

## **USEPA Great Lakes National Program Office (GLNPO)**

### **Request for Initial Proposals (RFIP) for the operation of the Integrated Atmospheric Deposition Network (IADN)**

#### **OVERVIEW**

The U.S. Environmental Protection Agency's Great Lakes National Program Office (GLNPO) is requesting Initial Proposals for the management and operation (including field sampling and laboratory analysis) for the Integrated Atmospheric Deposition Network (IADN). IADN measures persistent bioaccumulative toxic (PBT) substances in three phases: precipitation, vapor, and particulate. IADN is a cooperative effort between the U.S. EPA and Environment Canada aimed at estimating atmospheric deposition of PBTs to the Great Lakes. There are five sampling stations in the United States.

This is the initial announcement of this funding opportunity for the Great Lakes Program under Catalogue of Federal Domestic Assistance Number 66.469.

This RFIP is for a cooperative agreement totaling up to \$3,560,000 over five years. The successful applicant will submit quality-assured analytical results within 10 months of receipt of samples in laboratory (i.e., submit data on all 2005 samples to the IADN Data Manager by October 2006).

Proposals should not exceed fifteen pages in length. Curriculum vitae of principal investigators and other personnel critical to the proposed work should be included as appendices and will not count as proposal pages. The deadline for all Initial Proposals is 5:00 PM Central time, Monday evening, June 7, 2004. Decisions regarding this RFIP will be made by Tuesday, June 22, 2004. If a successful application is selected, a final proposal and documents required for an award will be due by Thursday, July 22, 2004.

Applicants should submit Initial Proposals in Microsoft Word, Wordperfect, or as a pdf file via e-mail to [hulting.melissa@epa.gov](mailto:hulting.melissa@epa.gov).

#### **I. FUNDING OPPORTUNITY DESCRIPTION**

Results of this award will support the Agency in measuring and achieving progress in protecting and restoring the chemical, physical, and biological integrity of the Great Lakes (Government Performance and Results Act subobjective 60403).

IADN is called for in Annex 15 of the Great Lakes Water Quality Agreement (GLWQA) and is used as a platform for conducting research and monitoring activities to assess the atmospheric deposition of PBT pollutants to the Great Lakes. The goals of IADN are to:

1. Determine, with a specified degree of confidence, the atmospheric loadings and trends (both spatial and temporal) of priority toxic chemicals to the Great Lakes and its basin on, at least, a biennial basis;
2. Acquire quality-assured air and precipitation concentrations measurements, with attention to continuity and consistency of those measurements, so that trend data are not biased by changes in network operations or personnel;
3. Help determine the sources of the continuing input of those chemicals (Second Implementation Plan for the IADN, 1998).

IADN currently collects data on the deposition of toxic pollutants (PCBs, organochlorine pesticides, and PAHs) to the Great Lakes at 16 sites (5 in the U.S.) through wet and dry deposition and gas exchange. Source attribution questions are addressed where possible.

The IADN presently consists of one master station per lake, along with several satellite stations. The three US master stations are located at Eagle Harbor, MI, Sleeping Bear Dunes, MI and Sturgeon Point, NY. Two satellite stations are located at Chicago, IL and Cleveland, OH. This Request for Initial Proposals (RFIP) addresses network management and operation including field sampling and sample analysis corresponding to a sample collection period of five years from September 1, 2004 to August 30, 2009 for the five currently operating US sites and other sites as determined by program needs. This RFIP also includes indefinite operation at the network co-location site at Point Petre, ON. (A site operator is already employed through Environment Canada at the Point Petre site.) Sampling equipment presently located at the sites is listed in Table 1. Target analytes are listed in Table 2. This list may be revised and/or expanded in the future depending on network resources and method availability. A summary of current sampling and analytical methods is given in Table 3.

### **Expectations of the Award Recipient**

The recipient will be responsible for program management (with US EPA and Environment Canada), field collection of samples through the use of site operators, sample analysis, Steering Committee participation, data reporting and interpretation, and methods development and intercomparison. Trace organics are currently collected as precipitation (XAD-2 resin columns), vapor-phase (XAD-2 cartridges) and particulate-phase air samples (Quartz Fiber Filters). The annual number of trace organic samples (sum of precipitation, vapor-phase, and particulate-phase) is approximately 485 plus any necessary additional quality assurance samples from the five land-based U.S. stations.

There is a possibility that some samples may be collected aboard the R/V Lake Guardian or alternate sites. In addition, chemicals may be added to or deleted from the IADN list at some point in the future. Such changes in sampling locations and chemicals will be based on program and grantee needs. In initial proposals, budgets should be based on the current IADN sampling and chemical scheme described in this RFIP. Applicants are requested to use sampling and analytical methods that are comparable to the SOPs that have been developed for IADN to ensure comparability and continuity in data sets. However, development and optimization of methods is encouraged.

Management/operation of the IADN involves the following tasks:

*Overall Program Management:* The Principal Investigator (PI)/grantee is responsible for ensuring efficient operation of the network. This includes coordination of the sample collection schedule with the GLNPO project officer and other IADN personnel; review and optimization of field methods; preparation and shipping of sampling supplies (including obtaining and cleaning XAD-2 resin if it is used); supervision of site operators; maintenance and calibration of the sampling equipment used in the collection of the organic parameters beyond that required of the site operators; maintenance and calibration of meteorological equipment and archiving of meteorological data (using Campbell dataloggers); maintenance of overall site (grounds, platform, fence, power supply, etc.) on an as needed basis; development, implementation, and revision of the Quality Assurance Project Plan (QAPP) and field and analytical Standard Operating Procedures (SOPs); sample analysis; data management, reporting, and interpretation; IADN Steering Committee participation; analytical methods development and optimization; and field and analytical intercomparison studies. The training and direction of the site operators is the responsibility of the PI. Frequent and effective communication is necessary between the PI and the GLNPO project officer to resolve problems, discuss status of sampling and results, etc.

*Steering Committee Participation:* The PI will actively participate in the binational US-Canada steering committee. The Steering Committee is responsible for determining the future direction of IADN and assessing and improving the quality of the present network through quality assurance, methods

comparability studies, reporting, etc. As a participant on the Steering Committee, the PI will be involved in evaluation of data quality indicators, revision of the target analyte list, assessing the adequacy of the measurement process, network-wide results reporting and outreach, development of loading estimates and models, and assessing the degree of accuracy of loading estimates. The Steering Committee also develops a report for SOLEC (State of the Lakes Ecosystem Conference) Indicator #117, Atmospheric Deposition of Toxic Chemicals.

The Steering Committee consists of representatives from participating IADN agencies. The PI will participate on monthly conference calls and at 1-2 network workshops, most often requiring travel, annually.

*Data Reporting and Interpretation:* Electronic data submissions, annual data summary and interpretive reports, annual Quality Assurance reports, and a Biennial US-Canadian Data Interpretation and Loadings report are the minimum requirement for data reporting. **Field and analytical data must be available to the GLNPO project officer and the IADN data manager within 10 months of receipt of samples in the laboratory.** Data is quality controlled by the IADN data manager and must be submitted in the proper format. There is also a possibility that IADN data may be added to the Great Lakes Environmental Monitoring Database (GLENDa) in the future. Drafts of manuscripts that use IADN data must be sent to and reviewed by the EPA Project Officer prior to submission for publication.

*Methods Development/Optimization/Intercomparison:* Methods development may be necessary as the parameter list is modified in response to workgroup recommendations. Specific details of required methods development are not presently available for inclusion in this RFIP; however, the initial proposals will be evaluated as to experience and success in methods development. Laboratory performance evaluations and intercomparison of field and analytical methods between IADN investigators to ensure sample comparability is also a part of the IADN program and is required. All IADN partners have sampling operations at the Point Petre station on Lake Ontario as part of an intercomparison program.

Information on IADN is on the internet at:

[http://www.msc.ec.gc.ca/iadn/index\\_e.html](http://www.msc.ec.gc.ca/iadn/index_e.html)

Look under "Resources" for current Standard Operating Procedures (SOPs).

Cooperation and communication with EPA employees and participants from other monitoring programs may also be necessary and beneficial in order to provide a full picture of toxic contaminants in the Great Lakes basin, as well as to properly inform policy and regulatory decisions regarding toxics reduction.

The above responsibilities and tasks should be discussed in Initial Proposals.

## II. AWARD INFORMATION

GLNPO is requesting that applicants submit Initial Proposals for up to \$670,000 for Year 1, followed by four more years of funding, adjusted roughly for inflation, for a total of up to \$3,560,000 for five years of IADN operation. The estimated funding amount is included in this RFIP as a planning target. EPA may partially fund the budget period each year and will consider funding each annual portion of the balance of the budget request contingent upon satisfactory progress as certified by the EPA Project Officer, the availability of funds in GLNPO's annual budget, IADN program needs, and EPA-GLNPO priorities. It is understood that the scope of work will be renegotiated to reflect the amount awarded if additional funds are not available.

GLNPO anticipates that one award will be made. However, the U.S. EPA reserves the right to reject all initial proposals or applications and make no awards.

Anticipated Start and End Dates. The cooperative agreement start date and end dates are planned as September 1, 2004-August 30, 2009. Applicants should also consider the Federal requirement that projects involving data collection require an approved Quality Assurance Project Plan prior to commencing environmental data collection. Annual data reports are required, as well as a final report covering the full project period.

Clarification/Revisions. Applicants may be contacted for clarification and for the purpose of negotiating changes in project terms and amounts.

Confidentiality. Applicants should clearly mark information they consider confidential, and EPA will make final confidentiality decisions in accordance with Agency regulations at 40 CFR, Part 2, Subpart B. However, we discourage submission of any confidential material. Note that under Public Law No. 105-277, data produced under an award is subject to the Freedom of Information Act.

Type of Award. The successful applicant will be issued a cooperative agreement, inter-agency agreement or such other funding instrument as may be most appropriate. An initial proposal from the current IADN grantee for renewal of the project may compete with new initial proposals. A cooperative agreement is appropriate since the GLNPO project officer will have substantial involvement and communication with the grantee (via phone calls, conference calls, e-mail, face-to-face meetings) regarding the operation of and planning for the network (see "Expectations of the Award Recipient").

### **III. ELIGIBILITY AND MATCHING**

Eligibility. Assistance is available pursuant to Clean Water Act §104(b)(3) for activities in the Great Lakes Basin and in support of the Great Lakes Water Quality Agreement. The Catalog of Federal Domestic Assistance identifies this assistance as: 66.469, Great Lakes Program. State pollution control agencies, interstate agencies, other public or nonprofit private agencies, institutions, and organizations are eligible; "for-profit" organizations are not.

Match. A minimum non-Federal match of at least 5% of total project costs, which may include in-kind work, is required for this program.

### **IV. APPLICATION AND SUBMISSION**

All information needed by applicants regarding information to be submitted is contained in this RFIP and on the IADN website at [http://www.msc.ec.gc.ca/iadn/index\\_e.html](http://www.msc.ec.gc.ca/iadn/index_e.html).

Format. Proposals should not exceed fifteen pages in length. Curriculum vitae of principal investigators and other personnel critical to the proposed work should be included as appendices and will not count as proposal pages.

Include the following in your Initial Proposal:

1. Applicant. Applicant Organization Name, Contact Person's Title and Name, Business Address, City, State, Business Phone, Fax and E-mail.
2. Project Title.
3. Abstract. Less than a page.
4. Problem Statement and Background.
5. Proposed Work. Outline what will be done and how, including proposed methods. Include experience and previous projects involving analysis for trace organics.
6. Project Milestones/Timeline. Specify milestones and final products and projected due dates (Month/Year).
7. Budget. Note how USEPA funds (USEPA Share) and non-USEPA matching funds (Applicant's Match) will be used for personnel/salaries, fringe benefits, travel, equipment, supplies, contract

costs, and other costs. You may include a separate line for indirect costs if your organization has in place (or will negotiate) an "indirect cost rate" from a cognizant Federal agency. The USEPA share represents the total that the Applicant expects to request from USEPA for the project's duration.

8. Other Active Grants/Projects.
9. Describe any proposed collaboration on this project, other than with USEPA GLNPO and Environment Canada. (Additional collaboration is not required.)
10. Appendices (not included in page limit): Curriculum vitae of PI/PIs and main staff. Any relevant letters from collaborators.

#### Additional Budget Details.

Include funds for sampling and analysis of the following sample breakdown:

#### Number of Samples

For five U.S. stations (including field duplicates and field blanks collected at a 10% frequency):

Organic	- precipitation: Every 28 days	80/year
	- particle-phase: Every 12d	180/year
	- vapor-phase: Every 12d	<u>180/year</u>
		440/year

Intercomparison station (Point Petre):

Organic	- precipitation: Every 28d	13/year
	- particle-phase: Every 24d	16/year
	- vapor-phase: Every 24d	<u>16/year</u>
		45/year

**Total: 485 field samples**

Lab QC samples (duplicates at a 5% frequency, surrogate and matrix spikes, blanks, network-wide common reference standard, etc.) are also required. Currently lab matrix blanks are analyzed at a frequency of 5%. Adjustments from these quality assurance sample frequencies may be suggested with justification.

Site Costs: Costs for site operators and for shipping sampling media and samples to and from the sites should be included. Calibration and maintenance (three times per year per site, plus visits for emergency repair) of the appropriate organics sampling equipment (hi-vols, MICs, meteorological tower) is also required.

Travel: For the purpose of cost comparisons, the initial proposal shall include travel costs to attend one meeting in Toronto and one in Chicago (two days, two nights for each meeting) each year for Steering Committee and progress reporting meetings. Travel costs for attending two professional meetings (including IAGLR) each year should also be included. For network operation, estimates for three trips per year to each of the sites for calibration and maintenance of equipment should be included as a separate line item.

Submission. Electronic submissions are required. Attach a copy of the file, in Word, Wordperfect, or pdf format, to an e-mail to [hulting.melissa@epa.gov](mailto:hulting.melissa@epa.gov). Hard copies do not have to be mailed. Applicants will receive confirmation that their initial proposal has been received via e-mail.

Deadline. The deadline for all Initial Proposals is 5:00 PM Central time, Monday evening, June 7, 2004. Timeliness will be determined by the date and time of receipt by [hulting.melissa@epa.gov](mailto:hulting.melissa@epa.gov). Late applications will not be reviewed and considered.

Reimbursement of pre-award costs incurred up to 90 days prior to the grant start date will be considered on a case-by-case basis.

## **V. APPLICATION REVIEW**

Criteria. Initial proposals will be evaluated according to these criteria:

(50%) Qualifications of the principal investigators (PIs) and staff. This will stress demonstrated expertise of the PI in the proposed program area including ability to perform trace level contaminants analyses and experience in management and interpretation of environmental data. Applicants with existing EPA projects should be up-to-date on reporting and other requirements, and past performance on EPA grants will be considered.

(20%) Demonstrated access to laboratory space, instrumentation, and personnel sufficient to complete the work described in this RFP within the prescribed time frame.

(20%) Appropriate budget. Reasonable budgetary justification of the project, including cost of analysis, meeting administrative principle requirements of 40CFR Part 30/circular A-21 or A-122, and applicable administrative requirements for audit and administration.

(10%) Management structure sufficient for successful project completion, successful and broad reporting, and overall vision in terms of the future direction of IADN.

At least three USEPA reviewers, including the GLNPO IADN Program Manager, and two external reviewers will evaluate and score each Initial Proposal using the above criteria and weighting. The three proposals with the highest scores will be further evaluated by the panel, and a selection will be made. The final decision will be made by the EPA Approval Official based on the final proposal and Federal application package submitted by the chosen applicant. The U.S. EPA reserves the right to reject all proposals or applications and make no awards.

Decisions regarding this RFIP will be made by Tuesday, June 22, 2004. USEPA will invite the selected applicant to submit a detailed final Proposal along with the SF-424 and attendant documentation for Federal assistance (Application Packages). The application package will be due by Thursday, July 22, 2004.

## **VI. AWARD ADMINISTRATION**

Notification: We will confirm Initial Proposal receipt via a reply e-mail. Contact Melissa Hulting at 312-886-2265 if you do not receive a confirmation e-mail. GLNPO will contact all Applicants to notify them whether or not they will be asked to submit an Application Package. If an Initial Proposal is selected for funding, the applicant will be required to submit a full proposal, an Application for Federal Assistance, and other required assistance documents.

Issuance of Awards. USEPA reserves the right to negotiate changes in Initial Proposals before making a final decision and award and reserves the right to reject all Initial Proposals or applications and make no awards. USEPA has 60 days to issue an award following receipt of the complete, fundable Application Package. Final funding decisions are based upon the Application Package.

Administrative and Reporting Requirements applicable to Awards. The successful applicant will be required to adhere to the Federal grants requirements, particularly those found in applicable OMB circulars on Cost Principles (A-21, A-87, or A-122), Administrative Requirements (A-102 or 110), and Audit Requirements (A-133) available from <<http://www.whitehouse.gov/omb/grants/>>. This includes

government-wide requirements pertaining to accounting standards, lobbying, minority or woman business enterprise, publication, meetings, construction, and disposition of property. EPA regulations governing assistance programs and recipients are codified in Title 40 of the Code of Federal Regulations. Those requirements, GLNPO-specific requirements, and the application materials that will be needed by applicants ultimately selected in this process can be found at <http://www.epa.gov/grtlakes/fund/projreqs.html> and <http://www.epa.gov/grtlakes/fund/appforms.html>.

Dispute Resolution Process. If necessary, a dispute resolution process in accordance with 40 CFR 30.63 and Part 31, subpart F will be implemented.

Quality Assurance. All projects that use or collect environmental data must have an approved Quality System. A Quality Management Plan (QMP) that adequately describes the Quality System must be approved by the GLNPO Quality Assurance Manager and IADN Project Officer 30 days prior to commencement of data collection. Costs associated with data collection are not allowable costs until the Quality System is approved. Contact GLNPO's Quality Assurance Manager, Louis Blume (312-353-2317) with questions.

Reporting. Electronic data submissions, annual data summary and interpretive reports, annual Quality Assurance reports, and a Biennial US-Canadian Data Interpretation and Loadings report are the minimum requirement for data reporting. At least two Atmospheric Loadings Reports (i.e. deposition estimates and corresponding uncertainty estimates) will be developed during the grant period in coordination with other US and Canadian IADN participants and will be published under the IADN program. Traditionally, the IADN Base Program U.S. PI is responsible for developing the loadings estimates every two years (i.e., every other biennial loadings cycle).

Note that under Public Law No. 105-277, data produced under an EPA award is subject to the Freedom of Information Act. The PI will be required to submit all data in the electronic format required by the data verification application Research Data Management and Quality Control System (RDMQ). Details will be supplied by the IADN data manager.

## **VII. AGENCY CONTACT**

According to USEPA's Competition Policy and USEPA guidance, contacts may provide pre-application assistance to help potential applicants determine whether the applicant is eligible for funding. Drafts of initial proposals *cannot* be pre-reviewed by EPA personnel prior to submission.

Contact:  
Melissa Hulting  
U.S. EPA Great Lakes National Program Office  
77 West Jackson Boulevard, Mail Code G-17J  
Chicago, IL 60604  
Phone: 312-886-2265  
Fax: 312-353-2018  
E-mail: [hulting.melissa@epa.gov](mailto:hulting.melissa@epa.gov)

**Table 1. IADN Master Station Sampling Equipment**

Parameter	Sampling Instrument	Number of Samplers	Current Frequency of Sampling
Semivolatile organic compounds - vapor/particulate	Mod Hi-Vol Anderson (Model UV-1)	2	24 hours every 12 days
Semivolatile organic compounds - precipitation	Mod MIC Sampler w/Belfort rain gauge	2	Integrated 28 days
Trace Metals - air	Dichot Andersen (Model 234)	1	Discontinued in US; In past, composite 96 hours/28 days ♦ ★
Trace Metals - precipitation	Mod Aerochem	1	Discontinued in March 1995; In past, integrated 7 days
Nutrients/major ions	Std Aerochem	1	Discontinued; In past, integrated 7 days
TSP/TOC	Std Hi-Vol Andersen (Model UV-1)	1	Discontinued; In past, 24 hours every 6 days
Wind Speed	Meteorological Tower	1	continuous
Wind Direction	Meteorological Tower	1	continuous
Solar Radiation	Meteorological Tower	1	continuous
Temperature	Meteorological Tower	1	continuous
Relative Humidity	Meteorological Tower	1	continuous

♦ Actual number of hours per month has varied in past depending on character of sites (more time for cleaner sites, less for Chicago, etc.)

★ Environment Canada currently samples metals in precipitation monthly and metals as particulates every 12 days

## Table 2. Integrated Atmospheric Deposition Network Parameters

The "IADN Chemical List" includes those parameters required by all participating agencies. A subset of PCB congeners must be measured by all agencies, and their total is reported as Suite PCB by IADN. The second section of this table names the substances for which data is currently available for one or more agencies. The last section of the table shows substances for which loadings estimates are available. Calculation of loadings estimates requires appropriate water concentration data and reliable physical-chemical parameter information.

### Chemical List, Revised 5/2000

IADN Chemical List	
Chemicals Measured at all Master Stations in Air and Precipitation	
PCBs (56 congeners and $\Sigma$ PCB suite)	
<p><b>Organochlorine pesticides:</b></p> <p>Aldrin</p> <p>trans-chlordane (<math>\gamma</math>)</p> <p>cis-chlordane (<math>\alpha</math>)</p> <p><i>p,p'</i>-DDT</p> <p><i>p,p'</i>-DDD</p> <p><i>p,p'</i>-DDE</p> <p><i>o,p'</i>-DDT</p> <p>Dieldrin</p> <p><math>\alpha</math>-endosulphan (I)</p> <p><math>\beta</math>-endosulphan (II)</p> <p>Endrin</p> <p>Heptachlor epoxide</p> <p>Hexachlorobenzene (HCB)</p> <p><math>\alpha</math> - HCH</p> <p><math>\beta</math> - HCH</p>	<p><math>\gamma</math> - HCH (lindane)</p> <p>Methoxychlor</p> <p>Trans-nonachlor</p> <p><b>Polycyclic aromatic compounds:</b></p> <p>Anthracene</p> <p>Benz(<i>a</i>)anthracene</p> <p>Benzo(<i>b</i>)fluoranthene</p> <p>Benzo(<i>k</i>)fluoranthene</p> <p>Benzo(<i>ghi</i>)perylene</p> <p>Benzo(<i>a</i>)pyrene</p> <p>Chrysene + Triphenylene</p> <p>Dibenz(<i>a,h</i>)anthracene</p> <p>Fluoranthene</p> <p>Indeno(1,2,3,<i>cd</i>)pyrene</p> <p>Phenanthrene</p> <p>Pyrene</p>

**Additional chemicals for which data is available**  
**Monitoring currently done by at least 1 agency**⊗

<i>o,p'</i> -DDD (MSC, EPA)	Benzo( <i>e</i> )pyrene (MSC, EPA)
<i>o,p'</i> -DDE (MSC)	2-chloronaphthalene (EHD)
Endosulphan sulphate (MSC, EPA)	Coronene (MSC, EPA)
Heptachlor (MSC, EHD)	Dibenz( <i>a,c</i> )anthracene (MSC)
Photomirex (MSC)	Fluorene (MSC, EPA)
Mirex (MSC, EHD)	Indene (EHD)
Octachlorostyrene (EPA)	1-methylnaphthalene (EHD)
Oxychlorodane (MSC, EPA)	2-methylnaphthalene (EHD)
di-/tri-/tetra-/pentachlorobenzenes (EHD)	Retene (MSC, EPA)
Acenaphthene (MSC, EHD)	<b>Trace elements</b> ◆:
Acenaphthylene (MSC, EHD)	As (MSC)
Anthanthrene (MSC)	Cd (MSC, EHD)
Benzo( <i>ghi</i> )fluoranthene (MSC)	Pb (MSC, EHD)
1,2,3,4-tetrahydronaphthalene (EHD)	Se (MSC)
	Mercury (MSC, EHD)

**Chemicals for which loadings estimates are available**  
 (Based on loadings report published 5/2000)

trans-chlordane	Suite PCBs
cis-chlordane	Individual PCB congeners 18, 44, 52, 101
<i>p,p'</i> -DDD	
<i>p,p'</i> -DDE	Benzo( <i>b</i> )fluoranthene
<i>p,p'</i> -DDT	Benzo( <i>k</i> )fluoranthene
Dieldrin	Benzo( <i>a</i> )pyrene
$\alpha$ -endosulphan	Indeno(1,2,3, <i>cd</i> )pyrene
$\beta$ -endosulphan	Phenanthrene
Endosulphan sulphate	Pyrene
Hexachlorobenzene (HCB)	
a-HCH	As
g-HCH	Cd
trans-nonachlor	Pb
	Se

Meteorological parameters: Wind speed, wind direction, air temperature, solar radiation, relative humidity, barometric pressure, precipitation amount/rate

⊗ Cooperating agencies are U.S EPA/its grantee; the Meteorological Service of Canada (MSC), part of Environment Canada and formerly Atmospheric Environment Service (AES); and Ecosystem Health Division of Environment Canada (EHD).

◆ Samples at U.S. stations have not been analyzed for metals since 1995.

**Table 3. Summary of sampling and analysis methods**

Media/Parameter	Agency	Sampling Method <sup>a</sup>	Sampling Frequency <sup>b</sup>	Analytical Method	Reporting Units/ Status
Air Organics (PCBs, Pesticides, PAHs)	MSC	HiVol PUF Sampler: GFF + PUF	24 hr/12 days	Soxhlet/GC-ECD (PCBs, Pesticides); HPLC-fluorescence (PAHs)	pg/m <sup>3</sup>
	Current EPA grantee	HiVol: GFF + XAD-2	24 hr/12 days	Soxhlet/GC-ECD (PCBs, Pesticides); GC/MS (PAHs)	pg/m <sup>3</sup>
Air Metals	MSC	PM10/15 HiVol	24 hr/12 days	ICP-MS or INAA	ng/m <sup>3</sup>
	Current EPA grantee	PM10 Dichot	96 hr/28 days	XRF	ng/m <sup>3</sup> Discontinued
Precipitation Organics (PCBs, Pesticides, PAHs)	Current EPA grantee	MIC-B/XAD2	28 days	GC-ECD, GC-MS	ng/L
	EHD	MIC-B/DCM	14 days	GC-ECD or GC-MS	ng/L
Precipitation Metals	EHD	MIC-B	monthly	ICP	ug/L
Total Suspended Particulate	MSC	HiVol/GFF	24 hr/6 days	Gravimetric	ug/m <sup>3</sup> Discontinued
	Current EPA grantee	HiVol/QFF	24 hr/12 days	Gravimetric	ug/m <sup>3</sup>
Meteorology <sup>c</sup>					
Temperature	MSC, Current EPA grantee	Thermistor	hrly. avg.	Direct Reading	°C
Relative Humidity	MSC, Current EPA grantee	Hygristor	hrly. avg.	Direct Reading	Percent
Barometric Pressure	Current EPA grantee		hrly. avg.	Direct Reading	kPa
Wind Speed	MSC, Current EPA grantee	Anemometer	hrly. avg.	Direct Reading	m/s
Wind Direction	MSC, Current EPA grantee	Vane	hrly. avg.	Direct Reading	Degrees
Precipitation Amount	MSC	Type B Rain Gauge	24 hrs	Direct Reading	mm
	Current EPA grantee, MSC	Belfort gauge	continuous	Direct Reading	mm
Solar Irradiation	MSC	Pyranometer	hrly. avg.	Direct Reading	W/m <sup>2</sup>
	Current EPA grantee	Pyranometer	hrly. avg.	Direct Reading	Langleys

## NOTES:

- <sup>a</sup> Sampling and analysis methods used by different groups may appear similar, but differ in operational and other details.
- <sup>b</sup> Sampling frequency is sometimes given as sample duration/sampling interval.

### KEY TO ABBREVIATIONS

AAS	atomic absorption spectroscopy
DCM	dichloromethane solvent
Dichot	dichotomous sampler
ECD	electron capture detector
GC	gas chromatography
GFF	glass fibre filter
HiVol	high volume sampler
ICP	inductively coupled plasma spectrometry
INAA	instrumental neutron activation analysis
LoVol	low volume sampler
MIC-A	MIC type A precipitation sampler
MIC-AU	MIC type AU precipitation sampler
MIC-B	MIC type B precipitation sampler
MS	mass spectrometry
PM10	particulate matter less than 10µm in diameter
PUF	polyurethane foam plug
XAD	XAD resin
XRF	x-ray fluorescence