

# **THE QUALITY OF DRINKING WATER IN THE EUROPEAN UNION**

**SYNTHESIS REPORT ON THE QUALITY  
OF DRINKING WATER IN THE  
MEMBER STATES OF THE EUROPEAN  
UNION IN THE PERIOD 1999-2001**  
*Directive 80/778/EEC*

|

14 April 2008

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## Accuracy of information

The reader should note that the information contained in this report is that submitted by Member States. The European Commission is thus not responsible for its quality, accuracy or representativeness. It should also be noted that the information is not complete in terms of the number of Member States reporting and the number of questions being answered. All information presented in this synthesis report has been submitted to responsible authorities in the Member States for approval prior to the publication of this report.

## List of abbreviations

WSZ	Water supply zone as defined in the Drinking Water Directive
“Larger WSZ”	More than 5000 persons or more than 1000m <sup>3</sup> /day
MAC	Maximum Acceptable Concentration
DWD	Drinking Water Directive

# Executive Summary

The quality of drinking water in the European Union is covered by Council Directive 98/83/EC concerning the quality of water intended for human consumption. The 98/83/EC Drinking Water Directive (DWD) came into force in 1998 and replaces the previous DWD 80/778/EEC. EU Member States had two years to transpose the new DWD in their national legislation (transposition) and another three years to comply with the requirements of the DWD (implementation).

Every three years the Member States have to report to the European Commission on the quality of the drinking water within their territory in relation to the DWD. Member States report for each of the three years separately. Reporting requirements and formats are regulated in the Reporting Directive (91/692/EEC).

For each reporting period the European Commission produces and publishes a synthesis report that is based on the information provided by the Member States. This synthesis report covers the returns from Member States on the Drinking Water Directive (80/778/EEC) for the third reporting period, covering the years 1999-2001.

Twelve Member States submitted a return for the Drinking Water Directive (DWD). Some of the returns reached the Commission only early 2008. This report takes into account the data received not later than January 2008.

No data were received from Greece and Finland and Sweden did submit information at a very late stage but the format of the information supplied was such that processing was not possible. It should be noted that Sweden failed to submit an adequate return on the quality of drinking water for all three reporting periods. The Spanish data for 1999 and 2001 arrived late and were in a format that could not be processed.

When the full set of data will be received and processed, the reports will be updated.

Event though Member States have to report at a national level and not at a regional level it was decided to include data from the three Belgian regions. However, it was not possible to aggregate the data from the three regions, so Flanders, Wallonia and Brussels are presented as separate entities. This has an effect on the comparisons that are made between Member States in this report, as regional data should not be compared to national data from other Member States. In the future the Commission will not accept anymore a separate reporting by region under the format regulated in the Reporting Directive (91/692/EEC).

In this synthesis report the water quality parameters that cause non-compliance with the drinking water standards in the DWD are identified at an individual Member State level. Where possible a comparison is made between the water quality in the third and the previous reporting period. A summary of water quality at European Union level is made. There is no significant change in the overall drinking water quality in the European Union, as can be judged from the data that were received by the EC.

Parameters that most often cause non-compliance at a European level are:

- Iron
- Manganese
- Aluminium
- Total coliforms
- Hydrocarbons
- Phenols
- Pesticides
- Nitrate
- Temperature
- Potassium
- Fluoride
- Sodium
- Sulphate
- THM
- Faecal coliforms
- Turbidity
- Faecal streptococci
- Ammonium
- Nitrite and
- Colour.

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# 1 Introduction

The quality of drinking water in the European Union is covered by Council Directive 98/83/EC concerning the quality of water intended for human consumption. The 98/83/EC Drinking Water Directive (DWD) came into force in 1998 and replaces the previous DWD 80/778/EEC. The Member States of the EU had two years to transpose the new DWD in their national legislation (transposition) and another three years to comply with the requirements of the DWD (implementation).

Every three years the Member States report to the European Commission on the quality of the drinking water within their territory in relation to the DWD. Member States report for each of the three years separately. Reporting requirements and formats are regulated in the Reporting Directive (91/692/EEC).

For each reporting period the European Commission produces and publishes a synthesis report that is based on the information provided by the Member States. This synthesis report covers the returns from Member States on the Drinking Water Directive (80/778/EEC) for the third reporting period, covering the years 1999-2001.

The first reporting period for the 80/778/EEC DWD covered the years 1993-1995. The data submitted by the Member States were processed by the European Commission and a synthesis report was produced in 2001<sup>1</sup>.

For the second reporting period (1996-1998)<sup>2</sup> a second synthesis report was produced on the quality of drinking water in the European Union. Both reports (1993-1995) and (1996-1998) are available on the website of the European Commission, [http://ec.europa.eu/environment/water/water-drink/index\\_en.html](http://ec.europa.eu/environment/water/water-drink/index_en.html). This synthesis report covering the reporting period 1999 - 2001 is the third synthesis report..

1. Synthesis report on the quality of drinking water in the Member States of the European Union in the period 1993-1995 (2001)
2. Synthesis report on the quality of drinking water in the Member States of the European Union in the period 1996-1998 (2003)





# **Council Directive on the quality of water intended for human consumption 80/778/EEC**

## **General aspects Drinking Water Directive**

In 1998 the revised Drinking Water Directive 98/83/EC was adopted and the Directive has been transposed into national legislation by all fifteen Member States of the European Union at that time. For the reporting period covered in this synthesis report all information relates to the previous Drinking Water Directive (DWD) 80/778/EEC. Thirteen of the fifteen Member States submitted a return for the third reporting period. No information was received from Greece and Finland for the reporting years 1999-2001. Sweden did submit some information on the quality of drinking water at a very late stage. However, the format used to provide information was very different from the required format and could not be used. In this synthesis report a comparison is made with the water quality results from the previous two reporting periods if such information is available.

## **Reporting Requirements for Drinking Water**

Member States are required by the Reporting Directive 91/692/EEC and Decision 92/446/EEC which was subsequently amended by Decision 95/337/EEC to answer a standardised questionnaire on implementation of the Drinking Water Directive. In this synthesis report some of the information submitted is summarised. Information on legal transposition and limit values and information on derogations are not addressed in this report.

The DWD applies to all water supply zones that serve more than 50 persons or produce more than 10 m<sup>3</sup> of water per day. Member States have a reporting obligation to the European Commission on all water supply zones that serve more than 5000 persons or produce more than 1000 m<sup>3</sup> of water per day.

## **Rationale of the synthesis report**

In this report each Member State is discussed with respect to its drinking water supply, where both quantitative and qualitative information are addressed. In the first part of each paragraph some key data on the supply of drinking water is presented for each Member State. This information concerns:

- the total population in the Member State;
- the number of water supply zones serving more than 5000 people or producing more than 1000 m<sup>3</sup> of water per day;
- the number of people served by these supplies;
- the total quantity of water supplied by these water supply zones;
- the percentage of the population served by these supplies;
- and the water sources used for the production of this water: (groundwater, surface water and other water sources).

In the second part of each paragraph the quality of the drinking water supplied is addressed and compared to the information on the quality in the previous two reporting periods if available. The qualitative analysis for each Member State concerns: a summary of water quality at a national level, mentioning for each parameter the percentage samples that do not comply with the parametric values in the DWD; the number of water supply zones where one or more parameters are not always in compliance with the parametric values in the DWD.

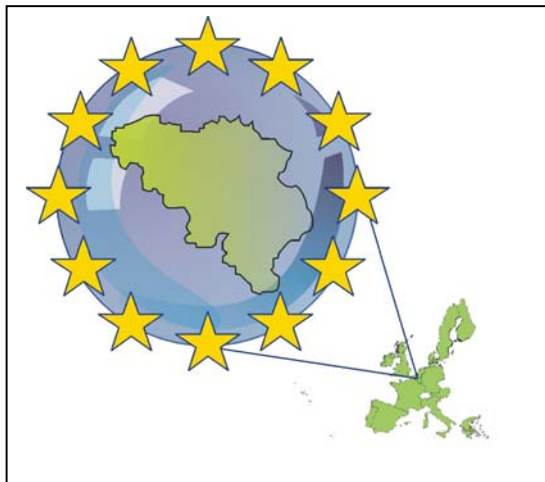
In this analysis only parameters that have a numeric parametric value (MAC= Maximum Acceptable Concentration) in the DWD are considered, parameters that have no parametric value but only a guidance level in the DWD are not included.

In the last chapter data submitted by the Member States are used to draw some conclusions at a European Union level.

## 2 Drinking Water Quality in the Member States

In this chapter the returns submitted by all 15 Member States will be discussed. Each paragraph summarises the information for one of the Member States. Firstly some key data on the water supply are addressed and secondly the quality of the drinking water supplied in comparison to the requirements of the Drinking Water Directive. Parameters discussed are limited to those that have a parametric value in the Directive. The information is restricted to the “larger” water supply zones that fall under the reporting requirements. Larger water supply zones are serving more than 5000 persons or supply more than 1000 m<sup>3</sup> water per day. Where possible data are compared to the results of the previous two reporting periods to try and identify any improvements in water quality.

### 2.1 Drinking Water Quality in Belgium 1999-2001



Belgium consists of three regions, the Brussels Region (the district of the capital city of Brussels), the Flanders Region (Vlaams Gewest) and the Walloon Region (Région Wallonne).

The information received from Belgium consisted of returns covering the Brussels Region, an incomplete return from the Walloon Region and an incomplete return from the Flanders Region. Processing and merging of regional data is the responsibility of the Member State and the Member States should report to the European Commission at a national level and not at a regional level. The returns submitted by Belgium did not comply with this requirement. Data from the three Belgian regions are included as they have been submitted to make this report as complete as possible. No attempt was made to aggregate the data to a higher level. In the future the Commission will not accept anymore a separate reporting by region under the format regulated in the Reporting Directive (91/692/EEC).

Belgium has a total population of 10.2 million persons, dependent on the region between 83 and 100% of the population is connected to larger water supplies that serve more than 5000 persons or that produce more than 1000 m<sup>3</sup> of water per day (see table 3.1.1). There are 2 of such water supply zones in Brussels and 168 in the Walloon region. The number of large water supply zones in the Flanders region is not yet known. The large water supply zones in the three regions supply approximately 528 million m<sup>3</sup> of drinking water. The quality data for Belgium that are presented in this synthesis report concern the abovementioned water supply zones. Drinking water in Belgium is produced from both groundwater sources and surface water sources. The exact contributions are unknown as Wallonia did not submit data on the sources.

Total population in Belgium	10.2 million		
	Brussels region	Flanders region	Walloon region
Number of water supply zones serving more than 5000 persons/more than 1000 m <sup>3</sup> water per day	2	?	168
Number of people served by these water supply zones	1.0 million	?	2.8 million
Total amount of water supplied (only supplies serving 5000 or more consumers)	68 million m <sup>3</sup> /year	345-346 million m <sup>3</sup> /year	182.4 million m <sup>3</sup> /year
Population served by these supplies	100%	94-97%	83%
Raw water sources			
Groundwater:	85%	50%	No data
Surface water:	15%	50%	
Other sources, bank filtrate	0%	0%	

Belgium did not provide a national summary, but three *regional* summaries on the water quality in large water supply zones serving more than 5000 persons, mentioning for each parameter the percentage of samples that did not comply with the parametric values in the DWD.

The parameters that caused non-compliance in more than 1% of the samples taken in these water supply zones are listed in table 3.1.2 (left column), starting with the parameter that has the highest percentage of non-complying samples (phenols in Flanders and residual chlorine in Wallonia). Detailed information is presented in tables 3.1.3 a, b and c.

Belgium also provided information at water supply zone level on the parameters that did not always comply with the parametric values in the DWD. The information is available for the Brussels Region, incomplete for the Walloon Region and missing for the Flanders Region. The parameters that caused non-compliance in more than one sample in individual water supply zones are listed in table 3.1.2 (right column), starting with the parameters that caused non-compliance in the highest number of water supply zones (faecal coliforms in the Walloon Region). Detailed information is presented in table 3.1.4.

<b>Table 3.1.2 Summary of water quality parameters that cause non-compliance in Belgium</b>	
Parameters that cause non-compliance in more than 1% of all samples taken in Belgium (in any of the three reporting years)*	Parameters that show non-compliance in a number of water supply zones in Belgium*
<b>Brussels Region:</b> None of the parameters	<b>Brussels Region:</b> None of the parameters
<b>Flanders Region</b> Phenols Sodium Iron Fluoride Cyanide Pesticides Manganese Nickel Total coliforms Silver Potassium Cadmium Faecal streptococci Hydrocarbons Turbidity	<b>Flanders Region</b> No data at wsz level supplies
<b>Walloon Region</b> Residual chlorine Aluminium Trihalomethanes Iron Total coliforms Sulphate	<b>Walloon Region</b> (incomplete data) Faecal coliforms Nitrate Aluminium Faecal streptococci
All other parameters comply in 99% or more of the samples or do not have a parametric value in the Directive 80/778/EEC	Parameters that most often caused failure in supply zones (in more than 1 sample in any year)

\* Only supplies serving 5000 or more consumers

### **National summary of the drinking water quality in Belgium**

Tables 3.1.3.a, b and c present information on the overall quality of drinking water in all larger supplies in the three Belgian Regions in the third reporting period. For each non-compliant parameter the percentage of samples that exceeded the parametric value in the DWD is presented. Where available data for the previous reporting periods are also included.

Table 3.1.3.a shows that in the Brussels Region none of the water quality parameters exceeded the DWD value in more than 1% of the samples taken in 1999, 2000 and 2001.

Table 3.1.3.b shows that in the Flanders Region the parameter phenols was more often exceeding the parametric value in the total number of samples in the larger water supply zones; 27.0% of samples in 1999, 24.6% in 2000 and 4.3% in 2001.

Table 3.1.3.c shows that in the Walloon Region the parameter residual chlorine was most often exceeding the parametric value in the total number of samples in the larger water supply zones. Only the percentage was given for the three reporting years combined and the percentage of exceedance was 4.3%.

Table 3.1 3.a Percentage exceedences for samples taken in all water supply zones serving 5000 or more consumers in 1996-1998 and for comparison 1993-1995 (Brussels Region)

Table 3.1.3.a Percentage exceedances for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 and for comparison 1993-1995 and 1996-1998, Brussels region Belgium					
Parameter	1993/1994 /1995	1996/1997/1998	1999	2000	2001
	No data	No parameters	No parameters exceeded in more than 1% of samples		

Table 3.1 3.b Percentage exceedences for samples taken in all water supply zones serving 5000 or more consumers in 1996-1998 and for comparison 1993-1995 (Flanders Region)

Table 3.1.3.b Percentage exceedances for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 and for comparison 1993-1995 and 1996-1998, Flanders region Belgium					
Parameter	1993/1994 /1995	1996/1997/1998	1999	2000	2001
All parameters	No data	No data			
Phenols			27.0	24.6	4.3
Sodium				6.4	
Iron			4.5	4.2	4.4
Fluoride			3.8	3.2	4.0
Cyanides				3.3	
Pesticides			1.9		
Manganese			1.4	1.4	
Nickel				1.7	
Total coliforms					1.7
Silver				1.2	
Potassium			1.4	1.1	
Colour				1.2	
Faecal streptococci					1.1
Hydrocarbons/Mineral oils			1.2		
Turbidity					1.2
All other parameters complied in 99% or more of the samples taken or no data were submitted					

Table 3.1 3.c Percentage exceedences for samples taken in all water supply zones serving 5000 or more consumers in 1996-1998 and for comparison 1993-1995 (Walloon Region)

<b>Table 3.1.3.c Percentage exceedences for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 and for comparison 1993-1995 and 1996-1998, Walloon region Belgium</b>					
<b>Parameter</b>	<b>1993/1994 /1995</b>	<b>1996/1997/1998</b>	<b>1999, 2000, 2001 data reported in an aggregated way</b>		
<b>THM</b>	3.5/9.8/3.8	5.8			3.2
<b>Iron</b>	2.0/2.0/2.8				2.1
<b>Manganese</b>		2.1			
<b>Turbidity</b>		1.8			
<b>Nickel</b>		1.5			
<b>Pesticides</b>	13.4/7.4/4.3	1.5			
<b>Aluminium</b>	25.0/6.4/3.8	1.4			3.3
<b>Total coliforms</b>	2.5/2.2/3.0	0.9			1.7
<b>Nitrite</b>		1.0			
<b>Sulphate</b>		0.9			1.7
<b>Hydrocarbons</b>		0.7			
<b>pH/PAH/SSRC</b>		0.4			
<b>Faecal coliforms</b>		0.3			
<b>Nitrate</b>		0.3			
<b>Faecal streptococci</b>		0.3			
<b>Sodium</b>		0.2			
<b>Lead</b>		0.2			
<b>Residual chlorine</b>					4.3
All other parameters complied in 99% or more of the samples taken or no data were submitted					

#### **Number of water supply zones exceeding water quality parameters**

For each parameter that showed non-compliance in more than 1 sample in individual water supply zones, the number of such water supply zones was calculated. The total of number of water supply zones with more than 1 non-compliant sample is listed in table 3.1.4. The total number of water supply zones serving more than 5000 persons in Belgium is unknown due to missing data from the Flanders Region. In general no or incomplete information was available from both the Flanders and the Walloon Region to assess the number of water supply zones that failed to comply with the requirements of the DWD. In the Brussels Region none of the parameters caused non-compliance in more than 1 sample per year in individual water supply zones.



*Table 3.1.4 Number of water supply zones that show non-compliance listing the parameters that most often cause zones to fail 1999-2001 and for comparison data for 1996-1998, Belgium (omitting parameters that fail in 1 sample per year)*

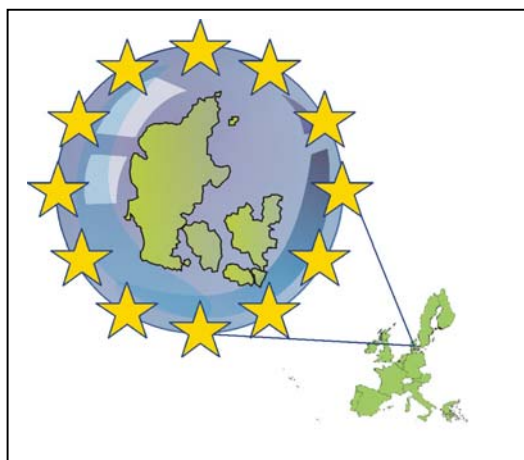
<i>Parameter causing failure Brussels Region</i>	<i>Reporting year</i>					
	1996	1997	1998	1999	2000	2001
<i>None parameter</i>						
<i>Parameter causing failure Flanders Region</i>	<i>Reporting year</i>					
	1996	1997	1998	1999	2000	2001
<i>No data supplied</i>						
<i>Parameter causing failure Walloon Region</i>	<i>Reporting year</i>					
	1996	1997	1998	1999	2000	2001
<i>All parameters</i>	No appropriate data supplied					
<i>Faecal coliforms</i>				2	5	1
<i>Faecal streptococci</i>				1	1	0
<i>Nitrate</i>						3
<i>Aluminium</i>					3	
All other parameters no or incomplete data supplied						

### **Conclusions Belgium**

In general the returns from Belgium are presented in the wrong format, and are providing regional rather than national returns; the quality of most of the data is also poor.

The Brussels Region has the most complete return of all three regions. No conclusion can be drawn at national level, because of the reasons mentioned above.

## 2.2 Drinking Water Quality in Denmark 1999-2001



Denmark has a total population of 5.3 million persons. Denmark has approximately 270 large water supply zones that supply 3.4 million people, which equals 65% of the population (see table 3.2.1). The large wsz supply 280 million m<sup>3</sup> of drinking water per year.

The quality data for Denmark that are presented in this synthesis report concern the abovementioned water supply zones. Most drinking water in Denmark is produced from groundwater sources.

Total population in Denmark	5.3 million
Number of water supply zones serving more than 5000 persons/more than 1000 m <sup>3</sup> water per day	270
Number of people served by these water supply zones	3.4 million
Total amount of water supplied (only supplies serving 5000 or more consumers)	280 million m <sup>3</sup> /year
Population served by these supplies	65%
Raw water sources	
Groundwater:	99.0%
Surface water:	1.0%
Other sources, bank filtrate	none

Denmark provided a national summary of the water quality in the 270 water supply zones serving more than 5000 persons, mentioning for each parameter the percentage samples that did not comply with the parametric values in the DWD. The parameters that caused non-compliance in more than 1% of the samples taken in these water supply zones are listed in table 3.2.2 (left column), starting with the parameter that has the highest percentage of non-complying samples (aluminium). Detailed information is presented in table 3.2.3.

Denmark did not provide information at water supply zone level on the parameters that did not always comply with the parametric values in the DWD.

<b>Table 3.3.2 Summary of water quality parameters that cause non-compliance in Denmark</b>	
Parameters that cause non-compliance in more than 1% of all samples taken in Denmark (in any of the three reporting years)*	Parameters that show non-compliance in a number of water supply zones in Denmark*
Aluminium Trihalomethanes Phosphates Methane Free carbondioxide Trichloromethane Hydrogen sulphide Colony Counts 37 Temperature TOC Total coliforms Iron Colony Counts 21 Total volatile hydrocarbons Tetrachloroethene Manganese	No data supplied**
All other parameters comply in 99% or more of the samples or do not have a parametric value in the Directive 80/778/EEC	Parameters that most often caused failure in supply zones (in more than 1 sample in any year)

\* Only supplies serving 5000 or more consumers

\*\* According to the Danish returns the municipalities have this information and not the national authorities

### **National summary of the drinking water quality in Denmark**

Table 3.2.3 presents information on the overall quality of drinking water in all larger water supply zones in Denmark in the third reporting period. For each non-compliant parameter the percentage of samples that exceeded the parametric value in the DWD is presented. Data for the previous reporting periods are also included when available.. Table 3.2.3 shows that the aluminium parameter was most often exceeding the parametric value in the total number of samples. Data supplied were aggregated for the three reporting years and the percentage of non-compliance was 78.6%.

When the data for 1999-2001 period are compared with the previous two reporting periods, we notice there is quite some difference in the type of parameters that cause non-compliance. Consistent non-complying parameters are Colony Counts at 21 and 37 degrees Centigrade, total coliforms, iron and manganese. In the third reporting period a whole new range of parameters causes non-compliance.

<b>Table 3.2.3 Percentage exceedances for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 and for comparison 1993-1995 and 1996-1998, Denmark</b>			
<b>Parameter</b>	<b>1993/1994/ 1995</b>	<b>1996/1997/ 1998</b>	<b>1999/2000/2001 (reported together)</b>
<b>Aluminium</b>			78.6
<b>Trihalomethanes</b>			50.0
<b>Phosphates</b>			42.8
<b>Methane</b>			25.3
<b>Free carbondioxide</b>			10.8
<b>Trichloromethane</b>			10.2
<b>Hydrogen sulphide</b>			5.1
<b>Colony Counts 37 °C</b>	1.7/0.4/1.2	2.3/3.7/2.0	4.3
<b>Temperature</b>			4.2
<b>TOC</b>			3.0
<b>Total coliforms</b>	1.3/1.0/0.8	0.9/1.7/2.0	3.0
<b>Methane</b>			3.0
<b>Iron</b>	1.7/2.0/1.7	1.8/1.8/2.3	2.8
<b>Colony Counts 21 °C</b>	0.3/0.2/0.5	1.1/2.5/1.7	2.5
<b>Total volatile Hydrocarbons</b>			1.7
<b>Tetrachloroethene</b>			1.6
<b>Manganese</b>	2.1/2.2/1.4	0.9/1.3/1.2	1.5

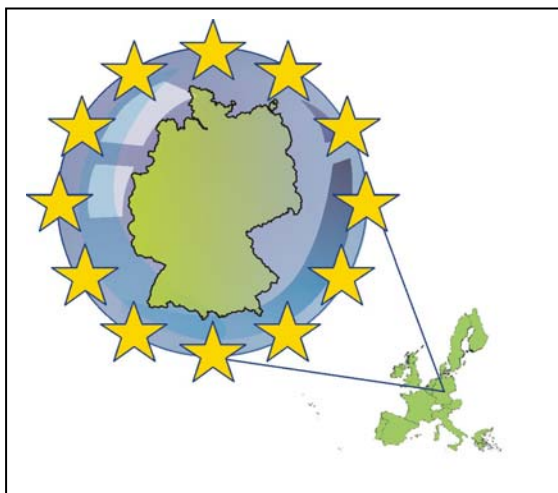
### **Number of water supply zones exceeding water quality parameters**

Denmark did not supply any information at water supply zone level with the following explanation: "it is the municipal council that is the inspection authority with regard to drinking water, and thus it is the municipalities that hold this information". This is not in accordance with the requirements of the DWD, which holds the Member States responsible for submitting the data to the European Commission.

**Conclusions Denmark**

The returns from Denmark is incomplete and information on non-compliance is very different from the information supplied in the previous reporting periods.

### 2.3 Drinking Water Quality in Germany 1999-2001



Germany has a total population of 82 million persons, of which 79% are connected to larger water supplies that serve more than 5000 persons or that produce more than 1000 m<sup>3</sup> of water per day (see table 3.3.1). There are 2669 of such water supply zones in Germany and they supply 4775.5 million m<sup>3</sup> of drinking water per year to more than 64 million people. The quality data for Germany that are presented in this synthesis report concern the abovementioned water supply zones. Most drinking water in Germany is produced from groundwater sources, and the remainder is produced directly or indirectly (bank filtrate) from surface water sources.

<b>Table 3.3.1 General Information Germany</b>	
Total population in Germany	82 million
Number of water supply zones serving more than 5000 persons/more than 1000 m <sup>3</sup> water per day	2669
Number of people served by these water supply zones	64.27 million
Total amount of water supplied (only supplies serving 5000 or more consumers)	4775.5 million m <sup>3</sup> /year
Population served by these supplies	79%
Raw water sources	
Groundwater:	73.7%
Surface water:	15.6%
Other sources, bank filtrate	10.7%

Germany provided a national summary of the water quality in the 2669 water supply zones serving more than 5000 persons, mentioning for each parameter the percentage samples that did not comply with the parametric values in the DWD. The parameters that caused non-compliance in more than 1% of the samples taken in these water supply zones are listed in table 3.3.2 (left column), starting with the parameter that has the highest percentage of non-

complying samples (trihalomethanes). Detailed information is presented in table 3.3.3.

Germany also provided information at water supply zone level on the parameters that did not always comply with the parametric values in the DWD. The parameters that caused non-compliance in more than one sample in individual water supply zones are listed in table 3.3.2 (right column), starting with the parameters that caused non-compliance in the highest number of water supply zones (total coliforms). Detailed information is presented in table 3.3.4.

<b>Table 3.3.2 Summary of water quality parameters that cause non-compliance in Germany</b>	
Parameters that cause non-compliance in more than 1% of all samples taken in Germany (in any of the three reporting years)*	Parameters that show non-compliance in a number of water supply zones in Germany*
THM (trihalomethanes) Pesticides Manganese Iron Phenols Nitrate Arsenic Lead Cadmium Chromium Fluoride Nickel Mercury PAH** Hydrocarbons Sulphate Oxidisability Kjeldahl-N Surfactants	Total coliforms Manganese Iron Faecal coliforms THM Turbidity Nitrate Faecal streptococci Pesticides Aluminium Ammonium Arsenic Sulphate Nitrite Potassium Colour Hydrocarbons Magnesium Oxidisability Odour
All other parameters comply in 99% or more of the samples or do not have a parametric value in the Directive 80/778/EEC	Parameters that most often caused failure in supply zones (in more than 1 sample in any year)

\* Only supplies serving 5000 or more consumers \*\* PAH Polycyclic Aromatic Hydrocarbons

### **National summary of the drinking water quality in Germany**

Table 3.3.3 presents information on the overall quality of drinking water in all larger water supply zones in Germany in the third reporting period. For each non-compliant parameter the percentage of samples that exceeded the parametric value in the DWD is presented. Data for the previous reporting periods are also included when available.. Table 3.3.3 shows that the trihalomethanes parameter was more often exceeding the parametric value in

the total number of samples; 8.0% of samples in 1999, 4.8% in 2000 and 2.0% in 2001.

<b>Table 3.3.3 Percentage exceedances for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 and for comparison 1993-1995 and 1996-1998, Germany</b>					
<b>Parameter</b>	<b>1993/1994 /1995</b>	<b>1996/199 7/1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>
<b>Other organochlorine compounds (+THM)</b>		0.9	8.0*	4.8*	2.0*
<b>Pesticides</b>		2.6	3.5	2.5	1.2
<b>Manganese</b>	<1	4.1	2.4	1.6	1.3
<b>Iron</b>		2.4	1.2	1.4	1.5
<b>Arsenic</b>		1.9		1.3	
<b>Sulphate</b>		1.6		1.2	
<b>Nitrate</b>	2.3/3.4/3.2	1.4	1.1	1.1	
<b>Hydrocarbons</b>		1.4	1.1		1.7
<b>Phenols</b>			1.4		1.7
<b>Lead</b>				1.1	
<b>Cadmium</b>				1.1	
<b>Chromium</b>				1.1	
<b>Fluoride</b>				1.1	
<b>Nickel</b>				1.1	
<b>Mercury</b>				1.1	
<b>PAH**</b>				1.4	
<b>Oxidisability</b>					1.2
<b>Kjeldahl-N</b>					2.0
<b>Colour</b>		1.0			
<b>Surfactants</b>			1.9		

\* 1999, 2000, 2001 THM reported separately

\*\*PAH Polycyclic Aromatic Hydrocarbons

### **Number of water supply zones exceeding water quality parameters**

For each parameter that showed non-compliance in more than 1 sample in individual water supply zones, the number of such water supply zones was calculated. The total of number of water supply zones with more than 1 non-compliant sample is listed in table 3.3.4. The total number of water supply zones serving more than 5000 persons is 2669 in Germany.

The parameter total coliforms caused non-compliance in most water supply zones, 69 water supply zones in 1999, 54 in 2000 and 55 in 2001.



**Table 3.3.4 Number of water supply zones that show non-compliance listing the parameters that most often cause zones to fail 1999-2001 and for comparison data for 1996-1998, Germany**

<i>Parameter causing failure</i>	<i>Reporting year</i>					
	1996	1997	1998	1999	2000	2001
<i>Total coliforms</i>	16	12	21	69	54	55
<i>Manganese</i>	40	37	33	33	23	14
<i>Iron</i>	25	29	20	18	25	16
<i>Faecal coliforms</i>	7	3	11	14	18	21
<i>Organochlorine compounds/THM</i>	13	8	8	10/15	3/12	/9
<i>Turbidity</i>	10	9	6	9	8	11
<i>Nitrate</i>				3	14	3
<i>Faecal streptococci</i>				1	6	3
<i>Aluminium</i>	8	4	2	2	1	
<i>Sulphate</i>	7	9	5	2	2	1
<i>Pesticides</i>	3	3	7	3	1	
<i>Ammonium</i>				3	3	2
<i>Arsenic</i>				1	1	1
<i>Nitrite</i>				1	1	2
<i>Hydrocarbons</i>				1	1	
<i>Colour</i>				1	1	3
<i>Potassium</i>				2		
<i>Magnesium</i>					1	
<i>Oxidisability</i>					1	
<i>Phosphorus</i>					1	
<i>Odour</i>						1

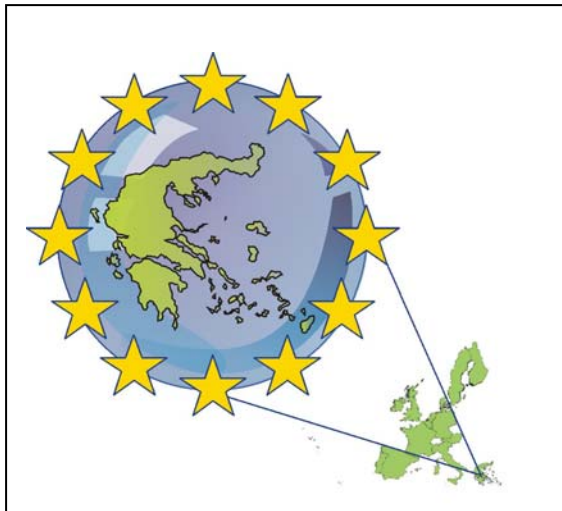
Germany did not give detailed information on the number of exceedances in the various water supply zones; also the actual raw data were not supplied. It is therefore possible that water supply zones with only one exceedance are included for the 1999-2001 data. The returns did not offer sufficient detail for a proper synthesis.

### **Conclusions Germany**

There are 18 water quality parameters that cause non-compliance in more than 1% of the samples taken in Germany. The parameters that cause a relatively higher percentage of non-compliance are organochlorine compounds and trihalomethanes, pesticides, manganese and iron. Some water quality parameters cause non-compliance with the parametric values in the DWD in more than one water supply zone; total coliforms, manganese, iron, faecal coliforms, organochlorine compounds and trihalomethanes,

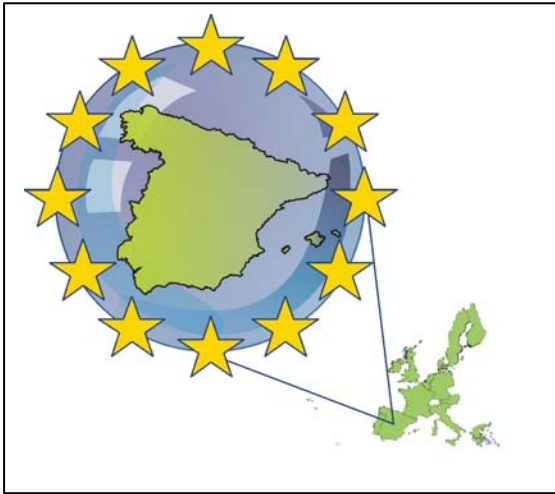
turbidity, nitrate and faecal streptococci. Germany is a large Member State which has 2669 water supply zones. The parameter total coliforms causes non-compliance in approximately 2% of the water supply zones and in less than 1% of the samples taken in Germany. The parameter organochlorine compounds and trihalomethanes is non-compliant in approximately 10% of the samples taken in Germany and cause non-compliance in less than 0.5% of the water supply zones. When the data from the third reporting period are compared with the data available for the first and the second reporting period there is no sign of a significant improvement in the quality of drinking water. compared to the previous periods. The number of water supply zones that are not meeting all drinking water quality standards seems to have increased for some parameters (total coliforms and faecal coliforms).

#### 2.4 Drinking Water Quality in Greece 1999-2001



Greece did not submit returns for the 1999-2001 period.

## 2.5 Drinking Water Quality in Spain 1999-2001



Spain has a total population of 40 million persons, of which 70% are connected to larger water supplies that serve more than 5000 persons or that produce more than 1000 m<sup>3</sup> of water per day (see table 3.5.1). There are 842 (1999), 847 (2000) and 737 (2001) of such water supply zones in Spain. In the three reporting years they supply drinking water to 28.4 to 30.7 million people. No information is given on the amount of water supplied nor on the raw water sources used for the production of drinking water in Spain. The quality data for Spain that are presented in this synthesis report concern the abovementioned water supply zones.

Total population	40 million
Number of water supply zones serving more than 5000 persons/more than 1000 m <sup>3</sup> water per day	842/847/737
Number of people served by these water supply zones	29/30.7/28.4 million
Total amount of water supplied (only supplies serving 5000 or more consumers)	No data
Population served by these supplies	70%
Raw water sources	No data supplied

Spain provided a national summary of the water quality in the all (842/847/737) water supply zones serving more than 5000 persons, mentioning for each parameter the percentage samples that did not comply with the parametric values in the DWD. The parameters that caused non-compliance in more than 1% of the samples taken in these water supply zones are listed in table 3.5.2 (left column), starting with the parameter that has the highest percentage of non-complying samples (magnesium). Detailed information is presented in table 3.5.3.

Spain also provided information at water supply zone level on the parameters that did not always comply with the parametric values in the DWD for the year 2000 and 2001. The parameters that caused non-compliance in more than one sample in individual water supply zones are listed in table 3.5.3 (right column), starting with the parameters that caused non-compliance in the highest number of water supply zones (residual chlorine). Detailed information is presented in table 3.5.4.

<b>Table 3.5.2 Summary of water quality parameters that cause non-compliance in Spain</b>	
Parameters that cause non-compliance in more than 1% of all samples taken in Spain (in any of the three reporting years)	Parameters that show non-compliance in a number of water supply zones in Spain
Magnesium Temperature Sodium Nitrate Potassium Sulphate Phenols Arsenic Aluminium Iron Manganese Residual chlorine	Residual chlorine Total coliforms Temperature Nitrate Turbidity Faecal coliforms Magnesium Sulphate Faecal streptococci Potassium Sodium Ammonium Fluoride Aluminium Sulphite reducing Clostridia Manganese Iron Nitrite Colour Oxidisability Dry residues Pesticides Arsenic
All other parameters comply in 99% or more of the samples or do not have a MAC in the DWD 80/778/EEC	Parameters that most often caused failure in water supply zones (in more than 1 sample in any year).

\* Only supplies serving 5000 or more consumers

### **National summary of the drinking water quality in Spain**

Table 3.5.3 presents information on the overall quality of drinking water in all larger supplies in Spain in the third reporting period. For each non-compliant parameter the percentage of samples that exceeded the parametric value in the DWD is presented. Data for the previous reporting periods are also included when available. Table 3.5.3 shows that the magnesium parameter was most often exceeding the parametric value in the total number of samples in the larger water supply zones; 4.0% of samples in 1999, 12.5% in 2000 and 7.1% in 2001.

<b>Table 3.5.3 Percentage exceedences for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 and for comparison data for 1996-1998 and 1993-1995 Spain</b>									
<b>Parameter</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>
<b>Magnesium</b>	1.9	2.6	5.2	4.2	3.3	3.3	4.0	12.5	7.1
<b>Temperature</b>				5.0	2.8	1.4	6.5	8.4	4.0
<b>Sodium</b>	40.7	29.2	50.6	33.0	47.5	20.3	3.8	2.2	3.8
<b>Nitrate</b>	<1	<1	<1	2.0	2.8	3.5	3.7	3.5	2.2
<b>Potassium</b>	5.4	0.2	17.5	2.4	14.6	14.2	3.1	2.9	3.3
<b>Sulphate</b>	17.0	2.7	25.2	6.1	4.0	7.0	2.7	2.4	3.7
<b>Phenols</b>				1.1	9.0	4.9	<1	<1	<b>10.5</b>
<b>Arsenic</b>							<1	2.2	2.2
<b>Aluminium</b>	<1	<1	<1	<1	<1	2.5	1.3	<1	1.7
<b>Total Coliforms</b>	<1	<1	<1	<1	1	2.5	<1	<1	<1
<b>Iron</b>	<1	<1	<1	<1	2.0	1.4	1.4	<1	<1
<b>Manganese</b>	<1	<1	<1	1.6	<1	1.2	1.2	<1	<1
<b>Residual chlorine</b>				1.4	1.4	1.4	<1	1.8	<1
<b>Faecal streptococci</b>				1.0	1.4	<1	<1	<1	<1
<b>Dry residues</b>	2.6	2.0	3.9	<1	<1	<1	<1	<1	<1

#### **Number of water supply zones exceeding water quality parameters**

For each parameter that showed non-compliance in more than 1 sample in individual water supply zones, the number of such water supply zones was calculated. The total of number of water supply zones with more than 1 non-compliant sample is listed in table 3.5.4. The total number of water supply zones was 847 in 2000 and 737 in 2001. The parameter residual chlorine caused non-compliance in the highest number of water supply zones, 166 in 2000 and 134 in 2001.

**Table 3.5.4 Number of water supply zones that show non-compliance listing the parameters that most often cause zones to fail in 2000 and for comparison data for 1996-1998, Spain**

<i>Parameter causing failure</i>	<i>Reporting year</i>			
	1996-1998 (759 wsz)	1999 (842 wsz)	2000 (847 wsz)	2001 (wsz)
<i>Residual chlorine</i>	50		166	134
<i>Total coliforms</i>	60		106	108
<i>Temperature</i>	48		71	65
<i>Faecal coliforms</i>	19		35	43
<i>Nitrate</i>	35		45	35
<i>Turbidity</i>	15		40	41
<i>Magnesium</i>	33		29	24
<i>Sulphate</i>	59		26	29
<i>Faecal Streptococci</i>	19		24	25
<i>Potassium</i>	31		19	22
<i>Sodium</i>	41		15	18
<i>Ammonium</i>			13	13
<i>Fluoride</i>			12	4
<i>Aluminium</i>	53		12	12
<i>Sulphite Red. Clos.</i>			10	7
<i>Managese</i>	9		8	10
<i>Iron</i>	14		7	5
<i>Nitrite</i>			6	9
<i>Colour</i>	5		5	8
<i>Oxidisability</i>			4	9
<i>Dry residues</i>			4	3
<i>Pesticides</i>			3	8
<i>Odour</i>				15
<i>pH</i>				12
<i>Mineral oils</i>				5
<i>Phenols</i>				5
<i>Lead</i>				3
<i>Nickel</i>				3
<i>Hydrogen sulphide</i>				6
<i>Arsenic</i>			2	1

*Odour, taste, Kjeldahl-N and phenols cause non-compliance in 1 water supply zone.*

### **Conclusions Spain:**

Some basic information is missing from the Spanish returns, such as information on the percentage of the total population served, the amount of water supplied and the percentages of various raw water sources used for the

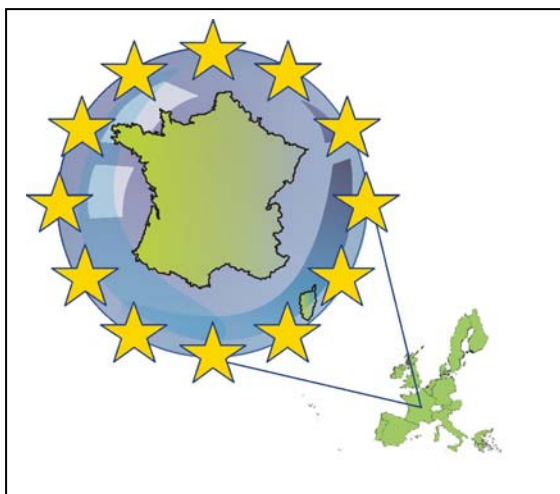
production of drinking water. Information at water supply zone level was provided for the year 2000 and 2001.. This missing information makes it difficult to provide a full synthesis for the drinking water quality in Spain. With respect to the quality of drinking water in Spain the following conclusions can be drawn. In the third reporting period 12 water quality parameters caused non-compliance in more than 1% of the samples taken in Spain. A relatively higher percentage of non-compliance was caused by the parameters magnesium, temperature, sodium, potassium, nitrate, sulphate and phenols.

Non-compliance in individual water supply zones was caused by 30 water quality parameters. The parameters that most frequently caused non-compliance in water supply zones are: residual chlorine, total coliforms, temperature, nitrate, turbidity, faecal coliforms, magnesium, sulphate, faecal streptococci, potassium sodium, ammonium, aluminium, manganese and (spores of) sulphite reducing Clostridia (SSRC).

Spain has approximately 800 water supply zones (the number decreases over the three years). The parameter residual chlorine causes non-compliance in most water supply zones affecting nearly 20% of all zones.

When compared to the previous reporting periods there is some improvement in the quality of drinking water noticeable for the parameters sulphate, potassium and sodium.

## 2.6 Drinking Water Quality in France 1999-2001



France has a total population of 59 million persons, of which more than 73% are connected to larger water supplies that serve more than 5000 persons or that produce more than 1000 m<sup>3</sup> of water per day (see table 3.6.1). There are 2236 of such water supply zones in France and they supply 3750 million m<sup>3</sup> of drinking water per year to more than 44 million people. The quality data for France that are presented in this synthesis report concern the abovementioned water supply zones. Most drinking water in France is produced from groundwater sources, and the remainder is produced from surface water sources, with a small contribution from sea water and rain water.

Total population	59 million
Number of water supply zones serving more than 5000 persons/more than 1000 m <sup>3</sup> water per day	2236
Number of people served by these water supply zones	44.3 million
Total amount of water supplied (only supplies serving 5000 or more consumers)	3750 million m <sup>3</sup> /year
Population served by these supplies	73.15%
Raw water sources	
Groundwater	66.1%
Surface water	33.9%
Other sources (sea water and rain water)	< 0.05%

France provided a national summary of the water quality in the 2236 water supply zones serving more than 5000 persons, mentioning for each parameter the percentage samples that did not comply with the parametric values in the DWD. The parameters that caused non-compliance in more than 1% of the samples taken in these water supply zones are listed in table 3.6.2 (left



column), starting with the parameter that has the highest percentage of non-complying samples (the pesticide desethylatrazine). Detailed information is presented in table 3.6.3.

France also provided information at water supply zone level on the parameters that did not always comply with the parametric values in the DWD. The parameters that caused non-compliance in more than one sample are listed in table 3.6.2 (right column), starting with the parameters that caused non-compliance in the highest number of water supply zones (faecal coliforms). Detailed information is presented in table 3.6.4.

<b>Table 3.6.2 Summary of water quality parameters that cause non-compliance in France</b>	
Parameters that cause non-compliance in more than 1% of all samples taken in France (in any of the three reporting years)	Parameters that show non-compliance in a number of water supply zones in France
Desethylatrazine Selenium Atrazine Aluminium Temperature Manganese Fluoride Iron Nitrate Total coliforms Deisopropylatrazine Phenols Potassium Sodium Hydrocarbons	Faecal coliforms Total coliforms Desethylatrazine Faecal streptococci Turbidity Nitrate Atrazine Iron Temperature Aluminium Manganese Sulphate Sulphite Reducing Clostridia Fluoride Selenium Hydrocarbons Chlorodecane Terbutylazine Potassium Sodium Simazine Deisopropylatrazine
All other parameters comply in 99% or more of the samples or do not have a MAC in the DWD 80/778/EEC	Parameters that most often caused failure in water supply zones_(in more than 1 sample in any year)

\* Only supplies serving 5000 or more consumers

### National summary of the drinking water quality in France

Table 3.6.3 presents information on the overall quality of drinking water in all larger water supply zones in France in the third reporting period. For each non-compliant parameter the percentage of samples that exceeded the parametric value in the DWD is presented. Data for the previous reporting periods are also included when available.. Table 3.6.3 shows that the pesticide desethylatrazine was most often exceeding the parametric value in the total number of samples in the larger water supply zones; 11.5% of samples in 1999, 11.7% in 2000 and 7.0% in 2001.

**Table 3.6.3 Percentage exceedences for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 and for comparison 1996-1998 and 1993-1995 France**

Parameter	1993	1994	1995	1996	1997	1998	1999	2000	2001
Desethylatrazine							11.5	11.7	7.0
Selenium							7.5	7.3	7.2
Atrazine							6.2	5.1	4.8
Aluminium	5-6	5-6	5-6	6.3	5.7	4.3	5.0	3.8	3.2
Temperature				0.8	2.7	3.2	3.0	3.4	4.4
Manganese	1-2	1-2	1-2	2.8	3.1	2.6	2.4	2.7	2.6
Fluoride	1-2	1-2	1-2	5.1	4.4	2.1	2.4	3.0	2.0
Iron	1-2	1-2	1-2	2.3	2.5	2.4	2.0	2.1	2.0
Nitrate	4	4	4	2.3	2.3	2.4	2.2	2.0	2.6
Total coliforms	1-2	1-2	1-2	1.8	1.8	2.4	1.4	1.3	1.2
Desisopropylatrazine							1.0	1.5	<1
Phenols							1.7	<1	<1
Potassium	1-2	1-2	1-2	2.2	2.2	1.3	<1	<1	1.2
Sodium	1-2	1-2	1-2	2.8	2.2	1.2	<1	1.1	<1
Hydrocarbons	2-3	2-3	2-3	1.3	0.8	1.6	<1	<1	1.4
Odour				4.0	3.3	3.4			
Taste				3.2	1.3	1.1			
Pesticides (total)	2.4	1.8	1.5	1.3	1.6	1.2			
Sulphate	1-2	1-2	1-2	1.7	1.7	1.8			
Faecal coliforms	1-2	1-2	1-2	<1	<1	<1			

#### **Number of water supply zones exceeding water quality parameters**

For each parameter that showed non-compliance in more than 1 sample in an individual water supply zone, the number of such water supply zones was calculated. The total of number of water supply zones with more than 1 non-compliant sample is listed in table 3.6.4. The total number of water supply zones serving more than 5000 persons is 2236 in France. The parameter faecal coliforms caused non-compliance in most water supply zones, 177 water supply zones in 1999, 163 in 2000 and 138 in 2001.

Table 3.6.4 Number of water supply zones that show non-compliance listing the parameters that most often cause water supply zones to fail. 1999-2001, France. For comparison the number of **départements** in which one or more water supply zones show non-compliance, listing the parameters that most often cause non-compliance. Excluded are occasional failures in any of the three years 1996-1998. For 1996-1998 no processed data at a water supply zone level were available in time only at département level.

<i>Parameter causing failure</i>	Nr of départements in which one or more water supply zone show non-compliance (total <b>100 départements</b> ). Only parameters failing in > 1 sample are included			Nr of water supply zones with non-compliance. Only parameters failing in more than 1 sample are included. 1999-2001 period 2236 water supply zones		
	1996	1997	1998	1999	2000	2001
<i>Faecal coliforms</i>	75	83	77	177	163	138
<i>Total coliforms</i>	74	80	77	139	159	137
<i>Desethylatrazine (pest.)</i>				102	108	70
<i>Faecal streptococci</i>	73	74	71	101	102	81
<i>Turbidity</i>	68	65	64	68	81	68
<i>Nitrate</i>	30	25	25	75	72	78
<i>Atrazine (pest.)</i>				77	60	49
<i>Iron</i>	29	36	30	58	57	57
<i>Temperature</i>	12	19	13	43	56	55
<i>Aluminium</i>	23	22	20	43	32	40
<i>Manganese</i>	19	21	22	16	24	14
<i>Sulphate</i>	10	12	9	16	14	20
<i>Sulphite Reducing Clostridia</i>	24	24	24	15	20	11
<i>Fluoride</i>	3	4	5	12	18	15
<i>Selenium</i>				8	8	7
<i>Hydrocarbons</i>	7	4	8	0	37	2
<i>Chlorodecane (pest.)</i>				2	9	3
<i>Terbutylazine (pest.)</i>				4	7	4
<i>AMPA(pesticide)</i>				0	7	0
<i>Potassium</i>				2	4	9
<i>Sodium</i>	6	4	4	4	6	4
<i>Simazine</i>				9	3	3
<i>Desisopropylatrazine(pest)</i>				2	14	4
<i>Colour</i>	2	5	7	7	5	2
<i>Pesticides</i>	43	45	43			
<i>Nitrite</i>	11	8	9			
<i>Ammonium</i>	3	4	6			
<i>Other parameters</i>	<5	<5	<5	<5	<5	<5

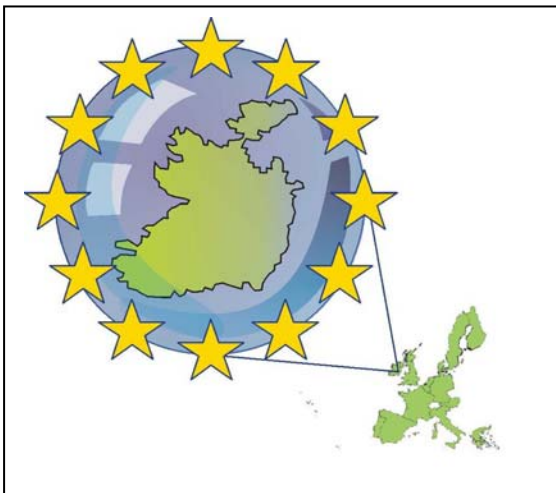
## Conclusions France

With respect to the quality of drinking water in France the following conclusions can be drawn. In the third reporting period 15 water quality parameters caused non-compliance in more than 1% of the samples taken in France. A relatively higher percentage of non-compliance was caused by the parameters desethylatrazine, selenium, atrazine, aluminium, temperature, manganese, fluoride, iron, nitrate and total coliforms. Non-compliance in individual water supply zones was caused by 24 water quality parameters. The parameters that often caused non-compliance in water supply zones are: faecal coliforms and total coliforms, desethylatrazine, faecal streptococci, turbidity, nitrate, atrazine, iron, temperature, aluminium, manganese, sulphate, SSRC and fluoride.

France is a large Member State which has 2236 water supply zones. The parameter faecal coliforms causes non-compliance in most water supply zones affecting nearly 0.7% of all zones. The faecal coliforms parameter causes non-compliance in less than 1% of all samples taken in France. The pesticide desethylatrazine causes the highest percentage (between 11.5 and 7%) of samples to fail. This pesticide caused non-compliance in 3 to 5% of all water supply zones in France.

When compared to the previous two reporting periods no significant improvement in the quality of drinking water in France is noticeable.

## 2.7 Drinking Water Quality in Ireland 1999-2001



Ireland has a total population of 3.8 million persons, of which 73-79% are connected to larger water supplies that serve more than 5000 persons or that produce more than 1000 m<sup>3</sup> of water per day (see table 3.7.1). There are 116 to 125 of such water supply zone in Ireland and they supply between 360 and 460 million m<sup>3</sup> of drinking water per year to approximately 3 million people.

The quality data for Ireland that are presented in this synthesis report concern the abovementioned water supply zones. Most drinking water in Ireland is produced from surface water sources, and the remainder is produced from groundwater sources.

<b>Table 3.7.1 General information Ireland</b>	
Total population	3.8 million
Number of water supply zones (water supply zone) serving more than 5000 persons/more than 1000 m <sup>3</sup> water per day	120/125/116
Number of people served by these water supply zone	3.1/2.9/2.9 million
Total amount of water supplied (only supplies serving 5000 or more consumers)	360/446/460 million m <sup>3</sup> /year
Population served by these supplies	75/79/73%
Raw water sources	
Groundwater	25%
Surface water	75%

Ireland provided a national summary of the water quality in all water supply zones serving more than 5000 persons, mentioning for each parameter the percentage samples that did not comply with the parametric values in the DWD. The parameters that caused non-compliance in more than 1% of the samples taken in these water supply zones are listed in table 3.7.2 (left column), starting with the parameter that has the highest percentage of non-complying samples (iron). Detailed information is presented in table 3.7.3.

Ireland also provided information at water supply zone level on the parameters that did not always comply with the parametric values in the DWD. The parameters that caused non-compliance in more than one sample are listed in table 3.7.2 (right column), starting with the parameters that caused non-compliance in the highest number of water supply zones (total coliforms). Detailed information is presented in table 3.7.4.

<b>Table 3.7.2 Summary of water quality parameters that cause non-compliance in Ireland</b>	
Parameters that cause non-compliance in more than 1% of all samples taken in Ireland (in any of the reporting years)	Parameters that show non-compliance in a number of water supply zones in Ireland
Iron	Total coliforms
Manganese	Fluoride
Aluminium	Aluminium
Total coliforms	Odour
Odour	Faecal coliforms
Fluoride	Iron
Colour	Manganese
Faecal coliforms	Colour
Taste	Turbidity
	Taste
All other parameters comply in 99% or more of the samples or have no MAC in the DWD 80/778/EEC	Parameters that most often caused failure in supply zones (in more than 1 sample in any year)

\* Only supplies serving 5000 or more consumers

Ireland knows three types of water supplies, which are public water supplies, group water supplies and small/private water supplies. The group and the small/private water supplies are mostly too small to be subject to the mandatory reporting to the Commission (serving less than 5000 people).

### National summary of the drinking water quality in Ireland

Table 3.7.3 presents information on the overall quality of drinking water in all larger water supply zones in Ireland in the third reporting period. For each non-compliant parameter the percentage of samples that exceeded the parametric value in the DWD is presented. Data for the previous reporting periods are also included when available.. Table 3.7.3 shows that the iron parameter was most often exceeding the parametric value in the total number of samples in the larger water supply zones; 8.0% of samples in 1999, 8.1% in 2000 and 3.9% in 2001.

Table 3.7.3 Percentage exceedences for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 and for comparison:1996-1998 and comparison 1993-1995, Ireland									
Parameter	1993	1994	1995	1996	1997	1998	1999	2000	2001
Iron	9	4	5	4.4	5.6	6.2	8.0	8.1	3.9
Manganese	8	8	4	1.2	7.4	6.5	6.0	6.0	2.1
Aluminium	12	5	6	4.5	6.1	5.7	5.5	6.4	5.6
TC/FC*	4	5	5	4.5	5.6	4.5	TC and FC separate entry		
Total coliforms							5.6	6.4	5.3
Odour	7	8	6	7.2	3.5	3.1	3.2	3.3	4.1
Fluoride	16	10	9	7.5	6.2	4.0	2.9	4.1	2.8
Colour	5	2	2	3.3	2.6	3.1	3.0	2.7	1.8
Faecal coliforms								2.1	1.7
Taste	3	10	10	7.2	3.0	2.7	2.4	1.9	1.6
Heavy Metals	<1	<1	<1	1.2	0.2	0.5	<1	<1	<1
Turbidity	<1	<1	<1	0.6	0.7	0.5	<1	<1	<1
pH	<1	<1	<1	0.6	0.6	0.3	<1	<1	<1
Ammonium	<1	<1	<1	0	1.1	0.1	<1	<1	<1
Nitrite	<1	<1	<1	0	0.1	0.5	<1	<1	<1

\* TC and FC total and faecal coliforms

### Number of water supply zones exceeding water quality parameters

A total of 120/125/116 water supply zones are subject to reporting to the Commission for the 1999-2001 period. For each parameter that showed non-compliance in more than 1 sample in individual water supply zones, the number of such water supply zones was calculated. The total of number of water supply zones with more than 1 non-compliant sample is listed in table 3.7.4. The parameters total coliforms and faecal coliforms caused non-compliance in most water supply zones, 15 water supply zone in 1999, 64 and 22 in 2000 and 44 and 16 in 2001. In the year 1999 both parameters were reported together while in the years 2000 and 2001 they were reported separately.

**Table 3.7. 4 Number of water supply zones exceeding parametric values (omitting parameters that fail in 1 sample per year) for the period 1999-2001 and for comparison the 1996-1998 period, Ireland**

<i>Parameter causing failure</i>	Reporting year					
	1996 (120 water supply zone)	1997 (120 water supply zone)	1998 (120 water supply zone)	1999 (120 water supply zone)	2000 (125 water supply zone)	2001 (116 water supply zone)
<i>Total/Faecal coliforms</i>	44	49	44	15		
<i>Total coliforms</i>					64	44
<i>Fluoride</i>	40	40	26	4	40	32
<i>Aluminium</i>	24	25	24	30	27	33
<i>Odour</i>	36	30	20	26	28	30
<i>Faecal coliforms</i>					22	16
<i>Iron</i>	20	20	19	27	17	19
<i>Manganese</i>	7	7	11	13	11	13
<i>Colour</i>	22	20	22	10	28	18
<i>Turbidity</i>	6	7	6	17	10	8
<i>Taste</i>	20	17	10	1	8	11
<i>Ammonium</i>				60	1	0
<i>Lead</i>				1	0	2
<i>Nitrite</i>				0	1	0

### Conclusions Ireland

With respect to the quality of drinking water in Ireland the following conclusions can be drawn. In the third reporting period 10 water quality parameters caused non-compliance in more than 1% of the samples taken in Ireland. A relatively higher percentage of non-compliance was caused by the parameters iron, aluminium and total coliforms.

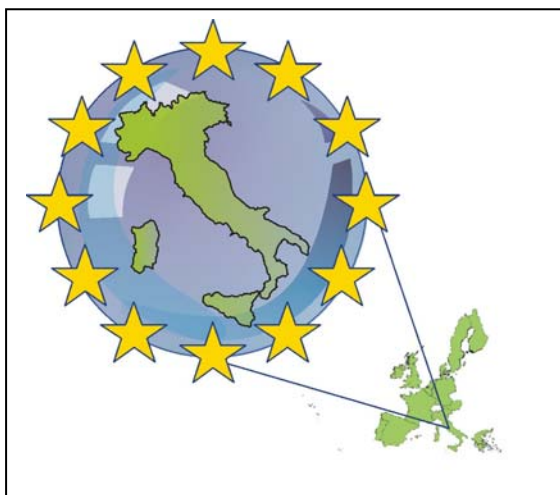
Non-compliance in individual water supply zones was caused by 14 water quality parameters. The parameters that more often caused non-compliance in water supply zones are total coliforms, fluoride, aluminium and odour.

Ireland has a small number of water supply zones, varying between 125 and 116. The parameter total coliforms caused non-compliance in most water supply zones affecting between 38 and 51% of all zones. The total coliforms parameter caused non-compliance in approximately 5 and 6 % of all samples taken in Ireland. The parameter iron caused the highest percentage (between 8.1 and 3.9%) of samples to fail. This parameter caused non-compliance in 14 to 22% of all water supply zones in Ireland.



When compared to the previous two reporting periods there is some improvement in the quality of drinking water in Ireland with respect to fluoride and taste, but the opposite is the case for iron.

## 2.8 Drinking Water Quality in Italy 1999-2001



Italy has a total population of 57.5 million persons, of which more than 63% are connected to larger water supplies that serve more than 5000 persons or that produce more than 1000 m<sup>3</sup> of water per day (see table 3.8.1). There are 325 of such water supply zones in Italy. The quality data for Italy that are presented in this synthesis report concern the abovementioned water supply zones. No information is provided by Italy on the type of raw water sources used for the production of drinking water.

<b>3.8.1 General Information Italy</b>	
Total population	57.5 million
Number of water supply zones serving more than 5000 persons/more than 1000 m <sup>3</sup> water per day	325
Number of people served by these water supply zones	17.6 million
Total amount of water supplied (only supplies serving 5000 or more consumers)	unclear million m <sup>3</sup> /year
Population served by these supplies	63.09%
Raw water sources	No data supplied

Italy provided a national summary of the water quality in the 325 water supply zones serving more than 5000 persons, mentioning for each parameter the percentage samples that did not comply with the parametric values in the DWD. The parameters that caused non-compliance in more than 1% of the samples taken in these water supply zones are listed in table 3.8.2 (left column), starting with the parameter that has the highest percentage of non-

complying samples (potassium). Detailed information is presented in table 3.8.3.

Italy also provided information at water supply zone level on the parameters that did not always comply with the parametric values in the DWD. The parameters that caused non-compliance in more than one sample are listed in table 3.8.2 (right column), starting with the parameters that caused non-compliance in the highest number of water supply zones (total coliforms). Detailed information is presented in table 3.8.4.

<b>Table 3.8.2 Summary of water quality parameters that cause non-compliance in Italy</b>	
Parameters that cause non-compliance in more than 1% of all samples taken in Italy (in any of the reporting years)	Parameters that show non-compliance in a number of water supply zones in Italy
Potassium Total coliforms Faecal coliforms Faecal streptococci pH Iron Manganese PAH** Pesticides Phenols Hydrocarbons <i>A number of other parameters only exceeded in the year 1999</i>	Total coliforms Faecal coliforms Faecal streptococci Iron Temperature Nitrate Turbidity Nitrite Aluminium Organochlorine compounds SSRC
All other parameters comply in 99% or more of the samples or have no MAC in the DWD 80/778/EEC	Parameters that most often caused failure in supply zones (in more than 1 sample in any year)
* Only supplies serving 5000 or more consumers ** PAH Polycyclic Aromatic Hydrocarbons	

### National summary of the drinking water quality in Italy

Table 3.8.3 presents information on the overall quality of drinking water in all larger water supply zones in Italy in the third reporting period. For each non-compliant parameter the percentage of samples that exceeded the parametric value in the DWD is presented. Data for the previous reporting periods are also included when available. Table 3.8.3 shows that the potassium parameter was most often exceeding the parametric value in the total number of samples in the larger water supply zones; 14.9% of samples in 1999, 8.4% in 2000 and 8.3% in 2001.

**Table 3.8.3 Percentage exceedences for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 and data for 1993-1995 and 1996-1998, Italy**

Parameter	1993-1995	1996-1998	1999	2000	2001
Potassium			14.9	8.4	8.3
Total coliforms	3-5	8	8.1	6.8	7.3
Faecal coliforms	3-5	4	7.5	5.3	6.1
Faecal streptococci	3-5	3	8.7	5.8	6.5
Iron	2-3	2	4.0	1.2	1.3
Manganese	4-7	2	1.0	1.4	1.0
PAH			1.3	<1	14.1
Pesticides		2	7.9	<1	<1
Phenols			0	0	15.1
Aluminium	2-4	2	1.7	<1	<1
Hydrocarbons			1.2	1.1	1.3
Sulphate		2	2.3	<1	<1
Lead			3.1	<1	<1
Turbidity			1.4	<1	<1
Odour			1.7	<1	<1
Temperature			2.0	<1	<1
Magnesium			4.4	<1	<1
Sodium			6.0	<1	<1
Oxidisability			1.1	<1	<1
Nitrate			2.1	<1	<1
Nitrite			3.0	<1	<1
Ammonium			2.1	<1	<1

#### **Number of water supply zones exceeding water quality parameters**

For each parameter that showed non-compliance in more than 1 sample in individual water supply zones, the number of such water supply zones was calculated. The total of number of water supply zones with more than 1 non-compliant sample is listed in table 3.8.4. The total number of water supply zones serving more than 5000 persons is 325 in Italy.

The parameter total coliforms caused non-compliance in most water supply zones, 30 water supply zones in 1999, 33 in 2000 and 32 in 2001.

**Table 3.8.4 Number of water supply zones that show non-compliance listing the parameters that most often cause zones to fail 1999-2001 and for comparison the 1996-1998 period, Italy**

Parameters causing failure	Reporting year					
	1996	1997	1998	1999	2000	2001
<b>Total coliforms</b>	48	49	51	30	33	32
<b>Faecal coliforms</b>	28	24	29	16	16	12
<b>Faecal streptococci</b>	18	17	21	7	13	7
<b>Nitrate</b>	9	15	8	9	9	5
<b>Iron</b>	20	16	20	5	6	5
<b>Temperature</b>				2	3	2
<b>Turbidity</b>	12	12	8	3	1	2
<b>Nitrite</b>				1	3	1
<b>Aluminium</b>	13	8	7	0	2	0
<b>Manganese</b>				0	2	0
<b>SSRC</b>				0	0	2
<b>Residual chlorine</b>				0	0	2
<b>Organochlorine compounds + THM</b>	7	10	7	0	3	0

### Conclusions Italy

With respect to the quality of drinking water in Italy the following conclusions can be drawn. First of all with respect to the quality of the information submitted as the returns from Italy is not always easy to process. For a start the number of water supply zones has decreased considerably since previous reporting periods, then there are some conflicting data on the percentage of the population and the number of people supplied and with respect to the amount of water produced.

There are large inconsistencies between the data supplied in the national summary and the data supplied for the water supply zones. In many cases the number of samples failing in the national summary is much higher than the numbers mentioned in the water supply zones. These inconsistencies effect the synthesis of the data and the validity of the conclusions.

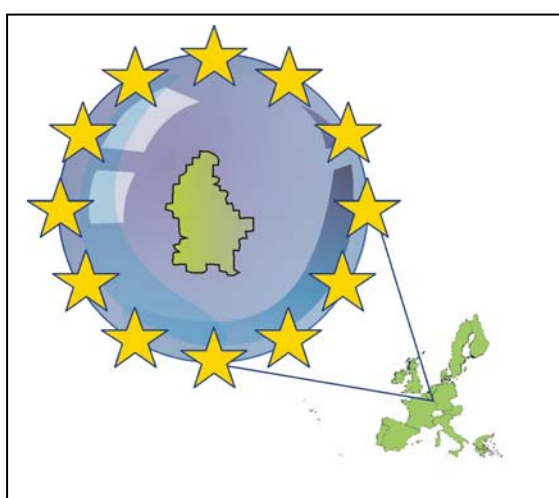
In the third reporting period 22 water quality parameters caused non-compliance in more than 1% of the samples taken in Italy. A relatively higher percentage of non-compliance was caused by the parameters potassium, total and faecal coliforms and faecal streptococci.

Italy reports 325 water supply zones in the third reporting period. Non-compliance in individual water supply zones was caused by 13 water quality parameters. The parameters that more often caused non-compliance in water supply zones are total coliforms, faecal coliforms, faecal streptococci, nitrate and iron.

The parameter total coliforms caused non-compliance in most water supply zones affecting more than 30% of all zones. The total coliforms parameter caused non-compliance in approximately 7.5 % of all samples taken in Italy. The parameter potassium caused the highest percentage (between 14.9 and 8.3%) of samples to fail. This parameter does not appear in the list of parameters that caused more than 1 case of non-compliance at water supply zone level.

When compared to the previous two reporting periods there is no significant improvement in the quality of drinking water in Italy in this reporting period.

## 2.9 Drinking Water Quality in Luxembourg 1999-2001



Luxembourg has a total population of 0.44 million persons, of which 73% are connected to larger water supplies that serve more than 5000 persons or that produce more than 1000 m<sup>3</sup> of water per day (see table 3.9.1). There are 10 of such water supply zones in Luxembourg. The quality data for Luxembourg that are presented in this synthesis report concern the abovementioned water supply zones. No information is provided by Luxembourg on the type of raw water sources used for the production of drinking water. Previous reports state that 30% of drinking water is produced from surface water and 70% from groundwater.

<b>3.9.1 General Information Luxembourg</b>	
Total population	0.44 million
Number of water supply zones serving more than 5000 persons/more than 1000 m <sup>3</sup> water per day	10
Number of people served by these water supply zones	?
Total amount of water supplied (only supplies serving 5000 or more consumers)	31.8 million m <sup>3</sup> /year
Population served by these supplies	73%
Raw water sources	No data supplied

Luxembourg did not provide a national summary of the water quality in all water supply zones serving more than 5000 persons. Summaries were provided for 5 individual water supply zones, for half the wsz an average summary was given for the three reporting years. From the data supplied an estimate was made on the total number of samples taken at national level and the percentage non-compliance, mentioning for each parameter the percentage of samples that did not comply with the parametric values in the DWD. The parameters that caused non-compliance in more than 1% of the samples taken in these water supply zones are listed in table 3.9.2 (left column), starting with the parameter that has the highest percentage of non-complying samples (Colony Counts at 37 degrees). Detailed information is presented in table 3.9.3.

Luxembourg provided information at water supply zone level on the parameters that did not always comply with the parametric values in the DWD. For half the wsz data were given for each reporting year and for the other wsz an estimated average was given for the three reporting years combined. The parameters that caused non-compliance in more than one sample in individual water supply zones are listed in table 3.9.2 (right column), starting with the parameters that caused non-compliance in the highest number of water supply zones (Colony Counts at 37 degrees). Detailed information is presented in table 3.9.4.

<b>Table 3.9.2 Summary of water quality parameters that cause non-compliance in Luxembourg</b>	
Parameters that cause non-compliance in more than 1% of all samples taken in Luxembourg (in any of the reporting years)	Parameters that show non-compliance in a number of water supply zones in Luxembourg
Colony Counts 37 C Colony Counts 22 C Total coliforms Manganese	Colony Counts 37 C Colony Counts 22 C Total coliforms Manganese
All other parameters comply in 99% or more of the samples	Parameters that caused failure in water supply zones (in more than 1 sample in any year)

### **National summary of the drinking water quality in Luxembourg**

Table 3.9.3 presents information on the overall quality of drinking water in all larger water supply zones in Luxembourg in the third reporting period. For each non-compliant parameter the percentage of samples that exceeded the parametric value in the DWD is presented. Data for the previous reporting periods are also included when available. Table 3.9.3 shows that the colony counts 37C parameter was most often exceeding the parametric value in the total number of samples in the larger water supply zones; 3.9% of samples in 1999, 3.9% in 2000 and 5.1% in 2001.

**Table 3.9.3 Percentage exceedances for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 and for comparison data for 1996-1998, Luxembourg**

Parameter	1996	1997	1998	1999	2000	2001
Residual Chlorine	20.8	30.4	13.0	--	--	--
Total Coliforms	4.1	4.5	3.2	2.8	2.8	2.6
Faecal coliforms	2.4	3.4	2.0	<1	<1	<1
Manganese	4.2	0.8	0	<1	<1	2.0
Aluminium	1.7	0.3	0	0	0	0
Sulphate	0	0	1.4	0	0	0
Iron	0	0	0.5	0	0	0
Nitrite	0	0	0.2	0	0	0
Ammonium	0	0	0.2	0	0	0
Colony Counts 37C				3.9	3.9	5.1
Colony Counts 22C				3.0	3.1	4.6

### Number of water supply zones exceeding water quality parameters

For each parameter that showed non-compliance in more than 1 sample in individual water supply zones, the number of such water supply zones was calculated. The total of number of water supply zones with more than 1 non-compliant sample is listed in table 3.9.4. The total number of water supply zones serving more than 5000 persons is 10 in Luxembourg.

The parameter colony counts 37 caused non-compliance in most water supply zones, 5 water supply zones in 1999, 5 in 2000 and 6 in 2001.

**Table 3.9.4 Number of water supply zones that show non-compliance listing the parameters that most often cause zones to fail 1999-2001 and for comparison the 1996-1998 period, Luxembourg**

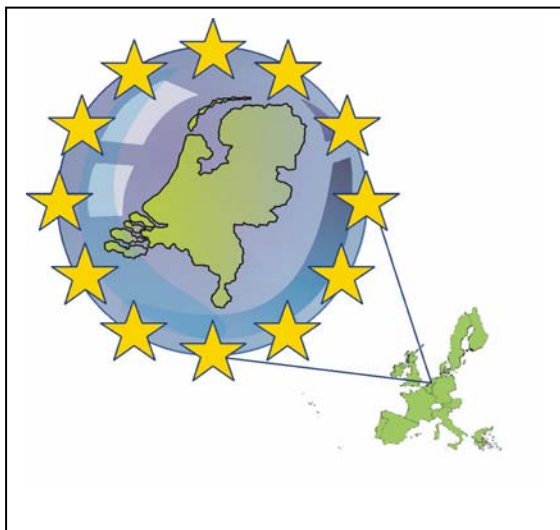
Parameters causing failure	Reporting year					
	1996	1997	1998	1999	2000	2001
<i>Total coliforms</i>	2	2	5	4	4	4
<i>Faecal coliforms</i>	2	2	4	0	0	0
<i>Colony Counts 37</i>				5	5	6
<i>Colony Counts 22</i>				5	5	5
<i>Manganese</i>				0	0	2

### Conclusions Luxembourg

With respect to the quality of drinking water in Luxembourg the following conclusions can be drawn. First of all the returns was very late and not completely in accordance with the required format. For half the wsz the data were combined for the three reporting years. Some general information is still missing. Only three microbiological parameters colony counts 22 and 37 and total coliforms were reported to cause non-compliance and one chemical parameter: manganese. More exotic parameters as Luxembourg calls them

were analysed in specific general programs and no cases of non-compliance showed up. No more information is given.

## 2.10 Drinking Water Quality in the Netherlands 1999-2001



The Netherlands has a total population of 16 million persons, of which almost 100 % are connected to larger water supplies that serve more than 5000 persons or that produce more than 1000 m<sup>3</sup> of water per day (see table 3.10.1). There are 230 of such water supply zones in the Netherlands and they supply 1270 million m<sup>3</sup> of drinking water per year to 16 million people. The quality data for the Netherlands that are presented in this synthesis report concern the abovementioned water supply zones. Most drinking water in Netherlands is produced from groundwater sources, and the remainder is produced from surface water sources.

Total population	16 million
Number of water supply zones serving more than 5000 persons/more than 1000 m <sup>3</sup> water per day	230
Number of people served by these water supply zones	16 million
Total amount of water supplied (only supplies serving 5000 or more consumers)	1270 million m <sup>3</sup> /year
Population served by these supplies	99.99%
Raw water sources	
Groundwater	62%
Surface water	38%

The Netherlands provided a national summary of the water quality in the 230 water supply zones serving more than 5000 persons, mentioning for each parameter the percentage samples that did not comply with the parametric



values in the DWD. Table 3.10.2 (left column) shows that there are no parameters that exceed in more 1% of the samples in the Netherlands. Detailed information is presented in table 3.10.3.

The Netherlands also provided information at water supply zone level on the parameters that did not always comply with the parametric values in the DWD. The parameters that caused non-compliance in more than one sample in individual water supply zones are listed in table 3.10.2 (right column), starting with the parameters that caused non-compliance in the highest number of water supply zones(iron). Detailed information is presented in table 3.10.4.

<b>Table 3.10.2 Summary of water quality parameters that cause non-compliance in the Netherlands</b>	
Parameters that cause non-compliance in more than 1% of all samples taken in the Netherlands (in any of the reporting years)	Parameters that show non-compliance in a number of water supply zones in the Netherlands
No parameters that failed in more than 1% of the samples or have no MAC in the DWD 80/778/EEC..	Iron Total coliforms Faecal coliforms Manganese Turbidity Pesticides (AMPA, Bentazon, Mecoprop, BAM) Nitrite Lead Temperature Ammonium
	Parameters that most often caused failure in supply zones (in more than 1 sample in any year)

\* Only supplies serving 5000 or more consumers

### National summary of the drinking water quality in the Netherlands

Table 3.10.3 presents information on the overall quality of drinking water in all larger water supply zone in the Netherlands in the third reporting period. For each non-compliant parameter the percentage of samples that exceeded the parametric value in the DWD is presented. Data for the previous reporting periods are also included when available.. Table 3.10.3 shows that none of the drinking water paarmeters exceeded the parametric values of the DWD in more than 1% of the samples.

**Table 3.10.3 Percentage exceedences for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 for comparison 1993-1995 and 1996-1998, the Netherlands**

Parameter	1993	1994	1995	1996	1997	1998	1999	2000	2001
Ammonium	<1	<1	<1	1.1	0	0.02	<1	<1	<1
Iron	<1	<1	<1	0.4	0.6	0.4	<1	<1	<1
Manganese	<1	<1	<1	0.2	0.3	0.4	<1	<1	<1

	<1	<1	<1	0.2	0.6	0.8	<1	<1	<1
<b>Pesticides</b>									
<b>SSRC</b>	<1	<1	<1	0.7	0.3	0.3	<1	<1	<1
<b>Nickel</b>	<1	<1	<1	0.1	0.2	0	<1	<1	<1

### Number of water supply zones exceeding water quality parameters

For each parameter that showed non-compliance in more than 1 sample in an individual water supply zone, the number of such water supply zones was calculated. The total of number of water supply zones with more than 1 non-compliant sample is listed in table 3.10.4. The total number of water supply zones serving more than 5000 persons is 230 in the Netherlands.

The parameter iron caused non-compliance in most water supply zones, 6 water supply zone in 1999, 7 in 2000 and 4 in 2001 in water leaving the water production plant and for water in the distribution system the number of water supply zones affected are: 11 (1999), 7 (2000) and 8(2001).

<i>Table 3.10.4 Number of water supply zones that show non-compliance listing the parameters that most often cause zones to fail 1999-2001 and for comparison the 1996-1999 period, the Netherlands</i>						
	<i>Number of water supply zones with non-compliance, water quality leaving the treatment plant (only parameters failing in more than 1 sample are included)</i>					
	1996 (250 water supply zone)	1997 (250 water supply zone)	1998 (250 water supply zone)	1999 (230 water supply zone)	2000 (230 water supply zone)	2001 (230 water supply zone)
<b>Iron</b>	5	5	5	6	7	4
<b>Total coliforms</b>	9	3	4	4	2	2
<b>Manganese</b>	3	5	4	5	3	3
<b>Pesticides</b>	4	5	5			.
<b>AMPA</b>				1	0	0
<b>Benrazon</b>				2	1	1
<b>BAM</b>				0	2	2
<b>Mecoprop</b>				1	1	1
<b>Turbidity</b>				0	1	0
<b>Sulphate</b>				1	0	0
<b>Nitrate</b>				0	1	0
<b>Nitrite</b>				1	1	0
<b>Colour</b>				0	1	0
<b>Oxidisability</b>				0	1	0
<b>Nickel</b>				0	0	2
	<i>Number of water supply zones with non-compliance, water quality in the distribution net (consumers' tap) (only parameters failing in more than 1 sample are included)</i>					
	1996	1997	1998	1999	2000	2001

	(250 wsz)	(250 wsz)	(250 wsz)	(230 wsz)	(230 wsz)	(230 wsz)
<i>Iron</i>	10	15	10	11	7	8
<i>Total coliforms</i>	5	8	5	5	7	4
<i>Manganese</i>	2	2	2	1	2	2
<i>Turbidity</i>				2	0	2
<i>Faecal coliforms</i>				0	1	0
<i>Nitrite</i>				0	1	0
<i>Lead</i>				0	0	2
<i>Temperature</i>				1	0	2
<i>Ammonium</i>				1	0	1

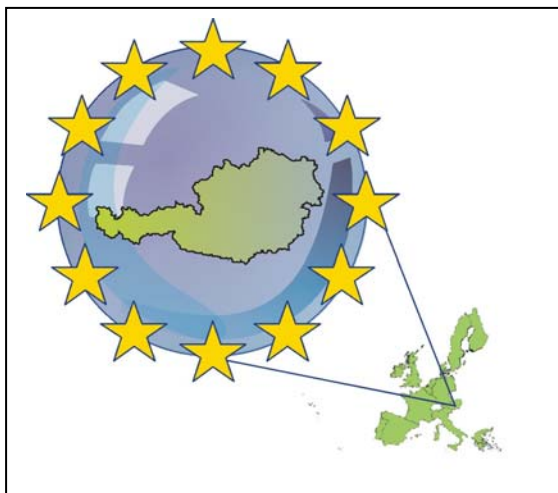
### Conclusions the Netherlands

With respect to the quality of drinking water in the Netherlands the following conclusions can be drawn. The Netherlands is a small Member State and has 230 water supply zones all of which are subject to reporting to the European Commission.

None of the water quality parameters caused non-compliance in more than 1% of the samples taken in the Netherlands.

In the third reporting period 18 parameters caused non-compliance in water supply zones (either in water leaving the treatment plant or at the consumers' tap). The parameters that caused non-compliance in most water supply zones are iron, total coliforms and manganese. The parameter iron caused non-compliance in 0.3 to 0.4 % of the water supply zones. The parameter iron caused non-compliance in less than 1% of all samples in the Netherlands.

### 2.11 Drinking Water Quality in Austria 1999-2001



Austria has a total population of 8 million persons, of which 59% are connected to larger water supplies that serve more than 5000 persons or that produce more than 1000 m<sup>3</sup> of water per day (see table 3.3.1). There are 208 of such water supply zones in Austria and they supply 367 million m<sup>3</sup> of drinking water per year to more than 4.77 million people. The quality data for Austria that are presented in this synthesis report concern the abovementioned water supply zones. Most drinking water in Austria is produced from groundwater sources, and the remainder is produced surface water sources.

<b>Table 3.11.1 General Information Austria</b>	
Total population	8 million
Number of water supply zones serving more than 5000 persons/more than 1000 m <sup>3</sup> water per day	208
Number of people served by these water supply zones	4.77 million
Total amount of water supplied (only supplies serving 5000 or more consumers)	367 million m <sup>3</sup> /year
Population served by these supplies	59%

Austria provided a national summary of the water quality in the 208 water supply zones serving more than 5000 persons, mentioning for each parameter the percentage samples that did not comply with the parametric values in the DWD. The parameters that caused non-compliance in more than 1% of the samples taken in these water supply zones are listed in table 3.11.2 (left column), starting with the parameter that has the highest percentage of non-complying samples (the pesticide desethylatrazine). Detailed information is presented in table 3.11.3.

Austria also provided information at water supply zone level on the parameters that did not always comply with the parametric values in the DWD. The parameters that caused non-compliance in more than one sample in individual wsz are listed in table 3.11.2 (right column), starting with the parameters that caused non-compliance in the highest number of water supply zones (the pesticide atrazine). Detailed information is presented in table 3.11.4.

<b>Table 3.11.2 Summary of water quality parameters that cause non-compliance in Austria</b>	
Parameters that cause non-compliance in more than 1% of all samples taken in Austria	Parameters that show non-compliance in a number of water supply zones in Austria
Desethylatrazine Atrazine Desethylpropylatrazine Nitrate Magnesium Total coliforms	Atrazine Desethylatrazine
All other parameters comply in 99% or	Parameters that most often cause failure

more of the samples or with no MAC in the DWD 80/778/EEC	in water supply zones (in more than 1 sample in any year)
----------------------------------------------------------	-----------------------------------------------------------

\* Only supplies serving 5000 or more consumers

### National summary of the drinking water quality in in Austria

Table 3.11.3 presents information on the overall quality of drinking water in all larger water supply zones in Austria in the third reporting period. For each non-compliant parameter the percentage of samples that exceeded the parametric value in the DWD is presented. Data for the previous reporting periods are also included when available.. Table 3.11.3 shows that the pesticide desethylatrazine was most often exceeding the parametric value in the total number of samples in the larger water supply zones; 31.2% of samples in 1999, 41.0% in 2000 and 69.8% in 2001.

Table 3.11.3 Percentage exceedences for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 and for comparison the 1996-1998 period, Austria				
Parameter	1996-1998	1999	2000	2001
Desethylatrazine		31.2	41.0	69.8
Atrazine		22.1	33.5	42.7
Desethylpropylatrazine		0	11.1	0
Pesticides	2			
Total coliforms	2	1.2	<1	<1
Nitrate	2	1.1	1.5	1.7
Magnesium		1.3	1.3	1.2
Organochlorine compounds+THM	2			
Manganese	2			
Iron, aluminium, FC, FS, PAH, hydrocarbons	1			

### Number of water supply zones exceeding water quality parameters

For each parameter that showed non-compliance in more than 1 sample in an individual water supply zone, the number of such water supply zones was calculated. The total of number of water supply zones with more than 1 non-compliant sample is listed in table 3.3.4. The total number of water supply zones serving more than 5000 persons is 2669 in Austria.

The pesticides atrazine and desethylatrazine caused non-compliance in most water supply zones, 16 water supply zones in 1999, 16 in 2000 and 16 in 2001.

Table 3.11.4 Number of water supply zones that show non-compliance listing the parameters that most often cause zones to fail.1999-2001 and for comparison the 1996-1998 period, Austria						
Parameters causing failure	Number of water supply zones with non-compliance (only parameters failing in more than 1 sample are included)					
	1996	1997	1998	1999	2000	2001
Atrazine				16	16	16
Desethylatrazine				16	16	16

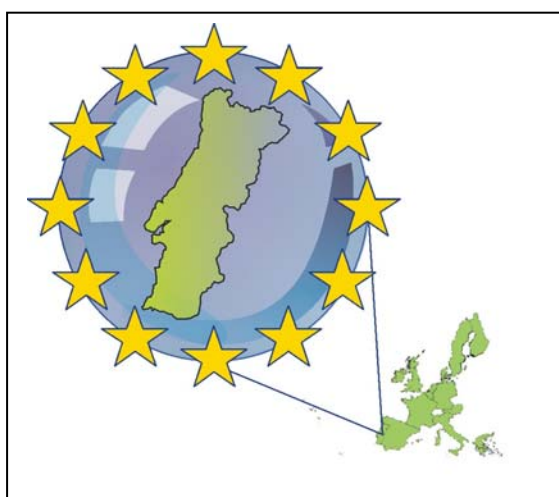
### Conclusions Austria

With respect to the returns submitted by Austria the following comments can be made. It was difficult to process the data and make a proper analysis because some important data were missing. At water supply zone level only data on non-compliance for the two pesticides atrazine and deetylrazine were given. This makes it also difficult to draw any valid conclusions with respect to trends in drinking water quality over the years.

In the reporting period a total of 6 parameters were reported to have caused more than 1% non-compliance in the water samples taken in Austria. The pesticides atrazine and desethylatrazine caused the highest percentages of non-compliance. These two parameters are also causing the failure of water supply zones. Austria has 208 water supply zones and non-compliance due to the two pesticides occurs in more than 7.5% of all water supply zones.

Changes in water quality can not be judged because of the incomplete data available.

## 2.12 Drinking Water Quality in Portugal 1999-2001



Portugal has a total population of 10 million persons, of which 75-80% are connected to larger water supplies that serve more than 5000 persons or that produce more than 1000 m<sup>3</sup> of water per day (see table 3.12.1). There are approximately 275 of such water supply zone in Portugal and they supply 270-290 million m<sup>3</sup> of drinking water per year to more than approximately 8 million people. The quality data for Portugal that are presented in this synthesis report concern the abovementioned water supply zones. Most drinking water in Portugal is produced from surface water sources, and the remainder is produced from groundwater sources.

<b>Table 3.12.1 General Information Portugal</b>	
Total population	10 million
Number of water supply zones serving more than 5000 persons/more than 1000 m <sup>3</sup> water per day	272/274/278

Number of people served by these water supply zones	7.5/7.7/8.0 million
Total amount of water supplied (only supplies serving 5000 or more consumers)	270/280/290 million m <sup>3</sup> /year
Population served by these supplies	75/77/80%
Raw water sources	
Groundwater	31%
Surface water	69%

Portugal provided a national summary of the water quality in the 272-278 water supply zone serving more than 5000 persons, mentioning for each parameter the percentage samples that did not comply with the parametric values in the DWD. The parameters that caused non-compliance in more than 1% of the samples taken in these water supply zones are listed in table 3.12.2 (left column), starting with the parameter that has the highest percentage of non-complying samples (iron). Detailed information is presented in table 3.12.3.

Portugal also provided information at water supply zone level on the parameters that did not always comply with the parametric values in the DWD. The parameters that caused non-compliance in more than one sample in individual wsz are listed in table 3.12.2 (right column), starting with the parameters that caused non-compliance in the highest number of water supply zones (total coliforms). Detailed information is presented in table 3.12.4.

<b>Table 3.12.2 Summary of water quality parameters that cause non-compliance in Portugal</b>	
Parameters that cause non-compliance in more than 1% of all samples taken in Portugal (in any of the three reporting years)	Parameters that show non-compliance in a number of water supply zones in Portugal
Iron	Total coliforms
Manganese	Faecal coliforms
Hydrocarbons	Oxidisability
Temperature	Temperature
Aluminium	Aluminium
Phenols	Iron
Total coliforms	Faecal streptococci
Kjeldahl-N	Odour
Faecal streptococci	Sulphite reducing Clostridia
	Taste
	Manganese
	Hydrocarbons
	Turbidity
	Phenols
	Nitrate
	Ammonium
	Kjeldhal-N
	Nitrite
	Magnesium
	Potassium
	Sodium
	PAH
	Fluoride

	Cadmium Nickel Lead Surfactants
All other parameters comply in 99% or more of the samples or do not have a MAC in the Directive 80/778/EEC	Parameters that most often cause failure in water supply zones (in more than 1 sample in any year)

\* Only supplies serving 5000 or more consumers

### National summary of the drinking water quality in Portugal

Table 3.12.3 presents information on the overall quality of drinking water in all larger water supply zones in Portugal in the third reporting period. For each non-compliant parameter the percentage of samples that exceeded the parametric value in the DWD is presented. There are no data for the previous reporting periods. Table 3.12.3 shows that the iron parameter was most often exceeding the parametric value in the total number of samples in the larger water supply zones 3.9% of samples in 1999, 4.3% in 2000 and 5.3% in 2001.

**Table 3.12.3 Percentage exceedances for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 Portugal**

Parameter	1993-1995	1996-1998	1999	2000	2001
Iron			3.9	4.3	5.3
Manganese			4.4	3.5	4.6
Hydrocarbons			4.4	3.6	5.2
Temperature			3.3	3.8	2.5
Aluminium			2.6	2.4	1.9
Phenols			3.8	5.6	
Total coliforms			2.0	2.1	2.2
Kjeldahl-N			1.5	<1	3.3
Faecal streptococci					1.1

All other parameters failed in less than 1% of the samples or did not have a MAC in the Directive 80/778/EEC.

### Number of water supply zones exceeding water quality parameters

For each parameter that showed non-compliance in more than 1 sample in an individual water supply zone, the number of such water supply zones was calculated. The total of number of water supply zones with more than 1 non-compliant sample is listed in table 3.12.4. The total number of water supply zones serving more than 5000 persons in Portugal is between 272, 274 and 278 in the three reporting years. The parameter total coliforms caused non-compliance in most water supply zones, 62 water supply zone in 1999, 64 in 2000 and 67 in 2001.



**Table 3.12.4 Number of water supply zones that show non-compliance listing the parameters that most often cause zones to fail 1999-2001 Portugal**

<i>Parameter causing failure</i>	<i>Number of water supply zones with non-compliance 1999-2001 (only parameters failing in more than 1 sample are included)</i>		
	1999 (272 wsz)	2000 (274 wsz)	2001 (278 wsz)
Total coliforms	62	64	67
Faecal coliforms	25	28	28
Oxidisability	22	12	18
Temperature	14	19	24
Aluminium	11	17	16
Iron	9	16	17
Faecal streptococci	13	11	12
Odour	9	13	18
SSRC	13	14	13
Taste	8	13	14
Manganese	10	9	8
Hydrocarbons	5	8	12
Turbidity	7	10	9
Phenols	5	11	
Nitrate	3	2	6
Ammonium	5	4	1
Kjeldahl-N	3	3	5
Nitrite	1	3	3
Magnesium	2	1	1
Potassium		1	2
Sodium	1	1	1
PAH			2
Fluoride		1	
Cadmium		1	
Nickel		1	
Lead		1	
Surfactants	1		

### Conclusions Portugal

For the drinking water quality in Portugal the following conclusions can be drawn.

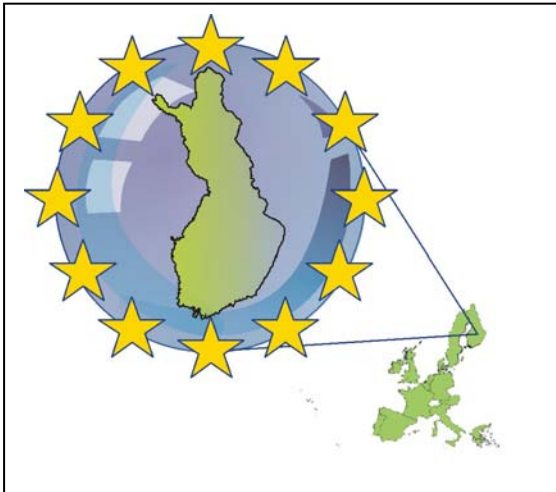
In the third reporting period 9 water quality parameters caused non-compliance in more than 1% of the samples taken in Portugal. A relatively higher percentage of non-compliance is caused by the parameters iron, manganese, hydrocarbons and temperature.

Portugal reported between 272 and 278 water supply zones (the number increasing over the years). In this reporting period 27 parameters caused non-compliance in water supply zones. The parameter that caused non-compliance in most water supply zones was total coliforms, affecting approximately 24% of all zones. The total coliforms caused non-compliance in less than 1% of all samples taken in Portugal.

The parameter iron caused the highest percentage of non-compliance approximately 4 to 5% of all samples. This parameter caused non-compliance in 3 to 6% of all water supply zones in Portugal.

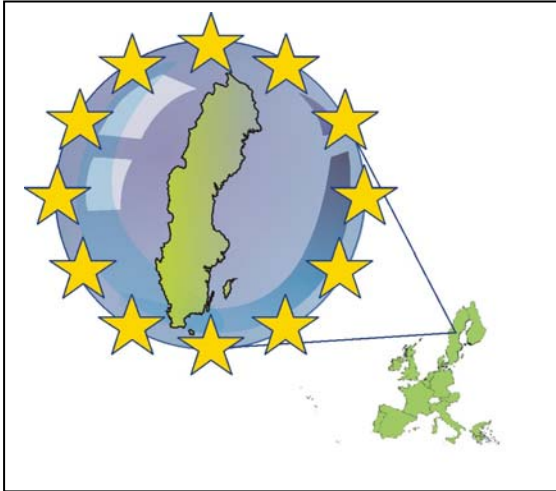
It is not possible to judge changes in water quality as there are no data for the previous years available.

### 2.13 Drinking Water Quality in Finland 1999-2001



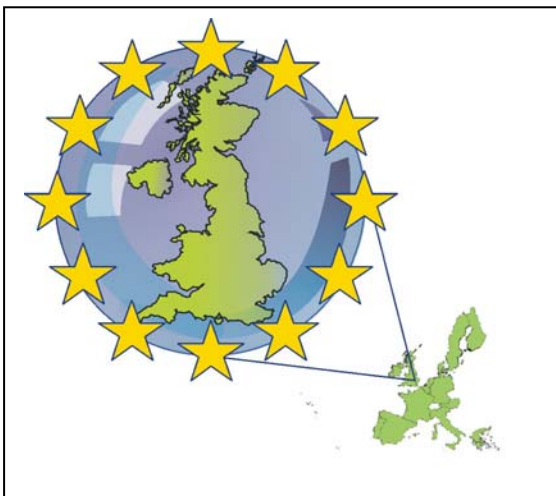
Finland did not submit a returns for the third reporting period.

#### 2.14 Drinking Water Quality in Sweden 1999-2001



Sweden did submit information for the 1999-2001 period at a very late stage. The return was in such a format that it could not be processed. It was therefore decided not to include the information on the quality of drinking water in Sweden in this report.

#### 2.15 Drinking Water Quality in the United Kingdom 1999-2001



The United Kingdom has a total population of 59.4 million persons, of which approximately 90 % are connected to larger water supplies that serve more than 5000 persons or that produce more than 1000 m<sup>3</sup> of water per day (see table 3.15.1). There are more than 2300 of such water supply zone in the United Kingdom and they supply drinking water to more than 52 million people. The quality data for United Kingdom that are presented in this synthesis report concern the abovementioned water supply zones. Most drinking water in the United Kingdom is produced from groundwater sources, and the remainder is produced surface water sources.

<b>Table 3.15.1 General Information United Kingdom</b>	
Total population	59.4 million
Number of water supply zones serving more than 5000 persons/more than 1000 m <sup>3</sup> water per day	2324/2316/2305
Number of people served by these water supply zones	52/52.1/52.7 million
Total amount of water supplied (only supplies serving 5000 or more consumers)	???? million m <sup>3</sup> /year check data
Population served by these supplies	88.5/88.7/89.6%
Raw water sources	
Groundwater	68%
Surface water	32%

The United Kingdom provided a national summary of the water quality in the more than 2300 water supply zones serving more than 5000 persons, mentioning for each parameter the percentage samples that did not comply with the parametric values in the DWD. The parameters that caused non-compliance in more than 1% of the samples taken in these water supply zones are listed in table 3.15.2 (left column), starting with the parameter that has the highest percentage of non-complying samples (trihalomethanes). Detailed information is presented in table 3.15.3.

The United Kingdom also provided information at water supply zone level on the parameters that did not always comply with the parametric values in the DWD. The parameters that caused non-compliance in more than one sample are listed in table 3.15.2 (right column), starting with the parameters that caused non-compliance in the highest number of water supply zones (trihalomethanes). Detailed information is presented in table 3.15.4.

<b>Table 3.15.2 Summary of water quality parameters that cause non-compliance in the United Kingdom</b>	
<b>Parameters that cause non-compliance in more than 1% of all samples taken in the United Kingdom (in any of the reporting years)</b>	<b>Parameters that show non-compliance in a number of water supply zones in the United Kingdom</b>
THM+ other organochlorine compounds Aluminium Lead Iron Oxidisability PAH Pesticides Colour Ammonium	THM +other organochlorine compounds Iron Aluminium Lead Total coliforms Oxidisability Pesticides PAH Ammonium Turbidity
All other parameters comply in 99% or more of the samples or have no MAC in the DWD 80/778/EEC	Parameters that most often caused failure in water supply zones (in more than 1 sample in any year)

\* Only supplies serving 5000 or more consumers

### National summary of the drinking water quality in the United Kingdom

Table 3.15.3 presents information on the overall quality of drinking water in all larger water supply zones in the UK in the third reporting period. For each non-compliant parameter the percentage of samples that exceeded the parametric value in the DWD is presented. Data for the previous reporting periods are also included when available.. Table 3.15.3 shows that the trihalomethanes parameter was most often exceeding the parametric value in the total number of samples in the larger water supply zones; 24.4% of samples in 1999, 26.8% in 2000 and 31.4% in 2001 (*still to be clarified by UK responsible authorities*).

**Table 3.15.3 Percentage exceedences for samples taken in all water supply zones serving 5000 or more consumers 1999-2001 and for comparison 1996-1998 and 1993-1995, United Kingdom**

Parameter	1993	1994	1995	1996	1997	1998	1999	2000	2001
THM + other org chlorine compounds	-	-	-	3.7	5.1	8.1	24.2*	26.8*	31.4*
Aluminium							18.6	15.4	19.9
Lead	3.1	3.2	3.4	2.4	2.1	1.8	8.0	3.1	2.7
Iron	2	2.1	3.4	2	1.8	1.8	5.6	4.0	2.9
Oxidisability	-	-	-	0.5	0.9	1.1	10.4	7.7	
PAH	3.6	4.5	4.9	3.9	3.3	3.2	1.5	2.5	1.6
Pesticides	7.2	4.7	3.2	<0.1%	<0.1%	<0.1%	1.7		2.2
Manganese	-	-	-	0.6	0.6	0.5	2.8		
Colour							1.4	1.4	
Ammonium								1.2	
Total coliforms	1	1	1	0.8	0.9	0.8			
Nitrite	4.3	4.9	4.8	4	3.7	3.4			
Hydrocarbons	7.1	0	1.5	<0.1%	<0.1%	<0.1%			

\* Exact data on THM and organochlorine compounds (national summary on data from various regions) still has to be clarified by the UK responsible authorities.

### Number of water supply zones exceeding water quality parameters

For each parameter that showed non-compliance in more than 1 sample in an individual water supply zone, the number of such water supply zones was calculated. The total of number of water supply zones with more than 1 non-compliant sample is listed in table 3.15.4. The total number of water supply zones serving more than 5000 persons varies between 272 and 278 in the UK. The parameter trihalomethanes caused non-compliance in most water supply zone, 73 water supply zones in 1999, 69 in 2000 and 67 in 2001.

<i>Table 3.15.4 Number of water supply zones exceeding parametric values in 1999-2001 and for comparison 1996-1998 (omitting parameters that fail in 1 sample per year), United Kingdom.</i>						
<i>Parameter causing non-compliance</i>	Number of water supply zones with non-compliance (only parameters failing in more than 1 samples are included)					
	1996 (1900 wsz)	1997 (1900 wsz)	1998 (1900 wsz)	1999 (2324 wsz)	2000 (2316 wsz)	2001 (2305 wsz)
<i>THM +other organochlorine compounds</i>	66	83	134	73	69	67
<i>Iron</i>	235	201	204	28	21	14
<i>Aluminium</i>	39	28	23	15	9	5
<i>Lead</i>	37	109	91	12	6	7
<i>Total coliforms</i>	105	108	78	6	5	7
<i>Oxidisability</i>				5	3	1
<i>Pesticides</i>				3	3	1
<i>PAH</i>	106	103	89	2	3	1
<i>Ammonium</i>					1	1
<i>Turbidity</i>				1		
<i>Nitrite</i>	152	134	145			
<i>Manganese</i>	47	42	37			

### **Conclusions United Kingdom**

The return from the United Kingdom summarises the results from the various parts of the Member State at a national level. This includes England and Wales, Northern Ireland, Scotland and Gibraltar. This caused some confusion about the parameter trihalomethanes and other organochlorine compounds. Some further clarification and perhaps adjustment of the data can be expected for this parameter.

In the third reporting period 10 water quality parameters are reported to cause non-compliance in more than 1% of samples taken in the various regions of the United Kingdom. The parameters trihalomethanes and other organochlorine compounds, aluminium, lead and iron caused a relatively high percentage of non-compliance in the samples. The United Kingdom is a large Member State that has more than 2000 water supply zones. There are 10 parameters that caused non-compliance in water supply zones. The parameters that caused non-compliance in a relatively higher number of water supply zones are trihalomethanes, iron and aluminium.

The parameter trihalomethanes and other organochlorine compounds caused non-compliance in between 25 and 30% of all samples taken. This is also the

parameter that mostly caused non-compliance in water supply zones affecting approximately 3% of all water supply zones in the United Kingdom.

The non-compliance of some parameters (THM, iron, oxidisability, pesticides) seems to have increased since the previous reporting periods. The number of water supply zones showing non-compliance has decreased since the previous reporting period.





### 3 Conclusions at European Union Level

#### Background information on the supply of drinking water in the European Union

Some key information is presented on the supply of drinking water in the European Union, such as the number of water supply zones serving 5000 or more consumers (producing more than 1000 m<sup>3</sup> water per day), the total population in the Member States and the percentage of this population served in the abovementioned water supply zones, the total amount of water produced by the abovementioned supplies and the relative contribution of various raw water sources (surface water, groundwater and other sources). This information is presented in table 4.1.

Table 4.1 Information on the supply of drinking water in the European Union 1999-2001

MS	Population	Water supply zones serving 5000 or more consumers	Water supply zones serving 5000 or more consumers	Water supplied by these wsz	% of the total population served by these supply zones
	Millions	1999/2000/2001	1993-1998	Million m <sup>3</sup> /year	%
B	10.2	>170 (no data Flanders)	301	530	83-100% (3 regions)
DK	5.3	270	277	280	65
D	82	2669	2664	4775	79
EL	10.6		97		
E	40	842/847/737	759	?	70
F	59	2236	2179	3750	73
IRL	3.8	120/125/116	120	360-460	73-79
I	57.5	325	1656	1270	63
LUX	0.44	10	14	32	73
NL	16	230	250	1270	100
Ö	8.0	208	185	367	59
P	10.0	272/274/278		270-290	75-80
FIN	5.1		171		
S	8.8				
UK	59.4	2324/2316/2305	1919-1824	5566-5709	88-90

Note: there is a remarkable decrease in the number of water supply zones in Italy.

#### General

Returns from thirteen Member States were received for this third period, but Sweden failed to submit an adequate return (for the third time) and Portugal sent in a return for the first time.

In many cases it was not possible to give a proper analysis because the information given was incomplete. More complete returns were received from: France, Ireland, the Netherlands, Portugal and the United Kingdom. All

other returns were incomplete, showed inconsistency and/or were difficult to process. Many problems occurred with the processing of the data from Belgium as the three regions reported independently to the EC. Considering the difficulty with the production of any synthesis at all it is very important to introduce the new reporting formats as soon as possible and to start using the WISE system (Water Information System Europe).

### **Non-complying parameters in the Drinking Water Directive for the third reporting period 1999/2000/2001**

The information is summarised in tables 4.2 and 4.3. Table 4.2 indicates the parameters that cause non-compliance in more than 1% of the samples taken at Member States level only considering water supply zones serving more than 5000 persons.

The water quality parameters that cause non-compliance in the reporting Member States are iron and manganese (9 MS), total coliforms and aluminium (8 MS), hydrocarbons and phenols (6 MS), pesticides, nitrate and temperature (all in 5 MS) and potassium, fluoride, sodium, sulphate and THM (all in 4 MS).

The table 4.3 also indicates parameters that cause non-compliance at water supply zone level in more than 1 sample. Attention is needed for the fact that not all MS supplied this information. The parameters that cause non-compliance in most water supply zones are total coliforms, iron, turbidity, aluminium and faecal coliforms (each in 8 MS), manganese, faecal streptococci, pesticides and nitrate (each in 6 MS), ammonium, nitrite, potassium, fluoride and colour (each in 5 MS).

### **Improvement in drinking water quality**

It is difficult to judge changes in overall water quality in the various Member States on the basis of aggregated data. Still an attempt is made at an overall conclusion. For most Member States no significant change is noticeable. For Austria and Portugal no such analysis can be made because of incomplete data or because no previous data are available for comparison. Some improvement can be noticed in the overall water quality in Spain. In Ireland some parameters have indeed improved while others have deteriorated. In the United Kingdom there is a tendency towards more non-compliance. The overall conclusion is that the quality of drinking water has not significantly improved in the 1999-2001 reporting period.

*Table 4.2 Overview of drinking water quality parameters causing non-compliance in the Member States*

Parameter/Member State	B	DK	D	ES	F	IRL	IT	LUX	NL	AT	P	UK
Iron	1	1	1	1	1	1	1				1	1
Manganese	1	1	1	1	1	1	1	1			1	
Aluminium	1	1		1	1	1	1				1	1
Total coliforms	1	1			1	1	1	1		1	1	
Hydrocarbons	1	1	1		1		1				1	
Phenols	1		1	1	1		1				1	
Pesticides	1		1		1					1		1
Nitrate			1	1	1		1			1		
Temperature		1		1	1		1				1	
Potassium	1			1	1		1					
Fluoride	1		1		1	1						
Sodium	1			1	1		1					
Sulphate	1		1	1			1					
THM+	1	1	1									1
Magnesium				1			1			1		
Lead			1				1					1
Oxidisability			1				1					1
Faecal streptococci	1						1				1	
PAH			1				1					1
Turbidity	1						1					
Faecal coliforms						1	1					
Ammonium							1					1
Colour						1						1
Odour						1	1					
Kjeldahl-N			1								1	
Nickel	1		1									
Cadmium	1		1									
Arsenic			1	1								
Nitrite							1					
Taste						1						
Selenium					1							
Chromium			1									
Mercury			1									
Cyanide	1											
Silver	1											
Methane		1										
Free Carbondioxide		1										
Trichloromethane		1										
Hydrogensulphide		1										
TOC		1										
Tetrachloroethene		1										
pH							1					
total	18	13	18	11	13	9	22	2	0	4	9	9

*Table 4.3 Overview of drinking water quality parameters causing water supply zones to be in non-compliance in the Member States*

Parameter/Member State	B	DK	D	ES	F	IRL	IT	NL	LUX	AT	P	UK	Total
Non compliant wsz	few data	no data											
Total coliforms			X	X	X	X	X	X	X		X	X	8
Iron			X	X	X	X	X	X			X	X	8
Turbidity			X	X	X	X	X	X			X	X	8
Aluminium	X		X	X	X	X	X				X	X	8
Faecal coliforms	X		X	X	X	X	X	X			X		8
Manganese			X	X	X	X		X	X		X		6
Faecal streptococci	X		X	X	X		X				X		6
Pesticides			X	X	X			X		X		X	6
Nitrate	X		X	X	X		X				X		6
Ammonium			X	X				X			X	X	5
Nitrite			X	X			X	X			X		5
Potassium			X	X	X						X		4
Fluoride				X	X	X					X		4
Colour			X	X		X		X					4
Oxidisability			X	X							X	X	4
Temperature				X	X		X				X		4
SSRC				X	X		X				X		4
Sulphate			X	X	X			X					4
Sodium				X	X						X		3
Hydrocarbons			X		X						X		3
Magnesium			X	X							X		3
Lead				X				X			X	X	4
Odour			X	X		X					X		4
THM+			X				X					X	3
Nickel				X				X			X		3
PAH											X	X	2
Taste						X					X		2
Phenols				X							X		2
Arsenic			X	X									2
Kjeldahl-N											X		1
Cadmium											X		1
Selenium					X								1
pH				X									1
Mineral oils				X									1
Hydrogen sulphide				X									1
Total wsz	4		20	28	17	10	11	12	2	1	26	10	