testing samples and certified reference materials.*

*NLET's analytical laboratories are housed on the seventh floor at CCIW and are organized into organic and inorganic laboratories specializing in trace and ultra-trace ambient aquatic analytical chemistry. The instrumental technology is predominantly state-of-the-art chromatographic and spectrometric techniques for low parts per billion and quadrillion levels of detection of environmental pollutants. The Quality Management Group has laboratories and storage facilities throughout the CCIW complex and has specialized facilities for bulk production of proficiency testing samples.*

## MISSION

The NLET mission is to support the laboratory science needs of Environment Canada research and monitoring programs and to deliver quality management products and services through responsive, cost-effective laboratory services that meet international standards of quality.

## ROLE

- 1) a national analytical support laboratory capable of providing EC program managers with: a) standardized and fully accredited environmental analysis capability for a wide range of organic and inorganic chemicals, b) unique analytical capabilities used to deliver collaborative projects outside the boundaries of the QA framework and usually delivered through MOUs, and c) partnership based applied research projects such as developing/adapting new methods;

- 2) a centre of expertise for analytical chemistry and quality assurance advice, particularly with regard to low level organic and metals analysis of environmental samples, and the application of quality assurance practices within the environmental analysis community;
- 3) a Quality Assurance Reference Laboratory, to support the production of Proficiency Testing Samples for SCC/CAEAL.

## STRATEGIC PRIORITIES

NLET works within its role to fulfill client and Departmental expectations. The strategic priorities identified below are used to ensure that the Business Activity outcomes achieved are consistent with the role and mission of the laboratory. These priorities will be used to provide NLET with guidance and direction in its activities over the next five years.

- 1. Mandated Obligations:** These are activities undertaken by the Laboratory to fulfill its role as an Environment Canada accredited operational laboratory supporting operational and research programs of EC in a proportion that reflects the historical regional resource contributions to the Laboratory when it was created in 1983 (NLET credit system);
- 2. Financial Sustainability:** These are activities undertaken by the Laboratory to provide more service flexibility to clients within EC (both Business Activities) and to clients nationally and internationally (QA Business Activity only) on a cost-recovery basis, and to enable the Laboratory to meet current client service demands/expectations and maintain fiscal sustainability;
- 3. Scientific Excellence and Credibility:** These are activities undertaken by the Laboratory to provide and maintain the capability and expertise to enable the Laboratory to maintain its leading edge capabilities so that unique expertise, advice, or services are available to EC program managers in a manner that is of mutual benefit. These activities may or may not be cost recovered;
- 4. Improved Service Delivery:** These are activities undertaken by the Laboratory to enhance all aspects of service delivery in both Analytical and Quality Management Business Activities. These include turnaround times, cost efficiency, program effectiveness, client communication and enhanced technical capabilities to address emerging issues.

The outcomes achieved for each Business Activity are delivered through one of five activity elements categorized as: 1. Accredited Analytical Services; 2. Special Analytical Services; 3. New Products and Services; 4. Technological Enhancements; and 5. Management and Administration. The activity elements are used to provide the framework for internal accountability and management and for external reporting of NLET achievements for both the Analytical and Quality Management Business Activities.

# DIAGNOSTIQUE

## Business Niche

Within the operational laboratory, 36 A-base and 3 B-base staff occupy positions in the Analytical Business Activity, and 3 A-base and 5 B-base staff occupy positions in the Quality Management Business Activity. Appendix 1 provides the organization chart for NLET. The analytical laboratories are accredited by the Standards Council of Canada through the Canadian Association for Environmental Laboratories for a variety of organic and inorganic parameters under the SCC Guide CAN-P-4D (ISO 17025) for provision of laboratory services. The Quality Management Business Activity is accredited by the Standards Council of Canada under ILAC Guide G13 as a provider and collaborator of proficiency testing programs. A description of the activities of the various groups in NLET is given in Appendix 2.

The National Laboratory for Environmental Testing undertakes numerous activities in support of the Environment Canada National Business Lines, nationally and regionally. The Laboratory has defined a niche which is supportive of EC programs while, at the same time, does not significantly compete with the private sector to provide similar services to the EC program managers.

Core analytical chemistry knowledge and state-of-the-art instrumentation are required to meet mandated responsibilities, while flexibility and adaptability are needed to work in collaborative projects and to maintain an applied research capability. Figure 1 illustrates the diversity of program activities and business line results that are being supported by NLET, the analytical services being requested and the associated NLET A-base value. Figure 2 shows the global distribution of products and services provided by the Quality Management Business Activity.

**Figure 1 - Analytical Business Activity Service Delivery**

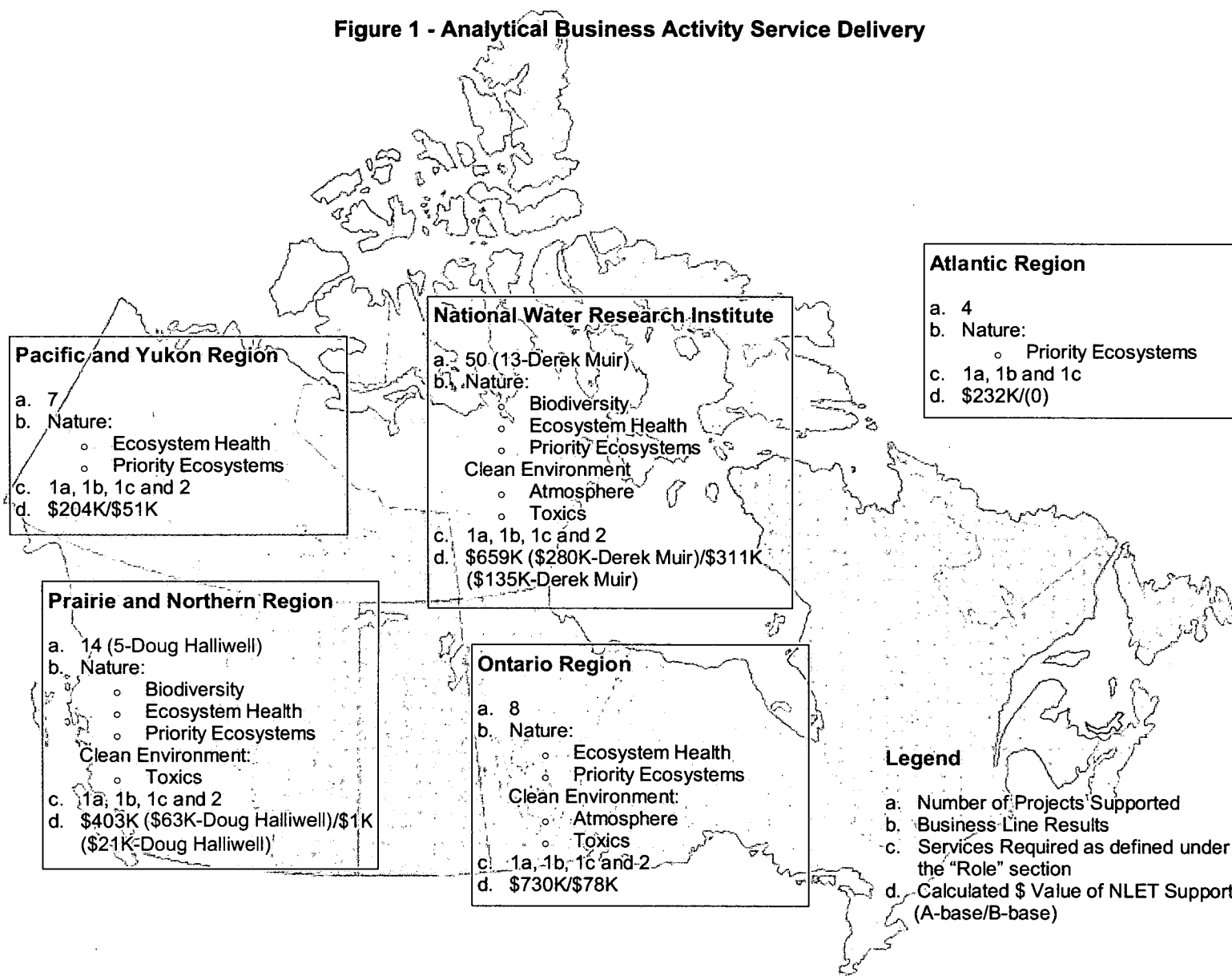
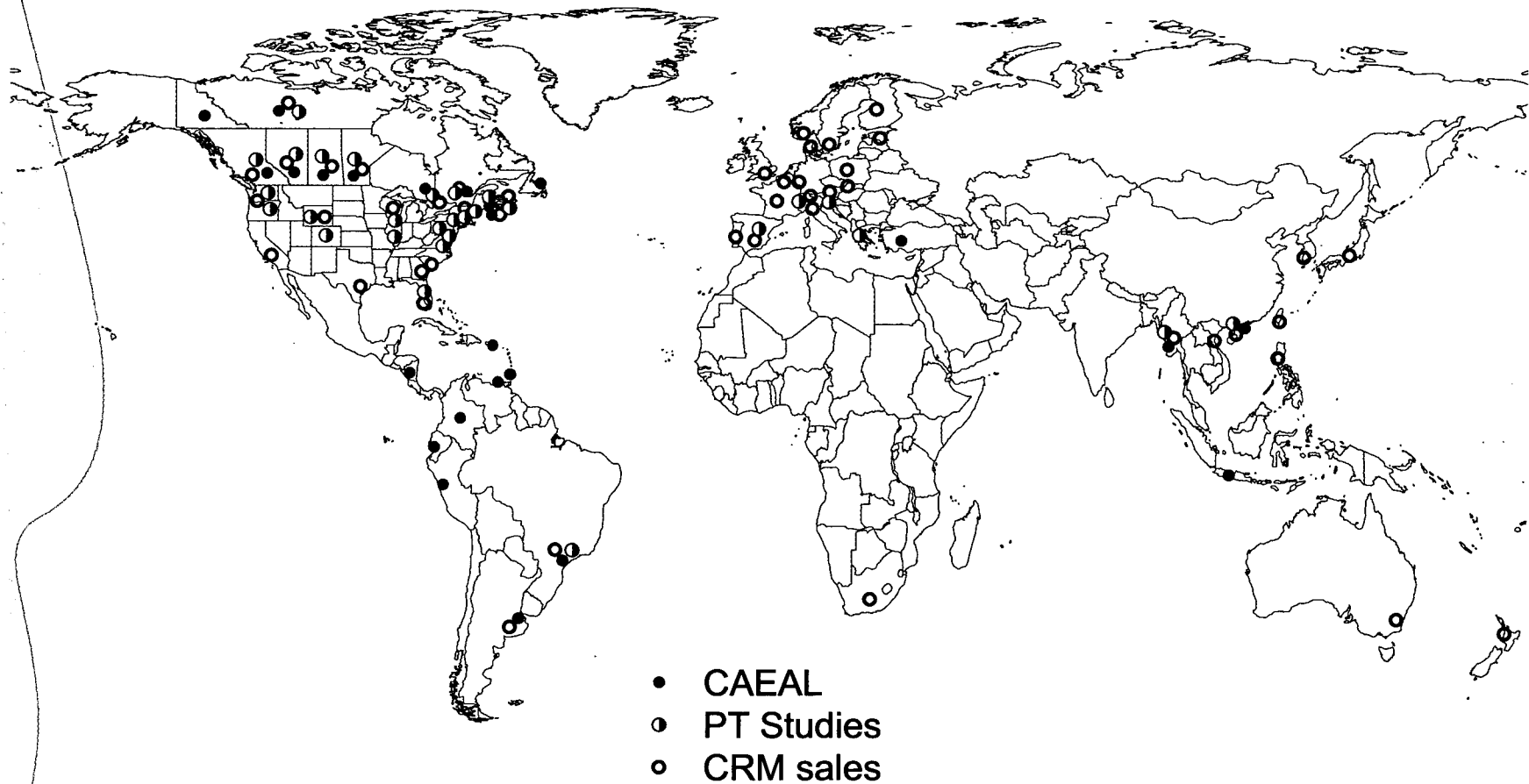


Figure 2 - Global Distribution of Quality Management Business Activity



# Partnerships and Collaborations

NLET works closely with its regional clients and the research community at the National Water Research Institute to support over one hundred Environment Canada projects under the Clean Environment and Nature Business Lines. Partnership arrangements have been developed to fund special client projects through a combination of laboratory credits, cost recovery and in-kind work arrangements. These arrangements, which include technology transfer and method development and adaptation, generally result in the leverage of technical and analytical expertise of NLET and scientific knowledge of the client to achieve the desired outcomes. Involvement in client partnerships has widened the analytical scope and capability of the Laboratory, and ensures NLET remains relevant. It also provides clients with access to flexible delivery of analytical services.

NLET promotes a culture that embraces quality assurance as an integral component and collaborates as a registered member of the following organizations:

1. Canadian Association for Environmental Analytical Laboratories (CAEAL);
2. Canadian Food Inspection Agency (CFIA);
3. International Atomic Energy Agency (IAEA);
4. National Institute of Standards and Technology (NIST);
5. Ontario Ministry of Environment and Energy (MOEE);
6. Quality Assurance Working Group (Canada B.C.).

The programs these activities serve include the following:

1. Integrated Atmospheric Deposition Network (IADN);
2. International Measurement Evaluation Program (IMEP) ;
3. Great Lakes 2020;
4. Arctic Monitoring Assessment Program (AMAP);
5. Metals in the Environment - Research Network (MITE-RN);
6. Regional program commitments, particularly federal-provincial programs such as Prairie Provinces Water Board and Federal-Provincial Water Quality Monitoring Agreement Programs.

Activities under the NLET Quality Management Business Activity include collaborations with SCC and CAEAL to provide technical advice regarding development of proficiency testing samples and to strengthen the environmental laboratory industry. NLET collaborates with domestic and international CRM producers to exchange knowledge regarding production strategies and to explore new avenues in the development of quality assurance products and distribution. Development of new materials with different matrices is undertaken in response to needs identified by clients through direct consultation. NLET works with program managers (eg. GEMS/Water, MITE-RN) to design and deliver quality assurance programs to identify sources of measurement uncertainty and variation among analytical results generated by contributing laboratories.

NLET provides representation and input to standing committees such as the IADN Steering Committee, NWRI Genomics, EC EPA and EC-MOEE-USEPA Niagara River for review and recommendations in areas of specialty. NLET maintains membership on the Laboratory Coordinating Committee and Laboratory Manager's Committee of ECS, ISO Technical Committee 147/SC2 and the NLET Steering Committee. Technical consulting and training are provided to Environment Canada clients and their partners on a case by case basis. Collaborations with international agencies (e.g. USGS) permit knowledge exchange regarding scientific expertise and analytical testing capability.

# Opportunities and Challenges

## Opportunities

NLET is located at the Canada Centre for Inland Waters (CCIW), a world renowned center of water research. This gives NLET a strategic advantage in the conduct of analytical science. The facilities contain scientific, engineering and technical support infrastructure functions unique to large institutions in environmental sciences. Proximity to world class scientists and major clientele is a definite advantage. These result in certain efficiencies and synergy, which would not be possible at more remote locations. For example, the availability of Great Lakes surveillance ships at CCIW facilitate coordination and delivery of analytical science projects and operations on board ship. Furthermore, the Quality Management group often relies on the Research Support Branch of NWRI to sample large volumes of water from locations across Canada for the development of proficiency testing samples as well as certified reference materials.

NLET has a team of highly skilled and dedicated employees with a wide range of expertise, especially in leading edge analytical technologies. The recent acquisition of a high resolution ICP-MS for ultra-trace metal analysis and the construction of the ultra-trace laboratory for organic analysis will begin to fulfill the growing need for clean and ultra-trace analytical facilities. This will also provide unprecedented opportunities for the development of skills of NLET staff in leading edge scientific capabilities. The recent addition of a high resolution GC-MS and LC-MS in the research laboratories of NWRI have provided the same focus on trace analytical opportunities for NLET to collaborate in state-of-the-art scientific projects. NLET also possesses a world class Quality Management team with products and services which encompass the Canadian accreditation programs as well as international collaborations.

One of the strengths of NLET operations has been the extensive partnerships and collaborations that have developed in recent years (see section above). These strengthen the logistic and scientific/technical, as well as the financial parameters, of NLET projects. The Information and Quality Management group provides an organized infrastructure support system to NLET staff and clients, enabling access to information and logistics support. NLET invests a considerable amount of resources in communication and marketing, as well as client and scientific liaison activities. These include the NLET newsletter, NLET Schedule of Services, NWRI publications, Catalogue of Certified Reference Materials, etc.

Within NLET, collaboration and cooperation between the Organic, Inorganic and Information and Quality Management units are being utilized to the fullest extent to improve delivery of products, services, and programs, reduce costs, increase opportunities for cross training of staff and to meet contingency situations.

# Challenges

Although the strategic priorities provide guidance and direction to NLET activities, existing A-base funding is insufficient to deliver all the expected results. This has resulted in a serious challenge in managing operations. It has been necessary for the Laboratory to pursue revenue generation projects at the expense of the free credit projects. Furthermore, the increase in the effort required to meet the accreditation requirements exacerbates the problem. The need to generate revenue becomes even more complicated when one considers that the operational laboratories in Environment Canada must not compete with the private sector laboratories.

Replacing capital equipment on a planned basis is difficult, since the required A-base capital \$420K is not available on an annual basis. Recent capital acquisitions have relied on unique one time opportunities, rather than on planned acquisitions.

Recruitment and retention of staff is an ongoing challenge in attracting qualified scientific and technical staff in an increasingly competitive, knowledge-economy labour market. As mentioned recently in a report by the Council of Science and Technology Advisors, "the government's recruitment practices are not conducive to first-rate science". For example, in FY 2002-03 four NLET staff (10%) have retired. They can only be replaced **after** they have retired, and the average time it takes to hire new employees is more than 200 days. Over the next five years, NLET could lose up to 13 out of 47 staff, including all of its management staff, through retirement.

The facilities at the CCIW complex were constructed in 1970. Although situated in a facility that is a leader in energy and efficiency management, recapitalization rates for laboratory equipment and facilities are well below industry standards. Laboratory facilities are outdated and substantial resources have been and are being spent in their modernization. Examples include the need to modernize fumehoods, bench tops and sample preparation laboratories. More recently, and with the advent of ultra-trace sampling and detection techniques, there will be a need to expend additional O&M resources.

The issue of retaining scientific relevance is also related to the resource situation. While NLET is a part of the largest freshwater scientific research institute in Environment Canada, there is a need to interact with clients, other laboratories, both public and private, and with universities and other institutes around the world. Maintaining these collaborations and partnerships is an ongoing expense. In addition to maintaining the human contacts, it is also necessary to maintain technical relevance, for both the facility, the laboratory computer infrastructure (ECOLIMS) and the instrumentation. All of these systems require ongoing replacement and maintenance, and require financial resources to pay for continued operation.

# Client Perspective

NLET periodically conducts client surveys to stay abreast of client needs. The current survey was sent out in the Spring of 2002 to solicit input regarding the adequacy of NLET communications, sample turnaround times, responsiveness, flexibility, resource management and project support and provision of special requirements (see Appendix 3 for results). Clients were also asked to provide information on their future requirements in the areas of: accredited methods; information technology; quality assurance; methods development; and logistics support.

## Key Survey Findings - Current Services

1. NLET communications with its clients are effective, but communications between the Steering Committee members and their regional constituents need to improve.
2. Clients are satisfied with turnaround times, but there are study specific concerns.
3. Clients are satisfied with NLET's ability to respond to changing requirements.
4. There are divergent views on whether or not analytical credits could be exchanged.
5. Management of NLET resources is not clearly understood by all clients.
6. In general, clients feel that NLET is unable to support their studies adequately because of resource limitations.
7. Clients are satisfied with NLET's ability to respond to unique requirements.
8. Clients feel that NLET staff are extremely responsive and helpful.

## Key Survey Findings - Future Services

1. There was not much feedback on accredited methods or special analytical services, however, more capability and capacity is needed to include a greater range of sample types, biological analyses and emerging parameters.
2. A need was identified for IT development to allow electronic data transmission [NWRI], electronic submission of samples and analytical requirements and an ability to check sample and project status on-line.
3. Most clients are interested in QA reports to accompany analytical results.
4. There is a need to develop methods for pharmaceuticals, endocrine disrupting chemicals, in-use pesticides and emerging chemicals of concern.
5. Some clients require the continuation of the bottle washing service for ultra-trace analysis in the Trace Metal Laboratory.

## Synopsis

Survey results indicate that NLET has been successful in meeting the strategic priorities identified in the 1998-2002 Business Plan, which included the efficient delivery of services and maintenance of existing as well as unique services for certain clients. However, some respondents felt that NLET needs to focus more on concerns related to flexibility and communication, including information on the management of laboratory resources. Although clients feel that day-to-day communications are effective some clients do not fully understand all aspects of NLET operations, and how constraints on the Laboratory affect their demand for service. It is apparent that expectations still exceed the ability of the Laboratory to deliver. A detailed discussion of specific topics is summarized in Appendix 4.

# HISTORY

## Role Evolution

The National Laboratory for Environmental Testing (NLET) was formed in 1983 by the consolidation of a substantial portion of the regional laboratories of the Water Quality Branch. At that time, the major roles undertaken by the Laboratory were to: 1) Provide a single center of expertise in trace and ultra-trace analytical capability to support ECS ambient water monitoring and research program needs across Canada; and 2) Deliver the regional analytical support function to Ontario Region. The single centre of expertise concept has never been fully supported in EC, thus, the proposed model has never been fully implemented.

Since its inception, the primary business of the Laboratory has been to deliver scientifically credible analytical results to its regional and national monitoring, assessment and research programs across all regions of Environment Canada. This was achieved through the development of an NLET credit system, whereby laboratory services were delivered to the regional clients in the same proportion as the resource contribution attributed to NLET during its creation. Management of this set of obligations to the original resource contributors, in the face of ongoing resource reductions, has been a significant challenge for the Laboratory.

In the early 1990s, NLET, like all other operational laboratories in EC, adopted ISO based quality assurance practices, as part of the early trend towards laboratory accreditation in Canada. Until about 1997-98, NLET experimented with expanding its role to a more non-traditional approach, whereby R&D (development of analytical methods) and contract management on behalf of program managers became more important. In 1997-98, through a comprehensive consultative process with its clients, it was determined that the best fit for NLET would be to return to its traditional program support role. The first NLET Business Plan concentrated on efficiencies and clarification of role. As a result, NLET operations have become much more efficient over the last 5 years.

At the same time, and through its association with the National Water Research Institute, the Quality Assurance group housed in one of the research branches was transferred to NLET. The role of this group was redefined from a partial R&D role to a client support role within Environment Canada, and to a promotional role supporting the adaptation and implementation of quality assurance and quality management practices in Canada and abroad through the support of SCC and CAEAL.

Currently, the operational laboratory part of NLET encompasses two laboratories and the associated common support functions. Three units comprise this part of the Laboratory: the Inorganic Analysis Laboratory, the Organic Analysis Laboratory and the Information and Quality Management unit. The Quality Management Business Activity is carried out within the Information and Quality Management unit. Appendices 1 and 2 provide the current organization chart of NLET and a description of the organizational units within NLET respectively.

# Financial Evolution

NLET was established in 1983 by a resource transfer of a substantial portion of the five regional laboratories to a single consolidated laboratory located at the Canada Centre for Inland Waters. Total transfers from the regions were completed in 1989 and amounted to \$2,175K. When NLET was transferred to NWRI in April 1994, 67% (\$1,465K) of the total regional contributions was transferred to NWRI to maintain the operation of the Laboratory.

The A-base resources for NLET in April 1994 included: \$1899K Salary (40.0 PYs), \$413K O&M and \$116K Capital. The regional portion of this budget was: \$1007K for Salary, \$360K for O&M and \$98K for Capital. The regional percentages of this resource base were: Atlantic 7.1%, Quebec 4.5%, Ontario 36.7%, WNR 18.7% PYR 6.6% and HQ programs (including support to NWRI) 25.8%. The operating principal is that all future A-base funded laboratory support will continue to be delivered in these proportions.

Between April 1995 and March 1998, Program Review reduced the laboratory salary budget by 16%. Starting in March of 2000, the imposition of a departmental levy reduced the capital and O&M budgets of the Laboratory by 75% and 13%, respectively. The net result of the decade long budget reductions has been a significant decline in the A-base funded service available to the regional and Institute programs being supported by NLET.

To illustrate the point, if the original investment transferred to NWRI in 1994 had been maintained, the A-base budget for NLET, without salary increases, would now be: \$3,242K made up of \$2,575K Salary \$521K O&M and \$147K Capital. The NLET A-base budget (no QA Business Activity) in FY 2002-03 is: \$2,522K, made up of \$2,032K Salary \$430K O&M and \$60K Capital.

According to the current private sector models for operational laboratories, the annual cost of running a 40 person lab is \$3,600K, of which 10-15% is Capital, 57% is Salary, and the rest is operating expenses (see Appendix 5 for Financial History).

## ANALYSIS

### Business Analysis

### Operational Focus

NLET operates in a unique analytical and quality management environment. The operational laboratory is expected to provide a highly credible analytical service for a client group who are world leaders in the field of environmental research and assessment. NLET operates in a specific niche of environmental analysis (trace and ultra-trace analysis of water, sediment and biota) in Environment Canada, one that is "leading edge" in some analytical areas (metals and organic analysis), and "proven edge" in others (nutrients and major ions). NLET also provides its clientele with standardized (also available in the private sector) and unique (not available elsewhere) analytical services and other laboratory support, such as method development and scientific advice, for their programs. The Quality Management Business Activity supports the implementation of quality assurance and quality management practices for laboratories and programs under Environment Canada, and abroad, through the support of the SCC and CAEAL.

## Internal Environment

Within EC, NLET delivers analytical services to more than 130 different science projects across the country. NLET redefined its role after the latest EC laboratory review, which removed \$2M from the annual EC laboratories operating expenditures of about \$30M in 1997. After this review, it was decided to retain the existing operational and R&D laboratories within the department, while ensuring that their roles were relevant and necessary. Mechanisms to do this have operated successfully for the last five years. There is no reason to expect that this operating environment will change in the next five years. It was also anticipated each operational laboratory would specialize in some aspect of departmental support, but this aspect of the review has not been fully implemented.

## External Environment

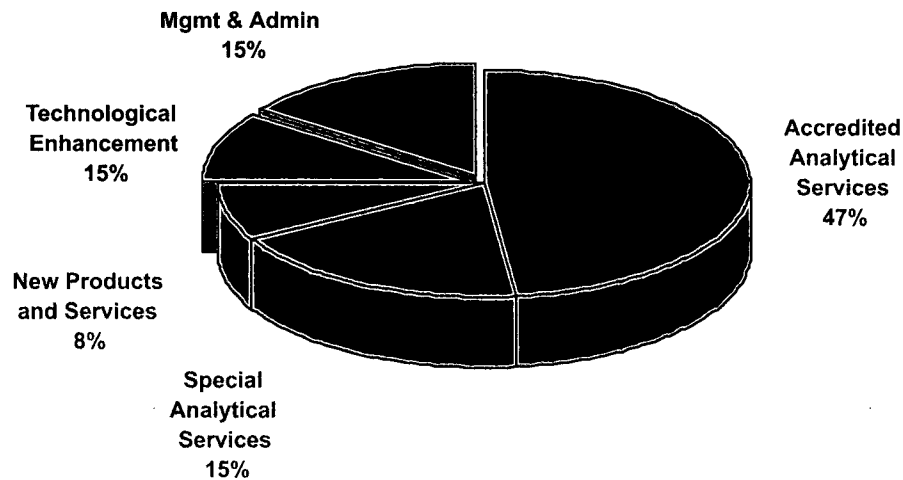
Laboratory operating environments, whether private or public, are always driven by the need to maintain technological relevance. Trends in inorganic analytical chemistry are evolving from traditional molecular spectroscopy to dedicated high throughput automated techniques. For the analysis of metals, emission spectrophotometry (ICP) is gradually being replaced with quadrupole mass spectrometry (ICP-MS) and, in certain trace laboratories, with medium and high resolution ICP-MS. Furthermore, ultra-trace metal sample preparation facilities are becoming a necessity for specialized low level projects. Similar trends in organic analysis have lead to the construction of an organic trace laboratory in NLET. Other trends in the Analytical Business Activity are towards instrumentation miniaturization and portability into the field environment, and the use of biological surrogates to measure analytes of interest cheaper and faster. It is unlikely that these techniques will be operational within the 5 year time frame of this plan. NLET will be keeping abreast of developments in these new technologies.

In the environmental laboratory industry, there are also trends towards specialization and critical mass. These trends are driven by the need to have larger QA and IT elements within all laboratories. NLET is well positioned with regard to both of these critical infrastructure elements. In fact, NLET has utilized the trend towards more QA as a springboard to develop a leadership role with respect to its Quality Management Business Activity. The focus in the Quality Management project is the provision of PT samples in support of both the CAEAL and EC proficiency testing programs, as well as the production and sale of CRMs on a worldwide basis. Future opportunities include the provision of program specific advisory services for both laboratory and field components.

## Organizational Response

Within this operating environment, NLET has organized the activities of its Analytical Business Activity under five operational elements. These include: Accredited Analytical Services, Special Analytical Services, New Products and Services, Technology Enhancement and Management and Administration. Figure 3 shows the idealized human resource utilization devoted to these activities for the Laboratory. Actual proportions fluctuate yearly in response to changes in demand for services from the EC program managers.

**Figure 3 - Activity Element Utilization**



## Financial Analysis

An analysis of NLET's financial resources indicates that financial stability is the greatest challenge in the continued delivery of analytical support to the national and regional operational and research programs of EC. If the current rate of change of A-base and B-base operating resources continues, by the end of this Business Plan, NLET will be more of a revenue generation (B-base) operation than an A-base one. This suggests that the long-standing credit system of operation for the Laboratory is not sustainable over the next 10 years. The Laboratory will have to reconsider its role of supporting programs across all of the EC regions if the decline of the A-base resource is not turned around. In the immediate term, the current A-base system will continue to be replaced by a modified cost recovery laboratory model, such as is currently evolving. The following discussion analyses the salary, operating and maintenance and capital budgets of NLET.

## Salary

The FY 2002-03 A-base salary budget for the Analytical Business Activity is \$1,916.8K. It has been determined that NLET requires a minimum critical mass of 40 PYs to operate the Laboratory to efficiently deliver the breadth and scope of services needed to support the EC programs across the country. This critical mass ensures that NLET delivers a national analytical service with a centre of analytical excellence in leading technologies as well as a laboratory infrastructure and specialized expertise in information technology, quality assurance and client and logistical support.

Only 36 staff can be supported through A-base resources at the present time. NLET management has made the decision to maintain staff levels as close as possible to 40 PYs, to maintain the technical and operational capability of the Laboratory necessary to fulfill the program requirements within EC. No other option exists in the Department or in the private sector to ensure EC programs are adequately supported. Consequently, NLET relies on B-base cost recovery projects to make up for the salary shortfall. However, the B-base workload does not alleviate the operating budget pressures where an operating budget (O&M) shortfall exists. This shortfall is being addressed through the imposition of a levy on the operational programs using NLET services. While the details are complex, essentially the EC client group is being asked to pay for services that were, until recently, delivered for no cost.

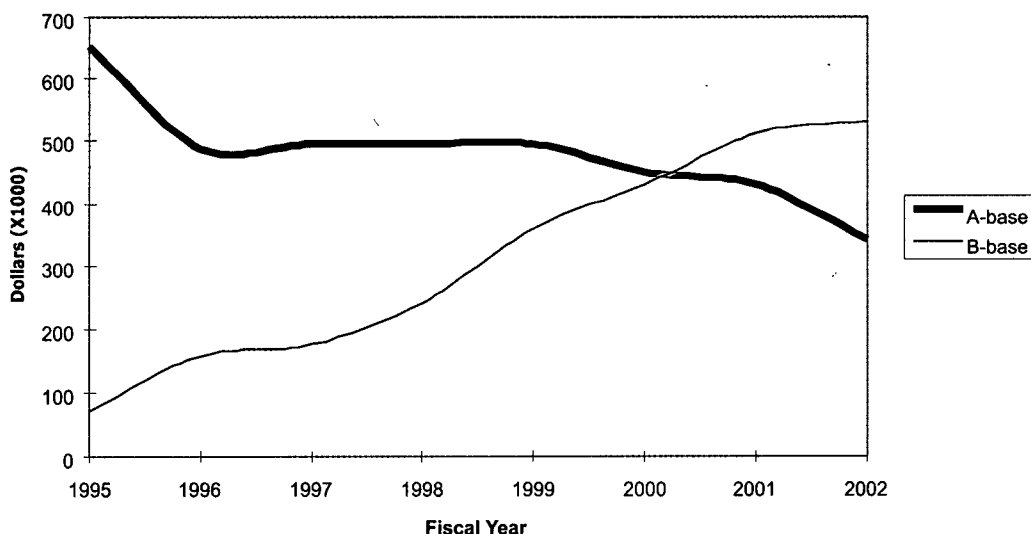
The FY 2002-03 A-base salary budget for the Quality Management Business Activity is \$200K (3 PYs). In addition to Laboratory facility needs, a small portion (1.2 PY ~\$60K) of existing A-base management and administrative resources is utilized to support the Quality Assurance Business Activity. All other technical salaries as well as operating and capital expenses for the Quality Management Business Activity are funded through B-base cost recovery.

## Operating and Maintenance (O&M)

The decline of A-base O&M relative to the amount required to maintain the analytical capabilities of NLET over the last 8 years is clearly shown in Figure 4. It is also clear that B-base (cost recovered) projects have grown in importance. Most of the B-base funds are needed to maintain the necessary critical mass of human resources and the revenues derived from the B-base projects and are not available to offset NLET's O&M shortfall.

NLET requires O&M funds of about \$17K per PY. At the current level of 39 staff, this translates into an annual operating budget of \$663K. The current O&M budget is \$430K, which results in a minimum shortfall of \$233K. NLET has an existing obligation to provide 20,000 hours of free analytical services (TMU) to its client groups. Thus, a levy of \$12 per TMU hour has been charged since FY 2001-02 to make up for the annual shortfall. Not all clients are willing/able to pay the levy and chose the option of an analytical credit cut. NLET is attempting to sell these credits to other EC clients on a cost recovery basis to generate the needed O&M funds. This activity is challenging to manage since the cuts are not always applied in the area where the demands for cost recovery are being made, and it cannot be predicted whether all the time available will be sold. It is also very costly from an administrative perspective, and stressful from an operational perspective, to maintain this type of operating model.

Figure 4 - O&M

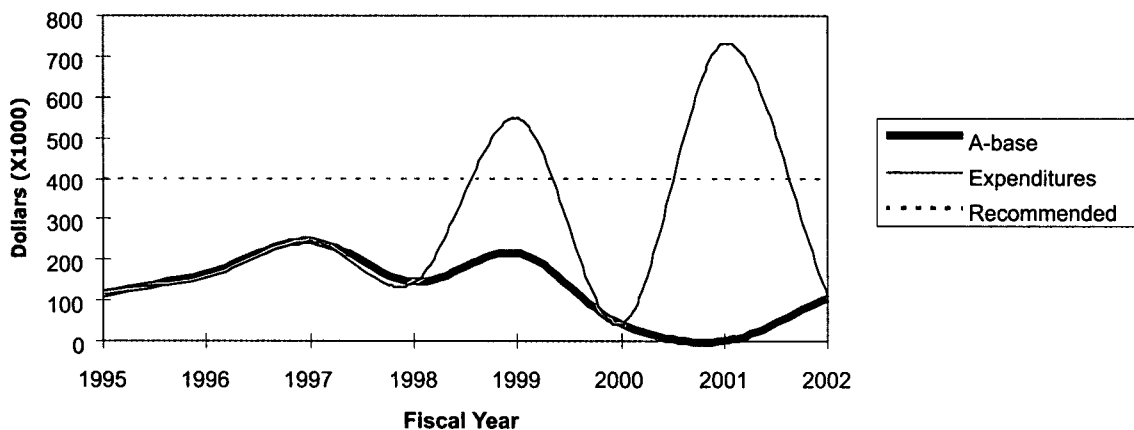


# Capital

NLET has a capital inventory of \$4.2 million. A 10 year replacement life span yields a depreciation of 10% or about \$420K. This is the Departmentally recommended annual investment required to sustain capital inventory replacement for scientific organizations.

Figure 5 shows the A-base capital budget as well as the actual expenditures for NLET over a 8 year period. Clearly, NLET has had difficulty in acquiring the amount of capital necessary to maintain its existing equipment. In 1999, a repayable loan approach was used. In 2001, a one time year end Departmental capital budget surplus made the acquisition of some equipment possible. Given the A-base funding situation, there is no mechanism currently available to replace and maintain the capital equipment inventory in the Laboratory.

**Figure 5 - Capital Investment**



# **ACTION PLAN**

## **Financial Resources**

### **Activities**

The sections on "Financial Evolution" and "Financial Analysis" describe challenges and opportunities facing the Laboratory. Currently, neither of the two Business Activities are fully funded by means of traditional A-base financial salary, O&M and capital resources. The previous discussions have identified how the shortfalls are being met.

#### **Analytical Business Plan**

1. Maintain the analytical expertise, capacity and capability to deliver needed support to 131 EC projects by charging clients a fee to fully supplement the A-base budget.
2. Maintain a well rationalized capital acquisition plan to compete for A-base funds.
3. Explore opportunities for cost recovery projects to supplement O&M resources.
4. Continue to look for operationally efficient practices to preserve O&M funds.
5. Maximize efficiencies in the utilization of A-base human resources to reduce costs and enable deployment of additional personnel.
6. Look for partnership opportunities to leverage funds

#### **Quality Management Business Plan**

1. Maintain A-base funding of overhead functions to provide stability to the QM project.
2. Generate enough externally derived revenues to fully fund all technical staffing and operating costs.
3. Maintain market driven competitive pricing of QM products and services while maintaining quality.
4. Explore options for efficient spending practices to preserve operating funds.
5. Explore opportunities in proficiency testing program support for revenue generation activities to maximize O&M resources.
6. Increase existing sales of QM products and services by exploring new and more efficient marketing techniques.

# Human Resources

## Values

Values at NLET include:

- Respect:** Valuing our differences and demonstrating this through our behaviour towards each other.
- Fairness:** Ensuring that all staff are treated equitably. This means recognizing that everyone is an individual and that treating everyone the same fails to ensure fairness.
- Teamwork:** Recognizing that each member of the organization has a role to play in the successful delivery of our services for our organization.
- People:** Recognizing that staff are the organization's greatest asset.

## Activities

Staff at NLET fulfill four main roles. These include: management (2 PYs), administration (3 PYs), scientific (16 PYs) and technical (18 A-base and 8 B-base PYs). The classification levels for the scientific and technical roles generally include a recruiting level, a working level, and a supervisory/specialist level (see NLET organization chart in Appendix 1).

NLET expends a considerable portion of its operational resources to maintain a high level of scientific and technical skill through training and exposure to workshops, symposia and conferences as well as liaison and collaborative activities with national and international agencies. Communication at all levels of the organization must be open and transparent so that all members are well equipped with the relevant information required to perform their duties. An environment of continuous improvement is maintained through ongoing hands on learning and participation in all NLET activities.

### Plan

1. **Maintain a highly skilled workforce through a program of training and mentoring at all levels of the NLET organization.**
2. **To deal with the aging work force, implement a succession plan to minimize disruptions during the period of multiple retirements.**
3. **Maintain and extend opportunities for collaboration with EC Human Resources.**
4. **Conduct regular management meetings, semiannual all staff meetings and other meetings as required to ensure communication throughout the organization is clear and effective.**
5. **Provide responsiveness and guidance in all human resource issues.**
6. **Take advantage of special departmental initiatives to recruit and retain new qualified staff.**
7. **Ensure the staffing process includes effective assessments of personal suitability for a role as well as the technical competence required to carry it out.**

# Analytical Capabilities

## Activities

Analytical methods in NLET are classified under two categories: Accredited Analytical Methods and Special Analytical Methods. The former include standard methods listed in the Schedule of Service which are validated, documented, audited and accredited by the SCC/CAEAL under Guide CAN-P-4D (ISO 17025). They undergo biannual site audits and semiannual analytical proficiency testing. The second category, Special Analytical, are those methods which clients request but which have less stringent requirements and where non adherence to a standardized scheme is of direct benefit to the client. These are not accredited and special Memorandum of Understanding (MOU) are signed by both NLET and the requesting client to qualify their operation outside the sphere of accreditation. NLET is engaged in more than 30 projects which require special MOUs.

### Inorganic Plan

1. Develop and implement ultra-trace methods for metals by high resolution ICP-MS.
2. Continuously re-evaluate methods to isolate the sample from the environment and eliminate sources of contamination.
3. Streamline the 8 water methods to 4 with the addition of the high resolution ICP-MS.
4. Incorporate collision cell technology to improve detection limits (eg. As, Se).
5. Adapt a method for routine arsenic speciation and possibly other metals (eg. Cr, Se) in water and biological materials.
6. Implement ultra-trace method for Hg by improving CVAFS detection limit to meet EPA's recommendations for Hg analysis in water.
7. Implement isotope ratios method using high resolution ICP-MS for Pb and possibly other metals.
8. Streamline major ion analysis of chloride and sulphate by expanding the use of ion chromatography.
9. Improve efficiency of analysis for determination of nitrogen compounds.
10. Investigate the use of high pressure liquid chromatography for chlorophyll a analysis.
11. Validate, document and prepare for accreditation for new inorganic methods which require standardized service delivery.
12. Maintain and update existing documentation to ensure ISO 17025 compliance.

### **Organic Plan**

1. Develop analytical expertise for in-use pesticides, flame retardants, pharmaceuticals, endocrine disrupting chemicals, larvicides and other emerging compounds for various matrices.
2. Develop and implement ultra-trace methods and procedures using the new ultra-trace organic facility.
3. Develop and implement an in-house computerized record keeping database for the standards laboratory utilizing a bar code "create and release" tracking system.
4. Maintain and expand analytical capabilities for measurement of organometallics.
5. Maintain and evolve system management and hardware/software support for analytical instrumentation and integration into the EC and NWRI computer systems and into the NLET laboratory information management system (ECOLIMS).
6. Maintain and enhance the working space of the laboratory to provide effective facility management.
7. Prepare and negotiate contracts, MOAs and MOUs as required.
8. Validate, document and prepare for accreditation of new organic methods which require standardized service delivery.
9. Maintain and update existing documentation to ensure ISO 17025 compliance.

# Facilities and Capital Investment Activities

The Inorganic Analysis Laboratory is equipped with four sample preparation and three instrument laboratories for metals and three multipurpose automated laboratories for major ions and nutrients analysis. The instrumentation include two Hg analyzers (atomic absorption and fluorescence), two optical ICP systems, a quadrupole ICP-MS an ICP-MS (mid and high resolution) and eleven automated systems for ions and nutrients. Facilities include low and high level sample handling areas, with two Class 100 workbenches and sample introduction systems for low level analyzers.

The Organic Analysis Laboratory is equipped with four sample preparation laboratories for different applications (water, biota, sediments, etc.). In addition, the construction of an organic trace sample preparation facility gives NLET a state-of-the-art trace organic analytical capability. There are two instrument laboratories housing nine gas chromatographic systems with electron capture, and other specialized detection systems, as well as four GC-MSD systems and a HPLC.

The Information and Quality Management group has a logistics laboratory for sample storage, sample initialization and bottle washing/preparation as well as four laboratories dedicated to different aspects of the proficiency testing programs supported by NLET. These include a QA laboratory specializing in organic standards preparation and storage as well as verification testing of selected compounds. There are three gas chromatographic systems with MSD, ECD and FID detection systems and a purge and trap unit.

**Table 1: Capital Investment Plan**

| Inorganic Plan   | Organic Plan   | IQM Plan  |
|--|--|---|
| <ul style="list-style-type: none"> <li>• ICP-QMS with Collision Cell Technology(\$250K)</li> <li>• HPLC and Interface Kit (\$70K)</li> <li>• Three Class 100 Workstations (\$30K each)</li> <li>• Microwave Digestion System with 80 Vessels(\$120K)</li> <li>• ICP-OES (\$180K)</li> <li>• Two Robotics Systems (\$120K)</li> </ul> | <ul style="list-style-type: none"> <li>• LC-MS-MS System (\$500K)</li> <li>• Two ASE Solvent Extraction Systems (\$80K each)</li> <li>• GC-MSD System (\$140K)</li> <li>• GC-ECD System (\$110K)</li> <li>• HPLC System (\$60K)</li> <li>• High Resolution GC-MS (\$550K)</li> </ul> | <ul style="list-style-type: none"> <li>• Automated Ampoule Filling and Sealing System (\$100K)</li> <li>• Information Technology Servers (ECOLIMS-\$25K, File/Web-\$25K)</li> </ul> |

# Quality Assurance and Accreditation Activities

NLET activities under the Analytical Business Activity have been accredited by SCC/CAEAL for more than 10 years. Since 2000, changes in ISO standards introduced the 17025 guide and NLET successfully maintained its accreditation under the new system. The Quality Management System (QMS) at NLET is comprehensive and encompasses activities in documentation, compliance, quality assessment and reporting.

NLET activities under the Quality Management Business Activity, which support the CAEAL program, attained accreditation under the ILAC Guide 13 in 2001-02 as a collaborator to the PT provider. Furthermore, NLET's PT program that supports the DOE Interlaboratory Quality Assurance Studies is attaining accreditation from the Standards Council of Canada in 2002-03.

A Quality Control Module has been incorporated into ECOLIMS to provide laboratory personnel with an automated QA data management system for storage/retrieval of QC data, and control charting and decision making in quality assessment. This would also provide the QA Office with a powerful tool to continuously monitor QC, at the database level, and to provide feedback/control to laboratory personnel and report to management on the adequacy of the QMS in NLET operations.

The ISO 17025 guide addresses Measurement Uncertainty (MU) in a more comprehensive way than the previous guide. CAEAL has mandated that all accredited laboratories have a MU policy by December 2002 and implement by the 2003 on-site audit. MU calculations must be addressed in all NLET Standard Operating Procedures (SOP).

## Plan

1. Update QA Manual and prepare for ISO 17025 audits biannually.
2. Prepare Quality Management System (QMS) report annually.
3. Use QC Module to monitor and assess quality and report quarterly.
4. Modify QMS to include both analytical and PT provider accreditation.
5. Carry out QA audits to ensure compliance to ISO 17025 guidelines.
6. Write policy on Measurement Uncertainty (MU).
7. Calculate MU for each method and add to each SOP.
8. Survey clients to determine their MU reporting needs.
9. Provide advice on the completion and implementation of QC Module.
10. Assist the Ontario Region laboratory for on-site audit. Add appendices to include all major routine SOPs.

# Information Technology

## Activities

The Information Technology (IT) group at NLET (2 PYs) provides a broad range of services that include system and network management of the client-server based computer system serving about 50 users. Various hardware and software peripherals and components throughout the Laboratory are maintained and managed to fulfill the computing needs of the Laboratory activities while meeting all Departmental security directives and through close cooperation with the CCIW informatics group. The Laboratory Information Management System used at NLET (ECOLIMS) has been developed over the years to meet the specific needs of Laboratory operations at CCIW. In addition, NLET provides ECOLIMS support to the Prairie and Northern regional laboratory located in Saskatoon. The computing system at NLET supports the operations of the analytical laboratories, the quality assurance units, management functions and the publication, marketing and promotion activities.

The ECOLIMS system has recently been modified with the addition of the Quality Control Module for the management of QC data. This will provide users with a database of the different types of QC samples run with every batch of analysis. The program has a graphical interface with the capability to prepare quality control charts of all QC types and to aid in the assessment of the QA program.

Recently electronic mailing of final data reports has been implemented. This utility has three benefits: 1. Reduce paper output; 2. Increase timeliness of reporting; and 3. Provide alternative format. A planned area of development in ECOLIMS is web enabled access and retrieval capability by clients for certain functions such as sample initialization, data retrieval and to check on project status.

### Plan

1. Add web based functionality to ECOLIMS.
2. Implement future enhancements as required by CAEAL.
3. Continue to fix assorted ECOLIMS bugs.
4. Replace servers as necessary.
5. Implement new departmental office suites as required.
6. Switch network from Windows domain model to Windows Active directory.
7. Provide systems management and hardware/software support to NLET staff.
8. Prepare proposals, MOUs and/or MOAs for the development of special software and manage external contracts.
9. Conduct client surveys (within and outside NLET) to assess needs and establish direction of future development projects.

# Partnerships and Collaborations

## Activities

The section on "Partnerships and Collaborations" under "Diagnostic" describes in detail NLET's activities in this area. NLET maintains representation on many committees with national and international organizations. Both the Analytical and Quality Management Business Activities are involved in partnering and collaborative projects whether they be for the delivery of analytical services to existing and outside clients or the establishment of links with international agencies for the marketing and sale of QA products and services.

In addition to the above, the Information and Quality Management group (IQM) provides a formal framework in the coordination of partnerships and collaborative arrangements for NLET. Liaison activities are maintained at different levels. These include collaborating with the NWRI Science Liaison group to fulfill Institute based scientific activities, liaison with clients to coordinate service delivery and with external national and international agencies to coordinate PT programs and the marketing, sale and distribution of QM products. IQM maintains formal contracts and agreements in the form of MOAs and MOUs in all these areas.

### Plan

1. Maintain registered membership in programs and in organizations such as listed in section on Partnerships and Collaborations to meet service delivery needs of clients.
2. Document contracts, MOAs and MOUs as required.
3. Provide representation on Laboratory Coordinating Committee.
4. Provide representation on Laboratory Manager's Committee.
5. Collaborate with CAEAL in the provision of PT support.
6. Provide liaison on scientific programs, client service and on product delivery.
7. Maintain liaison with the USGS, USEPA and NIST and other organizations listed under "Partnerships and Collaborations" and pursue new partnerships to exploit areas of common interest.
8. Maintain membership in ISO committees and collaborate on laboratory science projects.
9. Participate in CCME (Canadian Council of Environment Ministers) activities.

# Communication and Marketing Activities

As a service organization, communication and marketing activities are vital in maintaining accountability and in leading the evolution of the business in response to customer requirements. Only through communication with its customers can the laboratory position itself to be relevant to their present needs and responsive to the future needs of the EC client program managers. As part of the ongoing communication plan, NLET has developed a number of communication tools targeted at NLET personnel, laboratory management and its external partners. Furthermore, information and advice are provided at many levels throughout the organization by means of the NLET newsletter, the annual Schedule of Services, and the biannual laboratory Management Reports. Recently, NLET provided considerable input in the redesign of the NWRI Web site. This is of particular interest since NLET promotes and markets many of its products through the World Wide Web.

Communication initiatives provide the tools with which NLET promotes its business within EC and in new markets around the world. New initiatives being contemplated include the development of an annual report, and better linking of NLET services to EC program outcomes.

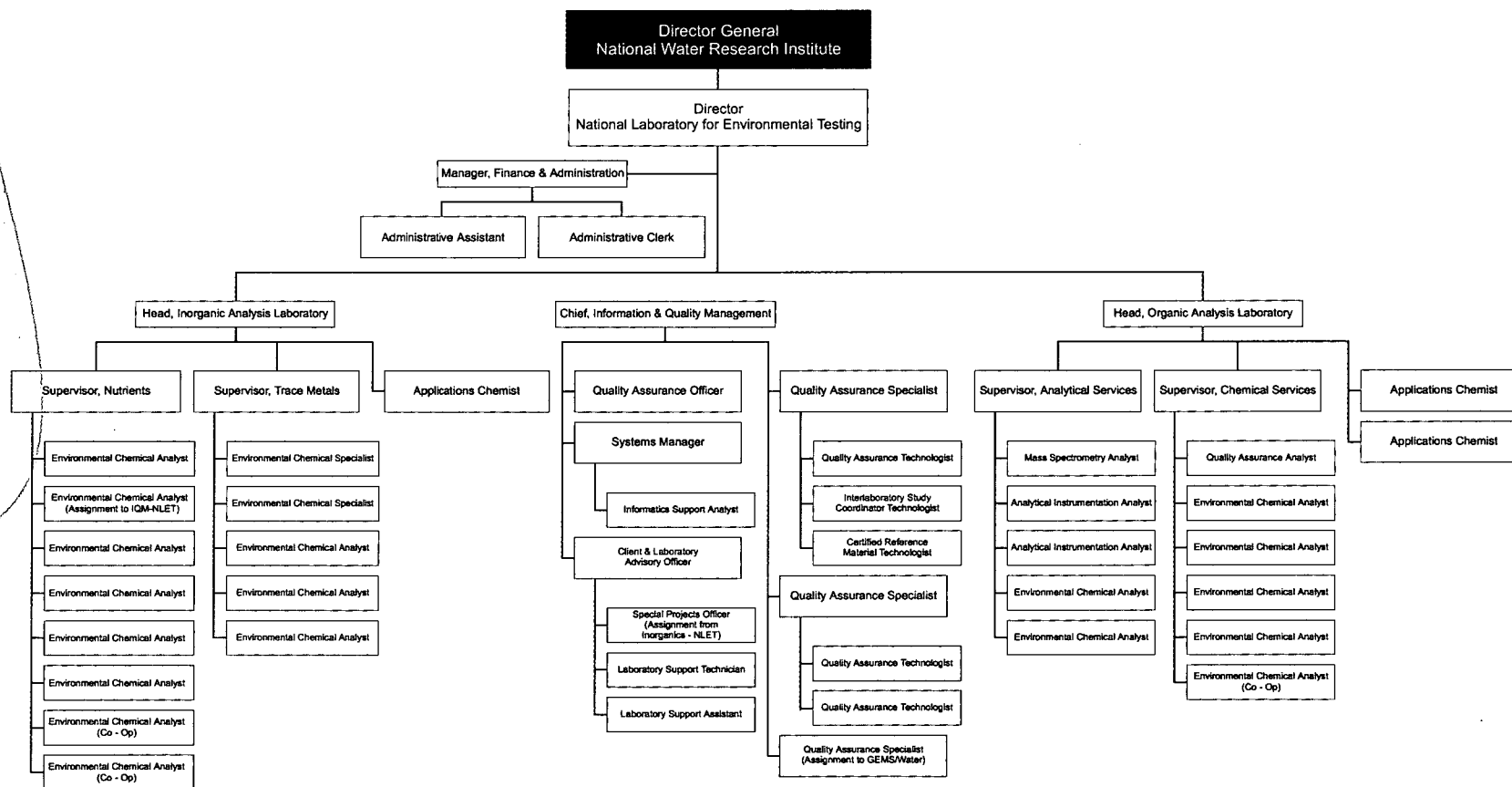
## **Plan**

- 1. Collaborate and contribute to the design of the NWRI Web site and manage the NLET portion.**
- 2. Prepare and publish NLET Newsletter on a quarterly basis.**
- 3. Publish the NLET Schedule of Services annually.**
- 4. Update the CRM catalogue twice a year.**
- 5. Develop Fact Sheets on NLET activities.**
- 6. Co-author and/or prepare at least five scientific publications annually.**
- 7. Prepare management reports and business plans as required.**
- 8. Prepare QA and QM reports for in-house and external use.**
- 9. Prepare annual Quality Management System review report.**
- 10. Conduct periodic client surveys for both Business Activities.**
- 11. Chair and organize an annual NLET Steering Committee meeting.**
- 12. Provide science liaison and client liaison in both Analytical and Quality Management Business Activities.**
- 13. Maintain a formal exhibit and display for the marketing of quality management products and services.**

# APPENDICES

# APPENDIX 1

## NLET Organization Chart



## **APPENDIX 2**

# **Description of Organizational Units**

## **Inorganic Analysis Laboratory**

The Inorganic Analysis Laboratory (IAL) operates under the Analytical Business Activity and provides accredited analytical measurements to Departmental programs and projects nationally, for a wide variety of inorganic parameters in environmental substrates, including major ions, nutrients and metals. Analytical instrumentation includes automated and robotic systems that utilize spectrophotometry, high resolution and quadrupole inductively coupled plasma mass spectrometry, ion chromatography and other specialized techniques. IAL specializes in high quality trace and ultra-trace analysis in water, sediment and biota. Technical consulting services are provided to EC clients, including appropriate sampling techniques.

## **Organic Analysis Laboratory**

The Organic Analysis Laboratory (OAL) operates under the Analytical Business Activity and provides accredited analytical measurements to Departmental programs and projects nationally for a wide variety of organic compounds including pesticides, herbicides, industrial chemicals and other organic contaminants in environmental substrates. Analytical instrumentation includes gas and liquid chromatography coupled with mass spectrometric and other specialized detection systems. All data are handled by means of a single, integrated, computerized data acquisition system. The unit specializes in providing high quality analysis for trace and ultra-trace concentrations of organic contaminants in water, sediment and biota samples. The unit specializes in analytical measurement capabilities in a clean laboratory facility as well as for unique environmental samples and provides technical consulting services to EC clients on a case by case basis.

## **Information and Quality Management**

The Information and Quality Management (IQM) group provides support towards both Business Activities of NLET. Under the Analytical Business Activity, IQM provides critical infrastructure support services to the operational laboratory including Intralaboratory Quality Assurance, information technology support to NLET and to the Prairie and Northern Region water quality laboratory in Saskatoon, and science liaison to NWRI science programs and client liaison and logistics support services to more than 100 different study leaders across Canada.

Under the Quality Management Business Activity, the Information and Quality Management group contributes to the delivery of Environment Canada's and associated agency's science-based programs through the provision of quality management support and advice including:

1. Design and implementation of the long-standing Environment Canada's Interlaboratory Quality Assurance Studies;
2. Production and sale of about 40 natural matrix Certified Reference Materials (CRMs) to laboratories in Canada and around the world;
3. Production and delivery of 75% of the Canadian Association for Environmental Analytical Laboratories (CAEAL) proficiency testing samples required to implement the accreditation program run by the Standards Council of Canada;

4. Collaborations in special proficiency testing studies such as the Metals in the Environment Research Network (MITE-RN) Program, and the Global Environment Monitoring System (GEMS)/Water Collaborating Center and the Environmental Laboratory Certification Consortium (ELAC) quality assurance activities.

# APPENDIX 3

## NLET Client Survey Results

Number of Surveys Returned: 23

Table 1 shows the percentage of responses under each rating for each question with the bracketed number representing the number of responses returned. Percentages may not add up to 100 because of rounding.

| TABLE 1- NLET PERFORMANCE ASSESSMENT  |                      |      |           |           |           |            |            |
|---|----------------------|------|-----------|-----------|-----------|------------|------------|
|   | No Response / Rating | Poor |           |           |           |            | Excellent  |
|   |                      | 0    | 1         | 2         | 3         | 4          | 5          |
| 1. Are NLET communications effective?   |                      |      |           |           | 13.0% (3) | 39.1% (9)  | 47.8% (11) |
| 2. Are you satisfied with the turnaround time?  | 1                    |      | 9.1% (2)  | 4.6% (1)  | 31.8% (7) | 50.0% (11) | 4.6% (1)   |
| 3. Is NLET able to respond to your revised requirements throughout the fiscal year?                                   | 3                    |      |           | 5.0% (1)  | 5.0% (1)  | 45.0% (9)  | 45.0% (9)  |
| 4. Do you feel there is sufficient flexibility for the exchange of analytical credits?                                | 3                    |      | 5.0% (1)  | 5.0% (1)  | 25.0% (5) | 40.0% (8)  | 25.0% (5)  |
| 5. Is the management of NLET resources clearly understood and visible?  | 1                    |      | 22.7% (5) | 18.2% (4) | 22.7% (5) | 27.3% (6)  | 9.1% (2)   |
| 6. Are your studies adequately supported at NLET given the current resource level?                                    | 1                    |      | 13.6% (3) | 18.2% (4) | 31.8% (7) | 31.8% (7)  | 4.6% (1)   |
| 7. Is NLET able to respond to requirements which are unique to your region (e.g. cruise support, emergency response)? | 6                    |      | 5.9% (1)  |           | 17.5% (3) | 35.3% (6)  | 41.2% (7)  |
| 8. Are NLET staff responsive and helpful?   |                      |      |           |           | 8.7% (2)  | 8.7% (2)   | 82.6% (19) |

## **APPENDIX 4**

# **Detailed Discussion of Client Survey Findings**

## **Current services**

### **Communication**

Overall clients feel that NLET communications are effective. However specific concerns were identified. Communication between the regional representatives on the NLET Steering Committee and the clients in the regions is not effective. One suggestion given at the annual client meeting was to hold information sessions and/or workshops, where practical, to communicate information directly from NLET to study leaders. It was also suggested that it would be worthwhile to improve direct communication between NLET and project leaders to address sample specific concerns, such as analytical ranges covered to ensure appropriate dilution of samples prior to submission, analytical limitations, etc. One client expressed an interest in receiving notification of sample receipt. Judging by the number of e-mails sent when samples are shipped, this is of interest to other clients as well.

### **Turnaround Time**

In general, clients are satisfied with the turnaround time. NLET has made an effort to prioritize samples based on the needs of the clients. This has been successfully achieved through client consultation. However, concerns remain when results are critical for assessment purposes (eg. experiments to assess the effectiveness of actions taken for remediation or testing procedures or to meet third party deadlines for reporting). In these cases, better communication is required between the Laboratory and the client to understand study objectives. NLET has successfully accommodated priority samples when an urgency has been identified. In fact, in those instances, positive feedback was received for laboratory performance (e.g. rush flood samples for Prairie and Northern Region for analysis of organochlorine pesticides and acid herbicides, mecoprop results for a method development project for Prairie and Northern Region and total nitrogen results for the National Water Research Institute). The research community is less satisfied with turnaround time in those cases where results are required in a short time frame.

### **Revised Requirements**

Most clients (over 90%) feel that NLET is able to accommodate their revised requirements throughout the year. This includes year-end dumping, where NLET has been able to direct resources to meet demands for services not originally planned for. This can represent a challenge for the Laboratory, depending on the nature and magnitude of the shift in requirements and the timing of the submission. It may not always be feasible to meet changing needs. In this case, communication is key. Clients are more accepting if they understand the difficulties.

### **Flexibility for the Exchange of Analytical Credits**

There were divergent views on whether or not analytical credits are easily transferable. The clients who rated this category high also benefited from arrangements whereby they were able to transfer credits to meet a specific need (e.g. transfer between regions for collaborative studies, use of credits for method development or special studies such as the mass spectrometry identification of components in

polyurethane foam (PUF) samples). It must be recognized though that NLET has a limited capacity for the transfer of credits and this must be made clear to clients.

## **Management of NLET Resources**

Over half of the clients responding to the survey felt that they did not clearly understand the management of NLET resources. Clients who are on site or act as regional representatives rate this category higher than those who do not communicate directly with the Laboratory. This suggests that there are communication problems within the regions that need to be addressed to ensure that the information provided by NLET is being disseminated to all clients.

## **NLET Analytical Support to Client Studies**

There was a split in the responses received under this category but in this case it may be attributed to interpretation. NWRI, in particular, feels that there are not enough resources in the Laboratory to support all of their studies. It does not appear to be a complaint against service delivery, but rather a concern that there just aren't enough resources to meet all their needs. The low ratings from the regions may be an indication that they feel the current resources cannot deliver the amount of service that they used to. This category is difficult to analyze because it is dependent on the interpretation of the question. Perhaps the question could have been better worded.

## **Unique Requirements**

Clients are satisfied with the arrangements made to address their needs for unique services such as cruise support for Ontario Region. There was only one response returned with a low rating. In this case, the client normally requests analytical services that are outside the scope of NLET capability and do not qualify for acceptance as New Products and Services. To qualify for New Products and Services there must be sufficient demand or national need. This would influence the rating received. Again, communication needs to improve with the client to ensure there is a understanding of NLET operations and obligations.

## **NLET Staff**

This category rated the highest with clients extremely satisfied with the responsiveness and helpfulness of NLET staff. 19 out of 23 (82.6%) responses returned were a top (excellent) rating.

## **Future services**

### **Accredited or Special Analytical Services**

Under this activity, clients have indicated that they would like NLET to develop capability for a greater range of sample types, for biological analyses and to address emerging parameters. Requests for new analytical services are currently considered using a formalized process under New Products and Services. NLET needs to communicate this better and provide information on the guidelines used in the evaluation process before a request can be considered for method development.

### **Information Technology**

The feedback under information technology is an ongoing request for development of web based programs to allow electronic transfer of analytical requests and to facilitate sample submissions. Clients would also like to be able to check the status of their samples/projects on-line. There is a need for electronic transmission of analytical results for NWRI.

### **Quality Assurance**

There is a consensus that QA reports should accompany analytical results. NLET will need to look into this further to determine what information would best suit the need of the client.

### **Method Development**

The parameters of interest for method development were shared by a number of clients and include pharmaceuticals, endocrine disrupting chemicals, in-use pesticides and emerging chemicals of interest. One dissenting opinion was returned by a client who felt that it was the responsibility/role of the research community to address method development for emerging issues and that the role of NLET was to provide analytical capability for established methods. However it was felt that collaborative studies between NLET and the research community were acceptable. More communication is required regarding this activity because one of the guidelines specifically states that a method must exist before the request can be considered for method development.

### **Bottle Washing**

There was very little feedback under bottle washing but there is a clear indication that clients would like NLET to continue to provide bottle preparation services for ultra-trace analyses in the Trace Metal Laboratory.

## APPENDIX 5

### Financial History

Between 1990 and April 1994, the laboratory budget fluctuated from a high of \$3.7M to a low of \$2.3M.

The total resource base transferred to NWRI to support NLET in 1994 was \$2,428K, of which \$1,465K of the \$2,175K regional contribution was transferred, and \$505K was a Headquarters contribution. Between April 1995 and March 2000, NWRI invested an average of \$147K per year in NLET (O&M and controlled capital) to mitigate some of the affects of the ongoing salary resource cuts and the controlled capital shortfalls in the Laboratory during this period. All of the EC programs being supported by the Laboratory were affected severely during this time. NLET had to adapt to a cut of \$363K (7 PYs) in salary during Program Review II (1996-1998).

In 1997, the Quality Assurance group was assigned to NLET to provide a more focused and client-centered delivery of quality management products and services, rather than a research and development focus. When the QA program was transferred to NLET in 1997-98, ~\$200K (3 PYs) in salary but no O&M or capital, was transferred to NLET to operate the program. In 1999-00, one administrative position was added to NLET to help support this activity.

Since FY 2000-01, the operating budget (O&M and controlled capital) of NLET has been reduced by an average of \$181K per year, from the 1999-00 budget year. This reduction has been applied towards the departmental levy. The NLET A-base budget in FY 2002-03 is: \$2,722K, made up of \$2,032K Salary \$430K O&M and \$60K Capital. This budget cannot support a 40 person operational laboratory, and so it has been necessary to: 1) impose a levy or a service cut on those programs using the lab for service, and 2) divert a certain amount of service away from traditional programs to those programs that can pay for the services.

The need to provide ongoing support to clients in the face of decreasing resources has resulted in the evolution of the Laboratory from an A-base supported organization to the current blended business model of an A-base and B-base organization.