

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

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Date:

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2. Team Members

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3. Measurement Program

NO/NO₂

4. Measurement Species and Units

NO/NO₂, ppbv

5. Representative Size Range (if PM)

N/A

6. Measurement Platform (surface, airborne)

Surface, estimated 5 m above ground by trailer on tower

7. Measurement Sites (surface only)

Langley and Sumas

8. Measurement Objective(s)

9. Measurement Details

9.1. Field Measurements

9.1.1. Measurement Principle

chemiluminescence with photolysis conversion for NO₂

9.1.2. Instrumentation (Manufacturer/Model)

Ecophysics CLD770+PLC760

9.1.3. Flow System

Main sample flow and O₂ flow for O₃ generation produced by a vacuum pump. Bypass flow to flush system generated by a KNF portable pump. The main ambient sampling line is of ¼" black Teflon tubing.

9.1.4. Inlet Height Above Ground (if surface)

5 m above the ground on tower near trailer.

9.1.5. Nominal Flow Rate

Total ambient inlet flow: 3 LPM; 1.5 LPM for NO; 1.5 LPM for NO₂; 1.5 LPM bypass flow; 70 cm³/min O₂ flow with 20-30 cm³/min excess

9.1.6. Flow Measurement/Control

Ambient flow to detector unit (CLD770) controlled by a capillary. The bypass flow controlled by a manual valve and measured and recorded with a Hastings 5K flowmeter. The O₂ flow is controlled with a needle valve and measured with a 100 or 500 cm³/min MKS flowmeter.

9.1.7. Flow Temperature and Pressure

9.1.8. Sampling Times/Period/Frequency

The data will be collected as counts and integrated over a 1 minute period.

9.1.9. Sampling Methods

N/A

9.1.10. Filter Type/Coating Type/Reagent Type

N/A

9.1.11. Planned Changes to Instruments or Methods During Study

None

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 and NO₂ will be calibrated using a NIST-referenced NO standard. Flows are referenced to an MSC MKS primary flow standard.

10.1.2. Calibration

Daily calibrations will be performed for about 1 hour using the NO transfer standard (referenced to NIST) to determine the instrument sensitivity and the NO₂ conversion efficiency. The daily calibration factors and efficiencies will be applied to the data set probably using an interpolation method.

10.1.3. Zeros and spans

Instrument zeros will be performed once every 10 minutes each for NO and NO₂, and zero air will be run through the system daily as part of the calibration routine.

10.1.4. Blanks

N/A

10.1.5. Field Quality Control procedures

There will be a check list used to perform daily tasks to ensure that the measurement system is functioning properly. These tasks will include checks of: O₂ flow, bypass flow, computer data acquisition okay, time synchronization and cylinder pressures.

10.1.6. Precision determination

10.1.7. Comparison with other measurements

10.1.8. Inspections and Audits

10.2. Laboratory Quality Assurance/Quality Control

N/A

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

One minute integrated counts/sec will be collected on a notebook computer running QBasic. An analog signal may also be recorded on the main computerized data acquisition system, and possibly to a chart recorder. The bypass and O2 flows will be recorded on the main computer data acquisition system.

11.2. Final Data Reporting

1 minute data will be reported.

11.3. Data Quality Control and Validation

Data values will be flagged as either Valid (V) or Invalid (I). Raw data will be inspected and all instrument and power failures, zero, span and calibration period will be flagged as invalid. The raw data will be zero-corrected (method determined from stability) and calibration factors and efficiencies will probably be interpolated from the daily values to correct the zero-corrected data.

11.4. Validity Flags

V valid value

Q valid value, but qualified because of possible contamination (eg. pollution source, laboratory contamination source)

M0 missing value because no value available

M1 missing value because invalidated by data originator

11.5. Below Method Detection Limit Values

11.6. Derived Parameters

N/A

11.7. Explanation of Zero or Negative Data

N/A

12. Data Quality Objectives (Pre-Study)

12.1. Accuracy

<15%

12.2. Precision

N/A

12.3. Comparability

N/A

12.4. Representativeness

The measurements at the Langley site will be representative of processed air pollution in which secondary pollutants will have formed. The measurements at the Sumas Mountain site will be representative of processed air pollution. They will also be characteristic of the free boundary layer air and thus representative of the processes affecting the evolution of pollutants throughout the diurnal cycle.

12.5. Completeness

Objective = 100%. Excluding periods of instrument failure, power failure, zero and span readings, calibrations and on-site motor vehicle interference.

12.6. Other Quality Information

End of Pre-Study QAPjP
