



COMMISSION OF THE EUROPEAN COMMUNITIES

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Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the protection of groundwater against pollution

(presented by the Commission)

EXPLANATORY MEMORANDUM

1. INTRODUCTION

- 1.1. Groundwater is an important natural resource. It acts as a reservoir from which good quality water can be abstracted for drinking and for use in industry and agriculture. It is also valuable in maintaining wetlands and river flows, acting as a buffer through dry periods. Groundwater moves slowly through the ground and so the impact of human activities may last for a relatively long time. It may be difficult to clean up, even once the source of pollution has been removed, so we need to focus on preventing pollution in the first place. Groundwater provides base flow for surface water systems and so its quality may affect the quality of those surface waters. In other words, the effects of human activity on groundwater quality may impact on the quality of associated aquatic ecosystems and directly dependent terrestrial ecosystems. Groundwater is much more widely present than surface water, so it is even more difficult to prevent pollution, and to monitor and restore water quality.
- 1.2. In addition to the rules in Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances,¹ groundwater protection is also a feature of the Water Framework Directive 2000/60/EC (WFD),² which is the basic legislation for the protection of Europe's aquatic environment. Article 17 of the WFD requires that on the basis of a proposal from the Commission, the European Parliament and the Council shall adopt specific measures to prevent and control groundwater pollution by defining common criteria on good chemical status and on quality trends. This proposal for a Groundwater Daughter Directive meets that requirement.

2. GROUNDWATER: A RESOURCE AT RISK

- 2.1. Groundwater generally flows slowly so takes a long time to carry pollutants from their source. This means that pollution that occurred some decades ago – whether from agriculture, industry or other human activities - may still be threatening groundwater quality. These processes are difficult to observe and measure and so there is often a lack of awareness and/or evidence of the risks of groundwater pollution. Recent reports^{3,4} show that pollution from domestic, agricultural and industrial sources is increasing, either directly through discharges (effluent) or indirectly from the spreading of fertilisers or through leaching from landfill, some of it illegal. While point sources have caused most of the pollution identified to date, there is evidence that diffuse sources are having an increasing impact on groundwater.

¹ OJ L 20, 26.1.1980, p.43

² OJ L 327, 22.12.2000, p.72

³ OECD Review, 2003

⁴ Europe's environment: the third assessment, EEA, 2003

- 2.2. Consequently the prevention of groundwater pollution is of critical importance. It must be a key aim of European legislation for the following reasons:
- Once groundwater has been polluted, the consequences last for longer than surface water pollution (months, years and sometimes decades) because, in most cases, groundwater moves slowly underground. Moreover, it is usually either not practical or else very expensive to clean up the groundwater afterwards. Again, it is both impractical and bad strategy to provide comprehensive treatment to remove certain pollutants, such as pesticides and other organic trace substances. Contaminated drinking water is a health hazard and, once contamination has occurred, drilling new wells is expensive and in many instances not feasible. It is, therefore, preferable to prevent or reduce the risk of pollution rather than to deal with the consequences.
 - Groundwater is an important resource, which is used for drinking water, and by industry and agriculture, and should be protected for present and future use.
 - Groundwater provides the base flow (i.e. the water which feeds rivers all year round) for surface water systems, many of which are used for water supply and recreation. In many rivers, more than 50% of the annual flow is derived from groundwater, which travels a long way. In low-flow periods in summer, more than 90% of the flow in some rivers may come from groundwater. Hence, deterioration of groundwater quality may directly affect other related aquatic and terrestrial ecosystems.

3. CURRENT POLICY

- 3.1. Rules to protect against groundwater pollution have been in place since the adoption of Directive 80/68/EEC. This Directive provides a protection framework by preventing the direct discharge of high priority pollutants (List I) and subjecting the discharge of other pollutants (List II) to an authorisation procedure preceded by a thorough investigation on a case-by-case basis. Monitoring is required only for those specific cases of authorisation and is not generally required for all groundwater bodies. According to Article 22(2) of the WFD, Directive 80/68/EEC should be repealed in 2013, after which the protection regime should be continued through the WFD and the present Groundwater Daughter Directive.
- 3.2. The WFD requires the achievement of good groundwater status and to that end provides for the monitoring of groundwater bodies as well as measures to protect and restore groundwater. While the WFD provides a general framework for groundwater protection, Article 17 of the Directive provides for the adoption of specific criteria for the assessment of good chemical status and the identification of significant and sustained upward trends and for the definition of starting points for trend reversals.
- 3.3. Besides the existing groundwater directive (80/68/EEC) and the WFD, groundwater protection also features in other environmental legislation and policies, e.g. the Landfill Directive (99/31/EC),⁵ the Drinking Water Directive (80/778/EEC as

⁵ OJ L 182, 16.7.1999, p.1

amended by Directive 98/83/EC),⁶ the Nitrate Directive (91/676/EEC),⁷ the Plant Protection Products Directive (91/414/EEC),⁸ the Biocides Directive (98/8/EC)⁹ and the Commission Communication Towards a Thematic Strategy for Soil Protection.¹⁰

- 3.4. In addition, groundwater protection affects agricultural production. This is reflected by the cross-reference to Directive 80/68/EEC in the Commission's recent proposals on common rules relating to the review of the Common Agricultural Policy.¹¹ Already, Regulation (EC) No 1259/1999 allows Member States to make payments granted directly to farmers under the various common market organisation rules dependent on their compliance with national implementing rules on groundwater protection.

4. PREPARATION OF THE PROPOSAL

- 4.1. The debates leading up to final agreement on the Water Framework Directive (which was adopted on 23 October 2000) were difficult and covered very different conceptual approaches to groundwater protection. As it proved impossible to achieve agreement on detailed provisions relating to groundwater, the WFD included a provision, Article 17, stipulating that the European Parliament and the Council shall at a future date and on the basis of a proposal from the Commission, adopt specific measures to prevent and control groundwater pollution. These would include criteria for assessing the good chemical status of groundwater (Article 17.2a), for identifying significant and sustained upward trends, and for defining a starting point for trend reversal (Article 17.2b).
- 4.2. The Commission initiated a discussion with stakeholders to prepare the proposal referred to in Article 17(1) and (2) of the WFD. It established an Expert Advisory Forum (EAF) on groundwater, made up of representatives of Member States, stakeholders (NGOs, industrial associations and Commission departments) and observers from the Associated and Candidate Countries. The first meeting of the EAF on Groundwater (on 26 November 2001) discussed an issue paper prepared by the Commission and provided guidance on the lines to be followed when developing a legislative proposal on groundwater protection.
- 4.3. An extended issue paper was presented and discussed at the second meeting of the EAF on Groundwater on 25 and 26 March 2002. The first elements of a legislative proposal for a groundwater directive were presented at the third EAF Groundwater meeting on 25 June 2002, and the main draft outline of the GWD was presented at the fourth EAF Groundwater meeting on 8 October 2002. Overall, the proposal has received a positive response from Member States. NGOs have been more critical with respect to the prevent/limit clauses, which they considered not sufficiently stringent, and did not agree with the proposal of EU wide quality standards on nitrates and pesticides, which they found too lax with respect to agricultural pollution

⁶ OJ L 229, 30.8.1980, p.11. Directive as last amended by Directive 98/83/EC (OJ L 330, 5.12.1998, p.32)

⁷ OJ L 375, 31.12.1991, p.1.

⁸ OJ L 230, 19.8.1991. Directive as last amended by Directive 98/47/EC (OJ L 191, 7.7.1998, p.50).

⁹ OJ L 123, 24.4.1998, p.1.

¹⁰ COM(2002) 179

¹¹ COM(2003) 23

risks. The element of the proposal, which gave rise to the most comment, was the delay in establishing lists of pollutants and thresholds. However, the Commission considers that it is not possible to establish lists at present because there is not enough scientific data.

4.4. The GWD proposal is designed to complement the WFD. This already contains extensive provisions on groundwater, and in particular on:

- co-ordinated administration of river basins (Article 3);
- environmental objectives, in particular the no-deterioration clause and the protect and limit provisions (Article 4);
- requirements for analysing the characteristics of the river basin district, reviewing the environmental impact of human activity and analysing the economics of water use (Article 5);
- establishment of a register of protected areas (Article 6);
- identification of waters for the abstraction of drinking water and the establishment of safeguard zones for those bodies of water (Article 7);
- monitoring requirements (Article 8);
- the principle of recovery of the costs of water services, including environmental and resource costs (Article 9);
- establishment of a programme of measures (Article 11);
- issues which cannot be dealt with at Member State level (Article 12);
- establishment of a management plan for each river basin district (Article 13);
- requirements for public information and consultation (Article 14), which should be complemented by education on good environmental practices;
- reporting requirements (Articles 15 and 18);
- plans for future Community measures (Article 19);
- technical adaptations to scientific and technical progress (Article 20);
- the Regulatory Committee (Article 21);
- repealing clauses and transitional provisions (Article 22);
- penalties (Article 23).

5. OVERVIEW OF THE PROPOSAL

- 5.1. The proposal for a Groundwater Daughter Directive sets out criteria for assessing the chemical status of groundwater, as required by Article 17.2a of the WFD. It was not considered appropriate to list new quality standards that would be applied uniformly to all groundwater bodies throughout Europe, because of the natural variability of groundwater chemical composition and the present lack of monitoring data and knowledge. This decision was fully in line with the principles of good governance set out in the Sixth Environmental Action Programme,¹² namely that “sound scientific knowledge and economic assessments, reliable and up-to-date environmental data and information, and the use of indicators will underpin the drawing-up, implementation and evaluation of environmental policy”. Clearly drinking water quality standards would be of only limited value for assessing groundwater quality, since they are designed to protect human health and are not necessarily appropriate as environmental standards. The only EU-wide quality standards that are directly linked to groundwater protection at this stage are those referring to nitrates (Directive 91/676/EEC), and plant protection and biocidal products (Directive 91/414/EEC and Directive 98/8/EC respectively). These have therefore been included in the proposal.
- 5.2. A workshop on the BASELINE project held on 27 January 2003 (and funded by DG RTD under the Fifth Framework Programme) stressed the difficulty of setting uniform quality standards for groundwater, and emphasised the need to consider aquifer characteristics and pressures from human activity.
- 5.3. The present proposal also establishes criteria for identifying and reversing significant and sustained upward trends in pollution from human activity, taking into account the need to prioritise actions according to the environmental significance of these trends. It proposes a common methodology for testing the statistical significance of these trends.
- 5.4. Groundwater monitoring requirements are covered by the Water Framework Directive and so are not repeated in this Directive.

6. THE ARTICLES OF THE PROPOSAL

- 6.1. The purpose of the Groundwater Daughter Directive (Article 1) is to establish specific measures to prevent and control groundwater pollution. These include special criteria for assessing good chemical status, criteria for identifying significant and sustained upward trends in the concentration of pollutants in groundwater and criteria for defining the starting points for trend reversals.
- 6.2. Article 2 gives more definitions to supplement the WFD definitions, in particular on threshold values, significant and sustained upward trends and indirect discharges into groundwater.
- 6.3. Article 3 establishes criteria for the assessment of good groundwater chemical status, specifying the compliance regime for quality standards set out in Annex I to this

¹² OJ L 242, 10.9.2002, p.81

Directive as well as for threshold values for pollutants, of which requirements are developed in the subsequent article.

- 6.4. Article 4 provides requirement regarding pollutant threshold values. For groundwater bodies which are considered to be at risk following the analyses of pressures and impact carried out in accordance with Article 5 of the WFD, Member States are to establish threshold values for pollutants, the lists of which are to be reported by Member States at the latest on the 22 June 2006, following the recommendations set out in Annex III to the Directive. The Commission then has to decide whether to propose EU-wide environmental quality standards on the basis of these lists. These criteria will guarantee that chemical status is evaluated in a comparable way throughout Europe and that any related decision-making is harmonised.
- 6.5. Article 5 sets out specific criteria for identifying significant and sustained upward trends in pollutant concentrations and for defining starting points for trend reversals. There are technical specifications in Annex IV to the Directive.
- 6.6. Article 6 introduces an additional provision to ensure that groundwater bodies are adequately protected. In the existing groundwater directive (80/68/EEC), there are provisions (Articles 4 and 5) for preventing and limiting the direct and indirect discharge of dangerous substances into groundwater. In the WFD there are general provisions for preventing or limiting the input of pollutants into groundwater and for preventing the deterioration of the status of all bodies of groundwater (Article 4.1(b)(i)). In addition, the WFD as part of its basic package of management measures (Article 11) prohibits, with certain exceptions, the direct discharge of pollutants into groundwater. However, the WFD says nothing about indirect discharges of pollutants into groundwater. This means that when Directive 80/68/EEC is repealed there will be no specific legislation on indirect discharges. Accordingly, Article 6 of this new Directive is intended to ensure the continuity of the protection regime established by Directive 80/68/EEC after its repeal by also establishing a link with the list of main pollutants indicated in Annex VIII of the WFD.
- 6.7. Transitional arrangements (Article 7) ensure continuity of the protection provided by Directive 80/68/EEC as regards prior investigation and authorisation of indirect discharges.
- 6.8. Based on Article 8, Annexes II to IV to the Directive may be adapted to scientific and technical progress, according to the Committee procedure established in Article 21 of the WFD.

7. LINK TO SUSTAINABLE DEVELOPMENT AND THE SIXTH ENVIRONMENTAL ACTION PROGRAMME

- 7.1. The Sixth Environmental Action Programme (6EAP) contains some objectives on the management of natural resources. The overall objective is to achieve better resource efficiency and pollution control. It also calls for a number of measures to be adopted to achieve these objectives. One of these is the present Groundwater Daughter Directive, which is also part of the broader water policy framework of the WFD.

- 7.2. The assessment of chemical status is based on selecting those pollutants that put groundwater at risk and threshold values for those pollutants that take into account the natural variability of European ground waters. This approach is necessary, since at present there is not enough monitoring data and consolidated knowledge. As mentioned in paragraph 5.1, this is fully in line with the principles of good governance set out in the 6EAP.

8. POLITICAL DIMENSION

- 8.1. Groundwater is a resource under increasing pressure from human activities. But for many people it is “out of sight, out of mind”. While the need to protect drinking water is well understood because of its environmental value, Member States do not all agree on how to manage groundwater protection. While most Member States support the concept of good groundwater protection, the majority considers assessing chemical status on the basis of compliance with a long list of pan-European quality standards is not the right way to achieve this protection. However, there are some Member States that would like to see EU standards established as soon as possible. Accordingly, the Commission’s proposal envisages listing substances for which EU-wide standards for groundwater already exist. For other substances, Member States should establish threshold values based on the criteria in the proposal. In the light of the action taken at national level, the Commission will decide whether it is appropriate to make proposals to extend the list of substances covered by EU standards.

9. COST/BENEFIT ANALYSIS

- 9.1. The proposal is accompanied by an Extended Impact Assessment carried out in the first quarter of 2003. It should be noted that the total quality assessment costs, the costs of the monitoring and clean-up measures required by the river basin management plan, and the administrative costs are already covered under the WFD. The proposed Groundwater Daughter Directive provides clear additional specifications, which should result in a more harmonised approach to defining and monitoring groundwater status than the existing WFD specifications.
- 9.2. The proposal thus represents a cost/benefit improvement over the existing situation. At present there are no common references (selected pollutants and related thresholds) and no common criteria for groundwater, which makes it difficult to achieve comparable chemical status throughout Europe. This could result in considerable economic losses and risks. If a body of groundwater is wrongly considered to be of poor chemical status, unnecessary restoration measures may be taken, wasting considerable amounts of money. Conversely, if because of the wrong data it is considered to have good chemical status, then evidence of deterioration might be overlooked, together with possible damage to the environment and human health. Any such doubts will not only have adverse effects on decision-making, but will also result in a loss of public confidence.

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the protection of groundwater against pollution

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,

Having regard to the proposal from the Commission,¹³

Having regard to the opinion of the European Economic and Social Committee,¹⁴

Having regard to the opinion of the Committee of the Regions,¹⁵

Acting in accordance with the procedure laid down in Article 251 of the Treaty,¹⁶

Whereas:

- (1) Groundwater is a valuable natural resource which should be protected from pollution in its own right.
- (2) Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme¹⁷ includes the objective to achieve levels of water quality that do not give rise to unacceptable impacts on, and risks to, human health and the environment.
- (3) In order to protect the environment as a whole, and human health in particular, concentrations of harmful pollutants in groundwater should be avoided, prevented or reduced.
- (4) Council Directive 2000/60/EC of 23 October 2000 establishing a framework for Community action in the field of water policy¹⁸ sets out extensive provisions for the protection and conservation of groundwater. As provided for in Article 17 of that Directive, measures to prevent and control groundwater pollution should be adopted, including criteria for assessing good chemical status and criteria for identifying significant and sustained upward trends and for defining starting points for trend reversals.

¹³ OJ C , , p. .

¹⁴ OJ C , , p. .

¹⁵ OJ C , , p. .

¹⁶ OJ C , , p. .

¹⁷ OJ L 242, 10.9.2002, p.81

¹⁸ OJ L 327, 22.12.2000, p.72.

- (5) Quality standards, threshold values, and assessment methods should be developed in order to provide criteria for the assessment of the chemical status of bodies of groundwater.
- (6) Criteria need to be established for identifying any significant and sustained upward trends in pollutant concentrations and for defining the starting point for trend reversal, taking into account the likelihood of adverse effects on associated aquatic ecosystems or dependent terrestrial ecosystems.
- (7) By virtue of Article 22, paragraph 2, third indent, of Directive 2000/60/EC, Council Directive 80/68/EEC of 17 December 1979 on the protection of groundwater against pollution by certain dangerous substances¹⁹ will be repealed with effect from 22 December 2013. It is necessary to ensure the continuity of the protection regime set up by Directive 80/68/EEC with regard to both direct and indirect discharge of pollutants into groundwater by also establishing a link with relevant provisions of Directive 2000/60/EC.
- (8) It is necessary to provide for transitional measures as regards the period between the date of implementation of this Directive and the date from which Directive 80/68/EEC is repealed.
- (9) The measures necessary for the implementation of this Directive should be adopted in accordance with Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission²⁰,

HAVE ADOPTED THIS DIRECTIVE:

Article 1
Subject matter

This Directive establishes specific measures as set out in Article 17(1) and (2) of Directive 2000/60/EC in order to prevent and control groundwater pollution. These measures include in particular:

- (a) criteria for the assessment of good groundwater chemical status; and
- (b) criteria for the identification and reversal of significant and sustained upward trends and for the definition of starting points for trend reversals.

This Directive also establishes a requirement to prevent or limit indirect discharges of pollutants into groundwater.

¹⁹ OJ L 20, 26.1.1980, p.43.

²⁰ OJ C 184, 17.7.1999, p.23.

Article 2
Definitions

For the purposes of this Directive, the following definitions shall apply in addition to those laid down in Article 2 of Directive 2000/60/EC:

1. 'threshold value' means a concentration limit for a pollutant in groundwater, exceedance of which would cause a body of groundwater or groundwater bodies to be characterised as having poor chemical status.
2. 'significant and sustained upward trend' means any statistically significant increase of concentration of a pollutant as compared to concentrations measured at the start of the monitoring programme referred to in Article 8 of Directive 2000/60/EC, taking into consideration quality standards and threshold values.
3. 'indirect discharges to groundwater' means discharge of pollutants into groundwater after percolation through the ground or subsoil.

Article 3
Criteria for assessing good groundwater chemical status

For the purposes of the characterisation to be carried out under Article 5 of Directive 2000/60/EC and under sections 2.1 and 2.2 of Annex II thereto, a body or group of bodies of groundwater shall be considered as having good groundwater chemical status when:

- (a) with regard to any of the substances referred to in column 1 of Annex I to this Directive, the measured or predicted concentration does not exceed the quality standards laid down in column 2 thereof;
- (b) with regard to any other polluting substances, it can be demonstrated, in accordance with the indications given in Annex II to this Directive, that the concentration of the substance complies with indent 3 of the definition set out in section 2.3.2 of Annex V to Directive 2000/60/EC.

Article 4
Threshold values

1. On the basis of the characterisation process to be carried out under Article 5 of Directive 2000/60/EC and under sections 2.1 and 2.2 of Annex II thereto, in accordance with the procedure described in Annex II to this Directive, and taking account of the economic and social costs, Member States shall, by 22 December 2005, establish threshold values for each of the pollutants, which within their territory have been identified as contributing to the characterisation of bodies or group of bodies of groundwater as being at risk. Member States shall as a minimum establish threshold values for the pollutants referred to in parts A.1 and A.2 of Annex III to this Directive. These threshold values shall inter alia be used for the purposes of carrying out the review of groundwater status as provided for in Article 5.2 of Directive 2000/60/EC.

Those threshold values can be established at the national level, at the level of the river basin district or at the level of body or group of bodies of groundwater.

2. At the latest by 22 June 2006, Member States shall provide the Commission with a list of all pollutants for which they have established threshold values. For each pollutant on the list, Member States shall provide the information set out in part B of Annex III to this Directive.
3. On the basis of the information provided by Member States in accordance with paragraph 2, the Commission shall publish a report, accompanied, if appropriate, by a proposal for a directive amending Annex I to this Directive.

Before publishing the report and before adopting any legislative proposals amending Annex I to this Directive, the Commission shall seek the opinion of the Committee referred to in Article 16(5) of Directive 2000/60/EC.

Article 5

Criteria for the identification of significant and sustained upward trends and the definition of starting points for trend reversals

Member States shall identify any significant and sustained upward trend of concentrations of pollutants found in bodies of groundwater, or groups of bodies, and define the starting point for reversing that trend, in accordance with Annex IV to this Directive.

For those bodies of groundwater where significant and sustained upward trends in pollutant concentrations are identified, Member States shall reverse the trend through the programme of measures referred to in Article 11 of Directive 2000/60/EC, in order progressively to reduce pollution of groundwater.

Article 6

Measures to prevent or limit indirect discharges into groundwater

In addition to the basic measures set out in Article 11(3) of Directive 2000/60/EC, Member States shall ensure that the programme of measures for each river basin district includes the prevention of indirect discharges to groundwater of any of the pollutants referred to in points 1 to 6 of Annex VIII to that Directive.

Furthermore, with regard to the pollutants referred to in points 7 to 12 of Annex VIII to Directive 2000/60/EC, the programme of measures set out in Article 11(3) of that directive shall include the provision that any indirect discharges to groundwater shall only be permitted on condition that the discharges does not put at risk the achievement of good groundwater chemical status.

Article 7

Transitional arrangements

In the period between [*insert date of implementation as in Article 9(1) of this Directive*] and the 22 December 2013 prior investigations and authorisations pursuant to Articles 4 and 5 of Directive 80/68/EEC shall take into account the requirements set out in Articles 3, 4 and 5 of this Directive.

Article 8
Technical adaptations

Annexes II to IV to this Directive may be adapted to scientific and technical progress in accordance with the procedure referred to in Article 21(2) of Directive 2000/60/EC, considering the period of reviews and updating of the river basin management plan, as referred to in Article 13(7) of Directive 2000/60/EC.

Article 9
Implementation

Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive at the latest [*18 months after the date of entry into force of this Directive*]. They shall forthwith inform the Commission thereof. When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

Article 10
Entry into force

This Directive shall enter into force on the twentieth day of its publication in the *Official Journal of the European Union*.

Article 11
Addressees

This Directive is addressed to the Member States.

Done at Brussels,

For the European Parliament
The President

For the Council
The President

ANNEX I

GROUNDWATER QUALITY STANDARDS

| Pollutant | Quality standards^{21, 22} | Comment |
|---|---|--|
| Nitrates | 50 mg/l | The quality standard applies to all bodies of groundwater, with the exception of the nitrate-vulnerable zones identified under Directive 91/676/EEC. ²³ For these areas, Article 4(1)(c) of Directive 2000/60/EC applies. |
| Active ingredients in pesticides, including their relevant metabolites, degradation and reaction products ²⁴ | 0.1 µg/l | |

²¹ Where for a given body of groundwater, it is considered that the groundwater quality standards could result in failure to achieve the environmental objectives specified in Article 4 of Directive 2000/60/EC for associated surface waters or result in any significant diminution of the ecological or chemical quality of such bodies, or any significant damage to terrestrial ecosystems which depend directly on the body of groundwater, more stringent threshold values shall be established in accordance with Article 4 and Annex IV to this Directive.

²² Compliance with the standards shall be based on a comparison with the arithmetic means of the monitoring values at each of the sampling points in the body or group of bodies of groundwater characterised as being at risk pursuant to the analysis to be carried out under Article 5 of Directive 2000/60/EC.

²³ OJ L 375, 31.12.1991, p. 1.

²⁴ Pesticides refer to plant protection products and biocidal products as defined by Article 2 of Directive 91/414/EEC and Article 2 of Directive 98/8/EC, respectively.

ANNEX II

ASSESSMENT OF GROUNDWATER CHEMICAL STATUS FOR POLLUTANTS FOR WHICH COMMUNITY QUALITY STANDARDS DO NOT EXIST

The assessment procedure for testing compliance to good groundwater chemical status for pollutants for which Community quality standards do not exist shall be carried out in relation to all bodies of groundwater characterised as being at risk and in relation to each of the pollutants which contribute to the body or group of bodies of groundwater being so characterised.

The assessment procedure shall in particular address the following issues:

- (a) the information collected as part of the characterisation to be carried out under Article 5 of Directive 2000/60/EC and under sections 2.1 and 2.2 of Annex II thereto;
- (b) environmental quality objectives and other standards for water protection that exist at national, Community or international level;
- (c) any relevant information concerning the toxicology, ecotoxicology, persistence and bioaccumulation potential concerning the pollutant or related substances;
- (d) the estimated amounts and the concentrations of the pollutants transferred from the body of groundwater to the associated surface waters and/or dependent terrestrial ecosystems;
- (e) the estimated impact of the amounts and concentrations of the pollutants as determined in (d) on the associated surface waters and dependent terrestrial ecosystems;
- (f) an assessment based on (d) and (e) as to whether the concentrations of the pollutants in the body of groundwater are such as would result in failure to achieve the environmental objectives specified in Article 4 of Directive 2000/60/EC for associated surface waters or any significant deterioration of the ecological or chemical quality of such bodies or any significant damage to terrestrial ecosystems which depend directly on the body of groundwater.

ANNEX III

THRESHOLD VALUES FOR GROUNDWATER POLLUTANTS

PART A.1: MINIMUM LIST OF SUBSTANCES OR IONS, WHICH MAY BOTH OCCUR NATURALLY AND AS A RESULT OF HUMAN ACTIVITIES, FOR WHICH MEMBER STATES ARE REQUIRED TO ESTABLISH THRESHOLD VALUES IN ACCORDANCE WITH ARTICLE 4.2²⁵

| Substance or ion | |
|-------------------------|--|
| Ammonium | |
| Arsenic | |
| Cadmium | |
| Chloride | |
| Lead | |
| Mercury | |
| Sulphate | |

PART A.2: MINIMUM LIST OF MAN-MADE SYNTHETIC SUBSTANCES FOR WHICH MEMBER STATES ARE REQUIRED TO ESTABLISH THRESHOLD VALUES IN ACCORDANCE WITH ARTICLE 4.2

| Substance | |
|---------------------|--|
| Trichloroethylene | |
| Tetrachloroethylene | |

²⁵

This list should be complemented by Member States for all pollutants which have been identified to characterise bodies of groundwater at being at risk following the analysis carried out under Article 5 of Directive 2000/60/EC.

**PART B: INFORMATION TO BE PROVIDED BY MEMBER STATES WITH REGARD TO THE LIST OF
POLLUTANTS FOR WHICH THRESHOLD VALUES HAVE BEEN DETERMINED**

In accordance with Article 4(2) and section 2 of Annex II to this Directive, for each of the pollutants that characterise bodies of groundwater as being at risk, Member States shall provide as a minimum the following information:

1. INFORMATION ON BODIES OF GROUNDWATER CHARACTERISED AS BEING AT RISK

- 1.1 Information on the number of bodies of groundwater characterised as being at risk in which the selected pollutants contribute to this classification.
- 1.2 Information on each of the bodies of groundwater characterised as being at risk, in particular the size of the bodies, the relationship between the bodies of groundwater and the associated surface waters and dependent terrestrial ecosystems and, in case of naturally occurring substances, the background levels in the bodies of groundwater.

2. INFORMATION ON THE ESTABLISHMENT OF THRESHOLD VALUES

- 2.1 The threshold values, whether they apply at the national level, or at the level of the river basin district, or for individual bodies or groups of bodies of groundwater.
- 2.2 The relationship between the threshold values and, in the case of naturally occurring substances, the observed background levels.
- 2.3 The manner in which economic and social costs were taken into account in establishing the threshold values.

ANNEX IV

IDENTIFICATION AND REVERSAL OF SIGNIFICANT AND SUSTAINED UPWARD TRENDS

1. IDENTIFICATION OF SIGNIFICANT AND SUSTAINED UPWARD TRENDS

Member States shall identify significant and sustained upward trends, taking into account the following requirements:

1.1 In accordance with Section 2.4 of Annex V to Directive 2000/60/EC, the monitoring programme shall be adjusted to detect any significant and sustained upward trends of concentrations of the pollutants identified pursuant to Article 4 of this Directive.

1.2 The procedure for the identification of significant and sustained upward trends shall be based on the following procedure:

- (a) the assessment shall be based on arithmetic mean values of the mean values of the individual monitoring points in each bodies or groups of bodies of groundwater bodies, as calculated on the basis of a quarterly, a half-yearly or an annual monitoring frequency.
- (b) in order to avoid bias in trend identification, all measurements below the limit of quantification shall be eliminated for the calculation.
- (c) the minimum number of data values and the minimum length of time series are laid down in the following table. The time series shall not exceed 15 years.

| Monitoring frequency | Minimum number of years | Maximum number of years | Minimum number of measurements |
|----------------------|-------------------------|-------------------------|--------------------------------|
| Annual | 8 | 15 | 8 |
| Half-yearly | 5 | 15 | 10 |
| Quarterly | 5 | 15 | 15 |

- (d) The missing of two or more subsequent data values should be avoided, and further requirements on the sampling scheme shall be considered to allow for calculations of reliable results.

1.3 The identification of significant and sustained upward trends in the concentrations of substances which occur both naturally and as a result of human activities shall consider data gathered before the start of the monitoring programme in order to report on trend identification within the first River Basin Management Plan set out in Article 13 of Directive 2000/60/EC.

1.4 Specific trend assessment shall be carried out for relevant pollutants in bodies of groundwater that are affected by point sources of pollution, including historical point sources, in order to verify that plumes from contaminated sites do not expand over a defined area and deteriorate the chemical status of the groundwater body.

- 1.5 Similarly, specific trend assessment shall be performed in those areas of groundwater bodies in which significant and sustained upward trends of concentrations of any pollutants identified pursuant to Article 4 of this Directive might result in adverse effects on associated aquatic ecosystems or dependent terrestrial ecosystems, or interference with existing or future uses of groundwater.
- 1.6 The identification of significant and sustained upward trends shall be based on the procedure for the assessment of chemical status specified in Annex II to this Directive.

2. STARTING POINTS FOR TREND REVERSALS

- 2.1 Trend reversals shall be focused on trends which present a risk of harm to associated aquatic ecosystems, directly dependent terrestrial ecosystems, human health or legitimate uses of the water environment.
- 2.2 The procedure for identifying the starting point for a trend reversal shall be established on a time basis, and at the minimum on the basis of monitoring data collected in accordance with Article 8 of Directive 2000/60/EC. In this case, the reference points shall correspond to the start of the monitoring programme.
- 2.3 The minimum number of measurement values and the minimum length of time series for the analysis of trend reversal in years includes and depends on the selected monitoring frequency according to paragraph 1.2 item (c) of this Annex and is laid down in the following table. The time series shall not exceed 30 years.

| Monitoring frequency | Minimum number of years | Maximum number of years | Minimum number of measurements |
|----------------------|-------------------------|-------------------------|--------------------------------|
| Annual | 14 | 30 | 14 |
| Half-yearly | 10 | 30 | 18 |
| Quarterly | 10 | 30 | 30 |

- 2.4 There is a trend reversal if in the first section the slope of the trend line is positive, and in the second section negative. To allow for a reliable assessment of the trend reversal, it shall be ensured that the number of values before and after the break in the time series is adequate to the monitoring frequency.
- 2.5 The decision for reversing a trend shall also be based on the environmental significance of the upward and sustained increase in pollutant concentrations. As a recommended value, and in accordance with Article 17(4) of Directive 2000/60/EC, the starting point for trend reversal shall be at a maximum of 75% of the level of the quality standards set out in Annex I and/or of the threshold values established pursuant to Article 4.
- 2.6 If data obtained earlier than the start of the monitoring programme exist, they should be used for establishing the reference points for the identification of the starting point for trend reversal.

2.7 Once a reference point has been established, pursuant to paragraphs 2.1 and 2.2 above, it shall be used for the groundwater bodies characterised as being at risk and the associated substance, and shall not be changed.