
PART OF THE PROJECT ‘TRANSITIONAL PROVISIONS FOR COUNCIL DIRECTIVE 76/464/EEC AND RELATED DIRECTIVES TO THE WATER FRAMEWORK DIRECTIVE 2000/60/EC’
Directive 76/464/EEC
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EXECUTIVE SUMMARY

In 1976 the Council of Ministers of the European Economic Community (EEC) adopted the Council Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (Discharge of Dangerous Substances Directive 76/464/EEC). The Directive deals mainly with the control of List I substances, which are regarded as particularly dangerous because of their toxicity, persistence and bio-accumulation. In addition, Article 7 of the Directive is aimed specifically at the control of List II substances, which are considered less dangerous but which, nevertheless, can have a deleterious effect on the aquatic environment.


WRc has been appointed by the Commission to identify the achievements made Europe-wide during the past 25 years in reducing pollution by dangerous substances and lessons learnt from the implementation of Directive 76/464/EEC.

This report provides a description of the implementation process and provides information on the achievement and the obstacles experienced during the implementation of Directive 76/464/EEC. The first draft was presented at a Workshop organised in Brussels (1/2 July 2002) with experts from the Commission, Member States and Accession Countries involved in developing and implementing the Directive 76/464/EEC. As a result, some further information was received from Member States for inclusion in the report. The conclusions of the work, including the results of the workshop, are summarised below.

Assessment of achievements

Slow but significant progress has been made across the EU in implementing measures to control the discharge of List I and List II substances into the aquatic environment, although some Member States may still not have implemented all the requirements of Directive 76/464/EEC. Some Member States have implemented certain measures only recently in response to infringement proceedings.

There have been significant successes in reducing discharges and emissions of dangerous substances (as covered by Directive 76/464/EEC) to Europe’s waters. This is shown by the progressive reductions of loads of some of these substances to the North-East Atlantic and the Baltic Sea. Similar successes have been recorded in one of Europe’s largest river catchments, the river Rhine, and a few examples from individual Member States also show improvements. There have also been reductions in the atmospheric loads of some metals to the North Sea.

The reductions in emissions of some substances have subsequently led to an improvement in water quality. This is seen in the significant reduction in the concentrations of some
substances in Europe’s rivers (particularly heavy metals, phosphorus and ammonium) and in some marine biota.

The improvement in water quality has, in a well-documented case, such as the Rhine, led to an improvement in biological quality.

Although no actual evidence of usage reductions has been obtained in this study, there is an indication of reductions in usage of certain substances as a result of the introduction of marketing usage and restrictions or bans at Community level.

The number of substances adequately monitored to observe trends, is very limited (mainly nutrients and toxic metals). However, in many countries more is now known about the substances present in water. This is reflected in the large number of substances monitored in some countries. Conversely, a few countries appear to do very little monitoring, even though dangerous substances may be used in those countries. Consequently, no comprehensive and representative picture can be derived for the entire European Union.

A significant success is the increased awareness of the importance of knowledge on the toxicity, fate and behaviour of hazardous substances. This is reflected by the fact that the Sea Conventions and other international organisations actively prioritise and revise lists of substances for subsequent control measures.

In contrast, there are many thousands of chemical substances used within Europe and most of these have not been formally assessed in terms of their potential risk to the water environment. Surveillance monitoring is thus required to detect the presence of substances not included in current priority lists for action.

In terms of monitoring, much of the monitoring undertaken for dangerous substances appears to be unfit for purpose in that the analytical methods used produce limits of detection or determination that are far too high in relation to ‘background’ levels, environmental quality standards or concentrations which may cause adverse effects.

There is also evidence that some substances are occurring in Europe’s drinking water at levels exceeding the required standards. It was not possible to assess any trends, although some improvements have been recorded in some countries.

There is a need for a consistent database on the emissions, loads, and levels in receiving waters and drinking water of hazardous substances at a European level, which would enable a more quantitative assessment of trends for use in the judgement of future policy success.

**Lessons learnt**

The main lessons learnt from the implementation of Directive 76/464/EEC have already been incorporated into the Water Framework Directive. Together with the Integrated Pollution Prevention and Control Directive 96/61/EC, the Water Framework Directive may reconcile the division among Member States brought about by Directive 76/464/EEC. In particular this may be achieved by the use of the combined approach (Quality Standards and Emission Controls) in the Water Framework Directive, rather than alternative approaches (Quality Objectives or Emission Limit Values) in Directive 76/464/EEC.

The long lists of dangerous substances and their classification into List I and List II appear to have slowed down the implementation progress of Directive 76/464/EEC. This approach has
been replaced by one list of priority substances in the Water Framework Directive for control at Community level, and a more pragmatic approach for other substances, focusing on good chemical/ecological quality of waters.

In addition, the lack of guidance for the implementation in the 80s and 90s from the Commission to Member States, limited exchange of information and lack of clarity in the division of responsibilities between Community and Member States may have hampered the effective implementation of Directive 76/464/EEC, as has the absence of deadlines. These issues have also been addressed by the Water Framework Directive and are being dealt with through the Common Implementation Strategy for the Water Framework Directive. In particular, a need was identified to promote the exchange of information between Member States, as well as between Member States and the Commission.

The lack of deadlines in Directive 76/464/EEC has been replaced by clear targets in the Water Framework Directive for meeting key requirements. Moreover, the division of responsibilities between the Community and Member States has been clearly set out (e.g. in respect of priority substances set at Community level and other relevant substances dealt with at river basin level).

Monitoring will need to be more systematic, focusing on priority substances and linked to Programmes of Measures as set out in River Basin Management Plans under the Water Framework Directive. There will also be greater focus on the control of diffuse sources of pollution.

The experience as regards reporting under Directive 76/464/EEC lead to the conclusion that there should be a move by Member States towards electronic reporting, providing real information (not raw data) and making the information available to the public (on web sites). This way, existing deficiencies on information and data on dangerous substances should be overcome.

The way forward

Most of the requirements of Directive 76/464/EEC remain in force until 2013 and measures are in place to facilitate the transition from the latter to the Water Framework Directive.

Compliance with Directive 76/464/EEC provides a condition for the implementation of the Water Framework Directive. The principles of the Water Framework Directive can be applied during the transition period in many areas. This applies in particular to inventories of dangerous substances, setting of Quality Standards and establishment of emission controls, selection of relevant substances on the basis of pressures and impacts analyses, and the preparation of Pollution Reduction Programmes based on river basins.

The elements to be contained in the Pollution Reduction Programmes under Directive 76/464/EEC are similar to those required under the Water Framework Directive. Member States are therefore encouraged to prepare their Pollution Reduction Programmes in compliance with Directive 76/464/EEC, already with a view of complying also with the requirements of the Water Framework Directive, especially the obligation to prepare River Basin Management Plans, including Programmes of Measures, which need to be completed by 2009.
The requirements of the ‘Daughter Directives’ (List I substances) are still valid until a review has been completed and revised measures and/or repeals of ‘Daughter Directives’, as appropriate, are in place.

In summary, the following points will ensure a smooth transition from the pollution control regime under Directive 76/464/EEC and its ‘Daughter Directives’ to the Water Framework Directive:


3. Measures on priority substances, including Environmental Quality Standards and emission controls to replace the regulation of List I substances on a European level;


5. Further development of guidance for implementation (IMPRESS, monitoring, selection of substances).
1. INTRODUCTION

In 1976 the Council of Ministers of the European Economic Community (EEC) adopted the Council Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (Discharge of Dangerous Substances Directive 76/464/EEC). The Directive deals mainly with the control of List I substances, which are regarded as particularly dangerous because of their toxicity, persistence and bio-accumulation. In addition, Article 7 of Directive is aimed specifically at the control of List II substances, which are considered less dangerous but which, nevertheless, can have a deleterious effect on the aquatic environment.


WRc has been appointed by the Commission to identify the achievements made Europe-wide during the past 25 years in reducing pollution by dangerous substances and lessons learnt from the implementation of Directive 76/464/EEC.

The report provides a description of the implementation process and provides information on the achievements and the obstacles experienced during the implementation of the Directive 76/464/EEC. It consists of 4 main sections:

1. A summary of the implementation process (including an overview on the transposition and status of implementation);

2. An analysis of the achievements (and failures) in reducing the discharges of List I and selected List II substances;

3. Lessons learnt; and

4. The way forward.

Information for the report has been gathered from the results of earlier studies and programmes which have evaluated the Directive or the occurrence of dangerous substances in water. In addition, the minutes from the National Expert Meetings associated with Directive 76/464/EEC have been analysed. Finally, a Workshop was organised in Brussels (1/2 July 2002) with experts from the Commission, Member States and Accession Countries involved in developing and implementing Directive 76/464/EEC. The objective of the workshop was to assess the achievements of Directive 76/464/EEC and the lessons learnt from its implementation. In addition it was to highlight the links between Directive 76/464/EEC and the Water Framework Directive, and how the latter can take forward some of the concepts developed under Directive 76/464/EEC. The overall aim was to ensure a smooth transition from the existing into the new legal framework. The programme and a summary of the outcome of the workshop, as well as the delegates list, are included in Appendix A of this report.
The first draft of this report (June 2002) was distributed to representatives of the Member States prior to the workshop and delegates were asked to provide further examples of achievements for inclusion in this report. Examples were received from Austria, Greece, Italy (Region Emilia Romagna) and the UK; these were included in this report.
2. SUMMARY OF THE IMPLEMENTATION PROCESS

This part of the report presents a brief history of the implementation of the Discharge of Dangerous Substances Directive 76/464/EEC. The introductory paper, presented by Nigel Haigh at the Workshop in Brussels, is included in Appendix B and provides an interesting ‘insider’s view’ of the early period of the Directive’s adoption and early history. This Section also includes a summary of the milestones recorded in the minutes of the ‘National Expert Meetings on Council Directive 76/464/EEC of 4 May 1976’ (main events, sequence of achievements – Appendix C).

In addition, the requirements of the Water Framework Directive are summarised and the options for the transition from Directive 76/464/EEC to the Water Framework Directive are communicated. Recommendations for the way forward will be addressed in Section 5.

2.1 History of the implementation of the Discharge of Dangerous Substances Directive 76/464/EEC

In 1976 the Council of Ministers of the European Economic Community (EEC) adopted the Council Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (Discharge of Dangerous Substances Directive 76/464/EEC). The Directive deals mainly with the control of List I substances, regarded as particularly dangerous because of their toxicity, persistence and bio-accumulation. In addition, Article 7 of the Directive is aimed specifically at the control of List II substances, which are considered less dangerous substances but which, nevertheless, can have a deleterious effect on the aquatic environment. For List I substances Community-wide controls (Quality Objectives and Emission Limit Values) are laid down in separate so-called ‘Daughter Directives’, whereas for List II substances Member States are required, according to Article 7 of the Directive, to prepare Pollution Reduction Programmes. The programmes must be designed based on Quality Objectives (or Quality Standards) to be established by Member States.¹

There was considerable debate among Member States before the Directive 76/464/EEC was finally adopted. The debate centred on the alternative approaches of setting Emission Limit Values versus Environmental Quality Objectives (or Standards). The UK with its existing system based on river basin management and Environmental Quality Standards (UK terminology) was strongly opposed to the setting of Emission Limit Values, whereas Germany was equally strongly opposed to Environmental Quality Objectives (or Standards). As a result, the Directive, when finally adopted, represented a compromise, whereby the two approaches were presented as alternatives. No date was set for the implementation of the requirements of Directive 76/464/EEC.

Subsequent efforts focused on List I substances. However, the process of designating List I substances at Community level was complex and very slow. This is evident from the summary

¹ Some Member States use the term Environmental Quality Objectives (long term aim), others Environmental Quality Standards (legal standard). To avoid confusion, the term Quality Objective will be used throughout this report in the context of Directive 76/464/EEC and the term Quality Standard in the context of the Water Framework Directive.
of highlights from the ‘National Expert Meetings on Council Directive 76/464/EEC of 4 May 1976’ (Appendix C - Tables C.1 and C.2) and the Communications and Directives issued by the Commission, as discussed below.

In June 1982, the Commission issued a Communication (COM, 1982), establishing a List of 129 substances, which might be included in List I. In a Resolution of 7 February 1983, concerning the combating of water pollution, the Council of Ministers took note of the Communication and stated that the List of 129 substances would serve the Community as a basis for further work on the implementation of the Directive (Council Resolution, 1983). The Council also noted that the Member States recognised the List of 129 substances as a provisional basis for any national measures to combat pollution of water by those substances, when applying the measures provided for in the Directive. Following that resolution, three other substances were added to the list of 129 substances, bringing the total number of substances to 132. Of those, 18 have been the subject of Council Directives (‘Daughter Directives’ to Directive 76/464/EEC) laying down Emission Limit Values and Quality Objectives (List I – Table 2.1).

Table 2.1 Agreed List I substances and corresponding ‘Daughter Directives’ to Directive 76/464/EEC with formal compliance dates

<table>
<thead>
<tr>
<th>Substance</th>
<th>Directive</th>
<th>Formal compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium</td>
<td>83/513/EEC</td>
<td>1/1/89</td>
</tr>
<tr>
<td>Mercury</td>
<td>82/176/EEC</td>
<td>1/7/86</td>
</tr>
<tr>
<td></td>
<td>84/156/EEC</td>
<td>1/7/89</td>
</tr>
<tr>
<td>Lindane (hexachlorocyclohexane)</td>
<td>84/491/EEC</td>
<td>1/10/88</td>
</tr>
<tr>
<td>Pentachlorophenol</td>
<td>86/280/EEC</td>
<td>1/1/91</td>
</tr>
<tr>
<td>DDT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chloroform</td>
<td>88/347/EEC,</td>
<td>1/1/90</td>
</tr>
<tr>
<td>amending 86/280/EEC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexachlorobenzene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexachlorobutadiene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dieldrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aldrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isodrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Drins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>90/415/EEC,</td>
<td>1/1/93 and 1/1/95</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>amending 86/280/EEC</td>
<td></td>
</tr>
<tr>
<td>Perchloroethylene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trichlorobenzenes (incl. 1,2,4-TCB)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As can be seen from Table 2.1, only four ‘Daughter Directives’ had been adopted by 1984, i.e. one each for cadmium and lindane, and two for mercury. To speed up the process, a ‘Framework’ Directive (86/280/EEC) was adopted in 1986. This Directive provides the general text applicable to all substances when they are formally assigned List I status. It is supplemented with Annexes giving Emission Limit Values and Quality Objectives for specific substances, as and when these are agreed. Using the new procedure, another 14 substances were confirmed as List I with agreed Emission Limit Values and Quality Objectives by 1990.

Certain ‘Daughter Directives’ include a ‘stands till’ provision, which requires the total concentration of the individual substances in sediments and/or shellfish and/or fish not to increase significantly with time. These provisions are included in the Directives for most of the substances assigned List I status, the exceptions being chloroform, carbon tetrachloride, 1,2-dichloroethane, perchloroethylene and trichloroethylene.

In 1990 the Commission issued a proposal (COM, 1990) for a Council Directive, amending Directive 76/464/EEC, which listed 15 substances for which Community-wide Emission Limit Values and Quality Objectives should be adopted. However, the proposed Directive was subsequently withdrawn. Following the above mentioned proposal, 33 Candidate List I substances were supposed to be regulated at a European level, leaving 99 substances for which no proposals for Community control have been made.

The Commission has consistently maintained that these remaining 99 substances properly belong to List I but, pending legislation to that effect, they must be treated in the same way as the substances referred to as List II in the Directive.

However, theoretically, hundreds or thousands of individual substances could be considered as List II, i.e. all substances, which are not designated as List I substances, should be considered as potential List II substances. There is clearly a need to prioritise the substances, if effective controls are to be introduced or maintained. Unfortunately, Directive 76/464/EEC did not specify a mechanism for priority setting.

Further details of List II substances and their management are presented in a separate report ‘Pollution Reduction Programmes in Europe’ (Horth et al., 2003).

2.2 Shortcomings of Directive 76/464/EEC

A number of shortcomings of Directive 76/464/EEC have been identified which have hampered or delayed its effective implementation by Member States. These are briefly summarised below.

There were no deadlines for the implementation of the different requirements of the Directive.

Whilst there was a large number of substances potentially relevant for controls, there was no mechanism for priority setting, nor was there a clear attribution of individual substances to be dealt with either at European Community level or by Member States.

Moreover, there was no ‘de minimis’ clause (no threshold value for emissions to be controlled) and whilst the focus was on point sources of pollutants, there were insufficient provisions to control diffuse sources of pollution.
2.3 Transition to the Water Framework Directive 2000/60/EC

The Integrated Pollution Prevention and Control Directive (96/61/EC) and the Water Framework Directive (2000/60/EC) will replace and go beyond most of the provisions of the Discharge of Dangerous Substances Directive (76/464/EEC). Whilst Directive 96/61/EC focuses on the control of emissions from large installations into the environment (air, soil and water), the Water Framework Directive will focus on the protection of the water environment through river basin management plans, including programmes of measures. Similarly, whilst the Water Framework Directive clearly requires the control of point and diffuse sources of pollutants, Directive 76/464/EEC was mainly targeted at the control of point sources. However, there are some provisions under Directive 76/464/EEC for the control of multiple sources, e.g. Art.5 in 86/280/EEC and Art.4 in 84/156/EEC.

With the adoption of the Water Framework Directive (transposal by Member States required by 22 December 2003), the requirements made in Directive 76/464/EEC are subject to the transitional provisions made in Article 22 (2) to (6) which are, in summary, as follows:

- Article 6 of Directive 76/464/EEC relating to the setting of Uniform Emission Standards and Quality Objectives for List I substances has been repealed;
- Other parts of Directive 76/464/EEC, including the requirement to prepare Pollution Reduction Programmes, remain in force for 13 years but are to be repealed by 22 December 2013;
- Member States may apply the principles of the Water Framework Directive for the identification of pollution problems and the substances causing them, the establishment of Quality Standards and the adoption of measures for the implementation of Article 7 of Directive 76/464/EEC;
- The priority list of substances adopted under Article 16 of the Water Framework Directive (Annex X) will replace the list of substances prioritised in the Commission Communication to the Council of 22 June 1982 (the Commission’s List I Candidate list) (COM, 1982).

Under the provisions of Directive 76/464/EEC, all substances and families of substances on List I are moved to List II if they have not been selected as List I because of their toxicity, persistence and bio-accumulation. In addition, all List I substances (including the Candidate List I) for which no controls have been agreed at Community level are considered as List II (‘safety net’). Finally, the Annex of Directive 76/464/EEC lists a number of List II families and groups of substances including, for instance, a number of heavy metals. Thus, potentially there are a large number of substances, which require control at the national level, with only 18 substances being controlled at Community level.

In contrast, the Water Framework Directive requires the identification of a list of priority substances or groups of substances, including the identification of priority hazardous substances at Community level (Articles 16(2) and 16(3) and Annex X). The priority list replaces the old Commission’s list of ‘Candidate List I substances’ of 1982. This first priority list was adopted on 20 November 2001 (Decision 2455/2001/EC). The list needs to be reviewed every 4 years. For the priority substances the Commission will identify measures for their control and will establish Quality Standards. The Water Framework Directive also requires the identification of any relevant pollutant in a river basin, in addition to the priority substances, which impact on good chemical/ecological quality. Annex VIII of the Water
Framework Directive provides an indicative list of groups and families of substances (Table 2.2).

### Table 2.2    Pollutants listed in Annex VIII of the Water Framework Directive

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organo-halogen compounds and substances which may form such compounds in the aquatic environment</td>
</tr>
<tr>
<td>2</td>
<td>Organo-phosphorus compounds</td>
</tr>
<tr>
<td>3</td>
<td>Organotin compounds</td>
</tr>
<tr>
<td>4</td>
<td>Substances and preparations which have been proved to possess carcinogenic or mutagenic properties or properties which may affect reproduction in or via the aquatic environment</td>
</tr>
<tr>
<td>5</td>
<td>Persistent hydrocarbons and persistent and bio-accumulable organic toxic substances</td>
</tr>
<tr>
<td>6</td>
<td>Cyanide</td>
</tr>
<tr>
<td>7</td>
<td>Metals and their compounds</td>
</tr>
<tr>
<td>8</td>
<td>Arsenic and its compounds</td>
</tr>
<tr>
<td>9</td>
<td>Biocides and plant protection products</td>
</tr>
<tr>
<td>10</td>
<td>Materials in suspension</td>
</tr>
<tr>
<td>11</td>
<td>Substances which contribute to eutrophication (in particular, nitrates and phosphates)</td>
</tr>
<tr>
<td>12</td>
<td>Substances, which have an unfavourable influence on the oxygen balance and can be measured using parameters such as BOD, COD etc.)</td>
</tr>
</tbody>
</table>

**Notes:**

BOD = biological oxygen demand  
COD = chemical oxygen demand

Member States are required in the transition period (i.e. 13 years from the adoption of the Water Framework Directive) to continue to comply with Article 7 of Directive 76/464/EEC. This includes the identification of substances or groups of substances to be controlled, the setting of legally binding Quality Standards, the identification of sources of the substances and measures for their control and monitoring.

There are many similarities in the selection of dangerous substances under Directive 76/464/EEC and the Water Framework Directive. For example, the substances and categories of substances listed in Directive 76/464/EEC are similar to those of Annex VIII of the WFD (Table 2.2). In fact, the groups of List I and List II substances in the Annex of the Directive 76/464/EEC have been merged and consolidated into Annex VIII of the Water Framework Directive. The priority substances selected for control under the Water Framework Directive include some List I substances and a number of List II substances of Directive 76/464/EEC (see Figure 2.1). The two lists have been merged and there is no longer a distinction between List I and List II substances as in Directive 76/464/EEC.


In contrast to Directive 76/464/EEC, which has provided for alternative approaches of using Quality Objectives or Emission Limit Values, the Water Framework Directive prescribes a ‘combined approach’, based on Quality Standards and emission controls.
Figure 2.1  List I substances of Directive 76/464/EEC and priority list of the Water Framework Directive

* as amended by Decision 2455/2001/EEC
3. ACHIEVEMENTS OF DIRECTIVE 76/464 REGARDING LIST I AND SELECTED LIST II SUBSTANCES

3.1 Measuring success

3.1.1 Identifying appropriate success measures

Before evaluating the success of Directive 76/464/EEC, it is important to remember what the Directive set out to achieve, both in terms of its overall objective and the specific requirements made. The overall objectives of Directive 76/464/EEC (Article 2) were to 'eliminate pollution' of waters by List I substances and to 'reduce' pollution of waters by List II substances. The Directive made specific requirements designed to progress towards these objectives, in particular, Member States were required to:

1. Identify substances of national relevance and set legally binding environmental quality objectives for these (Art. 7);
2. Authorise discharges to waters and where necessary sewers, to meet, as a minimum, environmental quality objectives or uniform emission standards (Art 3, 5);
3. Prepare reduction programmes to ensure that environmental quality objectives are met (Art 7);
4. Ensure that pollution of waters does not increase (Art 8, 9);
5. Draw up an inventory of discharges containing List I substances (Art 11); and

The latter (point 6) relates to the reporting requirements under Decision 77/795/EEC and Amendment Decisions, as well as the Standardised Reporting Directive 91/692/EEC and the related water questionnaires 95/337/EC.

The Commission was required to:

1. Set environmental quality objectives and uniform emission standards for List I substances (Art 6); and
2. Set measurement methods (Art 12).

It was assumed that by implementing the specific requirements, Member States would move towards the objective of eliminating or reducing pollution of waters by dangerous substances. Where the term 'dangerous substances' is used, this refers only to those specific dangerous substances, which come under the control of Directive 76/464/EEC.

The success of the Directive can be measured in terms of the level to which the specific requirements were implemented and the extent to which this enabled or contributed towards meeting the overall objective. The relationship between these can be explained using the
DPSIR (Driving force – Pressure – Status – Impact – Response) framework, with the sequence adjusted to suit the current task of evaluating the success of Directive 76/464/EEC, i.e.:

- **Responses** – How successfully have Member States put in place the measures needed to implement the specific requirements of Directive 76/464/EEC?

- **Pressures** - What effects has this had in terms of reducing discharges of dangerous substances to the environment?

- **Status** - Have these measures resulted in improvements in the environment in terms of the chemical quality, i.e. concentrations of dangerous substances in waters?

- **Impacts** – How has the change in chemical quality impacted the ecological quality?

- **Driving Forces** - Have these measures changed the forces, which drive the need for using dangerous substances?

The effects-based overall objective is more closely related to what is ultimately expected to be achieved and, therefore, more meaningful in one aspect. However, this approach can be more difficult to deliver and more complicated to measure success. Effects-based targets rely on a good understanding of dangerous substances and their effects on the environment, and of the sources causing environmental contamination. They also rely on co-operation with other organisations responsible for controlling key sources of chemical emissions (see Figure 3.1).

**Figure 3.1** Environmental goals: meaningfulness versus risk of non-delivery

<table>
<thead>
<tr>
<th>Meaningfulness</th>
<th>Risk of non-delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce effects</td>
<td></td>
</tr>
<tr>
<td>Improve status</td>
<td></td>
</tr>
<tr>
<td>Reduce discharges</td>
<td></td>
</tr>
<tr>
<td>Apply approaches</td>
<td></td>
</tr>
</tbody>
</table>

**Risks:** e.g.

- **Very High:** as we have a limited understanding of relationship between substance and effect
- **High:** as we have a limited understanding of environmental fate and behaviour
- **Mixed:** as we have limited understanding of the main sources of substances
- **Low:** as we are in full control of the approaches we adopt
Achievements can be related to aspects other than water quality/discharge improvements. For example, one measure may be the number of substances for which data are available (i.e. to show progress from a position, where there was no information, to the current position where some information is documented but we still do not have 100% data). In addition to concentrations of dangerous substances in water bodies and their effects on overall water quality, such data may relate to usage and sources (point and diffuse) of dangerous substances and controls over emissions.

As it was clear from the outset that there would not be adequate data to assess all dangerous substances covered by Directive 76/464/EEC, especially in relation to List II substances, this report had to focus on substances for which data were likely to be available. In particular, the substances investigated were:

- All List I substances;
- Metals/metalloids (arsenic, chromium, zinc, copper, lead, nickel);
- Oxygen depleting substances (Biological Oxygen Demand – BOD);
- Phosphorus, ammonia and cyanide.

These substances (or parameters) have been selected to highlight differences between substances, which are already covered in the transition process and substances, such as the oxygen-depleting parameters, which are implicitly included in the Water Framework Directive, as oxygenation conditions have to be monitored. The substances should provide a representative view of the different measures likely to be included in a Pollution Reduction Programme.

Wherever possible the questions are addressed using Europe-wide information, although some examples from Member States are also included.

### 3.1.2 Other directives and policies

Directive 76/464/EEC is not the only directive seeking to reduce pollution of waters. There are several other directives, national policies and international agreements with similar objectives and requirements that have contributed at least in part to the overall objective. Key directives and international agreements of relevance include:

- Directive 75/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water in the Member States (Surface Water Directive);
- Directive 78/659/EEC on the quality of freshwaters needing protection or improvement in order to support fish life (Freshwater Fish Directive);
- Directive 79/923/EEC on the quality required of shellfish waters (Shellfish Directive);
- Directive 91/271/EEC concerning urban waste water treatment (Urban Waste Water Treatment Directive);
- Directive 91/676/EEC concerning the protection of fresh, coastal and marine waters against pollution caused by nitrates from agricultural sources (Nitrates Directive);
• International Action Programmes (North Sea Conference Declarations, OSPAR (Oslo and Paris Convention), HELCOM (Helsinki Convention) – see Section 3.3);

• Marketing and Use Regulations (see Section 3.6).

The study has not attempted to separate out precisely the achievements associated with the Directive 76/464/EEC as opposed to other related policies/actions. However, it does attempt to put the contribution of the Directive 76/464/EEC into context.

Each of the DPSIR (Driving force – Pressure – Status – Impact – Response) issues is considered separately in the following sections. Wherever possible, the report provides a European-wide picture of achievement, demonstrating the range of success that has been realised.

3.2 Effects on responses

Member States are required to report some information on the Directive 76/464/EEC under the Reporting Directive 91/692/EEC every three years. The first reports covered the years 1993 to 1995 (European Commission, 2000). Returns for the 1996-98 period have been analysed by the Commission and a draft synthesis report is now available (European Commission, 2002a). This shows some improvements since the earlier reporting period (1993-95).

In the evaluation of the information provided by Member States under the Reporting Directive on the implementation of Directive 76/464/EEC (returns for 1993 - 1995) (European Commission, 2000), it became clear that most of the efforts were directed at the control of List I substances. Nevertheless, even this aspect of the implementation of Directive 76/464/EEC was by no means in complete compliance in the Member States that reported information. In contrast, progress in establishing Pollution Reduction Programmes for List II substances (Article 7 of Directive 76/464/EEC) was generally even slower or in some countries (e.g. Germany) deemed covered by existing legislation on discharges (European Commission, 2002b). However, a more recent assessment of the implementation of Directive 76/464/EEC with respect to List II substances has shown significant progress since the earlier evaluation (Horth et al., 2003), in most cases in response to Infringement Proceedings.

The Accession Countries are in a good position to co-ordinate the implementation of Directive 76/464/EEC with the implementation of the Water Framework Directive. Most of the Accession Countries have existing legislation and procedures for the authorisation of discharges to surface water. However, the controls generally relate to a very limited number of substances and enforcement may be poor. Three countries have established Environmental Quality Objectives and several have started to prepare Pollution Reduction Programmes. In most cases, the need for the selection of relevant substances, setting of Environmental Quality Objectives and preparation of Pollution Reduction Programmes is now being realised and at least included in transposalfuture/ implementation plans, where work has not already started (Horth et al., 2003). No Accession Country has asked for a transitional period for setting up Pollution Reduction Programmes. Consequently, all these countries must establish Pollution Reduction Programmes by accession and implement them in subsequent years. However, some countries have a transitional period for specific provisions with respect to List I substances.

The available information for Member States is briefly summarised below.
3.2.1 List I substances

Eight of the 12 Member States\(^2\), required to submit information for the period 1993 – 1995, provided at least some information. The main conclusions of the assessment of the returns (European Commission, 2000) are presented below.

1. Seven Member States reported Authorisations for the discharge of List I substances to surface water and sewer; one (Greece) reported no such authorisations. The UK reported the highest number of authorisations. The highest number of authorisations for the 6 States providing information, was for cadmium, the lowest number for DDT.

2. Most of the Member States adopted the Emission Limit Values for List I substances (discharges to surface water and sewer), although not necessarily covering all List I substances. Only the UK applied the Environmental Quality Standards approach with limit values being laid down in individual discharge permits.

3. Limited information was available on Emission Loads and Industrial Sectors discharging List I substances to surface water. The main sector discharging both mercury and cadmium was the non-ferrous metal industry (among those Member States providing information).

4. Two Member States reported that they had not adopted the Environmental Quality Objectives established at European Union level for List I substances, whilst six Member States reported various levels of implementation:

   - Two Member States had no formal Environmental Quality Objectives but used the European Union Environmental Quality Objectives as guidelines when issuing permits;
   - Two Member States adopted Environmental Quality Objectives for some of the List I substances;
   - Two Member States adopted all Environmental Quality Objectives but did not fully implement these.

5. Monitoring information was inadequate for an assessment; only two Member States and one Region provided information.

6. Four Member States had implemented Pollution Reduction Programmes for List I substances, whereas the other four Member States had established no such programmes, either because there were no discharges of List I substances (two Member States) or because they considered their existing controls adequate (two Member States).

Returns analysed for the 1996-98 period (European Commission, 2002a) appear to show some improvements since the earlier reporting period (1993-95), although the returns and some of the information were still incomplete. Moreover, the differences in available data and presentation of the information make a direct comparison difficult.

Returns were received from 12 Member States (Belgium: two of the three Regions only; none were received from France, Italy or Ireland). Among those returning information, nine reported

\(^2\) Austria, Finland and Sweden were not required to report for the period 1993 to 1995
authorisations to surface water, five to sewer. Whilst most of the Member States reported emission standards for List I substances, some of the standards related to discharges to surface water only (not to sewer) and the Netherlands reported standards for only five List I substances. The number of countries which had adopted the EU Environmental Quality Objectives appear to have increased to five countries and one region, whilst another country and one region adopted Environmental Quality Objectives for eight and six substances, respectively. Although the information on monitoring was still far from complete, some further information was reported, compared with the previous reporting period. Nine countries reported monitoring programmes. Two countries and one region reported specific programmes for all List I substances, another three countries and one region for some of the List I substances.

3.2.2 List II substances

The information summarised below is based on a study carried out on behalf of the Commission to assess the current status of the implementation of the provisions of Article 7 of Directive 76/464/EEC by the Member States (Horth et al., 2003). The information used in the assessment was provided to the Commission by Member States, for the specific purposes of the study; the Standardised Reporting Directive; and/or Infringement Proceedings.

The implementation of Article 7 in the Member States varies considerably, with some Member States having only recently started with the preparation of Pollution Reduction Programmes. All except one Member State (which, on the basis of production/usage and monitoring data, does not consider it necessary) now have Pollution Reduction Programmes in place or are preparing these. However, the approaches vary substantially and may still not be in full compliance with the requirements (e.g. programmes not covering the entire country and/or a very limited number of substances). Nevertheless, recent progress and on-going actions in this area clearly demonstrate the success of infringement proceedings concerning the implementation of Directive 76/464/EEC. (1993-95 reporting period: only six Member States and two Regions – European Commission, 2000)

The number of substances identified by Member States as being of national concern varies widely. Some Member States consider all or most of the 139 tentative List II substances to be relevant, whereas others have been more selective.

Eleven Member States have established legally enforceable (statutory) Environmental Quality Objectives for List II substances. A further four Member States have established non-statutory Quality Objectives only, whilst seven countries have both statutory and non-statutory Quality Objectives. The number of substances for which Environmental Quality Objectives have been derived varies from Member State to Member State, with a few countries having derived Environmental Quality Objectives for most tentative List II substances. Other countries have only derived Quality Objectives for those substances of national relevance and some are still in the process of deriving these. (1993-95 reporting period: only two Member States and two Regions had established Environmental Quality Objectives - European Commission, 2000)

National legislation has been passed in all Member States, requiring the authorisation of discharges containing List II substances to surface waters and in ten Member States for discharges to sewers (two at regional or local level).
Four Member States have established industry specific **uniform emission standards** at national level, whereas a further three Member States have derived substance specific uniform emission standards or limit values. In three countries these are set at a regional or local level, whilst in two Member States emission standards are set on a site-specific basis. (1993-95 reporting period: only four Member States and two Regions - European Commission, 2000)

Eight Member States have provided information on **marketing and use restrictions** for selected List II substances. Some of these have been introduced in response to other EU legislation. Two Member States provided information on voluntary use restrictions for a few List II substances and two Member States reported that substitution by less harmful products had been used to reduce emissions of List II substances. Seven Member States provided information on other measures used to reduce emissions of List II substances, including the use of Codes of Practice (four Member States) and advanced wastewater treatment technologies to remove specific List II substances (four Member States).

The number of **substances monitored** in each Member State at the national level varies widely. Based on the information supplied, some Member States have monitored all 139 tentative List II substances, whereas in other countries only a few substances are monitored. The substances most widely monitored are the metals, phosphorus and ammonia. The frequency of monitoring also tends to vary, depending on the substance concerned and from year to year. Seven Member States reported data on compliance with statutory Environmental Quality Objectives, which showed that in a few cases exceedence of these Quality Objectives is still being observed. (1993-95 reporting period: information from one Region only – two failures of Environmental Quality Objectives - European Commission, 2002)

Nine Member States provided information on the main **industrial sectors** discharging List II substances. The data confirm that the highest loads discharged to Community waters are for nutrients and heavy metals. Very little information is available on the discharge of List II substances from **diffuse sources**. (1993-95 reporting period: information from three Member States and one Region on discharges: highest discharges: zinc, followed by chromium and lead, then phosphorus, oils and petroleum hydrocarbons, and finally toluene and xylene - European Commission, 2002)

### 3.3 Effects on pressures

There are a number of sources of information to demonstrate that there have been significant reductions in the emissions of some dangerous substances over recent years.

The returns from 1993 to 1995 under the Reporting Directive provide some useful information on emission loads (European Commission, 2000). No similar data have been extracted for the later reporting cycle (1996 to 1998; European Commission, 2002a) and it is therefore not possible to compare the data and assess whether there were any improvements.

Belgium (Flanders), France, Ireland (cadmium only) and the Netherlands reported actual loads of List I substances discharged to surface waters from permitted installations for 1995. Based on these data, **Figure 3.2** shows the quantity of List I substances actually discharged to surface waters from these four countries. It should be noted that the loads from France were total loads from discharges above the threshold loads for each substance, and they also included discharges from processes not listed in the questionnaire. It can be seen from this that the greatest discharge was of chloroform (32 tonnes), followed by trichloroethylene...
(16.3 tonnes) and perchloroethylene (9 tonnes). Only France and Ireland provided information on authorised and actual discharges. In all cases actual discharges were less than authorised discharges, often by a large amount. For example, in France actual discharges of mercury were 4% of the authorised quantity, and in Ireland actual cadmium discharges were 0.2% of the authorised quantity.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Actual Discharges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>0.02</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.05</td>
</tr>
<tr>
<td>HCH</td>
<td>2.81E-03</td>
</tr>
<tr>
<td>Drins</td>
<td>1.59E-03</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>1.20</td>
</tr>
<tr>
<td>HCB</td>
<td>0.12</td>
</tr>
<tr>
<td>HCBD</td>
<td>0.05</td>
</tr>
<tr>
<td>PCP</td>
<td>1.59E-03</td>
</tr>
<tr>
<td>Chloroform</td>
<td>31.50</td>
</tr>
<tr>
<td>EDC</td>
<td>2.81E-03</td>
</tr>
<tr>
<td>TRI</td>
<td>1.59E-03</td>
</tr>
<tr>
<td>TCB</td>
<td>0.02</td>
</tr>
<tr>
<td>PER</td>
<td>9.01</td>
</tr>
<tr>
<td>TCB</td>
<td>16.28</td>
</tr>
<tr>
<td>PER</td>
<td>5.87</td>
</tr>
</tbody>
</table>

Source: European Commission, 2000

Notes:
- Based only on information from Belgium (Flanders), France, Ireland (cadmium only) and the Netherlands
- No actual discharges of DDT in the countries listed above
- HCH = hexachlorocyclohexane
- PCP = pentachlorophenol
- HCB = hexachlorobenzene
- HCBD = hexachlorobutadiene
- EDC = 1,2-Dichloroethane
- TRI = Trichloroethylene
- PER = perchloroethylene
- TCB = trichlorobenzene

Figure 3.2 Annual emission loads to surface waters in some Member States (Belgium, France, Ireland and the Netherlands) - actual discharges

The Reporting Directive also requires Member States to provide information on the total amounts of authorised emissions of the main List II substances discharged (above a threshold of 50 kg a⁻¹). In addition, Member States are required to indicate the percentage of all emissions covered by such authorisations and the percentage which might be contributed by emissions falling below the thresholds.

Four Member States (Belgium, Denmark, France and the Netherlands) provided information on emission loads to surface waters, with the most comprehensive coverage being provided for the List II metals. It should be noted that the Netherlands submitted figures for actual discharges, and that the annual loads from France were derived from the daily loads.

3 Wallonia only
submitted in their report. **Figure 3.3** shows the total loads of six heavy metals to surface waters based on the data provided by the four Member States. From this it can be seen that zinc was discharged in the greatest quantities, followed by chromium and lead. Of the remaining substances on List II, phosphorus (as phosphorus and phosphate), and oils and petroleum hydrocarbons were discharged in the largest quantities. Of the List I candidate substances, toluene was discharged in the greatest quantities (13.2 tonnes per year<sup>4</sup>), closely followed by xylene (12 tonnes per year<sup>5</sup>). Other candidate List I substances were discharged in quantities less than 1 tonne per year on the basis of the data from the four countries.

**Figure 3.3**  
**Emission loads (tonnes per annum) of some List II metals to the surface waters of Belgium (Wallonia), Denmark, France and the Netherlands**

From the information received, only the Netherlands explicitly stated that it applied the <50 kg a<sup>-1</sup> threshold for discharges included in its load calculations. France only included the ‘largest’ discharges, whilst Belgium (Wallonia) and Denmark gave no indication as to whether or not thresholds had been applied. The small size of some of Denmark's loads, however, indicates that the <50 kg a<sup>-1</sup> threshold was not used for at least some discharges.

As well as the measures and targets to reduce the pressures arising from emissions of pollutants to water required by EU Directives, there are complementary measures and targets arising from other International Agreements and Conventions. These cover both the inland water and marine environment, as follows:

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<sup>4</sup> Based on data from three Member States  
<sup>5</sup> Based on data from two Member States
• Rhine Action Plan
• Elbe Action Programmes
• Helsinki Convention (HELCOM)
• Oslo and Paris Convention (OSPAR)
• Mediterranean Action Plan
• Arctic Monitoring and Assessment Programme.

Appendix D lists their main objectives and an assessment as to whether the objectives have been achieved.

In terms of the North East Atlantic, the former Paris Commission started the 'Comprehensive Study on Riverine Inputs and Direct Discharges' in 1989. This was an annual data collection exercise, aiming at collecting from the coastal countries their geographically referenced annual waterborne load data for a standard set of determinands. The participating countries undertook to aim to monitor at least 90% of the total loads reaching the maritime area from their coastal interface.

Figure 3.4 shows the loads of selected contaminants discharged from rivers and direct discharges into the North East Atlantic between 1990 and 1999. They thus represent the net loads from point and diffuse sources within river catchments plus point discharges downstream of the river measuring points. The loads are expressed as percentage loads compared to the year 1990. The loads of all the substances were lower in 1999 compared to 1990, with zinc showing the smallest decline. The loads of PCBs (polychlorinated biphenyls) were variable over the period though there appeared to be a general reduction over the 10 years.

The data in Figure 3.4 are compilations of the loads from the OSPAR signatory countries. An example of one of the countries, the UK, is given in Figure 3.5, and shows a similar pattern to that of Figure 3.4 with the loads of all the selected substances decreasing since 1985.

The information obtained from the assessment of loads discharged into the North East Atlantic is mirrored by that reported by the Rhine Commission. Figure 3.6 illustrates that there have been significant reductions in the point source discharges of cadmium, chromium, copper, lead, mercury and trichloromethane between 1985 and 1996.

The Helsinki Convention has similar objectives to OSPAR in reducing the total loads of nutrients, heavy metals and toxic, persistent and bio-accumulating organic compounds to the Baltic Sea. Figure 3.7 and Figure 3.8 show the reductions achieved for two substances, for which there is information, hexachlorobenzene and DDT.
Figure 3.4  Riverine and direct discharges into North East Atlantic, 1990 to 1999

Figure 3.5  Direct and riverine loads from the UK, 1985 to 1999
Source: Rhine Commission, 1999

**Figure 3.6** Point source discharges into the river Rhine catchment, between 1985 and 1996
Source: Helcom, 2001

Figure 3.7 Reduction in emissions of hexachlorobenzene in Baltic Sea countries, EU and non-EU countries, 1970 to 1995 (1970 = 100)
In terms of DDT the use of the substance has been banned according to different timetables in the Baltic Sea countries (see below). This resulted in there being no consumption of DDT in these countries by 1995 (Helcom, 2001):

- Denmark banned 1984
- Estonia banned 1967
- Finland banned 1976
- Germany banned
- Latvia banned 1966, 2000
- Lithuania banned
- Poland no registration/licensing for marketing or use as a pesticide since 1973
- Russia banned 1972
- Sweden banned 1975.

Atmospheric deposition is another (diffuse) source of pollutants to Europe’s waters. Figure 3.9 shows the atmospheric inputs into the North Sea between 1987 and 1995 with data presented relative to 1990 (for consistency with Figure 3.4 and Figure 3.5). The figure again illustrates a decreasing trend for 3 metals, cadmium, lead and mercury.
3.4 Effects on status – chemical quality

3.4.1 Do we have better information about the levels of ‘dangerous substances’ in our waters?

The COMMPS database was developed by the European Commission for the purpose of proposing a ‘Priority List of Substances for the Water Framework Directive’ (COMMPS, 1999). It covers all EU Member States and contains approximately 750 000 sample records of 293 different organic substances and 23 different metals or their compounds. The data were largely collected from inland waters and three quarters of all the data points came from the UK. The data may not, therefore, give a representative overview of the monitoring activities within EU countries, nor of all water types. However, the development of this database has improved significantly the amount of information available on hazardous substances monitored by the EU Member States.

Figure 3.10 shows the number of different substances held within the COMMPS database by country. There are 293 different organic substances and 23 different metals and their compounds within the database. Germany provided information on the largest number of different substances (162 organic substances and 9 metals), followed by the UK (104 and 9, respectively), France (84 and 5, respectively) and the Netherlands (83 and 11, respectively). Information on the smallest number of substances came from Portugal (4), Finland (8), Ireland (4) and Sweden (9). The latter three only provided data on metals and their compounds.
Assuming that the information received for the COMMPS database accurately reflects what is or was monitored, then some very significant differences and gaps can be readily identified between countries. These differences probably reflect, to some extent, differences in the use of chemicals within countries. However, it is also likely that many countries do not monitor adequately in terms of what might be present.

3.4.2 Are the levels of ‘dangerous substances’ in water lower?

The Exchange of Information Decision 77/795/EEC requires Member States to report on the levels of selected determinands from a limited number of rivers and lakes in their country. Cadmium and mercury are two of the required determinands. Figure 3.11 and Figure 3.12 show the station aggregated annual average concentrations reported from each country between 1977 and 1995/96 for cadmium and mercury, respectively.

Source: COMMPS database

Figure 3.10 Number of different substances held within the COMMPS database by country

Figure 3.11 and Figure 3.12 show the station aggregated annual average concentrations reported from each country between 1977 and 1995/96 for cadmium and mercury, respectively.
Source: Data from ‘Exchange of Information’ sites (European Topic Centre for Inland Waters – ETC/IW)
Note: The EU Environmental Quality Objective for total cadmium in inland waters is 5 µg l⁻¹ as an annual average (cf. Directive 83/513/EEC)

Figure 3.11 Annual average concentrations of total cadmium at Exchange of Information Decision sites between 1977 and 1995/96
Source: Data from ‘Exchange of Information’ sites (European Topic Centre for Inland Waters – ETC/IW)

Note:
The EU Environmental Quality Objective for total mercury in inland waters is 1 µg l\(^{-1}\) as an annual average (cf. Directives 82/176/EEC and 84/156/EEC)

**Figure 3.12** Annual average concentrations of total mercury at Exchange of Information Decision sites between 1977 and 1995/96
It can be seen that cadmium concentrations generally decreased from the late 1970s to 1995 in the river sites in Belgium, Germany, the Netherlands, Luxembourg and the UK. Levels in Ireland have remained relatively low over the same period. The lowest levels were recorded in Sweden. There has also been a general decrease in mercury concentrations in the 'Exchange of Information' river and lake sites in the UK, France, the Netherlands and Germany over the same period of time and in Portuguese sites since the late 1980s. The picture in the other countries is less clear with the concentrations apparently higher in Greece, Denmark, Italy and Spain than in the other countries. This could be partly due to differences in the analytical limits of detection of the methods used by these countries.

It is worth noting that all cadmium concentrations reported were below the EU Environmental Quality Objective of 5 µg l⁻¹ (Directive 83/513/EEC). In contrast, mercury concentrations in Denmark (before 1984 – but no data after 1985), Italy (before 1988) and Spain (in 1995 – no later data) were above the EU Environmental Quality Objective of 1 µg l⁻¹ (Directives 82/176/EEC and 84/156/EEC).

Figure 3.13 shows that mean concentrations of lindane, cadmium, mercury and zinc in blue mussels in the North-East Atlantic have decreased in the period 1990-1996, which is in agreement with decreasing inputs. In this period, decreasing trends in inputs are also found for lead, but the mean concentrations in the blue mussel do not show a similar clear trend. The decrease in mean concentrations is most clear for lindane. For cadmium and zinc the rate of decrease is less than for lindane. Mercury showed a decreasing pattern after an extremely high maximum concentration in 1991.

Phosphorus and its compounds, ammonium and oxygen depleting substances are included as List II substances under the Directive. Figure 3.14 shows that the concentrations of orthophosphate, total phosphorus and ammonium have generally decreased since 1990 in Europe’s rivers. However, for nitrate the situation is less clear with concentrations higher in 2000 than they were in 1990. Figure 3.15 breaks down the data presented in Figure 3.14 between the different EU countries. There are clear differences between the countries, with Finland having much lower concentrations of all four determinands, and Sweden in terms of total phosphorus, than the other countries. Clear decreasing trends in the concentrations of orthophosphate, total phosphorus and ammonium are shown in most of the other countries. In terms of nitrate, most countries show no change in concentrations, though in Denmark there is some evidence for decreasing trends.

3.4.3 Examples from individual Member States

A few Member States (Austria, Greece, Italy – Region Emilia Romagna, and the UK) provided additional examples of achievements. The examples from Austria, Italy and the UK are outlined below (Greece and an additional example from Italy, see Section 3.5).

Some countries make extensive use of sum parameters to monitor overall water quality; AOX (Adsorbable Organo-halogen) is one such parameter and has been included in the example from Austria to illustrate this.
Figure 3.13  Hazardous substances (cadmium, mercury, lead, zinc and lindane) in blue mussels in the North East Atlantic (including the North Sea) in the period 1990 to 1996

Source ETC/MCE
Figure 3.14 Concentrations of orthophosphate, total phosphorus, total ammonium and nitrate in EU rivers, 1990 to 2000

Austria

Based on the Ordinance ‘Water Quality of the River Mur’ (Verordnung ‘Wassergüte Mur’, BGBl. Nr. 210/1977), a comprehensive programme of measures has been carried out in the Mur river basin (sub-basin of the Danube river basin) (BMLFUW, 2002). In the first phase of the river Mur restoration (until 1983) mainly process modifications of large paper and pulp industries and urban wastewater treatment plants have been undertaken, but due to increasing production, only moderate successes were achieved. In the second phase (until 1992) the enforced construction of treatment plants led to a significant reduction of the organic loads, for example COD (Chemical Oxygen Demand) loads were reduced by 60%. In the third phase until 1993, the systematic implementation of the Best Available Technology (BAT), as required by the Austrian emission ordinances, led to further reductions of the discharges of dangerous substances into the Mur river basin. In particular, this was evident for AOX (Adsorbable Organo-halogen), as a consequence of modifications of bleaching technology in the paper and pulp industry.
**Figure 3.15** Concentrations of orthophosphate, total phosphorus, total ammonium and nitrate in rivers in different EU countries 1990 to 2000

Source: EEA-EUROWATERNET
Note: Number of river stations per country and determinand in brackets
The success of the programme of measures in the Mur river basin can be illustrated by the development of water quality. For example, the percentage of river stretches with water quality class II or better (based on the saprobic water quality system of Kolkwitz and Marsson) increased from 70% at the beginning of the 70s to 93% in 2000. For the parameters AOX, ammonia and atrazine the concentration trend from 1993-2001 exhibits a distinct reduction. If one compares the period 1993-1995 with the period 1999-2001, the following reductions of the pollutant concentrations were found (because of similar flow situations, these figures may also be interpreted as reductions of pollution loads):

- AOX: -62 %
- Ammonia: -80 %
- Atrazine: -87 %

The following figures (Figure 3.16, Figure 3.17 and Figure 3.18) depict the annual averages of concentrations as well as the means over periods 1993-1995 and 1999-2001, respectively, at the monitoring site Mur/Spielfeld.

**Figure 3.16** Development of AOX concentrations in the river Mur in Austria, 1993 to 2001
Figure 3.17 Development of ammonia concentrations in the river Mur in Austria, 1993 to 2001

Italy

The development of phosphorus concentrations (total P, annual averages) and nitrate (NO$_3$-N, annual averages) from 1984 – 1998 at three sampling points in the Adriatic, close to the mouth of the river Po, is shown in Figure 3.19 and Figure 3.20, respectively (Regione Emilia-Romagna, 2000). There appears to be a slight decreasing trend in phosphorus concentrations, particularly as compared against the 1984 and 1985 data. However, similar to the EU data shown in Figure 3.14 and Figure 3.15, nitrate does not appear to have decreased. (See also Section 3.5 for an example from Italy on effects on ecological quality.)
### Development of atrazine concentrations in the river Mur in Austria, 1993 to 2001

![Graph showing atrazine concentrations in the river Mur](image)

**Source:** BMLFUW, 2002  
**Note:** Tributary to the river Danube - annual averages at Spielfeld monitoring station

**United Kingdom**

The following graphs (Figure 3.21, Figure 3.22 and Figure 3.23) show trends in water quality in terms of ammonia, phosphate and BOD (Biological Oxygen Demand) in UK river water (DEFRA, 2002).

These graphs are based on the Environment Agency's routine water quality monitoring programme. They are produced from approximately 8,000 individual sampling points, which are sampled 12 times per year. Therefore each bar of the histograms represents 90,000 to 100,000 results. Each sampling point represents a defined stretch of river. The results from each sampling point are weighted according to the length of river the point represents. This gives a measure of the quality of about 40,000 km of river in England and Wales.

There have been clear downward trends in the concentrations of these parameters, particularly in the second half of the 1990’s (ammonia and BOD).
Figure 3.19  Phosphate concentrations in the Adriatic (close to discharge of the river Po), annual averages of total Phosphorus (P), 1984 to 1998

Source: Regione Emilia-Romagna, 2000
Note: red line equals river flow

Figure 3.20  Nitrate concentrations in the Adriatic (close to discharge of the river Po), annual averages of NO$_3$-N, 1984 to 1998

Source: Regione Emilia-Romagna, 2000
Note: red line represents flow of the River Po
Figure 3.21 Ammonia concentrations in river waters in England and Wales, 1990 to 2000

Figure 3.22 Phosphate concentrations in river waters in England and Wales, 1990 to 2000
3.4.4 Accession countries – river Danube

The following figures (Figures 3.24, 3.25 and 3.26) illustrate some of the relatively high concentrations of ‘dangerous substances’ (List I and List II) in the Danube, particularly in the lower reaches (Slovakia, Hungary, former Yugoslavia, Romania and Bulgaria). Maximum concentrations of most of the substances were present at considerably higher levels in Zones III – V, compared with zones I and II, in particular, the concentrations of arsenic and nickel in Zones III and IV, and cadmium, lindane and DDT in Zone V.

It is worth noting that all maximum concentrations of mercury were below the EU Environmental Quality Objective of 1 µg l⁻¹ (Directives 82/176/EEC and 84/156/EEC). In contrast, the maximum cadmium concentration far exceeded the EU Environmental Quality Objective of 5 µg l⁻¹ (Directive 83/513/EEC) in the lowest region (Zone V) of the Danube. Earlier data (1997-1995) reported from EU Member States showed the opposite, in that all cadmium levels were below the Environmental Quality Objective, whilst mercury levels exceeded it in several countries (see Section 3.2.4).

Concerning the pesticides, lindane and DDT exceeded the EU Environmental Quality Objectives of 0.1 µg l⁻¹ and 0.025 µg l⁻¹, respectively, in Zone V only. Atrazine has no EU Environmental Quality Objective, but exceeded the EU drinking water standard of 0.1 µg l⁻¹ (Drinking Water Directive 98/83/EC) in Zones III-V. The latter could be relevant, if the river Danube water is used to abstract raw water for public water supplies.
Maximum concentrations of cadmium and mercury in the Danube

Source: Environmental Programme for the Danube River Basin, Component VI, 2000

Notes:
EU Environmental Quality Objective for Cd = 5 µg l⁻¹ (Directive 83/513/EEC)
EU Environmental Quality Objective for Hg = 1 µg l⁻¹ (Directives 82/176/EEC and 84/156/EEC)
Zone I: D/A/SK 2203-1873 rkm
Zone II: A/SK/HR 1873-1433 rkm
Zone III: HR/YU 1433-1071 rkm
Zone IV: YU/RO 1071-851 rkm
Zone V: RO/BG/RO 851-18 rkm

Figure 3.24 Cadmium and mercury concentrations in the river Danube water in 1998
Source: Environmental Programme for the Danube River Basin, Component VI, 2000
Notes:
Zone 1: D/A/SK 2203-1873 rkm As = arsenic
Zone II: A/SK/HR 1873-1433 rkm Cu = copper
Zone III: HR/YU 1433-1071 rkm Cr = chromium
Zone IV: YU/RO 1071-851 rkm Ni = nickel
Zone V: RO/BG/RO 851-18 rkm Pb = lead
Zn = zinc

Figure 3.25 Metal/metalloid concentrations in the river Danube in 1998
Figure 3.26 Pesticide concentrations in the river Danube in 1998
3.4.5 Effects of limits of detection and limits of determination on the detection of hazardous substances in water

It is the case that hazardous substances may not always be detected at all the locations at which they are monitored. This might be because they are in fact absent or if they are present, they are at a concentration below the limit of detection or limit of determination. Some laboratories distinguish between limit of detection, as a qualitative/semi-quantitative limit (substance absent or present) or a method limit of detection, not taking account of the sample matrix, which may interfere with detection at low concentrations; and the limit of determination as a limit where quantification is possible. However, the distinction is generally unclear and different laboratories use different definitions of limits of detection. Laboratories often provide only one value without clarification, since the difference between the values is usually small, sometimes negligible. Over recent years analytical techniques have improved greatly and limits of detection and limits of determination have decreased accordingly. Generally the analytical techniques employed should have a limit of determination that is appropriate for the purpose or use of the sample result. For example, if it is to be used to assess compliance with a standard, then the limit of determination would be expected to be one tenth to one fifth of the standard value.

There are, however, still a wide range of limits of detection or determination employed by countries, as illustrated by data in the COMMPS database. Moreover, there is no clear distinction between limits of detection and limits of determination. Although most countries provided so-called limits of detection, whilst only a few provided so-called limits of determination, the COMMPS report (COMMPS, 1999) refers throughout to ‘limits of determination’. However, the latter seems to be a minor problem compared with the wide range of limits reported. For example, in the case of trifluralin, the maximum limit of determination reported was 1 µg l\(^{-1}\) and the lowest was 3 orders of magnitude less at 0.0008 µg l\(^{-1}\). There were also 9 different maximum and 8 different minimum limits of determination that were given for 13 annual data sets reported. Atrazine shows a similar picture with 8 and 9 different maximum and minimum limits of determination for the 26 different annual data sets. The equivalent figures for lindane were 11 and 10 for maximum and minimum limits of determination out of 25 annual data sets.

The largest number of samples analysed are for herbicides, insecticides and intermediary chemicals with around 14 000 to 16 000 sample results existing in the COMMPS database (Figure 3.27). There are far fewer samples for PAHs (around 1000 at most for naphthalene), plasticisers (238) and surfactants (130 for 4-tert-octylphenol). For many substances the vast majority of results were below the limit of determination. For example, in the case of trifluralin 94% of the 13 000 samples were below the limit of determination, and for atrazine 62% of the 14 000 samples were also below the limit of determination. In contrast there are 17 000 sample results for lindane of which 53% were below the limit of determination. Most of the samples for surfactants and plasticisers were below the limit of determination.

The uncertainty concerning limits of determination and, in particular, the changes in limits over time, make it difficult to analyse the data in terms of a true representation of the status across Europe and even more so in terms of actual concentrations present and possible trends.
Figure 3.27 Number of samples analysed by country for the selected substances and the number of samples where concentrations were less than the limit of determination
Figure 3.27  (contd.)
### 3.4.6 Occurrence in drinking water


Annex I to the 1980 Directive lists standards and/or guidelines for 62 parameters, or groups of parameters. Most of these standards are defined in terms of Maximum Admissible Concentrations and a few as Minimum Required Concentration, although others are merely assigned guideline status. Member States are required to set standards in national legislation at least as stringent as those of the Directive but have the discretion to apply more stringent values.

The parameters are broken down into six categories. These are:

- **Organoleptic** (e.g. colour, turbidity, taste and odour);
- **Physico-chemical** (e.g. temperature, pH, chlorides and dissolved oxygen);
- **Substances undesirable in excessive amounts** (e.g. nitrate, surfactants, copper);
- **Parameters concerning toxic substances** (e.g. cyanide, mercury, pesticides);
- **Microbiological** (total coliforms, faecal coliforms, faecal streptococci); and
Minimum required concentration for softened water intended for human consumption (e.g. total hardness).

Member States are required by the Reporting Directive to answer a standardised questionnaire on implementation of the Drinking Water Directive. Ten of the 12 Member States required to submit reports for the 1993 to 1995 period provided at least some information, although for some of these Member States no monitoring data was available (European Commission, 2000). Member States have subsequently reported for the 1996 to 1998 period. However, two of the 15 Member States, obliged to submit information, have not done so and seven returns were considered incomplete, leaving only six returns, which were considered complete (European Commission, 2002a and 2002c).

The questionnaire requires the provision of "...information, such as average and peak exceedance and duration, necessary to allow the importance of the failure to comply with the standard to be assessed...". However, the precise format of the information is not specified, and this resulted in a large range of different, non-comparable information from different Member States (and even from within some single Member States). It was, therefore, not possible to undertake an assessment of the importance of failures that takes account of the level of exceedance of the Maximum Admissible Concentration, or the duration of the exceedance. The only analysis possible from the returned information was a crude assessment of the proportion of total population exposed to exceedances of Maximum Admissible Concentrations for some parameters.

Figure 3.28 illustrates the percentage of total population in nine EU Member States exposed to exceedances of drinking water standards for groups of determinands at some time during each year from 1993 to 1995. However, it must be stressed that the accuracy and completeness of the information is unknown, some cases were known to be underestimates, and the measure of exposure takes no account of the severity of exposure in terms of the level and duration of exceedance. At least one in ten European citizens were at some time during a year exposed to microbiological and some other undesirable contaminants that exceeded Maximum Admissible Concentrations as laid down in the EU Drinking Water Directive. At least one in 12 were also exposed to exceedances of some toxic contaminants, and one in 16 to water that may have had contaminants that affect aspects, such as taste or odour. Though the information from the three years indicates some temporal differences, there are no clear trends with time.

Groundwater is a significant source of drinking water in many EU Member States, hence the occurrence of pesticides would be of concern to European water regulators and water suppliers. Thus, pesticides are monitored in groundwater in some European countries, for example the pesticides, which most frequently exceeded 0.1 µg l⁻¹ in groundwater in England and Wales between 1992 and 1995, as shown in Figure 3.29. The most frequently found pesticide was atrazine, followed by isoproturon and diuron. There are not enough appropriate data, however, to detect any reliable trends with time.
Source: European Commission, 2000

**Figure 3.28** Percentage of total population in nine EU countries exposed to exceedances of drinking water standards for groups of determinands at some time during each year

Source: Environment Agency of England and Wales, 1997

**Figure 3.29** Pesticides most frequently exceeding 0.1 µg l⁻¹ in groundwater in England and Wales, 1992 to 1995
The synthesis report on the quality of drinking water in Member States of the European Union for the 1996-1998 reporting period (European Commission, 2002c) concludes that few direct comparisons can be made with the earlier returns (1993-1995), because of the incompleteness of returns for both periods. However, it concludes that improvements were significant and obvious in two Member States, whilst improvements might have occurred in two further Member States, although the latter was not clear and may have been due to differences in sampling strategies. In addition, some improvements but also some deterioration (for different parameters) was noted in four Member States, whilst no comparison was possible for the remaining seven Member States.

It must be noted that, whilst the presence of contaminants in drinking water mainly reflects the quality of the source water, their absence may not do so, because contaminants may be removed during drinking water treatment.

3.5 Effects on impacts – ecological quality

An indication of how often EU Environmental Quality Objectives have been exceeded in freshwaters has been obtained from the COMMPS database (COMMPS, 1999). It should be borne in mind that there is no indication of how representative the COMMPS database is of the situation in each EU country. This is because the COMMPS database was not produced for the purpose of assessing compliance but rather to have an overview of what the current levels of hazardous substances were in Europe’s waters. Thus some of the sampling stations within COMMPS are likely to have been located within mixing zones of discharges of effluents containing the substance, and will thus be expected to be relatively high. Nevertheless some useful information can still be obtained from COMMPS.

Thus Figure 3.30 shows the numbers of stations within COMMPS at which annual average concentrations exceed the relevant EU Environmental Quality Objectives for some of the List I substances (as specified in Directives 82/176/EEC, 84/156/EEC, 83/513/EEC, 88/347/EEC and 90/415/EEC). Also shown is the number of stations at which concentrations were >10% of the Environmental Quality Objective value but at or below the Environmental Quality Objective value, and also the number of stations at which concentrations were less than or equal to 10% of the Environmental Quality Objective value. The distributions for the years available are also given. It should be noted that no time trend assessments may be made because different countries and different stations contributed to the yearly distributions. Moreover, data for 1997 are incomplete, which may explain why the percentages of exceedances of Environmental Quality Objectives appear to be higher than in previous years.

Figure 3.30 shows that, for most of the substances and years, there were relatively few stations at which the EU Environmental Quality Objectives were exceeded. The highest proportion of stations exceeding Environmental Quality Objectives were for cadmium, isodrin and 1,2-dichloroethane, and the lowest for trichloromethane.
Figure 3.30  Numbers of monitoring stations at which EU Environmental Quality Objective (EQO) values were exceeded by year
Example from Greece

Data obtained from Greece show a small percentage of exceedances of the statutory limits for nine of the 17 List I substances monitored (University of the Aegean, 2002). Concentrations of the substances HCH, aldrin and hexachlorobenzene did not exceed the regulatory limits during the year 1998-1999. Moreover, the substances dieldrin, endrin, isodrin and hexachlorobutadiene were only detected during one sampling period (October 1998) and their concentrations were not detectable during the other three sampling campaigns during 1999.

Example from Italy

An example from Italy shows an overall decrease in the production of the toxin-producing algae dinoflagellate in the Adriatic (close to the discharge of the river Po) from 1982 to 1998 (Figure 3.31). The data are difficult to interpret, particularly as they are only given as annual averages, and the result could be due to a variety of factors. However, it may indicate an overall improvement in water quality, including possibly a decrease in nutrients (e.g. phosphate – see Section 3.4.3).

Source: Emilia – Romagna, 1999

Figure 3.31  Dinoflagellates in the Adriatic close to the discharge of the river Po (annual averages 1982 to 1998)
River Rhine

Figure 3.32 show that the macro-zoobenthos of the river Rhine has changed since the beginning of the 20th century in association with changes in pollution levels and resulting oxygen concentrations. For example, at the beginning of the 20th century there were 112 insect species identified, by 1971 only 5 of these were still present. Over this period there had been increasing pollution in the Rhine resulting in low oxygen concentrations of around 5 mg l⁻¹ O₂. As a result of improving levels of sewage treatment starting in the 1970s, there have been increasing levels of oxygen in the Rhine. Increasing levels in oxygen and decreasing pollution levels resulted in the number of macro-benthic species increasing steadily since 1975 and by 1995 they almost reflected the communities present in pre-pollution times.

3.6 Effects on driving forces

In the course of this project, not much information was obtained on actual usage and usage reductions. European Chemical industry production in the EU has increased steadily from 1985-1996 (European Environment Agency, no date), but total production does not indicate the level of risk posed to the environment.

However, one indication of the reduction in usage of certain ‘dangerous substances’ is provided by the evidence of marketing and usage restrictions or bans introduced at Community level. Examples of relevant directives are presented in Table 3.1.

In relation to List II substances under Directive 74/464/EEC, eight Member States have introduced marketing and use restrictions for some List II substances (Figure 3.33); the status of information is as of end of 2001. This information may be mainly based on restrictions imposed at Community level (Table 3.1). Six Member States (Spain, France, Ireland, Luxembourg, the Netherlands and Sweden) provided no information, whilst Greece provided some general information. The numbers of substances for which full or partial bans have been introduced in different Member States range from one to 21 and four to 43 substances, respectively.
Source: German Federal Ministry of the Environment, 1998

**Figure 3.32** Development of oxygen concentration and biota in the river Rhine
### Table 3.1 Examples of Community legislation on marketing and use restrictions for certain substances on List I or List II of Directive 76/464/EEC

<table>
<thead>
<tr>
<th>Year</th>
<th>Substance(s)</th>
<th>Directive</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973</td>
<td>Detergents</td>
<td>Directive 73/404/EEC (and amendments) on Detergents</td>
<td>Concerns biodegradability of detergents</td>
</tr>
<tr>
<td>1979</td>
<td>Plant protection products</td>
<td>Directives 79/117/EEC, replaced by 91/414/EEC concerning the placing of plant protection products on the market</td>
<td>Concerns authorisation of PPPs</td>
</tr>
<tr>
<td></td>
<td>Annex: PCBs, PCTs, Vinyl chloride</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td>Trichloroethylene Tetrachloroethylene Carbon tetrachloride</td>
<td>Directive 79/663/EEC - The First Amendment *</td>
<td>Usage restrictions</td>
</tr>
<tr>
<td>1982</td>
<td>Benzene</td>
<td>Directive 82/806/EEC - The Second Amendment *</td>
<td>Usage restrictions</td>
</tr>
<tr>
<td>1985</td>
<td>PCBs and PCTs</td>
<td>Directive 85/467/EEC - The Sixth Amendment *</td>
<td>Bans all new uses of PCBs and PCTs and, as of 30 June 1986.</td>
</tr>
<tr>
<td>1989</td>
<td>Lead Mercury Arsenic Organo-tin</td>
<td>Directive 89/677/EEC - The Eighth Amendment *</td>
<td>Bans/restrictions relating to (antifouling) paints</td>
</tr>
<tr>
<td>1994</td>
<td>Creosote Certain chlorinated solvents Certain carcinogens, mutagens and teratogens</td>
<td>Directive 94/60/EC - The Fourteenth Amendment *</td>
<td>Usage restrictions</td>
</tr>
<tr>
<td>1994</td>
<td>Around 800 dangerous substances, mainly petroleum or coal-tar derived substances, recently classified as Class 2 carcinogens, mutagens or teratogens</td>
<td>Directive 97/56/EC - The Sixteenth Amendment *</td>
<td>General EU-wide ban on the sale and use by the general public</td>
</tr>
</tbody>
</table>

* Amendment to Directive 76/769/EEC
Figure 3.33 Substances on List II of Directive 76/464/EEC for which full and partial marketing and use restrictions have been introduced in the Member States.

Source: Horth et al., 2003
Note:
Spain, France, Ireland, Luxembourg, the Netherlands and Sweden provided no information; Greece general information, e.g. Codes of Practice for pesticides.
4. LESSONS LEARNT

This Section has been completed in the light of the discussions and contributions from the Workshop held in Brussels on 1-2 July 2002 ‘Discharge of Dangerous Substances Directive (76/464/EEC) - Lessons Learnt and Transition to the Water Framework Directive’ (see details in Appendix A). It includes responses given at the workshop to a questionnaire from those involved in implementing the Directive, both at national and European levels, i.e. lessons learnt on the political level. The questionnaire sent to delegates prior to the workshop, requested information on the implementation process, lessons learnt from implementing Directive 76/464/EEC, in particular, difficulties experienced in implementing Directive 76/464/EEC, as well as ideas for improving the implementation.

The workshop addressed the following issues:


2. Transition from Directive 76/464/EEC to the Water Framework Directive 2000/60/EC; and

3. Reporting requirements.

The aim was to focus on open discussion with contributions from Member States and Accession Countries and to facilitate a smooth transition from Directive 76/464/EEC to the Water Framework Directive.

It has been demonstrated that the implementation of Directive 76/464/EEC in Member States has been very slow (European Commission, 2000 and 2002b; Horth et al., 2003). This seems to have been in part due to the complexity of the Directive, particularly the large number of potentially ‘dangerous substances’ to be controlled and the distinction between List I and List II substances. There was no clear division of responsibility between Member States and the Commission, concerning the selection and prioritising of substances. Therefore, Member States seem to have been uncertain of their responsibilities with respect to List II substances and ‘potential List I substances’. In addition, the lack of an agreed mechanism for prioritising substances lead to slow progress at Community level in selecting and assessing substances and finally adopting further Directives for List I substances. Clear guidance from the Commission to Member States was lacking in the early years of implementation of Directive 76/464/EEC and the exchange of information among Member States and between Member States and the Commission was limited.

The main issues emerging from the workshop are summarised below.

4.1 Achievements, obstacles and lessons learnt from the implementation of Directive 76/464/EEC

Achievements

It was recognised that one of the achievements of Directive 76/464/EEC was an increased awareness of the public, industry and authorities towards dangerous substances, for example a better understanding of their sources and ecological impacts, and a recognition of the need for authorisation of discharges.
Directive 76/464/EEC has resulted in the introduction of a Europe wide authorisation requirement and early action on problems concerning the emission of dangerous substances into the environment. In fact, this has lead to the preparation for what is now the pollution control policy under the Water Framework Directive.

Although often inadequate and introduced long after the introduction of Directive 76/464/EEC in many Member States, monitoring of dangerous substances has improved considerably since 1976. Analytical techniques have gradually improved, becoming more reliable (including Analytical Quality Controls) and more appropriate (lower) limits of detection (qualitative threshold) and limits of determination (quantitative threshold) have been achieved, whilst improvements are still being made.

The wide range of dangerous substances has been prioritised to a certain extent. Environmental Quality Objectives (or Standards) and emission standards have been developed and established (List I substances in 'Daughter Directives' of Directive 76/464/EEC and many List II substances at Community level – Scientific Committee on Toxicity and Ecotoxicity, CSTE - and by individual Member States).

Member States have made significant progress in preparing inventories of dangerous substances, selecting relevant List II substances for control and preparing Pollution Reduction Programmes, although to some extent only recently and often only in response to Infringement Proceedings initiated by the Commission. These measures, once completed, will form a good basis for a smooth transition to the Water Framework Directive (cf. Horth et al., 2003).

There has been a reduction in discharges and considerable improvements in water quality have been demonstrated. However, it is not possible to show how much was directly as a result of Directive 76/464/EEC, since other activities contributed to reductions, such as Action Programmes of International Conventions.

**Obstacles**

The implementation of Directive 76/464/EEC in Member States has been very slow and a number of obstacles to its successful implementation have been identified.

A major problem seems to have been the complexity of the Directive, and particularly, the large number of potentially ‘dangerous substances’ to be controlled, as well as the distinction between List I and List II substances. In addition, due to fundamentally differing views of Member States, the Directive was a compromise between alternative approaches to pollution control, based either on Quality Objectives or Emission Limit Values.

There were no deadlines for implementation of the various requirements of the Directive. In addition, guidance from the Commission to Member States was lacking in the early years of implementation of Directive 76/464/EEC, including guidance for monitoring compliance (especially on intermittent discharges) and for the selection of relevant pollutants and the preparation of Pollution Reduction Programmes. The exchange of information among Member States and between Member States and the Commission was limited.

The lack of an agreed mechanism for prioritising substances lead to slow progress, both at Community level in selecting and assessing substances and finally adopting further Directives (‘Daughter Directives’ for List I substances), and in Member States’ own selection of relevant substances (List II) requiring Pollution Reduction Programmes.
There was no clear division of responsibility between Member States and the Commission, concerning the selection and prioritising of substances. Therefore, Member States seem to have been uncertain of their responsibilities with respect to ‘potential List I substances’ (not covered by ‘Daughter Directives’) and List II substances. Member States seem to have been waiting for the Commission to set further priorities, Quality Objectives and emission standards.

The derivation of Quality Objectives was hampered by the absence of a unified method and a lack of ecotoxicological data for the assessment of substances (no information provided by industry).

Furthermore, the large number of substances to be considered as potential List II substances was somewhat daunting, and not helped by the lack of suitable analytical methods to establish their presence and concentrations in the aquatic environment. Where Quality Objectives had been set, the available analytical methods were often inadequate to establish whether these were met because the limits of determination and/or limits of detection were higher than the Quality Objectives.

In addition, there were no ‘de minimis’ provisions, i.e. no threshold loads as a basis for emission controls.

The main focus was on List I substances and point sources of pollution, whilst not enough attention was paid to List II substances (Article 7) and diffuse sources of pollution.

There were no provisions for de-selection of substances, which were no longer produced or not found in monitoring campaigns.

Although Directive 76/464/EEC included a ‘status quo’ requirement, there was no clear definition of the ‘no deterioration’ concept. Due to the lack of monitoring data and adequate analytical methods (see above), there was often insufficient information to establish what the status quo actually was.

Lessons learnt

Most lessons learnt have already been incorporated into the Water Framework Directive and for the large polluting industries in the Integrated Pollution Prevention and Control Directive, which will replace Directive 76/464/EEC.

To prevent similar difficulties to those encountered by Member States during the implementation of Directive 76/464/EEC, it was considered particularly important to provide guidance and to promote exchange of information between Member States and between the Commission and Member States. To this end, the EU Member States, Norway and the European Commission have jointly developed a common strategy for supporting the implementation of the Water Framework Directive. The main aim of this strategy is to allow a coherent and harmonious implementation of the Directive. The main focus is on methodological questions related to a common understanding of the technical and scientific implications of the Water Framework Directive, exchange of information and the production of Guidance documents for key requirements of the Water Framework Directive.

Furthermore, the Guidance documents are tested in pilot projects and may be amended in the light of such experience through dialogue between the experts using the Guidance and the Commission, as well as between Member States.
In contrast to Directive 76/464/EEC, where the absence of deadlines has clearly had a negative effect on the implementation process, the Water Framework Directive sets deadlines for specific milestones.

Experience with the implementation of Directive 76/464/EEC has shown the need to focus on relevant substances instead of setting long formal lists, i.e. to prioritise on the basis of risk assessment and to periodically review priority lists. Consequently, the Water Framework Directive includes a more pragmatic approach to the selection of relevant pollutants, whereby the priority list (Annex X) is set and periodically reviewed at Community level, whilst the selection of other relevant substances is left to Member States.

A clear division of responsibilities between Commission and Member States is also considered important to prevent delays in the effective implementation of the Directive. This has been addressed in the Water Framework Directive, for example in the division between priority substances, which replace the former List I and List II substances and are set at Community level, and other substances which have to be dealt with at river basin level (see above).

Monitoring needs to be more systematic, focusing on priority substances and linked to Pollution Reduction Programmes, or as in the Water Framework Directive, to Programmes of Measures as set out in River Basin Management Plans.

A systemic combined approach to water pollution control, i.e. setting quality standards and using emission controls should be more effective in safeguarding/improving water quality, than an approach based on either quality standards or emission controls. The former is the approach adopted in the Water Framework Directive, which focuses on maintenance or achievement of good chemical and ecological quality of waters.

It was also considered important to link in with related policy areas, and to address the problem of diffuse sources of pollutants. Whilst it was undoubtedly important initially to focus on the control of point sources of pollutants, e.g. from industrial discharges, a need has been identified to add emphasis to the control of diffuse pollutants, e.g. from agriculture.

The lack of a 'de minimus’ provision has been addressed in the Integrated Pollution Prevention and Control Directive, which controls pollution from large industries.

A need was also identified for effective information exchange between Member States, as well as between the Commission and Member States, particularly in respect of toxicity data and Quality Standards set by individual Member States.

4.2 Transition to the Water Framework Directive

The requirements of Directive 76/464/EEC are still relevant and most remain in force until repealed in 2013. The ‘Daughter Directives’ still apply (there is no date for their repeal, although they are currently under review) and monitoring for List I substances is still a legal requirement, even if a substance is no longer used.

Compliance with the requirements of Directive 76/464/EEC is conditional for an effective implementation of the Water Framework Directive. Member States should apply the principles of the Water Framework Directive for the implementation of Directive 76/464/EEC for the transition period, including the monitoring approach and the methods for the derivation of
Quality Standards. Pollution Reduction Programmes may be prepared based on River Basins; these can subsequently be aggregated to present a national picture to comply with Directive 76/464/EEC.

In particular, the Pollution Reduction Programmes under Article 7 of Directive 76/464/EEC should be established and used until 2007/08. After this time the Programmes of Measures (Article 11 of the Water Framework Directive), established as part of the River Basin Management Plans (Article 15 of the Water Framework Directive), will need to be complete (2009) and operational by 2012.

Thus a smooth transition is possible, as indicated by the timetable for important stages in the implementation of the Water Framework Directive, concerning the analysis of pressures and impacts, monitoring and the establishment of River Basin Management Plans, including Programmes of Measures, as shown below:

i) Impact review completed (Article 5, Article 15, Annex II) and register of protected areas established in 2004;

ii) Reporting of the impacts review to the Commission (Article 15) in 2005;

iii) Monitoring programmes operational (Article 8) in 2006;

iv) First River Basin Management Plan completed (Article 15) and Programme of Measures established (Article 11) in 2009;

v) Programme of Measures operational (Article 11) in 2012.

Member States should work in parallel to the Common Implementation Strategy in collecting information for pressures and impacts analysis. In particular, inventories should be in place and the selection of relevant pollutants can be based on the principles set out in the Water Framework Directive.

Instead of preparing rigid lists, a pragmatic approach should be taken to the selection of relevant substances and the development of dynamic tools is encouraged to address new problems in a flexible manner (cf. WFD CIS Guidance Document No.3, 2003 – Analysis of Pressures and Impacts).

4.3 **Revision of reporting requirements for Directive 76/464/EEC**

One conclusion of the workshop was that it was not worth reviewing the reporting questionnaire (95/339/EEC) in relation to Directive 76/464/EEC for any short-term revision. Instead it should be thoroughly revised when clearer information would be available on the requirements of the Water Framework Directive.

Nevertheless, certain short-term improvements could be made, such as focusing on electronic reporting and making information available on web sites. It was considered particularly important that Member States should provide information (interpreted data) rather than raw data and to make this available to the public.

In addition, the Commission would welcome further suggestions for improvements.
5. CONCLUSIONS AND THE WAY FORWARD

5.1 Assessment of achievements

Based on the information presented within the DPSIR (Driving force – Pressures – Status – Impacts – Responses) framework as applied to this study, the following main conclusions may be derived:

Responses: Slow but significant progress has been made across the European Union in implementing measures to control the discharge of List I and List II substances into the aquatic environment. However, some Member States may still not have implemented all the requirements of the Discharge of Dangerous Substances Directive 76/46/EEC. Some Member States have implemented certain measures only recently in response to infringement proceedings.

Pressures: There have been significant successes in reducing discharges and emissions of ‘dangerous substances’ (as covered by Directive 76/464/EEC) to Europe’s waters. This is shown by the progressive reductions of loads of some of these substances to the North East Atlantic and the Baltic Sea. Similar successes have been recorded in one of Europe’s largest river catchments, the river Rhine and a few examples from individual Member States also show improvements.

There have also been reductions in the atmospheric loads of some metals to the North Sea.

Status: The reductions in emissions of some substances have subsequently led to an improvement in water quality. This is seen in the significant reduction in the concentrations of some substances in Europe’s rivers (particularly heavy metals, phosphorus and ammonium) and in some marine biota.

Impact: The improvement in water quality has, in a well documented case such as the Rhine, led to an improvement in biological quality.

Driving Forces: Although no actual evidence of usage reductions has been obtained in this study, there is an indication of reductions in usage of certain substances as a result of the introduction of marketing usage and restrictions or bans at Community level.

Some additional observations are summarised below:

The number of substances adequately monitored to observe trends, is very limited (mainly nutrients and toxic metals). However, in many countries more is now known about the substances present in water. This is reflected by the large number of substances monitored in some countries. Conversely, a few countries appear to do very little monitoring, even though dangerous substances may be used in those countries. Consequently, no comprehensive and representative picture can be derived for the entire European Union.

A significant success is the increased awareness of the importance of knowledge on the toxicity, fate and behaviour of hazardous substances. This is reflected by the fact that the Sea Conventions and other international organisations actively prioritise and revise lists of substances for subsequent control measures.
In contrast, there are many thousands of chemical substances used within Europe and most of these have not been formally assessed in terms of their potential risk to the water environment. Surveillance monitoring is thus required to detect the presence of substances not included in current priority lists for action.

In terms of monitoring, much of the monitoring undertaken for dangerous substances appears to be unfit for purpose in that the analytical methods used produce limits of detection or determination that are far too high in relation to ‘background’ levels, Quality Objectives or concentrations which may cause adverse effects.

There is also evidence that some substances are occurring in Europe’s drinking water at levels exceeding the required standards, although some improvements have been observed when comparing the information provided by some Member States for the reporting period 1996-1998 against the earlier period 1993-1995.

There is a need for a consistent database on the emissions, loads, and levels in receiving waters and drinking water of dangerous substances at a European level, which would enable a more quantitative assessment of trends for use in the judgement of future policy success.

### 5.2 Transition from Directive 76/464/EEC to the Water Framework Directive

The Water Framework Directive and the Integrated Pollution Prevention and Control Directive will replace and go beyond the requirements of the Discharge of Dangerous Substances Directive 76/464/EEC. However, except for Article 6, which relates to the setting of emission limit values for List I substances, Directive 76/464/EEC will remain in force until 2013 (Article 22(2) of the Water Framework Directive). In particular, Article 7 of Directive 76/464/EEC will remain a key element for the control of dangerous substances in the aquatic environment in the period before the respective obligations under the Water Framework Directive enter into effect (i.e. 2009 – Programmes of Measures).

Priority substances set under Article 16 of the Water Framework Directive will replace List I and List II substances. However, to avoid conflict between the two directives, Article 22(3) of the Water Framework Directive has some transitional provisions, which will apply for Directive 76/464/EEC:

a) The priority list of substances to be adopted under Article 16 of the WFD (which will become Annex X of the Water Framework Directive) will replace the list of substances prioritised in the Commission Communication to the Council of 22 June 1982 (the Commission’s List I Candidates List).

b) For the purpose of Article 7 of Directive 76/464/EEC, Member States may apply the principles for the identification of pollution problems and the substances causing them, the establishment of quality standards and the adoption of measures laid down in the Water Framework Directive.

Hence there is a clear distinction between priority substances which will be dealt with at European level and other substances which have to be addressed at river basin level.
The Commission has provided guidelines for Member States on elements, which should be included in Pollution Reduction Programmes (COM, 2000) (see Table 5.1). A comparison of these elements with the requirements of the Water Framework Directive shows that these are similar (Table 5.1).

Table 5.1 Comparison of the requirements of Directive 76/464/EEC and the Water Framework Directive 2000/60/EC for the control of specific pollutants

<table>
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<tr>
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<tbody>
<tr>
<td>Type and scope of programme</td>
<td>The programme must be comprehensive: it must cover the whole country and it must be substances specific. (Article 1 and Article 7(1) and 7(2))</td>
<td>Programme of measures based on river basin districts to achieve good ecological and chemical status and the other objectives as set out in Article 4. (Article 11)</td>
</tr>
<tr>
<td>Selection of substances</td>
<td>Potentially all 115 candidate List I substances (132-17 confirmed List I) but also all families and groups of substances listed as List II in the Annex of Directive 76/464/EEC need to be considered. In practice Member States have to select substances of national concern. (Article 7(1) and 7 (2) and Annex to Directive 76/464/EEC)</td>
<td>Any relevant pollutant in a river basin, in addition to the priority substances (&quot;Specific Pollutants&quot;), which impacts on good chemical/ecological status. Annex VIII provides an indicative list of groups and families of substances (merger of List I and List II of Directive 76/464/EEC). Impact of human activity on the status of surface waters. In practice Member States have to select the substances, which impact on the good ecological/chemical status of the river basin. Selection of substances must be part of the analysis of pressures and impacts. (Article 5, Annex II)</td>
</tr>
<tr>
<td>Quality Standard or Quality Objective</td>
<td>Derivation left to Member States. Quality Objectives must be laid down in the national legal framework. Quality Objectives for surface waters. (Article 7 (3))</td>
<td>Derivation of the Quality Standards by Member States according to Annex V, point 1.2.6 of the Water Framework Directive. The Quality Standards must be laid down in the national legal framework. Quality Standards may be derived for surface water, sediment or biota. (Article 4)</td>
</tr>
<tr>
<td>Monitoring</td>
<td>No details provided in Directive 76/464/EEC but Member States must report the design and result of the surface water monitoring programmes according to Questionnaire 95/337/EC. The design of the monitoring system is left to the Member States.</td>
<td>Monitoring programmes of water status required for each river basin. Guidance for surveillance, operational and investigative monitoring is provided in Annex V of the Water Framework Directive. (Article 8)</td>
</tr>
</tbody>
</table>

6 Directive 76/464/EEC uses the term Environmental Quality Objective, which can be considered as being equivalent to the term Quality Standard (QS) used in the Water Framework Directive.
<table>
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</thead>
<tbody>
<tr>
<td>Authorisation</td>
<td>Prior authorisation using emission standards based on Quality Objectives.</td>
<td>Prior regulation, authorisation or registration based on general binding rules is required for effluents containing 'Specific Pollutants'. The authorisation must be based on the &quot;combined approach&quot;.</td>
</tr>
<tr>
<td>Specific provisions</td>
<td>Use of appropriate measures to reduce emissions (e.g. BAT for emissions and BEP for diffuse sources).</td>
<td>Emission and product controls and the application of the &quot;combined approach&quot;: BAT (best available techniques) or relevant emission limit values for control of point sources and BEP (best environmental practice) for diffuse sources and the application of Quality Standards.</td>
</tr>
<tr>
<td></td>
<td>(Article 2, Article 7 (4), Article 4 of 84/156/EEC and Article 5 of 86/280/EEC)</td>
<td>(Article 10)</td>
</tr>
<tr>
<td>Deadlines</td>
<td>Programmes must contain deadlines for implementation and a timetable for specific reduction targets. No deadline set in the Directive. A maximum deadline of 5 years was proposed by the Commission.</td>
<td>Programmes of measures must be established nine years and made operational twelve years and implemented 15 years after the adoption of the Water Framework Directive (with a certain possibility of extensions). Discharges, emissions and losses of priority hazardous substances (PHSs) must be ceased or phased out within 20 years after adoption of the substances as PHSs.</td>
</tr>
<tr>
<td></td>
<td>(Article 7(5))</td>
<td>(Article 11 and Article 16)</td>
</tr>
<tr>
<td>Communication</td>
<td>Summary of the pollution reduction programmes must be submitted to the Commission.</td>
<td>Review of human impacts must be submitted to the Commission within 4 ¼ years and the River Basin Management Plans including programme of measures 9 ¼ years after adoption of Water Framework Directive.</td>
</tr>
<tr>
<td></td>
<td>(Article 7(6), and CD 91/692 and questionnaire 95/337)</td>
<td>(Article 15)</td>
</tr>
</tbody>
</table>

Member States are therefore encouraged to prepare their pollution reduction programmes in compliance with Directive 76/464/EEC already with a view to complying with the requirements of the Water Framework Directive. This applies especially to the obligation to prepare River Basin Management Plans, including Programmes of Measures, which need to be completed by 2009 (see also outcome of the workshop – Section 4).

This approach is also encouraged in Article 22(3b) of the Water Framework Directive, which states that Member States may apply the principles of the Water Framework Directive for the purpose of Article 7 of Directive 76/464/EEC. Some of the measures contained in the Water Framework Directive (e.g. the combined approach using Quality Standards and Uniform Emission Standards, control of diffuse sources, monitoring requirements) may provide Member States with additional tools for the preparation and implementation of the Pollution Reduction Programmes (Article 7 of Directive 76/464/EEC).
Guidance for the preparation of Pollution Reduction Programmes is provided in a separate report produced under the current programme of work (Rees and Zabel, 2003), taking account of the working groups operating under the ‘Common Implementation Strategy’, in particular the guidance produced by the following two groups:

1) Working Group 2.1 on Analysis of Pressures and Impacts (IMPRESS), an informal working group set up in October 2001, dedicated to the identification of pressures and assessment of impacts within the characterisation of water bodies according to Article 5 of the Water Framework Directive. Guidance on ‘Analysis of Pressures and Impacts’ (WFD CIS Guidance Document No. 3, 2003) has been published and is available on the web7; and


Despite the repeal of Directive 76/464/EEC after a transitional period of 13 years, there is no date for the repeal of the ‘Daughter Directives’ (List I substances). Instead, the Water Framework Directive requires a review of the ‘Daughter Directives’ (as listed in Annex IX of the Water Framework Directive). This includes the preparation of proposals for revised controls for the List I substances included in the Water Framework Directive list of priority substances, and appropriate measures or the repeal of controls of other List I substances. This review is being undertaken by the Expert Advisory Forum for Priority Substances, whose tasks include the development of Quality Standards; the elaboration of emission controls; identification of priority hazardous substances; and a review of the ‘Daughter Directives’ for List I substances.

To assist the Expert Advisory Forum on Priority Substances, a review of List I substances and the need for their controls under the Water Framework Directive has been prepared under the current work programme (Zabel and Rees, 2003).

5.3 The way forward

In summary, the following points will ensure a smooth transition from the pollution control regime under Directive 76/464/EEC and its ‘Daughter Directives’ to the Water Framework Directive:


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3. Measures on priority substances, including Environmental Quality Standards and emission controls to replace the regulation of List I substances on a European level;


5. Further development of guidance for implementation (IMPRESS, monitoring, selection of substances).
REFERENCES


University of the Aegean (2002) Information provided by Prof. Themistokles Lekkas, University of the Aegean, Greece.


APPENDIX A  SUMMARY OF THE WORKSHOP ON ‘DISCHARGE OF DANGEROUS SUBSTANCES DIRECTIVE (76/464/EEC) - LESSONS LEARNT AND TRANSITION TO THE WATER FRAMEWORK DIRECTIVE’, ON 1-2 JULY 2002 IN BRUSSELS
Workshop on

Brussels 1-2 July 2002

Room 00/C, Building of DG Environment
Avenue de Beaulieu 5
B-1160 Brussels
## WORKSHOP PROGRAMME

<table>
<thead>
<tr>
<th>Part 1 (first day): Achievements, obstacles and lessons learnt</th>
<th>Speaker</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome and introduction to the workshop – reasons and objectives</td>
<td>Patrick Murphy, Joachim d'Eugenio</td>
<td>12.00</td>
</tr>
<tr>
<td>Lunch</td>
<td></td>
<td>12.30</td>
</tr>
<tr>
<td></td>
<td>Joachim d'Eugenio, Liam Cashman, Martin Wimmer, Liz McDonnel</td>
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</tr>
<tr>
<td>Discussion</td>
<td></td>
<td>14.40</td>
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<tr>
<td>Tea</td>
<td></td>
<td>15.00</td>
</tr>
<tr>
<td>Achievements of the Dangerous Substances directive and lessons learnt – Introduction</td>
<td>Helene Horth</td>
<td>15.20</td>
</tr>
<tr>
<td>Plenary discussions on the achievements and lessons learnt from the viewpoint of the Member States</td>
<td>Member State representatives</td>
<td>15.30</td>
</tr>
<tr>
<td>Discussion</td>
<td></td>
<td>16.30</td>
</tr>
<tr>
<td>Summary of first day</td>
<td>Joachim d'Eugenio</td>
<td>17.00</td>
</tr>
<tr>
<td>End of first day</td>
<td></td>
<td>18.00</td>
</tr>
</tbody>
</table>
### PART 2 (second day): Transition to the Water Framework Directive

<table>
<thead>
<tr>
<th>Activity</th>
<th>Speaker</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to second day</td>
<td>Joachim d’Eugenio</td>
<td>9.00</td>
</tr>
<tr>
<td>Plenary discussion on the transitional provision as seen by the Member States</td>
<td>Member State representatives</td>
<td>9.20</td>
</tr>
<tr>
<td>Discussion</td>
<td></td>
<td>10.20</td>
</tr>
<tr>
<td>Coffee</td>
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<td>10.45</td>
</tr>
</tbody>
</table>

### PART 3 (second day): Revision of reporting requirements for 76/464/EEC

<table>
<thead>
<tr>
<th>Activity</th>
<th>Speaker</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience of reporting under the Dangerous Substances Directive and reporting under the Water Framework Directive for dangerous substances, including priority substances</td>
<td>Joachim d’Eugenio</td>
<td>11.00</td>
</tr>
<tr>
<td>Current initiatives to streamline reporting</td>
<td>Joachim d’Eugenio</td>
<td>11.20</td>
</tr>
<tr>
<td>Reporting needs of the EEA related to dangerous substances - water quality</td>
<td>Steve Nixon</td>
<td>11.40</td>
</tr>
<tr>
<td>Reporting needs of the EEA related to dangerous substances: EUROWATERNET - emissions</td>
<td>Benoît Fribourg-Blanc</td>
<td>11.50</td>
</tr>
<tr>
<td>Lunch</td>
<td></td>
<td>12.00</td>
</tr>
<tr>
<td>Reporting for the Dangerous Substances Directive and the Water Framework Directive (related to dangerous substances) as seen by the Member States:</td>
<td>Member State representatives</td>
<td>13.30</td>
</tr>
<tr>
<td>- What should be reported</td>
<td></td>
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<tr>
<td>- How should reports be made</td>
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<tr>
<td>- How often should the reports be produced</td>
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<tr>
<td>Discussion</td>
<td></td>
<td>14.00</td>
</tr>
<tr>
<td>Summary of main views on reporting and possible agreement on follow-up</td>
<td>Joachim d’Eugenio</td>
<td>15.00</td>
</tr>
<tr>
<td>Close of meeting</td>
<td>Joachim d’Eugenio</td>
<td>15.30</td>
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</tbody>
</table>
The workshop addressed the following issues:

1. Achievements, obstacles and lessons learnt;
3. Reporting requirements.

The aim was to focus on open discussion with contributions from Member States and Accession Countries. The outcome of these discussions is summarised below.

Part 1 - Achievements, Obstacles and Lessons Learnt

This session was introduced by Patrick Murphy and Joachim d’Eugenio from the Commission, followed by a presentation by Nigel Haigh covering the historical perspective of the Discharge of Dangerous Substances Directive 76/464/EEC (cf. Appendix B).

The main point of the introduction by Nigel Haigh was that Directive 76/464/EEC was divisive among Member States in terms of the alternative approaches of emission limit values versus environmental quality objectives or standards. Together with the absence of a date for implementation, this was probably the main cause of the slow implementation of Directive 76/464/EEC. However, it was considered that the Water Framework Directive provided the opportunity to reconcile these differences by using the combined approach (Emission Limit Values and Quality Standards).

In his presentation, Martin Wimmer emphasised that, to a large extent, the lessons learnt were already incorporated in the Water Framework Directive and there was a new spirit of cooperation between EU Commission and Member States. The Water Framework Directive provided the following:

- Focus on relevant substances instead of formal lists (prioritisation risk based);
- Clear deadlines;
- Systematic monitoring;
- Prioritising actions and focusing resources;
The main points of the expert panel of Directive 76/464/EEC Desk Officers’ (Joachim d’Eugenio, Liz McDonnell, Martin Wimmer) and the Commission's legal expert (Liam Cashman) were as follows:

- The main focus was on List I substances, not enough attention was paid to Article 7;
- There was a lack of ecotoxicological data to assess substances (no information from chemical industry);
- There were no provisions for de-selection of substances, which were no longer produced or found in monitoring campaigns (example: Daughter Directive for ‘drins’ relevant to one plant in the Netherlands only – now closed?);
- Article 7 was already a ‘mini’ Water Framework Directive, i.e. it contained many of the main elements of the Water Framework Directive;
- Since 1990 legal actions had been taken against most Member States for inadequate implementation of Directive 76/464/EEC.

Following the presentation of the draft report ‘Implementation and Achievements for List I and List II Substances’ by Helene Horth (WRc) the main points of the contributions from Member States and Accession Countries and panel discussions were as follows:

**Achievements:**

- Directive 76/464/EEC increased the awareness of the public, industries and authorities towards dangerous substances, e.g. understand sources and ecological impacts of dangerous substances, need for authorisation of discharges;
- There has been a reduction in discharges and improvement in water quality; however it is not possible to show how much was due to the Directive 76/464/EEC, as other activities contributed to reductions, e.g. Action Programmes of International Conventions.

**Obstacles:**

- There was a lack of guidance for the implementation of Directive 76/464/EEC and for monitoring compliance (especially intermittent discharges);
- No guidance on Pollution Reduction Programmes;
- No de minimis provisions (no threshold load);
- Large number of substances somewhat daunting;
- Lack of analytical methods for some of these substances (Analytical Quality Control also important);
- No unified method for derivation of Environmental Quality Objectives;
- Problems with intermittent discharges;
Lessons learnt:

- Need for information exchange between Member States (i.e. toxicity data, EQS) and between the Commission and Member States;
- Development of guidance for implementation;
- Link to other policy areas;
- Diffuse sources important.

Member States were asked to provide further examples of improvements, which could be incorporated in the report.

Part 2 - Transition to the WFD

Following the introduction by Joachim d'Eugenio (Commission) on ‘The Common Implementation Strategy’ and the presentation by Thomas Zabel (WRc) on ‘Transitional Provisions for the Dangerous Substances Directive to the Water Framework Directive’, the main points from contributions of Member States and Accession Countries and panel discussions were as follows:

- Directive 76/464/EEC is not dead yet and is only going to be repealed in 2013. Only Article 6 of the WFD, which requires the Council to adopt emission limit values and quality objectives, has been repealed. The rest remains in force for another 13 years.
- Daughter Directives still apply (although currently under review); monitoring for List I substances is still a legal requirement (even if substance no longer used).
- Member States and Accession Countries should not wait for the outcome of the Common Implementation Strategy, but engage now in collecting information for pressures and impacts analysis. In particular, inventories should be in place.
- Programmes may be prepared based on River Basins, which can subsequently be aggregated to present a national picture to comply with Directive 76/464/EEC.
- Pragmatic approach to selection of relevant substances, instead of rigid lists;
• Develop dynamic tools to address new problems in a flexible manner.

Part 3 - Revision of Reporting Requirements for Directive 76/464/EEC

This session was introduced by Joachim d'Eugenio, who outlined ‘Current Initiatives to Streamline Reporting’. This was followed by presentations by Benoit Fribourg-Blanc, (European Environment Agency - EEA), on ‘Reporting Needs of the EEA Related to Dangerous Substances – Emissions’, and Steve Nixon (EEA) on ‘Reporting Needs of the EEA related to dangerous Substances – Water Quality’. The main points from contributions of Member States and Accession Countries and panel discussions were as follows:

• There are two initiatives dealing with Reporting: INSPIRE (Infrastructure for Spatial Information in Europe), based on Geographical Information Systems (GIS) and Review of the Standardised Reporting Directive:
  - New proposal for the Standardised Reporting Directive due end of 2002 (incl. water),
  - INSPIRE to report by end of 2002;
• European Environment Agency initiatives focus on informing decision-makers and public (annual indicator based reports), whilst the Standardised Reporting Directive is to monitor compliance (every 3 years);
• Some Priority Substances are covered by other Directives and initiatives (e.g. Integrated Pollution Prevention and Control, HARP-HAZ, PRTR);
• Important that Member States provide information (interpreted data) rather than raw data and make this available to public.

Questions from Commission to Member States:

1. Should Reporting Questionnaire be reviewed now (has to be repealed if no longer used)?
2. Broader initiative: system in line with the Water Framework Directive to start now, using existing initiatives/systems?
3. Are there any practical short term improvements, e.g. electronic reporting, make available to public on web sites?

Conclusions:

1. Not worth reviewing the questionnaire for any short term revision. Instead it should be thoroughly revised when clearer information is available on the requirements of the Water Framework Directive;
2. Short-term improvements: to focus on electronic reporting and making information available to public on web sites;
3. Member States can approach the Commission at any time with further suggestions.

**Wish list from the Commission:**

- Receive reports for 1999-2001 from September onwards;
- Receive information electronically as far as possible and with some detailed description of Pollution Reduction Programmes (see template in Appendix B of Report 1\(^8\) or page 10 of the Reporting Questionnaire);
- Make reports available on web page for public access.

**Overall Workshop Conclusions**

The implementation of Directive 76/464/EEC across the EU Member States has resulted in greater awareness of dangerous substances.

Reductions of dangerous substances in the aquatic environment have been achieved.

The main lessons learnt from the implementation of Directive 76/464/EEC have been incorporated in the Water Framework Directive.


Compliance with Article 7 of Directive 76/464/EEC provides a good basis for implementation of the Water Framework Directive.

The message from the Commission to Member States and Accession Countries is to start with the implementation of the Water Framework Directive now, i.e. do not wait for Commission. In particular, Member States and Accession Countries should prepare inventories of dangerous substances, set Quality Standards and establish emission controls.

Electronic reporting is preferable and reports should be made available to the public on web sites.

The Commission also asked Member States and Accession Countries to provide further illustrations of achievements.

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<thead>
<tr>
<th>Title</th>
<th>Firstname</th>
<th>Surname</th>
<th>Organisation</th>
<th>Position in organisation</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ms</td>
<td>Eda</td>
<td>Andresmaa</td>
<td>Ministry of the Environment of Estonia</td>
<td>Councillor</td>
<td>Estonia</td>
</tr>
<tr>
<td>Mr</td>
<td>Udo</td>
<td>Bosenius</td>
<td>Ministry for the Environment</td>
<td>Head of Unit</td>
<td>Germany</td>
</tr>
<tr>
<td>Mr</td>
<td>Michel</td>
<td>Boucneau</td>
<td>Flemish Environment Agency</td>
<td></td>
<td>Belgium</td>
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<tr>
<td>Mr</td>
<td>Jens</td>
<td>Brogger Jensen</td>
<td>Danish Environmental Protection Agency</td>
<td>Senior Advisor</td>
<td>Denmark</td>
</tr>
<tr>
<td>Mrs</td>
<td>Maria Salvina</td>
<td>Camilleri</td>
<td>Malta Resources Authority</td>
<td>Manager, Licensing, Monitoring and Enforcement Unit</td>
<td>Malta</td>
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<tr>
<td>Mr</td>
<td>Liam</td>
<td>Cashman</td>
<td>European Commission ENV D.2</td>
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<tr>
<td>Mr</td>
<td>Jan</td>
<td>Cortvriend</td>
<td>European Commission ENV B.1</td>
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<tr>
<td>Mr</td>
<td>Joachim</td>
<td>D'Eugenio</td>
<td>European Commission DG ENV B 1</td>
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<tr>
<td>Mr</td>
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<td>Dal Bianco</td>
<td>ARPA Emilia-Romagna</td>
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<tr>
<td>Mr</td>
<td>Bruno</td>
<td>de Kerckhove</td>
<td>DGRNE (Direction generale des ressources naturelles et de l'environnement)</td>
<td>Coordinateur</td>
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<tr>
<td>Mr</td>
<td>Pat</td>
<td>Duggan</td>
<td>Department of the Environment and Local Government</td>
<td>Inspector (Environment)</td>
<td>Ireland</td>
</tr>
<tr>
<td>Mr</td>
<td>Arkadiusz</td>
<td>Dzierzanowski</td>
<td>Ministry of Economy</td>
<td>Specialist</td>
<td>Poland</td>
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<tr>
<td>Mr</td>
<td>Benoit</td>
<td>Fribourg-Blanc</td>
<td>ETC/ Water (International Office for Water)</td>
<td>Study Engineer</td>
<td>France</td>
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<tr>
<td>Mr</td>
<td>Dino</td>
<td>Fontana</td>
<td>Regional Emilia-Romagna, Assessorato Ambiente, Servizio Tutela e Ris, Risorsa Acqua</td>
<td>Dirigente Responsabile programmi di monitoraggio e flussi informativi</td>
<td>Italia</td>
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<tr>
<td>Dr</td>
<td>Simon</td>
<td>Gardner</td>
<td>Environment Agency (England &amp; Wales)</td>
<td>Policy Advisor</td>
<td>Bristol</td>
</tr>
<tr>
<td>Ms</td>
<td>Anne</td>
<td>Gendebien</td>
<td>WRc plc</td>
<td>Manager, Brussels Office</td>
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<tr>
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<td>Mr</td>
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<td>Gislev</td>
<td>European Commission DG ENV D 3</td>
<td>Desk Officer</td>
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<td>Ms</td>
<td>Genevieve</td>
<td>Golaszewski</td>
<td>Ministere de L'Ecologie et du Developpement Durable - Direction de l'Eau</td>
<td>Focal Point France</td>
<td>France</td>
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<td>Ms</td>
<td>Prassede</td>
<td></td>
<td>Environment Protection Directorate, Malta Environment &amp; Planning Authority (MEPA)</td>
<td>Environment Officer (CŽM) Marine Pollution Section</td>
<td>Malta</td>
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<tr>
<td>Mr</td>
<td>Nigel</td>
<td>Haigh</td>
<td>Former Director of IEEP London</td>
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<tr>
<td>Mrs</td>
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<td>Horth</td>
<td>WRc</td>
<td>Principal Scientist, Environment</td>
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<tr>
<td>Mrs</td>
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<td>Kelnarova</td>
<td>Ministry of Environment</td>
<td>Environmental Management Specialist</td>
<td>Slovak Republic</td>
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<tr>
<td>Dr</td>
<td>Otto</td>
<td>Klab</td>
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<tr>
<td>Mr</td>
<td>Peter</td>
<td>KovAC</td>
<td>Ministry of Environment and Water</td>
<td>Deputy Head of Department, Integrated Pollution Control</td>
<td>Hungary</td>
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<tr>
<td>Dr</td>
<td>Thermistokles</td>
<td>Lekkas</td>
<td>University of the Aegean, Greece</td>
<td>Professor - Rector</td>
<td>Greece</td>
</tr>
<tr>
<td>Mrs</td>
<td>Christina</td>
<td>Makri</td>
<td>University of the Aegean, Greece</td>
<td>Assistant to Prof T D Lekkas</td>
<td>Greece</td>
</tr>
<tr>
<td>Mr</td>
<td>Jukka</td>
<td>Malm</td>
<td>Finnish Environment Institute, Chemicals Division</td>
<td>Division Manager</td>
<td>Finland</td>
</tr>
<tr>
<td>Mr</td>
<td>Dave</td>
<td>Martin</td>
<td>Environment Agency (England &amp; Wales)</td>
<td>Policy Advisor</td>
<td>UK</td>
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<tr>
<td>Dr</td>
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<td>McDonnell</td>
<td>Department for the Environment, Food and Rural Affairs</td>
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<tr>
<td>Mr</td>
<td>Bernd</td>
<td>Mehlhorn</td>
<td>Umweltbundesamt</td>
<td>Scientific Director</td>
<td>Germany</td>
</tr>
<tr>
<td>Mr</td>
<td>Frederic</td>
<td>Muhl</td>
<td>Brussels Institute for the Management of the Environment</td>
<td>Work for Inspection Division responsible for implementation of 76/464/CEE</td>
<td>Belgium</td>
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<tr>
<td>Mr</td>
<td>Gerrit</td>
<td>Niebeek</td>
<td>Ministry of Transport, Public Works and Water Management, Institute of Water Management and Waste Water Treatment RIZA</td>
<td>Staff member Industrial Pollution Control, member EAF priority substances</td>
<td>The Netherlands</td>
</tr>
<tr>
<td>Mr</td>
<td>Steve</td>
<td>Nixon</td>
<td>ETC / Water (WRc plc)</td>
<td>Senior Principal Scientist</td>
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<td>Ms</td>
<td>Donatella</td>
<td>Palazzi</td>
<td>ARPA(Regional Agency for Environmental protection) - Ferrara Ichthyological Laboratory</td>
<td>Toxicity testing team member</td>
<td>Italy</td>
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<tr>
<td>Mrs</td>
<td>Jeannette</td>
<td>Plokker</td>
<td>Ministry of Transport, Public Works and Water Management, Institute of Water Management and Waste Water Treatment RIZA</td>
<td>Senior staff member international affairs department, project leader implementation European court decision directive 76/464, OSPAR co-ordinator</td>
<td>The Netherlands</td>
</tr>
<tr>
<td>Mr</td>
<td>Luis</td>
<td>Pinilla</td>
<td>Ministerio de Medio Ambiente</td>
<td>Jefe Area Calidad de Aguas, C H Ebro</td>
<td>Spain</td>
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<td>Dr</td>
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<td>Puig</td>
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<tr>
<td>Mr</td>
<td>Patrick</td>
<td>Rijsdijk</td>
<td>European Parliament</td>
<td>Assistant Mr Hans Blokland (MEP)</td>
<td>Belgium</td>
</tr>
<tr>
<td>Mr</td>
<td>Hermann</td>
<td>Sveinbjornsson</td>
<td>Environment, Food Safety, Toxic Chemicals, Icelandic Mission to the European Union</td>
<td>Counsellor</td>
<td>Iceland</td>
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<td>Ms</td>
<td>Carmen-Stefania</td>
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<td>Ministry of Waters and Environmental Protection</td>
<td>Senior Advisor - Department of Strategies, Regulations and Permits</td>
<td>Romania</td>
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<td>Ms</td>
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<td>Jetske</td>
<td>Verkerk</td>
<td>Ministry of Transport, Public Works and Water Management (RIZA)</td>
<td>Staff Member International Affairs Department, EU Coordination, project leader reporting 76/464 directive, EAF reporting</td>
<td>The Netherlands</td>
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<tr>
<td>Dr</td>
<td>Martin</td>
<td>Wimmer</td>
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<td>Desk Officer - Dangerous Substances</td>
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<td>Ms</td>
<td>Natasa</td>
<td>Zitko Stemberger</td>
<td>Ministry of the Environment and Spatial Planning, Environmental Agency of the Republic of Slovenia</td>
<td>Water Quality Section, Assistant to the Director</td>
<td>Slovenia</td>
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</table>
APPENDIX B


Nigel Haigh

former Director Institute of European Environmental Policy (IEEP), London

Note on paper presented at the Workshop on


Brussels 1-2 July 2002

INTRODUCTION

One of the earliest Directives following the 1st Environmental Action Programme:

- Fascinating;
- Contentious;
- Important; and
- Involving a large work programme.

Two peculiarities:

- No date for implementation (a mistake!);
- Not based on 1st Environmental Action Programme.

ORIGIN

Belgium was concerned that the proposed Council of Europe Convention on Pollution of Trans-boundary Watercourses would put, for example, Antwerp (on the Scheldt) at a competitive disadvantage as compared with Paris and London (which are both on purely national rivers).

The Commission therefore proposed a Decision (later converted to a Directive) to co-ordinate three conventions and so prevent distortions to competition:

- Paris Convention – adopted June 1974;
- Rhine Chemical Convention – adopted December 1976;

  ⁹ This history is set out at greater length in the “Manual of Environmental Policy: the EU and Britain” (loose leaf – updated every six months) and published by the Institute of European Environmental Policy (IEEP) and Elsevier.

Each of these had two lists, which drew on the two lists in the London and Oslo Conventions on dumping at sea.

**THE PROPOSAL – COM (74) 1706 – 21.10.74**

The two lists were copied from the Conventions. Emission limits were to be set for both List I and List II substances by qualified majority voting.

**THE NEGOTIATIONS**

Member States fairly quickly agreed that emissions limits should not be set at EC level for List II substances: instead, these were to be subject to prior authorisation based on quality objectives. This was similar to the requirements of the Rhine Convention.

The conflict that led to the failure to agree the Directive at the October 1975 Council focused on List I. The UK refused to accept limit values for List I substances, although it came close to doing so. The Minister (Dennis Howell) made a 3 700 word speech at the December 1975 Council, at which a compromise was agreed, defending the British Government’s traditionally decentralised approach. Under the compromise, ‘Daughter Directives’ for List I substances would lay down both limit values and quality objectives and Member States could chose to follow one approach or the other. All Member States, except the UK, said they would follow the emission limit value approach. The ‘Mainzer Papier’ of 1975 produced by LAWA in Germany sets out the views of the German Länder, who were opposed to water quality objectives for waters with the same use.

The Directive, as adopted, thus presented the two approaches as ‘alternative approaches’, rather than a ‘combined approach’, as is the case now in the Water Framework Directive. The Directive in fact resulted in pushing Member States into opposite directions (since they had to make a choice), whereas previously their positions were closer together.

**DAUGHTER DIRECTIVES**

The development of ‘Daughter Directives’ went much more slowly than expected. In the first ten years (1976-86) only three substances were covered (mercury, cadmium and lindane). The first proposal (on ‘drins’) took nine years before adoption and covered only one plant in the whole European Community.

The reason for the delays was partly the difficulty of defining quality objectives and partly because the conflict between the two approaches re-emerged in the negotiations. The UK in particular found itself resisting what it regarded as excessively stringent standards, which other Member States would not need to respect.

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10 Note from the authors of this report: the UK’s approach to water management was already based on legally binding Environmental Quality Standards and river basin management.
To overcome this problem, the ‘General Application Directive’ (86/280/EEC) laid down standard articles, so that future negotiations would focus only on the numerical standards. As a result, 14 more substances were covered in the next four years (1986-90).

No further ‘Daughter Directives’ were adopted after 1990, and the emphasis then focused on the Integrated Pollution Prevention and Control Directive.

THE LISTS

In 1982 the Commission put forward a priority list of 129 potential List I substances (later extended to 132). Following the regulation of 18 List I substances in the ‘Daughter Directives’, a new list of 15 List I was proposed by the Commission in 1990 – COM (90)9 – for the next series of ‘Daughter Directives’, but none were adopted by the Council.11

IDEAS FOR AMENDING THE DIRECTIVE 76/464/EEC

In 1983 IEEP put forward preliminary ideas for an amendment of the Directive 76/464/EEC. The basic idea was that the two approaches should be ‘additional’ to each other (i.e. ‘combined’) rather than ‘alternatives’. This would require a change in position, both by the UK and by the other Member States. The Commission made it clear that it was not prepared to consider any amendment, until the UK showed itself ready to move.

The UK Parliament then published reports supporting a ‘unified’ approach (the House of Lords in 1985 and the House of Commons in 1987). At the North Sea Conference in 1987, the British Government announced a change in policy: it was prepared to accept limit values for a short ‘Red List’ of substances. This opened the door to a possible amendment of Directive 76/464/EEC, but the Commission was not interested at that time. It also opened the door to the Integrated Pollution Prevention and Control Directive.

Following more than 20 years of debate, the Water Framework Directive, which will eventually repeal Directive 76/464/EEC, does however adopt the ‘combined’ approach, but much depends on how it will be implemented. The Integrated Pollution Prevention and Control Directive also uses the combined approach to some extent.

CONCLUSIONS

Directive 76/464/EEC was born by chance. The conflict over the two approaches could have been avoided, and certainly slowed down the adoption of the ‘Daughter Directives’. It divided Member States rather than bringing them together. It also deflected attention from other water problems, e.g. eutrophication – later dealt with in the Urban Wastewater Treatment Directive. Nevertheless, the debate dealt with real issues in pollution control theory, which the Water Framework Directive may have resolved. The Directive has had other positive effects. Perhaps the substance by substance approach was always a mistake and a sector by sector based approach would have been better. That is now embodied in the Integrated Pollution Prevention and Control Directive. The quality standard approach remains embodied in the

11 Note from the authors of this report: The remaining 99 substances from the 1982 list were considered as List II substances, since the Commission did not want to propose further ‘Daughter Directives’.
Water Framework Directive, and these two Directives, together with marketing and use restrictions (a part of Chemicals policy) now provide a more flexible and comprehensive approach to dangerous substances in water.
## APPENDIX C  SUMMARY OF NATIONAL EXPERT MEETINGS ON COUNCIL DIRECTIVE 76/464/EEC OF 4 MAY 1976

### Table C.1  National Expert meetings – Highlights  (General)

<table>
<thead>
<tr>
<th>Substance</th>
<th>Date of meeting</th>
<th>Comment</th>
<th>Directives etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>General – List I / List II</td>
<td>13-14 Apr 1978</td>
<td><strong>Finalise method for drawing up inventories for List I substances</strong> based on a questionnaire - Inventory to be concerned with 12 substances regarded as priority substances (not specified)</td>
<td></td>
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<tr>
<td></td>
<td>27 Jan 1981</td>
<td><strong>Establishment of Priority List II substances</strong> which should be included in the reduction programme (6 metals/metalloids)</td>
<td></td>
</tr>
</tbody>
</table>
|                                | 5 Oct 1981      | **Selection of List I substances for priority examination:**  
1. Examination of Member States replies to questionnaire on 122 substances 
2. Agreement only 108 to be retained. 
3. Finally, 15 substances selected for an initial study |                                                      |
|                                | 12-13 Oct 1982  | **A 6th series of substances to be examined in detail** (11 substances) |                                                      |
|                                | 11-12 Jul 1983  | **Agreement in favour of a ‘general’ directive** containing a set of technical and administrative provisions common to all the substances of List I with ad hoc specific provisions by means of technical annexes for each of the listed substances | List I Framework Directive 86/280/EEC |
|                                | 22 May 1987     | Discussion on progress made on implementation of reduction programme for List II substances and difficulties in fixing quality objectives and programmes |                                                      |
|                                | 30 Jun – 1 Jul 1988  | **Provisional list of priority substances for List I (26 substances)** |                                                      |
### Substance

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<th>Substance</th>
<th>Date of meeting</th>
<th>Comment</th>
<th>Directives etc.</th>
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</thead>
</table>
| General – List I / List II | 31 Jan – 1 Feb 1989 | **1. Selection scheme for List I substances:** Agreement on selecting carcinogenic, mutagenic and teratogenic substances by the oral or dermic route  
**2. Priority list adopted:**  
- Metals and metalloids: chromium, zinc, copper, nickel, lead, arsenic, silver, vanadium, tin, boron  
- Monoaromatics: benzene, xylene, toluene, monochlorobenzene, phenols  
- Non-persistent oils and hydrocarbons of petroleum origin – surfactants  
- Ammonia, sulphides  
- Technical and economic aspects of reducing pollution from industrial sectors  
- Presentation of country reports by Working Group – the reports of the working group to be used for the purpose of the Explanatory Memorandum of a modified Council Directive 76/464/EEC, rather than for a Communication to the EC Council  
- Discussion of Reporting Directive |
<table>
<thead>
<tr>
<th>Substance</th>
<th>Date of meeting</th>
<th>Comment</th>
<th>Directives etc.</th>
</tr>
</thead>
</table>
2. Commission had the intention to improve current control on diffuse pollution when modifying Directive 76/464  
3. Reporting Directive still under discussion |                 |
|                            | 17-18 Mar 1994  | Agreements reached on several points dealing with modification of Directive 76/464/EEC |                 |
|                            | 20-21 Jun 1996  | Development of a communication on a strategy for the control of pollution from SIs (discussed with industry and NGOs on 2 September 1996) |                 |
2. Priority list and candidate List I substances  
3. Programmes under Article 7 of 76/464/EEC  
4. Identification of relevant pollutants (List II)  
5. CEN standards for List I and II  
6. Review of Daughter Directives |                 |
Table C.2  National Expert meetings – Highlights (Substance specific)

<table>
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<tr>
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<th>Directives etc.</th>
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<tbody>
<tr>
<td>Aldrin</td>
<td>01 Dec 1977</td>
<td>Discussion</td>
<td>Drins: 88/347/EEC (incl. isodrin)</td>
</tr>
<tr>
<td>Dieldrin</td>
<td>10-11 Jun 1978</td>
<td>Discussion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>23-24 Sep 1986</td>
<td>Commission modified proposals for Directives on Limit Values and Quality Objectives (COM (86) 534 final)</td>
<td></td>
</tr>
<tr>
<td>Cadmium and compounds</td>
<td>20-21 Jun 1978</td>
<td>Cadmium review - the Commission should be in a position by autumn 1978 to decide on a work programme to establish limit values for the various industries with cadmium in their effluent</td>
<td>Cadmium: 83/513/EEC</td>
</tr>
<tr>
<td></td>
<td>13-14 Nov 1978</td>
<td>Review of problems and possible courses of action for cadmium</td>
<td></td>
</tr>
<tr>
<td>Mercury and compounds</td>
<td>5-6 Dec 1977</td>
<td>Proposal for a Directive on pollution caused by mercury discharged in brine from the electrolysis industry - Comments from Member States on proposal</td>
<td>Mercury: 82/176/EEC 84/156/EEC</td>
</tr>
<tr>
<td></td>
<td>20-21 Jun 1978</td>
<td>Proposal for a Directive on pollution caused by mercury discharged in brine from the electrolysis industry – further discussions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13-14 Nov 1978</td>
<td>Presentation of a UK working paper on Quality Objective for mercury</td>
<td></td>
</tr>
<tr>
<td>HCH (lindane), DDT, HCB (hexachlorobenzene), PCB etc.</td>
<td>27-28 May 1980</td>
<td>2(^\text{nd}) series of substances susceptible to be List I substances</td>
<td>PCBs banned - also Candidate List I 1982</td>
</tr>
<tr>
<td></td>
<td>11-12 Jul 1983</td>
<td>(\text{DDT}) conformed to the selection criteria that justify inclusion in List I</td>
<td></td>
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<tr>
<td></td>
<td>3-4 Jul 1984</td>
<td>Measures proposed by Commission on HCB - comments on these</td>
<td></td>
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<tr>
<td></td>
<td>16-17 Oct 1985</td>
<td>- Future work: Proposal for directive on HCB</td>
<td></td>
</tr>
<tr>
<td>Substance</td>
<td>Date of meeting</td>
<td>Comment</td>
<td>Directives etc.</td>
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<tr>
<td>Pentachlorophenol (PCP) Trichlorophenol (TCP)</td>
<td>12-13 Oct 1982</td>
<td>Agreement that a directive on discharges of PCP could prove necessary – proposal for directive being drawn up Agreement that measures outside the framework of the Directive should be taken for PCP</td>
<td>Endosulfan: Candidate List I 1990 (Directive 76/464/EEC)</td>
</tr>
<tr>
<td></td>
<td>3-4 Jul 1984</td>
<td>Measures proposed by Commission on HCBD – comments on these</td>
<td>PCP: 86/280/EEC</td>
</tr>
<tr>
<td></td>
<td>12-13 Oct 1982</td>
<td>Endosulfan to be dealt with under the Rhine Convention</td>
<td>HCB: 88/347/EEC</td>
</tr>
<tr>
<td></td>
<td>11-12 Jul 1983</td>
<td>PCP conformed to the selection criteria that justify inclusion in List I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16-17 Oct 1985</td>
<td>Future work: - Proposal for directive on HCBD - Draft proposals for endosulfan and TCP</td>
<td></td>
</tr>
<tr>
<td>Benzene Chloroform Carbon tetrachloride (CCl₄)</td>
<td>11-12 Jul 1983</td>
<td>Agreement that on the basis of information available to date there is not sufficient evidence to declare benzene, chloroform and carbon tetrachloride dangerous to the environment 1. Benzene should not be included in List I 2. Chloroform and carbon tetrachloride should remain possible candidates for List I due to the risks of a link with cancer</td>
<td>Benzene: Candidate List I 1982 (Directive 76/464/EEC)</td>
</tr>
<tr>
<td></td>
<td>23-24 Sep 1986</td>
<td>- Quality Objective for benzene (List II) - Council has not approved the inclusion of chloroform as List I</td>
<td>Chloroform: 86/280/EEC</td>
</tr>
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<tr>
<td>Substance</td>
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<tr>
<td>Chromium (Cr-III and Cr-VI)</td>
<td>27 Jan 1981</td>
<td>Establishment of Priority List II substances which should be included in the reduction programme</td>
<td>All List II (DIRECTIVE 76/464/EEC)</td>
</tr>
<tr>
<td>Lead</td>
<td>3-4 Jul 1984</td>
<td>Proposal for Quality Objectives for chromium - still different views on necessity of a proposal for chromium</td>
<td></td>
</tr>
<tr>
<td>Nickel</td>
<td>16-17 Oct 1985</td>
<td>Proposal for Quality Objectives for lead, copper, zinc and nickel  Concerns about arsenic</td>
<td></td>
</tr>
<tr>
<td>Arsenic</td>
<td>23-24 Sep 1986</td>
<td>- Quality Objectives for List II (phosphate, copper, lead, nickel, zinc and chromium,)  - Incomplete return on copper, lead, nickel, zinc</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-3 Sep 1987</td>
<td>Discussion on chromium and progress of implementation</td>
<td></td>
</tr>
<tr>
<td>Substance</td>
<td>Date of meeting</td>
<td>Comment</td>
<td>Directives etc.</td>
</tr>
<tr>
<td>----------------------------</td>
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<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Phosphate                  | 16-17 Oct 1985  | Concerns about *phosphate*  
Presentation of Commission Studies on *organosilicates*:  
Decision not to include these in List II                                                                                  | List II (Directive 76/464/EEC)                        |
| Organosilicates            |                 |                                                                                                                                                                                                        |                                                      |
| Nitrate                    | 23-24 Sep 1986  | Quality objectives for List II (*phosphate*, *nitrate*, *organosilicates*):  
- Discussion on *phosphate* postponed to 1987  
- Commission intended to draw up a proposal to control inputs of nitrogen compounds even if nitrate is not a List II substance but because of rising levels of *nitrate* in waters.  
- Commission support proposal to exclude *organosilicones* from List II, preferably by modifying Directive 76/464/EEC |                                                      |
|                            | 22 May 1987     | Presentation of a study on methods of combating *eutrophication* and questionnaire on eutrophication:  
- Doubt about efficiency of reduction measures of *phosphates* in detergents to combat eutrophication  
- Recommendations needed for measures to be taken on eutrophication                                                                 |                                                      |
<p>|                            | 2-3 Sep 1987    | Discussion on <em>nitrogen and phosphorus</em> compounds and progress of implementation                                                                                                                      |                                                      |</p>
<table>
<thead>
<tr>
<th>Substance</th>
<th>Date of meeting</th>
<th>Comment</th>
<th>Directives etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene 1,2- dibromoethane 1,1-dichloroethane 1,2-dichloroethane 1,1-dichloroethylene 1,2-dichloroethylene dichloromethane 1,2-dichloropropane malathion 1,1,2,2-tetrachloroethane tetrachloroethylene trichlorobenzene 1,1,1-trichloroethane 1,1,2-trichloroethane trichloroethylene</td>
<td>5 Oct 1981</td>
<td>Selection of List I substances for priority examination 1. Examination of Member States replies to questionnaire concerning 122 substances 2. It was agreed that of the 122 substances listed; only 108 be retained. Finally 15 substances were selected for an initial study Note: the Dutch delegation wanted to include xylene, toluene, ethylbenzene, isopropylbenzene and epichlorohydrin in the list</td>
<td>1,2 –dichloroethane, tetrachloroethylene, trichlorobenzene and trichloroethylene: 90/415/EEC Malathion: Candidate List I 1990 Chlorobenzene: Candidate List I 1990 Others: Candidate List I 1982</td>
</tr>
<tr>
<td></td>
<td>3-4 Jul 1984</td>
<td>1. Presentation of studies on chlorobenzene and malathion: - Concern over malathion – talks about possibility to include it in List II - Doubt about including monochlorobenzene in List I 2. Certain consensus about retaining trichlorobenzene as List I candidate substance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16-17 Oct 1985</td>
<td>Measures proposed for monochlorobenzene, trichlorobenzene, 1,2-dichloroethane 1. Agreement to move monochlorobenzene to List II at least temporarily and to draw appropriate reduction programmes 2. The majority of delegations supporting proposal to include trichlorobenzene in List I and to have one global value as quality objective 3. The majority of delegations are supporting the inclusion of 1,2-dichloroethane in List I Future work: Draft proposals for 1,2-dichloroethane, perchloroethylene and trichloroethylene, trichlorobenzene</td>
<td></td>
</tr>
<tr>
<td>Substance</td>
<td>Date of meeting</td>
<td>Comment</td>
<td>Directives etc.</td>
</tr>
<tr>
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</tr>
</tbody>
</table>
| Continued: Chlorobenzene etc. | 23-24 Sep 1986 | 1. Measures proposed for List I (*chlorinated and brominated ethanes, chlorinated ethylenes*)  
2. Limit values and quality objectives for *trichloroethylene and tetrachloroethylene*  
3. *Trichloroethylene, tetrachloroethylene and 1,2-dichloroethane*:  
- Most delegations supported the proposal to include trichloroethylene and tetrachloroethylene in List I  
- Agreement to include 1,2-dichloroethane in List I  
- No unanimity with regard to Quality Objectives and Limit Values for trichloroethylene, tetrachloroethylene and 1,2-dichloroethane | |
| 2-3 Sep 1987 | Proposed Limit Values and Quality Objectives for *trichlorobenzenes* | |
| 3-chloroaniline | 16-17 Oct 1985 | Future work: Planned proposals for *chloroanilines, chloronitrobenzene and chlorophenols* | |
| 4-chloroaniline | | | |
| 1-chloro-2-nitrobenzene | 23-24 Sep 1986 | Presentation of studies on *chloroanilines and chloronitrobenzene, chlorophenols, chloroprenes, epichlorohydrins, chlorinated propenes* | |
| 1-chloro-3-nitrobenzene | | | |
| 1-chloro-4-nitrobenzene | | | |
| 2,4-dichlorophenol | | | |
| 2-chloroethanol | | | |
| 1,3-dichloro-2-propanol epichlorohydrin parathion | | | |
### APPENDIX D  INTERNATIONAL CONVENTIONS IN THE FIELD OF WATER QUALITY – OBJECTIVES, ACTIONS, ACHIEVEMENTS

**Objectives** | **Actions achieved**
--- | ---
Rhine Action Plan  
- 50% reduction of total phosphorus and nitrogen, and other priority pollutants by 1995  
- 70% reduction of mercury, cadmium, lead and dioxins by 1995  
- Sustainably decrease sediment pollution  
- 90% of communities connected to sewerage systems with subsequently biological treatment by 2000  
- Continue to guarantee the use of Rhine water for drinking water supply  
- Return of higher aquatic species which were previously present, such as the salmon, by 2000 – the "Salmon 2000" project  |  
- 50% reduction for phosphorus achieved 3 years early  
- Levels of heavy metals decreased dramatically 1985-1996, most by more than 50%  
- Only 20-30% reduction of nitrogen expected by 2000 (by 1996, anthropogenic inputs of nitrogen had only decreased by 26%)  
- Diffuse inputs, particularly of nitrogen very difficult to achieve, resulting in failure to meet 50% reduction target  
- For half the other substances, point source discharges reduced by as much as 80-100% by 1992  
- Cost expected to be >DM 25 billion, and will reduce loads to North Sea  
- Progress being made but still a lot to be done

Elbe Action Programmes  
- First action programme 1992 to 1995 aimed at: substantially reducing loads from the Elbe catchment to the North Sea; achievement of near-natural aquatic ecosystem; and to make river suitable for sophisticated uses  
- Long-term action programme for 1996 onwards aimed at further reduction of pollution in Elbe  
- Reduction of harmful discharges into the River Elbe and its tributaries  
- Czech Republic water quality monitoring programme to be completed by 1994, mitigation measures recommended from the study to be implemented over the next 20 years  |  
- Marked improvement in Elbe water quality and decrease in loads to North Sea  
- Levels of heavy metals decreased dramatically 1985-1996, most by more than 50%  
- Particularly successful decrease in levels of heavy metals from German sources, due to limiting of industry to certain areas
Objectives

Helsinki Convention (HELCOM) - Baltic Sea Joint Comprehensive Environmental Action Programme (1993 to 2012)

- Identification of all major point sources of pollution (hot spots)
- Undertake remedial (preventive and curative) actions at hotspots
- Reduction of nitrogen inputs from municipal wastewater treatment plants, diffuse sources (agriculture and transport) and shipping (alone accounts for 12-20% of nitrogen deposition)

Actions achieved

- 132 hotspots initially identified, 47 of which were given priority status for action: 66% in the transition countries
- Of the 132 hotspots, 25 have been cleaned up since 1992
- Progress not evenly distributed: well underway in Scandinavian countries, Finland and Germany, and also strong support in Baltic states and Poland
- Actions at hotspots are anticipated to decrease loads by about 40% for phosphorus and 30% for nitrogen during the period 1991-2000
- Decreases in phosphorus (due to point sources e.g. wastewater treatment) have been more successful than nitrogen reductions, because the latter originates mainly from diffuse sources, such as agriculture
- However, in recent years nutrient inputs from rivers have levelled out; between 1994-1998 there was no decrease in these levels
- Annual atmospheric nitrogen deposition into the Baltic Sea decreased by almost 40% 1985-1997

Helsinki Convention Ministerial Declaration 1988

- 50% reduction of the total load of nutrients, heavy metals and toxic, persistent and bio-accumulating organic compounds to the Baltic Sea by the year 1995
- Continuous reduction of discharges, emissions and losses of hazardous substances, to be phased out completely by 2020
- Unknown sources of hazardous substances must be investigated
- Ultimate aim: achievement of near-background concentrations of naturally occurring substances and near-zero levels of man-made synthetic substances
- Integrated Coastal Zone Management Systems (ICZMS) to be developed to protect the marine environment, conserve natural resources and ensure sustainable development

Actions achieved

- Although some countries have met the target, the overall 50% reduction will not be realised until the year 2020
- In some Central and Eastern European countries the decrease in nutrient loading has been reached mainly due to decreased use of fertilisers and decreased agricultural production caused by structural changes and economic difficulties. Economic recovery might again lead to an increase in the agricultural runoff
- Concentrations of many hazardous substances have decreased, especially DDT, mercury and lead
- Levels of toxic PCBs and dioxins remain high in the food chain
- Most heavy metal concentrations have been declining, except Cadmium in Baltic herring (for unknown reasons)
### Objectives
- Baltic Sea coastal states, particularly Accession countries should be supported in implementing the EU Water Framework Directive
- New funding mechanisms, public-private partnership, and other organisational capabilities must be developed to ensure the efficient implementation of HELCOM decisions in coastal states

### Actions achieved
- By 1995 Esbjerg Ministerial Conference significant progress made in achieving target for most hazardous substances
- Many Member States expected to achieve target in 1995.
- By 1995 evidence that 3 of the 16 identified groups of pesticides had been phased out of use in Member States
- Inputs of heavy metals have generally decreased due to reduction of discharges, emissions and losses
- According to recent studies, copper and booster biocides might be present in some areas of the marine environment at levels capable of causing an adverse impact on biota
- TBT levels have decreased greatly between 1989-1999 where effective regulations were introduced, resulting in some biological recovery
- PCBs concentrations in marine biota have decreased considerably in many locations, but the rate of reduction decreased in the 1990s and concentrations now seem to have levelled out
- In general there is a reduction in the use of OSPAR priority chemicals
- Oil discharges from refineries have been reduced by over 90% between 1981-1997, as a result of measures introduced in 1989

### Oslo and Paris Commission (OSPAR) – North Sea Ministerial Conferences, Hague Conference 1990
- Reduce inputs of most dangerous substances (dioxins, cadmium, mercury and lead) by 70% by 1995
- Reduce inputs of 36 priority substances by 50% by 1995
- Phase out use of certain groups of pesticides
- Reduce inputs of nitrogen and phosphorus into areas likely to cause pollution by around 50% by 1995

### OSPAR Convention 1992
- Prevention and elimination of pollution of the maritime area of the Convention
- Ensure that ecosystems of the maritime area are in a sustainable, sound and healthy condition
- Protection of human health
<table>
<thead>
<tr>
<th>Objectives</th>
<th>Actions achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Protection and conservation of ecosystems and biological diversity</td>
<td>A process for reducing anthropogenic emissions, discharges and losses of radioactive substances (including technetium) has started, so radioactivity levels associated with routine discharges are expected to continue to decline</td>
</tr>
<tr>
<td>2. Hazardous substances - reduction of discharges, emissions and losses of</td>
<td>In 1997, 90% of offshore oil installations met the target standard for oil of 40 mg l⁻¹ in water produced/discharged</td>
</tr>
<tr>
<td>radioactive substances. Ultimate aim: achievement of near-background levels for naturally occurring substances and close to 0 for man-made synthetic substances</td>
<td></td>
</tr>
<tr>
<td>3. Radioactive substances – progressive reductions of discharges, emissions and losses of radioactive substances. Ultimate aim: achievement of near-background levels for naturally occurring radioactive substances and close to 0 for artificial radioactive substances</td>
<td></td>
</tr>
<tr>
<td>4. Eutrophication – combat eutrophication. Achieve and maintain a healthy marine environment free from eutrophication</td>
<td></td>
</tr>
<tr>
<td>5. Environmental goals and management mechanisms for offshore activities –</td>
<td>Failure to meet reduction target for N inputs mainly due to losses from agriculture proving more difficult to control than anticipated and measures adopted were inadequate or inadequately implemented</td>
</tr>
<tr>
<td>prevent and eliminate pollution and use mitigation measures to protect the maritime area against the adverse effects of offshore activities. The overall aim is to safeguard human health and conserve marine ecosystems, and where possible, restore marine areas that have been adversely affected</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Collection and treatment of urban and industrial wastewater has reduced inputs of nitrogen by 30% and phosphorus by 20% between 1990-1996. (However, fluctuations in river flow prevented this from being reflected in reductions in riverine or atmospheric inputs to the North Sea)</td>
</tr>
<tr>
<td></td>
<td>Nutrient levels have decreased significantly between 1989-1997 in Danish coastal waters, the Wadden Sea and German Bight.</td>
</tr>
<tr>
<td></td>
<td>Reducing inputs of pollution from agriculture has decreased by over 60% between 1995-1997</td>
</tr>
<tr>
<td></td>
<td>Nitrogen inputs were only reduced by approximately 25% between 1985-1995</td>
</tr>
<tr>
<td></td>
<td>Diffuse sources e.g. agricultural use of fertilisers and slurry require targeting</td>
</tr>
<tr>
<td></td>
<td>Nutrient levels have decreased significantly between 1989-1997 in Danish coastal waters, the Wadden Sea and German Bight.</td>
</tr>
<tr>
<td></td>
<td>Reductions in Danish waters are due to a decrease in loads from sewage, industry and detergents</td>
</tr>
<tr>
<td></td>
<td>Bathing water quality has improved greatly since monitoring work started.</td>
</tr>
</tbody>
</table>
Arctic Monitoring and Assessment Programme

- To reduce and ultimately eliminate airborne and seaborne pollution such as that from heavy metals, greenhouse gases, PCBs, DDT and chlorinated hydrocarbons

A State of the Arctic Environment report was published in 1997, some of the trends noted follow:

- Over the last 10-20 years, mercury levels seem to have increased in lake and ocean sediments, and in the livers and kidneys of some marine mammals. This could indicate an increase in the global flux of mercury, but in some areas could be due to local geology, and gradients in sediment levels could be due to natural processes. Also, there is only limited information about the natural variation of mercury in biota

- Cadmium levels are high in marine birds and mammals in certain areas, again possibly due to local geology

- Lead levels have been decreasing for 20 years

- PCB and DDT levels have decreased over the last 20-25 years (since the first restrictions on their use were introduced) according to long-term studies

- Hexachlorocyclohexane (HCH or lindane) decreased 9-fold in air, between 1979-1993, in the Bering and Chukchi Seas and several locations in the Canadian Arctic Archipelago

- Alpha-hexachlorocyclohexane levels appeared to decrease two-fold, but total lindane levels increased, from 1984-1992 in the European Arctic

- Persistent Organic Pollutants (POPs) including DDT, PCBs, dioxin-like substances, hexachlorocyclohexane, lindane, and hexachlorobenzene, seem to have decreased between 1967-1995 in Sweden (which could represent the sub Arctic) and in the Baltic Sea.

- Further evidence for decline in PCB levels comes from Finnish and Norwegian studies.

- However, PCB levels have not decreased as quickly as pesticide levels and remain of concern.