

QUALITY ASSURANCE PROJECT PLAN (QAPjP) and QA Report for Pacific 2001

Prepared by: Jan Bottenheim

Date:

Table of Contents

1.	Principal Investigator	3
2.	Team Members	3
3.	Measurement Program	3
4.	Measurement Species and Units	3
5.	Representative Size Range (if PM)	3
6.	Measurement Platform (surface, airborne)	3
7.	Measurement Sites (surface only)	3
8.	Measurement Objective(s)	3
9.	Measurement Details	3
9.1.	Field Measurements	3
9.1.1.	Measurement Principle	3
9.1.2.	Instrumentation (Manufacturer/Model)	3
9.1.3.	Flow System	3
9.1.4.	Inlet Height Above Ground (if surface)	3
9.1.5.	Nominal Flow Rate	4
9.1.6.	Flow Measurement/Control	4
9.1.7.	Flow Temperature and Pressure	4
9.1.8.	Sampling Times/Period/Frequency	4
9.1.9.	Sampling Methods	4
9.1.10.	Filter Type/Coating Type/Reagent Type	4
9.1.11.	Planned Changes to Instruments or Methods During Study	4
9.2.	Laboratory Measurements (If Applicable)	4
9.2.1.	Laboratory Name and Address	4
9.2.2.	Analytical Method(s)	4
9.2.3.	Sample Extraction or Work-up	4
9.2.4.	Analytical Detection Limits	4
10.	Quality Assurance/Quality Control	4
10.1.	Field Quality Assurance/Quality Control	4
10.1.1.	Traceability	4
10.1.2.	Calibration	4
10.1.3.	Zeros and spans	5
10.1.4.	Blanks	5
10.1.5.	Field Quality Control procedures	5
10.1.6.	Precision determination	5
10.1.7.	Comparison with other measurements	5
10.1.8.	Inspections and Audits	5
10.2.	Laboratory Quality Assurance/Quality Control	5
10.2.1.	Traceability	5
10.2.2.	Calibration procedures	5
10.2.3.	Blanks	5
10.2.4.	Other lab QC	5
10.2.5.	Precision determination	5
10.2.6.	Comparison with other methods	5

10.2.7.	Audits	5
11.	Data Management and Quality Control	6
11.1.	Raw Data Recording	6
11.2.	Final Data Reporting	6
11.3.	Data Quality Control and Validation	6
11.4.	Validity Flags.....	6
11.5.	Derived Parameters	6
11.6.	Explanation of Zero or Negative Data	6
12.	Data Quality Objectives (Pre-Study)	6
12.1.	Accuracy	6
12.2.	Precision	6
12.3.	Comparability	6
12.4.	Representativeness	6
12.5.	Completeness	6
12.6.	Other Quality Information.....	6

1. Principal Investigator

Jan W Bottenheim, Meteorological Service of Canada, 4905 Dufferin Street,
Toronto, Ontario M3H 5T4

2. Team Members

Jan W Bottenheim, Alan J Gallant

3. Measurement Program

Gas Chromatography with Pulsed Discharge Detection (GC/PDD)

4. Measurement Species and Units

PAN, pmol/mol

PPN, pmol/mol

5. Representative Size Range (if PM)

N/A

6. Measurement Platform (surface, airborne)

Surface, intake port 3m above local surface (tbd by local circumstances)

7. Measurement Sites (surface only)

Slocan Park, Langley, Sumas Mountain

8. Measurement Objective(s)

To determine diurnal and episodic trends in PAN and PPN, including variations of their relative mole fractions at 2 (or 3) sites progressively further downwind of the center of Vancouver, and relate the results to atmospheric oxidation processes

9. Measurement Details

9.1. Field Measurements

9.1.1. Measurement Principle

Grab sample collection every 5 minutes followed by GC separation and detection by pulse discharge detector operating in "ECD" mode

9.1.2. Instrumentation (Manufacturer/Model)

Home built GC system with Valco PDD detector. Restec – 200 capillary columns (megabore, 0.53mmID, with 1 μ film

9.1.3. Flow System

Sampling flow controlled by critical orifice and Brooks Mass Flow meters

9.1.4. Inlet Height Above Ground (if surface)

3m above local surface if feasible

9.1.5. Nominal Flow Rate

sampling flow rate $2 \text{ dm}^3\text{min}^{-1}$, of which approx. $40 \text{ cm}^3\text{min}^{-1}$ is shunted towards the sample loop. Flow control downstream of sample loop

9.1.6. Flow Measurement/Control

critical orifice+Brooks mass flow meter

9.1.7. Flow Temperature and Pressure

STP (0 C, 101.2 kPa)

9.1.8. Sampling Times/Period/Frequency

Grab sample collection every 5 minutes

9.1.9. Sampling Methods

grab sampling, collection via Teflon filter (5m pore size), 6.25 mm OD PFA tubing, 5m length maximum (tbd), 2 cm^3 sample loop (stainless steel)

9.1.10. Filter Type/Coating Type/Reagent Type

Teflon

9.1.11. Planned Changes to Instruments or Methods During Study

none planned

9.2. Laboratory Measurements (If Applicable)

9.2.1. Laboratory Name and Address

N/A

9.2.2. Analytical Method(s)

N/A

9.2.3. Sample Extraction or Work-up

N/A

9.2.4. Analytical Detection Limits

N/A

10. Quality Assurance/Quality Control

10.1. Field Quality Assurance/Quality Control

10.1.1. Traceability

NO standard (1ppm in N_2 , Matheson), cross calibrated against NO_y systems on site

10.1.2. Calibration

Metcon PAN calibration system for PAN, based on photolysis of mixture of NO (known mole fraction) in nitrogen and acetone in air.

10.1.3. Zeros and spans

Automatic span with calibration system, frequency tbd (at least once every 6 hours, potentially more frequently)

10.1.4. Blanks

After installation of system and at end of study only, using heated stainless steel PAN/PPN “killer”

10.1.5. Field Quality Control procedures

Daily inspection by designated person on site (system operates in fully automated mode)

10.1.6. Precision determination

instruments will be operated side-by-side at CARE before shipment to BC

10.1.7. Comparison with other measurements

None

10.1.8. Inspections and Audits

inspections daily by designated person on site. No other inspection or audits planned

10.2. Laboratory Quality Assurance/Quality Control

10.2.1. Traceability

N/A

10.2.2. Calibration procedures

N/A

10.2.3. Blanks

N/A

10.2.4. Other lab QC

N/A

10.2.5. Precision determination

N/A

10.2.6. Comparison with other methods

N/A

10.2.7. Audits

N/A

11. Data Management and Quality Control

11.1. Raw Data Recording

All relevant parameters (flows, temperatures) are automatically logged for each sample. Cylinder pressures to be logged by local designated person. All logging by Campbell Scientific CR10 datalogger, automatically dumped for computer HD backup.

11.2. Final Data Reporting

Integration results stored on same computer/HD. Integration method tbd
5 minute grab sample data

11.3. Data Quality Control and Validation

11.4. Validity Flags

NARSTO flags
tbd. Identification by flagging

11.5. Derived Parameters

None

11.6. Explanation of Zero or Negative Data

none intended

12. Data Quality Objectives (Pre-Study)

12.1. Accuracy

Objective = +/- 15%

12.2. Precision

Objective +/- 5%

12.3. Comparability

Depends on NO_y systems

12.4. Representativeness

As in general planning document

12.5. Completeness

PAN better than 95%
PPN tbd (expect better than 80%)

12.6. Other Quality Information

End of Pre-Study QAPjP
