Commission of the European Communities

environment and quality of life

FIRST ANNUAL REPORT FROM THE COMMISSION TO THE COUNCIL ON THE IMPLEMENTATION OF THE COUNCIL DIRECTIVE ON AIR QUALITY LIMIT VALUES AND GUIDE VALUES FOR SULPHUR DIOXIDE AND SUSPENDED PARTICULATES (80/779/EEC)

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ABSTRACT

Efforts to combat pollution will not be successful unless environmental policy measures are taken at international level. The EEC Council Directive of 15 July 1980 on air quality limit values and guide values for sulphur dioxide and suspended particulates is just one stepping-stone on the path towards an international clean air policy.

The first annual report on the implementation of the Directive shows quite plainly, however, that environment policy is not so much a joint effort by "all those concerned" to locate islands of consensus in a sea of practical constraints, but rather a constant tussle with vested interests. The degree to which policy objectives aimed at ridding the air of harmful pollutants can be achieved depends largely on social awareness of environmental problems, economic and technical factors (preventive measures) and on the pattern and availability of energy resources.

All these factors play a crucial role in the implementation of the Directive but there are major differences in the problems confronting each Member State and in the approaches they adopt to put it into practice.

As a consequence, the implementation of the Directive is beset with major difficulties and the progress made so far is anything but satisfactory. As the Commission views the Directive as an acid test of the Member States' commitment to environment policy, it will continue to spare no effort in ensuring proper and uniform implementation of the Directive.

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PREFACE

Efforts to combat pollution will not be successful unless environmental-policy measures are taken at international level. The EEC Council Directive of 15 July 1980 on air quality limit values and guide values for sulphur dioxide and suspended particulates is just one stepping-stone on the path towards an international clean air policy.

This first annual report on the implementation of the Directive shows quite plainly, however, that environment policy is not so much a joint search by "all those concerned" to locate islands of consensus in a sea of practical constraints, but rather a constant tussle with vested interests. The degree to which policy objectives aimed at ridding the air of harmful pollutants can be achieved depends largely on social awareness of environmental problems, economic and technical factors (preventive measures) and on the pattern and availability of energy resources.

All these factors play a crucial role in the implementation of the Directive but there are major differences in the problems confronting each Member State and in the approaches they adopt to put it into practice.

As a consequence, the implementation of the directive is beset with major difficulties and the progress made so far is anything but satisfactory. As the Commission views the Directive as an acid test of the Member States' commitment to environment policy, it will continue to spare no effort in ensuring proper and uniform implementation of the Directive.

I. Introduction

Article 8 of the Council Directive 80/779 of 15 July 1980 on air quality limit values and guide values for sulphur dioxide and suspended particulates requires that the Commission shall publish annually, a summary report on the application of this Directive.
The Commission waited until the end of the first reference period (1.4.83 - 31.3.84) before starting with the work on this report, because it wanted to include the values measured in Member States.
All relevant information which the Commission received before the 15th of March 1985 has been incorporated in this report.

II. Legal implementation of the Directive

The Directive 80/779/EEC was adopted on 15 July 1980. It was notified to Governments of Member States on 18 July 1980. Pursuant to Article 15, Member States had to bring into force the necessary laws, regulations and administrative provisions within 24 months of the notification, i.e. on 18 July 1982.
Subsequent to the accession of Greece in 1981 article 14 of the directive was modified by Directive 81/857/EEC.

The United Kingdom informed the Commission by letter of 22 July 1982 of the implementing provisions adopted in the United Kingdom. Copies of the relevant legislative and administrative provisions were added.
The following national provisions were considered to be relevant for the implementation :

- Clean Air Act 1956
- Clean Air Act 1968
- Clean Air (NI) Order 1981
- The Alkali etc. Works Regulation Act 1906
- Alkali etc. Works Order 1971 SI 1960/1971

- Alkali etc. Works (Scotland) Order 1972 No 1330
- Alkali etc. Works Order (NI) 1977, SR 1977 No 152
- Control of Pollution Act 1974
- Pollution Control and Local Government (NI) Order 1978
- DOE Circular 11/81 27 March 1981
- SDD Circular No 40/1981 21 December 1981
- Local Government, Planning and Land Act 1980

After examination of the provisions of UK law which had been transmitted, the Commission had further questions on the implementation of the Directive. In the beginning of 1985 it addressed a letter to the United Kingdom drawing attention on the Commission's interpretation of the directive and requiring further information. The discussions between the United Kingdom and the Commission are currently being pursued.

Greece has not yet informed the Commission of any national provision transforming the directive into national law. Obviously any national provisions have not yet been taken. However, it should be noted that the Greek version of directive 80/779 was published in the EEC Official Journal only in August 1984.

France, by letters of 6 May 1981, 23 August 1982 and 18 January 1983, informed the Commission of several national provisions aimed at implementing the Directive. The following texts were indicated :

- Arrêté of 20 June 1975
- Instruction to Préfets of 24-11-1970,
- Décret of 13-5-1974 and several Arrêtés implementing this Décret
- Loi of 19-7-1976
- Circulaires to the Commissaire de la République of 2-2-1982 and 28-7-1982.

The Commission is at present discussing with the French authorities several questions on the implementation of Directive 80/779.

Denmark transmitted, by letter of 28-7-1982 the "Low om aendring af low an miljobeskyttelse" (Lov nr. 204 of 18th May 1982) which took effect from 1 January 1983. By letter of 1-7-1983 Denmark transmitted

the "Bekendtgorelse om graense vaerdier for luftens indhold af svovldioxid op svaevestov" (Miljoministeriets bekendtgorelse nr. 119 of 24-3-1983).
After examination of the provisions of Danish law which had been transmitted, the Commission had further questions. Therefore, at the beginning of 1985 a letter was addressed to the Danish authorities drawing their attention on the Commission's interpretation of the Directive and requiring further information. The discussions between Denmark and the Commission are at present being pursued.

Belgium transmitted, by letter of 24-3-1982 information concerning actual measuring methods for measuring SO_2, black smoke and suspended particulates. By letter of 11-5-1983 it transmitted the Arrêté Royal of 16-3-1983. Discussions are at present being pursued between the Commission and Belgian authorities as regards certain aspects of information to be provided under the directive.

Germany transmitted, by letter of 13-10-1982 a communication on the implementation of the directive and, on 10-1-1983, a communication which indicated that the implementation of directive 80/779 was assured by a system of legal provisions, described in detail. The legal system consisted essentially of the Bundesimmissionsschutzgesetz of 15 March 1974, subsequently modified, a number of Verordnungen and the Technische Anleitung zur Reinhaltung der Luft (TA-Luft), a general administrative provision.

The Commission is at present discussing with the German authorities several questions as regards implementation of Directive 80/779/EEC.

Italy transmitted, by letter of 20-6-1983 a Decreto del Presidence del Consiglio dei Ministeri of 28 March 1983 on maximal accepted concentration levels for air pollution. Discussions are at present being pursued between the Commission and the Italian authorities into certain aspects of information to be provided under the Directive.

Luxembourg has informed the Commission, by letters of 12 May 1981 and 10 August 1982, that the existing Luxembourg legislation assured compliance with the provisions of the Directive, so that no specific legislation needed be enacted.
At present discussions are being pursued between the Commission and the Luxembourg authorities as to the interpretation of the Directive.

Ireland observed, by letters of 26 January 1983 and 5 January 1984, that it considered the objectives of the directive 80/779 were already covered by the existant Irish legislation and that no further statutory rules were required.
The Commission has launched an official procedure against Ireland under Article 169 of the Treaty of Rome.

The Netherlands has, by letters of 8 April 1981, 1 September 1982, 2 December 1982 and 5 September 1983 informed the Commission of their national measures to implement Directive 80/779 and a Bill to amend the Wet inzake de luchtverontreiniging.
The Commission has started an infringement procedure against the Netherlands under Article 169 of the Treaty of Rome.

III. Application of the Directive

III.1. Monitoring of the pollutants

III.1.1. National Bodies responsible for monitoring

All Member States of the EC monitor the quality of air and the national and/or regional bodies responsible are given in Table 1. Nearly all of them regularly publish the concentrations measured.

III.1.2. Analytical methods, instrumentation and data presentation

Article 10(1) requires that Member States demonstrate to the Commission either a satisfactory correlation or a reasonably stably relationship, between national methods and the reference methods in the Directive.
From an inventory compiled by the Commission in 1982 [1], Member States are running, within the framework of this Directive, in total
- 1947 SO_2 monitors
- 1200 Black smoke monitors
- 242 gravimetric SPM monitors.

The type of instruments or analytical methods used in Member States are shown in Tables 2 and 3.

From this inventory it can be concluded that :

1. SO_2, black smoke and/or suspended particulates are monitored by all Member States. In most cases SO_2 is monitored more frequently than black smoke and/or suspended particulates.

2. The measurements are carried out with several different methods or instruments. At present little can be said about the comparability of these different methods because performance tests and/or parallel measurements have not been carried out according to internationally agreed and comparable rules. Only the F.R. Germany has published test procedures and performances characteristics [2] which provide a national basis for such comparability checks. On the basis of these checks 3 SO_2-instruments (Thermo Electron/van Hengel - Mod. 43; Wüsthoff oHG, BO - Ultragas U3ES; Hartmann & Braun, F - Picoflux 4) and 2 instruments for the gravimetric

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[1] Final report on inventory of current measuring techniques for SO_2, black smoke and suspended particulates. Document XI/27/83.

[2] Federal Office of the Environment of the F.R. Germany : Test routine for the performance testing of measuring devices for continuous monitoring of immissions (1982).

measurement of suspended particulate matter (Frieseke + Hoepfner/FAG,ER - PH 62 I; Verewa, Spohr, MH - F703) have received certificates from the German government.

Thus it was to be expected that use for establishing the correlations/relationships between the national measuring methods and reference methods, as required by Article 10(1), Member States would use procedures which were not mutually comparable. The qualitative and quantitative requirements the "correlations" and "relationships" had to meet, was also unclear.
In the framework of the implementation of Article 10(1) the Commission, in cooperation with the Member States, is working on the quantification of these expectable differences and, in the long term, on the harmonisation of the methods (see chapter V).

The Commission has submitted recommendations to Member States proposals how such demonstrations can be performed [3] [4]. The performance tests and parallel measurements should be carried out only by qualified laboratories and the Commission has asked Member States to nominate competent national institutions. At present only the Netherlands and Ireland have complied with this request officially. Table 4 lists these institutions together with others which have been nominated inofficially.

To contribute to harmonisation of the statistical treatment of the data, in 1983 the Commission distributed a document to the Member States which recommends a procedure for the calculation of the percentiles [5]. This document also includes a format to be used by

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[3] van de Wiel, Hollander, Verhagen :
Study to test and select one comparison apparatus for sulphur dioxide.
Final report (1984).

[4] Verduyn, Derouane, Hallez, Lenelle, Rasse, Vanderstraeten :
Study on the applicability of Article 10(1) of the Directive 80/779/EEC.
Final report (1984).

[5] Documents XI/430/83 and XI/431/83

Member States for informing the Commission of cases, in conformity with Article 7, where the limit values are exceeded.

Table 1 : Laboratories and institutions in the Member States which are monitoring SO_2 and Black Smoke and/or Suspended Particulates in the framework of Directive 80/779/EEC.

Member State	Institution
Belgique/België	Institut d'Hygiène et d'Epidémiologie 14, rue J. Wytsman B - 1050 Bruxelles (*)
Denmark	Air Pollution Laboratory National Agency of Environment DK - 4000 Roskilde (*)
BR Deutschland	Umweltbundesamt Pilotstation Frankfurt Feldbergstrasse. 45 D - 6000 Frankfurt/M. (*) Landesanstalt für Umweltschutz Baden-Württemberg Griesbachstr. 3 D - 7500 Karlsruhe 21

(*) These laboratories also act as National Coordinating Organization in the framework of the Common Measurement Programme (CMP).

Bayerisches Landesamt
für Umweltschutz
Rosenkavaliersplatz 3
D - 8000 München 81

Behörde für Bezirksangelegenheiten,
Naturschutz und Umweltgestaltung
Steindamm 22
D - 2000 Hamburg 1

Hessische Landesanstalt für Umwelt
Aarstrasse 1
D - 6200 Wiesbaden

Senator für Stadtentwicklung
und Umweltschutz
Lentzeallee 12-14
D - 1000 Berlin 33

Landesverwaltungsamt
Niedersachsen
Institut für Arbeitsmedizin
Immissions- und Strahlenschutz
Davenstädter Str. 109
D - 3000 Hannover-Linden

Landesanstalt für Immissionsschutz
Nordrhein-Westfalen
Wallneyer Str. 6
D - 4300 Essen

Landesgewerbeaufsichtsamt für
Rheinland-Pfalz
Rheinallee 97 - 101
D - 6500 Mainz

Staatliches Institut für Hygiene
und Infektionskrankheiten
Malstatter Strasse 17
D - 6600 Saarbrücken

France

Ministère de l'Environnement
Direction de la Prévention des
Pollutions
Service de l'Environnement Industriel
Sous-Direction de la Pollution de l'Air
14, Bd. du Général Leclerc
F- 92524 Neuilly-sur-Seine Cédex (*)

Direction Régionale de l'Industrie et de
la Recherche Ile de France
152, rue de Picpus
F - 75570 Paris Cédex 12

Direction Régionale de l'Industrie et
de la Recherche
Délégation Champagne Ardennes
2, rue Grenet Tellier
F - 51038 Chalons sur Marne Cédex

Direction Régionale de l'Industrie et
de la Recherche Bourgogne
Cité Administrative Dampierre
6, rue Chancelier de l'Hôpital
F - 21034 Dijon Cédex

Direction Régionale de l'Industrie et
de la Recherche Auvergne
43, rue de Wailly
F - 63038 Clermont Ferrand Cédex

Direction Régionale de l'Industrie et
de la Recherche Languedoc Roussillon
6, avenue de Clavières
F - 30105 Ales Cédex

Direction Régionale de l'Industrie et de
la Recherche Nord Pas de Calais
941, rue Charles Bourseul B.P. 838
F - 59508 Douai Cédex

Direction Régionale de l'Industrie et de la
Recherche Franche Comte
7, rue Léonard de Vinci
F - 25000 Bésançon

Direction Régionale de l'Industrie et
de la Recherche Limousin
15, place Jourdan
F - 87000 Limoges

Direction Régionale de l'Industrie et de
la Recherche Midi-Pyrénées
Cité Administrative
Boulevard Armand Duportal
F - 31074 Toulouse Cédex

Direction Régionale de l'Industrie et de
la Recherche Picardie Champagne Ardennes
44, rue Alexandre Dumas
F - 80026 Amiens Cédex

Direction Régionale de l'Industrie et de la
Recherche Alsace
6, rue d'Ingwiller
F - 67082 Strasbourg Cédex

Direction Régionale de l'Industrie et de
la Recherche Rhône Alpes
11, rue Curie
F - 69456 Lyon Cédex 3

Direction Régionale de l'Industrie et de
la Recherche Provence Alpes Côte d'Azur
37, Boulevard Périer
F - 13295 Marseille Cédex 2

Direction Régionale de l'Industrie et de la
Recherche Aquitaine
26, cours Xavier Arnozan
F - 33076 Bordeaux Cédex

Direction Régionale de l'Industrie et
de la Recherche Poitou Charentes
62, rue Jean Jaurès
F - 86000 Poitiers

Direction Régionale de l'Industrie et
de la Recherche Bretagne
13, rue Dupont des Loges
F - 35043 Rennes Cédex

Direction Régionale de l'Industrie et de
la Recherche Centre
16, rue Adèle Lanson Chenault B.P. 45
F - 45655 Saint Jean Le Blanc Cédex

Direction Régionale de l'Industrie et de
la Recherche Basse Normandie
Résidence Hélitas
27, rue Saint-Ouen
F - 14039 Caen Cédex

	Direction Régionale de l'Industrie et de la Recherche Pays de la Loire CAP 44 3, rue Marcel Sembat F - 44049 Nantes Cédex
	Direction Régionale de l'Industrie et de la Recherche Haute Normandie 68-70, rampe Bouvreuil F - 76037 Rouen Cédex
Greece	Ministry of Physical Planning, Housing and Environment Patissionstreet 147 Athens 814 (*)
	Environment Pollution Control Project (P.E.R.P.A.) Patissionstreet 147 Athens 814
	Laboratory of Hygiene, Medical Faculty University of Thessaloniki and State Laboratory of the Ministry for Northern Greece
Ireland	Department of Environment Custom House Dublin 1
	An Foras Forbartha St. Martin's House Waterloo Road Dublin 4 (*)

Italia

Reparto di Igiene dell'Aria
dell'Istituto Superiore di Sanità
Viale Regina Elena 299
I - 00161 Roma (*)

Laboratorio Chemico Provinciale
Via Amba Alagi, 5
I - 39100 Bolzano

Presidio Multizonale di Igiene
e Prevenzione
Corso Giovecca 169
I - 44100 Ferrara

Presidio Multizonale di Igiene
e Prevenzione USL 8
Via Baroni 18
I - 51100 Pistoia

Servizio Rilevamento
Inquinamento Atmosferico
Via della Consolata 10
I - 10100 Torino

Presidio Multizonale di Igiene
e Prevenzione
Via Juvara 22
I - 20129 Milano

Laboratorio di Igiene e Profilassi
USL RM 10
Via Saredo 52
I - 00173 Roma

Laboratorio di Igiene e Profilassi
USL 12
Via Montesano 5
I - 16122 Genova

Servizio Rilevamento Inquinamento
Atmosferico
Laboratorio di Igiene e Profilassi USL 28
Via Triachini 17
I - 40138 Bologna

Laboratorio di Igiene e Profilassi
Via Ospedale 22
I - 35100 Padova

Laboratorio di Igiene e Profilassi
Via Basardecci 5
I - 96100 Stracusa

Laboratorio di Igiene e Profilassi
Viale Piave 5
I - 38100 Trento

Laboratorio di Igiene e Profilassi
Via Patriota 2
I - 54100 Massa

Servizio Controllo Inquinamento Ambientale
Via S. Maria la Nova
I - 80139 Napoli

Laboratorio Igiene e Profilassi
Via Anfiteatro
I - 74100 Taranto

Laboratorio Igiene e Profilassi USL 10/4
Via Ponte delle mosse 211
I - 50144 Firenze

	Presidio Multizonale di Igiene e Profilassi Via Fontanelli 21 I - 41100 Modena
	Laboratorio Igiene e Profilassi Via Miglietta 1 I - Lecce
	Administrazione Provinciale di Venezia Palazzo Corner I - 30124 Venezia
Grand-Duché du Luxembourg	Administration de l'Environnement 1 A, rue A. Lumière L - 1950 Luxembourg (*)
Nederland	Rijksinstituut voor Volks- gezondheid en Milieuhygiene Laboratorium voor Luchtonderzoek Postbus 1 Ant. van Leeuwenhoeklaan 9 3720 BA Bilthoven (*)
United Kingdom	Warren Spring Laboratory Gunnels Wood Road UK - Stevenage, Herts SG1 2BX (*)

Table 2 : Number of instruments used in the survey for the Directive 80/779/EEC (as of 31.12.1982)

Member State	SO_2-instruments			Black smoke instruments	Gravimetric instruments
	continuous	non-continuous	Total		
Belgique/ België	68	/	68	219	/
Denmark	4	24	28	/	24
BRDeutschland	195(1)(8)	/(2)	195	13	200(3)
France	100	680	780	325	/
Grand-Duché du Luxembourg	/	12	12	12	/
Ireland	/	34	34	34	/
Italia(7)	21	1	22	/	10
Nederland	223	/	223	5	/
United Kingdom	/	572	572	572	/
Greece	8(4)	5	13	20(5)	8(6)
Total	619	1 328	1 947	1 200	242

(1) Furthermore about 50 instruments are working in regions (Bundesländer) which are below the limit values of the Directive 80/779/EEC

(2) The measurements units used within the random sampling programme are not taken into account.

(3) Furthermore about 40 instruments are working in regions (Bundesländer) which are below the limit values of the Direcitve 80/779/EEC

(4) Two instruments installed, 6 planned.

(5) planned

(6) planned

(7) incomplete data. In March 1985 the Commission was informed by Italia that 283 SO_2 monitors and 72 SPM monitors are installed in Italian network, however, even these figures do not display the actual number of installed instruments.

(8) In March 1985 the F.R. Germany corrected this figure to 260 installed SO_2-instruments.

Table 3 : Number of different types of instruments as notified by the Member States for SO_2- and SPM-survey for complying with Directive 80/779/EEC

SO_2	continuous		619		18 different types of instruments
	- FPD	133			
	- Cond.	107			
	- UV-F	76			
	- Coul.	303			
	non-continous		1 328		
	- strong acidity	1 299			4 different types of instruments
	- other methods(1)	29		Total : 1 947	3 different types of instruments
Black smoke					
	according to OECD	1 181			7 different types of instruments
	other methods	19		Total : 1 200	1 instrument type
Suspended particulates					
	by weighing	155			7 different types of instruments
	other methods	87		Total : 242	1 instrument type

(1) KOH impregnated filters (DK) 24; TCM-instruments (GR) 5

Abreviations :
FPD = Flame photometric method
Cond = Conductimetric method
UV-F = UV-Fluorescence method
Coul = Coulometric method

Table 4 : List of authorized laboratories nominated by Member States for the testing of measurement equipment in the framework of Directive 80/779/EEC.

Netherlands	RIVM Mr. H.J. van de Wiel A.van Leeuwenhoeklaan 9 P.O. Box 1 NL - 3720 BA Bilthoven MT-TNO Mr. J.C.T. Hollander Schoemakerstraat 92 P.O. Box 214 NL - 2600 AE Delft
Ireland	National Institute for Physical Planning and Construction Research (AN FORAS FORBARTHA) St. Martin's House Waterloo Road Dublin 4
Denmark	Riso National Laboratory Air Pollution Lab National Agency of environmental protection DK - 4000 Roskilde

Belgium	Institut d'Hygiène et d'Epidémiologie 14, rue Juliette Wytsman B - 1050 Bruxelles
United Kingdom	Warren Spring Laboratory Department of Industry Gunnels Wood Road UK - Stevenage, Herts, SG1 2BX
F.R. Germany	Umweltbundesamt Pilotstation Frankfurt D - Frankfurt Landesanstalt für Immissionsschutz des Landes Nordrhein-Westfalen D - Essen-Bredeney Landesanstalt für Umweltschutz Baden-Württemberg D - Karlsruhe

III.1.3. Network design

Article 6 of the Directive is concerned with the establishment of measuring stations (i.e. monitoring networks) for the purposes of implementing the Directive. Under the terms of this Article the purpose of supplying data for those zones where the limit values are likely to be approached or exceeded. It requires that the stations must be located at sites where pollution is thought to be greatest and where the measured concentrations are representative of local conditions. Clearly this phraseology is open to a variety of interpretations but no further guidance is given in the Directive, in particular no generally accepted rules on how to design and operate networks or on how to analyse and present the data.

In order to overcome the problems involved with network design and to improve the comparability between the national surveys, the Commission launched an international study, whose aim was :

1. To collect data from all Member States on the criteria which were employed in designing national monitoring networks for SO_2, black smoke and suspended particulates. Fixed and continuously working networks as well as mobile and discontinuous ones were to be studied and compared.

2. To compare the criteria and the results of the above study with the requirements laid down in Articles 2 and 6 and Annex IV of Directive 80/779/EEC.

3. To make recommendations, on the basis of these investigations, on the design of monitoring networks in order to fulfil the requirements and provide the information required by the Directive. In particular, the recommendations should aim at improving the comparability of the monitoring results. Results of this study will be available in the fourth quarter of 1985.

III.2. Information received in accordance with article 3

Article 3 of the Directive states, inter alia, that each Member State "where it considers that there is a likelihood that, despite the measures taken, the concentrations of sulphur dioxide and suspended particulates in the atmosphere might, after 1 April 1983, exceed in certain zones the limit values given in Annex I, it shall inform the Commission thereof before 1 October 1982".

Belgium, Denmark and Greece have not notified any zone within this requirement.

The other Member States have notified the Commission that the limit values are likely to be approached or exceeded in the zones listed in Table 5.

Table 5 : ZONES IN THE MEMBER STATES OF THE EUROPEAN COMMUNITY IN WHICH THE LIMIT VALUES FOR SO_2 AND SUSPENDED PARTICULATES OF DIRECTIVE 80/779/EEC ARE LIKELY TO BE APPROACHED OR EXCEEDED AFTER THE 1ST APRIL 1983 [6]

Member States	Zones
FRANCE	Agglomération parisienne, Lens, Dunkerque, agglomération de Creil, Carling, agglomération de Strasbourg, Thann, agglomération de Montbéliard, agglomération lyonnaise, agglomération grenobloise, région de Fos l'Etang-de-Berre, agglomération marseillaise, Viviez, Lacq, zone de Cheviré-Donges, agglomération rouennaise, zone du Havre

[6] The basis of this list is the information provided by the Member States up to 30.9.1983.

F.R.G.	Berlin (West)
IRELAND	Dublin
ITALY	Regione Veneto Arzignano-Bassano del Grappa-Belluno-Castelfranco-Veneto-Chioggia-Conegliano-Legnago-Mira-Montecchio-Maggiore-Padova-Porto Tolle-Rovigno S.Donà di PiaveShio-Treviso-Valdagno Venezia-Verona-Vicenza-Vittorio Veneto. Regione Lombardia Abbiategrasso-Arcore-Bareggio-Biassono-Bollate Bovisio M.-Bresso-Brugherio-Busto Garolfo-Canegrate-Cassano d'Adda-Cernusco S/N-Cerro Maggiore-Cesano-Maderno-Cesate-Cinisello Balsamo-Cologno M.-Concorezzo-Corbetta-Cormano Coraredo-Cornate d'Adda-Cuggiono-Cusano M.-Desio-Carbagnate-Gorgonzola-Inveruno-Lainate-Legnano-Limbiate-Lissone-Lodi-Magenta-Meda-Melgnao-Melzo-Milano-Monza-Moggiò-Nerviano-Nova- Milanese-Novate Milanese-Paderno D.-Parabiago-Pioltello-Rescaldina-Rho-Rozzano-S.Giuliano M.-Segrate-Senago-Seregno-Sesto S.G.-Seveso-Solaro-Tribiano-Veduggio-Vimodrone Vittuone.
LUXEMBOURG	Colmar-Berg, Contern
UNITED KINGDOM	Allerdale, Barnsley, Bassetlan, Blyth Valley, Bolsover, Bradford, Cannock Chase, Chesterfield, Copeland, Crewe and Nantwich, Doncaster

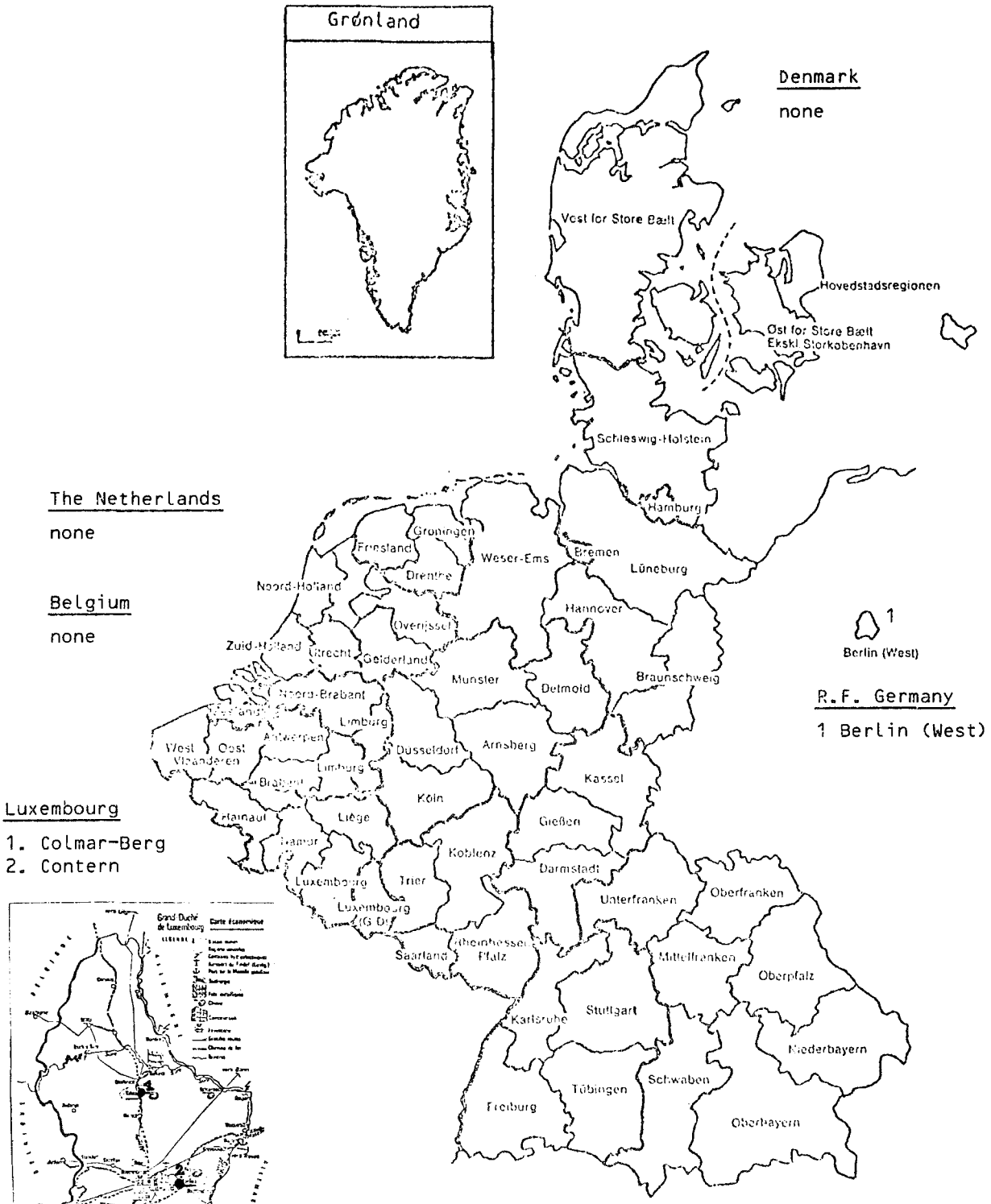
	Kirklees, Mansfield, Newark, Newcastle-under-Lyme, Nottingham, Rotherham, Staffordshire Moorlands, Sunderland, Wakefield, Wansbeck
	Cunningham, Falkirk, Glasgow, Strathkelvin, Belfast, Londonderry, Newry, Castle Morpeth

Figures 1 to 4 display the locations of these zones.
The Netherlands which had nominated the zones Rijnmond industrial area, northern part of the province of Limburg and eastern part of Noord-Brabant, south western part of the province Noord-Brabant and southern part of Zeeland, Velsen-Ijmuiden, withdrew this nomination in March 1985.
The Commission has some doubts whether this list really includes all zones in Europe which are likely to exceed the limit values. However, the decision on zones for inclusion is in the hands of the Member States; in all cases where the limit value are violated in zones other than those mentioned above, the more stringent requirements of article 7 have to be applied. In the light of information gained under Article 7 the Commission will decide on eventual further action.

Together with the list of zones, Article 3 requires Member States to forward to the Commission their plans for the progressive improvement of the quality of the air in those zones. These plans, drawn up on the basis of relevant information on the nature, origin and evolution of the pollution, shall describe in particular the measures taken, or to be taken, and the procedures implemented, or to be implemented, by the Member State concerned. These measures and procedures must bring the concentrations of sulphur dioxide and suspended particulates in the atmosphere within these zones to values below or equal to the limit values given in Annex I as soon as possible and by 1 April 1993 at the latest.

Very few Member States have forwarded their plans to the Commission and, in those cases where such plans have been submitted, only one of them (Ireland) met all the requirements of article 3. Table 6

Figure 1 : Areas and cities nominated in accordance with Article 3 in Belgium, Denmark, F.R. Germany, Luxembourg and the Netherlands



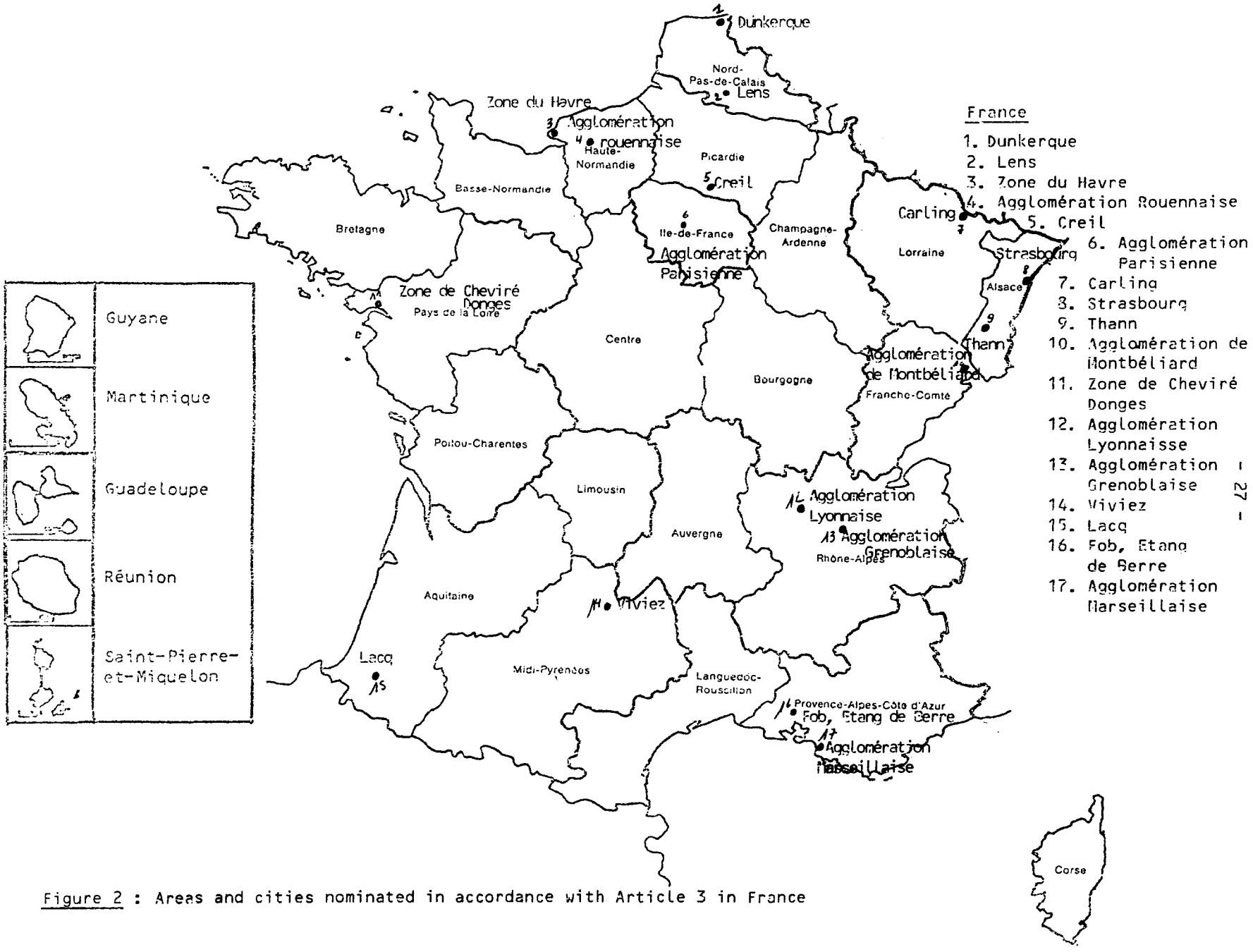


Figure 2 : Areas and cities nominated in accordance with Article 3 in France

Italy

1. Lombardia
2. Veneto

Figure 3 : Areas and cities nominated in accordance with Article 3 in Italy

Figure 4 : Areas and cities nominated in accordance with Article 3 in the United Kingdom and Ireland

United Kingdom

1. ALLERDALE
2. BARNSLEY
3. BASSETLAW
4. BLYTH VALLEY
5. BOLSOVER
6. BRADFORD
7. CANNOCK CHASE
8. CASTLE MORPETH
9. CHESTERFIELD
10. COPELAND
11. CREWE + NANTWICH
12. DONCASTER
13. KIRKLEES
14. MANSFIELD
15. NEWARK
16. NEWCASTLE-U-LYNE
17. NOTTINGHAM
18. ROTHERHAM
19. STAFFS MOORLANDS
20. SUNDERLAND
21. WAKEFIELD
22. WANSBECK
23. CUNNINGHAME
24. FALKIRK
25. GLASGOW
26. STRATHKELVIN
27. BELFAST
28. LONDONDERRY
29. NEWRY

Ireland

1. Dublin

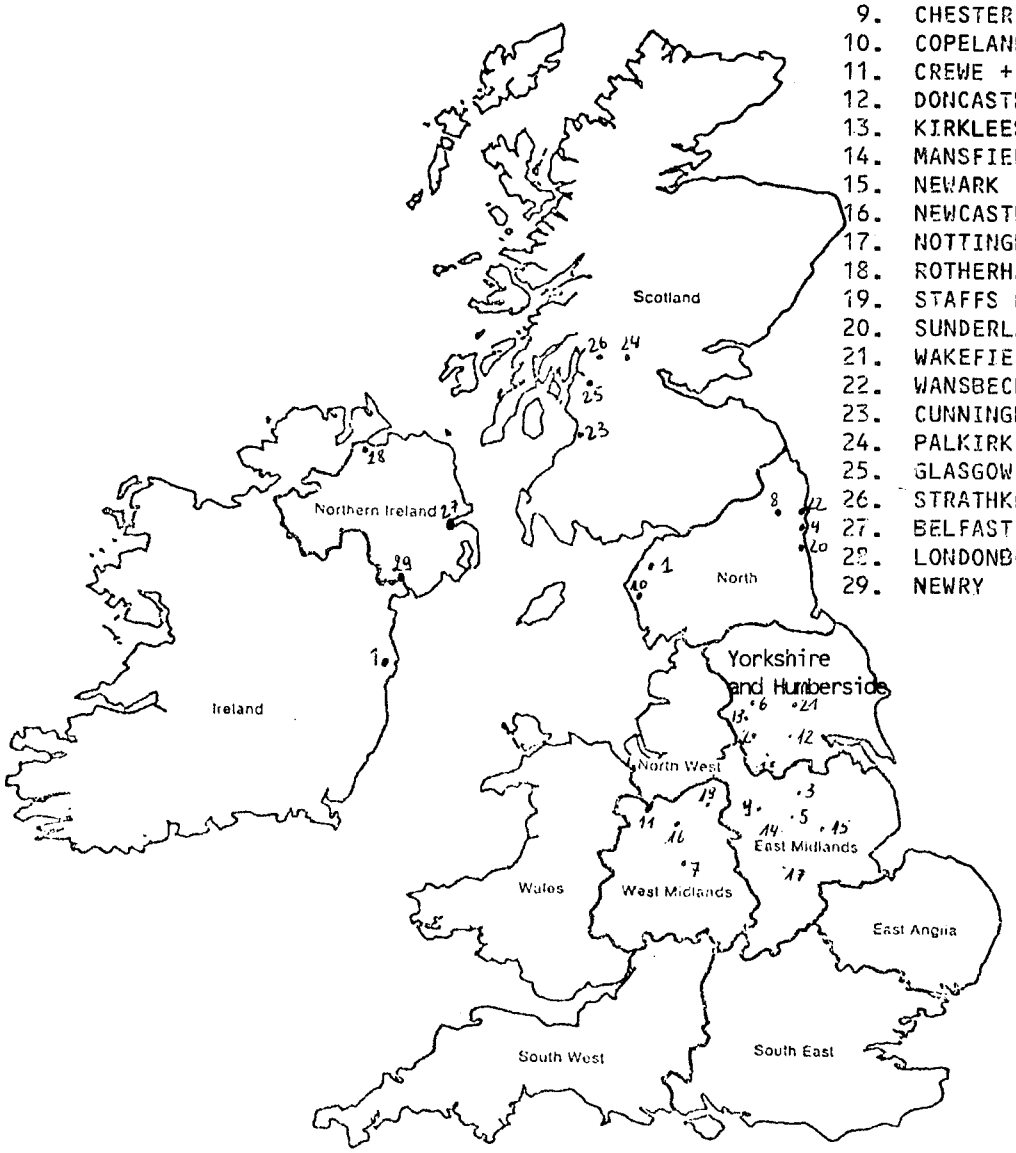


Table 6 : Counter measures planned or underway in order to decrease pollution levels in zones of Article 3(2)

Member State	Zone	Counter measure
France	Agglomération parisienne	Pollution alert procedures have been implemented in winter 83/84 according to "Arrêtés Préfectoraux" of 22nd September 1978.
	Lens	Technical modifications on plants are being implemented on the basis of "Règlementation sur les installations classées" in order to decrease pollution from industrial sources.
	Dunkerque	An alert system is in operation. Moreover technical modifications on plants are being implemented in order to decrease pollution from industrial sources.
	Agglomération de Creil	Reductions of emission fluxes on the basis of "Règlementation sur les installations classées".
	Carling	Emission are being reduced on the basis of "Règlementation sur les installations classées"
	Agglomération de Strasbourg	Pollution alert procedures and a special protection area will be implemented in 1985.
	Thann	Technical modifications on plants are being implemented on the basis of "Règlementation sur les installations classées" in order to decrease pollution from industrial sources.

Agglomération de Montbélliard	Technical modifications on plants are being implemented on the basis of "Règlementation sur les installations classées" in order to decrease pollution from industrial sources.
Agglomération Lyonnaise	An improvement of the existing alert procedures has been implemented in winter 1984-1985.
Agglomération Grenobloise	Pollution alert procedures will be implemented in 1985-1986.
Région de Fos l'Etang de Berre	Improvement of the already existing alert procedures on the basis of a dispersion study.
Agglomération Marseillaise	Application of the "Zone de Protection spéciale" on the basis of "Arrêté Préfectoral" of 8th of April 1981.
Viviez	Reduction of emission fluxes on the basis of "Règlementation sur les installations classées".
Lacq	Reduction of emission fluxes on the basis of "Règlementation sur les installations classées".
Zone de Chevire-Donges	Improvement of the existing alert procedures.
Agglomération rouennaise	Improvement in 1985 of the existing alert procedures on the basis of "Règlementation sur les installations classées".

	Zone du Havre	Improvement in 1985 of the already existing alert procedures on the basis of "Règlementation sur les installations classées".
F.R. Germany	Berlin (West)	Reduction of emissions from industrial and domestic sources. Preparation for negotiations with the GDR in order to reduce transboundary fluxes into Berlin (West) which account for up to 40% of the SO_2-ambient air concentrations.
Ireland	Dublin	Investigations into the reasons are underway, including the application of mathematical models.
Italy		No communication about counter measures has been submitted to the Commission.
Luxembourg	Colmar-Berg	Technical modifications on plants are being implemented in order to decrease emission from industrial and electricity-producing sources.
	Contern	Studies on possible counter measures aiming at a reduction of emissions from industrial sources are under way.
United Kingdom		No detailed information has been submitted to the Commission concerning the other areas mentioned in Table 5.

displays briefly the information received. The Commission is taking all necessary steps such that Member States comply with all requirements of this article.

III.3. Information received in accordance with article 7

Article 7(1) obliges Member States to inform the Commission, not later than six months after the end (31 March) of the annual reference period, of instances in which the limit values laid down in Annex I have been exceeded and of the concentrations recorded.

Member States applying Annex IV are also obliged to inform the Commission but in accordance with article 10(3), they must do so at least twice a year.
For Member States applying Annex I the due time for the first report was 30.9.1984.
Only Ireland and the United Kingdom informed the Commission in due time. Figures 5 to 7 display the locations of these stations. At a Government experts meeting in December 1984, the Commission reminded all Member States of their obligations. F.R. Germany, the Netherlands and Denmark informed the Commission at this meeting that concentrations in excess of the limit values had not been recorded within the reference period; Belgium and Italy were still checking this point. France, Luxembourg and Greece stated that violations occured but the reporting was delayed due to internal problems. In early 1985 the Commission finally received the written communications as requested from the Netherlands, Denmark, France and Luxembourg. This information has been incorporated in this report. Table 7 and 8 display the stations where the limit values have been exceeded.

With regard to article 10(3), at the same meeting the Commission emphasized that three Member States (F.R. Germany, Italy, Denmark) have not fulfilled their obligations. According to the schedule of the implementation, three reports should have been sent to the Commission (before 1.10.83, before 1.4.84 and before 1.10.84). The Commission has received only one report from F.R. Germany dated 8.10.82.

Table 7 : Measurement stations in Member States at which the Annex I SO_2-limit values of Directive 80/779/EEC have been exceeded in the reference period 1.4.83 - 31.3.84 (underlined values are above allowed limits)

Member State	Town	Station	measured values in ug/m^3			Number of consecutive days on which the value 250 or 350 was exceeded	Comments
			annual median	winter median	annual 98-percentile		
France[1]	Strasbourg	Neudorf	99[2]	103	241	3 x 2 (250)	
	Gravenchon (Agglomération rouennaise)	AF5	40	66	418	1 x 2 (350) 1 x 3 (350)	
	Le Havre	AF37	20	18	358	2 x 2 (250) 1 x 4 (350)	
	Vitry-sur-Seine (Agglomération parisienne	EDF ST 25	42	88	326[2]	1 x 3 (250) 1 x 2 (350)	
	Bouc Bel Air (Bouches du Rhône)	Mairie	58	71	318[2]	-	
	St. Saulve	N° 022	17	25	451[2]	1 x 4 (250) 1 x 12 (250)	
Luxembourg[1]	Colmar-Berg	rue de Luxembourg	82	131	642	1 x 6 (350) 2 x 5 (350)	

(1) All stations exceeding the limits have been notified by the Member States concerned in accordance with article 3.
(2) The measured concentration for Black Smoke associated with the SO_2-concentration was greater or assumed to be greater than 40 ug/m^3 or 60 ug/m^3 or 150 ug/m^3

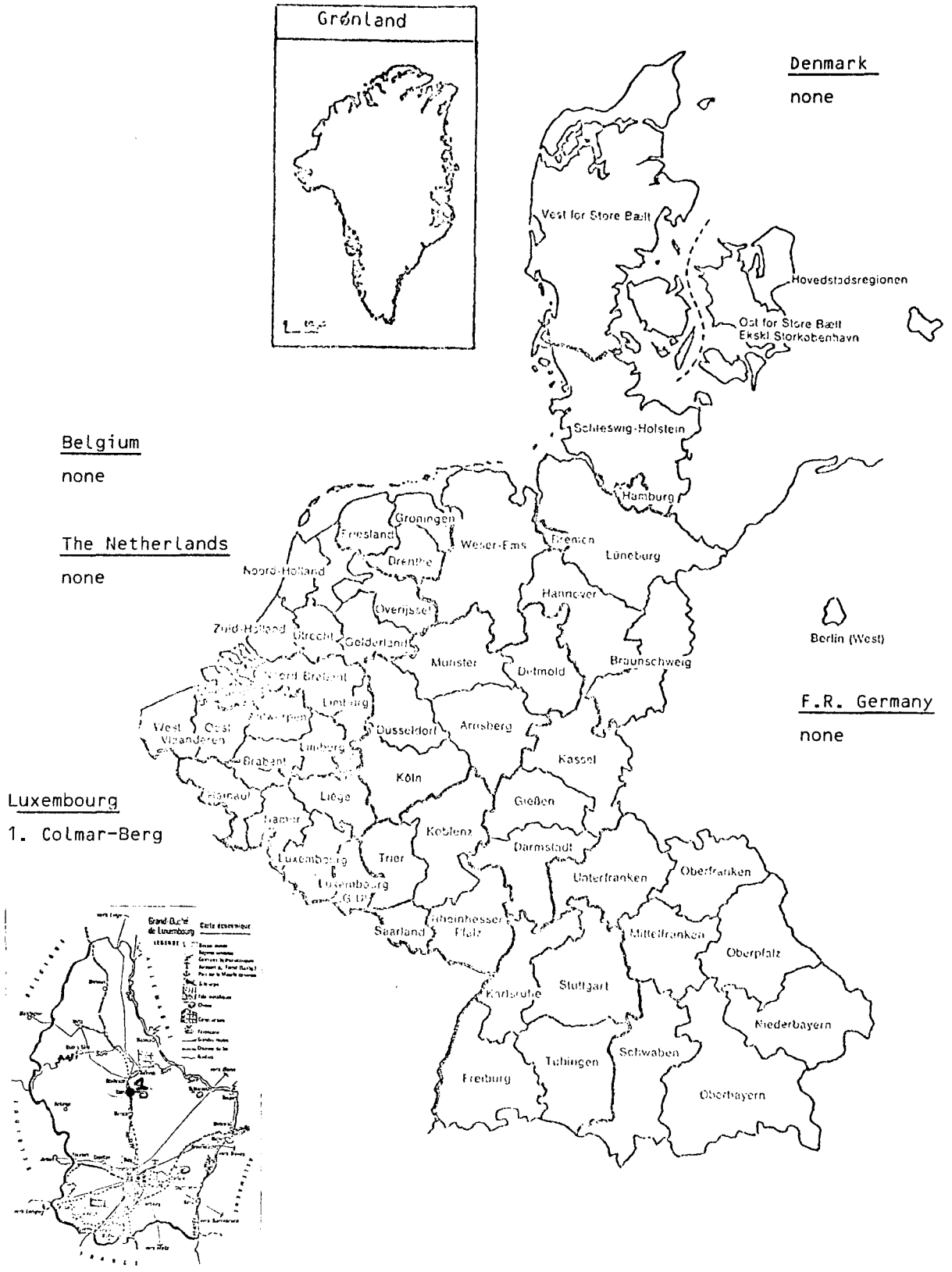
United Kingdom (1)	Mansfield Goldthorpe	Woodhouse 2 N°1	82 (2) 81 (2)	97 95	199 240	2 (250) 2 (250)	

Table 8 : Measurement stations in Member States at which the Annex I black smoke-limit values of Directive 80/779/EEC have been exceeded in the reference period 1.4.83 - 31.3.84 (underlined values are above allowed limits)

Member State	Town	Station	measured values in $\mu g/m^3$			Number of consecutive days on which the value 250 or 350 was exceeded	Comments
			annual median	winter median	annual 98-percentile		
Ireland (1)	Dublin	Rathmines	36	78	326	nil	
		Dame Street	47	80	260	nil	
		Broombridge Rd.	46	73	262	nil	
		Garrgowen Rd.	60	149	447	4	station out of operation from 22.9-20.10.
		Coinmarket	34	68	296	nil	
United Kingdom (1)	Ashington	N° 4	56	104	329	2	
	Askern	N° 6	42	55	291	3	
	Castleford	N° 9	41	65	286	2	
	Concaster	N° 32	81	111	359	5	
	Goldshorpe	N° 1	71	85	309	3	
	Grimethorpe	N° 7	46	87	329	4	
	Moorends	N° 1	76	109	273	3	
	Manderland	N° 8	47	88	321	2	
	Whitehaven	N° 2	28	46	291	1	
	Wombwell	N° 2	42	82	264	2	

(1) All stations exceeding the limits have been notified by the Member State concerned in accordance with article 3.

Figure 5 : Areas in Belgium, Denmark, F.R. Germany, Luxembourg and the Netherlands where the limit values were exceeded in the reference period 1.4.83 - 31.3.84



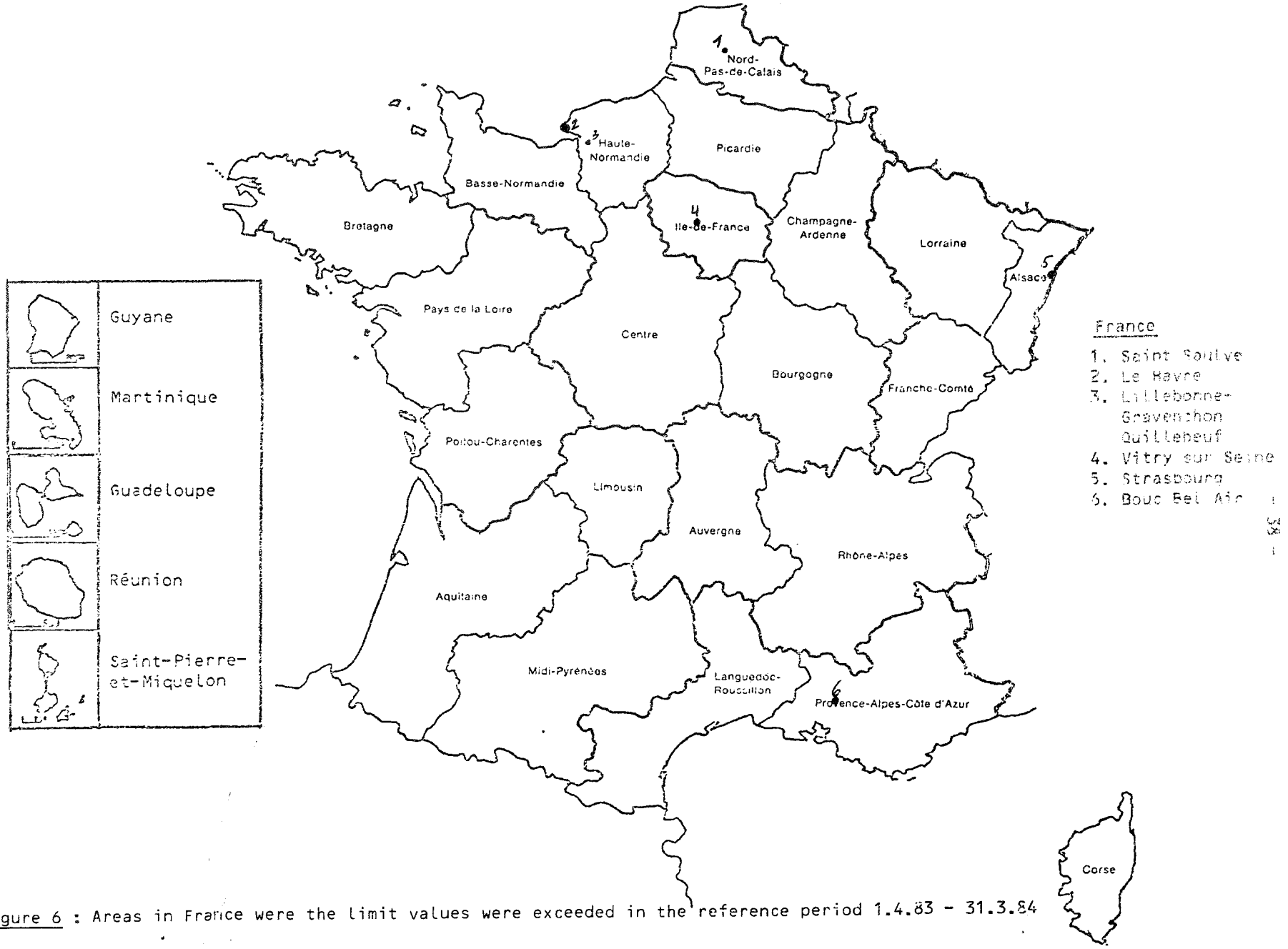


Figure 6 : Areas in France were the limit values were exceeded in the reference period 1.4.83 - 31.3.84

Figure 7 : Areas in the United Kingdom and Ireland where the limit values were exceeded in the reference period 1.4.83 - 31.3.84

Ireland

1. Dublin

United Kingdom

1. BARNSLEY
2. COPELAND
3. DONCASTER
4. HANSFIELD
5. SUNDERLAND
6. WAKEFIELD
7. WANSBECK

Table 9 : Counter measures planned or underway in order to avoid the recurrence of instances in which the limit values have been exceeded

Member State	Zone	Counter measure
France	Vitry-sur-Seine	Study on further emission reductions underway.
	Saint-Saulve	Measures to reduce industrial emissions underway.
	Agglomération de Strasbourg	Study on alert systems underway.
	Bouc Bel Air	Implementation of an alert system.
	Zone de Lillebonne-Gravenchon-Quillebeuf	Study on further emission reductions underway.
	Le Havre	Improvement of existing alert system planned.

Luxembourg	Colmar-Berg	Study on further emission reductions underway.
United Kingdom	Doncaster	Doncaster Council has prepared a series of smoke control programmes for implementation up 1989, subject to availability of funds, which will cost about £7 million. When completed, over two-thirds of the premises in the district will be smoke controlled.
	Barnsley	In 1982 the Council announced a ten year programme of smoke control which should cover the entire city by 1993.
	Mansfield	At the moment two-thirds of the area is smoke controlled. Current plans envisage further expenditure of about £1 million up to 1988. The Council envisages a programme continuing into the 1990's.
	Wansbeck	The Council has begun a series of smoke control programmes, and expenditure on smoke control will amount to approximately £4 million over the next four years. This will cover almost half of the total number of premises in the district.
	Copeland	District Council envisages a continuing smoke control programme over the next four years, expenditure for which will amount to approximately £0.8 million.
	Sunderland	In response to Directive 80/779/EEC almost £100,000 was spent on smoke control in 1984/5. At present one-quarter of the premises are smoke controlled. The Government continues to encourage the Council to approve further smoke control programmes,and it is hoped that the Council will approve such expenditure in the near future.
	Wakefield	Half the premises are already smoke controlled, and Government officials are consulting the Council about the possibility of extending smoke control further.

The Italian delegation indicated that no report could be submitted due to problems of internal responsibility. The Danish delegation explained that no report has been submitted because no violations of the limit values set out in the Annexes were detected in the reference period. The German delegation mentioned that a second report had been sent by UBA to the BMI in October 1984 and that the Commission should receive this report very soon.

The Commission emphasized that Member States are obliged to report in due time in accordance with article 10(3) and that they have to report even when no exceedances occurred. The three Member States concerned were requested to send these reports to the Commission without further delay.

Moreover, Article 7 states that Member States shall notify the Commission, not later than one year after the end of the annual reference period, of the reasons for such instances and of the measures they have taken to avoid their recurrence.

The latest date for providing this information is therefore 30.9.1985. Up to now the Commission has only received information from Luxembourg, the United Kingdom and France on the actions taken. Table 9 gives an overview about these actions.

Article 7(3) requires, that "Member States shall forward information to the Commission, at its request, on the concentrations of sulphur dioxide and suspended particulates in any zones they have designated pursuant to Article 4(1) and (2).

However, up to now none of the Member States have used article 4 so that no information could be requested.

III.4. Assessment of the present ambient air pollution levels

On the basis of the information provided by the Member States and of EC investigations a brief overview of the ambient air pollution levels for SO_2, Black Smoke and gravimetrically measured suspended

particulates will be given for each country. It would be beyond the scope of this report to give detailed tables of all measurements carried out within the frame of the Directive.

Trend evaluations for SO_2, Black Smoke and suspended particulates show for all three compounds, a general decrease in values since 1970. However, in the cases the decrease stopped in the early 80's and the situation seems to be quite stable over the last four years. The cold spell in January 1985 will most likely cause an increase in the measured concentrations for the reference period 1984/85 in some Member States.

It should be noted that Article 5 of the Directive requires that Member States shall endeavour to move towards the guide values of Annex II wherever the measured concentrations are higher than these values. In the light of the data below it can be seen that zones exceeding these guide values exist in all Member States.

Belgium

The most polluted zones are Bruxelles (Brussel), Anvers (Antwerpen), Liège (Luik), Charleroi and Gand (Gent). The measured annual concentrations are in the ranges of :

annual averages	50%	98%
SO_2 (24 h)	20 .. 90	80 .. 300 ug/m^3
Black Smoke	10 .. 50	30 .. 70 ug/m^3
winter averages		
SO_2 (24 h)	30 .. 120	100 .. 350 ug/m^3
Black Smoke	15 .. 70	50 .. 100 ug/m^3

Denmark

Measurement from only very few stations are available. The most polluted area is Kobenhavn where concentrations in the following ranges have been measured :

	arithmetic mean	95%
SO_2 (24 h)	5 .. 35	35 .. 115 ug/m^3
(1/2 h)	5 .. 35	55 .. 140 ug/m^3
Suspended particulates	35 .. 80	100 .. 200 ug/m^3

F.R. Germany

Except for West-Berlin, which has been notified as polluted in the framework of Article 3, there are the following polluted zones : Ruhrgebiet West, Ruhrgebiet Mitte, Ruhrgebiet Ost, Rheinschiene-Süd, Rheinschiene Mitte, Hamburg, Ludwigshafen, Frankenthal, Mainz-Bodenheim, Saarbrücken, Neukirchen, Dillingen, Saarbrücken-Völklingen, Kassel, Wetzlar, Untermain, Rhein-Main, Stuttgart, Aschaffenburg, Augsburg, Burghausen, Erlangen-Fürth-Nürnberg, Ingoldstadt-Neustadt-Kehlheim, München, Regensburg, Würzburg.
Most of the above mentioned areas and cities have been declared as "areas with heavy pollution load" (Belastungsgebiete) in the framework of the Bundes-Immissionsschutzgesetz (Federal Immission Control Law).
Concentration of SO_2- and suspended particulates are within the following ranges :

Annual averages	arithmetic mean	95%
SO_2 (1/2 h)	70 .. 140	200 .. 400 ug/m^3
Suspended particulates	60 .. 100	150 .. 300 ug/m^3

France

Except for the zones notified in compliance with Article 3, all big cities and industrial areas are polluted.

The measured concentration ranges are :

Annual averages	50%	98%
SO_2	30 .. 90	80 .. 260 ug/m^3
Black Smoke	15 .. 50	30 .. 120 ug/m^3
Winter averages		
SO_2	30 .. 120	90 .. 350 ug/m^3
Black smoke	25 .. 80	35 .. 140 ug/m^3

Greece

Very little is known about the air pollution levels in Greece. However, the most polluted areas are probably Athens and Thessaloniki.

Measured concentrations are in the ranges of :

Annual averages	50%	98%
SO_2	40 .. 60	80 .. 120 ug/m^3
Black Smoke	no data available	
Winter averages		
SO_2	40 .. 60	80 .. 120 ug/m^3
Black Smoke	no data available	

Ireland

Except for Dublin, the urban areas of Cork, Dundalk, Drogheda and Limerick have relatively elevated pollution levels. Measured concentration levels are in the range of :

Annual averages	50%	98%
SO_2	20 .. 90	60 .. 240 ug/m^3
Black Smoke	10 .. 50	20 .. 240 ug/m^3
Winter averages		
SO_2	30 .. 70	70 .. 260 ug/m^3
Black Smoke	15 .. 60	50 .. 270 ug/m^3

Italy

Due to the very sparse information, the Commission is unable to assess the ambient air situation in Italy. There are most likely more polluted zones than those mentioned in Table 5, e.g. cities and areas in Piemonte, Liguria, Emilia Romagua, Toscana, Luzio, Campania, Sicilia.

Measured concentrations in the polluted areas are estimated to be in the range of :

Annual averages	50%	98%
SO_2 (24 h)	50 .. 160	150 .. 350 ug/m^3
	arithmetic mean	95%
Suspended particulates	60 .. 160	100 .. 200 ug/m^3
Winter averages	50%	98%
SO_2 (24 h)	80 .. 250	120 .. 650 ug/m^3

Luxembourg

The Commission does not know of any polluted area other than those listed in Table 5. The concentration ranges measured are :

Annual averages	50%	98%
SO_2 (24 h)	20 .. 35	50 .. 100 ug/m^3
Black smoke	10 .. 20	25 .. 50 ug/m^3
Winter averages		
SO_2 (24 h)	25 .. 50	50 .. 100 ug/m^3
Black Smoke	15 .. 25	30 .. 70 ug/m^3

The Netherlands

The Commission is not aware of any polluted zone other than those mentioned on page 25. Measured concentration ranges are :

Annual averages	50%	98%
SO_2	5 .. 35	50 .. 175 ug/m^3
Black Smoke	5 .. 25	35 .. 105 ug/m^3
Winter averages		
SO_2	5 .. 60	50 .. 210 ug/m^3
Black Smoke	10 .. 30	40 .. 115 ug/m^3

United Kingdom

At present the Commission is not aware of any polluted zone other than those listed in table 5.
Measured concentration ranges in such polluted zones are :

Annual averages	50%	98%
SO_2	50 .. 100	100 .. 240 ug/m^3
Black Smoke	30 .. 80	80 .. 350 ug/m^3
Winter averages		
SO_2	60 .. 120	no data available
Black Smoke	50 .. 150	no data available

IV. Annex IV problem

IV.1. General aspects

According to articles 10(2) and 10(4) of the Directive it is said that "without prejudice to the provisions of this Directive, a Member State may also use, pending the decision of the Council on the proposals from the Commission referred to in paragraph 4, the sampling and analysis methods laid down in Annex IV and the values associated with these methods also laid down in Annex IV in substitution for the limit values set out in Annex I".

"A Member State which decides to avail itself of the provisions of paragraph 2 must however take measurements in parallel at a series of representative measuring stations, chosen in accordance with the requirements of Article 6, in order to verify the corresponding stringency of the limit values set out in Annex IV and Annex I. The results of these parallel measurements, including in particular instances in which the limit values laid down in Annex I have been exceeded and the concentrations recorded, shall be forwarded to the Commission at regular intervals, and at least twice a year, for incorporation in the annual report provided for in Article 8".

"The Commission shall, after five years, but within six years of the expiry of the limit of 24 months specified in Article 15(1), submit a report to the Council on the results of the parallel measurements

carried out under paragraph 3 and shall, having regard in particular to these results and to the need to avoid discriminatory provisions, make proposals relating to paragraph 2 and Annex IV". In the report provided for in Article 8 the Commission will indicate whether it has noted instances in which the limit values fixed in Annex I have been exceeded to a significant extent on repeated occasions.

In practical terms this means that the Directive permits one of two systems of monitoring to be used to implement the Directive :

(i) black smoke and sulphur dioxide fixed station networks (Annex I of the Directive)

(ii) temporarily, until reviewed : suspended particles at fixed stations and sulphur dioxide from random sampling networks (Annex IV).

However, any Member State availing itself of the provisions of Article 10.2 and, therefore, the second of the above two alternatives, must carry out parallel measurements at a series of measuring stations, selected in accordance with Article 6, to verify the corresponding stringency of the two approaches. This requirement is set out in Article 10.3.

Two Member States, F.R. Germany and Denmark, are applying the Annex IV while Italy is applying for SO_2 the limit values of Annex I and for suspended particulates the limit values set out in Annex IV.

Parallel measurements are being carried out in these three Member States, partly in cooperation with the Commission (see chapter V).

However, the obligation for regular reporting, as laid down in article 10(2), has not been fulfilled by the Member States concerned as already mentioned in chapter III. The Commission has taken all necessary steps such that Member States comply with the requirements of this article.

Moreover and particularly in order to accelerate the process of fact-finding, in 1982 the Commission launched a study on the assessment of the corresponding stringency of Annexes I and IV. Inter alia, the experts concluded in the final report [7] that :

1. The monitoring and assessment systems in Annex I and Annex IV are not directly comparable because of fundamental differences in sampling for sulphur dioxide and in the methods of measurement for suspended particulates. For suspended particulates it must be stressed that there are two methods which measure essentially unrelated properties of the particulates : for black smoke (Annex I) it is a measure of the blackness (carbon content) of suspended particulates whilst for the gravimetric method (Annex IV) it is a measure of the mass, independently of colour or composition. It is concluded that the only practicable criterion for assessing corresponding stringency is the ratio of measured value : limit value. Unless the Annex I and Annex IV values of this ratio are equal the two systems are not equally stringent.

2. The Annex I limit values for sulphur dioxide are more stringent than the Annex IV limit values with the exception of the (upper) long-term value which is permitted under the Annex I system when the associated black smoke concentrations are low. However, the Annex IV system of random sampling over an area of 16 km^2 can produce measured values of the statistics which are 10-40% less than the values which would be measured at a station in the most polluted part of the 16 km^2 area. This can increase further the stringency of Annex I in comparison to Annex IV for sulphur dioxide and can mean that the upper long-term limit value of Annex I is also more stringent than the Annex IV long-term value.

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[7] Keddie, Lahmann, McInnes : European Community Directive 80/779/EEC : An assessment of monitoring network design and of the corresponding stringency of Annexes I and IV.
Final report (1983).

3. For suspended particles, in general throughout the Member States, the available evidence indicates that the Annex IV limit values are more stringent than those of Annex I but there are locations where the opposite can be the case. The main reason for this inconsistency is the fundamental difference between determining suspended particulate concentrations by the black smoke (Annex I) and gravimetric (Annex IV) methods. Any relationship between the two methods varies substantially from place to place and, even at the same location, varies from day to day and, perhaps, from year to year. Therefore, it will usually be necessary to make separate measurements of both black smoke and gravimetric concentrations because one cannot be deduced from the other with sufficient reliability.

4. The requirement in Annex I that the short-term (98 percentile) limit values should not be exceeded on more than 3 consecutive days, introduces an additional element of stringency in comparison to Annex IV, although this condition is breached only very infrequently when the 98 percentile limit values are not exceeded.

5. The "hybrid" system of limit values adopted by Italy (lower sulphur dioxide limit values of Annex I and the gravimetric suspended particulates limit values of Annex IV) is more stringent than either the Annex I or Annex IV system on its own.

6. The smaller number of samplers under the Annex IV system will result in a greater degree of uncertainty in the measured statistics compared to those determined under the Annex I system.

7. When making comparisons between the Annex I and Annex IV systems under the provisions of Article 10.3 account may be taken of the errors in measurement, of uncertainties introduced by missing data and of the spatial representativity of the measuring stations. It is therefore suggested that if the relationship of the ratio measured value limit value (Annex I) to measured value limit value (Annex IV), determined from measurements carried out under Article 10.3, lies within the range 0.85 to 1.15 then the two systems should be regarded as being correspondingly stringent.

Values for the relationship outside this range would indicate that one system is more or less stringent than the other, although the influence of errors and other uncertainties may still need to be taken into account.

It has been noted above that Article 10(3) requires the Member States concerned to verify the corresponding stringency of the limit values set out in Annex IV and Annex I. The assessment criteria to be used in verifying the corresponding stringency mentioned in Article 10(3) were not clear. Thus it was necessary to define these criteria so that all of the data needed to verify the corresponding stringency should be derived from this.

The report of Keddie, Lahmann and McInnes also gives criteria for the necessary comparative measurements. At the same time they point to a number of differences of principle between the two Annexes and to the remaining gaps in the knowledge. (see also chapter IV).

To fill these gaps as quickly as possible, the Commission is taking part in the national measuring programmes under Article 10(3) by making comparative measuring devices available and by reaching agreements with the Member States concerned on investigation targets.

IV.2. Results of parallel measurements

The findings and predictions of the experts have been found valid by measurements. The German parallel measurement campaign came to the following preliminary conclusions :

a) The two methods of measuring suspended particulates (black smoke and the gravimetric methods) clearly measure different fractions of the suspended particulates. For suspended particulates the annual mean measured by the gravimetric method is higher by a factor of two to three than when measured by the black smoke method, the factors varying widely with the site and the time of year.

b) Taking into account the criteria mentioned under points 1 and 7 of chapter IV.1 the Annex IV limit values for suspended particulates are clearly more stringent than those in Annex I.

c) The short-term sulphur dioxide values in Annex I (98 percentile of the cumulative frequency distribution of the daily mean values) are generally more stringent than the limit values in Annex IV (95 percentile of the cumulative frequency distribution of the 30 minute values). The upper short-term sulphur dioxide value in Annex I (350 ug/m^3) has been repeatedly exceeded in German cities.

d) The facts are not yet quite so clear in the case of the long-term value for sulphur dioxide. In one third of the cases investigated the annual means measured by the Annex IV method were more stringent than those measured by the Annex I method.

e) Using theoretical considerations and the available data it is possible to calculate when the German immission values I-1 and I-2 are likely to reach a level where the Annex I limit values for sulphur dioxide will be exceeded. The critical concentrations are I-1 = 150 and I-2 = 250 to 350 $\mu g/m^3$

The Commission is studying further details of the comparability of Annex I and Annex IV in cooperation with F.R. Germany, Italy and Denmark within the framework of the Common Measurement Programme (see chapter V).

IV.3. Assessment of the problem

As outlined above, there is strong evidence that the SO_2 limit values laid down in Annex IV are less stringent as the ones laid down in Annex I. Moreover, the random sampling system is applied only temporarily in two "Länder" of F.R. Germany; in the rest of Germany and in Denmark the monitoring is carried out with fired stations which work continuously. As these two Member States already use the monitoring procedures required under Annex I, rather than those under Annex IV, as a consequence they should apply the limit values of Annex

I for SO_2. The Commission has contacted both Member States in order to resolve this problem, but up to now, there has not been any progress.

With regard to suspended particulates the parallel measurements carried out in the F.R. Germany show that the limit value of Annex IV are more stringent. However the problem is much more complex than for SO_2 because there is no stable relationship between Black Smoke (Annex I, and gravimetrically measured particulates (Annex IV). These are two different fractions from the total suspended particulates, having different health effects and requiring different emission-reduction measures. Harmonization efforts can only aim at measuring either black smoke and the gravimetric mass together or measuring one or the other in all Member States. The Commission is still studying this problem, especially the health effects caused by the mass of inhaled particles and the particle size distributions. Moreover, supplementary parallel measurements are being carried out in cooperation with Italy.

Based on the conclusions drawn from these studies the Commission will submit harmonization plans to the Council by 1987/88, as laid down in article 10(4). However, it can be said already that the parallel approach with two annexes should not be continued.

V. Common Measurement Programme (CMP)

V.1. Background

When the Directive was discussed in Council it was not possible to settle all of the problems by mutual agreement, especially the following:

- whether the Directive should cover suspended particulates measured gravimetrically or as black smoke,

- whether sulphur dioxide should be monitored continuously at so-called fixed measuring points or on a random basis within a 1 km x 1 km grid,

- whether the measurement procedures and equipment used by the Member States display the comparability required for the application of the Directive.

Article 10 of the Directive therefore provides for exploration of the outstanding points and submission of suitable proposals for harmonisation of the Directive to the Council.

In particular, Article 10(5), which obliges the Commission to carry out studies at selected locations in cooperation with the Member States concerned, is a major factor in the efforts to achieve harmonisation.

Examination of the sampling and analytical problems mentioned in the Directive showed that any programme carried out pursuant to Article 10(5) would have to meet the global requirements in Article 10 in order to be effective.

Care must be taken that the obligations and responsibilities laid down in Article 10 are met. Member States are obliged to fulfil the requirements of Article 10(1) and 10(3). Article 10(5) must be implemented by the Commission and Member States in mutual cooperation.

However, since the correlation of methods (10(1)) and the corresponding stringency of the two sets of limit values (10(3)) must be approved by the Commission and the studies pursuant to Article 10(5) must be carried out on a cooperative basis, the Member States and the Commission have agreed to coordinate procedures through a "Common Measurement Programme".

V.2. Aims of the Common Measurement Programme

The Common Measurement Programme aims to meet the following targets by mid-1988:

1. Consistent and usable reference methods for SO_2, black smoke and suspended particles will be worked out. Since revision of the reference methods is time-consuming "comparison methods" were agreed with the Member States in order to carry out the tasks imposed by Article 10(5).

   The Commission recommends Member States to use these comparison methods in the verifications required by Article 10(1) and 10(3).

2. A clear-cut definition of Article 10(1) should be developed. For this purpose test procedures and minimum requirements for the measuring methods and apparatus used by the Member States will be devised in order to define the term "satisfactory correlation".

   Interpretation of the term "reasonably stable relationship" should involve the Member States in plotting the relationships between their national methods and the comparison methods under ambient conditions for those instruments which are unable to meet the minimum requirements (see chapter III.1.2.).

   The long-term aim should be that only measuring equipment which has met the specified minimum requirements within a defined test procedure will be used to monitor air quality.

3. There must be an unambiguous definition of corresponding stringency referred to in Article 10(3). As a contribution to the harmonised sampling methods required by Article 10(5) the Commission will participate in measuring projects to be organised by those Member States affected (Italy, Denmark and the Federal Republic of Germany) to verify the corresponding stringency of the limit values laid down in Annexes IV and I.

4. In cooperation with the Joint Research Centre, Ispra, the Commission will organise quality assurance programmes which will include the exchange of calibration standards between all national laboratories concerned.

V.3. Initial results and prospects

The Common Measurement Programme was agreed by the Member States in October 1983. However work on some aspects had started earlier in 1982 so that several initial results already were available : for the revision of the reference methods (see chapter VI), the implementations of Article 10(1) (see chapter III) and Article 10(3) (see chapter IV).

The studies carried out within the CMP also served to select the "comparison methods" which should be used in the field to comply with Article 10 until an agreement on revised reference methods has been found. With the agreement of the Member States the following devices were selected in the light of the test results :

SO_2 : An UV-fluorescence monitor calibrated via multiple-tested calibration gases stored in specially-coated gas-cylinders,

Black smoke : The French SF8 sampler with Whatmann No 1 filter and EEL model 43 reflectometer

Gravimetric suspended particles : Small filter unit according to VDI 2463.

The Commission has made the Joint Research Center, Ispra, responsible for guiding the quality assurance in order, inter alia, to guarantee the comparability of the data measured by various Member States within the framework of the Common Measurement Programme. This quality assurance programme - currently being carried out - is, however, open to all national laboratories which are concerned with the monitoring of SO_2, black smoke and suspended particles in the framework of the Directive.

The report on the results of this action will be available in Summer 1985.

Timetables for implementation of the Common Measurement Programme have been laid down as have the tasks to be performed within it. The crucial date is 30 June 1988, which is the latest time for the Commission to report to the Council.

Some of the activities planned for 1985 are :

1. Revision of the SO_2 and black smoke reference methods.
2. Completion of the parallel measurements being carried out in Italy, the Federal Republic of Germany and Denmark in order to close the gaps in the knowledge and to assess the corresponding stringency of Annexes I and IV.
3. Conclusion of the procedures for determining the correlations and relationships between the national measuring methods and the comparative measuring methods, as foreseen in Article 10(1).
4. Completion of the first Quality Assurance Programme and preparation of further quality assurance measures.

VI. ADAPTION OF THE REFERENCE METHODS

In the framework of the Common Measurement Programme it was decided to adapt the reference methods to technical progress, in order to overcome several shortcomings :

The reference method for SO_2, a preliminary version of ISO Standard 6767, contained several short-comings which were identified by ISO Working Party TC146/SC3/WG7 and subsequently corrected [8]. However, even the improved ISO version is not suitable for sampling over 24

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[8] Seifert, B. : "Bestimmung von Schwefeldioxid in der Luft. Bestandsaufnahme und Versuche zum Tetrachloromercurat-Verfahren". Zwischenbericht zum Forschungsvorhaben Nr. 10 402 250 des Bundesministers des Innern.

hours and is thus very expensive as a direct method of comparison with the normal measuring method used in a given Member State pursuant to Article 10(1) [9].

In reviewing the reference measurement method the Joint Research Centre, Ispra (Italy) has carried out preliminary studies on the suitability of a TCM technique for determining airborne SO_2 which takes account of the new aspects of the ISO standard and of the improved American West-Gaeke Method[10]. This work has been completed by the Federal Health Agency, Berlin [11]. On the basis of these results, in September 1984, the Commission sent a revised specification for the TCM reference method to Member States, which includes a odified procedure for measurements up to 24 hours.

The method of measuring Black Smoke [12] as defined by the OECD in 1964, contains five different "proposals concerning international standard calibration measurements" based on studies in the early sixties. In the meantime, the emission situation and therefore the relationship of the various blackening indices to each other has changed considerably. It was to be assumed that the various calibration curves no longer displayed the comparability needed for the current situation.

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[9] Federal Register of the United States of America, No. 40 CFR part 50 of 15 January 1982.

[10] Serrini, B, Payrissat, M. : Determination of SO_2 in Air by the TCM-Pararosanile method - Progress reports 1 and 2 presented on the 5th and 6th meeting of Government experts on the implementation of Directive 80/779/EEC, (1983).

[11] Seifert, B., Zhao, L. : Comparative determination of sulphur dioxide in ambient air using TCM procedures with short-term and long-term sampling.
Final report to CEC-contract BU 83-654 (1984).

[12] "Methods of Measuring Air Pollution"
Report of the Working Party on Methods of Measuring Air Pollution and Survey Techniques OECD (1964).

In addition, the OECD method is vaguely formulated with the result that more precise definitions for the reference measurement method must be laid down for, inter alia, the sampling head, the length of the sampling pipe, the filter support, the filter paper, the reflection measuring unit, etc.

The Commission proposes to use a single calibration curve based on Whatman N° 1 filter paper and an evaluation based on the EEL model 43 reflectometer. In addition to that a detailed inventory of the technical requirements applying to the equipment is given [13].

The description of the gravimetric measurement of suspended particles set out in Annexe IV to the Directive cannot be considered as an unambiguous basis for a clearly defined reference measurement method. For example, Annexe IV, Item 3 states that: "The sampling system does not include a fractionating device". However, the sampling system itself constitutes a fractionating device because under atmospheric conditions only a fraction of the total suspended particulate matter can be captured. A second technical criterion for the measuring equipment as mentioned in Annexe IV, Item 7 is that the air velocity at the surface of the filter shall be between 33 and 55 cm/sec. inclusive, but this cannot guarantee comparable results if different equipment geometries are used. Therefore is was possible that instruments which comply with the provisions of Annexe IV would nevertheless yield incomparable results.

The sampling efficiencies of several measuring devices for suspended particulate used in several Member States were examined in a wind tunnel at Warren Spring Laboratory [14]. As expected, the results show

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[13] Clayton, P. : Programme for testing and selecting of black smoke comparison apparatus.

[14] Barrett, C.F., Ralph, M.D., Upton, S.C. : Windtunnel Measurements of the inlet efficiency of four samplers of suspended particulate matter.
Final report to CEC-contract 6612/10/2 (1983).

that the particle size spectrum captured by all three devices was a function of wind velocity, and that differences in sampling efficiency are considerable.

In parallel with the wind tunnel studies the German Federal Environment Agency's pilot station carried out atmospheric measurements in Frankfurt and Wetzlar with results which are also in line with the trend in the wind-tunnel tests [15].

The specifications of the reference method for the gravimetric monitoring of suspended particulates will need improvement therefore. The necessary work will take longer than that for SO_2 and black smoke, because there are no easy to questions like :

1. Based on health considerations, what is the particle size fraction which should be captured by the measuring unit?
2. Must the reference method require that this particle size fraction is sampled by the device independently of wind velocity?

The Commission tries to find answers to these questions and has launched study contracts, partly in cooperation with other Member States.
The Committee on the adaptation to technical progress, foreseen in article 13 of the Directive, was set up in March 1985 to consider the reference methods for SO_2 and Black Smoke which were revised as a result of the Common Measurement Programme.

The Commission still hopes to achieve final agreement on its proposals for SO_2 and Black Smoke in 1985.

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[15] Müller, J. : Field measurements of suspended Particulate Matter (SPM) sampled with different instruments.
Final Report to CEC-contract 6612/10/1 and 6612/10/5 (1984).

VII. Acknowledgments

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