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Canada

Northern Contaminants Program and Arctic Monitoring and Assessment Programme Interlaboratory Study (NCP-AMAP ILS)

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Background

Established in 1991, the Northern Contaminants Program (NCP) is tasked with working to reduce and, wherever possible, eliminate contaminants in traditionally harvested foods. Contaminants of concern found in the Arctic raised concerns with respect to human exposure via traditional diets of northern Indigenous peoples. Information from a variety of sources is brought together to allow for informed decision making by individuals and communities in their food use.

Five NCP priorities make up the program;

- Human Health
- Environmental Monitoring and Health
- Community-Based Monitoring and Research
- Communications, Capacity, and Outreach
- Program Coordination and Indigenous Partnerships

The Environmental Monitoring and Research component is supported by several researchers, each with specific interests and needs. As part of their funding agreement with NCP, those researchers with an analytical chemistry component are required to participate in the Northern Contaminants Program and Arctic Monitoring and Assessment Programme Interlaboratory Study (NCP-AMAP ILS).

The Problem and why it is important

The laboratories that report data on behalf of the researchers are a mix of private, government and academic laboratories. They are mixture of accredited and non-accredited facilities that operate independently from each other when they report their data.

For a given parameter in an environmental sample, five (5) laboratories might report the following;

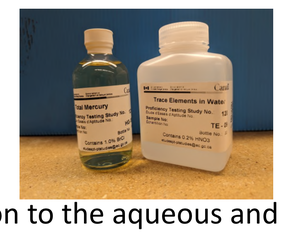
The average value is **180**ng/L, and the spread in data is **100**ng/L

In isolation, all the laboratories will consider themselves to be reporting the correct or true value. However, the spread in data values suggests this is a false assumption and the uncertainty might be too large to be useful in making decisions for the end user. This is important because environmental health data is used in conjunction with other data to make fundamental decisions regarding human health.

This ILS is one part of a comprehensive QA/QC scheme to ensure the validity of results for the analytical laboratories supporting NCP/AMAP. By supplying identical homogeneous samples to the laboratories, we can compare results across all participating laboratories. The aim is to have **all** laboratories generating consistent, high-quality data that can be used for decision making purposes.

What we are doing

Information and Quality Management (IQM) has been providing ILS or Proficiency Testing (PT) studies for over 40 years. We have an established PT program where we have incorporated the NCP/AMAP laboratories that analyse metals (including mercury) in water and soils/sediments. The NCP/AMAP laboratories join a group of long-time participants that allow us to compare performance across a 5-10 sample set.

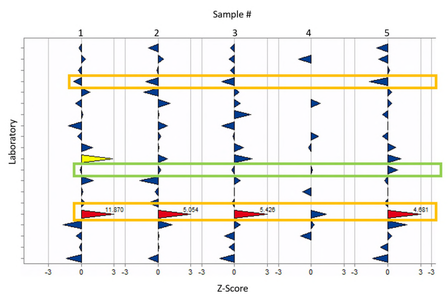


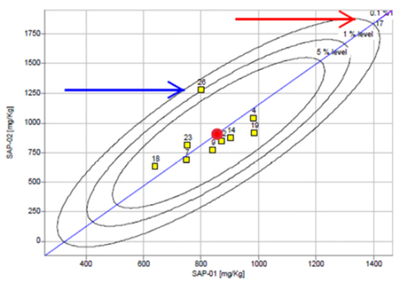
In addition to the aqueous and soil/sediment samples from our ECCCPT program, we provide ampouled standards[1] to verify calibrations between laboratories, spiked air filters to assess the AMAP laboratories, and biota samples. The biota samples are designed to represent a cross section of the country foods typically consumed.

Progress

IQM took lessons learned from developing its own accredited Proficiency Testing and Reference Materials programs[2] and applied them to the development of custom samples for the NCP/AMAP ILS. IQM partnered with other ECCC divisions and NCP/AMAP collaborators[3] to collect representative biota samples for inclusion into the program. IQM staff developed techniques for processing, homogenising, stabilising and packaging the resulting samples for the NCP/AMAP ILS.

IQM also revised some of its assessment and reporting techniques to accommodate the unique challenges posed by the NCP/AMAP ILS. In addition to our normal z-score plots, IQM incorporated additional Youden plots where possible to detect reproducibility issues and bias.





Areas for Improvement and next steps

Evaluation of the accuracy and precision of analytical results obtained from research for the NCP and AMAP programs is fundamental in the generation of reliable and inter-comparable data. To facilitate the design of this assessment, an advisory panel consisting of members of the participating laboratories, researchers, and members from the NCP/AMAP secretariat meets at regular intervals to discuss data quality objectives, sample matrices, and the addition of new analytes. Continual improvement of the program in coordination with evolving research priorities remains integral to program success.

We are looking to expand the number of advisory panels to handle specific issues, focusing on methyl mercury, unique requirements of air monitoring, multiparameter organic analyses, and reporting and evaluation issues for compounds of interest that have limited laboratory support.

We believe we are on a successful path to developing a stable methyl mercury in water sample that should eventually become a part of our regular proficiency testing program. In time, this sample should be available as a reference material to environmental laboratories.

We look forward to strengthening our working relationships with the research groups, collaborators, the NCP/AMAP secretariat, and indigenous groups. We welcome feedback, suggestions and the exchange of ideas that improve the QA/QC program and make it more meaningful to the end user.

1 Wellington Laboratories Inc.
2 A2LA Accreditation- https://customer.a2la.org/index.cfm?event=directory.detail&labPID=CF0F6422-F03E-46CD-A1A2-1CD10CC35CDF
3 Gamberg Consulting