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# COMMISSION OF THE EUROPEAN COMMUNITIES

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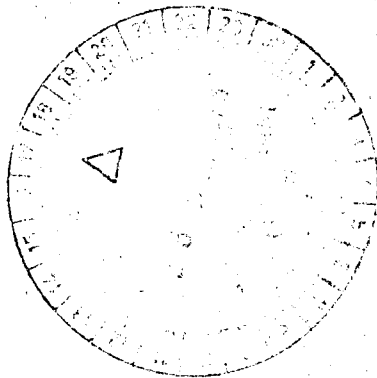
Brussels, 24 January 1978

## Proposal for a Council Directive

on the protection of groundwater against pollution caused  
by certain dangerous substances

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(submitted to the Council by the Commission)



## EXPLANATORY MEMORANDUM

### 1. Introduction

Groundwater constitutes an important part of the Community's water resources. Although often more difficult to exploit than surface water, groundwater does have an important regulating capacity, especially in periods of low water or drought. Furthermore, the filtration capacity of the soil gives aquifers partial protection against certain forms of pollution and imparts a quality to the water which makes it suitable for the highest-grade uses.

Yet groundwater pollution is insidious and only becomes apparent when it reaches an abstraction point; furthermore, it is still difficult in the majority of cases to ascertain the progression and effects of this pollution.

It is for all these reasons and to safeguard this vitally important resource that the Action Programmes of the European Communities on the Environment<sup>1</sup> set out to :

" protect the quality of groundwater and its abstraction points against pollution and against any ecologically unacceptable deterioration in the groundwater system". The programmes also require the Commission to implement the necessary measures as provided for under Directive 76/464/EEC and in particular "to submit a proposal for a Directive on groundwater protection".

There is growing evidence in the Member States of the Community of groundwater pollution caused principally by toxic substances, hydrocarbons and nitrates. This produces chemical, physical and biological change in the water with the result that the uses to which it can be put are gradually limited.

Groundwater pollution involves two basic mechanisms. Firstly, the pollutant seeps vertically between the source and the aquifer, often through a non-saturated intervening layer. It then percolates horizontally through the

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<sup>1</sup>OJ No C 112 of 20 December 1973

OJ No C 139 of 13 June 1977

aquifer. This explains why groundwater pollution is generally accompanied not only by pollution of the soil and the rock above the aquifer, especially in the case of free aquifers, but by pollution of the reservoir rock.

Groundwater pollution differs from surface water pollution in various respects. The following salient factors should be noted :

- a substance discharged on to the ground is likely, before reaching the groundwater, to be fixed, modified or decomposed owing to various phenomena such as solubilization, insolubilization and changes in composition;
- changes in the composition of substances which have entered groundwater are generally slower than in surface waters;
- substances in groundwater can be transported by it over very long distances and their residence time may also be very long.

These remarks illustrate the particular gravity of groundwater pollution, especially where dangerous substances are discharged.

## 2. Aim

On 4 May 1976 the Council of the European Communities adopted a Directive on pollution caused by certain dangerous substances discharged in the aquatic environment of the Community. This Directive applies to inland surface water, territorial waters, internal coastal waters and groundwater.

Article 4 of the Directive of 4 May 1976 provides for a specific Directive on groundwater to be drawn up in view of the special features of such water. At its 394th Session on 3 and 4 May 1976 the Council requested that a Commission proposal on groundwater be submitted as soon as possible.

The aim of this proposal for a Directive is to define the appropriate means of preventing, reducing or eliminating groundwater pollution caused by the discharge of the dangerous substances in Lists I and II annexed to the proposal for a Directive.

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### 3. Laws and regulations in force in the Member States

It is clear from a review of the legal situation in the Member States that there is a multiplicity and great diversity of provisions to protect groundwater from pollution.

#### Belgium

The Law of 26 March 1971 on the protection of groundwater establishes a general control on the discharge, dumping or deposit of substances likely to contaminate groundwater. Accordingly, it provides for the prohibition, regulation or authorization of the transport, storage, dumping, discharge, burial, disposal, tipping and spreading of these substances in abstraction and protection zones and, outside these zones, the regulation or authorisation of direct or indirect tipping or dumping of these substances on and in the ground.

#### Denmark

Article 11 of Law No 372 of 13 June 1973 on the protection of the environment stipulates that surface water, drainage water, waste water and other effluents likely to pollute the groundwater may not, without authorization, be discharged on to the land or introduced into the subsoil via sumps or other wells, boreholes, drainage or other installations.

There are special provisions governing the siting and operation of certain installations, e.g. for underground hydrocarbons storage and domestic effluent release.

#### France

The Law of 16 December 1964 introduced the general principle of prior authorization for the discharge of wastes likely to contaminate the aquatic environment, in particular groundwater.

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With the more specific aim of protecting groundwater, the Law provides for a general ban on all discharge or disposal of waste water or waste products of any kind into disused wells, boreholes or catchment tunnels.

In implementation of this Law the Decree of 23 February 1973 lays down the authorization procedure with special arrangements for shallow aquifers (less than 10 m) and those occurring at a greater depth (over 10 m). This Decree is supplemented by Orders of 13 May 1975 laying down the technical prerequisites for tipping, discharge, disposal and dumping authorizations.

Lastly, the Order of 10 August 1976 lays down conditions for the study prior to application for authorization to release liquid radioactive effluent from nuclear installations.

#### Ireland

The 1977 Local Government (Water Pollution) Act introduces a system for authorizing the release of domestic and industrial effluent into water. The authorization is subject to certain conditions which, for example, take account of the nature of substances released, the characteristics of the receiving medium, a monitoring procedure and accident-prevention measures.

#### Italy

Law No 319 of 10 May 1976 on the protection of water against pollution establishes general technical standards governing authorization of the dumping or release of wastes on or in the ground, but excludes discharges likely to cause groundwater contamination.

#### Luxembourg

The Law of 16 May 1929 on the cleansing, maintenance and improvement of watercourses stipulates that waste-water purification by the soil can be carried out only on condition that groundwater use is not compromised and that there is no danger to health. Under the Law of 9 January 1961 on the exploitation of groundwater resources a landowner with a hollow on his

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United Kingdom

The Control of Pollution Act 1974 makes all waste disposal subject to an authorization which may be granted only if the discharge presents no hazard to health risk of water pollution.

Special provisions provide that authorizations are necessary for installations engaged in the drilling for, refining and storage of hydrocarbons, for the dumping of residues, processes involving the discharge of organic wastes, for the building of cemeteries and for works likely to cause erosion.

It is also forbidden to discharge via boreholes, pipes or into wells used for the supply of drinking water.

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In view of the disparity between legal provisions in the Member States, which is likely to produce a distortion of the conditions of competition and hence have a direct effect on the functioning of the Common Market, Article 100 of the Treaty should be invoked.

Considering also that the Treaty has not provided for all the necessary powers to enable measures to be taken to safeguard and improve the quality of groundwater, Article 235 of the Treaty should be invoked.

It should also be borne in mind that Article 4 of the Council Directive of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community provides for the implementation of a separate Directive on groundwater.

Under Articles 100 and 235 of the Treaty the opinion of the European Parliament and the Economic and Social Committee is required.

4. Comments on the proposal for a Directive

4.1. General Comments

The aim of this proposal for a Directive is to preserve exploitable groundwater resources, i.e. water in the saturation zone. "Saturation zone" means

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land may not dump substances on his property which may pollute groundwater streams. Furthermore, a general provision of the Law of 29 July 1965 on the conservation of nature and natural resources makes the establishment of tips subject to authorization; this is refused if the tipping site presents a water-conservation hazard.

The Law of 27 June 1906 also introduces the concept of protection zones within which it is forbidden to spread human fertilizer or other substances likely to contaminate the water.

#### Federal Republic of Germany

Under the Law of 27 July 1957 on water management (Water Resources Law - WHG), as last amended on 16 October 1976, authorization for the release of substances into groundwater may be issued only if there is non reason to suspect that the water may be polluted or its properties may be impaired in any other way.

#### Netherlands

There are no national laws in the Netherlands specifically concerned with the ecological protection of the soil and groundwater. Most provincial authorities have nevertheless taken measures of this kind under the powers conferred upon them by the law on the organization of the provinces with respect to the control of areas not covered by the law.

Specific laws regulate the discharge of various substances which might have a harmful effect on groundwater. These are : "Hinderwet" (Law on nuisances, 1952), "Bestrijdingsmiddelenwet" (Law on pesticides, 1962), "Wet Gevaarlijke stoffen" (Law on dangerous substances, 1965), "Wet op de lijkbezorging" (Law on burials, 1896).

In addition, certain activities which threaten water quality are controlled by the Act on chemical waste and waste oil of October 1973 which prohibits the release of dangerous chemicals in watercourses, with exceptions subject to authorization.

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that portion of the aquifer where all voids are filled with water. This excludes waters in the aeration zone which either recharge the saturation zone or form part of the waters of the plant biosphere.

The scope of this Directive does not extend to wastes arising from domestic effluent from individual dwellings, from agricultural activities, wastes produced by the titanium dioxide industry and wastes containing radioactive substances :

- the first category relates in particular to dwellings which are not connected to a public sewerage system; the risk of polluting groundwater is fairly low and control presents practical problems;
- in the second category there is a risk of pollution from indirect discharge; however, the complexity of the problem demands a special study - now being carried out by the Commission - which should lead to Community directives;
- on 18 July 1975 the Commission presented to the Council a proposal for a Directive on waste from the titanium dioxide industry (OJ C 222 of 29 September 1975). It lays down an authorization procedure and a special system for controlling the injection of such waste into the groundwater;
- radioactive wastes are excluded because they are already covered by the Council Directive of 1 June 1976 laying down the revised basic safety standards for the health protection of the general public and workers against the dangers of ionizing radiation (OJ L 187 of 12 July 1976).

There are two methods of making discharges into groundwater, either :

- i) directly into the saturation zone (e.g., sumps), in which case the polluting capacity of the discharged substances is unaffected;
- ii) indirectly after seepage through the aeration zone. In the process, the discharged substances are subject to physico-chemical action and, in

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some cases, biological action which may either arrest them or reduce their polluting capacity. All together these actions constitute the purifying capacity of the ground.

4.1.1. Direct discharge of substances in List I

The direct discharge of substances in List I is generally banned on account of their properties, in particular acute toxicity and persistence. Some exceptions to this rule have been considered however, and are based on the following factors :

- the concept of unusable water, which was introduced by the Directive of 4 May 1976, has been taken over but clarified to allow identification of aquifers whose sole function would be to receive polluting substances difficult to dispose of by other means;
- the handling of water pumped out of mines and quarries, of water used for geothermal purposes and water pumped in the course of certain civil engineering works in no way alters the quality of such water;
- certain ground resources cannot be exploited or used to economic advantage without water injection; the importance of such operations justifies a detailed study of the pollution risks;
- in order to determine the properties of the ground it may be necessary to inject certain substances : e.g. groundwater velocity can be measured by radioactive tracers. The practical and scientific importance of such experiments justifies a detailed study of the risks of pollution;
- collected rainwater may constitute an important resource; in addition, its quality is easy to monitor.

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4.1.2. Indirect discharges of substances in List I and discharges of substances in List II.

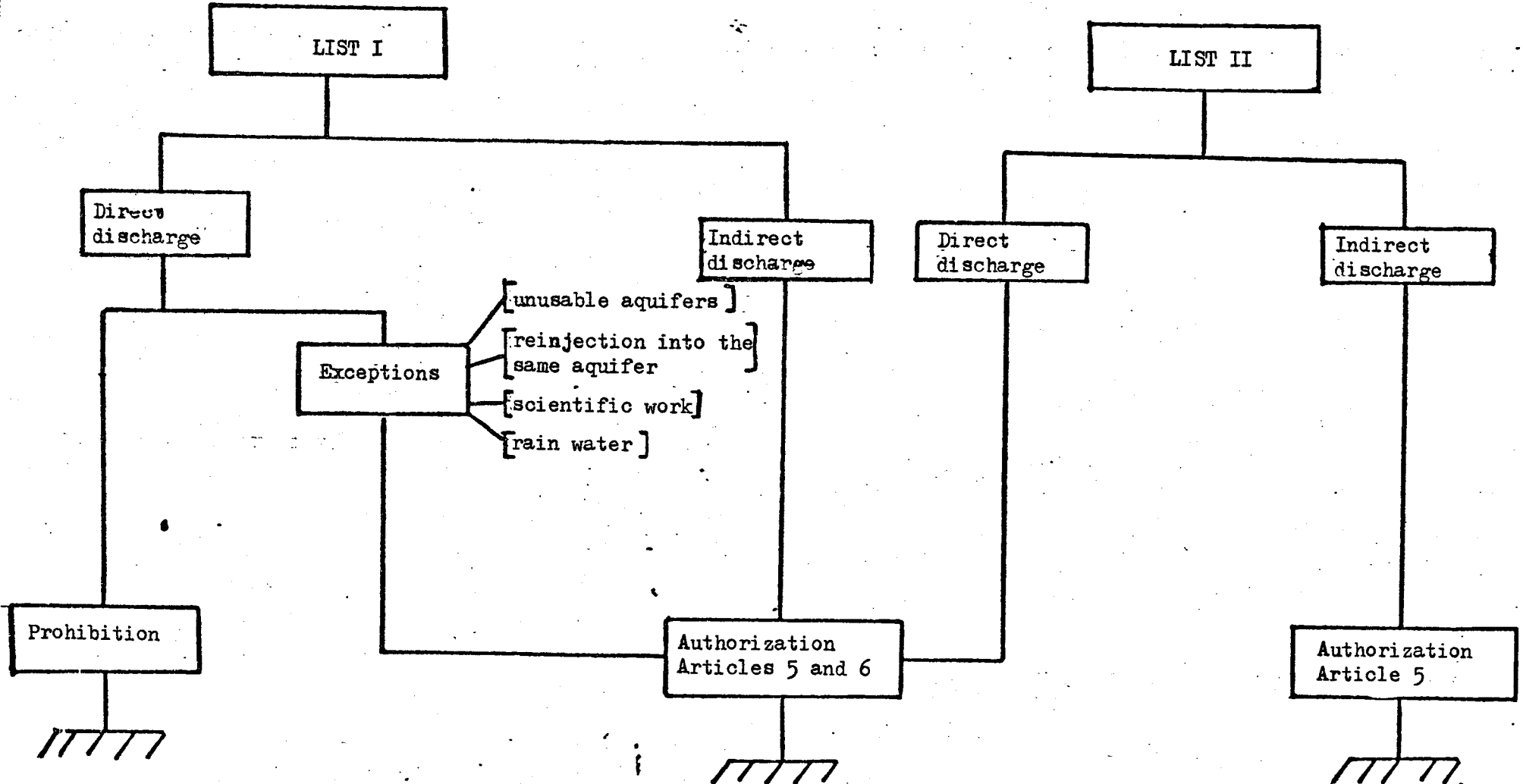
The purifying capacity of the soil enables the authorization system to be applied to the indirect discharge of substances on List I. Direct and indirect discharges of substances in List II are also subject to authorization. As part of the authorization procedure an investigation must always be made of the hydrogeological conditions obtaining in the zone in question.

In addition, the application for authorization (issued by the competent authority) must, in the case of direct and indirect discharges of substances in List I and the direct discharge of substances in List II, contain information about the place and method of disposal, the essential precautions to be taken during the operation and, where appropriate, the maximum permissible concentration and quantity of a substance in the discharge.

The diagram gives a simplified view of the proposed system of bans and authorizations.

.../...

Exceptions : Discharges arising from domestic effluent from isolated dwellings  
Discharges arising from normal agricultural activities  
Discharges arising from the titanium dioxide industry  
Discharges containing radioactive substances



4.2. Comments on the Annex

Certain amendments have been proposed to List I of dangerous substances as set out in the Directive of 4 May 1976 to reflect more faithfully the particular case of groundwater.

i) Mineral oils and hydrocarbons of petroleum origin

List I of the Directive of 4 May 1976 contains only "persistent" substances. It is proposed to drop this term, as many studies show that all mineral oils and all hydrocarbons of petroleum origin are liable to persist for a long time in the underground environment.

ii) Persistent synthetic substances which may float, remain in suspension or precipitate and which may interfere with water use

These substances are unlikely to occur in groundwater, their omission from List I is justified.

Proposal for a Council Directive on the protection of  
groundwater against pollution caused by certain  
dangerous substances

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THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community,  
and in particular Articles 100 and 235 thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Parliament,

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

Whereas there is an urgent need for action to protect the groundwater of  
the Community from pollution, particularly that caused by certain toxic,  
persistent and bioaccumulable substances;

Whereas the programmes of action of the European Communities on the  
environment of 1973 and 1977<sup>1</sup> provide for a number of measures to protect  
groundwater from certain pollutants;

Whereas Article 4 of Council Directive 74/464/EEC of 4 May 1976 on pollution  
caused by certain dangerous substances discharged into the aquatic environment  
of the Community<sup>2</sup> provides for the implementation of a separate Directive on  
groundwater;

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<sup>1</sup> OJ No C 112, 20.12.1973, p. and OJ No C 139, 13.6.1977, p.

<sup>2</sup> OJ No L 129, 18.5.1976, p.23

Whereas any disparity between the provisions on the discharge of certain dangerous substances into groundwater already applicable or in preparation in the Member States may create unequal conditions of competition and thus directly affect the functioning of the common market; whereas it is therefore necessary to approximate laws in this field, as provided for in Article 100 of the Treaty;

Whereas it is necessary for this approximation of laws to be accompanied by Community action in the sphere of environmental protection and improvement of the quality of life; whereas certain specific provisions to this effect should therefore be laid down; whereas Article 235 of the Treaty should be invoked as the requisite powers have not been provided for by the Treaty;

Whereas substances discharged are, by virtue of the purifying capacity of the soil and subsoil, subjected to processes capable of reducing their pollutant capacity; whereas a distinction should therefore be made between direct and indirect discharge into the groundwater;

Whereas, in order to ensure effective protection of the groundwater of the Community, it is necessary to prohibit the direct discharge of the substances enumerated in List I and to make the indirect discharge of the substances on this List and the direct or indirect discharge of the substances on List II subject to prior authorization;

Whereas the following should be excluded from the scope of this Directive: domestic effluent from isolated dwellings, on account of the low risk of pollution and the difficulty of controlling the discharge of such effluent; wastes arising from normal agricultural activities; wastes generated by the titanium dioxide industry, which will be the subject of special Community rules; radioactive substances and wastes, since they are already covered by Council Directive 76/579/EEC of 1 June 1976 laying down the revised basic safety standards for the health protection of the general public and workers against the dangers of ionizing radiation<sup>1</sup>;

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<sup>1</sup> OJ No L 187, 12.7.1976, p.1.



Whereas exceptions should be permitted to allow certain dangerous substances to be removed from the ecosystem, "discharge" of which into aquifers isolated from the biosphere is effective and ecologically harmless;

Whereas it is necessary to provide for other exceptions to the prohibition on the direct discharge of substances on List I in view of the scientific and practical benefit which certain discharges may offer, or because they do not affect groundwater quality;

Whereas an inventory of the authorizations granted for the discharge of List I substances into groundwater should be drawn up in order that their origin may be determined;

Whereas Member States should be able, individually or jointly, to take more stringent measures than those provided for under this Directive;

Whereas it may be necessary to revise and, where required, supplement Lists I and II on the basis of experience, if appropriate, by transferring certain substances from List II to List I,

.../...

HAS ADOPTED THIS DIRECTIVE :

Article 1

1. The purpose of this Directive is to prevent, reduce or eliminate ground-water pollution caused by substances belonging to the families and groups of substances enumerated in Lists I and II in the Annex, hereinafter called "substances in Lists I or II".
2. For the purposes of this Directive :
  - a) "groundwater" means all water which is below the surface of the ground in the water saturation zone and in direct contact with the ground;
  - b) "pollution" means the discharge by man, directly or indirectly, of substances into the groundwater, the consequences of which are likely to endanger human health, water supplies, living resources or the aquatic ecosystem, or to interfere with other legitimate uses of this water;
  - c) "direct discharge" means the introduction into the groundwater of substances Lists I or II without passage through the ground;
  - d) "indirect discharge" means the introduction into the groundwater of substances Lists I or II after passage through the ground.

Article 2

This Directive shall not apply to the following discharges:

- domestic effluents from isolated dwellings;
- discharges arising from normal agricultural activities;

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- discharges of the titanium dioxide industry;
- discharges containing radioactive substances.

Article 3

1. The Member States shall prohibit all direct discharge of substances in List I.
2. Notwithstanding the foregoing provision, Member States may, under a system of prior authorization, provide for exceptions in the case of:
  - a) discharges into aquifers which are isolated from the biosphere and unusable for any purpose, especially domestic or agricultural;
  - b) discharges due to the re-injection into the same aquifers of water used for geothermal purposes, of water pumped out from mines and quarries, or water pumped out for civil engineering works;
  - c) discharges due to the injection of waste water used in the exploration for, and working of, resources contained in the ground and discharges due to the exploitation of these resources;
  - d) discharges due to the injection of substances during scientific work;
  - e) discharges of collected rainwater.

Article 4

The Member States shall make all indirect discharges of substances in List I and all direct and indirect discharges for substances in List II subject to prior authorization.

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Article 5

The authorizations referred to in Articles 3(2) and 4 may be granted only after consideration of the hydrogeological conditions of the area concerned and on condition that any significant risk of pollution is eliminated. The authorizations may be amended or withdrawn.

Article 6

1. The authorizations granted for the discharges referred to in Article 3(2) and for the indirect discharges of substances in List I and the direct discharges of substances in List II shall be subject to supplementary requirements.
2. The authorizations shall specify in particular :
  - place of discharge,
  - method of discharge,
  - essential precautions in each individual case, taking particular account of the nature and concentration of the substances contained in the discharge and the characteristics of the receiving environment.
3. In addition, the authorizations shall, where necessary for the implementation of this Directive, lay down :
  - the maximum permissible concentration of a substance in the discharges,
  - the maximum permissible quantity of a substance in the discharges over one or more specified periods of time.

Article 7

1. If the discharger states that he is unable to comply with the conditions laid down in an authorization, or if this fact is evident to the competent authority, authorization shall be refused.

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2. Should the conditions laid down in an authorization not be met, the competent authority shall take all appropriate steps to ensure that the conditions are fulfilled and, if necessary, withdraw the authorization.

#### Article 8

As regards direct or indirect discharges of the substances in Lists I and II occurring at the time of the notification of this Directive, the Member States may stipulate a period not exceeding three years after entry into force of the provisions referred to in Article 14(1), on the expiry of which the discharges in question must comply with this Directive.

#### Article 9

The Member States shall keep an inventory of authorizations as referred to in Articles 3(2) and 4 granted in respect of direct or indirect discharges containing substances in List I.

#### Article 10

1. For the purposes of this Directive, the Member States shall supply the Commission, at its request, to be made separately for each case, with all the necessary information, and in particular :

- a) the hydrogeological conditions referred to in Article 5;
- b) details of the authorizations granted;
- c) results of the monitoring and inspection operations carried out;
- d) results of the inventory provided for in Article 9.

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2. Information acquired pursuant to this Article shall be used only for the purpose for which it was requested.
3. The Commission and the competent authorities of the Member States, their officials and other employees shall not disclose information acquired by them under this Directive and of a kind covered by the obligation of professional secrecy.
4. The provisions of paragraphs 2 and 3 of this Article shall not prevent publication of general information or surveys not containing data relating to particular undertakings or associations of undertakings.

#### Article 11

The application of the measures taken pursuant to this Directive may on no account be permitted to increase, either directly or indirectly, the pollution of groundwater.

#### Article 12

Where appropriate, Member States may, individually or jointly, take more stringent measures than those provided for under this Directive.

#### Article 13

The Council, acting on a proposal from the Commission, shall revise and, where necessary, supplement Lists I and II on the basis of experience, if appropriate, by transferring certain substances from List II to List I.

#### Article 14

1. The Member States shall, within two years of the date of notification of this Directive, bring into force the laws, regulations and administrative

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provisions necessary to comply therewith and shall immediately inform the Commission thereof.

2. The Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the sector covered by this Directive.
3. Once the measures referred to in paragraph 1 of this Article have been implemented by a Member State, the provisions of Directive 76/464/EEC relative to groundwater shall no longer apply.

Article 15

This Directive is addressed to the Member States.

Done at Brussels,

For the Council  
The President

.../...

ANNEX

List I of families and groups of substances

List I contains the individual substances which belong to the families and groups of substances enumerated below, with the exception of those which are biologically harmless or which are rapidly converted into substances which are biologically harmless :

1. organohalogen compounds and substances which may form such compounds in the aquatic environment;
2. organophosphorus compounds;
3. organotin compounds;
4. substances which possess carcinogenic properties in or via the aquatic environment<sup>1</sup>;
5. mercury and its compounds;
6. cadmium and its compounds;
7. mineral oils and hydrocarbons of petroleum origin.

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<sup>1</sup> Where certain substances in List II are carcinogenic, they are included in category 4 of this list.



List II of families and groups of substances

List II contains the individual substances and the categories of substances belonging to the families and groups of substances listed below.

1. The following metalloids and metals and their compounds :

- |             |               |               |               |
|-------------|---------------|---------------|---------------|
| 1. zinc     | 6. selenium   | 11. tin       | 16. vanadium  |
| 2. copper   | 7. arsenic    | 12. barium    | 17. cobalt    |
| 3. nickel   | 8. antimony   | 13. beryllium | 18. thallium  |
| 4. chromium | 9. molybdenum | 14. boron     | 19. tellurium |
| 5. lead     | 10. titanium  | 15. uranium   | 20. silver    |

2. Biocides and their derivatives not appearing in List I.

3. Substances which have a deleterious effect on the taste and/or odour of groundwater, and compounds liable to cause the formation of such substances in water.

4. Toxic or persistent organic compounds of silicon, and substances which may cause the formation of such compounds in water, excluding those which are biologically harmless or are rapidly converted in water into harmless substances.

5. Inorganic compounds of phosphorus and elemental phosphorus.

6. Cyanides  
Fluorides

7. Substances which have an adverse effect on the oxygen balance, particularly :

ammonia  
nitrites.