

REPORTING AND DISTRIBUTION OF RESULTS1 INTRODUCTION

This document gives instructions and recommendations for the collection of primary data from the ground sampling stations and the chemical analysis of the samples in the Pilot Measuring Phase of the LRTAP programme, and for the reporting of data to the Central Coordinating Unit (CCU).

2 PRIMARY DATA

The following data should be recorded for each sample:

2.1. Operation of sampling stationsAir samples:

- Date and hour of sample change. Either the time of starting, the sampling period, or both the start of the sampling and the time of the sample collection should be given.
- Gas meter reading, before and after, or sampling rate (flow meter reading) at the beginning and at the end of the sampling period.
- The temperature of the air in the gas meter or flow meter.
- the amount of absorption solution left in the bubbler at the end of the sampling period.

Precipitation samples:

- Date and hour of sample collection as above
- Volume in milliliters of sample collected
- Millimeters of precipitation from the ordinary precipitation gauge.

## 2.2. Chemical analysis

### Air samples:

- Concentration of sulphate in the hydrogen peroxide absorption solution expressed as  $\mu\text{g}$  of  $\text{SO}_2$  per milliliter.
- Amount of sulphate in impregnated standard filters giving the same XRF intensity as the sample filter.
- Ratio of the XRF intensity (minus blank counts) from the back side of the filter to the measured XRF intensity from the front of the sample filter.

### Precipitation samples:

- pH of the sample
- Concentration of strong acid in microequivalents per litre.
- Concentration of sulphate in milligrams of  $\text{SO}_4^{2-}$  per litre.
- Concentration of other cations or anions if determined, in milligrams per litre.

## 2.3. Registration of the primary data

The above data should be readily available to the CCU upon request. A form which has been used for the collection of primary data in the preparatory phase of the measuring programme in Norway is enclosed as an example of recording of primary data. This may be adaptable for use in some of the participating countries.

## 3 REPORTING OF DATA TO THE CCU.

### 3.1. Time schedule

All samples for each month should be analysed and the results sent to the CCU, Norwegian Institute for Air Research, P.O. Box 15, N-2007 Kjeller, within the 20th of the following month, in order to facilitate the preparation of the monthly survey of the results by the CCU.

### 3.2. Reporting form

A proposed standard form for the reporting of the results to the CCU is enclosed together with a brief explanation of the symbols.

This form should be followed as closely as possible in order to simplify the data handling. It is particularly important that the same concentration units are used by the participants in their reports to the CCU, and that the data are given in the same logical order.

The number of decimals included in the example should be taken as normative.

## 4 DISTRIBUTION OF RESULTS

The CPU will distribute a report within 2-4 weeks from receiving the results from the participants. This will contain monthly concentrations of the individual constituents determined in the air and precipitation samples. This will be given for all stations and all days in the month on a matrix form with the concentration of one component for all stations and each day in the month on one page.

APPENDIX 1FORM FOR RECORDING OF PRIMARY DATAExplanations of the columns:

Date: From - to. Hour of sample change is 0700 GMT on all stations.

PUMP No: A sequential air sampler with 8 individual pumps is being used.

SAMPLING RATE: A rotameter-type flow meter is used. The columns labeled "Corr" is for correction of the measured values according to calibration figures for the flowmeter.

SAMPLE WEIGHT: The amount of absorption liquid is left in the bubblers at the end of the sampling period is measured by weighing of the bottles.

µg SO<sub>2</sub>: Concentration per cm<sup>3</sup> of absorption solution, amount of SO<sub>2</sub> collected, and concentration per cubic metre of the air sample.

NOTES: This column is for observations made at the sampling station with respect to the functioning of the sampling equipment etc.

(XRF): This column is not used because the X-ray fluorescence determinations are made on a monthly basis.

DATE: Start of the sampling period

AMOUNT OF PRECIPITATION:

ML: Volume of sample collected in the precipitation sampler  
MM: Millimeters of precipitation from a precipitation gauge.

WIND DIRECTION: For internal use (in order to judge differences in the precipitation figures).

pH:

STRONG ACID: µeq/l concentration in microequivalents per litre.

mg/l: Concentrations of the indicated cations and anions in Milligrams per litre.

(Corr.  $\text{SO}_4^{2-}$ ): Concentration of sulphate not due to sea-spray, deduced from the measured sulphate concentration and the sodium or magnesium concentrations.

$\mu\text{g SO}_2/\text{m}^3$ , AIR: The concentrations of sulphur dioxide in air are copied down in this column in order to facilitate a condensation of the results.

OPERATION FORM - LRTAP GROUND STATIONS

Week 19

DATE m--to	PUM P no	Sampl. rate, l/h Before Meas After Meas	Air vol m <sup>3</sup>	Samp. weight		µg SO <sub>2</sub>		NOTES:	2)	(XRF):
				TOT.	NET.	pr ml	Total			
- / -	1								1	
- / -	2								2	
- / -	3								3	
- / -	4								4	
- / -	5								5	
- / -	6								6	
- / -	7								7	
- / -	8								8	

Instructions for the operator:  
Use a pencil to fill in the form. Do not write in the columns under the shaded areas. If the column for "Notes" does not give sufficient space, write observations on the back of the form with a reference number in column 2).  
For the rate of the sampling, flowmeter readings taken after insertion of a new filter and and just before removal of the filter should be recorded.

DATE	Station no.	Amount precip. ml	Wind direct.	PH	Strong acid µeq/l	mg/l:			NOTES:	2)
						Na <sup>+</sup>	Mg <sup>2+</sup>	SO <sub>4</sub> <sup>2-</sup>		
										9
										10
										11
										12
										13
										14
										15
										16

Operator:

Name of station:

µg SO<sub>2</sub>/m<sup>3</sup>  
AIR

APPENDIX 2FORM FOR THE MONTHLY REPORTS TO THE CCU.Symbols and units:

Station code:	Country's identification letter, number of the station in the national network.
Start sampling:	Day, month, year and hour of the start of the sampling period. Time basis: GMT.
ml	Volume in ml of the collected precipitation sample.
mm(1)	Amount of precipitation in millimeters from the volume of the precipitation sample.
mm(2)	Amount of precipitation in millimeters from the official precipitation gauge.
Na <sup>+</sup> , mg/l	Concentration of sodium in the precipitation sample, mg Na <sup>+</sup> /litre.
SO <sub>4</sub> <sup>--</sup> , mg/l	Concentration of sulphate as mg SO <sub>4</sub> <sup>--</sup> per litre in the precipitation sample.
pH	pH in the precipitation sample.
H <sup>+</sup> , µeq/l	Concentration of strong acids, expressed as microequivalents per litre. (Positive or negative.)
Mg <sup>++</sup> , mg/l	Concentration of magnesium in precipitation, as mg Mg <sup>++</sup> per litre.

SO <sub>2</sub>	Concentration of sulphur dioxide in air, expressed as µg SO <sub>2</sub> per cubic metre.
SO <sub>4</sub> XRF	Concentration of particulate sulphate in air as determined by x-ray fluorescence according to the procedure given in LRTAP 4/72, without taking account of the concentration profile effect.
SO <sub>4</sub> CORR	Concentration of particulate sulphate in air as calculated from SO <sub>4</sub> XRF, with the help of experimentally determined correction factors. Unit: µg SO <sub>4</sub> <sup>--</sup> per cubic metre.



LRIAP (OECD) MONTHLY REPORT

STATION CODE	START SAMPLING			PRECIPITATION DATA										AIR DATA			COMMENTS		
	DAY	MONTH	YEAR	HOUR	m	mm (1)	mm (2)	Na+	mg/l	SO <sub>4</sub> <sup>-</sup>	mg/l	pH	H+	Mg <sup>++</sup>	mg/l	SO <sub>2</sub>		SO <sub>4</sub> XRF	SO <sub>4</sub> CORR
	1	02	72	07		0.0	0.0									35	11.7	8.2	7.8/EP = 0.14
	2					0.0	0.0									29	9.7	6.8	0.14
	3					0.0	0.0									35	9.3	6.5	0.15
	4					0.0	0.0									20	8.4	5.9	0.20
	5					0.0	0.0									12	10.4	7.3	0.14
	6					1.0	0.3	15	13.4	5.05	30	0.32				9	8.7	6.1	0.15
	7					3.3	4.5	28	7.7	4.10	97	0.39				15	8.4	5.9	0.17
	8					3.3	3.5	19	6.2	4.10	135	0.23				7	3.3	2.3	0.36
	9					4.5	12.0	0.7	6.6	3.90	245	0.10				9	6.7	4.7	0.17
	10					0.6	1.2	2.8	10.1	4.10	118	0.40				17	5.1	3.6	0.24
	11					0.0	0.0									8	5.4	3.8	0.26
	12					1.6	2.5	12	3.4	4.20	69	0.15				22	2.6	1.8	0.32
	13					3.6	6.0	2.5	4.0	4.20	77	0.32				14	3.0	2.1	0.31
	14					0.3	0.1	9.3	7.4							8	2.1	1.5	0.28
	15					0.3	0.1	4.0	6.7							5	1.3	0.9	0.21
	16					0.2	0.1	4.5	4.9							7	3.0	2.1	0.32
	17					0.0	0.0									18	6.3	4.4	0.24
	18					0.0	0.0									7	4.3	3.0	0.22
	19					0.0	0.0									12	4.3	3.0	0.23
	20					0.0	0.0									0	3.1	2.2	0.18
	21					0.0	0.0									0	3.3	2.3	0.18
	22					0.3	0.1	5.0								0	3.9	2.7	0.19
	23					0.0	0.0									0	4.3	3.0	0.18
	24					0.0	0.0									0	5.3	3.7	0.16
	25					0.0	0.0									14	15.4	10.8	0.22
	26					0.0	0.0									7	10.1	7.1	0.21
	27					0.4	0.2	2.2								0	3.6	2.5	0.22
	28					0.0	0.0									0	6.0	4.2	0.24
	29					0.0	0.0									0	6.7	4.7	0.17
	30																		
	31																		

STATION N 09, Snyland  
 PERIOD February 1972

APPENDIX 2FORM FOR THE MONTHLY REPORTS TO THE CPUSymbols and units:

- DATE: Day, month and year of the start of the sampling period.
- HOUR: Hour (GMT) of starting the sampling period.
- MM(1): Amount of precipitation in millimeters from the volume of the collected precipitation sample.
- MM(2): Amount of precipitation in millimeters from the official precipitation gauge.
- PH: pH of the precipitation sample.
- H+: Concentration of strong acid, expressed in micro-equivalents per litre.
- NA and  
MG: Concentrations of sodium and magnesium in mg Na and mg Mg per litre.
- ( ): Reserved for the concentrations of other cations which may have been determined in the precipitation sample.
- SO4: Concentration of sulphate as  $\text{mg SO}_4^{2-}$  per litre in the precipitation sample.
- ( ): Reserved for concentrations of other anions.
- SO2: Concentration of sulphur dioxide in air, expressed as  $\mu\text{g SO}_2$  per cubic metre.
- SO4XRF: Concentration of particulate sulphate in air as determined by x-ray fluorescence according to the procedure given in LRTAP 4/72, without taking account of the concentration profile effect.
- IB/IF Ratio of x-ray fluorescence intensities  $I_B/I_F$  according to LRTAP 4/72.
- SO4CORR: Concentration of particulate sulphate in the air calculated from SO4XRF with the help of experimentally determined correction factors.  
Given as  $\mu\text{g SO}_4^{2-}$  per cubic metre.

LRTAP STATION NO 209 SØYLAND NORWAY. FEBRUARY 1972.

DATE	HOUR	MM(1)	MM(2)	PH	H+	NA	MG	S04	S02	S04XRF	IB/IF	S04CORR
010272	07	0	0						35	11,7	0,14	8,2
020272	07	0	0						29	9,7	0,14	6,8
030272	07	0	0						35	9,3	0,15	6,5
040272	07	0	0						20	8,4	0,20	5,9
050272	07	0	0						12	10,4	0,14	7,3
060272	07	1,0	0,3	5,05	30	1,5	0,32	13,4	9	8,7	0,15	6,1
070272	07	3,3	4,5	4,10	97	2,8	0,39	7,7	15	8,4	0,17	5,9
080272	07	3,3	3,5	4,10	135	1,9	0,23	6,2	7	3,3	0,36	2,3
090272	07	4,5	12,6	3,90	245	0,7	0,10	6,6	9	6,7	0,17	4,7
100272	07	0,6	1,2	4,10	118	2,8	0,40	10,1	17	5,1	0,24	3,6
110272	07	0	0						8	5,4	0,26	3,8
120272	07	1,6	2,5	4,20	69	1,2	0,15	3,4	22	2,6	0,32	1,8
130272	07	3,6	6,0	4,20	77	2,5	0,32	4,0	14	3,0	0,31	2,1
140272	07	0,3	0,1	-	-	9,3	1,02	7,4	8	2,1	0,28	1,5
150272	07	0,3	0,1	-	-	4,0	0,58	6,7	5	1,3	0,21	0,9
160272	07	0,2	0,1	-	-	4,5	0,57	19,1	7	3,0	0,32	2,1
170272	07	0	0						18	6,3	0,24	4,4
180272	07	0	0						7	4,3	0,22	3,0
190272	07	0	0						12	4,3	0,23	3,0
200272	07	0	0						0	3,1	0,18	2,2
210272	07	0	0						0	3,3	0,18	2,3
220272	07	0,3	0,1	6,50	-	5,0	0,72		0	3,9	0,19	2,7
230272	07	0	0						0	4,3	0,18	3,0
240272	07	0	0						0	5,3	0,16	3,7
250272	07	0	0						14	15,4	0,22	10,8
260272	07	0	0						7	10,1	0,21	7,1
270272	07	0,4	0,2	6,00	-52	2,2	0,67		0	3,6	0,22	2,5
280272	07	0	0						0	6,0	0,24	4,2
290272	07	0	0						0	6,7	0,17	4,7