

INVESTIGATION OF DRINKING WATER QUALITY
ENFORCEMENT PROCEDURES IN MEMBER STATES
OF THE EUROPEAN UNION

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*Final Report to the Department of the Environment,
Transport and the Regions*

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Final Report to the Department of the Environment, Transport and the Regions

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EXECUTIVE SUMMARY

The implementation of the EU Drinking Water Directive 80/778/EEC in six Member States (Denmark, France, Germany, Italy, The Netherlands and Spain) has been reviewed with particular reference to enforcement procedures, in terms of their legal basis, institutional arrangements and practice for contraventions of the standards set out in the Directive. In addition, other aspects, such as information available on drinking water quality, consumers' rights and any court actions relating to drinking water quality have been examined.

None of the reviewed countries have a fully privatised public water supply, although several countries have some private companies, often operating on behalf of municipalities (or regions), but all under the control of public administrations. However, there seems to be a wide-spread trend towards increasing rationalisation to form larger organisations and moves towards more privately operated water suppliers.

Overall supervision of water supply and quality at national level lies with Ministries of Health or Environment, although direct supervision and enforcement is fragmented, with involvement of local, regional and sometimes state authorities, and the distinction between operators and legislators is often blurred. Only the system in the Netherlands, where Regional Health Inspectors and one National Co-ordinator oversee water companies, closely resembles the system in England and Wales.

All Member States reviewed have implemented the Directive, although most with considerable delays with respect to the required time scale (France in 1989 after European Court action was initiated). France, Germany and the Netherlands have amended their drinking water regulations in response to action by the European Commission and/or European Court of Justice proceedings, concerning incomplete and/or incorrect transposal of the Directive; in France and Germany this concerned, among other issues, the provisions relating to derogations. The parameters have broadly been adopted as in the Directive, with minor deviations, i.e. some stricter standards and some additional standards. On the whole, the provisions of the Directive for issuing derogations have also been adopted in national legislation.

Only one country, The Netherlands, publishes an annual, national report on drinking water quality, similar to, though less detailed than that produced in the UK. France compiled a national summary report in 1993, some national surveys for specific parameters, and a recently published, regional report has been obtained. In view of the lack of published data and inconsistency where data are available, it is not possible to assess the overall level of compliance in most countries. However, there is evidence of compliance problems, particularly in respect of microbiology, nitrate and pesticides.

There are a variety of ways of enforcing compliance with drinking water standards; in most cases the responsible authorities are at local or regional level and frequently the powers are divided among several levels of authority; moreover, the distinction between water suppliers and enforcement authorities is not always entirely clear (Denmark, Italy, Spain).

The most centralised, and probably the most effective system, similar to that in England and Wales, is in The Netherlands where Regional Public Health Inspectors (with one national co-ordinator) have the duty to enforce compliance. In France the responsibility lies with the Departmental Prefect (regional level); in Spain with the Regional Health Administration (with close involvement of municipal authorities); in Denmark with the County Council, though the municipal authorities are also involved; in Italy it is mainly with the Local Health Department, but with responsibilities divided among several other levels (provincial, regional, national) and in Germany with the Local Medical Officer.

Compliance monitoring is carried out in a variety of ways ranging from self-monitoring (The Netherlands) to analyses carried out directly by the authorities responsible for enforcement or laboratories appointed by these authorities (Denmark and France), and combinations of these approaches (Germany, Italy, Spain). Where the responsible authorities do not carry out the monitoring, they have to be informed of any breaches of standards.

Concerning breaches of standards, it is clear that all countries give overriding importance to maintenance of supply, provided that consumers' health is not considered to be at risk if the supply is continued. Consequently, all decisions concerning actions in cases of non-compliance are primarily based on public health considerations.

In cases of microbiological contamination (or suspected contamination), the problem is investigated and rectified immediately (usually by (additional) disinfection of the supply and distribution system) and boiling notices may be issued.

It is also generally recognised that non-compliance with chemical parameters does not normally constitute an immediate health risk, and that relatively long-term improvement measures are usually adequate. All countries studied, except The Netherlands, have used mainly derogations to deal with breaches of chemical standards, i.e. they have made extensive use of derogations in cases not permitted under the Directive, e.g. for long-term breaches of standards for nitrate, pesticides and other undesirable or toxic substances (parameters listed in Annexes C and D of the Directive). In France and Italy this was done through legal instruments (Circulars or Decrees, respectively; some recently withdrawn) permitting such derogations, whilst in Germany, official guidelines are used which are based on health considerations but have no legal standing. The derogations are normally accompanied by improvement measures and time limits; these may form part of the derogation ('Prefectoral Order' in France, 'Administrative Order' in Denmark, 'Exemption Regulation' (Ausnahmeregelung) in Germany).

In addition, authorisation or informal acceptance of temporary breaches of standards for chemical parameters is practised in all countries together with relatively informal agreements or recommendations relating to improvement measures, although the option of issuing formal Orders is available to enforcement bodies in Denmark, France and The Netherlands. With the exception of France and The Netherlands, where these are dealt with by the Departmental Prefect or the Regional Inspector, respectively, such authorisations are mainly dealt with by lower level authorities than the derogations, i.e. mainly at municipal level, and may not be reported to national authorities.

In some cases derogations or authorisations of temporary breaches of standards, e.g. for nitrate, are accompanied by other measures, such as informing the public of the risk and/or providing alternative supplies for drinking or for vulnerable groups of consumers.

The responsible authority for enforcement is usually also responsible for monitoring progress with improvement measures and achievement of compliance, but in most cases it was difficult to assess just how effectively these were carried out. It seems quite common to give extensions to derogations or other forms of authorisation of breaches of standards. Court proceedings seem to be rarely used to enforce compliance.

In all Member States, consumers have general rights to receive or obtain water quality information, either from the water suppliers directly, or from enforcement agencies. However, the information may not always be detailed, it may consist of annual, average values or incomplete sets of parameters. Rights to compensation exist, in principle, but have not been tested in all countries.

The experience of actual court cases in the countries studied, is varied and there do not seem to be very many on the whole. However, a number of interesting court cases have taken place, involving actions against enforcement authorities and actions against water suppliers. In several cases in Germany, Mayors or water suppliers were judged guilty of negligence for supplying drinking water with microbiological contamination. Two similar cases are being fought in Italy. However, on at least three occasions, cases have been won against enforcement authorities: in Germany a court ruled that diacetone keto-gulonate which originated in drinking from industrial effluent (vitamin C production) was not subject to the pesticides parameter, although chemically identical to the pesticide Dikegulac; in Denmark a municipality won a case against the Danish EPA which had refused to issue a derogation for manganese; and in Italy a court ruled that several 'Orders' authorising breaches of the pesticides standard could only be applied in emergencies and with a time limit. In several countries, consumers have fought successfully against water suppliers: in France for breach of the nitrate standard; in Denmark for supplying 'undrinkable' water and damage to laundry; in the Netherlands for adding fluoride to the drinking water; and in Germany for serious damage to the health of a baby due to high nitrate levels in drinking water.

It is difficult to assess the overall effectiveness of enforcement in the countries studied, particularly because of the scarcity of published data on drinking water quality and the absence of a consistent approach to reporting, even where data are available, as well as the fragmented approach to enforcement. However, of the countries studied, it seems that the system in The Netherlands has been the most effective, mainly due to the close collaboration between water suppliers and regulators, a system of national co-ordination, public pressure to ensure high quality of supplies, combined with openness and public accountability (i.e. the responsibility for water supply lies with elected local or regional governments).

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1. INTRODUCTION

Standards for drinking water quality across the European community were established by the 1980 Directive relating to the quality of water for human consumption (Drinking Water Directive - 80/778/EEC, currently under revision which is near completion). Member States were required to transpose the Directive into national legislation and set up the necessary administrative procedures by 1982, and to comply with the standards by 1985.

All countries reviewed in this study have implemented the Directive, many with considerable delays with respect to the required timetable. The water quality standards specified in the Directive have broadly been adopted, though there are differences among Member States and some have prescribed stricter limits for certain parameters. However, there are considerable differences between Member States in the institutional mechanisms and administrative procedures adopted. Moreover, there are different approaches with respect to monitoring requirements, compliance controls, reporting and publicising of results, and enforcement procedures.

The Directive allows Member States to make provisions for derogations in case of non-compliance with the standards prescribed by the Directive (Articles 9 and 10) and most countries, including the UK (England and Wales: Regulations 4 and 5 of The Water Supply (Water Quality) Regulations 1989) have incorporated these into national legislation. In England and Wales, the Water Industry Act 1991 provides the powers for enforcement action to be taken in the event of a breach of drinking water standards (there are equivalent provisions in Scotland). Similar provisions are available in some other Member States. However, the European Commission has recently challenged the legal basis for UK enforcement action.

In 1987/88, WRc undertook a study for the Department of the Environment (DoE) on the application of the EC Drinking Water Directive in six Member States (the same States as the current study) (Newman *et al.*, 1988 and 1989). The report focused on the incorporation of the Directive into national law, on national differences in standards, institutional mechanisms and administrative procedures, compliance monitoring, reporting, compliance problems and derogations. At the time of the above study, implementation of the Directive and enforcement of national legislation was at an early stage in many countries (or in the case of France, the Directive had not been implemented) and many changes in legislation, administrative procedures and practice have since been made. Some aspects have been updated through studies carried out by WRc for the Water Utilities (Foundation for Water Research) in 1991/92 (Agg and Derick 1991, Agg *et al.*, 1992). A more recent study (Horth *et al.*, 1994) focused on compliance with the pesticides parameter in six European countries (not including Spain or Denmark).

The above reports formed a basis for the current study, but the latter includes changes introduced since then, and focuses on the current legal basis and practice of enforcement. Moreover, this study covers additional aspects, such as information available on drinking

water quality, consumers' rights and any court actions relating to drinking water quality in the study countries.

Additional up-to-date information was gathered for all countries, appropriate experts were identified and visits were undertaken to each of the study countries. Information on consumers' rights, legal mechanisms and procedures was supplemented by IEEP (Institute for European Environmental Policy, London, the sub-contractor) through national legal experts in each of the study countries.

The main report summarises, compares and assesses the approach of the countries studied, whilst details for each of the countries are presented separately in Appendices A to F. All country-specific references, details of national legislation and court cases are given in the appropriate appendices, and not repeated in the summary report.

2. OBJECTIVES

The overall objectives of the research project were as follows:

1. To review enforcement procedures for contraventions of the Drinking Water Directive (80/778/EEC) in Denmark, France, Germany, Italy, The Netherlands and Spain.
2. To assess the effectiveness of these procedures in terms of their success in maintaining compliance with standards, and in ensuring that remedial action is carried out as quickly as possible in the event of breaches of standards.

In particular, the following aspects were to be covered for each study country:

- The organisation of water supply (public authorities or private companies), and the institutional mechanisms for compliance control and enforcement of legislation.
- The current drinking water legislation including details of the first implementation of the Drinking Water Directive, any amendments and reasons for making the changes.
- The national drinking water standards adopted, highlighting any deviations from the Directive.
- Information on compliance with drinking water standards, such as publicly available reports on drinking water quality, including any relevant comment on monitoring practice which could affect compliance.
- The legal mechanisms of enforcement, both in the case of long-term systematic problems of non-compliance not giving rise to a health risk, and in the case of short-term problems which may be associated with a risk to health.
- The actual practice of enforcement, particularly the basis for decisions and the nature and extent, and legal status of contacts between water supplier and enforcement authority.
- The rights of consumers with respect to access to information, compensation payments and access to courts if water quality standards are breached, or to ensure adequate enforcement of drinking water legislation.
- Any European or national court rulings relevant to drinking water supply and quality.

3. ORGANISATION AND MANAGEMENT OF WATER SUPPLY

The main aspects of the organisation and responsibility for providing public water supplies in the six study countries are summarised in Table 3.1

None of the reviewed countries have a fully privatised public water supply, although several countries have some private companies, often operating on behalf of municipalities (or regions), but all under the control of public administrations.

In all countries, the responsibility of providing or organising public water supply lies with municipalities, usually with Mayors carrying the ultimate responsibility. In some countries, higher levels of government may also be involved, for example provincial governments in The Netherlands where re-organisation/rationalisation of public water supply has resulted in fewer, but larger companies covering wider areas. In France certain, additional responsibilities lie at Departmental level (Prefect), and in Italy there are complex interactions between several levels of government (Municipalities, Provinces, Regions, State) within a Federalist system; these are currently undergoing major reorganisation.

The municipalities of each country carry out their duties in a variety of ways:

- direct management by local administrations;
- individually (all countries to some extent);
- by organising joint services for several municipalities;
- formation of public corporations;
- private or public companies in public ownership (owned by municipalities or shareholdings with the municipalities/districts/provinces);
- private co-operatives (Denmark);
- mixed companies with mainly public, but some private capital (Spain); or
- by subcontracting to private water companies.

Increasing rationalisation to form larger organisations seems to be a fairly widespread trend.

There also seems to be an increasing trend of organising public water supplies through private companies, particularly in Italy. In The Netherlands, there is some pressure to privatise, but public controls over water companies are being strengthened through legislation. In France there are several, large private water companies, but they operate on behalf of municipalities, and there are still a large number of small municipal water works and others run by syndicates of municipalities. There are few private water companies in

Germany (e.g. Gelsenwasser AG in North-Rhine-Westfalia), but there is considerable debate on this subject and there may be an increase in the numbers in the near future. Denmark has a large number of private co-operatives under public control.

Some countries still have large numbers of private, untreated well and spring water supplies, particularly Denmark (8% of the population) and Germany where it varies with regions (especially in mountain regions in the South, and in former East Germany); small communal supplies are also often untreated groundwater or spring water. In Germany, the numbers of private and small community supplies are decreasing, particularly in the former East Germany where more households are being connected to public supplies. In Denmark, it seems difficult to bring about an increase in connections to public supplies, as landowners have a fundamental right to abstract water (defined as 'common goods'); the government has just decided to allocate funds for remedial measures for private supplies which do not meet standards.

Table 3.1 Organisation and responsibilities in public water supply

Country	Organisation of water supply	Responsible for public water supply
Denmark	<p>Water supply utilities owned either by</p> <ul style="list-style-type: none"> • municipalities (180 public utilities operating 280 water works); or • private co-operatives (2700 water works). <p>In addition, there is a large number of private wells (29 000 wells, supplying 8% of the population) (land owners have the right to abstract water which is defined as 'common goods').</p>	<p>Local Councils (257 municipalities) are responsible for</p> <ul style="list-style-type: none"> • planning and ensuring supply, • providing 'best possible quality of water, irrespective of regulations', • supervision of water supply, • and setting charges.
France	<p>Local Councils can organise public water supply in three different ways:</p> <ul style="list-style-type: none"> • Manage it directly by local council (13 500 municipalities); or • Join a union of municipalities running a common service (there are 2000 such syndicates); or • Subcontract to a private company. <p>There are large numbers of small, municipal supplies.</p>	<ul style="list-style-type: none"> • The elected Mayor of the municipality is ultimately responsible for water supply, even where subcontracted to a private company. • An elected, general council at Department level can authorise subsidies to municipalities for water supply projects. • The Departmental Prefect is responsible, on behalf of the State, for supervision of technical, administrative and financial aspects of water supply.
Germany	<p>Organised by municipality, town or district administrations in a variety of ways:</p> <ul style="list-style-type: none"> • Economic enterprise governed separately by municipal administration; • Private law company in municipal ownership; • Public corporations (various municipalities linked); • Delegation of duties to private company whilst municipality keeps overall responsibility (very few at present, but may be increasing). <p>There are also relatively large numbers of very small communal and private (untreated) supplies (wells and springs).</p>	<p>Municipality has ultimate responsibility, even in the few cases where private companies are operating.</p>

Country	Organisation of water supply	Responsible for public water supply
Italy	<p>Previously a highly fragmented approach, with</p> <ul style="list-style-type: none"> • Municipality owned companies; • Consortia (combining water management responsibilities of several municipalities); and • Public Boards; <p>but currently undergoing extensive reorganisation aimed at rationalisation of water management and supply, with</p> <ul style="list-style-type: none"> • a trend towards large private companies undertaking various public service tasks, including water supply. 	<ul style="list-style-type: none"> • Municipalities are responsible for supplying water, the mayor is held legally responsible for ensuring that water quality standards are maintained, but • There is a complex system of duties and responsibilities from municipality to provinces, regions and central government. <p>Currently undergoing reorganisation.</p>
The Netherlands	<ul style="list-style-type: none"> • Public limited companies with provinces and municipalities as the main shareholders • Private company (one at present) • Ongoing re-organisation to rationalise has resulted in reduced number of companies in recent years (from 86 to 25 with some further reductions planned). 	<ul style="list-style-type: none"> • The management of a water company is accountable to elected municipal and provincial governments. • The current revision of the Water Supply Law is aimed at strengthening public control of water companies, in view of some pressure towards privatisation.
Spain	<p>Public service organised in a variety of ways:</p> <ul style="list-style-type: none"> • Direct management by the municipality (in some cases groups of municipalities sign an agreement to carry out a joint service); • Municipal company financed by the administration; • Mixed company where most of the capital is public (municipality) with a minority holding of private capital; • Private company (private capital) contracted by the administration. 	<ul style="list-style-type: none"> • The municipalities (about 8000 in Spain) have the obligation to supply water, although • Some large companies (controlled by Regional Governments).

4. LEGAL AND INSTITUTIONAL FRAMEWORK

4.1 General Framework

Table 4.1 summarises the legislation governing drinking water quality. The table also includes official guidelines relating to enforcement; these will be discussed in Section 6.

In all countries, the drinking water regulations have been implemented under a general law or act, similar to the situation in England and Wales. However, in Germany, France and Spain the legislation comes under the area of health. Thus, in France and Spain the regulations are part of laws relating to the health of the population, whilst in Germany the regulations have been passed under both the food law and the epidemics law, focusing on the overriding importance of microbiological quality of drinking water and its potential to spread disease and epidemics if standards are not monitored and maintained. In Denmark, Italy and The Netherlands, as in England and Wales, drinking water regulations come under general water management and water supply laws more closely linked to environmental matters.

4.2 Implementation of Directive 80/778/EEC

Standards for drinking water quality across the European community were established by the 1980 Directive relating to the quality of water for human consumption (Drinking Water Directive - 80/778/EEC, currently under revision). Member States were required to transpose the Directive into national legislation and set up the necessary administrative procedures by 1982, and to comply with the standards by 1985.

Table 4.2 summarises the implementation into national legislation, subsequent amendments and the reasons for them.

All countries reviewed have implemented the Directive. With the exception of Denmark, where the Directive was transposed in 1980 (though amended in 1983 and 1988 to bring it in line with the Directive), none complied with the time scale required by the Directive. Most did so with considerable delays (France in 1989 after European Court of Justice (ECJ) action was initiated) and several were requested by the Commission to amend the national regulations on the grounds of incomplete and/or incorrect implementation (see also Section 8.1).

In response to action by the European Commission through the ECJ, France amended some parameters (1990) and withdrew circulars in 1997 concerning derogations; Germany issued revised regulations in 1990, adding and tightening several parameters and revising the article on derogations; whilst The Netherlands amended the monitoring requirements in 1994 in response to threatened ECJ action.

Table 4.1 Legal framework for drinking water supply in six EU Member States

Country	Legislation - Main Law/Act	Drinking Water Regulations	Official Guidelines
Denmark	Water Supply Act 1978 (Act No. 299, 1978) amended in 1982, 1984, 1985, 1987, 1989, 1991, 1992, 1995 (none of these amendments concerned the quality of drinking water).	Statutory Order (SO) No. 515 of 29 of August 1988 on water quality and supervision of water supply plants (superseding SO 6 of 6 January 1980, amended by SO 468 of September 1983).	Danish EPA Guideline No.3 (1990) on water quality and supervision of water supply plants. Two circulars on drinking water quality from Ministry of the Environment (No.100 of 26 July 1984 and No. 82 of 11 July 1986).
France	Code de la Santé Publique (Articles L19-25.1) specifies that anybody supplying water to the public is under obligation to ensure that this water is fit for human consumption.	Decree 89/03 implements the EC Directive 80/778EEC, and was amended in 1990. The Decree requires that water for human consumption must comply, at the point of supply, with the quality requirements of the decree, as specified in Annex 1.1. In addition, it must not show any deterioration in its quality.	Circulars No. 717 of 12 April 1990 and No. 1325 of 9 July 1990 authorised nitrate, atrazine and simazine to exceed MAC laid down in the EC Directive; these were withdrawn in 1997 due to ECJ action. Circulars concerning derogations for lead and organohalogen compounds.
Germany	Federal Act on Foods and Essential Goods 1974 (<i>Bundes-Lebensmittel- und Bedarfsgegenständegesetz</i>) last amended 1993, and Federal Epidemics Act 1979 (<i>Bundes-Seuchengesetz</i>).	Drinking Water Regulations 1990 (Trinkwasserverordnung - TrinkwV) (as amended 1993) - gradual implementation in the former East Germany with full implementation on 1 October 1995.	Guidelines from the Federal Ministry of Health and Department of Health in case of breaches of a) toxicological standards, b) nitrate, and c) pesticides, and on the interpretation of Article 4 of the TrinkwV 1990 relating to derogations.

Country	Legislation - Main Law/Act	Drinking Water Regulations	Official Guidelines
Italy	Galli Law - Law 36 of 14 January 1994 (Disposizione in materia di risorse idriche).	Presidential Decree 236 of 24 May 1988.	Decreases relating to derogations for undesirable substances and organoleptic properties (1988, revised 1992), pesticides and related substances (1989), and organo-chlorine compounds (1991); the decrees relating to pesticides and organo-chlorine compounds have now been withdrawn.
The Netherlands	Water Supply Law 1957 (<i>Waterleidingwet</i>) last amended 1994.	Water Supply Decree 1960 (<i>Waterleidingbesluit</i>), last amended 1994.	VEWIN Code of Practice for dealing with breaches of the pesticide standard, other codes of practice/recommendations are in preparation.
Spain	General Law 14/1986 on Health.	Royal Decree 1138/1990 of 14 September 1990 (Technical Sanitary Regulations on Drinking Water Supply and Quality Control for Human Consumption).	none

Table 4.2 Implementation of Directive 80/778/EEC, amendments and reasons for amendments

Country	Implementation of 80/778/EEC	Amendments	Reasons
Denmark	Statutory Order (SO) No 6 of 6 January 1980	Amended September 1983 (SO 468), and replaced by SO No. 515 of 29 August 1988 on water quality and supervision of water supply plants.	To bring regulations in line with Directive with respect to monitoring requirements.
France	Decree 89/03 (1989)	Amended in 1990 to tighten some limits, several circulars issued permitting derogations, but those on nitrate and pesticide derogations withdrawn in 1997.	In response to ECJ action, concerning incomplete implementation (some guide levels instead of MAC, some MACs less stringent than Directive); Circulars withdrawn in response to ECJ action.
Germany	Drinking Water Regulations 1986 (Trinkwasserverordnung - TrinkwV) - and 1990 revision; gradually implemented in the former East Germany, with full implementation on 1 October 1995.	Revision and new issue of Drinking Water Regulations 1990 (Trinkwasserverordnung - TrinkwV), mainly <ul style="list-style-type: none"> • inclusion of missing parameters; • tightening of some parameters; • revision of article relating to derogations. (1993 amendment relates to reorganisation/renaming of responsible Ministry only).	In response to European Court action, concerning incomplete (missing parameters) and incorrect (derogations) implementation.

Country	Implementation of 80/778/EEC	Amendments	Reasons
Italy	Presidential Decree 236 of 24 May 1988	No amendment, although decrees were issued relating to derogations, some of these were later withdrawn.	Decrees issued because of difficulties in complying with certain parameters, withdrawn to bring in line with Directive (judged illegal by Italian court).
The Netherlands	1984 Amendment of the Water Supply Decree 1960 (<i>Waterleidingbesluit</i>)	Amended in 1994 to revise monitoring requirements. (Many other amendments not concerned with water quality).	In response to threatened action by the European Commission.
Spain	Royal Decree 1138/1990 of 14 September 1990 (Technical Sanitary Regulations on Drinking Water Supply and Quality Control for Human Consumption)	No amendment.	-

4.2.1 Provisions for the former East Germany

After re-unification of Germany in 1990, special legal provisions were made for the former Eastern Germany (GDR) which faced particular difficulties in complying with the Drinking Water Regulations of the former Western Germany (FRG). These provisions were based on the Directive 90/656/EEC (on the transitional measures valid in Germany for certain Community Directives relating to environmental protection) which was transposed in Germany by the *EG-Rechts-Überleitungsverordnung* of 18 December 1990. Within this legal framework, implementation of the FRG Drinking Water Regulations was delayed to 31 December 1992, up to which time the old GDR regulations remained in force. Many parameters prescribed in the EC Directive and FRG Regulations were missing from the old GDR regulations, e.g. pesticides and several toxic elements (see Appendix D, Table D2 for more detail).

The compliance requirement for many parameters was further delayed, as follows:

- The Limit Value (LV) for cadmium to come into force on 1 October 1993;
- The Lvs for arsenic, lead, mercury, nitrate, pesticides, PCBs/PCTs, colour, turbidity, threshold odour concentration, iron and manganese to come into force on 1 October 1995;

4.2.2 National standards

The water quality standards specified in the Directive have broadly been adopted unchanged, though there are differences among Member States and some have prescribed stricter standards for certain parameters, or prescribed maximum admissible concentrations (MACs) or similar standards, where the Directive only indicates guide values.

Annex I lists all national parameters compared with those of the EC Directive. Differences are highlighted (in bold). Differences involving less stringent national requirements than MACs set in the Directive, are minor, e.g.

- Germany has no taste parameter;
- Italy has no MAC for potassium;
- Germany has no value for dry residue;
- France and the UK have no dissolved oxygen parameter;
- Spain has only provisional values for the pesticides parameter;
- Germany effectively has a higher limit for PAH by about 10% by virtue of its definition in terms of 'carbon' rather than 'PAH'.

The Regulations in Germany set out Limit Values (LVs) together with permitted margins of error; effectively this means that the MACs in terms of the need to report breaches of

standards, are equal to the LVs plus the (upper) margin of error; for example the LV for individual pesticides is $0.1 \mu\text{g l}^{-1} \pm 0.05 \mu\text{g l}^{-1}$, therefore the MAC effectively becomes $0.15 \mu\text{g l}^{-1}$.

4.3 Control of Drinking Water Quality

The responsibilities for overseeing and enforcing compliance with drinking water quality standards is summarised in Table 4.3.

Overall responsibility at national level lies predominantly with the ministries concerned with health (four countries: France, Germany, Italy and Spain) and the environment (two countries Denmark and The Netherlands). However, the Ministry of the Environment also has a degree of involvement in Germany and Italy.

Direct supervision and enforcement is organised in a variety of ways. In all countries, the focus is on health administration. The system in The Netherlands, where Regional Public Health Inspectors and one National Coordinator are overseeing water companies which carry out their own monitoring, seems to be closest to the system in England and Wales.

The responsibility for direct supervision and enforcement is mainly through regional health administrations in France, Spain, The Netherlands and Denmark (though local authorities also have considerable involvement in Denmark) and predominantly at local level in Germany and Italy. However, the institutional mechanisms in Italy are presently undergoing a major reorganisation, involving increased centralisation (to provincial and regional levels).

Compliance monitoring is carried out exclusively by the enforcement agencies (DDASS) in France, by laboratories appointed by the enforcement agencies (County Councils) in Denmark, and exclusively through self-monitoring in The Netherlands. A variety of approaches characterises the other three countries, including combinations of monitoring by health authorities, appointed (some certified) laboratories, and some shared responsibilities between water suppliers and authorities, as well as self-monitoring.

Table 4.3 Responsibilities for water quality monitoring, supervision and enforcement

Country	Overall Responsibility at National Level	Direct Supervision/Enforcement	Compliance Monitoring	Reporting of Results
Denmark	<ul style="list-style-type: none"> • Ministry of Environment, • Environment Protection Agency. 	<ul style="list-style-type: none"> • County Councils are responsible for controlling the quality of water supplies; each appoints a Public Health Officer who should be consulted if standards are exceeded; • Municipalities also have direct responsibilities of inspection and enforcement of quality standards (for their own supplies). 	<ul style="list-style-type: none"> • Laboratories appointed by the County Councils carry out the analyses, • Municipalities have to submit samples to these laboratories. 	<p>Laboratories report results to:</p> <ul style="list-style-type: none"> • water supplier • local authority (municipality) • regional authority (County Council, County Public Health Officer) • local public health officer.
France	<ul style="list-style-type: none"> • Ministry of Social Affairs and Health, • High Council for Public Hygiene may be consulted. 	<p>Departmental Offices of the Ministry of Health (DDASS): Departmental Prefect.</p>	<p>DDASS</p>	<p>The Departmental Prefect is required to send results of compliance monitoring to:</p> <ul style="list-style-type: none"> • Mayor of each municipality, and/or • the presidents of syndicates where municipalities have organised joint operation of water supply.

Country	Overall Responsibility at National Level	Direct Supervision/Enforcement	Compliance Monitoring	Reporting of Results
Germany	<ul style="list-style-type: none"> • Federal Ministry of Health (advised by Federal Department of Health and Federal Department of Environment), • Health Departments of each Federal State (in appropriate ministry, this varies from state to state). 	<p>Local Medical Officer (Amtsarzt) who is head of the local health authority, although certain matters (e.g. concerning derogations) are referred to the Highest State Authority of each Federal State (e.g. State Health Department).</p>	<p>A variety of approaches which varies from state to state, and within states:</p> <ul style="list-style-type: none"> • Health Authorities' own laboratories (state, regional or district level); • Laboratories appointed (some certified) by the administration; • some self-monitoring by water suppliers. 	<p>Results have to be reported to</p> <ul style="list-style-type: none"> • the Local Medical Officer, • the water supplier (where appropriate), • State Health Department and/or Federal Ministry of Health in cases of derogations, Traditionally, there has not been any formal system of reporting (except in cases of non-compliance) but the authorities are now putting systems in place for the purpose of reporting to the Commission.
Italy	<p>Ministry of Health (National level) the Ministry of Environment also has a role, mainly where environmental matters affect water quality (e.g. decrees on derogations), and the Ministry of Public Works.</p>	<ul style="list-style-type: none"> • Local Health Departments (Unita Sanitaria Locale - USSL), • Provincial and Regional authorities also have some involvement, • The institutional framework is currently undergoing extensive re-organisation and rationalisation involving more centralisation (Provincial and Regional level). 	<ul style="list-style-type: none"> • The USSL carries out so-called 'sanitary controls', mainly at point of supply (compliance controls) • Water suppliers carry out so-called 'internal and preventative controls', i.e. analyses of raw water, treated water ex works and from the distribution system. <p>Sampling programmes may be agreed annually between the USSL and water suppliers (Lombardia Region).</p>	<p>Results should be reported to:</p> <ul style="list-style-type: none"> • Provincial Health Authority, • Regional Authority, • Ministry of Health and Ministry of Environment (in case of non-compliance) <p>In practice it is not clear how much of this reporting does take place.</p>

Country	Overall Responsibility at National Level	Direct Supervision/Enforcement	Compliance Monitoring	Reporting of Results
The Netherlands	<ul style="list-style-type: none"> • Ministry of Housing, Physical Planning and Environment (VROM) with assistance from the • National Institute of Public Health (RIVM). 	Regional Public Health Inspectors (RHI) and one National Coordinator.	<ul style="list-style-type: none"> • Self-monitoring carried out by water companies • occasional checks by RIVM mainly in case of problems (previously regular checks, recently abandoned in favour of introducing quality control schemes at water companies). 	Results are reported to the RHI (on an annual basis, or immediately in case of non-compliance).
Spain	Ministry of Health and Consumption (Ministerio de Sanidad y Consumo)	Regional Health Administration (or Regional Health Authority).	There are different approaches: <ul style="list-style-type: none"> • Self monitoring by water suppliers (large companies), • Regional Health Administrations through municipal and regional laboratories. 	Results are reported to the Regional Health Administration if carried out elsewhere.

5. PUBLICATION OF DRINKING WATER QUALITY REPORTS - COMPLIANCE

Information on compliance with national drinking water standards is scarce in the countries studied; the situation is summarised in Table 5.1 which includes comments on compliance with standards. Even where data are available, the format differs widely, both between countries and from area to area within a single country (e.g. non-compliance in terms of samples analysed, size of water supply works, population affected, different time periods etc.); consequently no reliable comparisons between countries can be made. Moreover, in view of the lack of data, and particularly the absence of any time series of data, it is not possible, in most cases, to comment on whether improvements have been made in recent years.

5.1 Drinking Water Quality Reports

Only one country, The Netherlands, publishes an annual, national report on drinking water quality (DWQ), similar to, although less detailed than, that produced by DWI for England and Wales.

France produced a national summary report in 1993 (covering data for 1989 to 1990) in preparation for the EU requirement for reporting under Directive 91/692/EEC. Other national surveys have been published in France for specific parameters, such as lead, nitrate, and triazines. One report from a French regional health department (DDASS) has been obtained which contains compliance data.

No national DWQ reports are produced in Denmark, Germany, Spain or Italy, although national databases of drinking water quality are being compiled, at least in Denmark, Germany and in Spain. However, in general, the information on these databases seems to be collated mainly for the purpose of reporting to the European Commission, and does not appear to be available to the public, although in Spain the data may be used to answer requests for information from the public or consumer associations. In Denmark, the regional councils collect the monitoring data and forward these annually to the Danish Environment Agency, where it is kept on a database.

In Germany, national reports on water management include a small amount of general information on the state of water supply in each of the Federal States (Länder). However, in the most recent report, only one of the 16 States included a minimal amount of summarised compliance data. In addition, the most recent, national report on the state of the environment (1997) included summarised compliance data for drinking water for 13 of the 16 Federal States, covering the years 1993, 1994 and 1995; some separate information on compliance in the former East German States was also included, but in a different format and, hence, not directly comparable with the other data. Some health authorities of individual Länder (e.g. Baden-Württemberg) publish annual reports, with some summarised compliance data (without identification of water suppliers).

Table 5.1 Publication of drinking water quality (DWQ) reports and compliance with standards

Country	Publication of reports	Compliance with standards
Denmark	<p>No national report - although there is an Environment Agency database of DWQ monitoring data supplied annually by regional councils.</p>	<ul style="list-style-type: none"> • No information on large supplies; • Considerable problems with contamination of groundwaters from intensive agriculture and industrial pollution, affecting particularly small and private supplies (bacteria, nitrate, pesticides, industrial chemicals) where minimal treatment or no treatment is used.
France	<p>National summary report produced in 1993 (covering 1989-1991), plus some national surveys for specific parameters (lead, nitrate, triazines).</p> <p>One recently produced regional health department (DDASS) report contains DWQ compliance data.</p>	<ul style="list-style-type: none"> • Major problems seem to be microbiology, nitrate and pesticides; • 1993 national report indicates 99.7% compliance in terms of samples analysed in 1989-1991, but covers large supplies only (>10,000 population served), microbiological results for 1991 only, and excludes lead and pesticides; • Regional report (1991-1995 results): water non-compliant with the microbiology parameters was supplied to 7% of the population, non-compliant with the nitrate parameter to 4% of the population, and non-compliant with the pesticides parameter to 6% of the population.
Germany	<p>No national report - though a national database is being compiled for the purpose of reporting to EU Commission.</p> <p>Annual national water management reports and 1997 environmental data report contain a small amount of information on drinking water quality, but no consistent reporting format for different Federal States;</p> <p>Annual reports of individual Federal State health authorities may also contain some information on DWQ.</p>	<ul style="list-style-type: none"> • National data (works supplying >5,000 population, data from 13 of 16 Länder 1993-1995) indicate considerable levels of non-compliance for the microbiological parameters (0.2-0.7% of total compliance samples), nitrate (2.3-3.4% of samples) and nitrite (0.1-0.5%); no data were given for pesticides. • In the former East Germany, considerable improvements have been made since re-unification, but at the end of 1995, a small proportion (<0.1%) of the population still received water non-compliant with a toxic parameter (List D of Directive 80/778/EEC), 0.6% received water which exceeded the nitrate parameter, and most other parameters were exceeded, particularly at relatively small treatment works. • Significant problems with the microbiological parameters, nitrate and pesticides in small and private supplies.
Italy	<p>No national report - compliance data have to be reported to the Ministry of Health on an annual basis.</p> <p>Some Regions may produce occasional reports, but these do not seem to be available to the public.</p>	<p>There seem to be widespread compliance difficulties with microbiology, pesticides, nitrate, organo-chlorine compounds and heavy metals (several decrees were issued, allowing derogations, but these are gradually being withdrawn).</p>

Country	Publication of reports	Compliance with standards
The Netherlands	National report published annually - less detail than UK.	<ul style="list-style-type: none"> • Generally high levels of compliance; • Some problems with hardness, manganese and iron in raw waters (usually long-term derogations issued because not considered a health risk); • Relatively frequent non-compliance with the organo-chlorine parameter ($1 \mu\text{g l}^{-1}$) which, in national legislation, applies to THMs etc., but the risk of these are usually balanced against the risks of not using disinfection, and derogations are normally issued; • Infrequent short-term non-compliance with microbiological, ammonia, nitrate, pesticides parameters, mainly due to process failures.
Spain	No national report - national database is being compiled.	<ul style="list-style-type: none"> • Main problems: microbiology, nitrate, nitrite, ammonia; • Recent survey indicated non-compliance ranging from 0.5-19.2%, depending on Health Area and parameters analysed; 4% of total samples analysed failed to comply in the Madrid area.

In Italy, official compliance data have to be reported to the Ministry of Health on an annual basis; in case of breaches of standards, details of remedial measures must be added. At least one of the Regions of Italy, Lombardia, prepares occasional, statistical reports from data received from provincial health services. It seems that none of these data are publicly available.

Some water suppliers publish annual reports which include water quality data, but this varies from country to country and between water suppliers/water companies. Such reports may be produced in the interests of customer relations and will, at best, include annual average results. They are unlikely to contain all parameters and will almost certainly not contain any non-compliance results, although some companies may refer to problems and solutions, such as shutting down wells, or installing better treatment works. (see also Section 7 on consumers' rights). In France, consumers can have direct access to data from some of the large water companies via a computerised system, MINITEL.

5.2 Compliance with Drinking Water Standards

Due to the scarcity of published data on drinking water quality, it is not possible to assess the overall level of compliance with prescribed standards in most countries. Moreover, even where data are available, presentation varies widely, making it very difficult to compare compliance from one country to another; even data from different regions of one country may be presented differently in national summary reports, as for example in Germany.

However, there is evidence of compliance problems in all countries studied, particularly in the case of microbiology, nitrate and pesticides (see Table 5.1). The available information is discussed below.

5.2.1 Denmark

There seem to be considerable problems in Denmark where many private wells with no treatment installations are in use. The director of the Danish Water Supply Association has indicated that many groundwater sources in Denmark are contaminated as a result of intensive agriculture, and that 70% of private supplies (equivalent to 5% of total supplies) do not comply with the standards for bacteria and nitrate. Industrial pollutants are also giving rise to non-compliance in many small or private supplies. The Danish government has just announced funding for remedial actions for private wells where drinking water does not comply with standards set in the EC Directive (ENDS Daily, 18/12/97).

Judging from the use of derogations for nitrate (see Section 6.1.3) problems do not seem to be restricted to small supplies.

5.2.2 France

A national report from France, covering 1989, 1990 and 1991, indicated 99.7% compliance overall in terms of samples analysed. However, the report covered results

from large supplies only (greater than 10 000 population served, equivalent to 63.5% of the population, but only 3.4% of the number of supply zones), mainly groundwater sources, and excluded lead and pesticides; the microbiological parameters were included for 1991 only. Using a compliance criterion of 95% of samples per supply zone for the microbiological parameters (faecal coliforms, streptococci, sulphate-reducing bacteria) and 90% for total coliforms, 13% of zones failed to comply with the microbiological parameters (representing 3.5 million inhabitants). For nitrate, about 3.9 million inhabitants (89 zones, 9.5%) were supplied with drinking water exceeding the limit on at least one occasion in the period covered by the report.

More detail, including information from a recently published regional report, covering the period 1991 to 1995, is presented in Section F4 - Appendix F. These data indicated an average of 7% of the population receiving drinking water non-compliant with the microbiological standards, 4% not complying with the nitrate standard, and 6% not complying with the pesticides parameter. An increasing trend for compliance was reported for the period for microbiology and pesticides, but not for nitrate. It was reported that long-term measures to reduce input from agriculture and wastewater were in place.

Another, yet unpublished report (see Section F4, Appendix 4), which appears to be highly critical of water management in France, suggested that in the whole of France, 5.1 million people (about 9%) received water not complying with the microbiological standards, and 1.6 million people (about 2.8%) were supplied with water which exceeded the nitrate limit. This information seems to be broadly in line with official, already published data.

5.2.3 Germany

National data (works supplying >5,000 population, data from 13 of 16 Länder 1993-1995) indicate considerable levels of non-compliance for the microbiological parameters (0.2-0.7% of total compliance samples), nitrate (2.3-3.4% of samples) and nitrite (0.1-0.5%). Over the three year period, the non-compliance rate for most parameters seemed to be increasing; but no explanation was offered as to the reason. No data were given for pesticides, nor any information on the population affected by non-compliance.

In the former East Germany, special regulations were introduced to deal with its particular problems, and to postpone full compliance requirements until 1995 (on reunification, about 10% of the population received water exceeding the limit for a toxic substance - List D of Directive 80/778/EEC). Although full compliance has not been achieved, considerable progress seems to have been made with the help of investment in new treatment facilities, construction and renovation of distribution networks, and the closure of many small community and private supplies. However, by the end of 1995, about 0.1% of the population still received water non-compliant with a toxic parameter, 0.6% received water which exceeded the nitrate parameter, and most other parameters were exceeded in some supplies (see Appendix D, Table D4).

There are still a large number of small and private supplies in many parts of Germany (former East and West); these supplies receive little or no treatment and there seem to be

considerable levels of non-compliance with the microbiological parameters, nitrate and pesticides in water from such wells.

With the exception of the former East Germany, where considerable improvements have clearly been achieved since 1990, it is difficult to comment on trends in drinking water quality. Overall, the emphasis in Germany is on implementing long-term measures aimed at source protection, rather than resorting to extensive treatment options. This was recommended by the Federal authorities in their guidance notes on dealing with non-compliance. Such measures include the implementation of extensive groundwater protection schemes, stricter controls on pesticides (the use of atrazine was banned in 1991) and collaboration schemes with farmers, including compensation schemes, aimed at reducing pesticide and fertiliser applications.

Although of a long-term nature, these measures seem to be beginning to show results. For example, results of the extensive groundwater monitoring scheme, started in Baden-Württemberg in 1990, indicated a significant decreasing trend in atrazine levels for the first time in 1996.

Other measures have resulted in improved surface water quality, i.e. strict legislation on discharges and investment in effluent treatment.

Nevertheless, it has also been recognised that, in many cases, short-term improvement measures were needed to achieve compliance. Such measures involved

- the closure of small supplies and wells, and their replacement with larger treatment works and long-distance distribution systems;
- exploitation of deeper groundwaters;
- mixing of supplies; and
- treatment options, e.g. activated carbon to remove pesticides.

5.2.4 Italy

Most Italian Regions seem to have compliance difficulties, either caused by agriculture, industrial pollution or for hydrogeological reasons; these concern mainly pesticides, nitrate, microbiological parameters, organo-chlorine compounds and heavy metals. In response to these problems, the Italian Ministry of Health has issued Decrees (legal instruments) allowing derogations up to higher, specified limits (see also Section 6); these have been widely applied in practice, but are gradually being withdrawn because it has been recognised that these are not in compliance with the requirements of the EU Drinking Water Directive.

5.2.5 The Netherlands

The national reports available from The Netherlands are not sufficiently detailed to determine whether there has been any improvement in drinking water quality. In both recent reports (covering the years 1994 and 1995) the authors concluded that the quality was good overall, but they pointed out the need for increased source protection, optimisation of pesticide usage, and harmonisation of monitoring across all water companies. The parameters which were frequently exceeded, and repeatedly in the same supply, were mainly related to raw water quality and concerned non-toxic substances for which derogations were issued, i.e. hardness, manganese, iron. In addition, a large number of non-compliances were observed due to trihalomethanes (THMs) which, in The Netherlands, are subject to the non-pesticide organo-chlorine parameter (MAC $1 \mu\text{g l}^{-1}$ for individual substances). However, in such cases, derogations may be issued if disinfection is necessary, and if any health risk from disinfection byproducts is considered less than that associated with supplying the water without disinfection or cutting off the supply. Other limits, including microbiological parameters, ammonia, nitrate, and pesticides, were generally exceeded on a less frequent basis, and said to be short-term and due mainly to process failures.

On the whole, it seems that much has been achieved in The Netherlands through co-operation between the enforcement authorities and water suppliers, general openness and maintenance of good consumer relations, since, ultimately, elected local governments are responsible for water supply. Consumers tend to respond to perceived problems by exerting political pressure, rather than through court action.

5.2.6 Spain

Spain appears to have problems, particularly with the microbiological parameters, and nitrate, nitrite and ammonia; short-term remedial measures are normally applied, or derogations issued (nitrate). A recent survey indicated non-compliance ranging from 0.5% to 19.2% of samples (depending on Health Area and parameters analysed). In the Madrid Region, on average, about 4% of the total samples analysed failed to comply.

6. ENFORCEMENT PROCEDURES

All countries reviewed have incorporated Articles 9 and 10 of the Drinking Water Directive (concerning derogations for geological reasons, unusual meteorological conditions, and authorisation of revised limits in emergency situations, respectively) into their national drinking water regulations, except Denmark, which has only transposed Article 9 (see below). Extensive use is made of these provisions, it seems, in a wider sense than permitted by the Directive.

It is clear that all countries give overriding importance to maintenance of supply, provided that consumers' health is not considered to be at risk if the supply is continued. In cases of microbiological contamination (or suspected contamination), boiling notices are normally issued whilst the problem is investigated and rectified (usually by (additional) disinfection of the supply and distribution system). It is also generally recognised that breaches of chemical standards do not normally constitute an immediate health risk, and that relatively long-term improvement measures are usually adequate. All countries studied, except The Netherlands, have made extensive use of derogations in cases not envisaged by the provisions of the Drinking Water Directive, e.g. for long-term breaches of limits for nitrate, pesticides and other undesirable or toxic substances (listed in Annexes C and D of the Directive). The derogations are normally accompanied by improvement measures and time limits. Other forms of authorisation of temporary breaches of standards are also applied in all countries, though mainly on a relatively informal basis, together with informal agreements relating to improvement measures.

In France and Italy, Circulars or Decrees with legal status were issued giving permission, in principle, to exceed limits for many problem parameters, including nitrate and pesticides, up to prescribed maximum levels which were considered acceptable in terms of health risk. Most of these have, however, been withdrawn or amended recently, partly in response to pressure from the European Commission, although practice does not seem to have changed much.

The Federal authorities in Germany (Ministry of Health, Department of Health) have issued several guidelines which have no legal standing, but these recommend upper limits, based on health considerations, for derogations or other forms of authorisation of breaches of standards, for example pesticides, nitrate and other 'undesirable or toxic' substances.

In The Netherlands, the Regional Public Health Inspector agrees the improvement measures with the water supplier and subsequently controls its implementation and completion. This system most closely resembles the system of enforcement through 'undertakings' in England and Wales. However, the contact between Regional Inspector and water supplier is informal (details of improvement plans are recorded in letters and minutes of meetings) although the option of a formal 'Order' is available but rarely used.

Improvement measures range from additional treatment and mixing of supplies, to finding new sources and protection of water sources, such as restrictions in the use of fertilisers

and pesticides. On the whole, these measures seem to be agreed, implemented and controlled on a relatively informal basis.

The legal basis and practice in each country are briefly outlined below and summarised in Table 6.1; more detail on each country is provided in the Appendices.

6.1 Denmark

6.1.1 Legal basis

Denmark seems to have made extensive use of derogations in a broader sense than that laid down in the EC Drinking Water Directive. Moreover, it seems that transposal of Articles 9 and 10 of the Directive into Danish legislation (Danish Statutory Order 515, 1988 on water quality) is inaccurate, i.e.

- There is no restriction in the Danish Order to limit derogations so that they do not constitute a health risk;
- There is no requirement for notification to the Commission (or national authorities) even if derogations relate to a daily supply of 1000 m³ or more, or affect more than 5000 consumers;
- There is no reference to ‘emergency’ situations and the notion that derogations may be issued only if an alternative supply cannot be provided, nor to time limits, as set out in Article 10 of the Directive.

6.1.2 Official guidelines

Danish EPA guidelines on procedures concerning breaches of water quality standards, recommend that supply may continue if the levels are acceptable (it does not seem to specify on what grounds); that remedial measures such as technical changes in operations or finding an alternative supply be investigated and implemented if considered necessary.

6.1.3 Practice

The responsibility for enforcement lies with the County Council which appoints laboratories to carry out compliance monitoring. In practice, however, municipal authorities have considerable discretion to order actions, such as closure of a supply or remedial measures, if the quality of a water supply does not comply with standards. If a breach of a standard is considered minor, for example due to a pollution incident in the area, and it is considered possible that water quality will be restored in time, additional monitoring to check developments may be the only measure required.

Table 6.1 Enforcement procedures

Country	Organisation which has the power/duty of enforcement	Enforcement procedure	Checks on improvement measures/compliance	Action if improvements are not carried out/compliance not achieved
Denmark	<ul style="list-style-type: none"> • County Councils (in consultation with the county Public Health Officer if necessary) • Municipal authorities also have certain enforcement powers and are involved in decisions concerning actions in case of non-compliance. 	<ul style="list-style-type: none"> • Derogations have been widely used, even for pesticides and nitrate; • Derogations are issued by the County Council, and include conditions (Administrative Orders) for remedial measures and time limit; • Approval to exceed a standard may also be granted by County Council; • Some non-compliances/remedial measures are dealt with directly/informally by the Municipal authorities; • Danish legislation does not require reporting of derogations to national body, even if more than 5,000 consumers are affected. 	<ul style="list-style-type: none"> • The County Council is responsible for checking progress with remedial measures, as indicated by the results of compliance monitoring. • Municipal authorities have duties to inspect works and monitor progress of improvement measures. 	<ul style="list-style-type: none"> • Derogations may be extended up to 5 years, or persistent non-compliance referred to the EPA; • The Danish EPA can issue ‘Orders’ requiring a municipality to supply water which complies with national standards; • There appear to have been no court actions brought by authorities against water suppliers. • Enforcement does not seem to be very effective as the same authorities are involved in provision of supply and enforcement.
France	<p>Departmental Prefect: overall supervision and enforcement (where necessary in consultation with Departmental and local health and medical authorities, e.g. Departmental Health Council).</p>	<ul style="list-style-type: none"> • Derogations by Prefectoral Order have been widely used, even for nitrate, pesticides, lead, etc.; linked to improvement plans agreed between water supplier and Prefect; • Official Circulars gave ‘blanket’ permission to exceed certain problem parameters up to specified limits considered acceptable in terms of health risk; Following recent withdrawal of the Circulars, practice remains similar, i.e. authorisation of breach of standard whilst implementing remedial measures, but includes warning public of any health risk. 	<ul style="list-style-type: none"> • The Departmental Prefect monitors progress with improvement programmes; • The Mayor also has responsibilities for monitoring compliance and has certain enforcement powers. 	<ul style="list-style-type: none"> • The Prefect can serve formal notice on water suppliers requesting compliance; • If compliance is still not achieved, the Prefect can take over control and implement necessary measures at the supplier’s cost.

Country	Organisation which has the power/duty of enforcement	Enforcement procedure	Checks on improvement measures/compliance	Action if improvements are not carried out/compliance not achieved
Germany	<p>Local Medical Officer (head of local health authority) and State Health Department (of each individual State)</p>	<ul style="list-style-type: none"> The Local Medical Officer (LMO) decides on immediate measures, and may authorise breach of a limit whilst improvement measures are implemented; Formal derogations (Ausnahmeregelung) may be issued by the LMO or by the State Health Department (on request of LMO) depending on the State and issue; Official, Federal guidelines recommend upper limits and time-limits for breaches of standards for nitrate, pesticides and other toxic substances, linked to improvement programmes. 	<ul style="list-style-type: none"> In the first instance, the LMO monitors progress with improvement measures - in close liaison with the water supplier; the State Health Department may also be involved, depending on the issue and the State concerned; <p>In some cases, other authorities are also involved, e.g. where improvement measures include groundwater protection schemes.</p>	<p>Local or State authorities may resort to court action against a water supplier or a Mayor responsible for water supply; this seems to have been applied mainly in cases where a public health risk was perceived, i.e. microbial contamination.</p>
Italy	<p>Local Health Departments with involvement of Provincial and Regional authorities (current re-organisation aimed at more centralised responsibilities) and State Ministries (Health, Environment)</p>	<ul style="list-style-type: none"> The Local Health Department may authorise breach of a standard, linked to improvement measures (after consultation with Regional and State authorities) or may merely request further investigations into the extent of the problem (e.g. groundwater monitoring programme if pesticide limit is exceeded); Derogations based on National Decrees have been widely used by Regional Authorities for pesticides, nitrate, organo-chlorine etc. (linked to improvement programmes); Some Decrees recently withdrawn or replaced, but no change in practice. 	<p>The Local Health Department supervises improvement measures, with involvement of Provincial and Regional authorities where derogations are involved.</p> <p>The Ministries of Health and Environment monitor improvement measures (where derogations are concerned) on an annual basis.</p>	<ul style="list-style-type: none"> It is possible to resort to court action, e.g. against water suppliers or Mayors in charge of water supply where standards have been breached. On the whole, supervision of water quality and enforcement is very fragmented, and does not seem to be effective.

Country	Organisation which has the power/duty of enforcement	Enforcement procedure	Checks on improvement measures/compliance	Action if improvements are not carried out/compliance not achieved
The Netherlands	Regional Public Health Inspectors with one National Co-ordinator	<ul style="list-style-type: none"> The Regional Public Health Inspector must be informed of any non-compliance; The water supplier submits a remediation plan to be agreed with the Inspector who may also issue informal exemption whilst measures are carried out; Derogations may be issued by the Inspector (short-term - 6 months) or by the Ministry of Environment (long-term - 2 years) 	The Regional Public Health Inspector monitors progress, but the emphasis is on professional co-operation, rather than resorting to legal action.	<ul style="list-style-type: none"> The Inspector has the option to issue a formal Order or take over management of a water supply, but this is rarely applied. The Inspector can also inform the news media if a water company does not co-operate; The above options seems to be relatively powerful threats not usually needed in practice, since the ultimate responsibility for water supply lies with elected local and regional governments, consequently the enforcement system seems to be effective.
Spain	Regional Health Administrations (or Regional Health Authority)	<ul style="list-style-type: none"> Derogations may be issued by Regional Health Authorities (not for microbiological or toxic parameters, but includes nitrate) and include reason, exceedence limit and time limit; In other cases of non-compliance, the municipal or regional authorities may merely recommend improvement measures, or the water suppliers and authorities work out immediate measures and improvement plans together; there seem to be no legally binding agreements. 	Regional Health Authority provides advice and monitors progress with improvement measures in cases of exceedence.	There appears to be no set procedure for further action, enforcement plans seem to be informal agreements and there is no evidence of any legal actions to enforce standards, although municipal and health authorities have powers to order any necessary actions or suspend a supply in case of a health risk.

However, if a problem of non-compliance is thought to persist, applications for derogations have to be made to the County Council which can authorise derogations, or issue approval to exceed standards, for pollutants including nitrate and pesticides (after consultation with the Public Health Officer where there may be a health risk). The derogation may be accompanied by conditions (Administrative Order) concerning immediate actions, remedial measures and/or additional monitoring requirements, and a time limit for the derogation. Although the Administrative Order is issued by the county authorities, the municipal authorities (which are also responsible for supplying water) are involved in the decisions concerning derogations and conditions.

With respect to derogations, the term ‘nature and structure of the ground’ is still used to include contaminants introduced from farming, even though the Danish EPA no longer upholds this interpretation. Derogations have been issued, for example for nitrate and pesticides, without reporting to the Commission although more than 5000 consumers were affected. Derogations for nitrate have frequently been issued for a period of time limited to one year for concentrations up to 65 mg l⁻¹, and up to six months for concentrations up to 100 mg l⁻¹, whereas concentrations above this level were considered unacceptable for human consumption.

The current practice for pesticides involves increased monitoring if concentrations reach 0.05 µg l⁻¹ (one sample every six months; normal frequency is one sample every two years). If the concentration of any pesticide in a well exceeds 0.1 µg l⁻¹, and another source of supply is available, the well is closed. If no other source is available, water is still abstracted and supplied but with restrictions; for example water for drinking is supplied by alternative means, such as deliveries by tanker.

The municipal authorities have a duty to inspect water supply works and monitor progress with remedial measures, whilst the County Council is responsible for checking progress as indicated by compliance monitoring. If compliance is not achieved in the time period given in the derogation, the time limit may be extended (up to 5 years), or the matter may be referred to the EPA which can issue an ‘Order’ to a municipality requesting it to supply water which complies with national standards. There appear to have been no court actions taken by enforcement agencies against water suppliers.

On the whole, it seems that enforcement is not particularly effective, as there are no clear distinctions between the authorities responsible for enforcement (County Council) and those responsible for supply (municipal authorities), with the latter having considerable discretion in dealing with breaches of standards.

6.2 France

6.2.1 Legal basis

The legal requirements of the French Decree (No. 89-3) are similar to those of the Directive. However, derogations have been used extensively, backed by official ‘Circulars’ with legal standing, allowing breaches of many parameters, including nitrate,

pesticides, lead, organo-chlorine compounds etc., up to limits considered safe to the consumer (issued by the Ministry of Health in 1990). These Circulars have recently been withdrawn in response to court action by the European Commission, but practice remains similar.

Under the Circular of 12 April 1990 regarding triazines, derogations for breaches of standards were authorised, in principle, as long as the concentrations measured were below WHO guidelines (although simazine concentrations up to $17 \mu\text{g l}^{-1}$ were permitted) on the basis that a prevention programme and remedial measures, such as treatment or blending, were implemented.

6.2.2 Official guidelines

In the case of non-compliance with microbiological parameters, confirmation of the result has to be carried out immediately. If the second analysis confirms non-compliance, the DDASS (Departmental Offices of the Ministry of Health) advises disinfection or flushing of the distribution system. If it is not confirmed, no action needs to be taken, though in both cases, the breaches of standards must be reported to the public.

Following withdrawal of the Circulars, new, formal, written guidelines were published in an interministerial letter of 22 February 1997 governing exceedence of the pesticide parameter, but the Circular on nitrate has not been replaced.

The new ministerial guidelines concerning the pesticides parameter recommend that breaches of standards can be authorised under point 3.1 of the Decree, namely for situations arising from the nature and structure of the ground. It requires the water supplier to take all necessary measures to protect consumers within a timescale specified by the Departmental Prefect. Necessary measures include informing the population of the nature and risks associated with consuming the water and the drafting of an improvement programme with a timescale for implementation. The improvement programme can consist of changing the source of a supply, blending of water or applying treatment. Preventative actions must also be carried out such as limiting the use of pesticides for agricultural and non-agricultural uses in water protection zones and water abstraction areas. Prefects can impose these limitations (or bans) on the use of certain pesticides, if monitoring reveals concentrations 20% above WHO guideline values.

In the case of 'nitrate', the cancellation of the 1990 Circular has left a gap in current practice as the standard for nitrate is frequently exceeded. However, it appears that the advice currently given by the DDASS is the same as that given in the 1990 Circular, i.e.:

- It was recommended that water did not present any risk for health for concentrations between $50\text{-}100 \text{ mg l}^{-1}$, except for children aged less than six months and pregnant women. If concentrations exceeded 100 mg l^{-1} , water should not be consumed;

- As soon as nitrate concentrations were above 50 mg l⁻¹ or if concentrations were regularly increasing and above 25 mg l⁻¹, an increase in monitoring had to be implemented;
- Improvement measures had to be implemented as quickly as possible (usually blending of supplies, use of alternative supplies, treatment); and
- The public had to be notified of the health risk involved (since June 1997 water exceeding the nitrate limit has to be declared unfit for human consumption, although supply is maintained.).

For other parameters, discretion is left to the Departmental Prefect.

6.2.3 Practice

The Departmental Prefect is the competent authority for enforcing compliance, for issuing authorisations to use water in case of non-compliance, and to issue derogations (by Prefectoral Order). The Prefect uses the official guidelines (previously the Circulars) and is advised by the DDASS, the Departmental Health Council (*Conseil départemental d'hygiène*) and local medical authorities. In practice, the withdrawal of the Circulars does not seem to have altered the approach significantly.

There is widespread recognition that cutting off water supplies creates more problems than supplying water which is not in compliance with the standards set in the Directive. The MAC is not necessarily taken as an action level for carrying out improvement programmes. A supply for which one parameter hovers around the MAC might not necessarily require action, whilst a supply for which a parameter is showing a steady increase, even if its value lies within the MAC, is investigated and the cause identified. If a parameter exceeds the MAC for two samples in succession, the Prefect (together with DDASS) must decide whether the supply can be allowed to continue. In nearly all cases, it has been considered that there was no risk to health and, consequently, the supply was not cut off. Alternatively, supply may continue and a health warning issued to the public. A temporary derogation or authorisation to breach a standard can be granted by the Prefect. A derogation will normally include conditions relating to improvement measures and a timescale, worked out in collaboration between the Prefect, and the water supplier. The Mayor or private water supplier is responsible for carrying out the measures.

The Departmental Prefect monitors progress with improvement programmes whilst the Mayor also has responsibilities for monitoring compliance and has certain enforcement powers. Other authorities may also be involved, for example with respect to long-term measures, such as restrictions in pesticide usage.

The Prefect can serve formal notice on water suppliers requesting compliance. If compliance is still not achieved, the Prefect can take over control and implement necessary measures at the supplier's cost. Water suppliers can be taken to court, although so far this option seems to have been exercised only by consumers claiming compensation from water suppliers for providing water which did not comply with standards.

6.3 Germany

6.3.1 Legal basis

The Drinking Water Regulations 1990 contain considerable detail on derogations. The earlier Regulations (1986) were revised, in response to European Court action, to bring the provisions on derogations in line with the Directive, i.e. to include the term 'emergency' situation and the reporting requirement.

The microbiological parameters must not be exceeded (or increased over the normal levels in the case of total colony counts) in any case.

Article 15 of the Regulations states that a water supplier or owner of a water works must report without delay to the health authority, the following:

- breach of any microbiological standard;
- breach of any of the chemical standards prescribed in Anlage 2 (includes toxic substances);
- breach of other standards for which monitoring/reporting has been specifically requested by the competent authority; and
- any raw water problems which could lead to non-compliance.

Article 4 sets out the requirements for issuing derogations (*Ausnahmeregelungen*) in respect of chemical parameters. Derogations may be issued in cases of emergency, or where non-compliance is due to geological conditions, or under unusual weather conditions, provided there are no health risks to the consumers. Emergency type derogations may only be issued where no alternative supplies can be provided. In the case of derogations relating to an emergency situation or weather conditions, time limits must be set.

The Highest Authority of a Federal State must be informed of emergency derogations, together with the authorised limit, the estimated time period and the reasons for issuing the derogation. Derogations relating to geological/weather conditions must also be reported, and if water supplies over 1000 m³ of water per day, or at least 5000 consumers are involved, they must also be reported to the Federal Ministry of Health.

Certain exemptions for general water quality parameters (potassium, magnesium, sulphate, ammonia if present due to natural conditions, and silver if used for treatment) are permitted without the need for formal derogations; higher limits for these parameters under these conditions are incorporated into the Drinking Water Regulations.

6.3.2 Official Guidelines from the Federal Authorities

The official explanation relating to derogations defines the term ‘emergency situation’ as follows:

- Sudden difficulties with the supply of drinking water;
- Interruption of supply due to other circumstances.

It is stressed that a lack of supply would constitute a significant health hazard. If the competent authorities decided to grant permission to exceed limits, they would have to decide, on the basis of scientific evidence, the safety of the authorised limit in terms of risks to human health. Furthermore, there must be a time limit, corresponding to the time required to restore the quality to that required by the regulations.

The Federal Ministry of Health and the Federal Health Department have issued guidelines for dealing with breaches of limits for nitrate, for pesticides and for the toxicological assessment of breaches of limits. These include recommended, permitted limits based on toxicological considerations, and are applied extensively, in practice, but have no legal status.

The guidelines on nitrate recommend the following:

- Time-limited authorisation for NO_3^- concentrations up to 90 mg l^{-1} can be issued, but must be accompanied by promising improvement measures;
- In particular, agricultural measures must be initiated without delay to improve the quality of the contaminated groundwater source;
- Treatment measures should only be considered in exceptional circumstances;
- Consumers must be informed if the nitrate concentration is above 50 mg l^{-1} and, as a precautionary measure, water with less than 50 mg l^{-1} nitrate must be used for the preparation of baby food.

In its guidelines concerning non-compliance with the pesticides parameter, the Federal Health Department has made recommendations on the selection of pesticides and degradation products (DPs) to be monitored (the local health departments decide specific requirements). Guidance is provided for a large number of pesticides and DPs, for which authorisations for breaches of standards may be issued, but a list is provided of pesticides and DPs for which no authorisation of breaches may be issued. The others are classified into groups A, B and C with maximum limits up to which authorisations may be granted, as follows:

- A up to $1 \mu\text{g l}^{-1}$
- B up to $3 \mu\text{g l}^{-1}$
- C up to $10 \mu\text{g l}^{-1}$

The guidance note also specifies that authorisations must be accompanied by improvement programmes and must be time-limited (up to a maximum of two years) although extensions may be granted under some circumstances. The following improvement measures are recommended:

- Establishment of water protection zones;
- Hydrogeological establishment of catchment boundaries and banning the application of certain pesticides in the catchment;
- Provision of information to farmers on pesticide application restrictions in the water protection zone; and
- Review of pesticide usage situation in the catchment.

The guidelines concerning ‘toxicological considerations’ include maximum concentrations for several parameters, including toxic metals, nitrite, PAH, organochlorine compounds, for which authorisations may be issued.

The general requirements are similar to those set out in the recommendations for nitrate and pesticides, i.e. to justify the need for the derogation, the need to inform consumers and make special provisions for ‘special risk’ sections of the population, the need to implement an improvement plan, and to inform the highest State authority. However, in contrast to the time limit recommended in the case of pesticide derogations (two years) (time limit not specified for nitrate derogations), these derogations may only be issued for a maximum period of one year.

Practice

The Local Medical Officer is responsible for direct supervision of compliance and for enforcement if standards are breached, although the highest authority of each individual Federal State, usually the State Health Department, may also be involved, particularly if derogations are issued. Authorisations for temporary breaches and remedial actions are prescribed and monitored by the Local Medical Officer, derogations are usually issued by the State Health Department, depending on the issue and the State concerned.

In the case of a breach of a microbiological standard, action is taken immediately by the water supplier on receipt of the result from the laboratory charged with compliance monitoring or his own laboratory (without waiting for confirmation of a result). The Local Medical Officer is informed, disinfection measures are implemented directly, and a boiling notice may be issued, but the supply is rarely cut off.

Overall, it is recognised that breaches of limits for chemical parameters do not present an immediate health risk to the population. Consequently, considerable use is made, in practice, of the legal provision for derogations and the recommendations issued by the Federal authorities, concerning authorisation of temporary breaches of standards. Whilst, according to the Federal guidelines, the primary objective should be improvement

measures directed at the raw water sources, in practice, short-term measures, such as (additional) treatment of water are often ordered by the authorities. Other measures may involve closure of wells, especially where relatively small supplies are concerned, and connection to remote, but larger supplies.

In the case of non-compliance with the pesticides parameter, the Local Medical Officer often gives instructions for short-term measures, for example treatment with activated carbon, without issuing formal authorisation of breaches of standards. Where non-compliance is expected to be short-term, such treatment may be carried out through the use of mobile treatment units.

It is also possible for State governments to issue special regulations concerning derogations relating to regional characteristics, but this option has rarely been used.

Local or State authorities may resort to court action against a water supplier or a Mayor responsible for water supply; so far this seems to have been applied in a few cases where a public health risk was perceived, i.e. microbial contamination, and inadequate actions were considered to have been taken by the water suppliers or Mayors.

6.4 Italy

6.4.1 Legal basis

Presidential Decree No 236 of 1988, which regulates drinking water quality requirements, allows the Regional Authorities to issue derogations, and to specify actions or measures to be taken by the local authority and the water supplier if prescribed standards are not met.

The provisions specify that derogations must be time-limited and include a plan of action (identification of the cause of the problem, estimate of the affected area and population, remedial action, cost estimate and any penalties against parties concerned). However, the situation in which remedial action is necessary is broadly defined in the legislation as 'when results of analyses indicate a hazard'. This suggests that action is not necessarily taken merely on the basis of non-compliance.

In response to widespread problems of non-compliance, the Ministry of Health has issued several Decrees (legal instruments) allowing Regional Authorities to permit derogations to be given for many parameters ('undesirable substances' and organoleptic properties in 1988, herbicides in 1989, organo-chlorine compounds in 1991) giving higher, permitted limits than those prescribed in the drinking water regulations, and time limits ranging from two to four years.

These decrees have now been repealed (a court in Turin declared such a decree was not in agreement with the requirements of Directive 80/778/EEC, see Section 8), but a revised Decree for 'undesirable substances' and organoleptic parameters was issued in 1992. It allows derogations for several substances, permitting, for example, nitrate concentrations

of up to 75 mg l⁻¹ for a maximum period of three years (the 1988 Decree allowed 100 mg l⁻¹ nitrate over a period of four years). There is a precautionary note indicating that water with nitrate levels >50 mg l⁻¹ cannot be given to babies under one year old, nor should it be consumed on a regular basis by certain individuals at risk. This Decree is likely to be repealed in the near future.

6.4.2 Practice

Enforcement responsibilities lie mainly with Local Health Departments, though Provincial, Regional and/or State authorities may be consulted. The Ministers of Health and Environment are responsible, on behalf of the State, to guide and co-ordinate enforcement activities. Re-organisation of water supply and supervision of drinking water quality has been on-going for several years with the aim of introducing a more centralised system of supervision.

If a water supplier identifies a problem, a plan of action is submitted and authorisation requested from the Local Health Authority (USSL). The USSL normally consults the Regional Authority which, after consultation with the State Ministry, can authorise the remedial measures and, by implication, authorise breaches of standards whilst remedial measures are implemented. Alternatively a derogation accompanied by a request to implement improvement measures may be issued by the Regional Health Authority.

If a local authority detects a problem (as a result of compliance monitoring), it imposes measures on the water supplier. Remedial measures recommended by a Regional Health Authority in the case of breaches of standards are as follows:

- Pesticides: Annual monitoring programme on wells and neighbouring agricultural areas;
- Organo-chlorine compounds: additional treatment;
- Arsenic: discontinue use of supply or install treatment.

The measures recommended in the case of breaches of the pesticide standard do not seem to be very effective for establishing compliance within a given period of time.

Derogations for nitrate still seem to be given in practice; remedial measures include the use of new wells, additional treatment or other improvements.

Water suppliers or Mayors responsible for water supply can be prosecuted for negligence in cases of non-compliance, but criminal sanctions can only be imposed if damage to human health is proven. Courts can also order fines to authorities granting derogations without improvement plans.

On the whole, supervision of water quality and enforcement is very fragmented, and does not seem to be effective. Derogations still seem to be used extensively in cases, such as nitrate, not permitted by the Directive. Alternatively, other forms of authorisation by

Local Health Departments are issued without adequate enforcement of improvement measures.

6.5 The Netherlands

6.5.1 Legal basis

The legal basis for compliance, derogations and enforcement is set out in the Water Supply Law 1957 (as amended). According to Article 4, the water supplier is legally bound to guarantee the supply of drinking water at such quality, quantity and pressure as is required for public health (quality and other requirements as prescribed in the Water Supply Decree). Articles 5, 6 and 7 lay down the obligations of proprietors of water works to supply information, notify any non-compliance results, generally support the Public Health Inspector in his tasks, and to implement 'Orders' (remedial measures with time-scales) issued, in writing, by the Inspector.

Formal derogations are issued (in writing) by the Inspector for certain parameters if a relatively short-term (less than six months) breach of a standard is expected, or by the Ministry of Environment (VROM) for certain other parameters and if longer-term breach is expected. Applications to the Ministry involve very lengthy procedures. Derogations cannot be issued for toxic substances or microbiological parameters in any circumstances, but may relate to either drinking water quality or raw (surface) water, since standards for the latter are included in the Water Supply Decree.

6.5.2 Practice

In practice, there is a very informal, professional relationship between Regional Public Health Inspectors (PHI) and water companies. In addition there are fora set up to encourage close liaison between the water suppliers (professionals from water companies, trade association VEWIN, research institute KIWA) and the Inspectors (co-ordinated by the National Co-ordinator of Inspectorates); they have meetings and collaborate, through working groups, in issuing guidelines for the water industry. In addition, the Inspectors, in collaboration with the Ministry (through the research institute RIVM - National Institute of Environment and Public Health) have been producing guidelines for quality management at water works.

Inspectors deal with the legal representatives of water companies (directors) and have meetings, normally twice a year, with the management (including technical managers) of water companies. These submit the monitoring programme for the coming year, and any plans for changes in treatment technology, for approval by the Inspector. Water companies may also, voluntarily, provide other information, such as special programmes of investigation.

There are no inspections of treatment works or laboratories, instead the Inspector relies on the water supplier to provide appropriate information, and increasingly, quality management programmes and external audits are being introduced.

Water companies are required to report to the Inspector any non-compliance as well as other issues giving rise to risks to public health. In the case of microbiological problems, the water supplier usually deals with remedial measures and, if necessary, informs the public (e.g. a boiling notice), all in close liaison with the Inspector. Improvement measures are usually agreed through discussions, meetings and exchange of correspondence between inspectors and the management of water companies, whereby the formal records comprise letters and minutes of meetings.

The inspector can also demand (and has done so in practice) improvement measures even if no standards are breached, if he considers that there are unacceptable risks to public health, for example the risk of contamination with *Cryptosporidium* oocysts, though it may be more difficult to issue a formal 'Order' in such a case.

Whilst, in principle, no formal derogations may be granted for non-compliance with the pesticides parameter (as the parameter is among the list of toxic compounds, Table I of Annex A of the Water Supply Decree), informal exemptions may be granted if, after consultation with VROM and RIVM (National Institute of Public Health), it is considered to be safe in terms of public health risk. In this case, an improvement programme is established through dialogue between the Inspector and the water supplier, and progress is monitored by the Inspector.

The Inspector has powers to issue an official 'Order' or to take over management of a water company if not satisfied that the latter is acting according to the legal requirements. Both the latter options have rarely been applied in practice but are seen as an effective 'threat'; formal 'Orders' to implement measures have only been issued on two or three occasions since 1962, whilst the management of a company has been taken over temporarily on at least one occasion.

In general, dialogue is the preferred option and this policy appears to be working. If progress is considered inadequate by the Inspector, he may give an informal warning, threatening to issue a formal Order; in practice this has usually proved sufficient to obtain a satisfactory reaction on the part of the water supplier. Another, relatively powerful option for Inspectors, is to publicise the non-co-operation of a water supplier; this would be likely to elicit a rapid response (action) on the part of a water supplier, as public relations are considered a high priority, not least because, ultimately, the responsibility for water supply lies with an elected local government.

The National Co-ordinator of Public Health Inspectors has expressed some concern over complete reliance on water supply management to report to him any non-compliance or other difficulties; he also considers it a weakness in the Dutch system, that unlike in the UK, the Inspectors do not necessarily have much technical experience of water treatment, supply and analysis (M. Oversluizen, Regional Public Health Inspector and National Co-ordinator, personal communication).

In addition, there has been concern over regional differences in dealing with non-compliance. However, the latter problem has been addressed through the recent re-organisation of Environmental Health Inspectorates, including the introduction of the system of national co-ordination, whereby the Co-ordinator is responsible to the Ministry (VROM).

6.6 Spain

6.6.1 Legal basis

The drinking water regulations (Royal Decree 1138/1990) specify that water suppliers must communicate to the competent municipal and health authorities any 'loss of potability'; and that these authorities will order any actions. 'Loss of potability' is defined as non-compliance with the standards set out in the Annexes of the Decree.

The Decree includes provisions for derogations due to geological and meteorological reasons; the term 'emergency' has been replaced by 'Critical Accidental Circumstances'.

Derogations are issued by Regional Health Authorities on application from local councils (municipalities). Derogations for geological and meteorological reasons cannot be issued for toxic or microbiological parameters. Derogations relating to 'Critical Accidental Circumstances' must specify the reasons, the temporary limit value(s) and a time limit.

Derogations must be reported to the Ministry of Health, immediately in 'emergency' cases, within seven days for 'meteorological' type derogations, and within 45 days for 'geological' cases.

6.6.2 Practice

The Regional Health Administration is responsible for supervision of compliance and enforcement. In practice it seems that the water supplier takes the initial decision concerning necessary remedial action or repeat sampling and analysis. If the water supplier perceives a risk, the authorities are notified and the water supplier, municipal and regional authorities work together to decide and implement any necessary steps. The Regional Health Authority provides advice and monitors progress. We have no evidence of any legally binding contracts between water suppliers and enforcement authorities, other than the official derogations issued by the Regional Health Authorities.

There appears to be no set procedure for further action, improvement plans seem to be informal agreements and there is no evidence of any legal actions to enforce standards, although municipal and health authorities have powers to order any necessary actions or suspend a supply in case of a health risk.

7. CONSUMER RIGHTS

The situation concerning consumers' rights in the different countries with respect to access to information on the quality of their drinking water, rights to compensation, access to courts, and rights to ensure enforcement of Community legislation, is summarised in Table 7.1.

7.1 Right to Information

In all Member States, consumers have general rights to receive or obtain information. This has been reinforced by the transposal of Directive 90/313/EEC on the freedom of access to information on the environment. Before this, in some States, e.g. Italy, there was no right to environmental information, whereas in others, e.g. France, such rights have existed for many years.

Nevertheless, the information provided in response to requests may be limited, for example, they are likely, in general to receive excerpts of analyses, giving annual average results and not necessarily covering all parameters prescribed in the Directive.

Consumers in The Netherlands can approach the water supply company directly for information, whereas in Spain they may approach either the water supplier, the administration or the consumers' association. In others, the first line of enquiry is through a regulatory authority (local government or regulator), e.g. in Denmark, France, Germany Italy, though in Germany they may be referred back to the water supplier. Compliance data obtained by the authorities in Germany, seem to be generally treated as confidential (the Data Protection Act is frequently quoted), except where the water supplier or the health authority decides to inform the public because precautions are necessary (e.g. boiling notices, or the need to provide a separate supply of drinking water for babies because of breach of the nitrate limit).

Provision of data prior to any request is not common (for national reports on drinking water quality see Section 5). At a local level, results of analyses are publicly displayed in France, though this information may be limited. In Spain, the mayor may occasionally publish a general summary of water quality in a local newspaper.

In some cases, e.g. Germany and The Netherlands, summaries of water quality data are circulated proactively by some water companies in the interests of customer relations. On the whole, relations between water suppliers, the public and the authorities seem to be very open in The Netherlands; perhaps mainly because, ultimately, local elected governments are responsible for water supply. In France, some large water companies operate customer information services, such as automatic fax systems (audiofax) or information via the Internet (Minitel).

Table 7.1 Consumer rights in six EU Member States

What rights do individual consumers have, where standards are breached? Details of how and where consumers can obtain information about the quality of water supply?

Denmark	France	Germany	Italy	The Netherlands	Spain
<p>Consumers have a right to approach courts to seek action relating to supply of drinking water to meet standards and to compensation. The right to information on monitoring results is supplemented by the Right to Know Environmental Information Act No. 291, 1994. When consumers have reason to believe that drinking water is contaminated, they have the right to get the water monitored at the expense of the supply company or the municipality.</p>	<p>Consumers have the right to be informed and the right to compensation if standards are not met. Monitoring information documents are made available to the public by the mayor or department Directorate for Health and Social Affairs (DDASS) under legislation enacted in 1978. Routine monitoring data are supplied by the operator to the municipalities. If standards are not met, the DDASS is informed. Department Prefects are required to send to Mayors, data on drinking water quality and this is displayed in the town hall. It may be sent to third persons and the DDASS must forward data if requested.</p>	<p>Rights to information exist under the 1994 law on Freedom of Access to Information on the Environment. If no answer is obtained to requests in two months, consumers can take the authority to court. Health agencies generally refer information requests to the water suppliers. Water suppliers produce leaflets for consumers, outlining water quality information in relation to standards. Consumer centres (funded by Länder) provide information given to them by water suppliers. The Stiftung Warentest can be asked to undertake sampling for private consumers at their own cost.</p>	<p>Consumers have rights to approach a variety of courts to seek redress. Only since February 1997 (with transposition of Directive 90/313) have they rights to freedom of access to environmental information. If a utility fails to provide information consumers have the right of access to the Regional Administrative Court to order the provision of information.</p>	<p>Consumers have the right to approach:</p> <ol style="list-style-type: none"> 1. The water company. 2. The Public Utilities Conciliation Board. <p>There is no requirement to publish information, although a variety of documents are produced and available on request. The Consumers Association also publishes a regular report on drinking water quality.</p>	<p>Consumers have rights to:</p> <ol style="list-style-type: none"> 1. Correct information. 2. Protection from deficient/hazardous services. <p>Consumers can request detailed information on monitoring results from water companies. Consumers can request the administration carries out an inspection, but the results are not provided in a detailed format.</p>

Do consumers have rights to compensation?

Denmark	France	Germany	Italy	The Netherlands	Spain
<p>Compensation is applicable when damage is caused by non-compliance of standards in drinking water. Only one case is known.</p>	<p>Compensation may be payable in the event of standards not being complied with.</p>	<p>It is a criminal offence to supply water that does not meet statutory standards. Private consumers can demand prosecution in this case and the public prosecutor will decide if a case can be made. If injury occurs a supplier may be fined or imprisoned. Compensation for injury may be made at the criminal trial or at a subsequent civil trial. Civil cases relating to drinking water have mostly concerned landlord/tenant issues.</p>	<p>Under the Italian Civil Code individuals have the right to compensation for any fraudulent, malicious or negligent act which results in unjustified injury (i.e. infringement of subjective rights, e.g. health). A breach of environmental standards constitutes a criminal offence and compensation can be payable. A breach of standards causing environmental damage may also result in compensation payable to the State.</p>	<p>A water company is liable for damage caused by poor supply except in events where it cannot be held responsible. Consumers have rights to compensation following harm occurring.</p>	<p>The right exists only if water quality problems give rise to harm, i.e. the damage is real, proven, calculable in economic terms and the blame can be placed on the administration (including water companies)</p>

Can consumers go to court directly to enforce Community rights to a water standard?

Denmark	France/	Germany/	Italy/	The Netherlands/	Spain
<p>The Danish EPA assume that citizens are entitled to enforce their Community rights to drinking water quality with the direct effect doctrine, but there are no cases to confirm this view. However, because there is concern that certain derogations, etc., are not in compliance with the Directive, such cases might appear in the future.</p>	<p>No: there is no direct effect of the Directive: standards are transposed into national legislation.</p>				

Do consumers have rights to ask courts to examine the role of enforcement authorities in ensuring standards are met?

Denmark	France	Germany	Italy	The Netherlands	Spain
<p>The Constitution allows individuals to ask courts to examine whether enforcement authorities are acting properly. However, courts are generally very reluctant to set aside the decisions of such authorities.</p>	<p>Individuals may ask an administrative court to challenge the compliance of particular measures to meet standards. Administrative courts can appraise the action of enforcement authorities. An administrative court can, exceptionally, quash a decision under an Act that does not comply with the objectives of a Directive.</p>	<p>German law provides the right of individuals to file actions against an authority which fails its obligations under two conditions:</p> <ol style="list-style-type: none"> 1. There was a deliberate or negligent violation of the obligations. 2. The obligations relate to the protection of third persons. <p>So far there have been no test cases to determine whether the Health Agencies' duty regulating water suppliers is an obligation relating to third persons.</p>	<p>Consumers must first file a petition with the Regional Administrative Court. This can overturn derogations on standards applied by local authorities and determines whether the authority is acting properly. If injury or damage has occurred, the consumer can proceed to the Civil Court to seek compensation.</p>	<p>Consumers should first approach the Inspector for Public Health and the Environment and/or the Medical Inspector. If not satisfied the most common solution is to approach the National Ombudsman (accessible and low cost). In seeking compensation consumers may go to the Public Utilities Conciliation Board (private users, claims <NGL 10 000, no injury) or to Civil Court (claims >NGL 10 000 or any injury/illness).</p>	<p>There are three types of court:</p> <ol style="list-style-type: none"> 1. Administrative Tribunal: if consumers not satisfied with administration, this body settle disputes. It can order compensation. 2. Civil Courts: covers contractual issues, which may include the supply of information in some circumstances. 3. Penal Courts: for criminal issues, i.e. where serious harm has occurred.

In some Member States, consumers can request additional monitoring. This is usually done through a regulatory authority and may be at the water company's expense (Denmark). In Germany consumers may commission their own analyses, at their own expense, through State subsidised consumers associations; these seem to be mainly aimed at checking heavy metal contamination derived from domestic plumbing which is the responsibility of the house owner.

7.2 Right to Compensation

At a European level, guidance to the rights of consumers to compensation in the case of a breach of Community law, can be found in the following judgements of the European Court of Justice (ECJ).

In the ECJ judgement of 5 March 1996 (related Cases C-46/93 and C-48/93, I-1131) the Court ruled that the principle that Member States are obliged to make good, damage caused to individuals by breaches of Community law, attributable to the Member State, is applicable where the national legislature was responsible for the breach in question. This principle holds good for any case in which a Member State breaches Community Law. In the judgement concerned, the Court also ruled, with regard to a breach of Community law for which a Member State acting in a field in which it has a wide discretion in taking legislative decisions, can be held responsible, that Community law confers a right to reparation where three conditions are met, i.e.:

1. the rule of law infringed must be intended to confer rights on individuals;
2. the breach must be sufficiently serious; and
3. there must be a direct causal link between the breach of the obligation resting on the Member State and the damage sustained by the injured parties.

In Case C-392/93 (26 March 1996), the Court confirmed that the same three conditions, as mentioned above, must be applicable to the situation in which a Member State incorrectly transposes a Community directive into national law. However, a restrictive approach to State liability is justified in such a situation. It is, in principle, for the national courts to verify whether or not the conditions governing Member State liability for a breach of Community Law are fulfilled.

In all six Member States, consumers have a right to compensation in some instances. In most cases a consumer would need to demonstrate that actual harm has occurred (Italy, The Netherlands, Spain), although in minor cases (e.g. landlord/tenant issues in Germany) non-compliance with standards is sufficient. In Denmark, compensation is applicable when damage is caused by non-compliance with drinking water standards (although this has not so far been applied in practice), whereas in France, non-compliance alone is sufficient for compensation to be payable.

7.3 Enforcing Community Rights

In all six Member States the Drinking Water Directive has been transposed into national legislation. Since the Directive cannot be applied directly at a national level, consumers must approach the courts to seek implementation of the national legislation. However, there is concern in some Member States (e.g. Denmark, France) that some exemptions, for example, do not fully comply with the Directive. Therefore, cases on this issue may arise in the national courts or the European Court of Justice (see Section 8).

Consumers in all six study countries can seek court action where they feel an enforcement authority or a water supplier has failed in its duty. In The Netherlands, consumers have a choice between addressing the courts or the National Ombudsman (Public Utilities Conciliation Board); the latter is generally consulted instead of court action, except in major cases which cannot be dealt with by the Conciliation Board. In Italy, consumers can file a petition with the Regional Administrative Court to investigate whether relevant authorities are acting properly, for example in authorising breaches of standards. In Spain, a highly bureaucratic procedure is necessary prior to court proceedings, and this would seem to present a considerable barrier to consumers bringing a case before a court. In Denmark, consumers tend to use other methods of applying pressure (e.g. political) rather than legal action. In France, consumer action groups have successfully fought cases against water suppliers which failed to meet prescribed standards.

8. COURT CASES

The situation concerning court actions in the six study countries is summarised in Table 8.1.

At a European level the Commission has initiated court proceedings or threatened court action against France for not implementing the Directive and against France, Germany and The Netherlands for incomplete or incorrect transposal of the Drinking Water Directive 80/778/EEC.

At a national level, whilst there are many common features on consumer rights in the six Member States, the experience of actual court cases is very varied and, generally, there have been few cases. None have occurred in Spain (possibly due to the complicated, bureaucratic procedures necessary before a case can be brought to court), whilst there have been a number in France (consumers gaining compensation from water companies), Denmark and Germany. In Denmark, Germany, Italy, and The Netherlands, drinking water issues have been addressed at the highest level in the courts, although most civil cases in Germany involved district or local courts, i.e. tenants versus landlords (cases of lead contamination due to plumbing which is the responsibility of the house owner). In Germany, cases have also been heard in State Administrative Courts involving enforcement authorities versus those responsible for water supplies.

It is interesting to note that in Denmark, several court judgements have been ruled against enforcement agencies, rather than against water suppliers; for example in an appeal against the EPA not granting a derogation, and appeals against decisions to close down wells which did not comply with standards, though in one case an EPA order to disinfect the distribution system was upheld.

It is possible, though it cannot be confirmed in this analysis, that the low number of cases may, in part, be related to the relatively short length of time that consumers have had access to detailed monitoring data on their drinking water.

The main cases relevant to this study, for which details have been obtained, are summarised below.

8.1 European Court of Justice

France has been taken to the European Court of Justice (ECJ), initially (in 1988) for not implementing the Drinking Water Directive 80/778/EEC and, after implementation in 1989, for incorrectly transposing certain standards. As a result, France made minor amendments, setting some stricter limits, but omitting others, in 1990 to the Decree of 1989 (No. 89-3). In addition, infringement proceedings have been initiated by the Commission in 1997, and in response, France has recently withdrawn certain circulars which provided a legal basis, nationally, for permitting breaches of the nitrate and pesticide standards.

Table 8.1 Court actions involving drinking water supply or quality (involving individual customers, water suppliers or authorities, or the Commission, on a national/regional/local basis)

Denmark	France	Germany	Italy	The Netherlands	Spain
<p>Citizens are generally reluctant to use legal measures and rely more on media and political pressures to achieve environmental improvements. However, there have been cases covering a wide range of issues:</p> <ol style="list-style-type: none"> 1. Compensation for supply of water of poor quality. 2. Cases concerned with the closure of private abstractions (i.e. compensation denied because abstracted water did not comply with standards). 3. Precautionary action to prevent potential contamination of drinking water from landfill. 	<p>A range of cases exist in relation to breaches of drinking water standards. Cases have determined that standards are binding on water suppliers, have specified procedures for derogations and have levied compensation for consumers where standards were not met.</p> <p>Currently two companies are appealing in order to determine the State's responsibility in meeting certain standards, e.g. nitrates, where only the State can take preventative action.</p> <p>Infringement proceedings in the ECJ are also taking place concerning</p>	<p>Most cases are civil cases concerning tenants and landlords on the issue of lead. The responsibility of the water supplier ends at the house, so internal responsibilities are those of the landlord. Compensation, etc., may include a reduction in the cost of a lease or replacement of pipes. One case has been heard by the Federal High Court of Justice concerning severe damage to a young child from supply of unclean drinking water and compensation was payable. Several State Administrative Court cases of enforcement authorities versus water suppliers, or</p>	<p>There have been few cases relating to water quality. However, both the Supreme Court and Constitutional Court have ruled on this issue.</p> <p>Prior to a change in the law in 1994 local water managers were liable for a simple breach of standards. Since then liability only occurs if they are found to fail to act following receipt of adverse water quality monitoring information.</p> <p>The Supreme Court has held local managers responsible in most cases.</p> <p>The Constitutional Court has distinguished the status of supply of non-drinkable (e.g.</p>	<p>Public Utilities Conciliation Board: very few cases for water quality. These relate to iron and copper and in two cases the water company was liable and compensation allowed. The burden of proof on causal links lies with the Company.</p> <p>Civil Court: only four cases. Most important concerned fluoridation in Amsterdam, which was prevented and there was no issue of compensation.</p>	<p>There do not appear to have been any court cases relating to drinking water quality, possibly due to the highly bureaucratic procedures required, before a case can be taken to court.</p>

Denmark	France	Germany	Italy	The Netherlands	Spain
<p>4. Relating to clean-up of contaminated land.</p> <p>5. From water companies relating to compliance with standards.</p>	<p>transposition of the Directive in relation to circulars which authorise some MACs in excess of those in the Directive.</p>	<p>town mayors responsible for water supply, have been fought.</p> <p>In addition, the ECJ ruled in 1992 that the Directive had not been correctly transposed in relation to derogations.</p>	<p>unpleasant) water from water that will result in actual harm.</p>		

Germany has been taken before the ECJ, not only for not fully implementing the Directive into their Drinking Water Regulations of 1986, with respect to the standards set, but also concerning provisions for derogations. In response, Germany issued a revised edition of the Drinking Water Regulations in 1990, before the court reached its decision (1992), incorporating additional parameters and setting stricter limits in line with the Directive. Germany also amended the article dealing with derogations, mainly to restrict derogations (other than those due to geological or weather conditions) to emergency situations and to incorporate the obligation to report derogations to the State and/or Federal Authorities.

However, the German government was still judged guilty of allowing certain derogations, and not requiring reporting of derogations, prior to 1991.

The Netherlands were threatened with court action because of incorrect transposal in respect of monitoring frequencies and, consequently, incorporated the exact provisions of the Directive into their national legislation in 1994.

Italy has also withdrawn circulars permitting derogations for certain substances, including nitrate and some pesticides, but it is not clear whether this was in response to direct pressure from the Commission.

Denmark seems to have changed its policy in 1992 on allowing long-term derogations for nitrate in response to the ECJ ruling against the UK, concerning delays in achieving compliance with the nitrate parameter.

8.2 Court Action Against Enforcement Authorities

An unusual case in Germany (Dikegulac case - Administrative Court at Darmstadt in Hessen, 15 October 1992) involved proceedings of a water supplier (Riedwerke Kreis Groß Gerau) against the enforcement authorities (State Administration of the Land Hessen). In this case, the authorities claimed that the drinking water limit of $0.1 \mu\text{g l}^{-1}$ for pesticides had been breached because of the presence of diacetone ketogulonate (which is chemically identical to the pesticide Dikegulac). The water supplier claimed that the substance should not be subject to the pesticides parameter, because it was shown to originate from the effluent of a chemical plant (vitamin C production), and not from its use as a pesticide. The Court ruled in favour of the water works, i.e. that, because of the broad definition of the pesticide parameter, the diacetone ketogulonate in the drinking water, did not originate from a substance covered by the pesticides parameter and, consequently, was not subject to the limit imposed for such compounds.

The Dikegulac judgement is of particular interest, in that it excluded a substance from the need to comply with the drinking water limit on the basis of its origin. In this respect, the judgement also has a bearing on substances which are introduced as a result of disinfection, for example trichloroacetic acid which is chemically identical to the herbicide, TCA.

In Italy, the magistrates court of Turin ruled in 1987 that several 'Orders' issued in the Piedmont Region in 1986 and 1987, permitting breaches of the pesticide limit (atrazine and

molinate) to levels considered acceptable in terms of health risk, could only be applied in emergencies and for a limited period of time, in accordance with Article 10 of Directive 80/778/EEC.

In Denmark, a municipality won a court case (in 1993) against the Danish EPA, which had refused to grant a long-term derogation for permanganate-oxidisability. The county court overruled the decision of a lower court and granted the application for a five year derogation for permanganate-oxidisability of 20 mg l⁻¹. The derogation was not reported to the Commission, although over 5000 consumers were affected.

A case in Denmark involved a claim of a water works against the Danish EPA which, following an incident of bacterial contamination of the drinking water, had placed repeated administrative orders to disinfect the distribution system. The waterworks claimed that the water quality had improved and disinfection was no longer necessary, but the administrative order was upheld.

Other cases in Denmark involved appeals against decisions to close down private wells and compensation associated with such cases.

8.3 Enforcement Authorities Versus Water Suppliers

Several cases in Germany at the State Administrative courts involved enforcement authorities versus water suppliers or those responsible for water supply (technical manager of a water works, town Mayors). Three cases involved microbiological contamination. In two cases (in 1988, *Adelsheim*, and 1993, *Bodman-Ludwigshafen*), the authorities took the Mayor of a town to court, and the accused were judged guilty of negligence for supplying water which did not comply with drinking water regulations (presence of *E. coli* and *coliforms*), endangering public health, and delaying appropriate action, such as informing the public and issuing boiling notices. The Mayors were ordered to pay fines. The other case (*Dysentery epidemic at Ismaning near Munich*) involved the authorities versus the technical manager of a waterworks; the technical manager was judged guilty of negligence (in 1980) by supplying drinking water containing pathogens, and thereby causing bodily harm to 1324 consumers. He was given one year imprisonment (suspended due to mitigating circumstances).

In Italy, the Supreme Court has judged Mayors in charge of water supplies; in one case the Mayor was convicted for supplying water which did not comply with regulations (it contained faecal coliforms). In another case, the Mayor was convicted for not having warned the population that the water was not drinkable (presence of faecal coliforms), though the Supreme Court ordered a retrial because it was not clear whether the water had actually been harmful to health (outcome not known). In another case the judge ordered a retrial because the defendant was not notified of the date and time of sampling for water analyses (outcome not yet known).

8.4 Consumers Against Water Suppliers

There have been several cases in France where consumers have been awarded compensation, payable by water companies, for supplying water not complying with prescribed standards, particularly in respect of nitrate. In turn, the water companies involved are currently appealing against the court decision to pay compensation to consumers, claiming that the national authorities failed to take adequate action to protect raw water supplies against nitrate pollution. No decision has been reached as yet on this appeal.

In Germany the highest court ruled that a baby had suffered serious damage to health because of the supply of water with nitrate above the prescribed limit, and that the plaintiff was entitled to compensation (Hamm Nitrate case, Federal Court of Justice, Decision of 25 January 1983).

In The Netherlands, consumers in Amsterdam brought a case against the Municipal Water Company because they objected to the addition of fluoride to their drinking water supply. The Supreme Court ruled that there was no legal basis for the addition of fluoride and ordered the water company to stop the practice (Fluoride Judgement 1973).

In a court case in Denmark, a consumer won a liability action against a municipality for supplying undrinkable water and for causing damage to the laundry. The lower court ruled that compensation was payable due to negligence. The municipality appealed against the decision, but the High Court upheld the ruling (in 1994).

Another court action in Denmark has been ongoing since 1984, it originated with a claim by a consumer against a water company for supplying contaminated water. Although remedial action was taken at the time (change of supply from another well) the plaintiff continued to claim that the water was contaminated, complaints were made to the Danish EPA, the government and the Commission. A High Court Ruling was expected in late 1997 (outcome not known at the time of writing).

9. CONCLUSIONS

9.1 Organisation and Supervision of Public Water Supply

None of the reviewed countries have a fully privatised public water supply, although several countries have some private companies, often operating on behalf of municipalities (or regions), but all under the control of public administrations. However, there seems to be a wide-spread trend towards increasing rationalisation to form larger organisations and moves towards more privately operated water suppliers.

Overall supervision of water supply and quality at national level lies with Ministries of Health or Environment, although direct supervision and enforcement is fragmented, with involvement of local, regional and sometimes state authorities, and the distinction between operators and legislators is often blurred.

The system in The Netherlands, where Regional Public Health Inspectors and one National Co-ordinator oversee water companies, most closely resembles the system in England and Wales.

9.2 Implementation of the Drinking Water Directive into National Legislation

All Member States reviewed have implemented the Directive, although most with considerable delays (France in 1989 after European Court action was initiated). France, Germany and The Netherlands have amended their drinking water regulations in response to action by the European Commission and/or European Court proceedings, concerning incomplete and/or incorrect transposal of the Directive; in France and Germany this concerned, among other issues, the provisions relating to derogations. The parameters have broadly been adopted as in the Directive, with minor deviations, some stricter, and some additional standards.

On the whole, the provisions of the Directive for issuing derogations have also been adopted.

9.3 Information on Compliance with Drinking Water Standards

Information on compliance with national drinking water standards is scarce in the countries studied. Only one country, The Netherlands, publishes an annual, national report on drinking water quality (DWQ), similar to, although less detailed than, that produced by DWI for England and Wales.

Even where data are available, the format differs widely, both between countries and from area to area within a single country (e.g. non-compliance in terms of samples analysed, individual parameters, size of water supply works, population affected, different time

periods etc.); consequently no reliable comparisons between countries can be made. Moreover, in view of the lack of data, and particularly the absence of time series of data, it is not possible, in most cases, to comment on whether improvements have been made in recent years.

However, there is evidence that all countries still have certain problems, particularly with microbiology, nitrate and pesticides.

9.4 Enforcement Mechanisms in Case of Non-Compliance

There are a variety of ways of enforcing compliance with drinking water standards; in most cases the responsible authorities are at local or regional level and frequently the powers are divided among several levels of authority; moreover, the distinction between water suppliers and enforcement authorities is not always entirely clear (Denmark, Italy, Spain).

The most centralised, and probably the most effective system, similar to that in England and Wales, is in The Netherlands where Regional Public Health Inspectors (with one national co-ordinator) have the duty to enforce compliance. In France the responsibility lies with the Departmental Prefect (regional level); in Spain with the Regional Health Administration (with close involvement of municipal authorities); in Denmark with the County Council, though the municipal authorities are also involved; in Italy it is mainly with the Local Health Department, but with responsibilities divided among several other levels (provincial, regional, national) and in Germany with the Local Medical Officer.

Compliance monitoring is carried out in a variety of ways ranging from self-monitoring (The Netherlands) to analyses carried out directly by the authorities responsible for enforcement or laboratories appointed by these authorities (Denmark and France), and combinations of these approaches (Germany, Italy, Spain). Where the responsible authorities do not carry out the monitoring, they have to be informed of any breaches of standards.

Concerning breaches of standards, it is clear that all countries give overriding importance to maintenance of supply, provided that consumers' health is not considered to be at risk if the supply is continued. Consequently, all decisions concerning actions in cases of non-compliance are primarily based on public health considerations.

In cases of microbiological contamination (or suspected contamination), the problem is investigated and rectified immediately (usually by (additional) disinfection of the supply and distribution system) and boiling notices may be issued.

It is also generally recognised that non-compliance with chemical parameters does not normally constitute an immediate health risk, and that relatively long-term improvement measures are usually adequate. All countries studied, except The Netherlands, have used mainly derogations to deal with breaches of chemical standards, i.e. they have made extensive use of derogations in cases not permitted under the Directive, e.g. for long-term breaches of standards for nitrate, pesticides and other undesirable or toxic substances

(parameters listed in Annexes C and D of the Directive). In France and Italy this was done through legal instruments (Circulars or Decrees, respectively; some recently withdrawn) permitting such derogations, whilst in Germany, official guidelines are used which are based on health considerations but have no legal standing. The derogations are normally accompanied by improvement measures and time limits; these may form part of the derogation ('Prefectoral Order' in France, 'Administrative Order' in Denmark, 'Exemption Regulation' (Ausnahmeregelung) in Germany).

In addition, authorisation of temporary breaches of standards for chemical parameters is applied in all countries, except Spain, together with relatively informal agreements relating to improvement measures, although the option of issuing formal Orders is available to enforcement bodies in Denmark, France and The Netherlands. With the exception of France and The Netherlands, such authorisations are mainly dealt with by lower level authorities than the derogations, i.e. mainly at municipal level and may not be reported to national authorities. In Spain, remedial measures may be recommended by the authorities or worked out jointly between authorities and water suppliers, without authorisation of breaches of limits.

In some cases derogations or authorisations of temporary breaches of standards, e.g. for nitrate, are accompanied by other measures, such as informing the public of the risk and/or providing alternative supplies for drinking or for vulnerable groups of consumers.

The responsible authority for enforcement is usually also responsible for monitoring progress with improvement measures and achievement of compliance, but in most cases it was difficult to assess just how effectively these were carried out. It seems quite common to give extensions to derogations or other forms of authorisation of breaches of standards, if the timescale proposed initially is not met. Court proceedings seem to be rarely used to enforce compliance.

9.5 Consumer Rights

In all Member States, consumers have general rights to receive or obtain water quality information, either from the water suppliers directly, or from enforcement agencies. However, the information may not always be detailed, it may consist of annual, average values or incomplete sets of parameters.

In all six Member States, consumers have a right to compensation in some instances, in principle, but this has not been tested in all countries. In most cases a consumer would need to demonstrate that actual harm has occurred (Italy, The Netherlands, Spain), although in minor cases (e.g. landlord/tenant issues in Germany) non-compliance with standards is sufficient. In Denmark, compensation is applicable when damage is caused by non-compliance with drinking water standards (although this has not so far been applied in practice), whereas in France, non-compliance alone is sufficient for compensation to be payable.

Consumers in all six study countries can seek court action where they feel an enforcement authority or a water supplier has failed in its duty. In The Netherlands, consumers have a

choice between addressing the courts or the National Ombudsman (Public Utilities Conciliation Board); the latter is generally consulted instead of court action, except in major cases which cannot be dealt with by the Conciliation Board. In Italy, consumers can file a petition with the Regional Administrative Court to investigate whether relevant authorities are acting properly, for example in authorising breaches of standards. In Spain, a highly bureaucratic procedure is necessary prior to court proceedings, and this seems to present a considerable barrier to consumers bringing a case before a court. In Denmark, consumers tend to use other methods of applying pressure (e.g. political) rather than legal action. In France, consumer action groups have successfully fought cases against water suppliers who failed to meet prescribed standards.

9.6 Court Rulings

The experience of actual court cases in the countries studied, is varied and there do not seem to be very many on the whole. However, a number of interesting court cases have taken place, involving actions against enforcement authorities and actions against water suppliers. It is possible, though it cannot be confirmed in this analysis, that the low number of cases may, in part, be related to the relatively short length of time that consumers have had access to detailed monitoring data on their drinking water.

At a European level the Commission has initiated court proceedings or threatened court action against France for not implementing the Directive and against France, Germany and The Netherlands for incomplete or incorrect transposal of the Drinking Water Directive 80/778/EEC.

Cases against enforcement agencies have been fought in Germany, Italy and Denmark. In Germany this involved a water supplier against a State administration; the court ruled in favour of the water supplier who maintained that diacetone ketogulonate, which was present in drinking water at a concentration $>0.1 \mu\text{g l}^{-1}$, was not subject to the pesticides parameter, because, although chemically identical to the pesticide Dikegulac, its origin in the raw water and in the drinking water was that of an industrial contaminant (a by-product of vitamin C manufacture), not of a pesticide. In Italy a court ruled that several 'Orders' authorising breaches of pesticide standards could only be applied in emergencies and for a limited period of time (in accordance with Article 10 of the Drinking Water Directive). In Denmark, a municipality won a case against the Danish EPA which had refused a long-term derogation for permanganate oxidisability. In another case of a water supplier against the Danish EPA, the courts upheld an administrative Order from the EPA to disinfect a distribution system.

In Germany several cases have been heard in State Administrative Courts involving enforcement authorities versus those responsible for water suppliers; all cases concerned microbiological contamination of drinking water and the defendants (town Mayors, technical manager of a water works) were judged guilty of negligence. Two cases in Italy were brought by the authorities against Mayors because of microbiological contamination of drinking water, but the outcome is not known at this stage.

At a national level, whilst there are many common features on consumer rights in the six Member States, the experience of actual court cases is very varied. None have occurred in Spain (possibly due to the complicated procedures necessary before a case can be brought to court), whilst there have been a number in France (consumers gaining compensation from water companies for supplying water in breach of the nitrate standard), Denmark (for supplying 'undrinkable' water and causing damage to laundry) and Germany (mainly tenants versus landlords in cases of lead contamination due to plumbing, but also a High Court ruling that a baby had suffered serious damage to health as a result of water containing high levels of nitrate). In The Netherlands, consumers won a case against a water supplier; the court ruled that it was unlawful to add fluoride to the water supply.

9.7 Overall Effectiveness of Enforcement

It is difficult to assess the overall effectiveness of enforcement in the countries studied, particularly because of the scarcity of published data on drinking water quality and the absence of a consistent approach to reporting, even where data are available.

It seems that the system in The Netherlands has been very effective, mainly due to the close collaboration between water suppliers and regulators, a system of national co-ordination, public pressure to ensure high quality of supplies, combined with openness and public accountability (i.e. the responsibility for water supply lies with elected local or regional governments).

Significant improvements have clearly been achieved in the former East Germany since reunification, but this was due mainly to large scale investment in treatment works and distribution systems, whilst bringing supervision and enforcement in line with the former West Germany, where in general, close co-operation between the Local Medical Officer, State enforcement agencies and water suppliers seems to have brought about improvements in drinking water quality, although the system is rather fragmented.

10. BIBLIOGRAPHY - GENERAL

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ANNEX I

**NATIONAL LIMITS COMPARED WITH
DIRECTIVE 80/778/EEC**

Parameter	Units	EC		Denmark		Germany	France	Italy		N'lands	Spain		UK
		GV	MAC	GV	MAC	LV	MAC	GV	MAC	MAC	GV	MAC	PCV
A ORGANOLEPTIC PARAMETERS													
1 Colour	mg l ⁻¹ Pt/Co scale	1	20	5	15	0.5m⁻¹⁽¹⁰⁾	15	1	20	20	1	20	20
2 Turbidity	mg l ⁻¹ SiO ₂	1	10	-	-	-	-	1	10	10	1	10	-
	JTU	0.4	4	-	-	-	2	0.4	4	-	0.4	4	-
	(FTU)	-	-	0.3	0.5	1.5 ⁽¹⁰⁾	-	-	-	-	1	6	4
3 Odour	Dilution No	0	2@12°C	-	2	2	2	-	2	2	0	2	-
		-	3@25 °C	-	3	3	3	-	3	3	-	3	3
4 Taste	Dilution No	0	2@12 °C	-	2	NV⁽¹¹⁾	2	-	3	2	0	2	-
		-	3@25 °C	-	3	-	3	-	3	3	-	3	3
B PHYSICO-CHEMICAL PARAMETERS													
5 Temperature	°C	12	25		12 ⁽¹⁾	25	25	12	25	25	12	25	25
6 pH	pH unit	6.5-8.5	-	7-8	8.5	6.5-9.5	6.5-9	6.5-8.5	6-9.5	7-9.5	6.5-8.5	9.5	5.5-9.5
7 Conductivity	µS/cm 20 °C	400	-	>300	-	2000	NNV⁽⁹⁾	400	-	1250⁽²⁰⁾	400	-	1500
8 Chloride	mg l ⁻¹ Cl	25	-	50	300⁽²⁾	250	200	25	200⁽²⁹⁾	150⁽²⁰⁾	25	-	400
9 Sulphate	mg l ⁻¹ SO ₄	25	250	50	250 ⁽²⁾	240⁽²⁴⁾	250	25	250	150⁽²¹⁾	25	250	250
10 Silica	mg l ⁻¹ SiO ₂	-	-	-	-	(24a)	(19)	-	-	-	-	-	-
11 Calcium	mg l ⁻¹ Ca	100	-	-	NNV⁽³⁾	400	NNV⁽²⁰⁾	100	-	150⁽²⁰⁾	100	-	250

Parameter	Units	EC		Denmark		Germany	France	Italy		N'lands	Spain		UK
		GV	MAC	GV	MAC	LV	MAC	GV	MAC	MAC	GV	MAC	PCV
12 Magnesium	mg l ⁻¹ Mg	30	50	30	50 ⁽²⁾	50 ⁽²⁴⁾	50	30	50	50	30	50	50
13 Sodium	mg l ⁻¹ Na	20	150 ^(a) 175 ^(b)	20	175 ⁽²⁾	150	150 ^(a)	20	150 ^(a)	120 ⁽²²⁾	20	150 ^(a)	150 ⁽³³⁾
14 Potassium	mg l ⁻¹ K	10	12	-	10 ⁽²⁾	12 ⁽²⁴⁾	12	10	NV	12	10	12	12
15 Aluminium	mg l ⁻¹ Al	0.05	0.2	0.05	0.2 ⁽²⁾	0.2	0.2 ⁽²¹⁾	0.05	0.2	0.2 ⁽²⁸⁾	0.05	0.2	0.2
16 Total hardness	mg l ⁻¹ Ca	-	-	-	(3)	(13)	-	-	15-50°F ⁽²⁹⁾	>60 ^(28a)	-	-	60
17 Dry residues	mg l ⁻¹ 180 °C	-	1500	-	1500 ⁽²⁾	NV	1500	-	1500	1000	-	1500	1500
18 Dissolved oxygen	%O ₂ sat.	-	(c)	-	(4)	5 mg l⁻¹	-	-	(c)	> 2 mg l⁻¹ O₂	-	(c)	-
19 Free CO ₂	mg l ⁻¹ CO ₂	-	(c)	-	nd ⁽⁵⁾	-	-	-	(c)	(c)	-	(c)	-
C PARAMETERS CONCERNING SUBSTANCES UNDESIRABLE IN EXCESSIVE AMOUNTS													
20 Nitrate	mg l ⁻¹ NO ₃	25	50	25	50 ⁽²⁾	50	50	5	50	50	25	50	50
21 Nitrite	mg l ⁻¹ NO ₂	-	0.1	nd	0.1	0.1	0.1	-	0.1	0.1	-	0.1	0.1
22 Ammonium	mg l ⁻¹ NH ₄	0.05	0.5	0.05	0.5 ⁽²⁾	0.5 ⁽²⁴⁾	0.5	0.05	0.5	0.2	0.05	0.5	0.5
23 Kjeldahl nitrogen	mg l ⁻¹ N	-	1	-	1 ⁽²⁾	1	1	-	1	1	-	1	1

Parameter	Units	EC		Denmark		Germany	France	Italy		N'lands	Spain		UK
		GV	MAC	GV	MAC	LV	MAC	GV	MAC	MAC	GV	MAC	PCV
24 KMnO ₄ oxidisability	mg l ⁻¹ O ₂	2	5	1.5	3⁽²⁾	5	5	0.5	5	5	2	5	5
25 Total Organic Carbon (TOC)	mg l ⁻¹ C	-	-	-	-	-	-	-	-	-	-	-	(34)
26 Hydrogen sulphide	µg l ⁻¹ S		undetectable organolept	.	nd ⁽²⁵⁾	NV	nd	-	nd	nd	-	nd	(37)
27 Substances extractable in chloroform	mg l ⁻¹ dry residue	0.1	-	0.1	-	1	NNV	0.1	-	1	0.1	-	1
28 Dissolved or emulsified hydrocarbons	µg l ⁻¹	-	10	nd	10	<u>10</u>	10	-	10	10	-	10	10
29 Phenols	µg l ⁻¹ C ₆ H ₅ OH	-	0.5	nd	0.5	0.5	0.5	-	0.5	0.5	-	0.5	0.5
30 Boron	µg l ⁻¹ B	1000		-	1000	1000	NNV	1000	-	1000⁽²⁰⁾	1000	-	2000
31 Surfactants	µg l ⁻¹ (lauryl sulphate)	-	200	nd	100	200	200	-	200	200	-	200	200
32 Organochlorine compounds other than pesticides	µg l ⁻¹	1	-	1	-	(12)	NNV	1	30	1	1	-	(36)
33 Iron	µg l ⁻¹ Fe	50	200	50	200	200	200	50	200	200	50	200	200
34 Manganese	µg l ⁻¹ Mn	20	50	20	50	50	50	20	50	50	20	50	50

Parameter	Units	EC		Denmark		Germany	France	Italy		N'lands	Spain		UK
		GV	MAC	GV	MAC	LV	MAC	GV	MAC	MAC	GV	MAC	PCV
35 Copper	$\mu\text{g l}^{-1}$ Cu Ex-works Consumer	100 3000	- -	- -	100 3000	3000 ⁽²⁹⁾ -	1000 -	100 -	1000 =	100 ⁽²⁰⁾ 3000	100 3000	- -	3000 -
36 Zinc	$\mu\text{g l}^{-1}$ Zn ex-works Consumer	100 5000	- -	- -	100 5000	5000 ⁽²⁹⁾ -	5000 -	100 -	3000 -	100 ⁽²⁰⁾ 5000	100 5000	- -	5000 -
37 Phosphorus	$\mu\text{g l}^{-1}$ P ₂ O ₅	400	5000	nd	687 ⁽²⁾	5000	5000	400	5000	2 mg l⁻¹ P	400 ³²	5000 ³²	2 mg l⁻¹ P
38 Fluoride	$\mu\text{g l}^{-1}$ F 8-12 °C 25-30 °C	- -	1500 700	- -	1500 ⁽²⁾ ⁽³⁰⁾ -	1500 ⁽³⁰⁾ -	1500 700	- -	1500 700	1100 ⁽³⁰⁾ -	- -	1500 700	1500 1500
39 Cobalt	$\mu\text{g l}^{-1}$ Co	-	-	-	-	-	-	-	-	-	-	-	-
40 Suspended solids		-	-	nd		NNV	NNV	None	-	1 mg l⁻¹	None	-	-
41 Residual chlorine	$\mu\text{g l}^{-1}$ Cl	-	-	-	(6)	-	(27)	-	(19)	-	-	-	-
42 Barium	$\mu\text{g l}^{-1}$ Ba	100	-	100	-	1000	NNV	-	NNV	500	100	-	1000
43 Silver	$\mu\text{g l}^{-1}$ Ag	-	10 ^(e)	nd	10	10	10	-	10	10	-	10 ^(e)	10 ^(e)

Parameter	Units	EC		Denmark		Germany	France	Italy		N'lands	Spain		UK
		GV	MAC	GV	MAC	LV	MAC	GV	MAC	MAC	GV	MAC	PCV
D PARAMETERS CONCERNING TOXIC SUBSTANCES													
44 Arsenic	µg l ⁻¹ As	-	50	-	50	10⁽¹⁴⁾	50	-	50	50 ⁽²⁸⁾	-	50	50
45 Beryllium	µg l ⁻¹ Be	-	-	-	-	-	-	-	-	-	-	-	-
46 Cadmium	µg l ⁻¹ Cd	-	5	nd	5	5	5	-	5	5 ⁽²⁸⁾	-	5	5
47 Cyanide	µg l ⁻¹ CN	-	50	nd	50	50	50	-	50	50	-	50	50
48 Chromium	µg l ⁻¹ Cr	-	50	nd	50	50	50	-	50	50	-	50	50
49 Mercury	µg l ⁻¹ Hg	-	1	nd	1	1	1	-	1	1 ⁽²⁸⁾	-	1	1
50 Nickel	µg l ⁻¹ Ni	-	50	-	50	50	50	-	50	50	-	50	50
				20 ex-works									
51 Lead	µg l ⁻¹ Pb	-	50 ^(f)	nd	50 ⁽¹⁵⁾	40⁽¹⁵⁾	50 ⁽¹⁵⁾	-	50 ^(f)	50 ⁽²⁸⁾	-	50 ^(f)	50
52 Antimony	µg l ⁻¹ Sb	-	10	nd	10	10	10	-	10	10	-	10	10
53 Selenium	µg l ⁻¹ Se	-	10	nd	10	10	10	-	10	10	-	10	10
54 Vanadium	µg l ⁻¹ V	-	-	-	-	-	-	-	-	-	-	-	-
55 Pesticides and related products	µg l ⁻¹												
- individually		-	0.1	nd	0.1	0.1	0.1 ⁽¹⁶⁾	-	0.1	0.1	-	(0.1) ⁽³¹⁾	0.1
- total		-	0.5	nd	0.5	0.5	0.5	-	0.5	0.5	-	(0.5) ⁽³¹⁾	0.5
56 Polycyclic aromatic hydrocarbons	µg l ⁻¹	-	0.2	-	0.2	0.2	0.2 ⁽¹⁷⁾	-	0.2	0.2	-	0.2	0.2

Parameter	Units	EC		Denmark		Germany	France	Italy		N'lands	Spain		UK	
		GV	MAC	GV	MAC	LV	MAC	GV	MAC	MAC	GV	MAC	PCV	
E MICROBIOLOGICAL PARAMETERS														
57 Total coliforms	per 100 ml	-	MF 0 ⁽⁶⁾ MPN<1	-	nd	0	0	-	0	Ex-works: <1/300 ml Distribn.: <1/100 ml Ex-works: <1/300 ml Distribn.: <1/100 ml	-	0 <1	0 ⁽³⁵⁾	
58 Faecal coliforms	per 100 ml	-	MF 0 MPN<1	-	nd	0	0	-	0		-	0 <1	0	
59 Faecal streptococci	per 10 ml	-	MF 0 MPN<1	-	nd	0	0	-	0		<1	-	0 <1	0
60 Sulphite-reducing Clostridia	per 20 ml	-	MPN ≤1	-	nd ⁽⁸⁾	-	1	-	0/100 ml		<1/100 ml	-	≤1	≤1
61 Total bacteria counts	per ml 37 °C	10	-	5	20⁽⁷⁾	100^(26,29)	-	-	10@36°C	<u>≤10</u>	10	-	(34)	
	22 °C	100	-	50	200	100 ^(26,29)	-	-	100	<100	100	-	-	
62 Total bacteria counts in closed containers	per ml 37 °C	5	20	NV	NV	100⁽²⁹⁾	20	5@36°C	20	NV	5	20	-	
	22 °C	20	100	-	-	1000⁽²⁹⁾	100	20 100	20 100	-	20 100	100	-	

		EC	Denmark	FRG	France	Italy	N'lands	Spain	UK
Parameter	Units	Minimum concentration	Minimum concentration	Minimum concentration	Minimum concentration	Minimum concentration	Minimum concentration	Minimum concentration	PCV
F MINIMUM REQUIRED CONCENTRATION FOR SOFTENED WATER INTENDED FOR HUMAN CONSUMPTION									
1 Total hardness	mg l ⁻¹ Ca	60	-	(13)	15 °Fr	60 ^(d)	60	60 _(d)	60
2 pH	pH unit	-	-	-	-	-	-	-	-
3 Alkalinity	mg l ⁻¹ HCO ₃	30	>100 for unsoftened water	(13)	2.5°Fr	30 ^(d)	30	30 ^(d)	30
4 Dissolved oxygen	mg l ⁻¹ O ₂	-	-	-	-	-	≤2	(d)	-
G RADIOACTIVITY									
Parameter	Units	-	-	-	-	-	-	MAC	-
63 Radioactivity total alpha	Bq l ⁻¹	-	-	-	-	-	-	0.1 ^(h)	-
64 Radioactivity total beta	Bq l ⁻¹	-	-	-	-	-	-	1 ^(h)	-

Notes

GV: guide value

MAC: maximum admissible concentration

LV: limit value (regulations include permitted margins of error)

PCV: prescribed concentration or value

(a) 80 percentile 3 years

(b) 90 percentile 3 years

(c) >75% except groundwater

Notes continued

- (d) water should not be aggressive
 - (e) 80 µg l⁻¹ where silver used in treatment
 - (f) where lead pipes present concentration should not frequently or to an appreciable extent exceed 100 µg l⁻¹ and should not exceed 50 µg l⁻¹ after flushing
 - (g) provided a sufficient number of samples is examined (95% consistent results)
 - (h) compliance with these values ensures that concentrations referred to in the Regulation on protection against radiation (Reglamento sobre la proteccion contra radiaciones) are not exceeded
-
- 1. Up to 25 °C for surface waters.
 - 2. Higher value allowed with special approval.
 - 3. Hardness shall be between 5° and 30° dH.
 - 4. Minimum 5 mg l⁻¹ if water treatment includes aeration.
 - 5. Not detectable.
 - 6. The content shall be as low as possible but sufficient to fulfil the microbiological requirements.
 - 7. Ex-works limits: 5/ml at 37 °C and 50/ml at 21 °C; 10/ml at 21 °C in disinfected water.
 - 8. Defined as sulphite-reducing anaerobic clostridium perfringens. Units: per 50 ml.
 - 9. NNV - no national value.
 - 10. Short-term breaches may be ignored.
 - 11. NV - no value set.
 - 12. 1,1,1 - trichlorethane, trichlorethylene, tetrachlorethylene, dichlormethane 25 µg l⁻¹ (revised to 10 µg l⁻¹ effective from 1.1.1992).
Carbon tetrachloride 3 µg l⁻¹.
 - 13. Included in treatment regulations.
 - 14. 10 µg l⁻¹ from 1.1.1996.
 - 15. No statement about lead pipes.
 - 16. Aldrin and dieldrin 0.03 µg l⁻¹. Hexachlorobenzene 0.01 µg l⁻¹.
 - 17. Benzo (3,4) pyrene 0.01 µg l⁻¹.
 - 18. No pathogens, particularly salmonella in 5 litres. No staphylococci in 100 ml. No faecal bacteriophage in 50 ml.
No enterovirus in 10 litres.
 - 19. 0.2 mg l⁻¹ required.
 - 20. Based on annual average.
 - 21. Allowance up to 250 mg l⁻¹.
 - 22. Allowance up to 150 mg l⁻¹.
 - 23. Corresponding to the mineralisation.
 - 24. Allowance for groundwaters up to limits of 500 mg SO₄/l, 120 mg Mg/l, 50 mg K/l, 30 mg NH₄/l.
 - 24a. 40 mg l⁻¹ Na-silicate if used in water treatment
 - 25. Methane should not be detectable.
 - 26. In disinfected water not more than 20/ml at 20 °C ± 2 °C .

Notes continued

27. Where disinfection is practised with chlorine a residual of at least 0.1 mg chlorine per litre must remain.
With chlorine dioxide a residual of 0.05 mg chlorine dioxide per litre is required.
28. Public health inspector to be notified if levels exceed 5 µg As/l, 1 µg Cd/l, 0.2 µg Hg/l, 15 µg Pb/l or 30 µg Al/l ex-works.
- 28a. Minimum in softened or desalinated water
29. Guide (recommended) value.
30. Not temperature specified.
31. Provisional values.
32. As P2O3.
33. Water should not be regarded as unwholesome solely by reason of a Na concentration exceeding 150 mg Na/l if 80% of the results of analysis of all the samples within the preceding 36 months from sampling points within the water supply zone in question demonstrate a concentration of sodium within the relevant maximum specified in the Table.
34. No significant increase over that normally observed.
35. Water shall not be regarded as unwholesome solely by reason of the presence in it of total coliforms if 95% of the results of analysis of:
 - every sample taken in the preceding year in respect of that parameter or
 - if less than 50 samples have been taken, the last 50 samples taken establish the absence of such coliforms.
36. Tetrachloromethane 3 µg l⁻¹, trichloroethene 30 µg l⁻¹ and tetrachloroethene 10 µg l⁻¹.
37. Covered by odour.

APPENDIX A THE NETHERLANDS

A1. SUMMARY OF COUNTRY SITUATION

The Netherlands is a constitutional and hereditary monarchy and the 'Crown' retains legislative power. Executive power rests with the monarch and a council of ministers known collectively as the 'Crown'. A council of state advises the 'Crown' on legislative matters but legislation must be approved by both Houses of Parliament, i.e. the Lower and the Upper House. The former is elected nationally and the latter by the provinces.

The Sovereign presides over the Council of State which is the highest court of appeal.

The country is divided into 12 Provinces, each with a Provincial Assembly which is directly elected. In addition, there are 647 Municipal Councils which are also directly elected.

The Netherlands, with about 15 million inhabitants (1993) and a surface area of 41 600 km², is the most densely populated country of Europe (360 inhabitants per km²). Water plays a very important role in The Netherlands, where about 15% of the land area has been recovered from the sea, and about 60% of the population live below sea level (Barraqué 1995).

However, although water is abundant, much of the freshwater resources depend on inflow from other countries (mainly the rivers Rhine and the Meuse which drain large parts of Europe), and water quality has been a major issue for a long time. Drinking water supplies are derived from groundwater, or highly treated surface water, river bank filtrate or dune infiltrate.

A2. ORGANISATION AND MANAGEMENT OF WATER SUPPLY

About two thirds of the water supply is derived from groundwater (a minor portion of this is bank filtrate which is a mixture of groundwater and river water) and one third from surface water (mainly from the rivers Rhine and Meuse and the IJssel lake which is fed largely by the river Rhine). Surface raw water sources are subjected to extensive treatment, usually including several filtration stages and often including dune infiltration.

Almost the entire population is connected to the public water supply network. Traditionally the supply of drinking water in The Netherlands has been organised through a large number of municipal and provincial water companies. However, in recent years, the highly fragmented administrative structure has been subjected to a process of reorganisation, aimed at achieving a reduction in the number of water supply companies from 86 to about 15-20. In 1996 there were still 25 companies operating one or more treatment works each (a few others merely distributing water); two of these were municipal companies and one a private limited company (Versteegh *et al.*, 1997 and

1997a); the remainder public limited companies, with provinces and municipalities as the main shareholders.

All except the private limited company (in Doorn) are members of the Association of Water Suppliers (VEWIN), an organisation which co-ordinates the activities of the different companies and funds collaborative research mainly through its research institute, KIWA (The Netherlands' Waterworks Testing and Research Institute). VEWIN is a highly influential organisation, representing the water companies at national and international level.

Overall responsibility for drinking water legislation and enforcement lies with the Ministry of Housing, Physical Planning and Environment (VROM). The Ministry obtains assistance and advice relating to drinking water quality from its research institute, the National Institute of Public Health (RIVM). Direct supervision for ensuring that water companies fulfil their requirements, is the responsibility of regional environmental health inspectorates. There are five Regional Inspectorates each covering all aspects of environmental inspection (e.g. air, water, noise); with one Public Health Inspector in each region concerned with the supervision of drinking water supply and quality. In addition, one representative from a Regional Inspectorate co-ordinates the activities of all regional drinking water inspectors, to promote consistency of approach on a national basis; this national co-ordinator is directly responsible to the Ministry (VROM). Thus in the Region of South-Holland, for example, the Inspectorate employs 60 members of staff, of which 40 are technical staff; two are concerned with drinking water, one of them in the capacity of national co-ordinator.

Ultimately the management of a water company is accountable to the elected municipal and provincial governments and it is intended to keep it this way. Indeed the latest proposed revision of the Water Supply Act includes provision for tighter public controls through municipal and provincial government (Anon 1997), i.e. direct government ownership of water supply companies (M Oversluizen, Regional Public Health Inspector South-Holland, and National Co-ordinator, personal communication).

A3. LEGAL AND INSTITUTIONAL FRAMEWORK

A3.1 General Framework

Management of drinking water supply in The Netherlands is regulated by the Water Supply Law 1957 (Waterleidingwet of 6 April, 1957), last amended in 1994. On the basis of Article 4 of the Law, water companies are legally bound 'to ensure that the customers within their distribution district are guaranteed the supply of drinking water of such quality, quantity, and at such a pressure, as prescribed by the prerequisites of public health'.

The quality of drinking water is prescribed by a statutory instrument issued under the Water Supply Law, the Water Supply Decree 1960 (Waterleidingbesluit of 7 June 1960), last amended in 1994.

Recent reorganisations of water supply, resulting in reductions in the numbers of water supply companies and hence, an increase in their sizes, as well as discussions on privatisation have led to a complete revision of the Water Supply Law. This revision is still in progress; the draft revision includes provisions for tighter public controls on water supplies, i.e. a clear statement of public ownership. Completion of the current revision is expected within about 2 years (i.e. by about 1999), including incorporation of the revised EC Drinking Water Directive.

A3.2 Implementation of Directive 80/778/EEC

The EC Drinking Water Directive (80/778/EEC) was transposed in 1984, through a revision of the Water Supply Decree of 1960, incorporating all parameters, including the guide values which have been adopted as maximum admissible concentrations (MACs); a few parameters are more stringent than those set out in the EC Directive (see below). The amendments were enacted on 2 April 1984, taking effect from 1 July 1984, i.e. 2 years after the formal implementation date required by the Directive (Art. 18, 80/778/EEC).

The drinking water quality parameters have not changed since the transposal of the Directive (1984 Amendment Decree). However, following the threat of court action from the European Commission over incorrect implementation of the Directive in respect of monitoring requirements, the Decree was amended in 1994; this involved a revision of the monitoring frequencies, to bring them in line with the Directive. Other amendments do not relate to drinking water quality directly, for example, the 1989 amendment relates to the protection of water supplies from calamities, such as nuclear war, floods and other disasters.

There is a major difference between the Water Supply Decree of The Netherlands and the EC Directive (and the water supply regulations of other Member States), in that the Decree of The Netherlands covers also the surface water quality criteria in relation to treatment requirements (Annex D of the Decree, based on the EC Surface Water Directive 75/440/EEC, though the limits for some parameters are more stringent). A separate decree covers the quality criteria of surface water used for dune infiltration (in connection with water storage as well as treatment of water for public supplies).

The parameters for drinking water are set out in Annex A of the Water Supply Decree and are divided into four distinct categories (Tables I-IV), as follows:

- *Table I:* Values which must not be exceeded (MACs) in any circumstances, i.e. no derogations can be granted; these include all the Table D 'toxic parameters' of the Directive, plus the microbiological parameters, total coliforms, faecal coliforms, faecal streptococci and sulphite-reducing *Clostridia*.
- *Table II:* Minimum concentrations for total hardness and alkalinity for softened or desalinated water.
- *Table III:* MACs for which deviations may be permitted in line with Article 9 (a) and (b) of the Directive (derogations granted by the Ministry). These include all

remaining parameters with MACs of Tables A, B and C of the Directive, and a note on aggressivity.

- Table IV: MACs for which deviations may be permitted (derogations granted by Regional Public Health Inspector) because it would be unreasonable to expect the water company to comply, for reasons of raw water quality, treatment technology and/or effects on water quality due to distribution systems. These values include the parameters without MACs of Tables B, C and E of the Directive.

The following parameters (MACs) are stricter than those set in the Directive:

- Sulphate: 150 mg l⁻¹ SO₄, but derogations permitted up to EC MAC of 250 mg l⁻¹;
- Sodium: 120 mg l⁻¹, but derogations permitted up to EC MAC 150 mg l⁻¹;
- Dry residue: 1000 mg l⁻¹ (EC 1500 mg l⁻¹);
- Ammonia: 0.2 mg l⁻¹ NH₄ (0.16 mg l⁻¹ N) (EC MAC 0.5 mg l⁻¹).

The following are stricter in that they have been set as MACs, where the EC Directive only prescribes guide values (GVs):

- pH: permitted range 7-9.5 (EC guide value 6.5-8.5, MAC 9.5);
- Boron: MAC 1000 µg l⁻¹ annual average (equal to EC GV);
- Organochlorine compounds other than pesticides: MAC 1 µg l⁻¹ (equal to EC GV);
- Copper: MAC 100 µg l⁻¹ ex works, 3000 µg l⁻¹ at consumer's tap, annual averages (equal to EC GV);
- Zinc: MAC 100 µg l⁻¹ ex works, 5000 µg l⁻¹ at consumer's tap, annual averages (equal to EC GV);
- Total bacteria count: <10 per 100 ml at 37 °C, <100 per 100 ml at 22 °C.

Differences:

- Chloride: MAC 150 mg l⁻¹, annual average value (EC GV 25 mg l⁻¹);
- Conductivity: 1250 µS cm⁻¹ at 20 °C, annual average value (EC GV 400 µS cm⁻¹ at 20 °C);
- Calcium: MAC 150 mg l⁻¹ annual average value (EC GV 100 mg l⁻¹);
- Barium: MAC 500 µg l⁻¹ (EC GV 100 µg l⁻¹);
- Substances extractable in chloroform: MAC 1 mg l⁻¹ dry residue (EC GV 0.1 mg l⁻¹);
- The pesticides parameter is defined as: 1) organochlorine pesticides including isomers, 2) choline-esterase inhibitors, 3) carbamates, 4) other pesticides including polyhalogens and triphenyls; it does not include metabolites;
- Total coliform: <1 per 300 ml ex works, <1 per 300 ml in distributed water;
- Faecal coliform: <1 per 300 ml ex works, <1 in 300 ml in distributed water.

Additional parameters:

- Calcium: minimum value 60 mg l⁻¹ in softened or desalinated water
- Alkalinity: minimum value 30 mg l⁻¹ in softened or desalinated water

- Dissolved oxygen: minimum value 2 mg l⁻¹ O₂.
- Radioactivity: total alpha activity 0.1 Bq l⁻¹ guide value
- Radioactivity: total beta activity 1 Bq l⁻¹ MAC

A3.3 Control of Drinking Water Quality

In line with the responsibility of water companies to supply water of adequate quality to protect public health (Water Supply Law, Article 4), monitoring of raw water and drinking water quality is the responsibility of the water supply companies which carry out process and compliance monitoring at their own laboratories. Formerly, RIVM carried out annual controls of water samples; however, this practice has been abandoned, except in some cases for the purpose of confirming non-compliance. Instead, participation of water company laboratories in analytical quality control systems is being introduced, as well as the development of total quality control systems.

Results of water quality monitoring are reported to the Regional Public Health Inspector (RHI), immediately in the case of non-compliance, or on an annual basis under normal circumstances. In addition, drinking water companies are obliged to inform the RHI immediately of any circumstance which might be expected to comprise a risk to public health or compromise full compliance with the Water Supply Law. In the case of arsenic, cadmium, mercury and lead, concentrations well below the MACs, if found ex works, have to be reported (i.e. As 5 µg l⁻¹, Cd 1 µg l⁻¹, Hg 0.2 µg l⁻¹, Pb 15 µg l⁻¹, as set out in special clauses in Table 1, Annex A of the Water Supply Decree). There is also a special clause for aluminium; if concentrations are >50 µg l⁻¹ ex works, the Inspector has to be informed.

Drinking water quality monitoring is generally carried out on samples taken ex works, and frequently from consumers' taps. If a water supplier finds that non-compliance results from installations on the consumer's premises, he will inform the consumer and instruct him to rectify the situation. If the consumer does not comply with the instructions, the water supplier can cut off the supply.

Under normal circumstances, the RHI meets with the management on an annual or bi-annual basis. If, however, cases of non-compliance or other, anticipated risks to public health are reported, the RHI and management of the water company correspond and/or have meetings to work out appropriate solutions. Additional data have to be made available to the RHI should he so request. The RHI is empowered to issue short-term derogations where public health is not compromised, and request any appropriate remedial action necessary to ensure compliance with the Water Supply Law (see Section 5.3). Applications for long-term derogations are referred to VROM (see Section 5.2).

Water companies, VEWIN, RIVM and RHIs all play an active part in developing guidelines and procedures for water quality monitoring and reporting.

For example, laboratory managers of water companies meet regularly and Inspectors take part in these meetings. Through these meetings and consultations with all parties concerned, VEWIN plays an important role in preparing recommendations concerning

drinking water supply, monitoring and reporting practices. These recommendations are revised from time to time. Members of VEWIN use these recommendations as a guide to *good practice*.

In addition, Public Health Inspectors and the responsible ministry (VROM) are concerned about quality management at water companies and have recently prepared and published a review of quality management at waterworks and recommendations for future improvements (Versteegh *et al.*, 1997a).

A4. PUBLICATION OF DRINKING WATER QUALITY REPORTS

A4.1. National Reports

The responsible ministry (VROM) obtains the drinking (and raw surface) water quality data from the Regional Public Health Inspectors and publishes a summary drinking water quality report, on an annual basis. The first such report was published in 1994, covering the year 1992 (Versteegh and Wetsteyn, 1994) followed by similar reports covering the years 1993, 1994 and 1995 (Versteegh *et al.*, 1995, 1996 and 1997). In line with the provisions of the Water Supply Law which states that the water companies are responsible for providing adequate quantity, quality and continuity of water supplies to consumers, the summary reports issued by VROM focus on these aspects. For each water company, the numbers of non-compliances for individual parameters are tabulated, together with the number of samples analysed, as well as minimum, average and maximum concentrations.

From the available reports it is not possible to comment on any improvements in drinking water quality. In both recent reports (Versteegh *et al.*, 1996 and 1997) the authors concluded that the quality was good overall, but they pointed out the need for increased source protection, optimisation of pesticide usage, and harmonisation of monitoring across all water companies.

The parameters which were frequently exceeded, and repeatedly in the same supply, were mainly related to raw water quality and are non-toxic parameters for which derogations were issued (Table III of the Water Supply Decree), i.e. hardness, manganese, iron. However, a large number of non-compliances were observed due to trihalomethanes (THMs) which are subject to the non-pesticide organo-chlorine parameter (MAC $1 \mu\text{g l}^{-1}$ for individual substances in the Water Supply Decree - GV only in EC Drinking Water Directive) but for which derogations may be issued if there is no health risk associated with their presence (risk assessment balanced against the need to apply disinfection). Other limits, including microbiological parameters, and ammonia, nitrate, and pesticides, were generally exceeded on a less frequent basis, and said to be short-term and due mainly to process failures.

A4.2 Water Company Reports

The legislation relating to drinking water does not require water companies to publish data on drinking water quality, nor are they obliged to inform consumers about the standards applied to drinking water. However, providing information to consumers is generally considered to be the responsibility of the water companies in order to maintain good relations with their customers, but practice varies from company to company (VROM 1994).

A customer entering into an agreement with a water company (see Section 6), will receive information on conditions of supply and tariffs. More specific brochures, for example about the composition of the water, its origin, environmental aspects etc., are provided free of charge upon request. Some of these brochures are published by VEWIN, others are published by the water company itself. If consumers request water quality data from their supply company, they are likely to receive annual average results, or mean, minimum and maximum values, of the preceding year for the appropriate works or pumping station. The results may include a large number of parameters, but not necessarily all those prescribed in the Water Supply Decree (e.g. no pesticides, no organochlorine compounds), and the table may or may not include the MACs set in the Water Supply Decree.

VEWIN publishes two consumers magazines 'Water News' and 'Energy & Water', distributed free of charge from home to home every three months. Several water companies supplement the 'Water News' with their own regional/local water news. Information for educational purposes is available upon request, and conducted tours round the water companies and treatment plants can be arranged.

A4.3 Consumers' Association Reports

Once every 2 to 3 years the Dutch consumers' organisation investigates drinking water quality on its own initiative. Drinking water is sampled from each water company at the home of a consumer. The last test was carried out in May 1995 and the results were published in the consumers' magazine of November of the same year (Anon 1995). All samples met the legal standards. As nitrate is one of the potential threats, the consumers' organisation advised all water companies to inform their clients, through the water bill, on the amount of nitrate in their drinking water.

A5. ENFORCEMENT PROCEDURES

A5.1 Legal Basis

The legal basis of enforcement is provided by the Water Supply Law 1957 (last amended 1994) and the Water Supply Decree 1960 (last amended 1994), as follows:

Article 4 of the Water Supply Law states that (a) water suppliers are legally bound to ensure that consumers within their distribution area are guaranteed the supply of drinking water of good quality in such quantity and at such pressure as is necessary to fulfil the requirements of public health, and (b) that the quantitative and qualitative requirements, plant operation and supervision, staff training and professional qualifications, hygiene at treatment plant, and materials used, are to be prescribed in the Water Supply Decree.

Article 5 specifies that the proprietor of the water supply works must provide all the support and detail required by the Inspector to carry out his duties in the interests of public health.

Article 6 sets out the requirement to inform the Inspector of any water quality problem, problems in the operation of the plant, or any anticipated difficulties in meeting the requirements.

Article 7 states the obligation of proprietors of water supply works to implement, within the given time scale, any measures considered necessary and provided in writing (Order) by the Inspector to ensure compliance with Article 4 of the Water Supply Law, although the proprietor may appeal against the Inspector's decision within four weeks of the issue of the instruction.

A5.2 Authorised Derogations

Since raw (surface) water quality criteria are included in the Water Supply Decree, water suppliers have to report to the authorities the quality of raw water (where surface water is used as a source) and drinking water.

Applications for formal derogations may be needed in relation to both surface water quality and final, treated water as supplied, and are normally restricted to natural causes, and only if there is no risk to public health (as determined by the RHI and VROM, with toxicological advice and risk assessments provided by RIVM if appropriate). For treated water, formal derogations cannot be obtained for parameters prescribed in Table I of the Water Supply Decree (toxic/microbiological, see Section 3.2).

In the case of contaminants in raw waters, derogations may be issued, if it can be shown that the contaminant is removed during treatment. In addition, improvement measures may be initiated, such as tighter controls on discharges, which may involve discussions at international level (for example through the Rhine Commission).

Where non-compliance is expected to be relatively short term (<6 months), the RHI may issue a relaxation decree and inform VROM of his decision, whereas applications for long-term derogations are referred to VROM; the process of applying and obtaining formal derogations is lengthy; the derogation will have a time limit, but repeat derogations may be granted.

A5.3 Remedial Action

There is a very informal relationship between Regional Public Health Inspectors and water companies; the Inspector deals with the legal representative, i.e. the Director of a water supply company. Meetings between the Inspector and Management of a water company are normally held twice a year. Water companies provide their monitoring programmes and any plans for changes in treatment technology for approval by the inspector, and may provide, voluntarily, other information, such as special programmes of investigation. There are no inspections of treatment works or laboratories, instead the Inspector relies on the water supplier to provide appropriate information, and increasingly, quality management programmes and external audits are being introduced.

Water companies are required to report to the Inspector any non-compliance as well as other issues giving rise to risks to public health. Improvement measures are usually worked out through discussions, meetings and exchange of correspondence between inspectors and the management of water companies, whereby the formal records are in the form of letters and minutes of meetings.

In 1996, a form was introduced (with instructions) which is issued to all water companies to be filled in (hard copy or diskette) and returned to the Inspector in cases of non-compliance. However, if there are microbiological problems, the Inspector is usually contacted by telephone (backed up by written and/or electronic forms of reporting), as rapid decisions are likely to have to be made.

Even with respect to microbiology, reporting is normally required only after confirmation of a non-complying result. In practice, however, the water supplier relies on other evidence (process control samples from other points throughout the treatment process, visual, organoleptic and other physico-chemical or microbiological parameters, as well as evidence of process problems) to decide whether a positive finding is a real non-compliance or an analytical error/superficial contamination. If found necessary on this basis, a positive finding will be reported immediately (M.W.M. Tieleman, Drinking Water Quality Manager, South-Holland Dune Water Supply Company, The Hague, personal communication). The water supplier will discuss the problem with the Inspector and take immediate steps to rectify the situation, e.g. (additional) disinfection or switching to an alternate supply. The water company is responsible for informing the public if considered necessary (e.g. issuing boiling notices and informing the public when the quality of the supply has been restored).

In the context of anticipated, possible risks to public health, the water supplier may also report findings of micro-organisms which are not covered by the regulations and not considered to pose a risk; for example at the dune water pumping station in The Hague, where contamination with *campylobacter* was frequently found in a treated water reservoir. This finding was discussed with the Inspector. The water company commissioned RIVM to carry out a risk assessment, balancing the risks from additional disinfection (presence of by-products) with the risks of the presence of *campylobacter*. As a result, disinfection was used, whilst an improvement programme (covering the reservoir) was initiated, and the public was informed of the problem (via a press release).

For reporting of non-compliance with the pesticide parameter, VEWIN has issued guidelines to water suppliers (Martijn 1990); these guidelines are generally followed in the case of all organic micropollutants. These recommend repeat sampling and analysis, and confirmation by mass spectrometry, before reporting the confirmed result to the RHI. This should be followed by a further set of analyses, and if still exceeding the limit, informing VEWIN, and holding discussions with the RHI on possible remedial actions.

Considerable discretion is used on the parameter for organo-chlorine compounds other than pesticides ($1 \mu\text{g l}^{-1}$ for individual substances) in that the monitoring requirement is based on an indication of the presence of 'extractable organo-chlorine' and the need to disinfect with chlorine. Moreover, if the parameter is exceeded, the health risks are determined, particularly with consideration of the health benefits of disinfection in cases where bacterial contamination is likely, and informal exemptions are likely to be granted by the RHI.

Whilst, in principle, no formal derogations may be granted for non-compliance with the pesticides parameter (as the parameter is among the list of toxic compounds, Table I of Annex A of the Water Supply Decree), informal exemptions may be granted if, after consultation with VROM and RIVM, it is considered to be safe in terms of public health risk. In this case, an improvement programme is established through dialogue between the Inspector and the water supplier, and progress is monitored by the Inspector.

The Inspector monitors progress with agreed improvement measures at regular intervals, e.g. six months after agreement of the programme. He has powers to issue an official 'Order' or to take over management of a water company if not satisfied that the latter is acting according to the legal requirements. Both the latter options have rarely been applied in practice; formal Orders have only been issued on two or three occasions since 1962, whilst management has been taken over temporarily on at least one occasion (see Section 5.4).

In general, dialogue is the preferred option and appears to be working. If progress is considered inadequate by the Inspector, he may give an informal warning, threatening to issue a formal Order; in practice this has usually proved sufficient to obtain a satisfactory reaction on the part of the water supplier. Another, relatively powerful option for Inspectors, is to publicise the non-co-operation of a water supplier; this would be likely to elicit a rapid response (action) on the part of a water supplier, as public relations are considered a high priority, not least because, ultimately, the responsibility for water supply lies with an elected local government.

The inspector can also demand improvement measures even if no standards are breached, if he considers that there are unacceptable risks to public health, for example the risk of contamination with *Cryptosporidium* oocysts, though it would be more difficult to issue a formal 'Order' in such a case. So far, no formal Order has been applied to such a situation, and as the water supplier has the right to appeal against a decision of an Inspector, the courts may have to decide the validity of such an Order. However, the National Co-ordinator considers the chance of success relatively high, since the Water Supply Law (Art. 4) incorporates the general requirement of supplying water which is of

a quality consistent with the needs of public health (M. Oversluizen, Regional Public Health Inspector and National Co-ordinator, personal communication).

There is currently a case where the Inspector has required a water company to alter the treatment process (among other changes, to install ozonation) in order to safeguard against the risks of *Cryptosporidium* contamination; this is at the level of an informal request (not an Order). However, the Inspector is not satisfied with progress. The water supplier keeps asking for more time to carry out research, such as investigations into the formation of bromate from the reaction of bromide with ozone. Consequently, the Inspector is now considering his options, such as publicity or issuing a formal Order (M. Oversluizen, Regional Public Health Inspector and National Co-ordinator, personal communication).

The National Co-ordinator has expressed some concern over complete reliance on water supply management to report to him any non-compliance or other difficulties; he also considers it a certain weakness in the Dutch system, that unlike in the UK, the Inspectors do not necessarily have much technical experience of water treatment, supply and analysis (M. Oversluizen, Regional Public Health Inspector and National Co-ordinator, personal communication). In addition, there has been concern over regional differences in dealing with non-compliance. However, the latter problem has been addressed through the re-organisation of Environmental Health Inspectorates, with the introduction of the system of national co-ordination, whereby the Co-ordinator is responsible to the Ministry (VROM) (see Section 2). Within this role of national co-ordination, working groups have been set up to develop guidelines which should ensure a consistent approach throughout The Netherlands. These working groups comprise not only Inspectors, but also strong representation of the water industry, including professionals from water companies, from VEWIN and KIWA. The Inspectors, in collaboration with the Ministry (through the research institute RIVM - National Institute of Environment and Public Health) have been producing guidelines for quality management at water works (Versteegh *et al.*, 1997a).

A6. PROSECUTION AND PENALTIES

Articles 62 and 63 of the Water Supply Law allow the Inspector to take a water supplier to court for non-compliance with the Water Supply Law or an 'Order', and they specify the penalties (the director of a water company may be sent to prison for a maximum of six months, or be ordered to pay a fine). An Inspector may also take over management of waterworks.

In practice, the former provision has not been used, though one case of an Inspector taking over temporary responsibility for management of a waterworks has been applied (Tielemans, personal communication). This case involved inadequate protection against risks to public health and insufficient provision of information to the Inspector, relating to the operation of the treatment works (direct surface water intake at treatment plant, instead of dune infiltration and storage prior to treatment). The management of the water company in question was subsequently replaced.

A7. CONSUMER RIGHTS

Note:- Only the rights of consumers are discussed: consumer in the meaning of any person who might wish to be supplied with the goods for his own private use or consumption.

A7.1 The Supply of Drinking Water

The supply of drinking water is arranged through agreement between the consumer and the water company. Therefore, the relationship between the water company and the customer is rooted in private law.

All users, households, small and large customers, are *captive users*, in other words they are not free in their choice of water supplier.

The agreements between the customer and the water company are governed by the General Conditions for Water Supply as formulated by the respective water company. Only in the case of large customers can the text of the agreement be subject to negotiation, in which case tariffs and risk-sharing will be points of negotiation.

The General Conditions for Water Supply are mostly based on the text of Model Conditions for the Supply of Drinking Water, as drafted by VEWIN in consultation with consumers' organisations under the auspices of the Commission for Consumer Affairs of the Socio-Economic Council of the Government. Water companies are free to deviate from the Model Conditions. However, in practice, all companies adhere closely to this text. The Model Conditions are revised regularly. The last revision was in 1994, the reason being the coming into force of the New Civil Code, in particular Division 3 *General Conditions*, Civil Code (Book 6, title 5), containing imperative law relating to general conditions. Naturally the Model Conditions had to be brought into line with these provisions as well as the provisions of paragraph 5, *Agreements*, Civil Code (Book 6).

In the following, a closer look is taken at the text of the Model Conditions for the Supply of Drinking Water.

A7.1.1 Model conditions for the supply of drinking water

In the context of this study, the most interesting conditions are those related to the supply of drinking water and the liability of the water company in case of poor supply. The texts of Articles 7 and 20 as quoted below, are derived from the Model Conditions for the Supply of Drinking Water of 1994. Despite the revision of the Model Conditions, these texts are almost the same as in the preceding Model Conditions.

Drinking water supply

Paragraph 1 of article 7 reads “ The company supplies drinking water”. Paragraph 2 reads “In principle drinking water is supplied continuously. The company does not assure

continuity of the supply” With this text water companies aim to avoid recognising that consumers have a right to continuity of supply. The difference is important for the extent of liability.

Liability, compensation

In paragraph 1, Article 20 of the Model Conditions, water companies exclude liability in case of damage to persons or objects as a consequence of **interruption** of supply. Paragraph 2 of the same Article concerns the liability in case of **poor** supply. It reads that the company is liable in case of damage to persons or objects as a consequence of poor supply, or bad performance, or non-performance. Yet, a company is not liable where the damage is the consequence of a shortcoming for which the company cannot be held responsible.

Damage to objects used by the customer in the performance of his business or work or other damage related to one’s business or work, is excluded from compensation.

Paragraph 4, Article 20, notes that compensation for damage to objects in all circumstances is restricted to a maximum of Dutch guilders (NLG) 3000 (about £900) per customer.

Article 20 has been the subject of intensive negotiations between VEWIN, the Association of Electricity Companies and the consumer organisations. These parties could not agree upon Paragraph 1, i.e. the exclusion of liability in case of interruption in the supply. Nevertheless the text of the Model Conditions has been established, albeit with the qualification that consumers organisations and the public utilities could not reach agreement upon the text.

Given the opportunities provided by the coming into force of the New Civil Code, the consumers’ organisation initiated a collective action and brought the case before court. Defendants in the case were VEWIN and the Association of Electricity Companies. For reasons not relevant to this study, the claim against VEWIN could not be heard. Yet the judgement reached was *mutatis mutandis* with respect to the legality of the provision concerned, in the General Conditions of the water companies. The Court of Justice concluded that the provision was unreasonably damaging to the consumer as it excluded completely the liability of, in this case, electricity companies for material damage as a consequence of interruption in the supply (Anon 1996). Both the consumer organisation and the Association for Energy Exploiters have appealed to the Supreme Court which has not yet reached a verdict.

A7.2 Do consumers have any rights to ask courts to examine whether enforcement authorities are acting properly to ensure water meets the standards?

The Ombudsman Act (Law Gazette 1981, 35) forms the legal basis of investigations of written complaints in connection with any act or omission of any administrative bodies of

the government. The National Ombudsman is a last resort, having competence only to investigate a complaint where there is no judicial administrative alternative for the complaining legal or private person. The National Ombudsman is a very accessible institution and costs are low. The parties concerned will be informed of the results of the investigation. Reports of the Ombudsman are made public. Every year the Ombudsman informs Parliament and the Government on its findings, and ensures that the findings are published.

The Inspectorates of Public Health and Environment are administrative bodies of the government, in charge of enforcement of the quality requirements as laid down in the Waterworks Decree (see paragraph 2.3.). If an Inspector should fail to execute his legal task, or in case of bad performance, consumers of drinking water will be the injured parties and complaints about the Inspectors' action, or omission of action, can be reported to the Ombudsman (National Ombudsman, Legal Department, the Hague, personal communication). No examples of complaints concerning the behaviour of Inspectors for Public Health and Environment have been found.

In addition to the above, the consumer can go to the civil court in the case that the Inspector acts against the law or unwritten rules in social interaction, or in the case that the Inspector violates someone's rights. The court action will then have to be based on *Wrongful Act*, Article 162, Book 6 Civil Code. However the burden of proof will be difficult and the process will be costly.

A7.3 What rights do individual consumers of water have, where standards are breached?

On the basis of article 4 of Water Supply Law, water companies are obliged to ensure that their customers are guaranteed the supply of drinking water of such quality, quantity and pressure as are determined by the prerequisites of public health. For the supply of drinking water, customers and water companies enter into an agreement with each other. When the quality of water is questionable, or when supply is poor or interrupted, the water company is approached first. In the situation that both parties cannot come to an understanding, the normal course of action would be to bring the case before court. However, it is also possible to ask the Public Utilities Conciliation Board to make a judgement.

A7.3.1 Public Utilities Conciliation Board

In the past, consumers of water, gas and electricity were reluctant to bring their cases before court, since it was often a complicated and costly process. Since the 1980s, however, consumers can bring cases before the Public Utilities Conciliation Board. The Board is very accessible and costs are low. Through the *Recognition of Public Utilities Conciliation Board Regulation* (Anon 1996a), issued by the Ministry of Justice in order to stimulate proper hearings of consumers' complaints, Conciliation Boards can be officially recognised by the Ministry. This recognition is subject to the fulfilment of certain requirements. Recognised Conciliation Boards are subsidised by the Government. The

Public Utilities Conciliation Board (referred to as the Board in the following) is recognised as an official conciliation board.

According to the Model Conditions for the Supply of Drinking Water (Article 22, Paragraph 1) both parties of the agreement can decide to bring their case before the Public Utilities Conciliation Board. The water company will respect the choice of the consumer.

Competence, procedures etc. are laid down in the *Rules for Public Utilities Conciliation Boards*. The Board will settle disputes between consumers and the company where the realisation of, or the performance under, the agreement is concerned, and insofar as disputes are related to the connection to the system and the supply of drinking water.

The Board usually aims to settle disputes by discussion and subsequent agreement between parties, or by giving binding advice. By bringing a case before the Conciliation Board, parties commit themselves to accept its judgement.

The competence of the Board is confined to the following types of disputes:

- the financial interest of which does not exceed the amount of NLG 10 000 (about £ 3000);
- on water used by consumers for own private use;
- other than those involving losses suffered as a consequence of death, illness or physical injury.

If the same dispute is, or has been, subject to a court case, the Board will not hear the case. Neither will it hear a case if the consumer's complaint has not been brought to the attention of the water company in advance.

Judgements of the Board are passed, subject to the agreement for the supply of drinking water as entered into by both parties and in compliance with *reasonableness and fairness* (Article 15 of the Rules of the Public Utilities Conciliation Board).

If the Board reaches a judgement it may assess the damage and fix the compensation to a maximum of NLG 10 000 (see above). In general the Board may take any decisions it deems reasonable and fair in settling the dispute (Article 16 of the Rules Public Utilities Conciliation Board).

In case the Board is not able to arrange a settlement between the parties, the Board will give advice which is binding upon both parties. However, within two months of the judgement, the advice of the Board can be subjected to a judicial review. The binding advice will be quashed if, taking in consideration the standards of reasonableness and fairness, the judgement itself or the way in which it was reached, is considered unacceptable, or if it is considered contrary to the standards of reasonableness and fairness, to ask the party proved wrong, to comply with the judgement.

A7.3.2. Court jurisdiction

In general, it is up to the consumer whether to bring a case before court or before the Public Utilities Conciliation Board. In some instances, however, the consumer has no choice, that is, he cannot use the Board, if the following applies:

- where the financial interest exceeds the amount of NGL 10 000;
- where losses are suffered as a consequence of death, illness or physical injury;
- where the dispute does not concern the performance under the agreement between consumer and water company and is not related to the connection to the system or the supply of drinking water;
- where the consumer calls the water company to account for extra-contractual reasons.

The relation between water company and customer is rooted in private law (see Section 6.1). The interests of consumers are protected through the Civil Code and its relevant provisions on *agreements*.

Actions can be based on the contractual obligation of water companies or on a *Wrongful Act* (Article 162, Book 6, Civil Code). In the latter case, the consumer has to prove that the water company, by acting against the law or against unwritten rules in social interaction, or that by its actions, or lack of action, the water company violates the consumer's rights.

A7.4 Can consumers go to court to enforce directly their Community rights to water of a Directive standard?

Drinking water legislation in The Netherlands conforms with Community Directives. The question "Can consumers go to court to enforce **directly** their Community rights to water of a Directive standard", is therefore a theoretical one and will be answered as such, since no jurisprudence relating to direct enforcement of Community rights of Directive standards is available.

The question raised here is whether the provisions of Community Directives to be transposed into national law can have direct effects in the case that they have not been (completely) transposed or have been transposed incorrectly. The European Court of Justice ruled in different cases relating to different types or provisions. In general, those provisions have no direct effect. However in the case that the directive has the objective to harmonise standards and in the case that it provides precise enough standards, its provisions will have direct effect (Jans 1994).

The wording of Directive 80/778/EEC and its Annexes puts Member States under a very precisely described obligation concerning the quality of drinking water. Considering the conditions to be fulfilled in order for the Directive to come into force, and considering the wording of the present Directive, a direct effect of the standards on the quality of drinking water cannot easily be denied.

The Member States are put under an obligation and as such are addressed by the Directive. Therefore, an appeal to the direct effect of the Directive can only be made towards the governments of the Member States. According to the *Foster vs. British Gas* case (C-188/89), *government* should be interpreted in a broad sense. In The Netherlands, water companies are legally bound to ensure that all customers in their distribution district are supplied with drinking water. The services are provided under governmental supervision. Consequently, the companies are fulfilling a public task and the public limited water companies, the municipal water companies and the one private limited water company, being “semi-governments”, all seem to fall within the broad definition of *government*. As consumers are the persons to benefit from the Directive, and as they suffer when Community rights to water under the Directive’s standards are breached, the conclusion seems to be that consumers could go to court to enforce directly Community standards.

As mentioned previously, most disputes relating to drinking water in The Netherlands are settled by the Public Utilities Conciliation Board. From several cases (Case 22/86; Case C-340/89) it can be deduced that the European Court of Justice recognises a general obligation of the Member States, resulting from Article 5, EC-Agreement, to ensure that Community rights are legally protected in an effective manner. Therefore, it cannot be the case that the legal protection for consumers provided/offered by the Public Utilities Conciliation Board is less effective than the legal protection of an independent judiciary established by law. The fact that the consumers have the choice to bring their case before court or before the Conciliation Board, and the fact that the judgement of the Conciliation Board can be subject to a judicial review by an independent judiciary established by law, seem to support this assumption.

A7.5 Do consumers have rights to compensation?

A7.5.1 Compensation in the case of the Public Utilities Conciliation Board

In the case that the Board reaches a judgement, it may assess the damage and fix the compensation to a maximum of NGL 10 000 (about £3000) (see Section A7.3). However, according to the Model Conditions for the Supply of Drinking Water (see Section A7.2), the compensation for damage to objects is, in all circumstances, restricted to a maximum of NGL 3000 (about £1000).

A7.5.2 Compensation in the case of court jurisdiction

In general, compensation in civil cases is governed by the provisions of Title 5, *Agreements*, Book 6, Civil Code, and in the case of an action being based on Article 162, *Wrongful Act*, Book 6, it is governed by paragraph 3 of the Article concerned. Compensation is not bound by a legal maximum.

A7.5.3. Compensation in the case where Community rights are breached

Compensation in the case that consumers suffer when Community rights to water under a directive's standard are breached, is discussed also in Section A8.

Answers to the question on consumers rights to compensation in case of a breach of Community rights, can be found in the following judgements of the European Court of Justice.

In the judgement of the European Court of Justice of 5 March 1996 (related Cases C-46/93 and C-48/93, I-1131) the Court ruled that the principle that Member States are obliged to make good, damage caused to individuals by breaches of Community law, attributable to the State, is applicable where the national legislature was responsible for the breach in question. This principle holds good for any case in which a Member State breaches Community Law. In the judgement concerned, the Court also ruled, with regard to a breach of Community law for which a Member State, acting in a field in which it has a wide discretion in taking legislative decisions, can be held responsible, that Community law confers a right to reparation where three conditions are met, i.e.:

1. the rule of law infringed must be intended to confer rights on individuals;
2. the breach must be sufficiently serious; and
3. there must be a direct causal link between the breach of the obligation resting on the State and the damage sustained by the injured parties.

In the case C-392/93 (26 March 1996), the Court confirmed that the same three conditions, as mentioned above, must be applicable to the situation in which a Member State incorrectly transposes a Community directive into national law. However, a restrictive approach to State liability is justified in such a situation. It is, in principle, for the national courts to verify whether or not the conditions governing State liability for a breach of Community Law are fulfilled.

A8. COURT CASES

A8.1. Public Utilities Conciliation Board

As discussed above (Section A7) most cases concerning drinking water are brought before the Public Utilities Conciliation Board.

Recurrent disputes between consumers and public utilities concern the cutting of supplies in cases of non-payment, the liability for third parties and errors in calculations of costs. In 1996 a total of 134 cases were heard, of which 31% concerned the water supply. Only in one case, a complaint concerning the financial aspects of water supply, did the Board judge in favour of the consumer.

In the period from 1983 to 1990, 10 cases were brought before the Board, in total, concerning **poor supply** of water, electricity or gas. In the period 1990 to 1993, a total of 25 cases on poor supply was heard. However, the majority of judgements of the Public Utilities Conciliation Board concern the supply of electricity.

As far as water supply is concerned, there are hardly any examples of cases in which the quality of water is under discussion. Such cases concerned, in three instances (GON 1990/91), the appearance of rust (because of the waterworks being out of use for a period of time), and in one case (GON 1992/93) the appearance of copper (claimed to be caused by erosion at the waterworks). In the cases mentioned it was the question of damage caused by the appearance of rust or copper in the water and the question on liability, that were under discussion (Stutterheim 1994). In two cases, the water company was held liable and compensation was awarded (ON 1990/91).

As shown above, most cases concerned the supply of electricity. These judgements are *mutatis mutandis* relevant to the supply of drinking water. Most interesting, in the context of this study, are the judgements of the Board relating to the liability of public utilities in case of poor supply or interruptions in the supply. A judgement of the Board in 1983 (GON 1983) influenced all the following judgements. In this case, in which an electricity company supplied electricity with too high a voltage, the Conciliation Board concluded that the fact that poor supply is beyond the control of the company does not exclude it from liability. Moreover the company would have to prove that the poor supply is the consequence of circumstances which are not at the company's own risk and, consequently, the company's responsibility.

This reversal of the burden of proof was deemed fair, since the public utility is generally more in a position to examine and decide what happened, than the consumer.

The following conclusions can be drawn from the Board's judgements in the period 1983-1992 (Stutterheim 1994a):

- if a causal connection between damage and poor supply is established, the company is liable, in principle;
- the burden of proof lies upon the public utility;
- compensation is based on the contractual liability; extra-contractual liability and/or product liability seem to be no basis for compensation (as far as the judgements of the Conciliation Board are concerned).

The origin of the disputes on the liability of public utilities seems to lie in differing views on the nature of public utilities. Whereas the consumer emphasises the *contractual* obligation of the water company to provide services in exchange for payment, the public utility emphasises its *public* task.

Considering the judgement of the Conciliation Board in 1983 and the following judgements, the Board seems to emphasise the contractual obligation of the public

utilities. As we have seen (Section 6.2) the jurisdiction of the Board is recognised at least in paragraph 2, article 20 of the Model Conditions.

A8.2 Civil Courts

The database of civil judgements, revealed only four relevant cases. The following judgement of the Supreme Court in 1973, regarding fluoride in drinking water, is the most far-reaching; other judgements build on this judgement or preceded it.

The judgement is known as the Fluoride Judgement, and it is dated June 1973 (Fluoride Judgement 1973). In the verdict, the Court judged the legality of the addition of fluorine to drinking water by the Municipal Water Company of Amsterdam. The case was brought to Court by the residents of Amsterdam who objected to the addition of fluorine for medical, ethical and biological reasons. Having heard all parties, the Court, taking into consideration,

- the monopolistic position of the water company,
- the fact that water is one of the primary necessities of life, and
- that customers are practically dependent on the mains system and, as such, were forced to drink fluoride,

came to the conclusion that:

‘the addition of substances for reasons beyond the objectives of drinking water supply is an operation with such far-reaching consequences that its justification must be found in law.’

A legal foundation was not found, neither in Article 4, Paragraph 1 of the Water Supply Law, nor in the Water Supply Decree. Consequently, the Municipal Water Company was forbidden from continuing to add fluoride to drinking water.

Other relevant considerations and presumptions of the Supreme Court in the context of this judgement were as follows:

1. The wording of Article 4, Paragraph 1 of the Water Supply Law “...customers are guaranteed the supply of good quality drinking water ...”, suggests a civil responsibility of the water company, enforceable through an action based on a *Wrongful Act* (see Section A7.2).
2. The obligation of water companies to supply their customers with wholesome drinking water is based on the agreement between company and customer (contractual obligation) and also (see under A7.1) on Article 4, Paragraph 1 of the Water Supply Law (extra-contractual obligation).

Compensation was not in question in this case.

A9. SOURCES OF INFORMATION

A9.1 Contacts

The following persons/institutions were contacted, interviewed or have otherwise contributed information, which is gratefully acknowledged:

WRc contacts:

- Ir. J.F.M. Versteegh, Senior Drinking Water Quality Scientist, National Institute of Public Health and Environmental Protection (RIVM), Bilthoven
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- Dr. M. Oversluizen, Public Health Inspector (national co-ordinator of regional drinking water inspectors), Regional Inspectorate of Public Health in the Province of South-Holland, Rijswijk;
- Ir M.W.M. Tielemans, Drinking Water Quality Manger, Duinwaterbedrijf Zuid-Holland, Den Haag

IEEP/Liesbeth Bijvoet, AIDEnvironment, Amsterdam:

- Ms Koerts, VEWIN, Public Relations
- Ms Stembord, VEWIN, Legal Department
- Mr Lindhout, Municipal Water Company, Department Water Quality Management, Amsterdam
- Public Limited Water Company Friesland, Public Relations
- Public Limited Public Utility Region Eindhoven, Public Relations
- Municipal Water Company Amsterdam, Public relations
- Mr van den Boogaard, Consumer' organisation
- Mr Van Moer Gastel, Foundation Conciliation Board for Consumer Cases, Juridical Department
- National Ombudsman, Legal Department, the Hague

A9.2. Legislation

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Waterleidingwet (Water Supply Act) of 6 April, 1957 (Stb. 150), as amended 1967, 1975, 1976, 1981, 1984, 1985, 1986, 1989, 1992, 1993; last amended 1994 (revised edition 1994, Stb. 832).

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APPENDIX B DENMARK

B1. SUMMARY OF COUNTRY SITUATION

Denmark is a kingdom consisting of the Jutland peninsula and 482 islands. It is a small country covering an area of 43 000 km² with a small population of approximately 5.25 million (122/km² population density). Twenty-four percent live in rural districts or in towns of less than 1000 inhabitants and 33% live in the metropolitan area of Greater Copenhagen. The country has three levels of administration; a central government, 14 counties and 275 local councils. The relatively limited number of subdivisions facilitate the contacts between the central government and the local authorities and between the counties and the municipalities.

Groundwater is used for 99% of drinking water production, normally involving a relatively simple treatment consisting of aeration and rapid filtration. The Danish policy is to avoid complex water treatment.

Until relatively recently, Danish groundwater resources were considered well-protected and of high quality. Nitrate pollution from agriculture, contamination by chlorinated organic solvents and, more recently, contamination by pesticides have become an increasing problem. Between 1974 and 1995, and in the Aarhus county alone, 177 communal water works were closed down due to contamination of water; 120 had problems with nitrate (69 consequently were closed down), six were closed down because of chloride or fluoride problems and five because of breaches of the pesticide standard. In the area covered by the Copenhagen Water Supply, four aquifers have had to be abandoned since 1995 due to pesticide contamination. In Jutland, where there are about 100 000 private abstraction wells, nearly 70% do not comply with EC parameters on bacteria and nitrate (Baekgaard 1993).

The management of drinking water supply in Denmark is decentralised. Drinking water is supplied either by municipal public utilities or by private co-operatives, both referred to in the text as 'communal water supplies' (supplying more than 10 properties). There are around 2900 'communal' utilities. In addition, 8% of the population is not connected to a communal network (public or private) but are supplied by private wells (around 92 000 in total).

Under Danish Law, groundwater - and partly fresh surface water - is considered as '*common goods*'. As a general rule, Danish water supply must be based on a break-even principle which means that the accounts of any 'communal' water supply company has to balance. In principle, customers must only pay the costs and common suppliers cannot receive money from municipalities, county or the state. However, in 1985 the system was changed and public and private communal water suppliers can receive financial support from municipal and county councils. More recently, in May 1997, a water fund has been set up for small common water suppliers and owners of private wells.

The Danish government has reached political agreement with opposition parties on policies to cut nitrogen pollution from farms, which could lead to the country's first tax on fertiliser use. It has also, taken the first steps recently towards an agreement to cut pesticide use, including a proposal to substantially increase current taxes on pesticides.

Under the agreement, farmers who exceed permitted fertiliser application rates could be taxed. But the proposal is just one of the policy tools in the agreement, and the supporting parties have agreed to carry out a more detailed analysis of how the nitrogen load target can be reached before presenting the parliament in February with formal proposals.

The agreement also includes a commitment by the government to completely phase out pesticide use in the public sector within five years, to prohibit pesticide use in private gardens, and to impose new restrictions on pesticide-use near drinking water wells.

The deal follows the release of monitoring data by the Environmental Protection Agency earlier in the autumn, which showed that a voluntary programme to reduce the amount and frequency of pesticide application had failed to meet its targets. Earlier this year, the government established a commission to investigate the implications of phasing out pesticide-use altogether

B2. ORGANISATION AND MANAGEMENT OF WATER SUPPLY

The management of drinking water supply in Denmark is decentralised and is dealt with at the local level (Table B.1). Responsibility for ensuring the supply of drinking water of 'quality as good as possible irrespective of the minimum water quality requirements stipulated in this Order' (Official English translation of SO No 515, 1988), lies with the 275 municipalities. The local councils are responsible for planning of water supply, sewerage and sewage treatment and for operating water services. They also are responsible for supervising water supplies. They set charges for water supplies and wastewater treatment.

The 1978 Water Supply Act (Act No 299,1988) distinguishes between 'common water supply plants' (supplying more than 10 properties) and other water supply plants [Section 3(3)]. The utilities for drinking water supply are owned either by the municipalities (around 180 Public utilities companies running 290 water works) or by private co-operatives (around 2700 private water works).

However, private landowners outside an area for a common water supply are entitled to abstract water on their own land, when the quality complies with the legally binding limit values, provided the county has not decided that the landowner is obliged to be connected to the common drinking water supply company under Section 29 of the Act. There are some 92 000 private wells, representing around 8% of the population, not connected to a network (public or private) (Baekgaard 1997).

County councils are responsible for water resource planning, for approving sewerage and sewage treatment plans, for controlling water quality, for issuing authorisations for

drilling wells, water abstraction and discharge, and for derogations from drinking water quality standards. They receive results of analyses carried out by appointed laboratories for monitoring compliance with drinking water quality and keep the results in a database.

Monitoring of the water quality is carried out by appointed laboratories. Laboratories are asked by the municipalities to take and analyse samples regularly from raw water and treated water at the outlet of plant and in the distribution system (reservoirs/tower and consumer's tap). The extent and frequency of the monitoring programme are laid down in the Danish Executive Order 515 1988. Laboratories have to send monitoring results to the water supplier, the local authority (municipality), the regional authority (County Council) and to the local public health officer. Each county appoints a public health officer who should be consulted in the case of breaches of quality standards.

Table B1 Organisation of water supply in Denmark

Administrative level	Supply	Compliance monitoring	Enforcement	Reporting
Regional (County)	-	-	County council : <ul style="list-style-type: none"> • Abstraction Licences • Authorisation for derogations • Final decisions on action to be taken in case of non compliance Public health officer: <ul style="list-style-type: none"> • receives monitoring results • advises LC in assessing breaches of standards 	County council: <ul style="list-style-type: none"> • collect results and store them in a database • send report annually to Danish Environmental Protection Agency
Local (Municipal)	Public/private common water suppliers Individual supplies	Appointed laboratory	Local council (LC): <ul style="list-style-type: none"> • ensure water complies with quality standard • decide on actions to take in case of non compliance in consultation with health officer and authorisation by county 	Local council can inform population of measures to be taken in case of breaches of standards.

B3. LEGAL AND INSTITUTIONAL FRAMEWORK

B3.1 General Framework

The 1969 Act on Water Supply established an administrative regime for water management which was further elaborated when the Act was replaced by the Water Supply Act in 1978 (Act No. 299, 1978). The 1978 Water Supply Act has been amended in 1982, 1984, 1985, 1987, 1989, 1991, 1992 and 1995 - however none of these amendments concern the quality of drinking water.

The purpose of the 1978 Water Supply Act was to ensure that the utilisation of water is subject to integrated planning, considering the needs of the population, industry and environmental protection [Sections 1 and 2].

Any abstraction of groundwater or surface fresh water is subject to a licence [Section 18(1)]. Licences to abstract small amounts of water (less than 6.000 m³ pr. year) are granted by the municipality, while other licences are granted by the county [the Water Supply Act Section 19]. The licence is given for a maximum period of 30 years and specifies the quantity of water, the purpose of the abstraction and monitoring requirements with respect to potential damage to the surrounding area, including ecological impact.

B3.2 Implementation of Directive 80/778/EEC

The drinking water quality directive is implemented by Statutory Order (SO) No. 515 of August 29, 1988 on water quality and supervision of water supply plants from the Ministry of the Environment, in pursuance of Section 55 of 1978 Act of Water Supply. The SO No 515 superseded SO No 468 of September 1983, amending SO 6 of January 1980 which already incorporated the limits set down in the Directive.

SO No 515 is supplemented by guidelines No. 3 (1990) from the Danish EPA on water quality and supervision of water supply plants and two circulars on drinking water quality from the Ministry of the Environment (No. 100 of 26 July 1984 and No. 82 of 11 July, 1986) (there is no official English translation of these guidelines). The guidelines detail the recommended response to breaches of water quality standards (described in Section B5).

B3.2.1 Scope

The Danish requirement on drinking water quality applies to public supplies and to individually owned (private) water abstraction wells. The requirements are not limited to third party supplies - (C 42/89).¹

B3.2.2 The Limit Values

The limit values in the directive, in accordance with articles 3 and 7(1)-(5) have been implemented almost unchanged (see Statutory Order No. 515, 1988, Annex 1). In the 1983 SO, parameters were grouped according to sampling frequency while the 1988 SO follows the format of the directive with maximum admissible values (MAC) and guide values. The MAC values are identical with those listed in the 1983 SO for periodic monitoring.

¹ See also the answer from the Commission to a Danish Member of the EU Parliament, OJ 1991, C 311/27.

Because the Danish drinking water supply is mainly based on groundwater, the MAC value for some parameters are lower than the directive (Table B2). In some cases, maximum admissible concentrations (MAC) values have been laid down in addition to guide values specified in the directive and limit values have been set at the water works and at the consumer tap (Table B3).

Table B2 Comparison between Danish and EC standards

Parameter	EC MAC	EC GVs	Danish MAC	Danish GVs
pH	9.5	6.5-8.5	8.5	7-8
Turbidity	4 JTU	0.4 JTU	0.5 FTU	0.3 FTU
Colour	20 mg Pt l ⁻¹	1	15 mg Pt l ⁻¹	5 mg Pt l ⁻¹
Potassium	12 mg l ⁻¹	10 mg l ⁻¹	10 mg l ⁻¹	-
Phosphorus	5 mg l ⁻¹ P ₂ O ₅	0.4 mg l ⁻¹	0.15 mg l ⁻¹	< DL
Surfactant	0.2 mg l ⁻¹ (lauryl sulphate)	-	0.1 mg l ⁻¹	< DL

Notes:

DL Below detection limit by a method detecting 1/10 of MAC

FTU Formazine Turbidity Unit

JTU Jackson Turbidity Unit

GV Guide value

MAC Maximum Admissible Concentration

Table B3 Additional Danish standards

Parameter	EC GV	EC MAC	Danish MAC	Danish GV
Chloride	25 mg l ⁻¹ Cl	-	300 mg l ⁻¹	50 mg l ⁻¹
Copper	0.1 mg l ⁻¹ ^a 3 mg l ⁻¹ ^b	-	0.1 mg l ⁻¹ ^a 3 mg l ⁻¹ ^b	-
Zinc	0.1 mg l ⁻¹ ^a 5 mg l ⁻¹ ^b	-	0.1 mg l ⁻¹ ^a 5 mg l ⁻¹ ^b	-
Boron	1 mg l ⁻¹	-	1 mg l ⁻¹	-
Total bacteria counts 22 °C	100 ml ⁻¹	-	200 ml ⁻¹ ^d 50 ml ⁻¹ ^a 10 ml ⁻¹ ^c	50 ml ⁻¹
Total bacteria counts 37 °C	10 ml ⁻¹	-	20 ml ⁻¹ ^d 5 ml ⁻¹ ^a	5 ml ⁻¹
Nickel	-	50 µg l ⁻¹	50 µg l ⁻¹ ^d 5 µg l ⁻¹ ^a	-

Notes:

a outlet from pumping and/or treatment plant

b after the water has been standing 12 hours in piping and at the consumer's tap

c in disinfected water after treatment plant

d at the consumer tap

GV Guide value

MAC Maximum Admissible Concentration

B3.3 Control of Drinking Water Quality

Most communal water supply plants are owned by municipalities, however they also have responsibility for inspection and the enforcement of quality standards [Section 62 of the Act].

Requirements on control and monitoring of water quality are specified in Section 8-17 of the 1988 Statutory Order (SO) No 515 supplemented by Annexes 2-8. These requirements are complying with the directive Article 12 and Annex II. Regular monitoring includes:

1. simplified monitoring for non public water supplies;
2. minimum monitoring of supply mains in common water supply plants;
3. standard monitoring of water abstraction plants;
4. periodic monitoring of water abstraction plants;
5. monitoring of individual wells.

B4. PUBLICATION OF REPORTS

B4.1 Routine Reports

Subsection 29(2) of SO 515 requires the laboratories to supply water companies, local and regional councils and the public health officers with monitoring results. The regional councils have to report annually to the National Environment Agency information submitted by local authorities and laboratories on the quantity of water abstracted and the quality of water supplied (subsection 30(1)). Monitoring results are stored in a database at a regional and national level.

If the results of the compliance monitoring shows that water quality does not comply with standards, local councils may inform the population on safety measures to be taken (Subsection 19(1)). It is a legal right of individuals to be informed of the monitoring results when water quality standards are violated.

If the results of operational monitoring shows that water quality does not comply with standards, water supply plants must inform the local council (Subsection 18(3)).

B4.2 National Report

There is no national report summarising the water quality in Denmark.

B4.3 Company Reports

There is no obligation to publish data on drinking water quality or data obtained through monitoring and analyses. However, some public water supply companies publish an annual report presenting, in broad terms, the quality of water supplied and any problems occurring such as the closing down of some wells due to contamination. This practice varies from company to company.

B5. ENFORCEMENT PROCEDURES

B5.1 Legal Basis

According to Statutory Order No. 515, 1988 Section 4 and Section 6, water for human consumption in households (domestic use) and for manufacturing or processing foodstuffs must comply with the maximum admissible concentrations (MAC) specified in Annex 1 of the Order. In addition, when possible, efforts shall be taken to ensure that water quality complies with guide levels (GV) or lower. These provisions comply with the directive Article 7(6) and Article 8.

The discretion of the municipalities and counties to decide how to react when monitoring shows that limit values are exceeded, implies it is disputable whether the limit values can be characterised as legally binding in all respects.

An analysis of the legislation and practice of the Danish EPA demonstrate, that Danish Law and practice are not complying with the conditions in Article 9, when legally binding values are exceeded due to geological or meteorological causes. Neither do Danish legislation and practice comply with the directive Article 10, when exemptions are permitted for other reasons (see below).

B5.2 Authorised Derogations for Exceptions from the Limit Values

While the Directive 80/778 includes three provisions for derogations of the limit values (Article 9 on geological or meteorological causes; Article 10 on emergency causes; and Article 20 for exceptional circumstances for geographically defined population groups) the Statutory Order 515, 1988 only includes the first derogation - and Denmark has not used the discretion in Article 20 before the date expired for implementation of the directive. Derogations to the limit values are granted by the counties after application from the local councils and consultation with the public health officer.

B5.2.1 Exceptions because of geological or meteorological causes

Derogations can be granted only under the conditions listed in Section 5. Subsection 5(1) grants derogation because of situations arising from the nature and structure of the

ground in the area in which the water is abstracted and because of extraordinary meteorological conditions. To get approval to exceed the limit values in subsection 5(1) the following conditions must be met:

- [5.2]: Higher values can only be approved for substances for which a higher level can be laid down in accordance with annex 1 [marked: “a higher value can be allowed”] - implementing the directive Article 9(3). That covers permanganate values, dry residues, magnesium, sodium, potassium, ammonium, chloride, sulphate, nitrate, total phosphorus, fluoride, aluminium and Kjeldhal nitrogen.
- [5.3]: Higher values cannot be approved if there is an immediate possibility of an alternative water supply;
- [5.4]: Approval can only be granted, when it includes detailed monitoring requirements to ensure that the new values are not exceeded;
- [5.6]: The approval must specify the period for the derogation and cannot be granted for more than five years.

When approval for a derogation is granted, the county is required to decide which measures shall be taken in the period of the derogation (Subsection 5(5)) (see Section 1.5.3 on remedial actions).

Although this derogation clause covers the same reasons as listed in Article 9 of the directive, the clause does not fully comply with the requirement in this provision of the directive.

First, the notion “situations arising from the nature and structure of the ground” in Article 9(1)(a) was for a long period interpreted by the Danish EPA and the supervisory authorities as covering contamination of drinking water with *nitrate* caused by farming activities. Several cases indicate that the limit value for *nitrate* has often been substantially exceeded for a long period of time² However, the Danish EPA has, after the ECJ ruling in C 337/89 (Commission v. U.K. - particular premise 27), in recent cases changed its view and does no longer consider contamination of *nitrate* covered by the provision for derogations in Article 9.

Second, the Directive 80/778 Article 9(3) last part, requires that derogations under Article 9 must not constitute a public health hazard. In contrast, the derogations under the Statutory Order Section 5 do not include such a demand but only require consultation of the Public Health Officer. The consequences can be illustrated by research carried out by the Public Health Officer of Vejle County on “blue babies” caused by the contamination of drinking water with *nitrate* in July 1992. In one of the reported cases, a child of 1½ months had stopped growing after receiving breast milk substitute. The water was analysed and showed a content of *nitrate* of 250 mg I⁻¹. The Public Health Officer

² Decision by the Danish EPA of 11.9.1992 (j.nr. M 232-0008): The drinking water company ordered to comply with the standards of the directive - in 1985 the Århus County approved exemption from the limit values for 2 years.

concluded that drinking water for babies must comply with the limit values, particularly concerning *nitrate* and *bacteria*.

Third, the Statutory Order does not require notification of the Commission when the permission by the municipality relates to a daily water supply of at least 1000 m³ or a population of at least 5000. Neither the guidelines on drinking water quality from the Danish EPA [No. 3, 1990] nor the Circular on drinking water quality from the Minister of Environment [No. 100 of 26 July 1984] or the Circular on drinking water supply from the Minister of Environment [No. 82 of 11 July 1986], include any information on this threshold for notification and there have been no cases of notification of the Commission based on this derogation clause. According to the Danish EPA this is because the control is made by the EPA. However, it is possible in the selected material from the EPA to find at least one case, where approval was granted in 1983 and repeated in 1993, to exceed the limit values for *nitrate* for a drinking water supply company abstracting 350 000 m³ pr. year³ - and in most of the cases the amount of supply is not stipulated.⁴

Fourth, under the directive Article 9(1)(b) derogation demands “exceptional meteorological conditions”, while the Danish Statutory Order requires only “*extraordinary* meteorological conditions”.

B5.2.2 Exceptions caused by emergencies or man-made contamination

Statutory Order No. 515, 1988 does not permit a derogation under Article 10 of the directive. According to Danish Administrative Law this implies - from a strictly legal point - that the supervising authority does not have the competence to approve exemptions from the binding limit values because of man-made contamination of the soil and groundwater or other causes covered by Article 10. However, according to the guiding scheme for measures against unsatisfactory water quality from common water supply plants from the Danish EPA, such options exist, as is shown by the translated version of the figure B1 [EPA guidelines No. 3, 1990, p. 39] below.

The recent practice of the Danish EPA is in accordance with the conditions in the directive Article 10(1) upheld by the ECJ in *Pretura Unificata di Torino, C 228/87* - although the formal legal implementation is not correct. However, it must be noted that the practice of counties does not always comply with this part of the conditions for derogations, as the *I/S Klarup og Omegn Vandværk case* shows (see below).

³ Decision by the Danish EPA of 2.4.1993 (j.nr. M 232-0008): The drinking water company approved to exceed the limit values for *nitrates* until January 1, 1994. See also *Kirsten Nielsen v. Hundested Municipality* below concerning higher limit values of *permanganate* oxidisability.

⁴ In *Kirsten Nielsen v. Hundested Municipality*, the facts indicate that the threshold for notification is exceeded, because the polluted water is mixed with water from other boreholes.

However, the recent practice of the Danish EPA does not comply with the conditions in Article 10 in two aspects. First, according to the information from the Danish EPA, the Commission has never been notified of the approved exemptions; so in this respect the practice of even the Danish EPA is sometimes in conflict with Article 10(3).

Second, according to Article 10(1) exemptions are permitted only, when “the supply of water for human consumption cannot be maintained in any other way”. This precondition is not followed in the recent practice from the Danish EPA as indirectly explained by the director of the Danish EPA in response to an application from a private citizen, Knud Damgaard Christensen. Christensen asked the Danish EPA whether the supervision authority had granted the discretion to approve higher concentrations of pesticides than the limit values under the Statutory Order. The director of the Danish EPA responded, that in the case of exceeding the limit values on pesticides, the municipalities should “as far as possible” immediately take action to improve the quality of the water. If this is not possible and the breach is minor, the municipality is granted the discretion to approve minor exemptions after consulting the Public Health Officer. The director of the Danish EPA underlines that the establishment of an emergency supply is complicated and will not necessarily be the right response to the problem.⁵

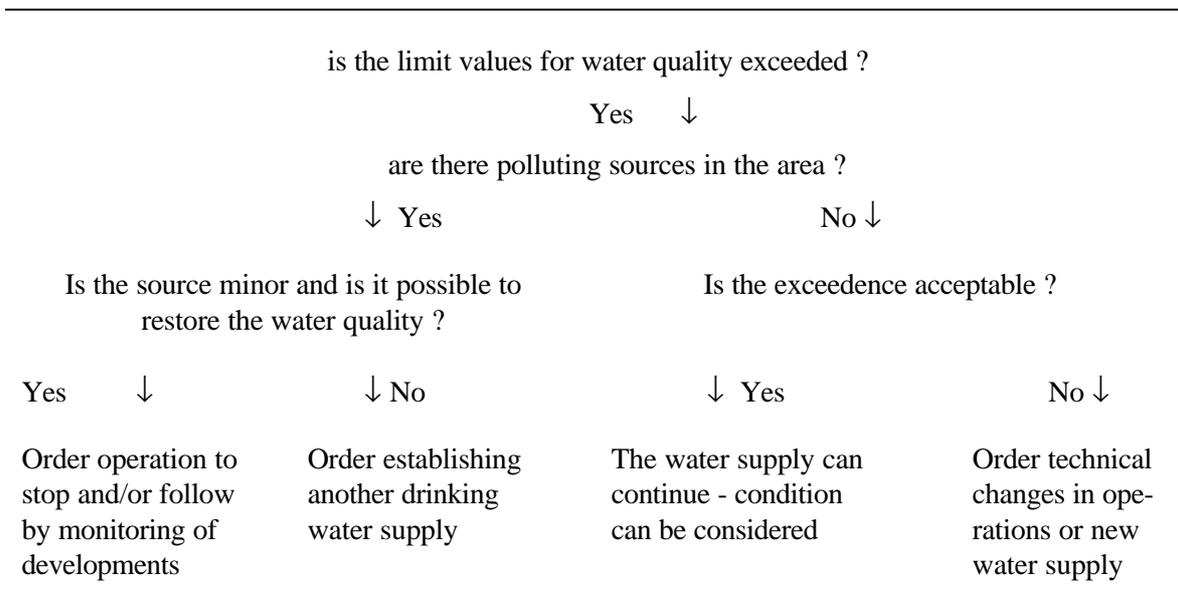


Figure B1 Recommended response to unsatisfactory water quality

B5.3 Remedial Action

If the drinking water does not comply with the quality standards, the municipality under Subsection 19(1) is granted the discretion to order the drinking water supply company to suspend operations temporarily or to stop operations - or to order a range of other

⁵ Answer from Director of the Danish EPA from September 24, 1996, j.nr. 272-0024.

measures. The same discretion is granted in case of immediate danger for contamination of drinking water [Subsection 19(2)]. The decision of the local council in this case is to be made after consultation with the health officer.

The wide discretion of the municipalities is subject to the approval of the county according to Subsection 19(4). Based on this provision, the county is granted discretion to ban the use of drinking water or to order supply from another drinking water well - but only when the competence is either delegated by the municipality to the county or it is a question of approval of exceedence of limit values under Section 5.

When an approval for a derogation is granted, the county is required to decide which measures should be taken during the period of derogation (Subsection 5(5)). The remedial action is, in most cases, to drill a new well and to remediate the aquifer by pumping and discharging contaminated groundwater to a nearby stream. Discharge authorisation has to be granted by the county.

In case of nitrate exceedences, until the mid 80s, the following guidelines applied;

- if concentrations were between 50-65 mg l⁻¹, water supplier had one year to solve the problem;
- if concentrations were between 70-100 mg l⁻¹, the water supplier had half a year to comply with the standard, and
- if concentrations were above 100 mg l⁻¹, groundwater could not be used for drinking water production.

These guidelines do not currently apply and if another source of water can be found, no derogations are granted.

For pesticides exceedences, the current rules are that if the concentrations of any pesticide in a well exceeds the standard of 0.1 µg l⁻¹, and another source of supply is available, the well is closed and the water is pumped and discharged to a nearby stream if an authorisation has been granted by the county. If concentrations exceed the standard of 0.1 µg l⁻¹ but no other source is available, water is still abstracted and used but with strict restrictions on use and drinking water is supplied by alternative source such as tanker. When concentrations reach 0.05 µg l⁻¹, monitoring is increased up to a sample every six months. Normal frequency for pesticide monitoring is every two years.

Due to a wide network of wells and a good level of interconnections between water works, water supply companies have often the opportunity to abandon a well which does not comply with quality standards, whilst retaining the capacity to supply water from other aquifers.

In Copenhagen, if during control of untreated water at a well, contaminants are found in concentrations higher than the permitted level in drinking water, either the entire well field or the individual well or wells concerned are closed. Even though it may be possible to dilute pollution to a level below the threshold limit value by mixing water, pollution in

excess of permitted levels is not acceptable. When pollution of a well or a group of wells is registered, Copenhagen water supply works alongside the county and municipality involved in order to implement measures to prevent the spread of pollution and take steps to detect and remove or limit the sources of pollution.

It is reported that close links between the municipal water company and county officials are usually in place during a case of exceedences. As most common remedial action comprises drilling a new well, county officials keep an eye on the progress of remedial actions as they are responsible for granting a licence for any new abstraction.

B6. PROSECUTION AND PENALTIES

Infringements of the quality standards under Statutory Order No. 515, 1988 are not sanctioned in any way. According to Section 33, penalties are limited to the following: [a] failure to monitor as required under Section 7-15; [b] failure to retain records on monitoring under Section 18(1); [c] failure to notify the municipality, when monitoring shows the quality standards are violated; [d] failure to comply with administrative order under Section 19. Violating the quality standards under Section 4 without approval is not in itself subject to penalties.

B7. CONSUMER RIGHTS

Disputes on the right to abstract water or on compensation for damages caused by the utilisation of water was until 1969 mainly a private law issue. The 1969 and 1978 Act on Water Supply established a more administrative oriented regime. In Denmark, consumer rights can be divided into three different categories:

1. to abstract water;
2. in case of damages due to the utilisation of water;
3. to appeal against decisions.

B7.1 Rights to Abstract Water

Private landowners placed outside an area for a common water supply are entitled to abstract water on their own land, when the water quality complies with the legally binding limit values, provided the county has not decided that the landowner is obliged to be connected to the common drinking water supply company under Section 29 of the Act. On the other hand the common drinking water supply company is obliged to supply landowners in the area under Section 49 of the Act. For the benefit of common water supply plants - private or public owned - other small wells can be closed and the owners obliged to be connected with the common water supply system, but the owner has the right to receive compensation in these circumstances [Section 37].

However, compensation has been denied in a number of administrative decisions because the water quality of the well did not comply with the drinking water quality standards. In the *Weksö v. Örbæk Municipality case*, [KFE.1989.184], compensation was granted because her well was not contaminated. In 1996 a court of appeal granted the supervision authority was the discretion to oblige a private owner to be connected to a common water supply plant because the water in his private well did not comply with the drinking water quality standards [MAD.1996.91].

B7.2 Rights in Case of Damages due to the Utilisation of Water

In this case, the administrative appeal regime is supplemented by liability law. Individuals have several rights when water quality standards are violated:

1. One of the legal rights of individuals when water quality standards are violated is to be informed of the monitoring results. Furthermore, as in the *Birthe Lundquist-case* (see below) water suspected to be contaminated or not in compliance with the quality standards is often - but not always - ordered to be monitored and paid by either the supervision authority or the drinking water supply plant. In some cases, political pressure had led to rather expensive monitoring, without detecting any subsequent breach of the standards.
2. Consumers have the right to compensation for damage caused by drinking water not complying with the standards, provided that the damage can be considered to be caused by the drinking water. In legal theory it is presumed that any damages caused to health or property by bad quality of drinking water are subject to strict liability under the Danish Act on Product Liability, implementing the directive 85/374 on product liability. Until now, no court cases have been reported on product liability, and the Danish EPA has no knowledge of any case where compensation has been settled for such damages. However in *Kirsten Nielsen v. Hundested Municipality* (see below) a consumer was granted compensation for damage caused by contamination of the supplied drinking water from the supervision authority, which also was the owner of the drinking water supply plant. Liability in this case was, however, based on negligence.
3. The right for individuals to enforce their right to drinking water complying with the quality standards of the directive has not been seen in practice. In Danish legal theory, the question is only dealt with in one publication [EU-Environmental Law, 1996 - Danish title: EU-miljøret], where the anticipated answer is *yes*, based on the doctrine of direct effect. From consultations with the legal officer of the drinking water department in the Danish EPA, I know they have the same opinion. However, the viewpoint is not supported by any practice from court - and traditionally, Danish courts have been reluctant to recognise administrative standards as enforceable by citizens.
4. Individuals, receiving drinking water not complying with the quality standards, have the right to examine whether the enforcement authorities are acting properly. This right is granted by the Constitution, Section 63. However, the courts are very

reluctant to set aside the decisions of the local authority on what is a ‘proper’ response. In that sense, the right to examination appears to be more a formal than a real right.

B7.3 Right of Appeal

According to Statutory Order No. 515, 1988, Section 32, decisions on the water quality in the municipality or the county are the subject of administrative appeal to the Danish Environmental Protection Agency, in accordance with the Water Supply Act Sections 75 and 76.

The term *decisions* includes in this context [1] approval of higher limit values on substances under Section 5 of the Statutory Order No. 515, 1988; [2] administrative orders to comply with the limit values of the Statutory Order No. 515, 1988; [3] administrative orders to the drinking water supply company to take precautionary measures to comply with the limit values under Section 19 of the Statutory Order No. 515, 1988; [4] administrative orders to the consumers to take precautionary measures under Section 19 of the Statutory Order No. 515, 1988; [5] administrative orders to stop operations under Section 19 of the Statutory Order 515, 1988; [6] administrative orders to be connected to another drinking water supply drilling under Section 30 of the Water Supply Act.

Even decisions not to enforce are subject to administrative appeal, as the *Birthe Lundquist-case* (the background) shows. However, if it is not possible to identify a decision and the municipality remain passive, legal action against the supervision authority (the municipality or county) can only be taken by the Minister of the Interior. Passivity in enforcement by municipalities are only subject for inspection and censorship by the Minister of the Interior under the Act for Statutes of municipalities and counties [Kommunestyrelsesloven]. Under this regime, citizens are not granted legal right to enforce.⁶

The *right to appeal* is granted for: [a] the addressee of the approval or the administrative order; [b] the Public Health Officer; [c] the county when decisions are taken by a municipality; and [d] any physical or legal person with legal vested interests in the decision [the Water Supply Act, Section 80].

However, the *scope of administrative appeal* is limited because the administrative structure under the Water Supply Act is decentralised, leaving the municipality and the counties wide discretion to decide how to respond when the limit values are exceeded and even when this endangers public health. This was stressed by the Minister of the Environment, Mr. Auken in an unpublished answer to the Parliament Committee on

⁶ See paper from the Danish EPA to the Minister of the Environment of December 7, 1992 concerning the drinking water supply in a big part of the Capital (Frederiksberg) in response to a claim to the Minister from one of the citizens in the area. However, as in this case, this does not prevent the Danish EPA from contacting the municipality.

Environment and Planning [answer on question 132 given January 18, 1995 (j. nr. M 2034-0128)]:

“Supervision of drinking water quality is based on the principle that the supervision authority make a concrete decision on how to respond in each case where the limit values are exceeded [...] The municipality has under the Water Supply Act Section 62 no obligation to order operations to cease or to order the restoration of the drinking water quality [...] Even when the water is a danger to health, the municipality is only obliged to decide, *what* should be done. The options of response are wide, and go from requiring stricter observations to an administrative order to stop operation. What response to chose, depends on an evaluation”.

The decisions by the Environmental Protection Agency on water quality are not subject to further administrative appeal. However, the addressee of the decision and other physical or legal person with legal vested interests in the decision are, under Section 63 of the Constitution, granted the right to a court review of the decision made by the Danish EPA or the municipality.

Based on the material provided by the Danish EPA and published administrative decisions, it can be concluded that citizens seem to be very reluctant to make administrative claims for poor drinking water quality. Complying with drinking water quality appears to be considered more as a political than a legal issue. Thus, citizens appear to use the media and political pressure rather than legal remedies.

B8. COURT CASES

Disputes on drinking water issues can be divided into five categories:

1. Disputes on whether the municipality or county have the competence to withdraw the license to landowners to abstract water for their own consumption and the competence to oblige landowners to be connected to a common water supply plant. *Weksö v. Örbæk Municipality, KFE.1989.184*, see below. In a number of cases the landowners fight for their right to use their own contaminated water - so the question is not if citizens have the right to clean water - but on the contrary: if they have the right to use contaminated water. A major part of the cases fall into this category.
2. Disputes on precautions concerning whether a landfill could be licensed to operate in the neighbourhood of a common water supply plant. In *KFE.1975.170* and in *KFE.1980.77* the Environmental Appeal Board denied citizens the right to administrative appeal concerning approval of landfills based on their interest in clean drinking water supply arguing that the interest of clean ground water must be expected to be taken care of by the drinking water supply company.
3. Disputes on precautions concerning whether the supervision authorities are granted the discretion to order clean up of contaminated soil on private land to prevent

pollution of drinking water. Under Danish Law the question can be solved under, at least, six different legal schemes.

4. Disputes on whether the drinking water from the communal water supply plant complies with the quality standards. Based on the research and information provided by the Danish EPA, there are very few cases of this kind.
5. Disputes between communal water supply plants and the counties, questioning administrative orders from the county to comply, or partly comply, with the drinking water quality standards.

The major part of the cases analysed for this report are administrative claims of the last category from private communal drinking water supply plants or municipalities requesting approval of exemptions from the binding limit values. Based on these cases it must be concluded that the local authorities - and even the Danish EPA - in several cases have granted approval to exceed the limit values, where the source of the contamination was neither geological nor meteorological. Approval has only been granted for a fixed period of time - and the Danish EPA has in the last few years not approved exemptions when this could endanger health.

Selected Cases:

Kirsten Nielsen v. Hundested Municipality. Frederiksværk lower court, judgement October 28, 1992 [BS 496/91]. After appeal to the higher court [BS 2991/92] the case was settled in court August 10, 1994.

Background: In 1979 the plaintiff - a citizen (private household) supplied with drinking water from the municipality owned drinking water supply company - complained that the water was dirty, and in 1981 the citizen claimed compensation. Compensation was accepted by the insurance company of the municipality: 500 D. kr. (about £44) because the water was not drinkable and 10.000 D. kr. (£884) because the water damaged the laundry. In 1983 the pipelines were changed and in 1984 the plaintiff complained to the Public Health Officer. Monitoring of the quality of the water showed high concentrations of bacteria and remedial measures were established. In 1986 the plaintiff again claimed for compensation. The claim was denied. In 1988 the plaintiff requested the municipality to change the installation and to ensure the drinking water quality was in accordance with the quality standards. The request was denied and the decision was by administrative appeal brought to the Danish EPA. Almost two years later in March, 1990 the Danish EPA ordered the municipality to comply with the drinking water quality standards. In May 1990 Hundested Municipality requested the Danish EPA to reconsider the decision, but the decision was upheld again by the Danish EPA in February, 1991.

Court case: In July 1991 the plaintiff started a liability action in a lower court claiming 125.000 D. kr. (£11 000) in compensation for damage: 75.000 D.kr. (£6600) for costs for drinking contaminated water; 10.000 D. kr. (£884) for costs for boiling the water; and 30.000 D. kr. (£2650) for expenses to buy clothes caused by damage to the laundry. Maybe because the accused was the municipality - and not the drinking water supply

company - the claim for damage was based on negligence and not on product liability. The lower court concluded that the municipality had caused damage to the plaintiff by negligence and assessed the damage to 50.000 D.kr. due to lack of proof of all the damages. After appeal by the municipality the case was settled in 1994 within the high court under the same conditions as ruled by the lower court.⁷

Approval of higher limit values: After Hundested municipality lost the lawsuit in the lower court and after the Danish EPA refused to change the decision, the municipality in December, 1992 requested the County for approval of higher limit values of *permanganate* oxidisability under the derogation clause in the Statutory Order No. 515, 1988, Section 5. The application was granted by the County April 21 1993 permitting 20 mg l⁻¹ (the binding limit value is 12 mg l⁻¹) for a period of five years. The Commission was not notified, despite the fact that the water from the two wells were mixed and that this water was part of the supply which seemed to cover more than 5000 people.

Birthe Lundquist v. Studebjerg Vandværk (Water supply company) is a case pleading before a higher court [Östre Landsret, 15. department, BS 19/1988 - the date for court procedure is fixed to the end of October, 1997]. The case includes two claims to the EU Commission.

Background: The case started in 1984 when Birthe Lundquist claimed the drinking water from the company, Studebjerg Vandværk, was contaminated. Monitoring showed the claim was correct and the operation was moved to another well. However, since then Birthe Lundquist has almost been in a war against the public authorities. Two complaints had been made to the EU-Commission. Several administrative claims have been made to the Danish EPA. The Minister of the Environment and even the Prime Minister has taken part in the correspondence and the Parliamentary Committee on Environment has been involved. Based on the correspondence and the material provided by the Danish EPA all monitoring shows the drinking water from Studebjerg Vandværk complies with the quality standards. Even the independent experts appointed by the court have not been able to establish evidence to support that the water is contaminated or does not meet the quality standards. In November, 1997 the high court is expected to give its judgement.

Weksö v. Örbæk Municipality, KFE.1989.184: Under the Water Supply Act, Örbæk Municipality had ordered a number of private owners using their own well to stop operations and to be connected to the Öksendrup vandværk (water supply company). After complaints from the citizens to the Danish EPA the administrative order was upheld. An administrative appeal was then made to the land tribunal pursuant to Section 30 of the Water Supply Act by the landowner, Weksö claiming for compensation because the water from her well was not contaminated. Compensation for this reason was granted.

KFE.1995.284, Andersen and others v. Ribe County: Under the Waste Deposit Act, Ribe County had ordered Andersen and other private landowners to stop using their privately owned wells because of an old landfill in the neighbourhood. Compensation was granted

⁷ See High Court, 8. departement, records of the court, August 19, 1994, BS 2991/92.

under the Waste Deposit Act Section 15, but the landowners claimed for more compensation and brought the case first before the Land Tribunal and later on appeal before the Higher Land Tribunal. The Higher land tribunal concluded that compensation must be estimated on two criteria: (a) increase of property value caused by improvement by the new water supply including the impact caused by better quality of the water; and (b) the age and quality of the privately owned wells.

I/S Klarup og Omegn Vandværk case: Because of damage to a sewer close to a drinking water well, contaminated water entered the drinking water supply in December 1995. At the end of January 1996 the leak to the sewer was discovered and monitoring of the drinking water showed a very high concentration of bacteria. In the meantime many of the citizens in the area reported sick. When the monitoring result was known, the County of Aalborg immediately ordered all water used for human consumption to be boiled - referring to the Water Supply Act, Section 62. This order was repeated at the drinking water plant, I/S Klarup og Omegn Vandværk, in March 4, 1996 and the plant operator was ordered to disinfect the drinking water pipeline system and further details on how to disinfect the pipelines was sent on March 17. I/S Klarup og Omegn Vandværk made an administrative claim to the Danish EPA against the order to disinfect the drinking water pipeline system, arguing that the water, after two months, had improved substantially and a new well was expected to make further improvements. The Danish EPA upheld the administrative order but made the supplementary remark that the correct response would have been to stop using the drinking water for consumption and bathing (for unknown reasons the Danish EPA, at the time, did not find it necessary to stop the drinking water supply to the area, presumably this would have posed an even greater risk).

B9. SOURCES OF INFORMATION

B9.1 Contacts

WRc contacts

Visits were made at two different areas in Denmark; Aarhus County and Copenhagen municipality. Meetings were organised with relevant people at the Aarhus county office and at the public water supplier for Aarhus municipality as well as Copenhagen Water Company.

- Mr Richards Thomsen, Aarhus County , Head of groundwater department;
- Mr Lars Schroder, Aarhus Municipal Water company, Engineer;
- Mrs Else-Marie Ostergaard, Aarhus Municipal Water company, Production;
- Mr Soren Lind, Copenhagen Water Supply Company, Chemical Engineer, Head of laboratory;

- Mrs Inge Bendix, Copenhagen Water Supply Company, Head of Microbiological laboratory.

The public utilities of the municipality of Aarhus has 14 water works abstracting groundwater from 107 wells and supplies some 21 million m³ of water annually to about 240 000 inhabitants. Around 3700 samples are taken every year, 63% are taken from treated water. Drinking water is a mixture from several wells and is reported to be of high quality.

The Copenhagen water company supplies drinking water to the city of Copenhagen (53% of its total supply) and to some other municipalities. The annual total volume of drinking water supplied (in 1996) amounts to 67.96 million m³. The company runs seven water works located in different catchment areas abstracting groundwater from 753 wells and two surface water treatment works.

IIEP/Peter Pagh, Associated Professor, Copenhagen University, Faculty of Law

- Janne Forslund, Legal Department, Danish EPA.
- Lise Wessenberg, Legal Officer, Danish EPA.

B9.2 Legislation

Statutory Order No. 515 of 29 August 1988 on water quality and supervision of water supply plants (Translation)

The Act of Water Supply No. 299 of 8 June 1978 amended. (Translation)

The Waste Deposit Act No.420 of 13 June 1990 (Translation).

The Act on compensation for damage to the environment, No. 420, 1994. (Translation).

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APPENDIX C ITALY

C1. SUMMARY OF COUNTRY SITUATION

Italy is a republic comprising 20 regions, 94 provinces and 8092 communes. In general, the central government proposes framework laws and ensures inter-regional co-ordination with respect to implementation of regulations.

It consists of a narrow peninsular stretching over 1200 km from the Alps into the Mediterranean Sea which, together with the larger islands of Sicily, Sardinia and Elba, covers a total land area of 324 000 km². Approximately 41% is used for arable agriculture and permanent crops, and 17% as permanent grassland; about 23% is covered in forest. There are few mineral resources; some gas, oil and coal is exploited, but this provides a very small part of national consumption.

There are great economic and social differences between the north and the south of Italy. The north is highly industrialised and the standard of living is much higher than in the south. This latter area, which includes Sardinia and Sicily, still relies to a great extent on agriculture.

The country receives relatively abundant rain, on average 1000 mm year⁻¹, but this is not evenly distributed between seasons and regions, and high evapotranspiration causes significant losses. Italian drinking water is mainly supplied through 12 000 public water supplies systems. Most Italian municipalities (99.2%) are totally or partially supplied by surface water and only certain mountain areas in the north are served by groundwater. Groundwater resources are considered to be fully utilised.

In central and southern Italy supply systems are often vulnerable to droughts, while at the same time leakage from both reservoirs and badly maintained distribution networks cause significant losses.

Visits were made to two different areas in Italy; Milan and Rome municipalities. Meetings were organised with the main water supplier, Consorzio di Acqua Pottabile (CAP) and the Health Authority in Lombardia Region and Emilia Romagna's main water supplier, ACEA, and the Italian association of water suppliers, Federgasacqua.

C2. ORGANISATION AND MANAGEMENT OF WATER SUPPLY

The historical approach of providing water as a social duty and that it should be available for sanitary reasons, has driven the development of water management in Italy. This has resulted in a highly fragmented and decentralised management system and the trend is towards a federalist state organisation.

The Responsibilities and jurisdiction related to the water management are organised in a complex system:

- At a central level, the Ministry of the Environment and the Ministry of Public Works have jurisdiction on the planning and environmental regulations and the Ministry of Health on sanitary aspects;
- The regions are responsible for implementing national policy;
- The Provinces have authority over environmental and sanitary control;
- The Municipalities acting under the general control of central government, are responsible for supplying water services. The elected Mayor is held legally responsible for ensuring that quality standards are maintained.

The size and services provided by the water operators vary considerably. In the major towns in the north and central Italy, plus Naples and Palermo there are well-organized Municipality owned companies. For the minor cities, similar organisations have been formed, 'Consortia', gathering together the water management responsibilities of a few Municipalities. Most of these entities run other services (gas, electricity distribution, transportation, etc.). In recent years, most of them have also taken over from the Municipality the management of drainage and sewage treatments works. The private sector has played a marginal role for some time, decreasing from around 30% in the mid 1950s to not more than 4-5% at the end of the 1980s, having an involvement mainly in the management of small sewage treatment works in the towns without Municipality-owned companies. However, data from the Italian group (which accounts for over half the market share held by private entrepreneurs) show a considerable upswing in the 1990-1994 period, both in terms of licences (from 237 to 415) and in terms of inhabitants served (from 1.4 to 2.7 million) and amount of water supplied (from 100 to 221 million m³

In the South of Italy (Puglia, Basilicata, Sicily and Sardinia Regions), large "public boards" have been formed (Enti pubblici) to manage schemes on drinking water supplies and waste collection treatment.

'Municipality owned companies', 'Consortia' and 'Public Boards' are part of 'Federgasacqua' (230 members in total, 131 water management associations), a trade association which covers organisations supplying about 60% of the water delivered in Italy.

C3. LEGAL AND INSTITUTIONAL FRAMEWORK

C3.1 General Framework

The Presidential Decree No. 236/88, has established standards adopted for drinking water in Italy providing full legal implementation of the Directive 80/778.

The latest legislation issued in Italy is contained in Law No. 36 of 5th January 1994, “Disposizione in materia di risorse idriche” (Galli Law). It includes guidelines for drinking water quality control but is mainly aimed at improving and completing the water management guidelines described in the Presidential Decree No. 236; 24 May 1988. Implementation of the Galli Law has been monitored by Federgasacqua. So far 12 Regions have adopted the law, and eight are under agreement and it is expected to be in full operation in about three years.

The principal objectives of the Galli law are:

- Water management should be organised in ‘optimal territories’ (i.e. river basins or catchments) and defined by the Regions.
- Provinces and Municipalities are combined to form larger authorities, the “Autorita di Ambito”. Local authorities are responsible for water, and they are required to undertake a survey of current conditions.
- Establish a tariff structure based on the “Price-Cap” formula.

This reorganisation process will represent a dramatic change for Italy, with over 10 000 small independent enterprises reduced to slightly over one hundred average size companies.

C3.2 Implementation of EC Directive

Italy enforced the EC directive concerning drinking water with Presidential Decree No. 236 of May 24, 1988. In compliance with the EC directive, the Decree provides quality standards for water intended for human consumption and provisions regarding the general preservation of water from pollution. The decree incorporates, almost completely, the same standards as the EC directive.

Italy has found real difficulties in implementing the EC Directive for certain parameters and to overcome these problems, the Regions adopted derogations for undesirable substances (Decrees 1988, 1992), pesticides and related substances (Decree 1989) and organ-chlorine compounds (Decree 1991). These derogations were issued by the Ministry of Health in association with the Ministry of Environment:

C3.2.1 Deviations from the Directive

The Presidential Decree No.236 includes maximum concentration (MAC's) and guide values. The Decree is less strict than the Directive in respect of:

- For the taste and odour parameters a dilution number of 3 at 12 °C is laid down compared to 2 in the Directive.
- The MAC range for pH is 6-9.5 compared with the guide range of 6.5/9.5 cited in the Directive.

- No MAC is given for potassium.
- No guide value is quoted for zinc in water stagnating in the distribution system.
- No guide value is quoted for barium.

Two guide values are stricter than those specified in the Directive:

- Nitrate: 5 mg l⁻¹ compared to 25 mg l⁻¹ in the directive
- Permanganate oxidisability: 0.5 mg l⁻¹ compared to 2 mg l⁻¹ in the Directive.

The Decree establishes values for certain parameters for which no limits are specified in the Directive:

- Total hardness should be in the range 15 to 50 °F (MAC) (The Directive specifies a minimum requirement of 15 °F for softened water).
- An MAC of 30 µg l⁻¹ is specified for other organochlorine compounds (parameter 32) to be met by 8 May 1991.
- An MAC of 1000 µg l⁻¹ is specified for copper.
- An MAC of 3000 µg l⁻¹ is specified for zinc.

As described in WRc report DoE 1964-M/1 the decree also establishes restrictions on use and control of private property and industrial/agricultural activities in order to protect the environment and water resources. Note especially the creation of protection zones around ground and surface water intakes; and the introduction of a register designed to control agrochemical pollution.

Table C1 Italian standards less stringent than EC MAC

Parameter	EC MAC	EC Guide value	Italian MAV ^a	Italian Guide value
Taste	2 at 12 C° 3 at 25 C°	0	3 at 12 C° 3 at 25 C°	0
pH	9.5	6.5-8.5	6-9.5	6.5-8.5
Potassium	12 mg l ⁻¹	10 mg l ⁻¹	-	10 mg l ⁻¹
Barium	100 µg l ⁻¹	-	-	-

Table C2 Additional Italian standards

Parameter	EC Guide value	EC MAC	Italian MAV	Italian Guide value
Copper	100 $\mu\text{g l}^{-1}$ ^b 3000 $\mu\text{g l}^{-1}$ ^c	-	1000 $\mu\text{g l}^{-1}$	100 $\mu\text{g l}^{-1}$
Zinc	100 $\mu\text{g l}^{-1}$ ^b 5000 $\mu\text{g l}^{-1}$ ^c	-	3000 $\mu\text{g l}^{-1}$	100 $\mu\text{g l}^{-1}$

a - MAV: Maximum admissible value (see section 1.5.2)

b - outlet from pumping and/or treatment plant

c - after a stagnation time of 12 hours and at the consumer's tap

C3.3 Control of Drinking Water Quality

Decree 236/88 sets out two different types of controls: 'internal or preventive' and 'sanitary'.

- Internal control: authorities responsible are water suppliers, having to check water quality in the catchment and at treatment plants and monitoring in the supply system.
- Sanitary control: carried out by the Unita Sanitaria Locale (USSL), responsible for supervising water quality in the network system.

Sampling schemes are drawn up annually including modifications on the number of analyses and parameters in order to adapt to the local needs. Usually these schemes are agreed with water suppliers.

There are four levels of control: minimum, normal, periodical and occasional, differing with respect to parameter and frequency of analysis.

C4. PUBLICATION OF REPORTS

There are no provisions in the Presidential Decree on the dissemination of information concerning the quality of drinking water, however the information should be made available in accordance with other laws, concerning freedom of access to information held by public authorities.

When monitoring indicates a potential threat to public health, a record of the actions proposed and measures taken by the Region should be sent to the Minister of Health and the Minister of Environment. In the two Regions studied (Lombardy and Emilia-Romagna) this appeared to be rarely carried out.

Lombardia Region draws up statistical reports based on the annual summary reports received from the provincial Unita Sanitaria Locale (USSL) on monitoring analysis.

C5. ENFORCEMENT PROCEDURES

C5.1 Legal Basis

The main legislation used to enforce quality of drinking water is Decree No.236, 1988, this includes the responsibilities of the State and Region. The latter can allow derogations, specify actions or measures together with the local authority and the water supplier when drinking water does not comply with standards and there is a risk to health. The State under the Minister of Health and the Minister of Environment is responsible for guiding and co-ordinating all necessary activities to apply or implement this Decree.

C5.2 Authorised Derogation for Exceptions from the Limit Values

Powers of derogation, similar to those given in the Drinking Water Directive, are included in the Presidential Decree. Regional authorities have the power to allow a derogation from the maximum concentrations (MAC) established in Appendix 1 up to maximum admissible values (MAV), (par.3, Art 18). These derogations are allowed for a limited period of time and include a plan of action: identification of the cause of the problem; estimation of the area involved and the population affected; actions to be taken for the elimination of the pollution; and the determination of the financial costs involved, and penalties to be imposed against parties concerned.

Maximum Admissible Values are determined by the health authority and are only applicable to single or groups of parameters as laid down in different decrees:

- Decrees of 14 July 1988 (DM 1988): undesirable and organoleptic parameters. The period of derogation ended in 1992.
- Decree of 14 February 1989 (DM 1989): herbicides (Table C3). The duration must not exceed 24 months and be as brief as possible.
- Decree of 8 May 1991 (DM 1991) for other organo-chlorine compounds, which included a MAV of 50 µg l⁻¹ and duration of a maximum of three years.

These decrees have now been repealed. A modified decree has been issued for undesirable substances;

Decree of 20 January 1992 (DM 1992) for undesirable substances and organoleptic parameters and allows temporary periods of breaches of standards before returning to the MAC. This specifies stricter maximum values than the previous Decree for four parameters: nitrates, magnesium, sulphates and sodium (Table C4). This Decree also includes the prescribed time period for achieving the MAC after remedial actions: three years for nitrate and fluoride, and five years for ammonium, magnesium, manganese, iron, sulphate, sodium and dry residue. However, this Decree is likely to be repealed in the near future.

Table C3 Maximum admissible values (MAVs), DM 1989

Parameter	MAV
Atrazine ($\mu\text{g l}^{-1}$)	0.8
Simazine ($\mu\text{g l}^{-1}$)	0.4
Bentazone ($\mu\text{g l}^{-1}$)	4
Molinate ($\mu\text{g l}^{-1}$)	0.3

Table C4 Comparison of maximum admissible values DM1988-DM1992

Parameter	MAV (DM 1988)	MAV (DM 1992)	Comments
Nitrate (mg l^{-1})	100	75	Water with values $>50 \text{ mg l}^{-1}$ cannot be used for feeding new-borns and children under one year of age nor can it be drunk regularly by subjects at risk, such as debilitated, weak individuals affected by hepatic disorders, or for dietetic food production.
Fluoride (mg l^{-1})	3-1.4	3-1.4	Variable MAV according to the average temperature of the air (from 8 to 30 degrees) in the area considered.
Ammonium (mg l^{-1})	10	10	The MAV indicated can be reached only when it is certified that the ammonium is of geological origin and that the water of origin presents no biological pollution. That MAV is reduced to 4 mg when the water is treated with chlorine and its derivatives, except chlorine dioxide.
Magnesium (mg l^{-1})	125	100	The MAV can be reached in particular hydrogeologic situations, provided that the concentration of sulphate (SO_4) is not greater than 400 mg l^{-1} .
Manganese (mg l^{-1})	0.2	0.2	The MAV can be reached in particular hydrogeological situations.
Iron (mg l^{-1})	1	1	Idem.
Sulphate (mg l^{-1})	500	400	Idem.
Sodium (mg l^{-1})	350-300	250	With a compliance of 80%-90%, with respect to the MAV, calculated from the total of the analytical results over a three year reference period.
Dry residue (mg l^{-1}) (at 180°C)	3000	3000	

Measures adopted have to be communicated to the State; through the Ministries of Health and Environment which monitor these on an annual basis.

C5.3 Remedial Action

The situations for which remedial actions are required are defined broadly in legislation; “When results of analysis show a potential public health hazard, the responsible body, having evaluated the hazard, requests the region, local authority and the water supply manager to take whatever actions or necessary measures that are required” (par.3, Art.12, D.P.R 236).

Whenever the water supplier locates a potential pollution problem, an emergency plan is established and authorisation is requested from the local health authority (USSL) to implement it. The USSL normally consults the Regional authority, who after agreeing with the State, can authorise that the measures be taken.

The main water supplier in Lombardy, Consorzio Acqua Pottabile (C.A.P.), has defined short term and long term guidelines for action to be taken depending on the conditions in the case of exceedences of limits.

A list of the guidelines applied is as follow:

- Removal of the well from the network supply system.
- Active carbon filter installation, 2 weeks, (e.g. for solvents and herbicides).
- Blending with another water to reduce the concentration of the parameter exceeded.
- Exclusion of the contaminated layer of the well (e.g. using a liner), 1-3 weeks;
- Installation of additional treatment systems (e.g for nitrate, by ion exchange or electro dialysis), 3-6 months;
- In the medium-long term: improvements in the well (making it deeper and avoiding the polluted layer), 6-12 months;
- Identification of new supply points, 2-3 years.

When a local authority detects problems, they impose measures which have to be taken by the water supplier. An example of remedial actions recommended by the Health Authority of Lombardy Region is shown below (Table C5).

Table C5 Example of remedial actions recommended by the Health Authority of the Lombardy Region

Parameter	Reason	Measures/Remedial actions
Pesticides	Use of herbicides in agriculture	Annual monitoring programme on wells, and neighbouring agricultural areas.
Nitrate	Run-off of slurry, use of nitrogenous fertilisers and manure on agricultural areas.	After authorised derogation in 92 municipalities, the following measures were taken by the water suppliers: <ul style="list-style-type: none"> – use of new wells; – additional treatment; – improvements in water supply system.
Other organochlorine compounds	Industrial origin	– additional treatment
Arsenic	Nature of the ground.	– discontinue use of water supply system – water treatment

C6. PROSECUTION AND PENALTIES

Under Italian Law, a breach of the standards results in a criminal sanction of imprisonment of up to three years or the payment of a fine ranging from Lit. 250 000 up to Lit. 2 000 000 (Art. 21 of Decree No. 236/1988). When a breach is caused by local managers of the water supply, criminal sanction can only be imposed when, after receiving information that problems exist e.g analytical results, necessary measures are not taken, (Art. 26 of Law No. 36 of January 5/1994).

Only if the breach of quality standards leads to serious offences (e.g., poisoning of water), would criminal sanctions be imposed, (par.1, Art.21 of Decree No. 236/1988).

When derogations are adopted without a plan of action there is a punishment of between 500 000 and 5 000 000 lira (about £170 - £1700). For a contravention on the guidelines for the use of herbicides anyone can be charged with a financial penalty between 500 000 and 3 000 000 lira (about £170 - £1000).

When a breach of water quality standards also causes environmental damages, special regulations concerning liability for environmental damages provided by Law No. 349 of July 8, 1986 will be applied and “the person who has committed the act has to pay compensation **to the State**” (Art.18)

Where a precise calculation of the damage is not possible, the court will determine a just and equitable amount, depending upon the degree of individual fault, the cost to rectify the damage and any profit gained by the wrongdoer. Article 18, then, is based upon fault and intention.

The conduct covered by Article 18 depends not only upon the subjective intent of the wrongdoer, but also upon the objective illegality of the act, committed in violation of "law provisions".

Where the acts of two or more parties combine to cause damage to the environment, the above Article holds each party individually liable for the harm it has caused, thus derogating from the general rule of joint liability found in Article 2055 of the Italian Civil Code, which states that

"[I]f the damaging act may be attributed to more than one person, all the parties are jointly liable for the payment of damages. If one of the parties has compensated for the damage, it may claim an indemnity from each of the other parties in proportion to the degree of fault of each of these and in proportion to the damage caused. In the case of doubt, the parties will be presumed to be equally liable".

Article 26 of the Galli Law enforces everything related to the internal checking described in Decree 236/1988, obliging every manager involved in water supply to establish their own analytical laboratories to check the quality of water in the catchment, distribution network, supply system and treatment plant.

a) Background on Presidential Decree No. 236 of 1988

There are few rulings concerning the breach of water quality standards. Court decisions regarding this topic have been issued in criminal trials, where managers of local water supplies, were charged with having supplied consumers with water which was not in compliance with quality standards, (Art. 21, Presidential Decree No. 236 of 1988).

Before Law No.36, criminal sanctions were imposed simply by the occurrence of a breach of quality standards. In fact, The Italian Supreme Court ("*Corte di Cassazione*") held local managers liable in every case with the exception in the event of *force majeure* (i.e. the absence of any careless act by an interested person).

For instance: the Supreme Court decided that, even if the breach of standards were caused by heavy rains, the local manager was responsible because he was supposed to take all necessary measures to prevent distribution of non-drinkable water to consumers⁸. That case occurred in a small town near Turin, and the Mayor in charge of the water supplier was convicted for supplying water not in compliance with the quality standards. The water was polluted with faecal coliforms, and although he appealed to the Supreme Court, it upheld the decision.

The Italian Constitutional Court has distinguished between the liability of local managers of water supplies and other parties. Their reasoning is based on the fact that the tasks which the local managers of water supplies carry out are more difficult (Constitutional Court, July 26, 1996, No. 317).

⁸ Cassazione, Sect.3, June 16, 1994, No. 7067, (defendant Maffiodo)

(b) Art. 21 in general

With reference to the applicability of Art. 21 of Presidential Decree No. 236 of 1988, the Supreme Court has clarified the scope of applicability of this provision with respect to other criminal sanctions. As explained above, whenever the breach of standards result in a more serious offence, the criminal sanctions of the latter will be imposed.

For instance the Supreme Court has distinguished between the crime within the meaning provided in Art. 444 of the Italian Criminal Code, and the crime within the meaning set forth in Art. 21⁹. In Art. 444, whoever distributes to consumers foodstuff dangerous to the consumers' health is punished with imprisonment ranging from six months up to three years and the payment of a fine.

A particular case occurred in a small municipality: 'the Mayor was convicted by the first degree judge for not having warned the population that the water was not drinkable because of contamination with faecal coliforms. The Supreme Court ruled that it was necessary to clarify whether the water was harmful to public health, and whether the degree of pollution could cause injury or death, or if the water was only non-drinkable, i.e., not in compliance with the standards provided in Presidential Decree No. 236 of 1988. Eventually the Supreme Court ordered a new trial, because it was not clear which offence he had actually committed.'

According to Court decisions, interpreting Art. 444 of the Italian Criminal Code, the concept of non-drinkable water must not be confused with the concept of harmful water which is defined as water which is dangerous to the public health. Therefore, whenever the breach of standards results in a danger to the public health, the protection of consumers is guaranteed by the heavier criminal sanctions imposed by Art. 444 of the Italian Criminal Code which becomes applicable.

Water analyses are therefore extremely important, and must be carried out in compliance with the requirements set forth in the Italian Code of Criminal Procedure.

With reference to this principle, the Supreme Court in a criminal trial for breach of water quality standards, held that the water analyses carried out were not valid as proof against a defendant to justify the applicability of criminal sanctions against him, because the defendant was not notified of the date and hour when water analyses were to take place as requested by the Italian Code of Criminal Procedure¹⁰. 'A Mayor of a group of municipalities, was convicted for supplying water not in compliance with the quality standards. The Supreme Court ordered a new trial because, in the first, the analysis did not take place with respect to the right procedure'.

If one looks at the penalties under Statutory Order No. 515, 1988, infringements of the quality standards are not sanctioned in any way. According to Section 33, penalties are limited to the following four types: [a] failure to monitor as required action under Section

⁹ Cassazione, Sect.1, September 22, 1995, No. 933 (defendant Zamboni)

¹⁰ Cassazione, Sect.3, May 6, 1994, No.5310 (defendant Elena)

7-15; [b] failure to retain records on monitoring under Section 18(1); [c] failure to notify the municipality, when monitoring shows the quality standards are violated; [d] failure to comply with administrative order under Section 19. Violating the quality standards under Section 4 without approval is not in itself subject to penalties.

C7. CONSUMER RIGHTS

In private and public societies consumers can participate in the managing of the water supply as “prestiti obbligazionari”(obliged loan).

C7.1 General Principles of Italian Law Concerning the Right to Bring an Action

According to the Italian legal system, a legal action can be brought only if there is a cause of action and consequently a right to obtain a remedy in the Courts. We call the cause of action the “interest to commence legal action”. An “interest” is created whenever an individual needs a judicial remedy to defend his properties or himself. Compensation is allowed only under the provisions of Art. 2043 of the Italian Civil Code, which states that

“[. . .] Compensation for unlawful acts: any fraudulent, malicious or negligent act that causes an unjustified injury to another, obliges the person who has committed the act to pay damages¹¹”.

The Italian system of liability centres around the interpretation of this provision and around the concept of unjustified injury (*damnum iniuria datum*) therefore a *damnum contra ius* and a *damnum non iure*. According to Italian Court decisions, not just any injury can be indemnified. Compensation is granted only when the injury is “unjustified”, that is, whenever the injury prejudices a “subjective right” (“*diritto soggettivo*”).

Common Law legal systems are not familiar with the distinctions between subjective rights and legitimate interests. This distinction exists specifically under the Italian legal system, and we can therefore assume that under Italian law, injuries to personal rights like honour, health, life or to property rights, are subjective rights and always indemnifiable, while in other cases, compensation may be more difficult for an injured party to obtain since the Court will deem it a legitimate interest and therefore will not acknowledge the existence of a “subjective right” (i.e., a *damnum contra ius*) to be indemnified.

Please note that whenever an injury is also a criminal offence, there is always a right to compensation.

¹¹ The Italian civil Code and complementary legislation translated by Mario Beltramo, Giovanni E. Longo, John Merryman. New revised and updated edition 1996.

C7.2 Rights to Go to Court and Rights to Compensation

C7.2.1 Civil and administrative proceedings

Once it is determined that an individual consumer has a legitimate interest and therefore the right to commence a cause of action, as explained in point 1 above, the consumer can file a petition to the Regional Administrative Court whenever he believes that an unlawful derogation to the standards issued by a Local Authority has been authorised.

The Court will verify if the local authority acted in compliance with the law or not, and this may result in the cancellation of the derogation.

If the violation has caused personal injury to the individual or damage to his goods he also has the right to compensation. Please note that the right to compensation can be enforced only in the Civil Courts and only after the Administrative Courts have annulled the unlawful derogation.

According to Art. 18 of Law No. 349 of July 8, 1986, Associations for Environmental Care also have standing to file a petition with the Regional Administrative Court against the derogation, but they lack the "subjective right" required to justify their injury, therefore, they do not have any right to seek compensation in the Civil Courts.

In addition, neither the associations or the individual consumer can ask the Court whether a Public Authority is acting properly: the Administrative Court will make this judgement during the proceedings for the annulment of the unlawful derogation.

C7.2.2 Criminal proceedings

According to the Italian Code of Criminal Procedure, a number of associations exist which safeguard the interest of those adversely affected by criminal activities. Such associations can participate in a criminal trial standing alongside with the Public Prosecutor to strengthen his position. Associations do not have either the right to compensation or the right to reimbursement for the trial expenses.

As explained above, a breach of the standards on environmental law constitutes a criminal offence. The criminal trial therefore is an opportunity for Associations for Environmental Safety, to enforce consumers' rights for water with certain quality standards.

Whenever an individual has suffered a personal injury from the criminal offence, he will have the right to compensation. The right can be enforced either during the criminal trial or in a new civil trial against the defendant.

C7.2.3 Conclusion

Decree No. 236 of 1988, provides almost the same standards as the EC directive. Therefore, any breach of EC standards also constitutes the breach of Italian standards and there are no *Community rights* enforceable by individual consumers.

An individual consumer can go to Court only if he has the right to commence a cause of action under Italian Law i.e. if he has a legitimate interest or a subjective right: an individual consumer, having the right to commence a cause of action can file a petition to the Regional Administrative Court whenever he discovers that an unlawful derogation to the standards has occurred.

Whenever the breach of standards has caused personal injury to the individual or damage to his goods the consumer has the right to compensation.

C7.3 Rights to Information

Recently, with Law No. 39 of February 24, 1997, Italy has implemented EU directive No. 313 of June 7, 1990, concerning the freedom of access to information on the environment. Art. 3 of the above mentioned Law, in compliance with the same provision in the EU directive, provides that Public Authorities shall make available information relating to the environment to any individual upon his request.

The Law is an important milestone in the enforcement of individual rights to a healthy environment. In fact, before its enactment, under Italian law there was little possibility for an individual to discover whether or not Public Authorities were acting in compliance with environmental law.

According to Law. No. 241 of August 7, 1990, the access to any information held by Public Authorities was allowed only when the applicant could prove an interest in the information: the interest had to be qualified, specific, and current.

Since the implementation in Italy of Directive 90/313/EEC, anyone can file a request for information about the quality of drinking water. The Public Authority who holds the information must answer within 30 days. If the Public Administration does not respond within the term or if it refuses to provide a response, the applicant can file a petition to the Regional Administrative Court. The Court, in turn, may order the Public Administration to forward the information requested.

However, it should be noted that there is a gap between the individual consumer's rights to information and the ability to commence a legal action on the basis of what the consumer may have uncovered from the information provided to him.

It may be that an individual after becoming aware that the quality of drinking water is not in compliance with the standards set forth by the law, would not have a cause of action in Italian courts. This has not been tested.

An individual consumer can file a petition with the Local Civil Court to ascertain if Local Authorities are acting properly to ensure drinking water standards are updated, but he has to prove a specific personal interest in this information *i.e.* an interest different from the interest of a *quisque de populo*; for instance if *his* health or *his* goods are in danger.

C8. COURT CASES

Some ‘test cases’ involving actions against local managers of water suppliers have already been discussed in Section C6.

Pretura Unificata di Torino on article 10 (1), 80/778/EC

Reference has been made to the Court of Justice of the European Communities by a judgement of the Pretura Unificata di Torino (Magistrates Court of Turin) of 22 July 1987, for a preliminary ruling in criminal proceedings against persons unknown on the following question:

“Must Directive 80/778 EEC on the quality of water intended for human consumption, and in particular Article 10 (1) thereof, be understood as authorising Member States to introduce derogations in the ways and in the circumstances in which the orders of 25 June 1986 and 22 December 1986 and Order No 135 of 3 April 1987 of the Ministry of Health and the orders of 7 October 1986, 30 December 1986 and 17 April 1987 of the Region of Piedmont¹² were introduced?

Judgement of the Court

1. “Authorisation to exceed the maximum admissible concentrations shown in Annex 1 to Directive 80/778/EEC relating to the quality of water intended for human consumption, as provided for in Article 10 of that Directive, must be granted only in the event of an emergency in which the national authorities suddenly have to cope with difficulties in connection with the supply of water for human consumption;
2. Such authorisation must be limited to the time normally necessary in order to restore the quality of the water affected, must not pose any unacceptable risk to public health and may be granted only if the supply of water for human consumption cannot be maintained in any other way.”

This judgement appears to refer to the ‘blanket’ derogation issued for atrazine and molinate on a national or regional basis probably based on toxicological considerations, similar to those set in the Decree of 14 February 1989 (see Section 1.5.2) where limits higher than 0.1 µg l⁻¹ were permitted. The latter decree has subsequently been withdrawn.

¹² Authorising water to be used for supply for human consumption in which the concentration of atrazine and molinate did not exceed specified limits.

C9. SOURCES OF INFORMATION

C9.1 Contacts/Contributors

People contacted/interviewed (WRc)

Prof. P. Berbenni, Politecnico di Milano, Dipartimento di Ingegneria Idraulica, ambientale e del Rilevamento, Sezione Ambientale.

Dr. Tavecchia, Director of Consorzio di Acqua Potabile (CAP) and Subdirector of Federgasacqua.

Dr. G. Petterlongo, Responsible for water resources, CAP.

Dr. M. Mattacotta, Federgasacqua

Dr. B. Moli and Dr. M. Salamana, Servizio Igiene Pubblica, Settore Sanita, Regione Lombardia.

IEEP: A Capria and A Montagnani, Brasio, Casati and Associates, Milan.

C9.2 Legislation

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APPENDIX D GERMANY

D1. SUMMARY OF THE COUNTRY SITUATION

Germany is a Federal Republic consisting of 16 individual states (*Länder*). Of these, 5 *Länder* (of the former East Germany, the so-called *New Länder*) joined the Republic on re-unification on 3 October 1990. These have been undergoing fundamental changes in their governmental structures to bring them in line with the structures of the original Federal Republic.

Duties are distributed between the central government (*Bund*) and the *Länder* which have a high degree of autonomy; they have legislative powers but also participate in federal legislation and implement federal laws as well as their own laws.

In some areas, such as national security, the federal government has been granted exclusive competence by the constitution (*Grundgesetz*). In most areas of environmental protection, e.g. air pollution, noise abatement, waste management, the federal government and the *Länder* have concurrent competence; the *Länder* participate in the lawmaking process and enforce these laws directly. In other areas, covering nature protection, land use and water management, the federal government only has powers to pass broad framework laws, and the *Länder* implement the federal laws with their own legislation (CEC 1993).

Länder administrations vary from Land (state) to Land, but typically comprise the Higher State Authorities (state level - *Land*), Lower State Authorities (regional level - *Bezirk or District*) and Local/Municipal Authorities (local level - *Landkreis or Stadtkreis*). In city states (e.g. Hamburg, Berlin) the intermediate level is omitted.

Germany is a densely populated country (Area 356 854 km², population density 222 per km²) with varied geographical conditions ranging from plains bordering the North Sea to the Alps in the South.

D2. ORGANISATION AND MANAGEMENT OF WATER SUPPLY

Germany relies heavily on groundwater and springwater (72%) for its drinking water supplies, the rest is derived from surface water (22%) and bank filtrate (6%). Groundwater is often supplied with minimal or no treatment, and the overall philosophy is as far as possible to protect water supplies to ensure that these can be used in their natural state with minimum use of treatment.. About 97.9% of the population are connected to public water supplies (UBA 1997); there are still a large number of relatively isolated farmhouses and other properties which rely on their own wells or springs for drinking water.

The supply of drinking water to the public is an obligation for towns and municipalities (Mutschmann and Stimmelmayer, 1991), incorporated in the right of self-government (*Selbstverwaltung*), as laid down in the German Constitution. The structure of public water supply takes various forms. In small municipalities, it is normally part of the general administration (*Regiebetrieb*). Economic enterprise (*kommunale Eigenbetrieb*), governed separately by the general administrative body, and municipal enterprises (*Eigengesellschaften*), private law companies in municipal ownership are widespread. Municipalities and districts (*Kreise*) can link and form a common water supply association, the so called “*Zweckverband*”. These public corporations (*Körperschaften des öffentlichen Rechts*) are legal entities which have the right of action and can be sued. Another form of management of drinking water supply is the delegation to private organisations. However, the municipality remains responsible for the lawful supply of drinking water to the public. A recent trend has been the formation of larger water supply companies which distribute water over relatively large distances (*Fernwasserversorgung*). This is often due to the need to close down small community wells which are contaminated with nitrate and/or pesticides, where the installation of treatment to achieve compliance with the Drinking Water Regulations is economically less viable than the transport of water from large supply plants.

Extensive investments were needed in the New Länder to bring their water supplies in line with the rest of the country; this was largely achieved through closing small old treatment plants and building new larger plants, renovating or replacing old distribution systems and connecting properties to public water supplies, as well as implementing water protection measures. A special programme, ‘*Sofortprogramm Trinkwasser*’ was set up by the Federal Government (Ministry of the Environment, with co-ordination provided by the Federal Health Department) to assess the problems, and to co-ordinate and monitor the investment and improvement programmes. Special regulations were passed which allowed a delay in full compliance with the Drinking Water Regulations in the New Länder (see Section D3.2 below).

Drinking water quality is subject to Federal legislation under the responsibility of the Federal Ministry of Health (*Ministerium für Gesundheit*, prior to a reorganisation in 1993, the Ministry of Youth, Family, Women and Health - *Ministerium für Jugend, Familie, Frauen und Gesundheit*). The latter is advised by the Federal Department of Health (*Bundesgesundheitsamt*) and the Institute for Water, Soil and Air (*Institut Wasser-Boden-Luft - WaBoLu*). Since the reorganisation in 1993, WaBoLu is subordinate to the Federal Ministry of Environment, Nature Conservation and Nuclear Safety (*Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit*). However, WaBoLu has dual roles, having previously been subordinate to the Ministry of Health, it has retained certain duties and responsibilities to this Ministry, particularly in the field of drinking water.

The Ministry of Health is also advised by a special commission on drinking water (*Trinkwasserkommission*), a committee of scientific experts which advises the Federal Government on issues of drinking water quality, and assists in the provision of advice to Länder Authorities on the interpretation of legislation.

The Federal Association of the German Gas and Water Industries (*Bundes Gas- und Wasserverband - BGW*) also plays an active role by promoting the interests of its members on policy, technical, legislative, economic and organisational matters. In addition, the technical and scientific tasks of the water industry are supported and co-ordinated by the German Association of Gas and Water Professionals (*Deutscher Verein des Gas- und Wasserfaches - DVGW*) which also has research establishments and issues technical guidelines for the water industry, including guidelines on the protection of raw water sources, such as the setting up of groundwater protection zones and compensation schemes associated with these.

D3. LEGAL AND INSTITUTIONAL FRAMEWORK

D3.1 General Framework

The Federal Drinking Water Regulations 1990 (*Verordnung über Trinkwasser und über Wasser für Lebensmittelbetriebe - Trinkwasserverordnung - TrinkwV*, as amended 1993) play the central part in the control of drinking water quality. These Regulations are an example of a special product regulation in the area of foods and, consequently, it has its legal basis in the 1974 Federal Act on Foods and Essential Goods (*Bundes Lebensmittel- und Bedarfsgegenständegesetz*, last amended 1993). Because of the significance of the hygienic aspects of drinking water, the Regulations also have a foundation in the Federal Epidemics Act 1979 (*Bundes-Seuchengesetz*).

The Drinking Water Regulations cover public and private supplies (e.g. consumers' own wells, and installations supplying drinking water to a group of tenants).

D3.2 Implementation of Directive 80/778/EEC

Germany implemented the Drinking Water Directive with the Drinking Water Regulations (*Trinkwasserverordnung - TrinkwV*) which entered into force on 1 October 1986, and was based on an earlier *TrinkwV* (1975, as amended 1984). The *TrinkwV* ignored several obligations of the Drinking Water Directive, and the chemical parameters of Annex 2 (*Anlage 2*, some toxic metals, nitrite and nitrate, PAH, pesticides) did not enter into force until 3 years later (1 October 1989).

The delays in implementing the Directive were largely due to a reluctance to add to the existing regulations, which were based entirely on health considerations, chemical parameters considered to be unrelated to health effects.

The Commission threatened action and followed this up with court proceedings against the Federal Republic of Germany (Case C-237/90, OJ 1990). The Commission claimed that Germany had neither fully, nor in good time, implemented the Directive, particularly by:

- not fixing values for all the necessary parameters as set out in Annex 1 of the Directive, and
- permitting or providing for derogations without complying with the requirements of Articles 9 and 10 of the Directive.

Germany responded by revising the Drinking Water Regulations (1990, which came into force on 1 January 1991). This involved the addition of several parameters, and changes in paragraph 4 which relates to derogations, such as the inclusion of the word ‘emergency situations’, and the requirement to notify the higher authorities Land and/or Federal) about derogations. However, in its judgement of 24 November 1992 (Case C-237/90, OJ 1992) the European Court still ruled that Germany had not complied with the requirements of Articles 9 and 10 of the Directive, by permitting certain derogations, and not requiring the Länder to notify permitted derogations to the Federal authorities prior to 1991.

The microbiological parameters are set out in Article 1 of the TrinkwV 1990, Limit Values (LVs, *Grenzwerte*) and some guidevalues (GVs, *Richtwerte*) for the chemical parameters are listed in Annexes (*Anlagen*), as follows:

- Anlage 2 contains toxic elements, cyanide, PAH, organo-chlorine compounds, and pesticides;
- Anlagen 3 and 6 contain permitted treatment chemicals, and some MACs for residuals and by-products;
- Anlage 4 contains Limit Values (and minimum value for pH) for general water quality parameters;
- Anlage 7 contains GV's for copper and zinc.

Permitted margins of error with respect to the reporting of results, are included for most Limit Values.

Anlage 1 prescribes details of the microbiological, analytical techniques to be employed, and Anlage 5 gives details of monitoring requirements.

Table D1 summarises the new parameters added in the 1990 revision of the Drinking Water Regulations as well as some tighter limits with delayed implementation (Schmitz 1990). (The latest, 1993, amendment only relates to the reorganisation of the Ministry of Health, and has no other significance, see Section D3.1 above).

Table D1 Summary of new parameters and stricter limits in the revised Drinking Water Regulations (TrinkwV) 1990, with values compared to 80/778/EEC

Parameter	80/778/EEC	TrinkwV 1990
New parameters		
Antimony (mg l ⁻¹)	MAC 0.01	LV 0.01
Selenium (mg l ⁻¹)	MAC 0.01	LV 0.01
Copper (mg l ⁻¹)	GV 3	GV 3
Zinc (mg l ⁻¹)	GV 5	GV 5
Barium (mg l ⁻¹)	GV 0.1	LV 1.0
Boron (mg l ⁻¹)	GV 1.0	LV 1.0
Calcium (mg l ⁻¹)	GV 100	LV 400
Chloride (mg l ⁻¹)	GV 25	LV 250
Kjeldahl-Nitrogen (mg l ⁻¹)	MAC 1.0	LV 1.0
Phenols (mg l ⁻¹)	MAC 0.0005	LV 0.0005
Phosphorous (mg l ⁻¹)	MAC 5 (as P ₂ O ₅)	LV 6.7 (as PO ₄ , equal to 5 as P ₂ O ₅)
Soluble or emulsified hydrocarbons/mineral oils (mg l ⁻¹)	MAC 0.01	LV 0.01
Chloroform extractables (mg l ⁻¹)	GV 0.1	LV 1
Faecal <i>streptococci</i>	MAC 0 in 100 ml	LV 0 in 100 ml
Stricter limits than TrinkwV 1986:		
organo-chlorine cmpds. (mg l ⁻¹)	GV 0.001	LV 0.01 (from 1.1.92, previously 0.025)
Arsenic (mg l ⁻¹)	MAC 0.05	LV 0.01 (from 1.1.96, previously 0.04)

MAC: maximum admissible concentration (*Grenzwert*)

GV: Guide Value (*Richtwert*)

Other tightening of prescriptions in the 1990 revision included the addition of the microbiological parameters, *Legionella pneumophila* and atypical mycobacteria, However, these and a number of the newly introduced, other parameters, including pesticides, only require monitoring, if requested by the competent health authorities which are also permitted to set different limits in some cases (Anlage 3 and 6 relating to treatment chemicals and by-products, and Anlage 7 which gives GVs for copper and zinc).

Article 4 of the TrinkwV was changed to bring it in line with Article 10 of the Directive by adding the words 'emergency situations'. The requirement to notify to the highest Land Health Authority, any authorised derogations affecting water supplies delivering over 1000 m³ of water per day or supplying to at least 5000 consumers (Article 9 of the Directive) was also added to Article 4.

D3.2.1 Deviations of the 1990 TrinkwV from Directive 80/778/EEC

- LVs are not equivalent in the strictest sense to the term MAC (maximum admissible concentration). Most LVs for chemical parameters have permitted margins of error (e.g. the pesticide limit is $0.1 \mu\text{g l}^{-1} \pm 0.05 \mu\text{g l}^{-1}$) and results within these margins of error seem to be considered compliant (Gilsbach 1994). Thus, strictly, the MAC is equivalent to the LV plus the (upper) margins of error, i.e. in the case of individual pesticides, $0.15 \mu\text{g l}^{-1}$.
- The following parameters have not been incorporated into the 1990 Drinking Water Regulations:
 - Parameters for which no values or only guide values (GVs) are given in the Directive: silica, total hardness, dissolved oxygen, total organic carbon, hydrogen sulphide, cobalt, beryllium, vanadium and suspended solids;
 - Parameters which are covered by other parameters: dry residue and total hardness and alkalinity.
- The LVs for both lead and arsenic were $40 \mu\text{g l}^{-1}$, (EC MAC $50 \mu\text{g l}^{-1}$) but the LV for arsenic was reduced to $10 \mu\text{g l}^{-1}$ with effect from 1 January 1996.
- The LVs for the sum of 1,1,1-trichloroethane, trichloroethylene, tetrachloroethylene and dichloromethane was set at $25 \mu\text{g l}^{-1}$, but $10 \mu\text{g l}^{-1}$ with effect from 1 January 1992. An additional limit for carbon tetrachloride was set at $1 \mu\text{g l}^{-1}$.
- The LVs for total PAH of $0.2 \mu\text{g l}^{-1}$ is expressed in terms of carbon, which effectively raises the MAC by about 10%.
- A single value of 1.5 mg l^{-1} is set for fluoride with no reference to temperature.
- The LV for turbidity is expressed in terms of Formazine units (1.5 FTU) rather than Jackson units (EC: 4 JTU).
- The Regulations state that short-term exceedences of colour and turbidity limits can be ignored.
- The LV for sulphate is 240 mg l^{-1} (EC MAC 250 mg l^{-1}) although geologically determined concentrations up to 500 mg l^{-1} are permitted (see below).

- There is provision for certain parameters in Anlage 4 to exceed the LVs if they are of geological origins, i.e. ammonia, potassium, magnesium and sulphate (details see Section D5.1).
- Anlage 3 of the TrinkwV lists permitted additives, doses and residuals for drinking water treatment. Where chlorine/hypochlorite is used, an LV for total THMs of 25 $\mu\text{g l}^{-1}$ (EC no value) applies. If chlorine dioxide is used, an LV of 0.2 mg l^{-1} chlorine dioxide applies.

D3.2.2 Special provisions for the former East Germany

The German Democratic Republic (GDR) had an exemplary Water Act and a high degree of technical knowledge in the area of drinking water treatment, but lacked investment in technology, and the enforcement of legislation was deficient (Wingrich 1997).

For the control of drinking water quality, the legal standard TGL 22 433 (Trinkwasser; Gütebedingungen) of April 1971 was in force. This standard comprised limits for 8 microbiological parameters, 5 chemical substances with toxic effects, and 29 other physico-chemical parameters. The standard had been under revision since 1980, resulting in a draft revision TGL 22 433 of July 1989, comprising a lower number of microbiological parameters (2) and a larger number of toxic chemical parameters (15). The limits proposed in the draft revision were closer to the TrinkwV 1990 of the Federal Republic (FRG), in terms of parameters and values, but had not been adopted due to the economic difficulties of the country.

Table D2 compares the limits of Anlage 2 of the TrinkwV 1990 with the limits of TGL 22 433 1971, and the 1989 revision.

An investigation ‘Sofortprogramm Trinkwasser’ initiated by the federal government immediately after re-unification, confirmed that considerable problems would be encountered in adhering to the limits set in the TrinkwV 1990. The predominant exceedences concerned the microbiology, iron and manganese, aluminium, organo-chlorine compounds (solvents, THMs), ammonia and nitrate, and toxic metals. However, only a relatively small number of works were supplying water which was considered an unacceptable risk to health. A number of problems (mainly microbiological) required immediate measures (disinfection) and, at a small number of works, the problems were considered such, that immediate measures, such as closure or use of additional treatment was required. In the majority of cases, it was considered that long-term derogations, accompanied by improvement measures, would be acceptable.

Table D2 Comparison of the limits of Anlage 2 of the TrinkwV 1990 of the FRG with the limits of TGL 22 433, 1971, and the 1989 revision of the GDR (from Wingrich 1997)

Substance	Limit values in mg l ⁻¹ according to		
	TGL 22 433 04.71 GDR	GDR Draft 07.89	TrinkwV 01.12.90
1 Arsenic	0.05	0.05	0.01 ⁽¹⁾
2 Lead	0.1	0.05	0.04
3 Cadmium	-	0.005	0.005
4 Chromium	-	0.05	0.05
5 Cyanide	-	0.1	0.05
6 Fluoride	1.3	1.3	1.5
7 Nickel	-	-	0.05
8 Nitrate	40	40	50
9 Nitrite	0.2	0.1	0.1
10 Mercury	-	0.001	0.001
11 PAH	-	0.0001	0.0002
12 Organo-chlorine compounds	-	0.02	0.01 ⁽²⁾
13 Plant protection products and pesticides	-	0.0005	0.0005
14 Antimony	-	-	0.01
15 Selenium	-	0.01	0.1

⁽¹⁾ effective from 1.1.96, previously 0.04 mg l⁻¹

⁽²⁾ effective from 1.1.92, previously 0.025 mg l⁻¹

On 4 December 1990, the EU Council of Ministers issued the Directive on the transitional measures valid in Germany for certain Community Directives relating to environmental protection (90/656/EEC). This was transposed into German law and the arrangements concerning compliance with the Drinking Water Regulations were prescribed in the Regulations for the transition to EU law (*EG-Rechts-Überleitungsverordnung*) of 18 December 1990. These involved the delay in compliance requirements as follows (Wingrich 1997, Gockel 1991):

- The measures contained in the TrinkwV 1990, concerning treatment and supply of drinking water to come into force on 31 December 1992, up to which time the old GDR regulations remained in force;
- The MACs for arsenic, lead, mercury, nitrate, pesticides, PCBs/PCTs (Anlage 2) to come into force on 1 October 1995; for cadmium on 1 October 1993;
- The MACs for the parameters colour, turbidity, threshold odour concentration, iron and manganese (Anlage 4) to come into force on 1 October 1995.

D3.3 Control of Drinking Water Quality

Due to the Federal structure of Germany, enforcement and overall supervision of drinking water quality lies with the State Health Authorities (*Landesgesundheitsamt*) of the Länder and, because of the diversity in administrations of the Länder, these may be part of different ministries, depending on the Land, e.g. Health, Food, Agriculture, Social Affairs or others.

In practice, however, most of the supervisory duties are carried out by the health departments at local level, under the direction of a medical officer (*Amtsarzt*) who is the head of the local health authority and ultimately in charge of supervision and laying down the quality requirements. However, matters directly related to the legislation will have to be referred to the Highest State Authority, for example where derogations are issued in accordance with Article 4 of the Drinking Water Regulations.

Compliance monitoring may be carried out by the health authority's own laboratories, or by authorised laboratories, in which case a health inspector (*Gesundheitsinspektor*) would control or verify the results. In some Länder, there are official certification schemes for laboratories to undertake compliance monitoring; and if a laboratory of a water works receives such certification, they may carry out compliance monitoring only for other suppliers but not their own. In other Länder, e.g. Berlin and Lower Saxony, the health authorities do not take their own samples, nor undertake their own analyses, nor do they inspect the water works or their laboratories. They merely collect data received from the water works and check whether they meet the requirements of the Drinking Water Regulations.

In some Länder, e.g. Baden-Württemberg, the State Health Department (*Landesgesundheitsamt*) undertakes compliance monitoring tasks, for example for some of the large water supply associations, and a multitude of small community and

individual/private supplies, as well as mineral water, bottled water, bathing waters, and surface waters. It has its own laboratories and research facilities, and in the area of drinking water, its responsibilities include the state supervision of drinking water quality where health issues and legal issues are concerned, and advising all regional and local health authorities on such matters.

Water samples for compliance monitoring are usually taken ex works and from the distribution system for microbiological analyses, and ex works only for all chemical parameters (including PAH) (Brauch, TZW, Karlsruhe, personal communication), except where other sampling is specifically requested by the health authority.

D4. PUBLICATION OF REPORTS

D4.1 Federal and State Level

To date, no comprehensive report on drinking water quality in Germany has been produced. Consequently, it is difficult to obtain an overall indication of the state of drinking water quality across Germany. Compliance monitoring data obtained by the health authorities is usually treated as confidential, except when it is considered necessary to inform the public about exceedence of a parameter, for example in connection with issuing boiling notices.

In connection with the obligation to supply information to the European Commission, the Federal Environment Agency (*Umweltbundesamt - UBA*) is building a database of results of drinking water analyses, collected from State Health Departments. However, this information is not available to the public.

In its Annual Report (UBA 1995), the UBA devoted a few paragraphs to drinking water standards and quality. The precautionary nature of most of the drinking water standards is emphasised, as well as the need to balance possible health risks of exceedences of chemical parameters against the risks of shutting down supplies. The legal provision of issuing derogations whilst implementing improvement programmes, in cases of exceedences where there is not considered to be a risk to health, is also explained. The report refers to exceedences in the New Länder, still occurring frequently; mainly from manganese, iron and turbidity (affecting 1.3 million consumers); and some exceedence for nitrate (affecting 1% of the population, 112 000 consumers).

Some national compliance data have recently been published in an environmental data report (UBA 1997), but only for selected parameters (notably excluding pesticides). The data for 13 of the 16 Federal States were summarised in a table showing total number of samples analysed and number of these complying/not complying with standards (separately for years 1993, 1994, and 1995, see Table D3 which also gives the non-compliance figures as a percentage of the total samples analysed). Notably, nitrate had the highest non-compliance rate (2.3-3.4% of samples); all others were below 1%, although the percentage of non-compliance increased for most parameters over the three year

reporting period. No explanation was offered for the increase and the data did not give any indication of the population affected.

Some separate information on compliance in the former East German States at the end of 1995 was also included (see Table D4). The data were presented as number of works not complying, separately for small and larger water supply works (<1000 and >1000 m³ per day) and in terms of the total population affected (number and percentage); consequently these data are not comparable with the above table (Table D3).

Table D4 shows non-compliance for most of the parameters listed, except some of the toxic substances; with the population affected ranging from less than 1000 (e.g. arsenic, cadmium) to over one million in the case of manganese. Nitrate, nitrite, ammonia and aluminium were among those affecting one to several hundred thousand consumers. The table also shows that compliance problems were particularly widespread among relatively small treatment works (<1000 m³ per day). Although the situation was not considered satisfactory, it was pointed out that considerable improvements had been achieved since unification; for example, some of the toxic parameters were monitored for the first time after re-unification and about 10% of the population was found to be supplied with water exceeding the limits of toxic parameters (UBA 1997). Improvements were achieved mainly through closure of small supplies and construction of new, larger treatment works, as well as construction, renovation or replacement of distribution systems.

Table D3 Drinking water non-compliance data published in Germany (13 of 16 Federal States) for selected parameters (works supplying more than 5,000 population) (UBA 1997)

Parameter	Number of samples analysed			Number (and %age) of samples not complying with limit value		
	1993	1994	1995	1993	1994	1995
Odour	54,669	56,507	36,387	11 (0.02)	16 (0.02)	2 (0.005)
Turbidity	56,621	58,779	37,711	223 (0.39)	310 (0.53)	183 (0.49)
Temperature	48,180	51,125	30,711	12 (0.02)	11 (0.02)	18 (0.06)
Conductivity	51,854	55,810	33,841	4 (0.008)	2 (0.004)	1 (0.003)
pH value	46,127	48,936	32,979	64 (0.14)	36 (0.07)	106 (0.32)
Free chlorine	60,402	64,142	20,564	62 (0.10)	37 (0.06)	12 (0.06)
Nitrate	17,269	17,682	10,814	402 (2.33)	601 (3.40)	351 (3.25)
Nitrite	12,348	12,840	7,636	8 (0.07)	70 (0.55)	16 (0.21)
Ammonia	11,305	12,104	6,080	33 (0.29)	23 (0.19)	20 (0.33)
Coliforms	141,008	152,319	102,325	884 (0.63)	1011 (0.66)	750 (0.73)
<i>E. coli</i>	140,747	152,134	10,2043	338 (0.24)	393 (0.26)	384 (0.38)
Total colony count 22°C	142,207	153,333	102,228	897 (0.63)	1181 (0.77)	732 (0.72)
Total colony count 36°C	141,875	153,061	101,111	724 (0.51)	947 (0.62)	743 (0.73)

Table D4 Drinking water non-compliance data published for the former East Germany - data at end of 1995 (UBA 1997)

Parameter	Non-compliance at Waterworks supplying		Population affected x 1000	Population affected %
	>1000 m ³ per day	<1000		
80/778/EEC Annex I, List A (organoleptic parameters):				
Colour	11	80	270	1.5
Turbidity	15	265	460	2.0
Odour	0	2	0.9	<0.1
80/778/EEC Annex I, List B (physico-chemical parameters):				
pH	10	466	337	1.8
Conductivity	0	12	20	0.1
Chloride	1	10	56	0.3
Sulphate	40	130	695	3.8
Calcium	0	3	4	<0.1
Magnesium	16	84	314	1.7
Sodium	2	19	83	0.5
Potassium	3	64	54	0.3
Aluminium	8	59	230	1.3
80/778/EEC Annex I, List C (undesirable substances):				
Nitrate	5	186	104	0.6
Nitrite	2	19	227	1.2
Ammonium	5	38	134	0.7
Kjeldahl-N	1	9	19	0.1
Permanganate value	5	21	49	0.3
Mineral oil	0	3	2	<0.1
Phenol index	1	14	20	0.1
Boron	0	2	11	<0.1
Surfactants	0	0	0	0
Organo-chlorine compounds ¹⁾				
- solvents (limit 0.010 mg l ⁻¹)	0	0	0	0
- CCl ₄ (limit 0.003 mg l ⁻¹)	0	7	6	<0.1
Iron	12	314	466	2.6
Manganese	38	558	1095	6.0
Phosphorus	0	2	5	<0.1
Fluoride	0	2	0.5	<0.1
Barium	0	3	4	<0.1
Silver	0	0	0	0
80/778/EEC Annex I, List D (toxic substances):				
Arsenic	0	1	0.4	<0.1
Cadmium	0	1	0.1	<0.1
Cyanide	0	0	0	0
Chromium	0	0	0	0
Mercury	0	0	0	0
Nickel	0	3	5.4	<0.1
Lead	0	0	0	0
Antimony	0	0	0	0
Selenium	0	0	0	0

Parameter	Non-compliance at Waterworks supplying		Population affected x 1000	Population affected %
	>1000 m ³ per day	<1000		
Pesticides				
- individual	0	1 ²⁾	0 ²⁾	0
- total	0	0	0	0
PAH	0	0	0	0
Total for List D parameters	0	6	5.9	<0.1

1) Excluding disinfection byproducts

2) Compliance achieved through mixing of supplies

D4.1.1 Annual reports on water management at Federal level

These reports are produced and published through collaboration of several Federal Ministries (Ministry of Food, Agriculture and Forestry, Ministry of Environment, Nature Conservation and Reactor Safety, Ministry of the Interior, Ministry of Health, Ministry of the Economy, and the Ministry of Traffic) (Anon 1996). They contain all aspects of water management and planning, including financial aspects, public works, surface water quality, flood defence, water supply (mainly statistics on water usage, investments costs etc.), waste water treatment facilities, information on new or revised legislation and protective measures.

The report consists of separate contributions from each Land and a summary covering all these to indicate the situation at Federal level. Some of the contributions (covering the year 1995) of the individual Länder include a small amount of information relating to drinking water quality, directly (only one with some data) or indirectly through reference to improvements in treatment facilities, connections to public supply, renovation of distribution systems, and groundwater protection measures (particularly in the New Länder). This is summarised below:

Baden-Württemberg: Occasional problems of non-compliance with respect to nitrate, pesticides, and microbiology - solved using legally permitted procedures or immediate measures; report refers to the need for long-term protective measures (extension of groundwater protection zones).

Bayern (Bavaria): No reference to drinking water quality.

Berlin: Extensive improvement/renovation programmes relating to distribution systems and treatment facilities, mainly in the former East German part.

Brandenburg ('New' Land): Extensive improvement/renovation programmes, focusing mainly on connections of households to public supplies, in order to replace supplies from private wells contaminated with nitrate, and improvements in treatment facilities and renovation/replacement of distribution systems.

Bremen: No reference to drinking water quality.

Hamburg: No reference to drinking water quality, except the setting up of a groundwater monitoring network, with a view to planning precautionary, protective measures, if found necessary.

Hessen: No reference to drinking water quality, except extensive water conservation and groundwater protection measures, including co-operation with farmers to minimise nitrate and pesticide input (95% of drinking water derived from groundwater).

Mecklenburg-Vorpommern ('New' Land): Installation of new ozone treatment plant to decrease the organic content of the water, to reduce chlorine and chlorine dioxide usage, and to improve taste and odour; in addition, the new installation was to provide a more flexible treatment facility allowing responses to fluctuations in raw water quality (River Warnow).

Niedersachsen (Lower Saxony): Introduction of new State legislation to provide increased groundwater protection measures, and regulate agriculture, particularly to reduce the nitrate input.

Nordrhein-Westfalen (North Rhine Westfalia): No reference to drinking water quality.

Rheinland-Pfalz: No reference to drinking water quality.

Saarland: No reference to drinking water quality.

Sachsen (Saxony) ('New' Land): Amendments of legislation to increase groundwater protection measures and compensation to farmers in relation to groundwater protection zones, and extensive investments focusing on;

- construction of water treatment works to achieve compliance with Drinking Water Regulations (in particular, aluminium concentration and pH),
- Construction of larger water works to replace smaller works which were either uneconomic or unable to comply with Drinking Water Regulations,
- connections of households to public water supplies in order to replace private wells not complying with the nitrate limit, and
- renovation/replacement of distribution networks.

Sachsen-Anhalt ('New' Land): This is the only report which contains a small table of non-compliance results for a few drinking water parameters in public supplies (see Table D5).

Table D5 Exceedence of limits in public water supplies, in terms of population affected (numbers) (Anon 1996, Sachsen-Anhalt)

Region/State	Parameter/group							
	Fe/Mn		Ca/Mg/Cl/SO ₄		NO ₃		heavy metals	
	1994	1995	1994	1995	1994	1995	1994	1995
Dessau	11 300	17 000	23 700	21 000	300	1 600	0	0
Halle	93 600	90 000	179 100	157 000	4 000	3 200	0	0
Magdeburg	22 000	12 000	25 700	18 000	4 000	7 200	0	0
Sachsen-Anhalt	126 000	119 000	228 500	196 000	8 300	12 000	0	0

The increase in non-compliance with the nitrate parameter in two Regions was considered to have been due to discontinued cultivation of land which had previously been fertilised excessively; discontinuation of cultivation caused excessive leaching of nutrients no longer taken up by crops. The increase in exceedence of Fe/Mn in one Region (Dessau) was explained by a return to service, for economic reasons, of a previously abandoned waterworks unable to supply water of the required quality.

In addition to the above, non-compliance with the nitrate parameter and with respect to microbiology in small (private) supplies, was reported to occur relatively frequently. However, connections to public supplies were increased to cover 99% of the population.

Schleswig-Holstein: Investments in construction of centralised public water supply works and connections of households to these large water works, no reference to drinking water quality.

Thüringen ('New' Land): Major investments in supply networks, including long-distance mains (*Fernwasserversorgungen*). The report mentions that full compliance with standards prescribed in the EC Directive was not achieved by end of 1995, despite considerable efforts, but no water was supplied from public works which constituted a risk to health of consumers.

Overall, the above reports from the individual states indicate that there are still considerable problems relating to drinking water quality, particularly in the former East Germany. These problems are being addressed through investments in drinking water treatment plants, rationalisation and centralisation of supply works, new connections and renovation of distribution systems. Long-term measures are also being implemented; these are aimed at protection of raw water supplies, especially groundwater which provides the majority of drinking water supplies throughout Germany.

D4.1.2 State Health Department Baden-Württemberg

The State Health Department (*Landesgesundheitsamt*) of Baden-Württemberg publishes an annual report of activities and results from monitoring (Hingst 1997). The report covers a wide range of activities in the field of hygiene, environmental health, toxicology, medicine, including research and State supervisory responsibilities. The section on public and private water supplies includes a summary of microbiological analyses of drinking water. Non-compliance was particularly high among small/private wells (28.8% of a total of 943 samples), less in small community supplies (7.2% of 11 715 samples) and lowest in large public supplies (1.1% of 2814 samples). The high numbers of incidents in small/private wells is of particular concern to the Health Department. These problems are rectified through short-term measures, such as boiling and disinfection, and if the contamination persists, wells may be shut down if alternative supplies can be found. There are still large numbers of remote properties (many farms) in Baden-Württemberg, not connected to sewerage and water mains; well contamination is often caused by cess pits which are located too close to the wells (Dr med Sacré, Landesgesundheitsamt, personal communication). However, non-compliance in these small community or private wells does not require reporting to the Commission.

D4.1.3 Water suppliers

Some water suppliers, particularly the large companies, issue annual reports which may include water quality data. Such data are usually presented as annual average results, and may not include all parameters prescribed in the Drinking Water Regulations. Tables of such results are also offered to consumers, on request.

D5. ENFORCEMENT PROCEDURES

D5.1 Legal Basis

The quality requirements for drinking water are set out in the Drinking Water Regulations 1990 as described in Section D3.2.

Article 1 prescribes the microbiological parameters which must not be exceeded (or increased over the normal levels in the case of total colony counts) in any case (also guidelines issued by the former Federal Health Authority, *Bundesgesundheitsamt - BGA*, now the Federal Institute for Consumers' Health Protection - *Bundesinstitut für den gesundheitlichen Verbraucherschutz*) (BGA 1987/1988).

According to Article 15, a water supplier or owner of a water works must report without delay to the health authority, the following:

- any non-compliance with the microbiological parameters (exceedence of limits or increases in total colony counts);
- exceedence of any of the chemical parameters prescribed in Anlage 2;

- other parameters specifically requested by the competent authority; and
- any raw water problems which could lead to non-compliance.

Article 4 sets out the requirements for issuing derogations (*Ausnahmeregelungen*) in respect of chemical parameters. Derogations may be issued in cases of emergency (para. 1), or where non-compliance is due to geological conditions (para 2a) or under unusual weather conditions (para. 2b), provided there are no health risks to the consumers. Emergency type derogations may only be issued where no alternative supplies can be provided. In the case of derogations according to para. 1 (emergency) and para 2b (weather conditions), time limits must be set.

The Highest Land Authority must be informed of Para. 1 (emergency) derogations, together with the authorised limit, the estimated time period and the reasons. Para. 2 derogations (geological/weather) must also be reported, and if water supplies over 1000 m³ of water per day, or at least 5000 consumers are involved, they must also be reported to the Federal Ministry of Health.

The official explanation (Anon 1991) of the revised (1990) Drinking Water Regulations states that Article 4, para 1, constitutes a formal adjustment to Article 10, para 1 of Directive 80/778/EEC, in order to satisfy the Commission of the European Communities, without constituting material changes in the content of the Regulations. It further defines 'emergency situation' as follows:

- Sudden difficulties with the supply of drinking water;
- Interruption of supply due to other circumstances.

It is stressed that a lack of supply would constitute a significant health hazard. If the competent authorities decided to grant permission to exceed limits (Anlage 2 substances) they would have to decide, on the basis of scientific evidence, the safety of the exceedence in terms of risks to human health. Furthermore, there must be a time limit corresponding to the time required to restore the quality to that required by the Regulations.

Certain exemptions are permitted without the need for formal derogations, by incorporation into the Drinking Water Regulations, Anlage 4, as follows:

- a) if the substances are present due to geological conditions:
 - Ammonia (LV 0.5 mg l⁻¹): up to 30 mg l⁻¹;
 - Potassium (LV 12 mg l⁻¹): up to 50 mg l⁻¹;
 - Magnesium (LV 50 mg l⁻¹): up to 120 mg l⁻¹;
 - Sulphate (LV 240 mg l⁻¹): up to 500 mg l⁻¹;
- b) if silver is used in the treatment drinking water:
 - Silver (LV 10 µg l⁻¹): up to 80 µg l⁻¹.

D5.2 Official Guidelines from the Federal Authorities

The Federal Ministry of Health and the Federal Health Department (*Bundesgesundheitsamt - BGA*) have issued guidelines for dealing with exceedences for nitrate (BGA 1986) and pesticides (BGA 1989) and for the toxicological assessment of exceedences (Wallauer 1988). These are applied extensively, in practice, but have no legal standing. They are discussed below.

D5.2.1 Nitrate

The first guideline which was issued by the Federal Health Department (BGA 1986), coinciding with the initial implementation of Directive 80/778/EEC, concerned exceedence of the nitrate limit. The BGA recognised that many, mainly relatively small, water supplies would not comply with the new nitrate limit of 50 mg I⁻¹ (the limit in Germany was 90 mg I⁻¹ prior to the 1986 implementation of the Directive). In the guideline, the BGA states that, following extensive consultations with the Drinking Water Expert Committee (*Trinkwasserkommission*), it can be concluded that:

- Nitrate in drinking water up to the previous limit of 90 mg I⁻¹ has not led to any detectable damage to the health of the population; and
- No case of methaemoglobinaemia caused by nitrate in drinking water, in the FRG, has been described in the scientific literature.

Consequently, the BGA recommended that:

- Time-limited derogations for up to 90 mg I⁻¹ NO₃ can be issued in accordance with the provision of Article 4. The derogation must be accompanied by improvement measures which promise success;
- In particular, agricultural measures must be initiated without delay to improve the quality of the contaminated groundwater source;
- Treatment measures should only be considered in exceptional circumstances;
- Consumers must be informed if the nitrate concentration is above 50 mg I⁻¹ and, as a precautionary measure, water with less than 50 mg I⁻¹ nitrate must be used for the preparation of baby food.

D5.2.2 Pesticides parameter

In its guidelines (BGA 1989) the Federal Health Department has made recommendations for a large number of pesticides and degradation products (DPs), for which derogations may be issued. In this document, guidance is provided on the pesticides and DPs which may be found, and, hence, should be monitored. A list is provided of pesticides and DPs for which no derogations may be issued (see Table D6). The others were classified into

groups A, B and C with maximum limits up to which derogations may be permitted, as follows:

- A up to 1 $\mu\text{g l}^{-1}$
- B up to 3 $\mu\text{g l}^{-1}$
- C up to 10 $\mu\text{g l}^{-1}$

Details of these are shown in Tables D7, D8 and D9.

Table D6 Pesticides and degradation products for which no derogations should be issued (BGA 1989)

Pesticides:

amitrole
1,3-dichloropropene
methyl bromide

Degradation products:

p-bromoaniline
2-chloroaniline
3-chloroaniline
1-chloro-p-aminophenol
3-chloro-4-fluoroaniline
3-chloro-4-methoxyaniline
5-chloro-p-toluidine
3,4-dichloroaniline
2,6-diethylaniline
2,6-dimethylaniline
p-isopropylaniline

all genotoxic degradation products, e.g.

genotoxic aromatic amine and nitro compounds
genotoxic chlorinated cyclenes

Table D7 Substances for which temporary derogations may be issued, for concentrations not exceeding 1 µg l⁻¹ (Class A) (BGA 1989)

alachlor
 aniline
 3-chlorophenol
 2,4-dichlorophenol
 3,6-dichlorophenol
 dazomet
 diazinon
 ethoprophos
 haloxyfop
 MCPA
 N-isopropylaniline
 S 421
 thiofanox

non-genotoxic aromatic amine and nitro compounds
 non-genotoxic chlorinated cyclohexenes
 non-genotoxic chlorinated cyclenes

Table D8 Substances for which temporary derogation may be issued, for concentrations not exceeding 3 µg l⁻¹ (Class B) (BGA 1989)

aldicarb (including major degradation products)
 6-amino-1,3,5-s-triazine
 atrazine (including major degradation products)
 dichlorobenzamide
 dichlorophenolcarboxylic acid
 dinoseb
 dinoseb acetate
 endosulfan
 flamprop-methyl
 lindane
 methamidophos
 methomyl
 methyl-isothiocyanate
 metobromuron
 metolachlor

Table D9 Substances for which temporary derogations may be issued for concentrations not exceeding 10 µg l⁻¹ (Class C) (BGA 1989)

alloxydim
 anilazine (and dichlor-s-triazine)
 asulam
 azinphos-ethyl
 benalaxyl
 benazolin
 bendiocarb
 bentazone
 bromacil
 carbetamid
 carbofuran
 carbosulfan
 chloramben
 chloridazon
 chlorfenvinfos
 chlorthiamid (and degradation products)
 chlorotoluron
 clopyralid
 cyanazine
 2,4-D
 dicamba
 dichlobenil (and degradation products)
 dichlorprop
 1,2-dichloropropane
 1,3-dichloropropene
 dikegulac
 dimefuron
 dimethoate
 dinoterb
 diuron
 DNOC
 ethidimuron
 ethiofencarb (and degradation products)
 etrimfos
 fenpropimorph
 fluazifop-
 fluroxypyr
 hexazinone
 isocarbamid
 isoproturon
 karbutilate
 linuron
 maleic hydrazide

Table D9 continued

mecoprop
mefluidide
metalaxyl
metam-sodium
metazachlor
methabenthiazuron
metoxuron
metribuzin
monuron
nitrothal-isopropyl
oxadixyl
oxamyl
oxycarboxin
parathion
pendimethalin
picloram
pirimicarb
pirimiphos-methyl
propachlor
propazine (and degradation products)
propoxur
pyridate (and degradation products)
sebuthylazine (and degradation products)
sethoxydim
simazine (and degradation products)
TCA
tebuthiuron
terbacil
terbumeton (and degradation products)
terbuthylazine (and degradation products)
triclopyr
trifluralin

The guidance note also specifies that derogations must be accompanied by improvement programmes and must be time-limited (up to a maximum of 2 years) although extensions may be granted under some circumstances. The following improvement measures are recommended:

- Establishment of water protection zones (according to the Water Management Act (*Wasserhaushaltsgesetz - WHG*));
- Hydrogeological establishment of catchment boundaries and banning the application of certain pesticides in the catchment;
- Provision of information to farmers on pesticide application restrictions in the water protection zone; and
- Review of pesticide usage situation in the catchment.

D5.2.3 Toxicological considerations

The Ministry of Health issued guidelines in 1988 concerning the toxicological considerations for issuing time-limited derogations (Wallauer 1988) in accordance with Article 4 of the then TrinkwV 1986.

The recommendations include a table (as shown in Table D10) giving the maximum concentrations for the parameters of Anlage 2 of the 1986 TrinkwV, for which derogations may be issued, on the basis of toxicological considerations.

The general requirements are similar to those set out in the recommendations for nitrate and pesticides (see Sections D5.2.1 and D5.2.2 above), i.e. to justify the need for the derogation, the need to inform consumers and make special provisions for ‘special risk’ sections of the population, the need to implement an improvement plan and to inform the highest Land authority. However, in contrast to the time limit of two years recommended in the case of pesticide derogations (a time limit was not specified for nitrate derogations), these derogations may only be issued for a maximum period of one year.

D5.3 Authorised Derogations

Overall, it is recognised that exceedence of the MACs for chemical parameters does not present an immediate health risk to the population. Consequently, considerable use is made, in practice, of the legal provision for derogations and the recommendations issued by the Federal Authorities (see Section D5.2). Whilst the primary objective, as recommended by the Federal Health Authority, should be improvement measures directed at the raw water sources, in practice, short-term measures, such as (additional) treatment of water are often ordered by the authorities. Other measures may involve closure of wells, especially where relatively small supplies are concerned, and connection to remote, but larger supplies.

Table D10 Derogation limits (*Ausnahmewerte*) for exceedences of Anlage 2 parameters of the TrinkwV 1986, permitted for a maximum of one year (Wallaner 1988)

Parameters	MAC (mg l ⁻¹)	Derogation limit (mg l ⁻¹)	Precautionary measure
Arsenic	0.04	0.04	no derogation
Organo-chlorine compounds			
a) Dichloromethane 1,1,1-Trichloroethane Tetrachloroethylene Trichloroethylene	0.025	0.050	
b) Carbontetrachloride	0.003	0.006	
Lead	0.04	0.08	x
Cadmium	0.005	0.01	
Mercury	0.001	0.005	x
Nitrite	0.1	2.0	x
PAH	0.0002	0.0004	
Chromium	0.05	0.150	
Nickel	0.05	0.150	
Fluoride	1.5	3.0	x
Cyanide	0.05	0.2	

x - Provision of 'uncompromised' water for the preparation of food and drink for children up to the age of 6

D5.3.1 Derogations in the case of emergency situations (parameters in Anlage 2)

In the case of non-compliance with parameters of Anlage 2 (including toxic elements, cyanide, nitrite and nitrate, PAH, organo-chlorine compounds, pesticides) the local health authorities can issue derogations (*Ausnahmeregelung*) in emergencies, in accordance with Article 4, para. 1 of the TrinkwV 1990. Derogations can only be issued if human health is not compromised, and alternative supplies cannot be secured. The derogation specifies the maximum level permitted for the exceedence and a time restriction. The authorities may have prescribed maximum levels for certain parameters which, on the basis of health considerations, may be applied in derogations.

The local health authority notifies the highest health authority of the Land (in North-Rhine-Westfalia this is the Ministry of Employment, Health and Social Matters) of the derogation, giving reasons for issuing the derogation, the time limit and the maximum permitted exceedence. The highest health authority, in turn, informs the Federal Ministry of Health.

Important points for local health authorities to observe when issuing derogations are as follows:

- To demonstrate that competent experts have been consulted;
- The derogation has to include details of a ‘promising’ improvement plan; for these measures, it is often necessary to liaise with other authorities, for example State Environment Departments, as the water supplier will not have the necessary authority and responsibilities to carry out the programme;
- Compliance should be established as quickly as possible; and
- The derogation must include provisions for sections of the population specifically at risk (see for example BGA recommendations concerning derogations for nitrate, and toxic substances, Section D5.2.1 and D5.2.3 above).

Nitrate

Nitrate has frequently presented compliance problems in Germany, and the recommendations given by the Federal Health Department (BGA 1986) have been used extensively (Overath and Borchers, personal communication), i.e. the local medical officer issuing permission, for a limited period of time, to exceed the nitrate limit up to 90 mg l⁻¹, whilst ordering that water with <50 mg l⁻¹ nitrate be supplied for the preparation of baby food, and specified improvement measures be put in place.

In practice, an improvement measure frequently used by water suppliers as an intermediate measure, is to develop deeper groundwater resources with lower nitrate concentrations, and mix it with the shallower, high nitrate, groundwater. However, sometimes this means that iron/manganese removal processes have to be applied.

Treatment measures, such as (biological) denitrification, are used less often, mainly at relatively large waterworks; in North-Rhine-Westfalia, for example, at Neuss and Langenfeld-Monheim (Overath and Borchers, personal communication).

According to employees of the health agencies interviewed by IEEP (Berlin, Bonn, Munich, Heidelberg), there were no cases where the standards were not met after additional measures prescribed by the authorities had been taken.

Agricultural measures are pursued separately in collaboration with the authorities, since the water supplier usually has inadequate control over such measures.

Pesticides

In practice, it seems that derogations for pesticides are no longer issued very often (Overath and Borchers, personal communication). It is recognised that the improvement measures involving water protection, are very long-term solutions, and although such measures are frequently introduced in line with the overall policy of groundwater protection, short-term measures are normally prescribed by the authorities, instead of issuing derogations (see Section D5.4.3 below).

D5.3.2 Derogations in the case of general water quality parameters (Anlage 4)

With respect to the general water quality parameters set out in Anlage 4 of the TrinkwV, the governments of the Länder are empowered to issue derogations in the form of 'State Regulations' (*Ausnahmeregelung*) which apply throughout the given State. These Regulations can prescribe higher limits than those set out in the Federal Drinking Water Regulations, if the health of the consumers is not compromised, and where the derogation is necessary to take account of regional characteristics, as follows:

- the particular geological composition and structure of the catchment of a water works; and/or
- exceptional weather conditions (in this case the derogation must be time-limited).

The competent authorities (Land level) have to provide reasons for the *Ausnahmeregelung* and the limit set in the Regulations, and to report it to the Federal Ministry of Health, if the water supply is 1000 m³ per day or affects 5000 consumers or more. For a few parameters (ammonium, potassium, magnesium, and sulphate) maximum levels for derogations (in the case of geological conditions) have already been incorporated into the Trinkwv 1990 (see Section D3.2.1 above).

Application of this provision is relatively rare, see example below.

Iron and manganese

Iron and manganese, which are not critical in terms of a risk to health, are often present at relatively high concentrations in anoxic groundwaters, and exceedence of the LVs are common, especially in small community and individual supplies which are also covered by the TrinkwV. In these cases it is normally not considered practical to install iron/manganese removal technology.

The Land Brandenburg has issued such an *Ausnahmeregelung* which sets higher limits than the LVs of the Federal Drinking Water Regulations, for iron and manganese, and applies them to drinking water from individual (private) supplies throughout the State.

Concerning public supplies, and in other Länder in general, the local health departments frequently issue derogations or ignore short-term exceedence of these parameters. The TrinkwV 1986 included provision for short-term derogations for these parameters; these have been omitted in the TrinkwV 1990, but the practice continues for technical/practical reasons.

D5.4 Remedial Action

D5.4.1 Microbiological parameters

As prescribed in the Drinking Water Regulations (see Section D5.1 above), derogations are not permitted in the case of microbiological parameters. Any non-compliant result has to be reported immediately to the authorities (medical officer) without waiting for confirmation by repeat sampling. Although repeat analyses must be initiated and the cause investigated, immediate measures normally involve disinfection (at plant and/or the distribution system, as samples are taken ex works and from the distribution system), and boiling notices are likely to be issued to consumers, as a precautionary measure either, as decided by the water supplier, or on the advice of the local health authority Medical Officer. An increase in sampling frequency is usually also ordered by the Medical Officer, until it can be demonstrated that the water quality is satisfactory.

A practical example was cited by Overath and Borchers (personal communication) of a large city where, on one occasion in 1993, coliforms were detected in water samples taken from the distribution network. This constituted a breach of the Drinking Water Regulations; by law a derogation could not be issued, but supply was continued. The population was made aware, over the media, of the possible presence of pathogens in their drinking water, and was advised to boil the water prior to consumption. This course of action was approved by the local health authorities.

Because of the overriding importance of the hygienic quality of water, derogations are not normally considered necessary where the need to disinfect results in exceedence of the THM parameter (there is a limit of $25 \mu\text{g l}^{-1}$ total THM which applies if disinfection is used, Anlage 3), nor would the supply be discontinued. In such cases, a temporary

exceedence of the THM parameter is considered to present an insignificant risk to health, compared with the benefits of maintenance of supply and the use of chlorination to maintain the microbiological quality of the drinking water (Dieter *et al.* 1996).

D5.4.2 Pesticides

In the case of exceedence of the pesticides parameter, the authorities usually issue instructions for short-term measures without issuing derogations, such as treatment with activated carbon; this may even be carried out through the use of mobile treatment units, where the exceedence is expected to be short-term due to improvement measures which are expected to produce compliance within a short period of time (Overath and Borchers, personal communication).

D5.4.3 Nickel

Due to special conditions in the catchment of a small treatment works on the Niederrhein (in North-Rhine-Westfalia), nickel levels were sometimes above the MAC of 50 µg l⁻¹. The competent authorities considered improvement measures in the catchment as too long-term and unpromising, and ordered instead, construction of a treatment plant to reduce nickel levels in the drinking water. In the mean time, the Medical Officer tolerated exceedences for nickel without specifying the maximum exceedence, because the water supplier demonstrated that these could be kept to a minimum by mixing supplies from several wells. (Overath and Borchers, personal communication).

This is a clear example of collaboration between water supplier and health authority, without issuing an official derogation.

D5.4.4 Lead

According to statements by the health officials interviewed by IEEP, lead contamination represents a major cause of non-compliance with drinking water standards. However, this is normally a matter for the house owner to rectify, i.e. replacement of plumbing (see also court cases, Section D6.3.1 below).

D6. PROSECUTION AND PENALTIES

Failure to meet the standards of the Drinking Water Regulations constitutes either a criminal offence (*Straftat*) or a summary offence (*Ordnungswidrigkeit*), the latter being an unlawful act punishable with a fine (*Geldbuße*) rather than a prison sentence.

The Federal Epidemics Act calls for a fine of up to DM 50 000 (about £18 000) or a sentence of imprisonment for up to two years for those responsible of supplying water not complying with the limit values set in the Drinking Water Regulations. If the supply of the polluted water has caused serious disease, the maximum sentence increases to five years' imprisonment.

D7. CONSUMERS' RIGHTS

D7.1 Consumers' Rights to Information

The Drinking Water Regulations do not grant any right of information to the public. However, authorities such as the Health Department or the Ministry of Social Affairs (*Sozialministerium*) are obliged to supply information according to the Law on Freedom of Access to Information on the Environment (*Umweltinformationsgesetz of 8 July 1994*). Article 4 of this law describes the individual right of access to information pertaining to the environment. On receipt of a request, the authority can decide whether to supply oral information, to grant the inspection of records (*Akteneinsicht zu gewähren*) or to send photocopies or other written material. If the authority does not answer the request within two months or refuses to provide a response, the applicant can file a legal action against the authority at the Administrative Court (*Verwaltungsgericht*).

D7.1.1 Health agencies and water suppliers

The health agencies, when asked for information about the quality of drinking water, refer, in most of the cases, to the information given by the operators of water supply services. These may produce annual reports with some water quality data, or they may provide consumers, on request, with tables of annual average results, but not necessarily including all parameters.

D7.1.2 Consumer support organisations

'Stiftung Warentest' (Foundation for Product testing) is a foundation, financed by the Federal State, giving advice to consumers. Products and services are tested, assessed and compared by the Foundation and results are published in monthly reports. In addition, the Foundation offers private households special services, for example, to analyse heavy metals in drinking water. On request, the Foundation provides special containers in which a sample of the tap water is to be collected. The water is then analysed for lead, cadmium, copper and zinc concentrations. After 2-3 weeks the consumer receives the results, including comments and recommendations. The test is available at a charge of 45 DM (about £16).

Other associations, giving advice to consumers, are the Consumer Centres (*Verbraucherzentralen*) which can be found in each of the Länder and are financed by the Länder. Consumer Centres are divided in different sections, dealing with different areas of demand for information. They only provide information and do not analyse water samples; but hand out the results of analyses they receive from the water suppliers. They also provide information about institutes undertaking water analyses.

D7.2 Criminal Proceedings

According to the Drinking Water Regulations, the Federal Epidemics Act, and the Foods and Essential Goods Act, it is a criminal offence to supply water which does not meet the quality standards (Art. 23, para.1; and Art. 24, para. 4 of the Drinking Water Regulations, and Art. 64, para.1, 3 or 4 of the Federal Epidemics Act, or Art. 53, para. 2 No. 1 of the Foods and Essential Goods Act).

D7.2.1 The right to demand a prosecution against the supplier

A private consumer can demand a prosecution against the operator (*Strafanzeige erstatten*) of a waterworks, if drinking water standards are breached. Once notified, the Public Prosecutor is obliged to investigate the case. The Public Prosecutor then has to decide whether to take the water supply operator to court. The Health Department controlling the quality requirements can also demand a prosecution against the operator of a waterworks.

If the provision of contaminated water has caused personal injury, the supplier is prosecuted according to the Penal Code (*Strafgesetzbuch*, §§233, 223a, 224, 225, 229). The offence of bodily harm can be punished with a fine or a sentence of imprisonment of up to five years. The injured person has the right to participate in the criminal trial. This includes the opportunity to stand alongside the Public Prosecutor, which can strengthen the case (*Nebenklage*) (§395 Strafprozeßordnung).

D7.2.2 The right to compensation

The individual having suffered personal injury as a result of a criminal offence, has the right to compensation. This right can be enforced either during the criminal trial (*Adhäsionsverfahren*) or in a subsequent civil trial against the defendant (see Section 6.2.3).

D7.3 Civil Proceedings

D7.3.1 Tenant versus landlord

Most of the civil cases brought so far concern proceedings against landlords or house owners, rather than water suppliers. This is because the responsibility of water suppliers to provide clean drinking water, ends at the point of entry to the property. The condition of the plumbing system at the property is the responsibility of the property owner. Tenants can sue landlords because the lead content in drinking water from the tap is exceeding the limits. If this is due to damaged or old plumbing systems in the house, the tenant has the right to a reduction in the rent, or he can demand, by right, that the installations in the house be replaced.

D7.3.2 Consumer versus enforcement authority

The German law provides the right to file an action against an authority where a civil servant fails to fulfil obligations of his official duty (*Amtspflichtverletzung*). According to §839 BGB (Civil Code) and Art. 34 of the German *Grundgesetz*, compensation depends on two things:

- i) the civil servant has to have intentionally or negligently violated his obligations, and
- ii) the obligation must have as its goal the protection of third persons (*Drittbezogenheit*).

According to previous court rulings, the obligations are considered to have protected third persons, if the person has a so-called „subjective right“ (*subjektives Recht*). Subjective rights concern not only the public at large, but are intended to protect the individual, in particular. In German case law, it is contested whether the rule under consideration constitutes such a subjective right.

In relation to drinking water standards, it is questionable whether the duty of a Health Department to supervise water suppliers, is an obligation which protects third persons. However, since there have not been any civil court rulings concerning the supervisory duties relating to drinking water, it is still questionable whether the individual would be granted compensation by the State if he or she suffers injury due to the failure of civil servants.

D7.3.3 Private consumer against water works

The right to compensation is laid down in §823 of the German Civil Code (*Bürgerliches Gesetzbuch*). If someone intentionally or negligently violates life, body, health, freedom or the property of somebody else, he or she is obliged to pay compensation.

If, in a criminal trial, the court has stated that a water supplier has committed a criminal offence in supplying drinking water not meeting the standards of the Drinking Water Regulations, the injured person can claim compensation in a subsequent civil trial.

There has only been one court ruling in which the Federal High Court of Justice (*Bundesgerichtshof*) (BGH Decision of 25 January 1983 - VI ZR 24/82, Hamm, see Section 7.2) called for a water supplier to pay compensation. This occurred when a person was judged to have suffered bodily harm because of the supply of unclean drinking water. The water supplier (private supply) had not met his obligation to regularly analyse the water, as laid down in the Drinking Water Regulations.

D7.4 Direct Enforcement of Community Rights

According to the European Court of Justice (Case 26/62 van Gend and Loos, Official Journal 1963, 1), the obligations laid down in a Directive of the European Community

may, under certain circumstances, be directly applicable in the Member States. An individual can then refer directly to the Directive.

The Member States are obliged to transpose the provisions of the Directive into national law within a certain period of time. If a Member State does not meet this obligation, or the provisions of the transposed, national law do not correspond to the European Directive, the individual can go to the national court to enforce directly the right laid down in the Directive. However, as soon as the Member State has lawfully transposed the provisions into national law, the individual has to refer to national law.

In the case of the Drinking Water Directive, the European Court of Justice has accepted that Germany, with the last amendment of the Drinking Water Regulations (1990) has finally transposed the drinking water limits into German law (judgement of 24 November 1992, Case C-237/90). Therefore individuals in Germany can no longer refer directly to European standards. However, German courts interpreting the Drinking Water Regulations, have to take the provisions of the European Drinking Water Directive into consideration. In cases of doubt they have the right, or even the obligation, to request the European Court of Justice to give a ruling thereon (according to Art.177 TEC).

D8. COURT CASES

D8.1 State Administrative Courts

Dikegulac Case - Public Works (Zweckverband) 'Riedwerke Kreis Groß Gerau' versus State Administration of Hessen, Judgement of the Administrative Court at Darmstadt, 15 October 1992 (Haumann 1992).

This case concerned the presence in drinking water of diacetone ketogulonate which had been shown to originate from the effluent of a chemicals company, and in particular, from vitamin C production. Diacetone ketogulonate is chemically identical to the pesticide Dikegulac and was present in raw and treated water above the drinking water limit of $0.1 \mu\text{g l}^{-1}$ for individual pesticides.

Whilst according to the Administration of the State of Hessen, the presence of the above compound at concentrations in excess of $0.1 \mu\text{g l}^{-1}$ in the drinking water supplied by the 'Riedwerke Kreis Groß Gerau' constituted a breach of the drinking water standard for pesticides, the water works argued that the origin of the contaminant was neither from a pesticide, nor a degradation product of a pesticide and, consequently, it should not be subject to the pesticides limit in drinking water.

The Court ruled in favour of the water works, i.e. that the diacetone ketogulonate in the drinking water supplied, did not originate from a substance covered by the pesticides parameter (Anlage 2, no 13 a, Article 2, para 1 TrinwV 1990) and, consequently, was not subject to the limit imposed for such compounds. A qualifying statement of the court added that 'the pesticides parameter already covered such a variety of compounds, that the legal justification for inclusion of a substance had to be found in its origins as a plant

protection product'. However, the ruling also included a comment querying whether on this basis 'the drinking water regulations and the pesticides regulations combined, provided adequate protection for long-term safeguarding of drinking water quality'.

The Dikegulac case resulted in a judgement of particular interest, with respect to the opinion of the court, that compounds for which there are limits prescribed in the Drinking Water Regulations are to be judged not only according to their chemical structure, but also as to their origins in the drinking water. This judgement also has a bearing on substances which are introduced as a result of disinfection or distribution of drinking water (Haumann 1992).

Dysentery epidemic at Ismaning near Munich - State of Bavaria versus technical manager of the waterworks at Ismaning - State court (Landgericht) at Munich I, judgement of 25 June 1980 - ref 26 Kls 237 Js 39307/78) (Dr med C Sacré, personal communication, various press cuttings, and BGW 1980).

The water at one of three wells was found to contain bacteria on 2 of 5 sampling occasions; consequently chlorination equipment was installed to rectify the problem. To achieve this, water from a disused shaft was used as temporary (emergency) supply; instead of switching to the chlorinated supply immediately upon completion of the installation of chlorination equipment, the accused continued to supply water from the shaft (considering it purer because it was not chlorinated), despite the presence of a 'cesspit' in the vicinity and being aware of the risks involved. The accused had also attempted to conceal his actions.

The court ruled that the manager of the waterworks was guilty of negligence by supplying drinking water containing pathogens (shigella sonnei, Colicin type 12), and thereby causing bodily harm in 1324 cases. The accused was judged to have been in contravention of the Drinking Water Regulations which prescribed the 'absence of pathogens'. Due to mitigating circumstances (the accused had been given inadequate training by the employer - the municipality, as well as inadequate information on responsibilities and legal requirements, he had suffered a nervous breakdown as a result of the case, and already lost his job) he was given one year imprisonment (suspended).

E. coli and coliforms in drinking water in Adelsheim, Baden-Württemberg - Untere Wasserbehörden against Mayor of Adelsheim, Peter Hütt, 1988 (Dr med C Sacré, personal communication, letter from Hütt to the State Government, and various press cuttings)

A more recent case also concerned bacteriological contamination of drinking water. In this case the Mayor (*Bürgermeister*) of Adelsheim, who was responsible for municipal water supply, was accused of supplying water which exceeded drinking water standards (containing *E. coli* and coliforms), thereby threatening public health, and not acting properly as soon as he was made aware of the problem (informing the public - boiling notice, whilst repeating analyses). Routine samples of drinking water were taken in Adelsheim on 19 August 1987 and sent by express delivery to the State Medical Department (*Medizinisches Landesuntersuchungsamt*) in Stuttgart. On Saturday 23 August (the normal time lapse of three days after sampling) the municipal

administration in Adelsheim was informed by telephone of positive findings (unconfirmed) of *E. coli* and coliforms. On his return on Monday 25 August, the Mayor, was informed. Instead of informing the public immediately whilst initiating further analyses and investigations of the cause, he merely ordered repeat analyses and continued to supply the water for several days until 28. August.

The Mayor was found guilty and ordered to pay a fine (from private funds) (Staatsanwaltschaft Mosbach No. 23, Js 5545/87).

Coliform bacteria in drinking water in Bodman-Ludwigshafen (Baden-Württemberg) - Authorities versus Mayor of Bodman-Ludwigshafen, Werner Debris, and his Municipal Civil Engineer (Dr med C Sacré, personal communication, and press cutting from the Südkurier, 28.01.1993)

A similar case occurred in Baden-Württemberg in 1993 involving coliform contamination of drinking water in May 1991, and inadequate action (delayed notification of the authorities, informing the public, issuing boiling notices etc.) The contamination occurred as a result of an extension of a sewage treatment works effluent outlet into Lake Constance (*Bodensee*); as a consequence, the outlet came to be in the vicinity of the intake for the drinking water treatment plant, causing the contamination. The accused were found guilty and ordered to pay a fine; the Mayor gained a criminal record and lost his position.

D8.2 Federal High Court of Justice - Nitrate Case

Bundesgerichtshof, Decision of 25 January 1983 - VI ZR 24/82, Hamm (Federal High Court of Justice)

In this judgement of the Federal High Court of Justice (*Bundesgerichtshof*), the highest civil court in Germany, it was established that the plaintiff, who had been crippled by the contaminated water with which she was provided, was entitled to damage compensation from the water provider.

The plaintiff was a girl, represented by her mother in the court case. The girl was born healthy in 1976. The apartment block, in which the mother lived, received its water supply from a private well (*hauseigene Anlage*).

Following her birth, the child was brought to the apartment house. There she was fed baby food prepared with the drinking water supplied to the apartment block. Two days later the child was showing symptoms of a life threatening illness, requiring her to be brought back to the hospital. Following a one month stay she was discharged. After two more days at home and the further consumption of baby food which had been prepared with the apartment's tap water, the child again showed the same life threatening symptoms that had emerged earlier. Following the advice of doctors, the mother then ceased to use the apartment's drinking water in preparing the child's baby food. Subsequently the symptoms of illness no longer appeared. The child, however, had suffered brain damage, which among other things, had left her without the use of her legs.

In the hearing of the plaintiff's case it was stated that the cause of the baby's illness was the apartment's drinking water, which contained nitrate levels in excess of the limits set down by the Drinking Water Regulations (*Trinkwasserverordnung*). The operator of the water well had not been making the regular checks of the drinking water, that are required by the Drinking Water Regulations. The checking requirement represents a law which aims to protect the individual (*Schutzgesetz*) and which calls for damage compensation when not fulfilled.

The courts of the first and second instance had declined such a requirement for damage compensation. The Federal High Court of Justice reversed this decision and referred the case back to the court of appeals on the condition that the water provider would be required to pay compensation for damage caused.

D8.3 Minor Civil Cases

The decisions of the highest federal courts (*Bundesverwaltungsgericht, Bundesverfassungsgericht, Bundesgerichtshof*) and the Administrative and Civil Courts of the *Länder* were examined in cases having to do with drinking water from 1982 to the present

The majority of cases were concerned with civil complaints of tenants against landlords, who provided drinking water not meeting the standards of the Drinking Water Regulations. Many landlords were found guilty of providing water that failed to meet prescribed levels for lead content.

If the hearing ends up in the conclusion that the pollution of the drinking water is caused by the plumbing of the apartment, the tenant has the right to new water piping and to a lower rent (*Mängelbeseitigung, Mietminderung*), as for example in the case Amtsgericht Hamburg, Decision of 18 August 1993 - 40 a C 1476/92 (District Court, Local Court).

D9. SOURCES OF INFORMATION

D9.1 Contacts/Contributions

The following persons/institutions were contacted, interviewed or have otherwise contributed information; these contributions are gratefully acknowledged:

WRc contacts:

Dr med. C Sacré (Manager, General Hygiene and Transmissible Diseases Department, and Deputy President) Landesgesundheitsamt (State Health Authority) Baden-Württemberg, Stuttgart (also a Member of the Federal Drinking Water Commission).

Dr H Overath (Scientific Director) IWW (Institute for Water Chemistry and Technology, Rhein-Westfalia) Mülheim an der Ruhr.

Dr U Borchers, IWW (Institute for Water Chemistry and Technology, Rhein-Westfalia) Mülheim an der Ruhr.

Dr H-J Brauch (Manager, Water Analysis Department) DVGW- TZW (Technology Centre for Water, of the German Gas and Water Association), Karlsruhe.

Dr B Hamsch (Manager, Microbiology), DVGW- TZW (Technology Centre for Water, of the German Gas and Water Association), Karlsruhe.

IEEP/Stefani Bär, Ecologic, Berlin:

Health Departments, Berlin, Lower Saxony, Bonn, Munich, Heidelberg.

D9.2 Legislation

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APPENDIX E SPAIN

E1. SUMMARY OF COUNTRY SITUATION

Spain is a constitutional monarchy which comprises 8050 communes, 52 provinces and more recently, 17 regional autonomous communities. The autonomous communities are playing an increasingly important role in the domain of water management in Spain, having powers to legislate on environmental matters, and they can enact legislation more restrictive than national legislation.

Mainland Spain has a land area of 500 000 km² and the total length of the main rivers is estimated at 175 000 km. The bulk of water supplies comes from surface sources taken from rivers or storage reservoirs. There are considerable differences in topography and climate which divides the country into two main regions - a mountainous north and north-west area having abundant water resources and a dry central plain and southern and south-eastern areas having much less reliable rainfall and frequent drought conditions.

Drinking water supply in Spain is a public service which municipalities (around 8000 in total) have to provide. The high number of municipalities and the way Spain is divided into Self-Governing Regions results in its water management being largely decentralised.

Visits were made to Madrid, to the main supply company “the Canal de Isabel II”, (CII) and to the Environmental Health Service (Consejeria de Salud, CS).

E2. ORGANISATION AND MANAGEMENT OF WATER SUPPLY

The drinking water supply system is a public service which municipalities are under obligation to provide, whatever the number of inhabitants (Law 7/1985). This is in contrast to other services which depend on the number of inhabitants: e.g., those municipalities having more than 5000 inhabitants are obliged to treat waste.

The Royal Decree 1138/1990 defines companies which supply and/or provide drinking water for public consumption as “*those persons, natural or bodies corporate public or private, who are active in all or some of the phases of collecting, treating, transporting and distributing drinking water for public consumption*”.

The functions of public water supply are undertaken in Spain in several different ways:

- a) Direct management by the Municipality, through a body that is fully integrated into its administrative organisation.
- b) Management by a municipal company, financed by the administration.

- c) Management by a mixed company, of which most of the capital is public (municipality), but with a minority holding by private capital.
- d) Management by a private company, with private capital, which is contracted by the administration in the form of a concession.
- e) Other forms of organisation: groups of municipalities (i.e., several municipalities sign an agreement to carry out this service) or companies which are controlled by a Regional Government (e.g. Canal de Isabel II)

E3. LEGAL AND INSTITUTIONAL FRAMEWORK

E3.1 General Framework

Drinking water is governed by different regulations or Norms having objectives, such as protecting human health, protecting consumers and users and governing the structure, obligations and responsibilities of administrative bodies. Norms covered are listed in Table E1 (at the end of this Appendix).

The Main legislation on drinking water for human health is: “Technical - sanitary regulation on the quality of drinking water destined for human consumption and its supply”, approved by Royal Decree 1138/1990, (Norm 1) and General Law 14/1986 on health (Norm 2).

E3.2 Implementation of EC Directive

In 1990 the Directive was incorporated into Spanish law through the above mentioned Royal Decree 1138/1990.

This Regulation contains the provisions of the Directive (the definition of drinking water to be used for human consumption, exceptions, Appendix I, Appendix II and Appendix III) and also governs the characteristics of supply in all respects, as well as the treatment, supply and distribution of drinking water for public consumption. This regulation is complemented by two pre-existing ministerial orders relating to the official methods for microbiological and physico-chemical analysis.

E3.2.1 Deviations from the Directive

Standards adopted for drinking water in Spain are essentially those of Directive 80/778/EC, with some minor differences including:

- Turbidity is specified in mg SiO₂ l⁻¹, JTU and FTU, (EC Directive only uses mg SiO₂ l⁻¹ and JTU).

- The MAC for Pesticides and related products has the same values as the Directive and although it is termed ‘provisional’, they have been used as the legal values. With the transposition of the new EC Directive fixed values will be laid down.
- The Spanish Decree includes guide values for alpha and beta radioactivity, namely 0.1 and 1 Bq l⁻¹ respectively.

E3.3 Control of Drinking Water Quality

Drinking water quality in Spain is controlled by water analysis and sanitary surveillance, and these activities are nationally coordinated by the State Public Health Office in the Ministry of Health and Consumption, (Ministerio de Sanidad y Consumo). Basic water quality data are collected according to national legislation, although each autonomous region can establish additional values and parameters (national legislation specifies minimum requirements).

Competent Health Administrations, corresponding to Self-Governing Regions (laid down under the Transference Decrees of Autonomous Communities), are responsible for sanitary surveillance. This comprises monitoring of analyses carried out by water suppliers and undertaking their own determinations when considered necessary. The Health Administration is responsible for deciding when the infringement of quality standards entails an unacceptable risk to health. A list of the Health Administrations for each Self-Governing Region is included in Table E2 at the end of this Appendix.

Water suppliers are obliged to control water quality through the following monitoring regimes:

- minimum analysis: includes determinations of odour, taste, conductivity, nitrites, ammonium, total and faecal coliforms and residual chlorine;
- normal analysis: includes minimum determinations and turbidity, temperature, pH, nitrates, oxidability and aerobic bacteria at 37 °C and 22 °C;
- total analysis: includes normal determination and the rest of parameters in the legislation;
- occasional analysis: includes determinations fixed by the Health Authority under particular or accidental circumstances which requires surveillance so that drinking water quality is guaranteed.
- initial analysis: carried out before any new resource exploitation for supplying water.

The number of minimum samples (based on population served) and periodicity are quoted for minimum, normal and total analyses. They must be carried out either ex treatment works and/or immediately prior to distribution, and at several points in the distribution system (Art.23.6.1, 23.6.2 and 23.6.3 of Regulation).

Water supply companies are charged with the following functions and obligations relating to the quality of drinking water:

1. To undertake the analysis and control of water, verifying that it meets required standards.
2. Adopting measures to ensure that the results of the above mentioned controls are available to the public.
3. To communicate to the competent municipal and health authorities any reduction in water quality rendering it 'unpotable' for any reason, the said authorities thereon ordering the appropriate actions.
4. The complete or partial suspension of supply, if the loss of potability implies an immediate risk to the health of the population supplied. Such a suspension is to be communicated immediately to the competent municipal and health authorities, which should order the adoption of the appropriate measures.
5. If there is any anomaly in the sanitary quality of the water, it is to inform consumers of the warnings issued by the Health Authority on the preventative measures which they should adopt to prevent or palliate the harm which could arise from the usage of the water in question.
6. To keep records of water quality data and incidents.

Since 1991, the CS has been carrying out programmes to evaluate the efficiency of monitoring and the quality of the water. These are annually revised and new activities set up, depending on the results obtained. For instance, in 1996 the program developed was "on assessing waters in the supply system". The main objective was to ensure a sanitary water supply for the population of the Region of Madrid and the program was evaluated by indicators of compliance (n° of analyses, n° analyses in drinking fountains) and indicators of quality (n° and % of chlorination, n° and % of non-compliance, minimum and normal analyses), per Health Area.

The main results from this project are as follows:

- the number of analyses (minimum, normal) carried out by Health Areas is usually high.
- although quality data and chlorination levels have improved compared with previous years (1992-1996), there are certain parameters which often exceed the limit value: conductivity, nitrite, ammonium, total coliforms, faecal coliforms and aerobe bacteria.

The range of non compliant minimum analyses varied between 0.5%-19.2% in absolute values, which means 3.7% of the total number of analyses carried out. For normal analyses the range of non compliance fluctuated, i.e. between 6.2%-18.2%, meaning a 4.4% of the total carried out

Madrid Region is a typical example of a Regional Health Administration. It is divided into 11 Health Areas centralised in the Health Authority (CS) which, as the formal monitoring body, makes minimum and normal water quality determinations at either municipal or Regional Laboratories. Controls are made on the activities of water suppliers and small municipalities (less than 20 000 inhabitants). The Canal of Isabel II (CII), as water supplier, carries out minimum, normal and total analyses in order to check the water quality, sending records of analysis and any incidents every three months to the Health Authority. They have internal meetings with departments involved in Water Quality every six months to try to detect problems and establish remedial actions, however no annual report is produced.

E4. PUBLICATION OF REPORTS

Water supply companies are required to keep *records of analysis and records of incidents*. The former must be made available to the Administration for a period of five years and the information on the record includes: the place, date and time that samples were taken; identification of the points, sections or zones of the supply system at which samples were taken; the dates, analytical techniques employed and results of analyses and laboratories which carried them out. The latter includes records of incidents in the supply system, according to year, together with the measures adopted. These records must be kept available for the Health Administration for a period of three years.

Based on Regulation 1138/1990 (Norm 1) a Water Consumption National Information System (SINAC) was set up with the main objective of identifying the sanitary quality of drinking water and supply systems at a State level. Collected information is divided into three main sections: supply system characteristics, the quality of water consumed and records on authorised derogations.

Information must be made available to the public by the following bodies (Norm 12):

1. Companies which provide water services: the information which these are obliged to supply is that specified in the Norms governing labelling, as well as technical - sanitary Norms. Article 25 of the Regulation (Norm 1) states that supply companies must take the measures which are needed to ensure that the results of analyses are available to the public
2. The Administration, through Offices and consumer information services. These offices have the following functions, amongst others:
 - To inform, help and guide consumers on their rights;
 - To receive, record and give proof of receipt of complaints and claims, as well as to send these on to the appropriate bodies or organisations;
 - To supply information on the penalties imposed due to infractions relating to the rights of consumers and users;

- To supply information on the Norms relating to prices and conditions corresponding to products and services for general public use.

3. Associations of consumers and users.

In addition, Norm 3 regulates the general right of all citizens to gain access to the records and archives of administrative bodies.

In the particular case of Madrid, users are able to obtain information on the quality of the water supplied by the following bodies:

- a) the company supplying drinking water.

Users are able to communicate with the Canal de Isabel II, in writing, demanding information on the quality of the water which they consume. An example of the information/data that the users can obtain is provided at the end of this Appendix.

- b) the Municipality.

If a user believes that the water is not of drinking quality, then the Water Department of the municipal laboratory sends an inspector to the zone in question to perform physical, chemical and microbiological analyses. Users are told only if the water is potable or not, without details being provided. If a user wishes to receive the results of analysis and the details of parameters, he has to take a sample into the laboratory which, after payment, will carry out the analysis.

- c) the Environmental Health Service of the self-governing Region of Madrid.

If a user's request (in writing) refers generally to the quality of the water in the area, then they are simply informed whether or not it is of drinking quality, on the basis of the information contained in the records of monitoring held in this department. It must be remembered that companies are obliged to keep records of analysis. If the request made by the user asks for a breakdown of the results standard by standard, they are sent a short report showing the results of the most recent analysis, together with information if any of the standards are being exceeded, and whether any such exceedence is hazardous in terms of health.

- d) Users may also request information from the Municipal Office for Consumer Information, which will pass on the request to any of the above-mentioned agencies.

E5. ENFORCEMENT PROCEDURES

E5.1 Legal Basis

Under Regulation 1138/1990 the water supplier must communicate to the competent municipal and health authorities any loss of 'potability', the said authorities thereon ordering any actions required.

The Regulation defines “potable water” as that which meets the standards laid down in the Annexes, and this coincides with those set by the Directive. Only potable water can be supplied for public consumption (Article 2.2), while the distribution of non-potable water through systems for supplying water for public consumption is prohibited (Article 14).

E5.2 Authorised Derogation for Exceptions from the Limit Values

Regulation 1138/1990 includes derogations for limit values based on geological and meteorological causes, as in [article 9](#) of Directive 80/778, and emergency causes, as in [article 10](#) of Directive 80/778. Derogations are granted by the regional public health authority after application from the local councils.

Derogations for geological and meteorological causes cannot be given if it involves toxic or microbiological factors. The ‘Emergency’ term in the Directive has been replaced by ‘Critical Accidental Circumstances’ and when a situation under those conditions arises, the reasons and likely period must be specified in authorising a derogation. Derogations are only authorised for a limited period.

Autonomous Regions are obliged to report to the Ministry of Health on derogations authorised within the following periods of time:

- 45 days: ‘situation arising from the nature and structure of the ground.’
- 7 days: ‘situation arising from exceptional meteorological conditions.’
- Immediately: ‘in the event of emergencies (critical accidental circumstances) and under circumstances when for the supply of drinking water it is necessary to resort to source water which does not meet the conditions required of category A3 water’ as defined in the Surface Water Directive.

The report should include parameters exceeded, any temporary limit values, the period of derogation and appropriate technical, analytical and statistical justification.

Example of problems encountered in the Madrid area are as follows:

- *Taste*: during a drought period a reservoir which is not normally used, was connected and consumers complained about the taste. The Canal de Isabel II took remedial action, after suspending the supply of water and reporting to the Consejería de Salud. The origin was from algal growth.
- *Mg, K, hardness*: exceedences in the southern area of Madrid in small municipalities. Caused by the nature of the ground; derogations have been granted.
- *Nitrate*: A temporary exceedence which involved no risk to health, the exceedence was about 60 µg I⁻¹ and it was a very specific case.
- *Nitrate*: a temporary exceedence was authorised by the Health Authority in small municipalities not supplied by the Canal de Isabel II on the south area of Madrid.

The Health Authority reported to the Environment Administration, which analysed the situation and established necessary measures to improve the aquifer. It is believed that the origin of the exceedence was agricultural.

- *Ammonium*: excess of ammonium due to disinfection with chloramines. No derogation has been granted and the water supply company has been advised to take actions to correct the problem.
- *Lead*: higher levels of this parameter have been found at sampling points in the network system and inside some dwellings (The Regional Laboratory takes these samples). This is not considered to be a significant problem as, when samples are repeated, levels are often under the limits. Normally this is caused by water stagnation and owners are advised to change their pipelines or public authorities are informed.
- *Other metals*: Cadmium has been found in old parts of the water system; as it is a sporadic problem that does not persist when sampling is repeated, no measures are being taken. There is no obligation to change the structure of the system. Copper has been detected in new water supply systems, although no remedial actions were taken, levels have decreased with time.
- *Manganese*: during a drought period, water from reservoirs had to be used, which had an exceedence of the manganese parameter. The Canal II reported this problem to the Local Authorities and the Consejería de Salud. It was not considered to be a significant exceedence and consumers were advised. Steps were taken to improve the water treatment plant to solve the problem.

E5.3 Remedial Action

When a water supply does not meet quality standards, the competent municipal and health authority has the power to order any actions required to meet limit values. If water ceases to be 'potable' and there is perceived to be a risk to human health suppliers can suspend completely or partially the supply (Art.26, Decree 1138/1990).

In the Madrid Region (part supplied by CII), if monitoring indicates contamination of the supply, but there is not thought to be public health hazard, the water supplier takes necessary measures and/or repeats the sampling control. When a health hazard is registered, the Madrid water supply company works with the county and municipality involved in order to implement measures to prevent the spread of pollution and take steps to detect, remove or limit the sources of pollution.

Close links are maintained between the municipal water company (Madrid) and officials from the local or regional authority during a case of non-compliance. The Regional Authority, gives advice on actions to be taken and monitors progress.

E6. PROSECUTION AND PENALTIES

The penal code includes offences against public health, amongst which there are:

- placing the health of consumers in jeopardy (Article 363)
- poisoning of drinking water (Article 365)

Users may take cases to the penal courts individually or collectively, if such offences are committed.

So far there have not been any prosecutions/sanctions against the Health Authority or the water supply company for non-compliance with the quality parameters since when the CS has given instructions to take remedial measures, the problems have been corrected. The CS has received consumer complaints related to the taste of water. These often coincide with periods of drought, when reservoirs levels are low and there are cases of eutrophication.

E7. CONSUMER RIGHTS

Spanish legislation (Norm 11) defines two different concepts:

- A "consumer" of products;
- A "user" of services.

It is therefore only possible to talk of “consumers” in the context of water when the latter is bottled (as a bottle of water is a product). In the case of drinking water, the individual is a “user” of a service: the drinking water supply service. For consumers to be aware of their rights it is first necessary that they take into account their dual nature as drinkers of potable water: as citizens and administered individuals on the one hand¹³, and as users of a drinking water supply service on the other. The users of drinking water supply services have two types of right when limits are exceeded:

E7.1 The Right to Information

This is dealt with in Section E4, Publication of Reports.

E7.2 The Right to be Protected when the Service is Deficient or Hazardous

These rights can be exercised in two different ways:

- Direct: through the right to obtain compensation for the damages and harm suffered, and

¹³ Regulation in Norms 3 to 11.

- Indirect; including the following actions:
 - a) Requesting that the administration undertake inspections and, if applicable, that the corresponding penalties be applied.
 - b) Requesting that the municipal authority ensures the correct supply of the public water service.

a) Request the administration to carry out inspections and impose any possible corresponding penalties:

The infringement which may be committed by a supply company are of two different types: health and service related. Norm 1 makes the Health Authority responsible for monitoring and, if the case arises, any sanctions.

The users of drinking water are able to make requests in writing to the competent Administration (e.g. water supplier, health authority). Nevertheless, the latter enjoys a high degree of freedom in the way it undertakes these functions, as it is has overall responsibility for satisfying general interest and, consequently, may or may not attend to the requests of individual users.

b) Requesting that the municipal authority ensures the correct provision of the public water service

As mentioned in the introduction, the supply of drinking water is organised as a public service, which municipal authorities are under an obligation to provide.

This obligation gives rise to the corresponding right of those living in the area covered by an authority, “... to demand the supply’ and, if applicable, the establishment of the corresponding public service...”¹⁴

In undertaking this obligation to supply water the municipality must comply with the requisites laid down by the technical health regulation, and if the water does not meet the standards of the Directive, it will be offering a defective public service. As “inhabitants”, the users of drinking water may request the municipal Administration to improve - in health terms - the service.

This could give rise to the municipal authority offering the management of the public water supply service to a company other than the one which had previously been in charge.

¹⁴ Article 18 1, g of Norm 6.

E7.3 The Right to Compensation

Consumers have a right to compensation, on condition that the reduction in drinking water quality gives rise to harm; Spanish law offers two different ways for exercising this right:

a) The responsibility of the administration

All individuals have the right to be compensated by the Administration for damages suffered as a result of the normal or abnormal working of the public services¹⁵ including the supply of drinking water.

Due to the above, individuals may act against the municipal authority in question, or against the body responsible for managing the public service, to gain compensation for the damages caused to them by the poor quality drinking water.

The following items are necessary for users of the service to gain compensation:

- That damage is proven, real and authentic.
- That it is calculable in economic terms.
- That it be individual: i.e that it affects an identifiable person or group of persons.
- That such damage be imputable to the Administration, i.e., to authorities, civil servants and contracted personnel, and that it is not imputable to persons or subjects other than these (those companies which manage public services also being considered as belonging to the administration).

b) Specific responsibility as laid down by Norm 12¹⁶

Chapter VIII of this Norm sets out the responsibility for damages occasioned by products or services to consumers and users. This chapter has been heavily criticized, due to its deficiencies in technical legal terms. On the other hand, it is difficult to apply it to damages caused by services, due to the fact that it seems to have been drawn up taking more account of damage caused by products.

Two systems of responsibility may be deduced from reading this chapter:

(i) Subjective responsibility, with culpability

Requisites:

- That the service has caused demonstrable damage

¹⁵ Article 106,2 of the Spanish constitution; Articles 120 and 121 of Norm 4; Article 40 of Norm 5; Article 54 of Norm 6; Article 223 of Norm 7; Articles 139 and below of Norm 3.

¹⁶ Articles 2, 1, c and Articles 25 and below of Norm 12.

- That the damage has not occurred due to any action of the user and that forms of consumption and usage are normal.
- That the supplier is guilty due to not having respected the demands of regulations, or not having acted with the diligence required by the nature of the product in question.

(ii) Objective responsibility without culpability

Requisites:

- That the service has caused demonstrable damage.
- That the damage has not arisen due to the actions of the user and that usage and consumption are normal.
- That this is a service which necessarily includes the guarantee of certain determined levels of purity, efficacy or safety, under objective conditions of determination and which involve the technical, professional or systematic control of quality. It is not necessary to prove the guilt of the supplier in these cases.

Some possible circumstances in which this objective responsibility would be seen to arise are given as examples of the working of this law. Amongst these, we may find foodstuffs as well as electricity and gas services, although the water supply service is not specifically mentioned. In any case, this list is not exhaustive, and the water service is covered implicitly.

The limit of liability is set at 500 million pesetas (approximately 2 million £).

A priori, and in practice, users are unable to decide for themselves on how they will try to attain compensation.

E8. COURT CASES

Under Spanish law, there are several ways of going to court, depending on the type of court in question:

- Administrative Tribunals, which control the legality of the actions taken by Administrative bodies. In Spain, it is necessary to have previously made a claim against the administrative body which ordered the act that caused harm to a citizen, before taking the case to an administrative tribunal.
- Civil courts, which are used to resolve the conflicts arising from civil contracts, such as claims for compensation due to damage and harm.
- Penal courts, which resolve questions relating to crimes or misdemeanours.

E8.1 Types of Legal Action Available to Individuals, and Possibilities of Success

Under the rights which we have described, the actions which may be taken by individuals and their possibilities for success are as follows:

E8.1.1 Actions based on the right to receive correct information

The administration, in general, is obliged to answer requests for information. If the administration does not respond to the request, the lack of a positive response is considered a breach of the law, and the users can go to court provided that the following steps have been taken:

- a) Users request information from an administrative body (e.g. water supplier, health authority) and if the request for information is rejected,
- b) users must request from the administrative body written confirmation of the decision not to supply the information previously requested (the latter is obliged to reply in writing to such a request).
- c) Users must then use this written decision, in the first instance, to complain or appeal to the same administrative body which refused to supply the information.
- d) If this body once again refuses to supply the information requested, then the user can proceed with taking the case to the administrative tribunals.

The action is based on a true individual right.

There is about a 50% possibility of success in these tribunals.

E8.1.2 Actions based on the right to request administrative bodies to carry out inspections, and, if applicable, to impose penalties

As previously mentioned, the administration has flexibility with respect to the way in which it has to comply with requirements for carrying out inspections and the imposition of penalties, as it is the administration itself which is also responsible for the general interest of the public. Under Spanish law, users, may request the administration to carry out such work. The administration is broadly free in deciding whether or not to comply with such requests. However, it is under an obligation to communicate with users, letting them know that they have received the request and whether or not, it is to be complied with. If the administration does not accede to the request of the user, the latter may complain to the administrative body in question (similar to the procedure described above concerning requests for information). The appeal may not be accepted, as the claim would not be based on any individual right, but on the defence of the general interest. The user may then appeal to the administrative tribunal, although the possibilities of this being successful are almost zero, for the same reason, i.e., that it would not be based on the rights of the individual.

E8.1.3 Action to request the correct supply of a public service

As we have already remarked, “citizens” (“inhabitants”) have the right to demand that municipal administrations ensure the supply of water meeting quality standards. If the Administration disagrees with a complaint, then users are able to appeal to the administrative tribunals, once they have complained to the administration itself. The action is based on a right which is half way between individual and collective rights. The possibilities of success are about 50%. No cases relating to quality or breaching of the standards set by the Directive were found.

E8.1.4 Action to request compensation for damage and harm caused

- If such a request is based on the responsibility of the administration for damages caused by the normal or abnormal workings of a public service, users have to demand compensation from the administration. If the latter refuses to offer compensation, then users may place their claim before the administrative tribunals.

The action is based on a true right of the individual.

It is this form of action which has the highest probabilities of success, although there are difficulties in proving damage following an exceedence of a standard.

- If this action is based on Norm 12 then civil courts are competent.

Again this action is based on a true right of the individual.

It also has a reasonable probability of success. As for the previous case, the main difficulty lies in proving damage. In fact, the only cases which have been found refers to compensation paid for damage and harm due to a breakdown in the drinking water supply infrastructure and cases concerning water rates (prices).

E9. SOURCES OF INFORMATION

E9.1 Contacts/Contributions

Personal communications/visits (WRc)

Instituto Nacional de Consumo (National Institute of Consume): Javier García Bartolomé.

Canal de Isabel II:

- División de Usuarios (Users Department): Manuela Montero.
- Laboratorio (laboratory): Luis Carlos Foncillas.
- Ingeniería de Calidad (Quality Department): Carmen Gordo

Servicio de Sanidad ambiental (Environment Health Service): Antonio Avello.

Oficina Municipal de Información al consumidor (Municipal Office of consumer information).

Universidad de Murcia: Departamento de Derecho administrativo: Santiago Alvarez Carreño.

IEEP: B. Lopez, IPEA, Madrid.

E9.2 Legislation

Royal Decree 1138/1990, of 14 September 1990: “Technically - sanitary regulation on the quality of drinking water destined for human consumption and its supply”.

E9.3 Bibliography/References

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Obra colectiva, IPAE coordinador. “Manual de Política ambiental europea: la UE y España”. Ed. Mapfre, Madrid, 1997.

Ortega Alvarez, L. “El control jurídico del medio ambiente a través del ejercicio de los derechos de los consumidores y usuarios”. Revista Estudios sobre Consumo, nº 40, 1997.

Quintana Calvo, I. “La responsabilidad del empresario de servicios en la Ley General para la defensa de los consumidores y usuarios”. Revista Estudios sobre consumo. Nº extraordinario, Nov. 1987.

Rovira Daudí, M^oJ. “La aplicación de la normativa comunitaria en materia de protección del medio ambiente, con especial referencia al papel de los particulares”. Tesis doctoral. Valencia, 1996.

EPE Water Alliance (EWA). “A practical guide to help move towards sustainable use of Europe’s inland waters. Water Alliance Workbook, June 1997.

Table E1 List of Norms in use

<p><u>Norms having the aim of protecting human health</u></p> <p>Norm 1: Technically - sanitary regulation on the quality of drinking water destined for human consumption and its supply, approved by Royal Decree 1138/1990.</p> <p>Norm 2: General Law 14/1986 on health.</p> <p><u>Norms relating to Public Administrative bodies:</u></p> <p>Norm 3: Law 30/1992 on the Legal Regime governing Public Administrative bodies and common administration procedures.</p> <p>Norm 4: Law on Forced Expropriation of 1956.</p> <p>Norm 5: Law governing the Legal Regime of the state administration, 1957.</p> <p>Norm 6: Law 7/1985 on the basis for local authorities.</p> <p>Norm 7: Regulation on the Organisation and working of local authorities, approved by Royal Decree 2568/1986.</p> <p>Norm 8: Redrawn Text on dispositions currently in force governing local authorities, of 18 April, 1986.</p> <p>Norm 9: Regulations governing the services of local corporations of 1955.</p> <p>Norm 10: Royal Decree 429/1993, which passes the Regulation on Public Administration Procedures in terms of responsibility for property.</p> <p>Norm 11: Law 98/1960 governing the right to petition.</p> <p><u>Norms relating to the protection of consumers and users.</u></p> <p>Norm 12: General Law 4/1985 on the defence of consumers and users.</p> <p>Norm 13: Royal Decree 1945/1983, which governs the infractions and sanctions in the field of consumer defence and agriculture and food processing.</p> <p><u>Norms relating to Offences</u></p> <p>Norm 14: The Penal Code of 1995.</p> <p><u>Norms relating to judicial procedures</u></p> <p>Norm 15: Law on Administrative Litigation Jurisdiction of 1956. (administrative tribunals).</p>

Table E2 Health Administrations

Self-Governing Region	Managing Body
Andalucia	Health Administration
Aragon	Health, Welfare and Work Department
Asturias	Social Services Administration
Baleares	Health and Consumption Administration
Canarias	Health and Consumption Administration
Cantabria	Health, Consumption and Welfare Administration
Castilla y Leon	Health and Welfare Administration
Castilla La Mancha	Health Administration
Cataluna	Health and Social Security Administration
Extremadura	Welfare Administration
Galicia	Health and Social Services Administration
Madrid	Health Administration
Murcia	Health and Social Politics Administration
Navarra	Public Health Service
La Rioja	Health, Consumption and Welfare Administration
Pais Vasco	Health Administration
Valencia	Agricultural and Environment Administration

ANNEX E1

EXAMPLE OF INFORMATION

Information is supplied by the Canal Isabel II

No 1: Análisis de reclamaciones

The user will receive this information if he claims for the bad quality of his drinking water.

No. 2: Análisis completo

The user will receive this information if he wants to know the general quality of Madrid region drinking water.

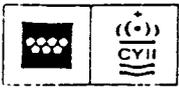
No. 3: Análisis completo

The user will receive this information if he wants to know the quality of his area drinking water (this analysis will be based on samples from deposits of his area).

No. 4: Análisis mínimo

The “Servicio de Sanidad Ambiental” (Environmental Health Service) will receive this information if it realizes punctual problems.

Note: The Canal Isabel II is working to adapt its “analysis documents” to ISO regulation.



ANALISIS DE RECLAMACIONES

Dirección: C/

Complemento:

Fecha: 06/05/97

Hora: 11:50:00

Reclamante: Abonado

Muestreador: 6

Motivo: Mala calidad

Olor (I.D.):	0	(2)	Sabor (I.D.):	0	(2)
Color (mg/L Pt-Co):	<5	(20)	Turbidez (U.N.F.):	0.4	(6)
pH (Unid.):	7.9	(6.5-9.5)	Conductividad (μ S/cm):	86.3	(Sin límite)
Amonio (mg/L):	0.45	(0.5)	Ortofosfatos (mg/L):	0.02	(5)
Nitratos (mg/L):	1.90	(50)	Sílice (mg/L):	7.9	(Sin límite)
Manganeso (mg/L):	0.03	(0.05)	Nitritos(mg/L):	0.023	(0.1)
Cloruros (mg/L):	4.9	(Sin límite)	Hierro (mg/L):	<0.02	(0.2)
Cloro Libre (mg/L):	<0.1	(0.2-0.8 *)	Cloro Combinado (mg/L):	1.2	(0.8-1.8 **)
Cloro Total (mg/L):	1.2	(Ver individuales)			

Aerobios 37 °C (Col./ml): (Sin límite)

Coliformes totales (NMP/100 ml): 0 (0)

Coliformes fecales (NMP/100 ml): 0 (0)

* En ausencia de Cloro Combinado. Valor de explotación, no establecido en la Reglamentación.
 ** En ausencia de Cloro Libre. Valor de explotación, no establecido en la Reglamentación.

OBSERVACIONES:

Todos los parámetros analizados se ajustan a lo dispuesto en el R.D. 1138/1990 de 14 de Septiembre.

MADRID, A 07/05/97

EL JEFE DE LA DIVISION:

Nombre de la muestra: media96
Valores medios del año 1996
(Sistema de distribución)

PESTICIDAS ORGANOCORADOS

α-HCH	<0,01	µg/L
β-HCH	<0,01	µg/L
δ-HCH	<0,01	µg/L
LINDANO	<0,01	µg/L
HEPTACLORO ...	<0,01	µg/L
ALDRIN	<0,01	µg/L
Oxi-CLORDANO	<0,01	µg/L
Trans-CLORDANO	<0,01	µg/L
Cis-CLORDANO	<0,01	µg/L
α-ENDOSULFAN	<0,01	µg/L
β-ENDOSULFAN	<0,01	µg/L
DIELDRIN	<0,01	µg/L
ENDRIN	<0,01	µg/L
o-p' DDT	<0,01	µg/L
p-p' DDT	<0,01	µg/L

FENOLES

FENOL	<0,02	µg/L
2-CLOROFENOL	<0,02	µg/L
4-CLOROFENOL	<0,02	µg/L
2,5-DICLOROFENOL	<0,02	µg/L
2,4-DICLOROFENOL	<0,02	µg/L
PENTACLOROFENOL	<0,02	µg/L
2,4,6-TRICLOROFENOL	<0,02	µg/L

HIDROCARBUROS AROMATICOS POLICICLICOS

FLUORANTENO	<0,01	µg/L
B (b) FLUORANTENO	<0,01	µg/L
B (k) FLUORANTENO	<0,01	µg/L
B (a) PIRENO	<0,01	µg/L
I (1,2,3,c,d)PIRENO	<0,01	µg/L
B (f,h,i) PERILENO	<0,01	µg/L

OBSERVACIONES:

PESTICIDAS ORGANOFOSFORADOS

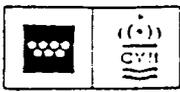
THIMET	<0,01	µg/L
DIAZINON	<0,01	µg/L
DISULFOTON ...	<0,01	µg/L
DIMETOATO ...	<0,01	µg/L
MALATION	<0,01	µg/L
ETIL-PARATION	<0,01	µg/L
ETION	<0,01	µg/L
AZINFOS-METIL	<0,01	µg/L
AZINFOS-ETILO	<0,01	µg/L

HERBICIDAS	-	µg/L
SIMAZINA	-	µg/L
PROPAZINA	-	µg/L
DESETILATRAZINA	-	µg/L
CIAAZINA	-	µg/L
TERBUTILAZINA	-	µg/L
METOXURON ...	-	µg/L
MONURON	-	µg/L
CLORTOLURON	-	µg/L
METOBROMURON	-	µg/L
VINCLOZOLIN ..	-	µg/L
PHENMEDIPHAN	-	µg/L
METAZACLORO	-	µg/L
PENDIMETALIN	-	µg/L
2,4 - D	-	µg/L

OTROS ORGANOCORADOS

CLOROFORMO	20,0-25,0	µg/L
DICLOROBROMOMETANO	2,5-3,5	µg/L
DIBROMOCOROMETANO	<1,0	µg/L
BROMOFORMO	<1,0	µg/L

Madrid, de de 199



DEPARTAMENTO DE INGENIERIA DE CALIDAD
ANALISIS COMPLETO

Nombre de la muestra: Media 96
Valores medios del año 1996 (Intervalo del 95% de las muestras)
(Sistema de distribución)

CARACTERES ORGANOLEPTICOS

Olor	1	
Sabor	1	
Color	4-5	mg/L Pt-Co
Turbidez	0,8-0,9	U.N.T.

CARACTERES NO DESEABLES EN CANTIDAD EXCESIVA

Amonio	0,34-0,35	mg/LNH ₄
Nitratos	2,23-2,36	mg/LNO ₃
Nitritos	0,01-0,02	mg/LNO ₂
Oxidabilidad	2,2-2,3	mg/L O ₂
Hierro	< 0,02	mg/L Fe
Manganeso	< 0,02	mg/L Mn
Ortofosfatos	< 0,02	mg/L P
COT	1,9-2,2	mg/L C
SEC	-	mg/L
Hidrocarburos	<10	µg/L
Fenoles	<0,2	µg/L Fenol (*)
Boro	70-131	µg/L B
Detergentes	<1	µg/L LSS
Otros organoclorados	23,0-28,4	µg/L (*)
Cobre	2,9-6,3	µg/L Cu
Zinc	<10	µg/L Zn
Fluoruros	7,2-9,3	µg/L F
Cobalto	<0,3	µg/L Co
Bario	11,2-15,9	µg/L Ba
Plata	<0,1	µg/L Ag
Materia suspensión	-	
Cloro libre	0,0	mg/L Cl ₂
Cloro total	1,3-1,5	mg/L Cl ₂

CARACTERES MICROBIOLÓGICOS

Aerobios 22°C ...	0 - 5	Col/ml
Aerobios 37°C ...	0 - 5	Col/ml
Coli total	0	NMP/100 ml
Coli fecal	0	NMP/100 ml
Esche. coli	0	NMP/100 ml
Clostridium	0	Col/20 ml
Estrep. Fecales ...	0	Col/100 ml

OBSERVACIONES: (1) Medias de temperaturas por meses

E	F	M	Ab	Mv	Jn	Jl	Ag	S	O	N	D
10	8	8,5	10	12	14	15	16	14	12	11	10

CARACTERES FÍSICO-QUÍMICOS

Temperatura	(1)	°C
pH	7,7-7,8	unidades
Conductividad	105-109	µS/Cm
Cloruros	7,1-7,4	mg/LCl ₂
Silíce	4,8-5,1	mg/L SiO ₂
Sulfatos	11,6-16,2	mg/L SO ₄
Calcio	8,9-11,4	mg/L Ca
Magnesio	1,4-2,4	mg/L Mg
Sodio	4,1-7,1	mg/L Na
Potasio	0,9-1,1	mg/L K
Aluminio	176,1-200,0	µg/L Al
Dureza total	28,2-38,0	mg/L CaCO ₃
Alcalinidad	20,0-28,1	mg/L CaCO ₃
Residuo seco	54-75	mg/L a 180°C

CARACTERES TOXICOS

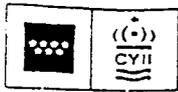
Arsénico	0,3-1,2	µg/L As
Berilio	<0,1	µg/L Be
Cadmio	<0,1	µg/L Cd
Cianuros	1,8-2,8	µg/L Cn
Cromo	0,0-0,2	µg/L Cr
Níquel	1,0-1,6	µg/L Cu
Plomo	<0,2	µg/L Pb
Antimonio	<0,5	µg/L Sb
Selenio	<0,5	µg/L Se
Vanadio	<10	µg/L V
Mercurio	<0,2	µg/L Hg
Plaguicidas	0,00-0,01	µg/L (*)
H.A.P.....	<0,01	µg/L (*)

CARACTERES RADIACTIVOS

Actividad Alfa total	0,00-0,02	Becquer/L
Actividad Beta total	0,02-0,07	Becquer/L

Madrid, de de 199

* Ver anexo



INFORME DE ANALISIS COMPLETO

MUESTRA: HORTADI (Deposito de Hortaleza, salida)

FECHA DE MUESTREO: 2/06/1997 HORA DE MUESTREO: 00:00:00 MUESTREADOR: 4

<u>CARACTERES ORGANOLÉPTICOS</u>		<u>CARACTERES FÍSICO-QUÍMICOS</u>		<u>CARACTERES NO DESEABLES EN CANTIDAD EXCESIVA</u>	
OLOR:	0	TEMPERATURA:	13.0 °C	AMONIO:	0.36 mg/L NH4+
SABOR:	0	pH:	7.8 Unidades	NITRATOS:	1.37 mg/L NO3-
COLOR:	<5 mg/L Pt-Co	CONDUCTIVIDAD:	119.4 µS/cm	NITRITOS:	<0.010 mg/L NO2-
TURBIDEZ:	0.3 U.N.F.	CLORUROS:	7.1 mg/L Cl-	OXIDABILIDAD:	0.4 mg/L O2
		SÍLICE:	8.4 mg/L SiO2	HIERRO:	<0.02 mg/L Fe2+
<u>CARACTERES TÓXICOS</u>		SULFATOS:	18.5 mg/L SO4=	MANGANESO:	0.02 mg/L Mn2+
ARSÉNICO:	<0.2 µg/L As	CALCIO:	16.2 mg/L Ca2	ORTOFOSFATOS:	0.02 mg/L PO4---
BERILIO:	<0.1 µg/L Be	MAGNESIO:	2.4 mg/L Mg	COT:	2.1 mg/L C
CADMIO:	<0.1 µg/L Cd	SODIO:	5.3 mg/L Na	SEC:	mg/L
CIANUROS:	9.3 µg/L CN-	POTASIO:	1.0 mg/L K	HIDROCARBUROS:	<10 µg/L
CROMO:	<0.1 µg/L Cr	ALUMINIO:	171.0 µg/L Al	FENOLES TOTALES:	0.2 µg/L Fenol
NÍQUEL:	2.3 µg/L Ni	DUREZA TOTAL:	50.3 mg/L CaCO3	BORO:	<30 µg/L B
PLOMO:	1.0 µg/L Pb	ALCALINIDAD:	36.5 mg/L CaCO3	DETERGENTES:	<1 µg/L LSS
ANTIMONIO:	<0.5 µg/L Sp	RESIDUO SECO:	143.0 mg/L 180 °C	OTROS ORGANOC:	26.6 µg/L
SELENIO:	<0.5 µg/L Se	<u>CARACTERES MICROBIOLÓGICOS</u>		COBRE:	10.0 µg/L Cu
VANADIO:	<10 µg/L V	AEROBIOS 22 °C:	1 Col/mi	ZINC:	<10 µg/L Zn
MERCURIO:	<0.2 µg/L Hg	AEROBIOS 37 °C:	2 Col/mi	FLUORUROS:	79.0 µg/L F-
PLAGUICIDAS:	<0.01 µg/L	COLI TOTAL:	0 Col/100 ml	COBALTO:	<0.3 µg/L Co
H.A.P.:	µg/L	COLI FECAL:	0 Col/100 ml	BARIO:	8.4 µg/L Ba
<u>CARACTERES RADIACTIVOS</u>		ESCHERICHIA COLI:	0 Col/100 ml	PLATA:	<0.1 µg/L Ag
ACT. α TOTAL:	Bequer/L	CLOSTRIDIUM S.R.:	0 Col/20 ml	MAT. SUSPENSIÓN:	
ACT. β TOTAL:	Bequer/L	ESTREP. FECALES:	0 Col/100 ml	CLORO LIBRE:	<0.1 mg/L Cl2
		<u>PESTICIDAS ORGANOFOSFORADOS</u>		CLORO TOTAL:	1.3 mg/L Cl2
<u>PESTICIDAS ORGANOCORADOS</u>		THIMET:	0.00 µg/L	<u>HIDROCARBUROS AROMÁTICOS POLICÍCLICOS</u>	
α-HCH:	0.00 µg/L	DIAZINON:	0.00 µg/L	FLUORANTENO:	µg/L
β-HCH:	0.00 µg/L	DISULFOTON:	0.00 µg/L	B (b) FLUORANTENO:	µg/L
δ-HCH:	0.00 µg/L	DIMETOATO:	µg/L	B (k) FLUORANTENO:	µg/L
LINDANO:	0.00 µg/L	MALATION:	0.00 µg/L	B (a) PIRENO:	µg/L
HEPTACLORO:	0.00 µg/L	ETIL-PARATION:	0.00 µg/L	I (1,2,3,c,d) PIRENO:	µg/L
ALDRIN:	0.00 µg/L	ETION:	0.00 µg/L	B (f,h,i) PERILENO:	µg/L
Oxi-CLORDANO:	0.00 µg/L	AZINFOS-METILO:	0.00 µg/L		
Trans-CLORDANO:	0.00 µg/L	AZINFOS-ETILO:	0.00 µg/L		
Cis-CLORDANO:	0.00 µg/L	<u>FENOLES</u>			
α-ENDOSULFAN:	0.00 µg/L	FENOL	0.23 µg/L		
β-ENDOSULFAN:	0.00 µg/L	2-CLOROFENOL:	0.00 µg/L		
DIELDRIN:	0.00 µg/L	4-CLOROFENOL:	0.00 µg/L		
ENDRIN:	0.00 µg/L	2,5-DICLOROFENOL:	0.00 µg/L		
o-p' DDT:	0.00 µg/L	2,4-DICLOROFENOL:	0.00 µg/L		
p-p' DDT:	0.00 µg/L	PENTAFLOROFENOL:	0.00 µg/L		
MITOXICLORO:	0.00 µg/L	2,4,6-TRICLOROFENOL:	0.00 µg/L		
<u>OTROS ORGANOCORADOS</u>					
CLOROFORMO:	24.9 µg/L				
DICLOROBROMOMETANO:	1.52 µg/L				
DIBROMOCLOROMETANO:	0.14 µg/L				
BROMOFORMO:	0.00 µg/L				

MADRID, A 31/07/1997

A.

ANALISIS MINIMO

Dirección:

Fecha: 11/02/97

Hora: 12:15:00

Olor (I.D.):	0	Sabor (I.D.):	0
Color (mg/L Pt-Co):	<5	Turbidez (U.N.F.):	0.5
pH (Unid.):	7.9	Conductividad (µS/cm):	58.9
Amonio (mg/L):	0.41	Nitritos (mg/L):	<0.010
Cloro Libre (mg/L):	<0.1	Cloro Combinado (mg/L):	1.4
Cloro Total (mg/L):	1.4		

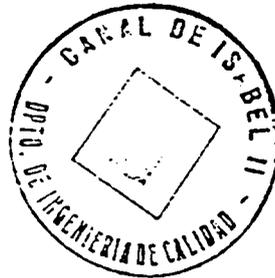
Aerobios 37 °C (Col./ml):	0
Coliformes totales (NMP/100 ml):	0
Coliformes fecales (NMP/100 ml):	0

(*)- El parámetro rebasa la C.M.A.

OBSERVACIONES:

MADRID, A 19/02/97

EL JEFE DE LA DIVISION:



APPENDIX F FRANCE

F1. SUMMARY OF COUNTRY SITUATION

France is a democratic Republic with a dual representativity; the Senate and the National Assembly. The President of the Republic appoints the Prime Minister who selects a Council of Ministers. The country is divided, administratively, into 36,400 municipalities, 95 departments and 22 regions. Each Region is administered by an elected regional council, each department by an elected general council and each municipality by an elected local council. The main legislation is voted by the elected members and the government applies the acts through decrees. This is why there are very few acts and a lot of decrees. Decrees are then complemented by orders and guidelines are also published in the form of circulars. It has to be pointed out that circulars are not recognised by the European Commission as legal documents.

It covers an area of 550 000 km² with a relatively small population density of 104/km² (population of around 57 million inhabitants). Water availability is relatively high which means there is a relatively low pressure on resources.

It is estimated that the total volume of water abstracted for drinking water production amounts to 6.1 km³ of which 57% is abstracted from groundwater and springs and 43% from surface water (Barraqué 1995).

Water supplies are very numerous, with many small systems scattered around the country. There are around 15 500 local management units relying on more than 31 000 different intake points (only 1000 for surface water). There are no official figures for the number of treatment works nor is information held centrally on the technologies used. Municipalities are responsible for water supply, sewerage and sewage disposal. They either directly manage the service, on their own or within a syndicate of municipalities, or delegate this responsibility to a private company. In addition, 1% of the population is not connected to a public supply and relies on its own supply (Barraqué 1995).

Because of the success of the formula for delegating water services to a private company, around 75% of consumers are supplied by a private company, the French overall culture for drinking water considers it as a commercial good, to be paid for by the consumer, and not by the tax payer. The French also buy large quantities of bottled water which places strong pressure on water suppliers to maintain the quality of drinking water.

There have been several cases reported in the press of nitrate exceedences and consumers receiving compensation for having been supplied drinking water which did not meet the required quality standards. The European Commission has taken actions several times against the French State for not transposing correctly Directive 80/778.

F2. ORGANISATION AND MANAGEMENT OF WATER SUPPLY

Each municipality elects a local council and a mayor who has responsibility for the administration, deciding which projects need to be implemented and to impose the taxes to finance them, such as improvements in infrastructure for water services drinking water, sewerage and sewage treatment. They are also responsible for organising and operating the water services. They can either manage this service directly (13 500 municipalities with a '*service en régie*'), join a union of municipalities running common services (2000 *syndicat de commune*) or subcontract to a private company (*délégation de service*) (Barraqué 1995). The mayor is still ultimately responsible for the supply of drinking water even if the water services are not operated directly by a municipality and subcontracted to a private company.

At the Department level, a general council is elected and can authorise subsidies to municipalities for projects on drinking water supply and sanitation. The Departmental Prefect is responsible, on behalf of the State, for supervising water supplies in technical, administrative and financial terms. The Prefect takes decisions on the procedure to be followed in the case of exceedences. The Prefect also issues authorisations for abstractions and discharges. The Prefect relies, for these tasks, on the departmental offices of the Health Ministry (DDASS - *Direction départementale des Affaires Sociales et de la Santé*) to monitor compliance of drinking water with quality requirements.

The Agences de l'Eau have an indirect role in drinking water supply as they collect charges on abstraction and discharges, which can then be used to assist municipalities in subsidising projects for resource improvement. The Ministry of Agriculture can also subsidise small rural municipalities to improve their water supply facilities through a fund (*Fond National de Développement des Approvisionnement en Eau-FNDAE*). The fund is created by a charge raised on every cubic meter of drinking water supplied in France.

The General Directorate for Health at the Ministry for Social Affairs and Health is responsible for implementing the relevant EC legislation into National law and to draw up national policy and establish general guidelines for drinking water supplies. The Ministry can consult, for advice, the High Council for Public Hygiene. Table D1 summarises the different roles and responsibilities at the different administrative levels.

Table F1 Responsibility for water services in France

Administrative level	Responsibility for		
	Legislation/Policy	Compliance and enforcement	Management and Operation
National	General Direction for Health at the Ministry for Social Affairs and Health	-	-
Regional/Departmental	Departmental Prefect (consent)	Departmental Prefect	-
Local	-	Mayor (Police)	Municipal Council/Mayor, or Syndicate of municipalities, or operation delegated to private companies

F3. LEGAL AND INSTITUTIONAL FRAMEWORK

F3.1 Legal Framework

Under Article L19 of the Public Health Code (*Code de la Santé Publique*), whoever supplies water for human consumption must ensure that it is fit for this purpose. The Decree No. 89-3 laid down the requirements for water provided for public consumption. Decree No. 89-3 has been amended several times, by Decrees No. 90-330, No. 91-257 and No. 95-363. Guidelines have been given in circulars sent to the departmental prefects for dealing with exceedences of specific parameters such as nitrate, pesticides, volatile organo-halogen compounds and lead.

F3.2 Implementation of EC Directive

EC Directive 80/778 on drinking water was adopted in France in 1989 by the Decree No. 89-3 of 1 January 1989. The delay in implementing the directive was due to disagreement between different ministries on the responsibility over financing quality monitoring.

The failure to implement the directive was the subject of a formal letter from the European Commission, a reasoned opinion of February 1988 and was eventually brought before the Court of Justice (Case 287/88 of 29 September 1988). After the publication of Decree No. 89-3, the Commission was not satisfied, considering that all the necessary provisions had not been implemented, such as the use of some values less stringent than the MAC specified in the directive.

These criticisms were addressed by circulars DGS/PGE/1.D No. 1361 of 24 July 1989 and DGS/PGE/1D No. 833 of 16 May 1989 regarding organohalogenated compounds. In January 1990, the Commission was still not satisfied with the way the directive had been implemented as the Commission does not recognise a 'circular' as a legal instrument. Decree No. 90-330 of 10 April 1990 (Article 10) was then published which modified maximum admissible concentrations (MAC) previously published in Decree No. 89-3 as shown in Table F2.

Most of the limit values have been implemented almost unchanged by Annex 1 of Decree No. 89-3 amended, except for the parameters listed in Table F3 for which more stringent or more specific values have been given or for which no value has been set up compared with the EC requirements.

Table F2 Parameters amended by Decree No. 90-330 of 10 April 1990

Parameters	EC MAC or GV	MAC (1989)	MAC (1990)
NKj	1 mg l ⁻¹	2 mg l ⁻¹ *	1 mg l ⁻¹
Chlorides	GV 25 mg l ⁻¹ (approximate conc above which effects might occur: 200 mg l ⁻¹)	250 mg l ⁻¹	200 mg l ⁻¹
Fluoride	0.7- 1.5 mg l ⁻¹ according to temperature	1,5 mg l ⁻¹	0.7- 1.5 mg l ⁻¹ according to temperature
Alkalinity and hardness	(100 mg l ⁻¹ Ca as guide value)	50 °F	-
PCB and PCT	no specific value - 0.1 µg l ⁻¹ for individual pesticide applies	0.5 µg l ⁻¹	-

Notes:

- removed

* the analytical method specified in the decree 89-3 had a limit of detection close to 1 mg l⁻¹ which made it difficult to fix the standard to 1 mg l⁻¹.

1 °F equal to 0.25 mg l⁻¹ Ca

Table F3 Differences between French legal requirements for drinking water quality and EC limit values

Parameters	EC MAC	EC GV	Comment	MAC in Decree 89-3/990 as amended
colour	20 mg l ⁻¹ Pt/Co	1		15 mg l ⁻¹ Pt/Co
turbidity	4 JTU	1		2JTU
conductivity	-	400 µS/cm at 20 °C	mineralisation of the water ± 2500 ohms/cm	-
calcium	-	100 mg l ⁻¹	-	-
dissolved oxygen (% sat)	-	-	sat. >75% except for groundwater	-
free CO ₂	-	-	water should not be aggressive	-
TOC	-	-	any increase must be investigated	-
substances extractable in CCl ₄	-	0.1 mg l ⁻¹ dry residue	-	-
chlorine	-	25 mg l ⁻¹	-	200 mg l ⁻¹
copper	-	0.1/3 mg l ⁻¹	-	1 mg l ⁻¹
zinc	-	0.1/5 mg l ⁻¹	-	5 mg l ⁻¹
barium	-	100 µg l ⁻¹	-	-
boron	-	1 mg l ⁻¹	-	-
SS	-	-	-	-
Benzo(3,4) pyrene	-	-	-	0.01 µg l ⁻¹
aldrin and dieldrin hexachlorobenzene	no specific value - 0.1 µg l ⁻¹ for individual pesticides applies	- -	-	0.03 µg l ⁻¹ 0.01 µg l ⁻¹
salmonella pathogenic staphylococci faecal bacteriophages entero-viruses	no pathogenic organisms	-	-	0/5l 0/100 ml 0/50 ml 0/10 l
others: parasites, algae, animalcules	should not be present	-	-	-

- no value or comment

F3.3 Control of Drinking Water Quality

Article 8 of the Decree No. 89-3 was modified by Decree No. 90-330 to remove the responsibility placed on plant operators to monitor water quality. Water supply operators have to carry out their own operational monitoring but these results are not used to check compliance with standards. Compliance monitoring is the responsibility of the Departmental Health Services (*Direction départementale des Affaires Sociales et de la Santé* - DDASS). Sampling is carried out by the DDASS, laboratories designated and approved by the DDASS or by agents of the municipal health and hygiene services (Article 11) in accordance with a programme of analyses defined in Annex 2 of Decree No. 89-3 (defined in accordance with Annex II of Directive 80/778). Water quality analyses have to be carried out by an approved laboratory (Article 12), which has to send the results to the DDASS and to the operator of the plant (Article 13).

F4 PUBLICATION OF REPORTS

F4.1 Routine/Daily Reports

The results of compliance monitoring have to be made available to the Mayor of each of the municipalities (*communes*) concerned and/or the presidents of the syndicate for those municipalities which have grouped their services. The departmental prefects are required to send the mayor data on the quality of drinking water supplied in their municipality in simple terms to be understood by all users. The data on the quality of drinking water supplied should be displayed in the town hall within three days of receiving the results.

For large municipalities, a monthly summary report is produced by the DDASS, also to be displayed in the town hall. Results may be forwarded to others on request and the DDASS must forward it to the inhabitants of the town or village concerned if they so request. The report displayed in the town hall gives a summary of the quality for the period covered and mentions any exceedences, even if the exceedence is not confirmed by subsequent analysis. Since June 1997, an exceedence of the MAC for nitrate, must be reported as 'water unfit for consumption'.

F4.2 Water Company Reports

Consumers can also have direct access to the results from the water companies. There is no legal obligation for water companies to supply information on water quality to the consumer but most large companies have put in place services to provide their customers with this information. Different systems are in place and some companies are using MINITEL, or an automatic fax system (audiofax).

The results of the analyses carried out under the responsibility of the operator should be forwarded to the DDASS in the event of any exceedence of the maximum admissible concentrations (MAC) or guide values. However, in practice, this does not always appear to take place. For example, results from a survey carried out in the department of Loire-

Atlantique on bacteriological analyses taken after new pipes were installed, showed that 22% of 1000 samples, failed the standard for bacteria (faecal bacteria and number of aerobic bacteria at 22 °C or 37 °C below 500 ml⁻¹). It was noted that such results are not always sent to the DDASS and often no confirmation is carried out after unsatisfactory results (Abasq 1997).

F4.3 National Report

There is no regular national report on drinking water quality. A first national survey was published in 1993 (MDS 1993) in preparation of the reporting requirement under Directive 91/692/EEC. It covered results from 1989, 1990 and 1991 except for microbiological parameters which only deals with data from 1991. It mainly took into account those supply zones serving more than 10 000 inhabitants, namely 931 zones serving 36.2 million people (about 63.5% of total population) and representing 3.4% of the total number of supply zones in France. The supplies were derived mainly from groundwater (60%). A total of 1.2 million samples were taken in the distribution system and/or at the production works. A second report, on the remedial actions taken or to be taken in case of exceedences was planned but not published. Lead and pesticide parameters were not taken into account in this specific survey.

F4.3.1 Overall quality

The number of supply zones with water exceeding the required standards for 24 parameters of the 28 monitored consistently, are listed in Table F4. Figure F1 summarises the percentages of water supply zones complying with standards. In total, 354 supply zones, namely 38% of the 931 zones surveyed, were not in compliance with the legal requirements for drinking water quality. A zone was reported as 'non compliant' if just one sample had not met the required standard for only one result. Compared to the total number of samples taken, it represents 99.7% compliance with the standards i.e. broadly the same overall percentage of compliance as for the UK in 1996.

It was reported in the national survey for 1993 (MDS 1993) that, for the whole of France, exceedences of the microbiological and nitrate parameters concerned, respectively, 5.1 and 1.6 million people. Similar figures were quoted again in a recent press release (Le Monde 14 November 1997) referring to a yet unpublished report which also included strong criticisms of the Agences de l'Eau financial policy.

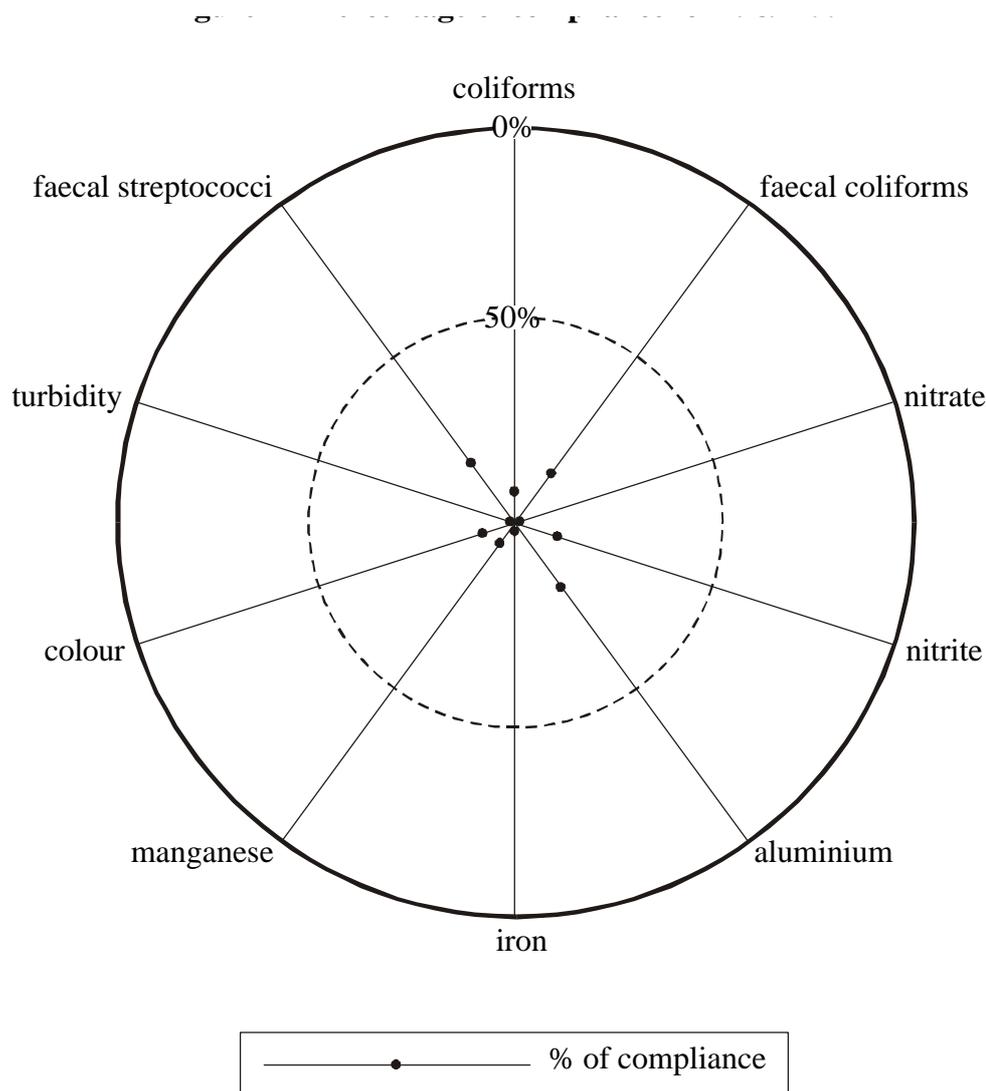


Figure F1 Percentage of compliance for 1989-1991

F4.3.2 Microbiological parameters

In 1991, there were 223 supply zones (24%) which exceeded, for at least one sample, the standard for any microbiological parameter, corresponding to 9.8 million inhabitants. In most cases, exceedences were reported for several microbiological parameters.

These results can give a misleadingly poor picture of water quality as for some of these exceedences, the level of exceedence could be quite low and be a one-off problem. This is why the results were presented using another compliance criteria. A supply zone is regarded as non-compliant only if more than 5% of samples failed compliance for faecal coliforms or streptococci or sulfate-reducing bacteria or more than 10% of samples failed compliance for the coliform parameter (even if the Decree No. 89-3 specifies 95%

compliance for total coliforms). In this case, 109 supply zones (13%) failed microbiological compliance in 1991, representing 3.5 million inhabitants.

An additional survey was carried out in 1989, 1990 and 1991 for supply zones supplying less than 10 000 inhabitants. It was reported that 22% of these zones had a 30% level of non compliance for faecal coliform and/or streptococci, representing an additional 1.7 million inhabitants exposed.

A previous survey carried out in 1979, 1980 and 1981 on all supply zones (namely 18 377 zones), representing 48 million people showed that 45% of zones, representing 42% of the population complied with any microbiological standard while 23% had 30% or more of non compliance, representing 2.3 million inhabitants. A direct comparison with the 1991 survey is not possible as criteria used for statistical analysis were different.

F4.3.3 Nitrate

Between 1989 and 1991, there were seven supply zones (0.8%), representing 140 000 inhabitants, with an annual average concentration above 50 mg l⁻¹ NO₃. When considering supply zones with at least one sample exceeding 50 mg l⁻¹ NO₃, the number of zones raises to 89, representing 3.9 million inhabitants. In supply zones of less than 10 000 inhabitants, an additional 580 000 people were supplied water with an average concentration above 50 mg l⁻¹ NO₃ or 2 million people supplied with at least one sample above 50 mg l⁻¹ NO₃. For the whole of France, a total of 700 000 inhabitants were supplied water with an average concentration above 50 mg l⁻¹ NO₃ or 5.1 million inhabitants were supplied water with at least one sample above 50 mg l⁻¹ NO₃.

Results of two previous surveys had been published in 1981 and 1988 on nitrate concentration in drinking water. Results from the 1988 report were based on a survey carried out in 1985, 1986 and 1987. During the three year period, 2.56 million people were supplied water with an average concentration above 50 mg l⁻¹ or at least one sample with a nitrate concentration above 50 mg l⁻¹.

F4.3.4 Others

Parameters for which non compliance has been reported between 1989 and 1991 are presented in Table F4. It mainly concerns iron, aluminium, fluoride and turbidity.

F4.4 Regional Reports

A regional report (DDASS 1996) for the Côte d'Or region presents drinking water quality for 1991-1995. Figure F2 and Table F5 summarise the overall quality between 1991-95 for microbiological, nitrate and pesticides parameters. Tables F6 - F8 present the results separately for each year.

F4.4.1 Microbiological parameters

During the five year period, it is reported that 93% of the population received water of good bacteriological quality, namely that in less than 10% of samples, faecal coliforms and faecal streptococci were present. Between 1991 and 1995, there has been a regular improvement in the microbacterial quality of drinking water (Table F6).

F4.4.2 Nitrate

During the five year period, 96% of the population received water in compliance with the nitrate standard, which means that 4% of the population (around 18 000 inhabitants) were exposed to annual average nitrate concentrations above the standard. Between 1991 and 1995, there has been an increase in the population supplied with water containing between 0 and 25 mg l⁻¹ NO₃ and an increase in population supplied with water containing more than 50 mg l⁻¹ NO₃ (Table F7). It was reported that remedial actions were mainly long-term plans to reduce agricultural inputs and treatment of wastewater, through codes of good agricultural practices and improvement of infrastructure.

F4.4.3 Pesticides

Based on monitoring of atrazine, simazine, propazine, promethrin, tebutylazine and cyanazine, 6% of the population (28 500 inhabitants) on average, were supplied water with an average total pesticide concentration above 0.5 µg l⁻¹ and below 2 µg l⁻¹. The situation has improved from 11% in 1991, to 5.21% in 1995 (Table F8).

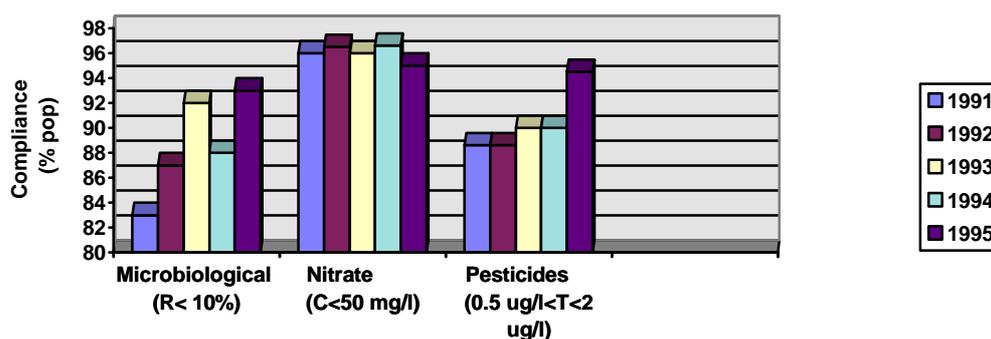


Figure F2 Summary and trends in drinking water quality of the Cote d'Or Region

Table F4 Summary of water quality in France in supply zones (SZ) of more than 10,000 inhabitants (MSD 1993)

Parameters*	French MAC	Non compliance based on at least 1 sample not complying				Non compliance based on average concentration (AC)		
		No of samples not complying	No SZ (%)	Population (x million)	Max conc	Criteria for non compliance	No SZ (%)	Population (x million)
Microbiological (1991 only)			223 (26.5%)	9.84		a	109 (13%)	3.47
streptococci	0/100 ml	513 (4.5%)	150 (18%)	6.7	145/100 ml	LNC > 5%		
coliform thermotolerant	0/100 ml	576 (43%)	125 (15%)	7	300/100 ml	LNC > 5%		
coliforms	0/100 ml	260 (10.6%)	52 (6.4%)	4.3	200/100 ml	LNC > 10%		
Clostridium	1 spore/20 ml	24 (6%)	14 (1.94%)	0.33	-	LNC > 5%		
Nitrates	50 mg l ⁻¹	1071 (6%)	89 (10.3%)	3.9	143 mg l ⁻¹	b	24 (2.7%)	0.49
						AC > 50 mg l ⁻¹	7 (0.8%)	0.14
Nitrites	0.1 mg l ⁻¹	56 (1.4%)	11 (1.4%)	0.9	1.1 mg l ⁻¹	AC>0.1 mg l ⁻¹	2	0.03
NH ₄	0.5 mg l ⁻¹	46 (13%)	9 (1%)	0.2	3.2 mg l ⁻¹	AC>0.5 mg l ⁻¹	3	0.06
Nkj	1 mg l ⁻¹	37 (62%)	12 (2.4%)	1.4	10.5 mg l ⁻¹	AC>1 mg l ⁻¹	3	0.26
Oxygen KMnO ₄	5 mg l ⁻¹	2	2	0.03	8.8 mg l ⁻¹	AC>5 mg l ⁻¹	-	-
Dissolved Hydrocarbon	10 µg l ⁻¹	16 (37%)	8 (1.4%)	0.3	92 µg l ⁻¹	AC>10ug	4	0.15
Phenol index	0.5µg l ⁻¹	3	3 (0.6%)	0.04	24 µg l ⁻¹	AC	-	-
Fe	0.2 mg l ⁻¹	302 (7.5%)	65 (7.5%)	2.1	2.6 mg l ⁻¹	LNC > 5%	38 (4.4%)	1.01
Al	0.2 mg l ⁻¹	244 (21.8%)	39 (6%)	1.2	1.89 mg l ⁻¹	LNC > 5%	35 (5.4%)	1.03
F	1.5 mg l ⁻¹	36 (53%)	11 (1.7%)	0.25	3.4 mg l ⁻¹	LNC > 5%	11 (1.7%)	0.25
Mn	0.05 mg l ⁻¹	50 (11%)	21 (3.4%)	0.7	8.36 mg l ⁻¹	AC>0.05 mg l ⁻¹	9 (1.6%)	0.14

Parameters*	French MAC	Non compliance based on at least 1 sample not complying				Non compliance based on average concentration (AC)		
		No of samples not complying	No SZ (%)	Population (x million)	Max conc	Criteria for non compliance	No SZ (%)	Population (x million)
Colour	15 mg l ⁻¹ Pt Co	42 (11.7%)	7 (1%)	0.5	30 mg l ⁻¹ PtCo	AC>15 mg l ⁻¹ PtCo	1 (0.1%)	0.02
Turbidity	2 U Jackson	399 (1.8%)	82 (10.3%)	5.6	26.5 UJ		68 (8.5)	2.3
	10 UJ		14 (2%)	2.5	26.5 UJ	AC>10 UJ	1	0.01
Temperature	25 °C	23 (6.1%)	5 (0.8%)	1.2	33 °C	AC>25	1	0.01
Chlorides	200 mg l ⁻¹	53 (29%)	6	0.2	532 mg l ⁻¹	AC>200 mg l ⁻¹	4	0.09
pH Max	9	-	10(1.2%)	0.4	11.4	>9	1	0.04
Sulphate	250 mg l ⁻¹	233 (59%)	15 (2%)	0.28	400mg l ⁻¹	AC>250 mg l ⁻¹	11(1.5%)	0.21
Mg	50 mg l ⁻¹	12 (67%)	2	0.05	62.5 mg l ⁻¹	AC>50 mg l ⁻¹	1	0.03
Na	150 mg l ⁻¹	2	1	0.01	175.5 mg l ⁻¹	AC>150 mg l ⁻¹	1	0.01
K	12 mg l ⁻¹	14 (37%)	9	0.25	19 mg l ⁻¹	AC>12 mg l ⁻¹	5	0.11

Notes:

* Data from 1989-1991

AC Average concentration

LNC Level of non compliance = percentage of samples which have not complied the required standard.

a Taking into account the level of non compliance as defined for each parameter

b Annual average concentration > 50 mg l⁻¹ NO₃ OR 40< AC<50 mg NO₃ AND level of non compliance >5%

Table F5 Summary of drinking water quality in the Côte d'Or Region (DDASS 1996) (1991-1995)

Nitrates				Microbiological				Pesticides			
Average concentration (mg l ⁻¹)* (C)	No SZ	No pop	% pop	% of analysis not in compliance (R)	No SZ	No pop	% pop	Level (µg l ⁻¹) (T)	No SZ	No pop	% pop
0<C<25	210	373 466	75	0<R<10%	209	456 991	92	T<LD	189	140 496	28
25<C<40	94	69 967	14	10<R<30%	118	1 111	6	LD<T<0.5	187	326 399	66
40<C<50	47	34 553	7	30<R<60	50	6 077	1	0.5<T<2	11	28 481	6
50<C	38	17 912	4	60%<R	11	1 719	0.35	T>2	0	0	0
	389	495 898			388	495 898			387	495 376	

Note: * based on results for 1991-1995

Table F6 Summary and trends in microbiological quality of drinking water in the Côte d'Or Region (DDASS 1996) (1991-1995)

Microbiological	1991			1992			1993			1994			1995		
% of analysis not in compliance (R)	No SZ	No pop	% pop	No SZ	No pop	% pop	No SZ	No pop	% pop	No SZ	No pop	% pop	No SZ	No inh	% pop
0<R<10%	264	410 334	83	282	433 463	87	265	457 704	92	235	438 548	88	255	460 671	93
10<R<30%	40	71 307	14	29	47 042	9.5	48	27 617	5.6	55	39 247	8	50	23 191	4.7
30<R<60	60	10 238	2	59	12 864	2.6	49	7 499	1.5	64	14 805	3	61	10 113	2
60%<R	24	4 019	0.8	18	2 569	0.5	26	3 078	0.6	34	3 298	0.7	22	1 923	0.4
	388	495 898		388	495 898		388	495 898			495 898			495 898	

Table F7 Summary and trends in drinking water quality for the nitrate parameter in the Côte d'Or Region (DDASS 1996) (1991-1995)

Nitrates	1991			1992			1993			1994			1995		
	No SZ	No pop	% pop	No SZ	No pop	% pop	No SZ	No pop	% pop	No SZ	No pop	% pop	No SZ	No pop	% pop
Average concentration (mg l ⁻¹) (C)															
0<C<25	208	356 762	72	194	360 918	73	197	347 059	70	206	372 118	75	221	378 950	77
25<C<40	74	77 473	16	78	71 575	14.5	95	103 139	21	98	69 854	14	96	63 356	13
40<C<50	55	39 114	8	49	43 590	9	43	24 711	5	44	37 809	7.6	45	25 735	5
50<C	41	18 714	3.8	62	19 553	4	47	19 169	4	34	15 421	3	22	22 983	5
	378	492 063		383	495 636		382	494 078		382	495 202		384	491 024	

Table F8 Summary and trends in drinking water quality for the pesticide parameter in the Côte d'Or Region (DDASS 1996) (1991-1995)

Pesticides	1991-92			1993-94			1995		
	No SZ	No pop	% pop	No SZ	No pop	% pop	No SZ	No pop	% pop
Level µg l ⁻¹ (T)									
T<LD	233	306 395	62	13	16 309	6	238	323 587	66
LD<T<0.5	127	131 812	26.6	67	233 905	84	124	139 128	28.5
0.5<T<2	25	57 054	11.5	9	28 180	10	10	25 437	5
T>2	1	115	0.02	0	0	0	0	0	0
	386	495 376		89	278 394		372	488 152	

Notes:

SZ - Supply zone

LD - limit of detection

F5. ENFORCEMENT PROCEDURES

F5.1 Legal Basis

Under articles 2 and 3 of Decree No. 89-3, the departmental prefect is the competent authority for authorisations to use water and to issue derogations to the limit values.

In case of exceedences, the mayor or the private operator responsible for the public water supply is required by the prefect and, after consulting the departmental Health Council (*Conseil départemental d'hygiène* - CDH), to take appropriate measures, to adopt a programme and timetable to improve water quality.

F5.2 Notification of Derogations

When a derogation is issued, the public must be informed and this is done by placing a notice on the bulletin board at the Prefecture.

The procedure of notification to the Commission when derogations have been authorised is described in Order of 11 March 1991 and circular DGS/SD1D No 22. Departmental prefects have to send a report to the Health Minister. Specific deadlines for notification of the derogations have been defined:

- within one month, in the case of derogations for nature of the ground and for plant supplying more than 5000 people or more than 1000 m³ d⁻¹, together with details on the reasons for the derogation
- within eight days, in the case of derogations for exceptional meteorological conditions and for plant supplying more than 5000 people or more than 1000 m³ d⁻¹, together with details on the reasons and timescale for adoption of remedial actions.
- immediate notification in the case of derogations after an accident or use of surface water of quality not suitable for the production of drinking water and for plant supplying more than 5000 people or more than 1000 m³ d⁻¹, together with details on the reasons and timescale for adoption of remedial actions.

F5.3 Authorised Derogations

Under article 3 of Decree No. 89-3, a water supplier can ask for derogations from limit values specified in Annexe 1 of the 1989 Decree according to the same three conditions as set out in Articles 9 and 10 of the directive, namely for geological, climatic conditions or after a serious accident. Derogations for climatic or accidental reasons can only be given for a limited period and derogations for geological or climatic reasons cannot cover toxic or microbiological parameters. However, guidelines for derogations of the pesticide parameter are given under the very same provision (see below). Derogations are granted only if there is deemed to be no threat to health. Derogations are granted by prefectural order after consultation with the departmental hygiene committee.

For nitrate and pesticides, specific guidelines for derogations were published in circular DGS/PGE/1D No 717 of 12 April 1990 regarding triazines and circular DGS/PGE/1D No 1325 of 9 July 1990 regarding nitrates, in water for human consumption. These two circulars have been recently cancelled by circular DGS/VS4 of 27 June 1997 following an action taken by the European Commission (Case C-49/97 of 6 February 1997) against the French Republic for non compliance with the obligations of Directive 80/778. New formal written guidelines were published in interministerial letter of 22 February 1997 governing derogations for pesticide parameter (see below).

Circulars and notes were also issued for dealing with lead exceedences and identifying priority areas (Circular 3756 of 6 August 1984, DGS/PGF/SD 1 D No. 66 of 27 November 1991 and No. 71 of 26 December 1991).

For volatile organohalogenated compounds for which a guide value of $1 \mu\text{g l}^{-1}$ is given in EC Directive 80/778/EEC, circular DGS/PGE/1D-No. 833 was published on 16 May 1989 to deal with exceedences of WHO recommended values.

For other parameters, discretion is left to the prefect. In allowing derogations, the prefect has access to advice from the DDASS, from local medical authorities, and the departmental hygiene committee. In the case of 'nitrate', the cancellation of circular DGS/PGE/1D No 1325 has left a gap in current practice as the standard for nitrates is frequently exceeded. In practice, however, it appears that the advice given by the DDASS is the same as previously (see below).

F.5.3.1 Derogations for the pesticide parameter

The current procedures are listed in interministerial letter of 22 February 1997 dealing with derogations for pesticide exceedences. Exceedences can be authorised under point 3.1 of Decree No. 89-3, namely for situations arising from the nature and structure of the ground. It requires the water supplier to take all necessary measures to protect consumers within a timescale specified by the prefect. Necessary measures include informing the population of the nature and risks associated with contaminated drinking water and the drafting of an improvement programme with a timescale for implementation. The improvement programme can consist of changing supply source, blending of water or applying treatment. Preventative actions must also be carried out such as limiting the use of pesticides for agricultural and non-agricultural uses in water protection zones and water abstraction areas. Prefects can impose these limitations or bans on the use of certain pesticides, based on monitoring results, when concentrations are above 20% of the WHO guidevalues.

Previously, under circular DGS/PGE/1D No 717 of 12 April 1990 regarding triazine, derogations for exceedences were authorised as long as the concentrations measured were below WHO guidelines, together with the implementation of a prevention programme and remedial measures such as treatment or blending.

The details of the old procedure are as follows:

- a) If, after verification of analysis carried out by chromatography, the concentration of atrazine in drinking water fell between $0.1 \mu\text{g l}^{-1}$ and $2 \mu\text{g l}^{-1}$, or for simazine between $0.1 \mu\text{g l}^{-1}$ and $17 \mu\text{g l}^{-1}$, water could still be supplied if:
- the water supplier informed the public of the situation;
 - an increase in monitoring, at least monthly was implemented;
 - a technical survey was started to identify the cause of the contamination;
 - an improvement programme was drafted and implemented (modification of agricultural practices, resource management, blending and eventually treatment). It was expected that a long timescale would be needed before compliance with standard could be achieved.
- b) If after verification of analysis, the concentration in drinking water for atrazine was above $2 \mu\text{g l}^{-1}$ or $17 \mu\text{g l}^{-1}$ for simazine, the water supplier had to inform the public that it was advised not to drink the water.
- c) If other pesticides were found, together with atrazine and simazine, a specific survey had to be carried out. Depending on the results, more stringent actions could be taken.

F5.3.2 Derogations for the nitrate parameter

Previously, exceedences of nitrates were dealt with according to procedures laid down in circulars DGS/PGE/1D No 1005 of 10 July 1981 and No. 636 of 29 April 1985, replaced by DGS/PGE/1D No 1325 of 9 July 1990 published by the Health Ministry. This advice has now been withdrawn but because nothing has been issued in its place, it would appear that it is still largely followed.

Derogations to the nitrate parameter in drinking water (treated water) were authorised by the prefect for water containing between $50\text{-}100 \text{ mg l}^{-1}$ if a remedial programme with a specific timetable was submitted and approved by the Ministry of Health together with a warning given to the population at risk and advising that pregnant women and babies aged less than six months should not drink the water. Remedial programmes often included treatment or blending of different sources of water.

Details of the procedure for derogations are as follows:

- Under normal conditions, outside any accidental circumstance, neither meteorological factors or the nature/structure of the ground could be used as the basis for derogations. However, remedial actions had to be implemented to comply with the standards as quickly as possible (use of deeper wells, blending, new supplies, etc.). In the meantime, water could still be supplied to the population as long as the public were warned of the health risks associated with drinking water containing high levels of nitrate and from drinking water from their own wells.

- In the case of exceptional meteorological conditions, temporary derogations could be authorised when there was no risk for public health.
- In the case of major accidental circumstances, temporary derogations could be authorised when water could not be supplied by any other means.

It was recommended that water did not present any risk for health for concentrations between 50-100 mg l⁻¹, except for pregnant women and children aged less than six months. If concentrations exceeded 100 mg l⁻¹, water should not be consumed.

As soon as nitrate concentrations were above 50 mg l⁻¹ or if concentrations were regularly increasing and above 25 mg l⁻¹, an increase in monitoring had to be implemented.

F5.3.3 Derogations for the lead parameter

Circular of 6 August 1984 SNS 84-41 (classification SP 5 544 No. 3756) was issued to Regional and Departmental Prefects and to the Regional and Departmental Health Services to identify and take actions in areas potentially at risk of drinking water contamination by lead due to aggressive waters and presence of lead pipes in the distribution systems. Recommendations have to be disseminated to water suppliers, plumbers and consumers. It recommended either the removal of lead pipes, a change of the resource or treatment of the water. Monitoring has to be carried out on samples after flushing and after stagnation to identify health risks, namely if concentrations in samples after flushing are above 50 µg l⁻¹ or above 100 µg l⁻¹ after stagnation.

Circular DGS/PGF/SD 1 D No 66 of 27 November 1991 deals with potential areas at risk of drinking water contamination by lead due to waters other than aggressive. It is recommended that in the areas with lead exceedences, to replace lead pipe in the public distribution systems and to modify the internal plumbing systems. It is also recommended, in the mean time, to apply relevant treatment, such as orthophosphate addition or increasing the pH by dosing with lime. Information has to be disseminated to consumers in areas where concentrations exceed the standards, including recommendation for pregnant women, babies and young children under six years to use bottled water, and other people to flush water before using tap water.

F5.3.4 Derogations for the volatile organohalogenated compound parameter

Circular DGS/PGE/1.D No. 833 deals with exceedences of volatile organohalogenated compounds due to contamination of water resources or disinfection by-products. It recommends maximum admissible concentrations in drinking water as follow:

- Carbon tetrachloride 3 µg l⁻¹
- Dichloroethane-1,2 10 µg l⁻¹
- Tetrachloroethylene 10 µg l⁻¹
- Trichloroethylene 30 µg l⁻¹
- Chloroform 30 µg l⁻¹

The occurrence of organohalogenated compounds other than THM has to be investigated even when concentrations are below recommended values. In case of high contamination, remedial actions have to be taken immediately. No detailed procedure has been defined as pollution by organohalogenated compounds can be due to several causes.

F5.4 Remedial Action

There is a widespread recognition that cutting off water supplies creates more problems than supplying water which is not in compliance with the directive. The MAC is not necessarily taken as an action level for carrying out improvement programmes. A supply for which one parameter hovers around the MAC might not necessarily require action, while a supply for which a parameter is showing a steady increase, even if its value were within the MAC, would be investigated and the cause identified. If a parameter exceeds the MAC for two samples in succession, the DDASS must decide whether the supply can be allowed to continue. In nearly all cases, there is no risk to health and the supply is not cut off. A temporary derogation can be granted and a programme of amelioration agreed, together with a timetable for completion.

In the case of microbiological exceedences, confirmation of the result has to be carried out immediately. If the second analysis is confirmed, the DDASS advises disinfection or flushing of the distribution system. If it is not confirmed, no action needs to be taken. In both cases, the exceedences are reported on the public notice.

Following the cancellation of circulars DGS/PGE/1D No 717 of 12 April 1990 regarding triazines and DGS/PGE/1D No 1325 of 9 July 1990 regarding nitrate, it is not clear what actions will be taken in the case of exceedences. Previously, temporary derogations for nitrate were authorised by the prefect, for water containing between 50-100 mg l⁻¹ if a remedial programme with a specific timetable was submitted and approved by the Ministry of Health. Remedial actions mostly consisted of treatment or blending of different sources of water.

For pesticides, derogations for exceedences were authorised as long as they were below WHO guidelines, together with the implementation of a prevention programme and remedial measures such as treatment or blending.

In the case of groundwater, treatment will need to be implemented to comply with pesticide parameters. For treatment works using surface water, the current level of treatment includes, already, several steps which help in removing pesticides. In the future, interconnection between works will be more widespread allowing more flexibility in case of problems.

Following a court ruling and prosecutions of water companies for supplying water which did not comply with the standard for nitrate, one of the water companies has installed a biological denitrification and membrane ultrafiltration plant as a temporary solution to treat water abstracted from surface water.

F6. PROSECUTION AND PENALTIES

In the event of quality standards not being complied with or if there are signs of deterioration that could lead to a situation where public health is endangered, the mayor or the private operator responsible for the public water supply is required on orders of the Prefect - and in the absence of an emergency - after consulting the Departmental Health Council (*Conseil départemental d'hygiène* or CDH), to take any appropriate measures, to adopt a programme and a timetable to improve water quality. However, the *commune* would not be held responsible if suppliers were not aware of these requirements.

If health and safety are threatened, mayors may take actions using their general police powers. They must check if water supplied is fit for human consumption. If it is not, the Prefect serves formal notice to the suppliers. If this remains unanswered, the Prefect may then take the necessary measures to make the water fit for human consumption. Any costs incurred are borne by the local authorities.

F7. CONSUMER RIGHTS

Under Article L19 of the Public Health Code (*Code de la Santé publique*) whoever supplies water must ensure that it is fit for human consumption. In this respect, consumers are entitled to two rights: the right to be informed and the right to compensation (*dommages et intérêts*) in the event of the water quality standards not being complied with. The latter right is subject to certain conditions as defined by case law.

F7.1 Right to Information

The public has to be informed of the results of the analyses carried out on the drinking water to determine its quality. These results constitute administrative documents that are to be made available to the public by the mayor or, if required, by a third person, by the *département* Directorate for Health and Social Affairs (*Direction départementale des affaires sanitaires et sociales* or DDASS), under the provisions of the Act of 17 July 1978 on different measures to improve relations between the administration and the public.

Routine monitoring data are supplied by the operator to the municipalities. If standards are not met, the DDASS is informed.

F7.2 Right to Compensation for Individual Consumers

Compensation may be payable to consumers in the event of standards not being complied with, subject to certain conditions as defined by case law (see Section 1.8 on court cases).

Following the numerous cases of nitrate exceedences, Eau Pure, a consumer group in Brittany has advised locals not to pay the part of their water bill which funds pollution

treatment in protest at the growing nitrate problem. The money will be placed in a special fund managed by Eau Pure (*Water Bulletin*, 20 September 1996).

F7.3 Other Rights

Individuals may ask an administrative court (civil court) to challenge the enforcement of particular measures to meet standards. Administrative courts can appraise the action of the enforcement authorities. For example, the courts may assess whether the enforcement authorities are acting appropriately to ensure drinking water meets the standards. Under certain conditions, in an administrative court, an individual may challenge the enforcement authority over a particular measure adopted at national level to meet an EC standard.

F8. COURT CASES

Significant examples of case law relating to users whose rights have been infringed through water supplied that did not comply with the quality requirements laid down in Directive 80/778, are listed below:

- a ruling issued by the Administrative Court of Appeal (*Cour administrative d'appel*) of Chambéry (Alps) on May 27 1986¹⁷ ordered Générale des Eaux (CGE) to pay consumers of the Cruseille municipality compensation of £315 each (3000 FF) for supplying water with the nitrate parameter in exceedence between 1976 and June 1982, and thus for non-respect of contractual obligations to supply water complying with statutory standards;
- a ruling issued on July 18 1994 by the magistrates court (*tribunal d'instance*) of Saint-Brieuc (Brittany),¹⁸ ordered Générale des Eaux (CGE) to pay the consumers of Tréguieux municipality costs incurred for the purchase of bottled water;
- in December 1995, a Guingamp court (Brittany) ordered Lyonnaise des Eaux to pay damages to 176 consumers for supplying water not complying with the nitrate parameter. The total amount paid in compensation was £22 000 (*Water Bulletin*, 31 January 1997);
- a ruling issued by the regional court (Tribunal de grande instance) of Romans-sur-Isère (Alps) of March 14 1996¹⁹ ordered CGE to pay compensation of £210 per inhabitant (2000 FF) for supplying water with excess nitrate concentration. The total amount paid in compensation was £12 500 to around 60 consumers (*Water Bulletin*, 22 March 1996)

¹⁷ Compagnie générale des eaux c/Richard et autres

¹⁸ Le Bras et autres c/CGE

¹⁹ Plancher et autres c/CGE (Case no. 11.95.00087)

- a ruling issued by the Appeal Court (*Cour d'appel*) of Rennes (Brittany) of November 14 1996²⁰ for the same case as described above (3) ordered CGE to pay compensation of 60p (3 FF) per day per person; the cost of two bottles of water.
- Seventy-seven consumers in Southeast France are each claiming £2200 from Générale des Eaux in compensation for being supplied drinking water which did not meet nitrate quality standards (*Water Bulletin*, 16 Feb. 1996). The compensation demand includes reimbursement for mineral water purchased over a five year period. The consumers point to similar complaints lodged by consumers in the Brittany region against both Générale des Eaux and Lyonnaise des Eaux which were upheld by the courts.
- Such cases have therefore confirmed that standards are binding on water suppliers, i.e. the suppliers are required to ensure that the drinking water supplied complies with the quality standards laid down in national legislation.

Under the aforementioned case law, compensation has been awarded by French courts to users in *communes* where the drinking water supplied by the two companies - Compagnie Générale des Eaux and the Lyonnaise des Eaux - did not comply with quality standards in respect of the MAC for nitrate.

This position taken by the French courts led the Lyonnaise Des Eaux to appeal to determine the State's responsibility in the deterioration of river water quality, pointing out that the State authorities are in a position to carry out effective preventative action to control nitrate pollution - by means of the system of granting permits for operating animal rearing. No decision has yet been reached on this case.

In addition, infringement proceedings have been initiated by the European Commission against France for failing to adequately transpose Directive 80/778. According to the Commission, two Circulars issued by the Ministry of Health (No. 717 of 12 April 1990 and No. 1325 of 9 July 1990) authorised nitrate, atrazine and simazine levels in excess of the MACs laid down under the aforementioned Directive (ref. Commission c/French Republic, Case C-49/97, OJEC C 108 of April 5 1997). In the past, the European Commission has brought action against the French Government for not implementing correctly, or fully, Directive 80/778; case 287/88 brought on 29 September 1988 (OJ C 286) and case C-21/90 on 22 January 1990 (OJ C 50).

F9. SOURCES OF INFORMATION

F9.1 Contacts

The following persons/institutions were contacted, interviewed or have otherwise contributed information, which is gratefully acknowledged:

²⁰ SA Compagnie générale des eaux c/M.Michel Le Bras et autres (Case n.&&)

WRc contacts:

Antoine Montiel, Senior Drinking Water Quality Scientist, SAGEP - water company supplying Paris. Water supplied to Paris is abstracted roughly equally from groundwater and surface water. Increasing contamination by nitrate and pesticides have required the introduction of more complex treatment and preventative measures (liaison with farmers) in recent years.

DDASS of Côte d'Armor in Brittany was contacted by phone to clarify the current situation with regard to nitrate exceedences following the cancellation of circular DGS/PGE/1D No 717 of 12 April 1990.

IEEP/Patrick Chatellet, Paris**F9.2 Legislation**

Code de la Santé Publique, Titre I- Mesures sanitaires générales, Chapitre III Des Eaux Potables (Article L.19 à L. 25.1).

Décret no 89-3 du 3 janvier 1989 relatif aux eaux destinées à la consommation humaine à l'exclusion des eaux minérales naturelles (Journal Officiel du 4 avril 1989) modifié par le décret no 90-330 du 10 avril 1990 (J.O. du 13 avril 1990), par le décret no 91-257 du 7 mars 1991 (J.O. du 8 mars 1991) et par le décret no 95-363 du 5 avril 1995 (J.O. du 7 avril 1995).

F9.3 Bibliography/References

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