The Department of the Environment, Heritage and Local Government

DISCUSSION DOCUMENT - RATIONALE FOR DERIVING NATIONAL PRIORITY ACTION, CANDIDATE RELEVANT POLLUTANT AND CANDIDATE GENERAL COMPONENT SUBSTANCES LISTS FOR SURFACE WATERS

NATIONAL DANGEROUS SUBSTANCES EXPERT GROUP

Produced by National Dangerous Substances Expert Group

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Acknowledgements

A National Dangerous Substances Expert Group was established to assist with developing lists of priority action, candidate relevant pollutant and candidate general component substances for surface waters in Ireland and to design a substances screening monitoring programme as part of the implementation of the Water Framework Directive (WFD). The group first met in August 2003, and there have been seven subsequent meetings during the time of preparation of this discussion document: September, October and December 2003, January, February, March and early April 2004. In late April 2004 the group met for a final time to agree the final version of the discussion document.

The members of the expert group are as follows:

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Audit of Discussion Document

In April 2004, WRc (on behalf of ESBI who are the lead consultants for the Western RBD Project) undertook an independent audit of the approach to the development of the Irish Dangerous Substances lists and the design of the national screening monitoring programme as set out in this discussion document.

The auditors provided detailed comments and suggestions which were incorporated in the text and raised a small number of more substantial points which were further explored and resolved. In summary these issues and subsequent actions were:

- Further screening of the candidate lists would be desirable to reduce the number of pollutants to be addressed by the monitoring programme, however, comprehensive use of existing registers, monitoring programmes and expert knowledge has been made.

- The report: Transitional Provisions for Council Directive 76/464/EEC and related Directives to the WFD – Pollution Reduction Programmes in Europe – Updated Report on the Assessment of Programmes under Article 7 of the DSD (WRc 2003) identifies some additional substances of relevance in Member States. The relevant Irish bottom-up study undertaken by CTC has been included in the compilation of the lists.

- The approach of addressing future monitoring by a screening survey is robust, but potentially demanding. The survey needs defined performance requirements with regard to levels of detection and substance/matrix combinations. Specifically, consideration should be given to monitoring of major sewage effluent discharges. This would address diffuse sources that are related to product use as well as urban run-off and light industry and provide an indication of significant presence/absence that could be assessed before dilution in the receiving water. The details of the programme were discussed and monitoring at a treatment plant was included as an element of the screening programme.

- Comments acknowledging the advantages and disadvantages of monitoring in various media (water/sediment/biota) were incorporated in the document.

The overall findings of the audit were as follows:

- The discussion document provides a comprehensive description of a rationale for the selection of pollutants to be monitored under current and future legislation.

- The document is consistent with current recommendations issued by the Common Implementation Strategy working group (IMPRESS), relating to the identification of pressures and assessment of impacts within the characterisation of water bodies according to Article 5 of the Water Framework Directive.

- All relevant principal drivers for the selection of relevant pollutants have been addressed.

Names of Correspondents: **Tom Zabel, Mike Gardner.**

Preface

This document has been prepared in support of the implementation of Directive 2000/60/EC establishing a Framework for Community Action in the Field of Water Policy (the Water Framework Directive - WFD).

The objectives of the WFD are to:

- Achieve good ecological status and chemical status in surface waters;
- Achieve good chemical status and quantitative status in groundwaters;
- Achieve good ecological potential and chemical status in artificial and heavily modified water bodies;
- Prevent deterioration in status of surface and groundwaters;
- Reverse pollution trends;
- Achieve objectives and standards for protected areas; and
- Cease Priority Hazardous Substances discharges.

Consideration of chemical substances in surface water bodies directly addresses several of these objectives, in particular, those related to achieving good status or potential, prevention of deterioration of status, reversal of pollution trends and cessation of discharge of priority hazardous substances.

The approach proposed for identification of dangerous substances in Irish surface waters is in accordance with guidance issued by the Common Implementation Strategy working group named IMPRESS, which was dedicated to the identification of pressures and assessment of impacts within the characterisation of water bodies according to Article 5 of the WFD.

IMPRESS 2002 state that: *"Pressures and impacts analyses have a central role in the river basin management planning process. Their principal aim is to identify where and to what extent human activities may be placing the achievement of the Directive's environmental objectives at risk.*

Article 5 of the Water Framework Directive requires, among other things, a review of the impact of human activity on the status of surface waters and groundwater. The review must be undertaken in accordance with Annex II 1.4 – 2.5, and will require Member States to assess the likelihood that water bodies in their river basin districts will fail to meet the Directive's environmental objectives. In undertaking this analysis, Member States must use information collected on the type and magnitude of pressures to which water bodies are liable to be subject and on the characteristics of those water bodies, together with any other relevant information, including existing environmental monitoring data.

The results of the analyses will be used in:

- *Targeting the monitoring programmes required under Article 8, so that they provide suitable information for validating the analyses and assessing the effectiveness of the programmes of measures;*
- *Setting objectives. The analyses will help identify water bodies for which the application of heavily modified water body designations under Article 4.3, extensions to the timetable under Article 4.4, less stringent objectives under Article 4.5 or exceptions from the obligation to prevent deterioration in status under Articles 4.6 and 4.7 may be appropriate; and*
- *Designing targeted and proportionate measures to achieve the Directive's objectives, in accordance with Article 11;"*

This document presents the approach used to determine the lists of priority action, candidate relevant pollutant and candidate general component substances in Ireland and sets out the proposal to undertake a substances screening monitoring programme to refine the candidate lists.

This document has been prepared to ensure that the selection process adopted is transparent.

The discussion document should be viewed as a consultative report which presents the rationale behind the development of the lists of substances and the approach to be taken to establish a substances screening monitoring programme to refine the lists by addressing information gaps. Submissions regarding the list content and the monitoring programme proposals are welcome and a response form has been included to encourage and facilitate comment.

The document does not propose to set statutory environmental quality objectives for substances: that task awaits the outcome of various European research projects and the analyses of datasets that would be generated by the proposed Irish Substances Screening Monitoring Programme.

The current lists of substances should be treated as evolving lists which will be subjected to periodic review to permit developments such as changes in human practices or the findings of new research which might identify additional substances of concern to be considered for inclusion on future lists.

Abbreviations

CIS	-	Common Implementation Strategy
COMMPS	-	Combined Monitoring-based and Modelling-based Priority Setting Scheme
CTC	-	Clean Technology Centre
DSD	-	Dangerous Substances Directive (76/464/EEC)
DYNAMEC	-	Dynamic Mechanism for Selection and Prioritisation of Hazardous Substances
EPER	-	European Pollutant Emission Register
EQS	-	Environmental Quality Standards
ELV	-	Emission Limit Value
EQualS	-	Database published by the National Centre for Environmental Toxicology, UK
ESBI	-	Electricity Supply Board International
IMPRESS	-	Impact and Pressures Common Implementation Strategy Working Group
IPC	-	Integrated Pollution Control
LC50	-	Lethal Concentration, 50^{th} percentile value
LOD	-	Limit of Detection
LOQ	-	Limit of Quantitation
MPC	-	Maximum Permissible Concentrations
NACE	-	Classification of Economic Activities in European Community
NDP	-	National Development Plan
NOEC	-	No Observed Effects Concentration
OSPAR	-	Oslo Paris Convention
PNEC	-	Predicted No Effects Concentration
UNEP POPS	-	United Nations Environmental Programme - Persistent Organic Pollutants
US-EPA	-	United States - Environmental Protection Agency
WFD	-	Water Framework Directive
WRc	-	Water Research Centre
WRc-NSF	-	Water Research Centre and National Sanitation Foundation
WWTP	-	Waste Water Treatment Plant

Glossary

Carrying capacity - Carrying capacity is the ability of eco-systems/the earth to bear environmental load without significant damage occurring.

Coastal Water - Surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side.

Critical load - The threshold carrying capacity above which significant damage occurs in ecosystems.

Dangerous Substances Directive (76/464/EEC) List I substances - lists of substances selected mainly on the basis of their toxicity, persistence and bioaccumulation.

Dangerous Substances Directive (76/464/EEC) List II substances - Substances which have "*deleterious effect upon the aquatic environment*".

DYNAMEC - Dynamic Mechanism for Selection and Prioritisation of Hazardous Substances Committee established by OSPAR for the identification of substances discharged to marine waters requiring cessation of discharge emissions and losses under the OSPAR Hazardous Substances Strategy.

Endocrine Disruptor - An endocrine disruptor is an exogenous substance that causes adverse health effects in an intact organism, or its progeny, consequent to endocrine function.

Environmental (Quality) Objectives - means the objectives set out in Article 4 of the WFD.

Environmental Quality Standards - means the concentration of a particular pollutant or group of pollutants in water, sediment or biota which should not be exceeded in order to protect human health and the environment.

European Pollutant Emission Register - The EPER is based on the Commission Decision of 17 July 2000 (2000/479/EC) on the implementation of a European Pollutant Emission Register (EPER) according to Article 15 of Council Directive 96/61/EC concerning Integrated Pollution Prevention and Control (IPPC). Article 15(3) of IPPC. This Directive requires Member States to compile an inventory and to supply data on principal emissions and responsible sources. The Commission will publish the results of the inventory every three years and shall establish the formats and particulars for the transmission of information provided by the Member States.

Hazardous Substances - Substances or groups of substances that are toxic, persistent and liable to bio-accumulate, and other substances or groups of substances which give rise to an equivalent level of concern.

Non-Synthetic Pollutants - Non-synthetic substances are naturally occurring substances identified as being discharged into the body of water and having a polluting effect.

Priority Action Substances - This is a term applied by the Expert group to the following substances: Annex X (WFD) + Annex IX (WFD - relating to the Dangerous Substance 76/464/EEC Daughter Directives).

Priority Substances - Substances identified in accordance with WFD Article 16(2) and listed in Annex X. Among these substances there are 'priority hazardous substances' which means substances identified in accordance with WFD Article 16(3) and (6) for which measures have to be taken in accordance with Article 16(1) and (8). (Article 2(30)).

Relevant Pollutants - Specific synthetic and non synthetic substances (not on priority action list) whose presence may lead to a "risk of failing the objectives" of the WFD.

LC50 - Lethal concentration for 50% of the individuals in a toxicity test

LOD - The limit of detection is commonly accepted as the smallest amount or concentration of a particular substance that can be reliably distinguished from zero in a given type of sample or medium by a specific measurement process.

LOQ - The limit of quantitation is the lowest concentration at which the determinand can be confidently quantified.

Synthetic Pollutants - Synthetic substances are man-made, substances (intentionally and unintentionally) identified as being released into the body of water.

Transitional Waters - Bodies of water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows.

Water Body - "Body of surface water means a discrete and significant element of surface water such as lake, reservoir, a stream, river or canal, part of stream, river or canal, a transitional water or a stretch of coastal water" (WFD(Article 2(10)

1.0 Introduction

1.1 Background

A key objective of the Water Framework Directive (WFD) is that all waters achieve good status by 2015.

Good status requires both good chemical status and good ecological status.

Chemical status is determined by reference to existing Environmental Quality Standards (EQS) for substances identified in Annex IX, and by EQS values which are currently being determined for the priority substances listed in Annex X. These groups of substances are collectively referred to as "Priority Action Substances" in this report. Annex X was established by Decision No 2455/2001/EC in November 2001 and lists 33 priority substances or groups of substances for which measures have to be developed for their progressive reduction. Eleven of the priority substances are listed as priority hazardous substances and a further 14 of the priority substances are under review as possible priority hazardous substances. The WFD states that measures for priority hazardous substances are to be aimed at the cessation or phasing-out of discharges, emissions and losses.

Ecological status determination requires assessment of three groups of elements (Figure 1):

1) Biological quality elements e.g. flora, fish, phytoplankton and fauna;
2) Chemical and physico-chemical elements supporting the biological elements e.g. thermal, oxygenation & nutrient conditions and chemical pollutants extracted from the universe of substances listed in Annex VIII; and
3) Hydromorphological elements supporting the biological elements e.g. flow regime, morphology.

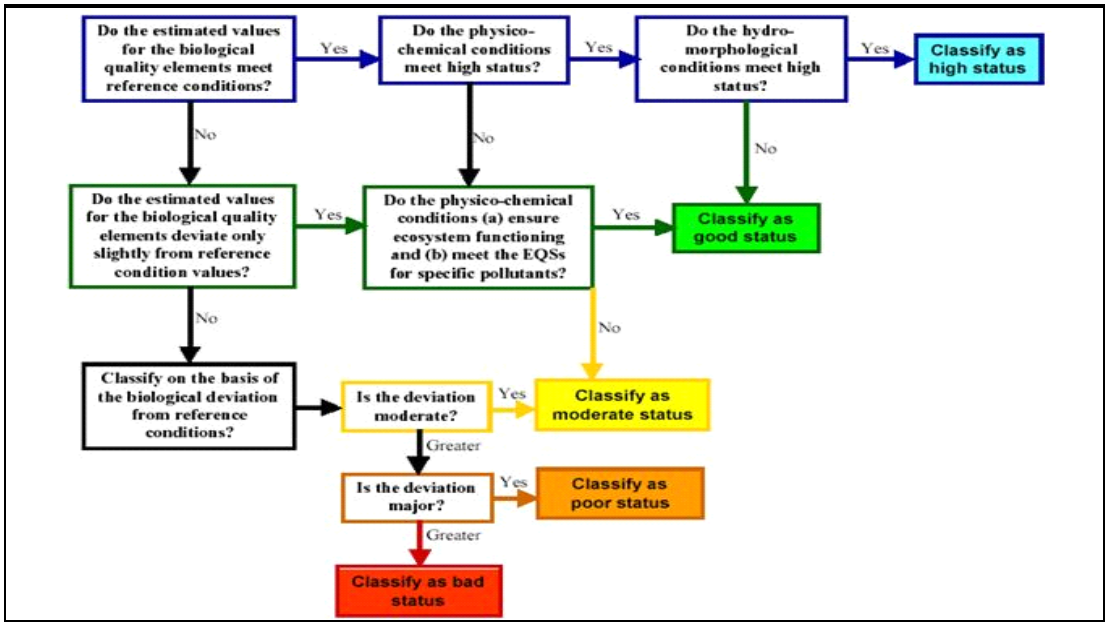

Figure 1 Ecological Status Schematic – CIS Monitoring Guidance

Chemical substances, therefore, play a part in the determination of both chemical status and ecological status.

Figure 2 illustrates the classification elements to determine river status. Whilst the specific synthetic and non-synthetic priority action substances, have been agreed at European level (Annexes X and IX), the WFD requires Member States to identify, other specific synthetic and non-synthetic substances which are present at sufficient levels to impact or cause a risk to water status. These "other" substances are referred to as "relevant pollutants" and are to be selected from Annex VIII of the WFD, which effectively lists the "universe of chemicals". The identified substances can be relevant at national, river basin or sub-basin level.

Both the priority action substances and the relevant pollutants will be either:

- synthetic (in which case high status requires that concentrations are close to zero and below the level of analytical detection) or
- non-synthetic (in which case high status requires that concentrations remain within the range of naturally occurring background levels).

Good status for synthetic and non-synthetic pollutants requires compliance with environmental quality standards set according to Annex V section 1.2.6 of the WFD.

In addition to the priority action substances and relevant pollutants, the chemical and physico-chemical elements supporting ecological status also include "general components" for each type of water body which are identified in Annex V of the WFD. General components relate to materials in suspension, substances which contribute to eutrophication (in particular, nitrates and phosphates) and substances which have an unfavourable influence on the oxygen balance (and can be measured using parameters such as BOD, COD, etc.) as well as physical parameters such as temperature, oxygen and salinity conditions.

This report deals with the following three groups of substances: priority action substances, relevant pollutants and general components.

The WFD is an umbrella directive incorporating the requirements of some other earlier pieces of European legislation. The earlier directives and Council decisions which are to be repealed following the entry into force of the WFD are identified and transitional provisions are set out. For instance WFD Article 22 (2), states that the Dangerous Substances Directive (DSD) 76/464/EEC and its daughter directives, will be repealed by 2013.

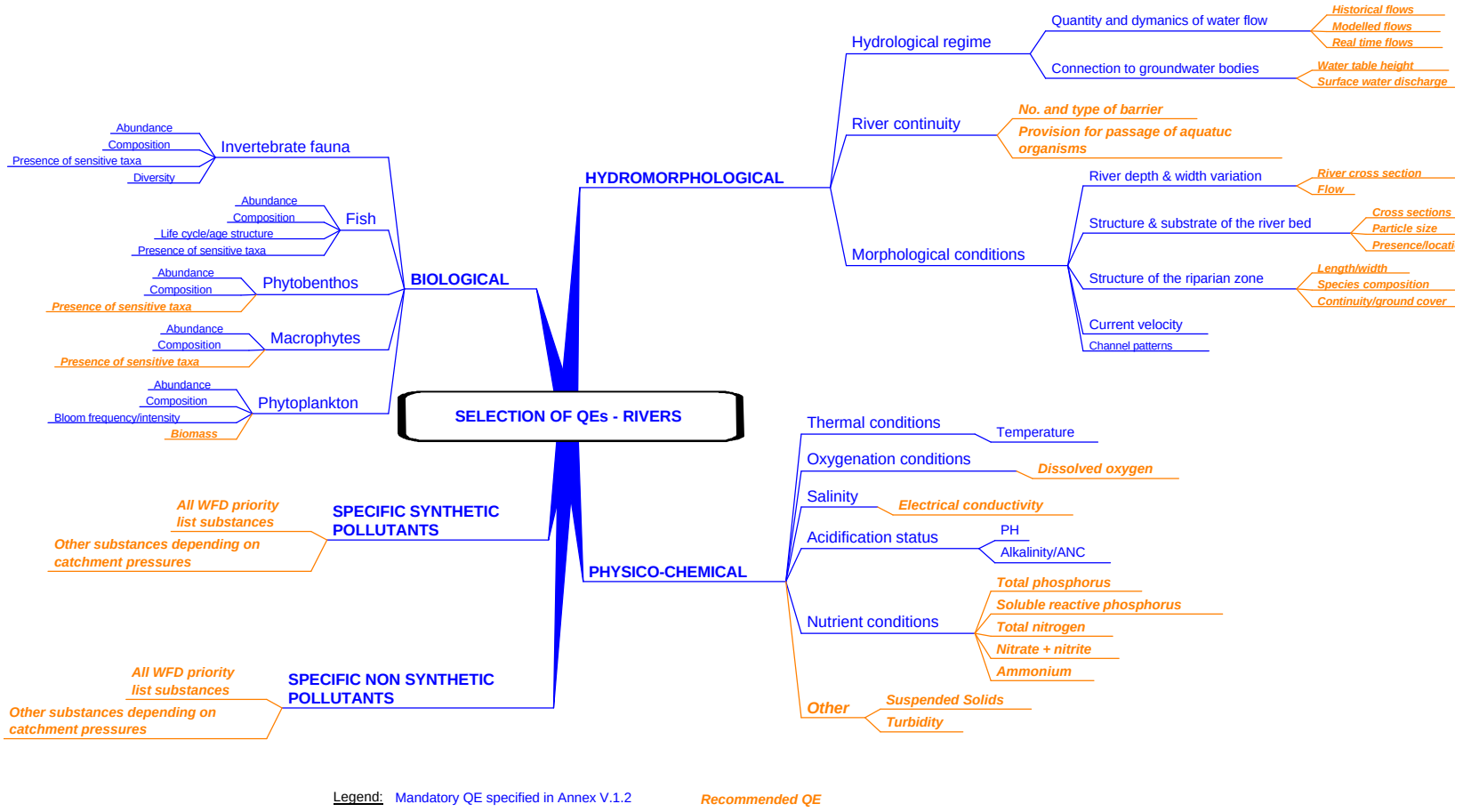

Figure 2 River Classification Elements – CIS Monitoring Guidance

During the 13 year transition period (2000-2013), Member States are required to continue to comply with both the WFD and the DSD requirements.

However, specifically "*for the purposes of Article 7 of the DSD Member States can 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 this* (the WFD) *Directive."* This means that the approach to implementing the WFD and DSD are compatible and consistent and to avoid duplication of effort member states are encouraged to apply the provisions of the WFD to also achieve compliance with the DSD.

The DSD was the first piece of EU legislation to control discharges to water. The DSD aims to eliminate or reduce pollution of Community waters by certain dangerous substances listed in the directive. Dangerous substances are judged on the basis of their toxicity, persistence and bio-accumulation properties. For the substances listed in the DSD Member States must set emission standards in the discharge permits, establish a system of prior authorisation and implement programmes to prevent or reduce pollution. Selected substances (List I) are regulated further by "daughter directives" which establish emission limit values and water quality objectives at community level. List II comprises other substances with deleterious effects on the aquatic environment which either, belong to the families and groups on List I for which Community-wide controls have not been adopted, or are less dangerous and can be confined to a given area and which depend on the characteristics and location of the water into which they are discharged.

After the DSD is repealed, the WFD priority substances will replace the List I substances prioritised by the DSD. The relevant pollutant/general component substances identified under the WFD will replace the DSD List II substances.

To satisfy the WFD and DSD requirements detailed above, the objective of the expert group was to establish lists of dangerous substances (separated into priority action substances, candidate relevant pollutants and candidate general components) and to design a screening monitoring programme for these substances to verify the list.

1.2 Dangerous Substances in Ireland

Whilst Ireland largely enjoys cleaner waters than much of the rest of Europe, due, at least in part, to its less industrialised history, the usage of chemicals throughout all sectors of society has become increasingly widespread during the past century.

Examples of potential sources of substances include everyday household products, which contain substances that could, if present at sufficient levels, potentially adversely impact on water quality. Commercial activities such as construction, agriculture, forestry, mining, pharmaceutical, food

processing and manufacturing processes also use potentially dangerous substances. Substances are also produced and emitted as the by-product of other processes, for example emissions from vehicle combustion engines can contaminate runoff from transportation routes. Similarly, inappropriate disposal of materials presents a risk of contamination of surface waters and/or groundwaters.

A trial audit of Industrial Pollution Control (IPC) licensed industries in the South Eastern and Shannon River Basin Districts was undertaken to investigate the extent of usage of priority action substances, relevant pollutants and general components by major industries. This audit involved a desk top study of a sample of licensed sites selected to represent the range of industrial activities which occurred in either district. The industries were categorised using the NACE code scheme which is a classification of economic activities in the European Community. All IPC licensed industries in both river basin districts were examined and given an individual NACE code depending on their type of activity. The licence of at least one industry from each NACE category was examined to establish the type of substances which could potentially be discharged or lost from the various industry categories. The study determined that the sample of 58 industries from the South-Eastern and Shannon River Basin Districts used 16 priority substances listed in Annex X of the WFD. Several substances, or members of families of substances, which might be further considered as relevant pollutant or general component substances, are also in widespread use within the districts.

Based on the findings of the audit of industries, supported by review of literature and discussions with stake-holder groups regarding the extent of usage of dangerous substances, it is evident that many substances which could be potentially harmful to water status, are in use in Ireland at present. Consequently further assessment was undertaken into the current position regarding dangerous substances standards, monitoring programmes and status in Ireland.

The EPA Interim Report - Towards Setting Guideline Values for the Protection of Groundwater in Ireland states that *"in contrast to many other western countries, Ireland does not have a legacy of widespread industrial contamination of soil and groundwater or large areas of intensive arable agriculture……Quality standards for many important uses of water have been prescribed in EU legislation and implemented by Irish regulations. Effluent or emission standards which relate to particular discharges from point sources have, likewise, been prescribed for some of the more environmentally dangerous substances (Scannell, 1995). Most of the water quality standards as prescribed in the various EU water quality directives have been implemented into Irish Law. These relate primarily to directives for the protection of surface water. "*

Environmental quality standards have been set for Irish waters by the Minister for the Environment, Heritage and Local Government to transpose the List I dangerous substances daughter directives through the following instruments:

- S.I. No. 294 of 1985,
- S.I. No. 55 of 1986,
- S.I. No. 348 of 1993,

- S.I. No. 43 of 1994,
- S.I. No. 245 of 1994.

More recently environmental quality standards have been set for List II dangerous substances including phosphorus (S.I. No. 258 of 1998) and 14 other dangerous substances (S.I. No. 12 of 2001). The standards established by this legislation are summarised in Appendix A.

In Ireland, several monitoring programmes pertaining to dangerous substances are being implemented under various pieces of legislation.

These programmes include, amongst others:

- ongoing national surveys of inland surface waters conducted by EPA which deal with 80 different metals, pesticides and volatile organic substances;
- dangerous substances screening programmes conducted for the development of catchment specific monitoring and management systems;
- auditing and development of monitoring programmes by Local Authorities under the Phosphorus Regulations and Dangerous Substances Regulations;
- European Pollution Emission Registers (EPER) industry self-monitoring programmes;
- OSPAR convention quality monitoring programmes to assess riverine inputs to the marine environment, conducted by EPA;
- OSPAR convention Co-ordinated Environmental Monitoring Programme (CEMP) for hazardous substances entailing marine tissue and sediment analysis, conducted by the Marine Institute. This programme is designed to detect spatial and temporal trends and biological effects (TBT) of contaminants. In some instances a broader range of parameters than required by CEMP is tested for;
- water quality in shellfish waters, trace metal and chlorinated hydrocarbons analysis is carried out by the Marine Institute in part fulfilment of the monitoring requirements of various EU legislation, including: 79/923/EEC - Quality required of shellfish growing waters and 91/492/EEC - Health conditions for the production and placing on the market of live bivalve molluscs. Monitoring of shellfish tissue is undertaken annually at approximately 24 locations in Ireland for metals, PCB's and Organochlorine Pesticides (OCP's)
- a survey of Toxaphene was carried out by the Marine Institute for 55 samples taken from 18 different marine species, as part of the EU funded MATT project;
- annual fish sampling programmes at 5 major ports for metals, PCB's and Organochlorine Pesticides (OCP's);
- the Department of Agriculture and Food initiated a cycle of pesticide usage surveys, commencing with a survey of pesticide usage on grassland and forage crops in early 2004. More accurate information on environmental loadings of pesticides will be available in the near future;

- site-specific sampling programmes in relation to water supply schemes, waste management systems, food safety programmes and the preparation of environmental impact statements;
- sediment testing as a prerequisite for granting dumping at sea permits for dredge sediments;
- various research projects including those under the ERTDI programme; and
- various investigative surveys.

These programmes have been introduced to address the requirements of legislation other than the WFD. Furthermore the implementation of the WFD requires co-ordinated consideration of a wider range of pollutants than are currently being addressed by existing programmes, for example many of the chemicals considered are diffuse use substances rather than those associated with regulated point discharges. In addition, in some cases, the programmes commenced relatively recently and the results of the programmes have not yet been fully assessed. Whilst definitive conclusions on chemical water quality status, therefore, cannot be drawn, assessment of the output of existing programmes (presented in Appendix B) indicates that Irish waters do not experience widespread and persistent chemical pollution.

1.3 The Approach Adopted to Identify National Dangerous Substances Lists in Ireland

There are two alternative approaches (top-down and bottom-up) for deriving dangerous substances lists. The report entitled "Guidance for the Preparation of Pollution Reduction Programmes, in particular the Selection of Relevant Pollutants" (WRc Ref: UC6201 4th draft April 2003), explains that *"The top-down approach starts with the human activities (i.e. pressures) in the river basin by identifying potential pollutants, which may be discharged from point and diffuse sources. In contrast the bottom up approach, starts with identifying those river basins where good ecological quality is not achieved or where the ecological quality is deteriorating (i.e. impact), which is followed by identifying the reasons for the failure. This can be caused by known or unknown pollutants or by other impacts (e.g. morphology, hydrology, river continuity). Once the potential pollutants have been identified either by analysing the human activities and/or by investigative monitoring the assessment of the relevance of the pollutants under the two methods is the same. Thus the two approaches can be considered as complementary with a number of elements of the two approaches being the same"*.

The expert group considered all dangerous substances with a view to simultaneously developing three prioritised and separate lists for priority action, candidate relevant pollutant and candidate general component substances. The substances on the priority action list are defined at European level, their consideration is not discretionary and the substances have not been screened. It is necessary to know which substances are on the priority action list to avoid duplication on the candidate relevant pollutant and candidate general components lists. This approach facilitates the implementation of both the WFD and the transitional requirements with regard to the DSD.

The CIS IMPRESS guidance (Figure 3) outlines a generic approach to identifying a candidate list of relevant pollutants which accommodates top-down and bottom-up selection procedures. The approach taken by the National Dangerous Substances Expert Group is in accordance with the IMPRESS guidance.

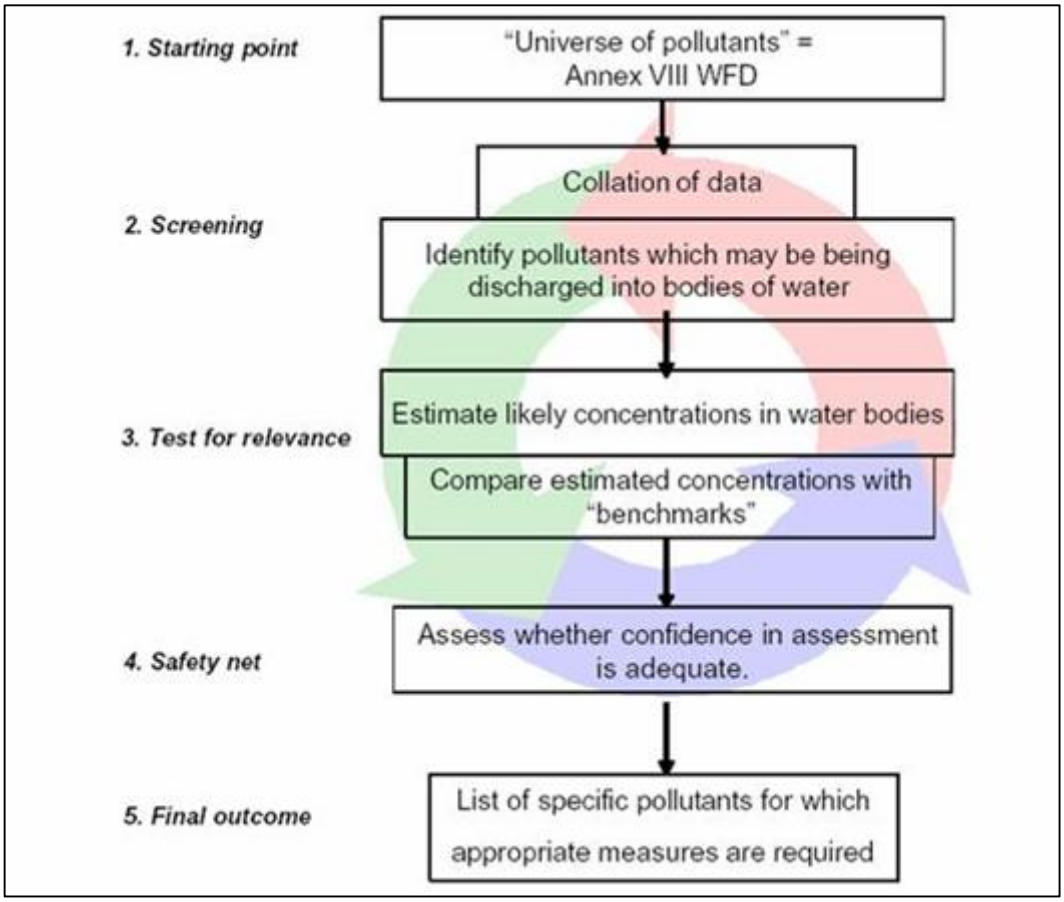

Figure 3 Generic Relevant Substance Selection Process – CIS IMPRESS Guidance

Step 1 – Starting Point

The starting point of the relevant pollutant selection process entails examination of the list of main pollutants as set out in Annex VIII of the WFD. The list can be considered as equivalent to the "universe of chemicals" and, hence, no chemical substance or pollutant can be excluded from the beginning. Annex VIII also identifies general component elements which are considered separately.

Step 2 – Screening

The screening step involves collating information about known pollution sources and impacts, and on the production and usage of substances to identify a working list of substances which are discharged to water bodies. The data collation process involves investigating sources of information such as chemical registers, existing water quality datasets and information from existing obligations such as the DSD, UNEP POPs list, EPER and COMMPS programmes. The datasets are then assessed with a view to excluding substances from the working list for which there is adequate confidence that they are not being discharged into water bodies.

The expert group reviewed the datasets to screen the substances based on the output from existing registers and monitoring programmes in Ireland. The following rationale was applied:

- Substances which had been included in previous monitoring programmes and found to be consistently not detected at significant levels were dismissed from the candidate list.
- Substances which had been prohibited from distribution and use for over 10 years were also excluded from the candidate list.
- Alternatively where there was no information from monitoring programmes, or no ban on or lack of authorisation for the substance, a precautionary principle approach was adopted and substances remained on the candidate list.

The data collection and screening process considered substances prioritised under existing obligations and additional substances of potential relevance due to knowledge of usage or the findings of existing monitoring programmes. The step 2 process is detailed in Section 2 of this report.

Step 3 – Test for Relevance

This step aims to select from the candidate list of substances those which are likely to cause, or are already causing, harm to the environment. Selection should ideally be based on an assessment of the environmental significance of concentrations necessitating obtaining data on concentrations in the environment and comparing these with suitable benchmarks. Concentration data can be obtained by monitoring or modelling approaches. Relevant substance benchmarks identified include LC50, NOEC, PNEC, EQS or critical load. EQS's are intended to reflect the good status condition of a water body. IMPRESS notes that EQS's have not been derived for all potential relevant pollutants.

Section 3 of this report details proposals for a screening monitoring programme for substances to be conducted in Ireland to refine the candidate list. The approach taken to adopt interim benchmark values for the national screening programme is described.

Step 4 – Safety Net

This entails an iterative review of the list to ensure that substances that may be environmentally significant are not incorrectly excluded from the candidate list of relevant pollutants.

Step 5 – Final Outcome

The process produces a candidate list of pollutants relevant at national level for subsequent investigation at river basin district level.

2.0 Establishing National Priority Action, Candidate Relevant Pollutant & Candidate General Component Substances Lists

The National Dangerous Substances Expert Group compiled three prioritised and separate lists of substances:

- priority action;
- candidate relevant pollutant;
- candidate general component;

for surface waters in Ireland using the approach detailed in the IMPRESS guidance.

2.1 Priority Action Substances

Priority action substances are defined for the purposes of this report as those substances for which legislative instruments have been or are to be laid down at the Community level i.e. substances listed in Annex IX and Annex X of the WFD.

The priority substances, including Priority Hazardous Substances, listed in Annex X of the WFD comprise a list of substances identified by a COMMPS procedure (Combined monitoring-based and modelling-based priority setting). In the application of the COMMPS procedure, monitoring data from fresh surface waters and sediments from Member States were evaluated. In addition for more than 310 substances, data available on production, use and distribution in the environment and their toxic effects were used for the modelling approach for those substances for which the available monitoring data were insufficient. The COMMPS procedure identified 33 priority substances. EQS values for Annex X substances are currently being developed on behalf of the European Commission. It is anticipated that the Commission will bring forward standards for these substance in the latter part of 2004.

The other substances for which legislative instruments have been put in place at European level are the DSD List I substances. Daughter Directives as listed in Annex IX establish EQSs for 18 substances. Ten of these substances are also listed in Annex X of the WFD, leaving 8 remaining daughter directive substances which must be considered under the transitional arrangements of the WFD.

The substances listed in Annexes IX and X have been identified at European level and there is no discretion regarding their consideration under the WFD. Consequently 41 substances are to be included on the priority action substances list (Table 1).

Table 1 - Priority Action Substances List

Number	Substance	CAS No.	Source List
1	Alachlor	15972-60-8	WFD Annex X
2	Anthracene	120-12-7	WFD Annex X
3	Atrazine	1912-24-9	WFD Annex X
4	Benzene	71-43-2	WFD Annex X
5	Brominated diphenylethers	n.a.	WFD Annex X
	Bis(pentabromo-phenyl)ether	1163-19-5	WFD Annex X
	Diphenyl ether, octabromo deviate	323536-52-0	WFD Annex X
	Diphenyl ether, pentabromo derivate	32534-81-9	WFD Annex X
6	Cadmium and its compounds	7440-43-9	WFD Annex X
7	C10-13-Chloralkanes	85535-84-8	WFD Annex X
8	Chlorfenvinphos	470-90-6	WFD Annex X
9	Chlorpyrifos	2921-88-2	WFD Annex X
10	1,2-Dichloroethane	107-06-2	WFD Annex X
11	Dichloromethane	75-09-2	WFD Annex X
12	Di (2-ethylhexyl) phthalate (DEHP)	117-81-7	WFD Annex X
13	Diuron	330-54-1	WFD Annex X
14	Endosulfan	115-29-7	WFD Annex X
15	Fluoranthene	206-44-0	WFD Annex X
16	Hexachlorobenzene	118-74-1	WFD Annex X
17	Hexachlorobutadiene	87-68-3	WFD Annex X
18	Hexachlorocylohexane (Lindane)	608-73-1 58-89-9	WFD Annex X
19	Isoproturon	34123-59-6	WFD Annex X
20	Lead and its compounds	7439-92-1	WFD Annex X
21	Mercury and its compounds	7439-97-6	WFD Annex X
22	Naphthalene	91-20-3	WFD Annex X
23	Nickel and its compounds	7440-02-0	WFD Annex X
24	Nonylphenols	25154-52-3	WFD Annex X
	(4-(para)-nonylphenol) ,(4-nonylphenol,branched)	(104-40-5) (84852-15-3)	WFD Annex X
25	Octylphenols (para-tert-octylphenol)	1806-26-4 (140-66-9)	WFD Annex X
26	Pentachloro-benzene	608-93-5	WFD Annex X
27	Pentachlorophenol	87-86-5	WFD Annex X
28	Polyaromatic Hydrocarbon (PAH)	n.a	WFD Annex X
	(Benzo(a)pyrene)	(50-32-8)	WFD Annex X
	(Benzo(b)fluoranthene)	(205-99-2)	WFD Annex X
	(Benzo(g,h,i)perylene)	(191-24-2)	WFD Annex X
	(Benzo(k)fluoranthene)	(207-08-9)	WFD Annex X
	(Indeno(1,2,3-cd)pyrene)	(193-39-5)	WFD Annex X
29	Simazine	122-34-9	WFD Annex X
30	Tributyltin compounds (TBT-ion)	688-73-3 (36643-28-4)	WFD Annex X
31	Trichlorobenzene	12002-48-1	WFD Annex X
	(1,2,3-trichlorobenzene)	87-61-6	WFD Annex X
	(1,2,4-trichlorobenzene)	120-82-1	WFD Annex X
	(1,3,5-trichlorobenzene)	108-70-3	WFD Annex X
32	Trichloromethane (Chloroform)	67-66-3	WFD Annex X
33	Trifluarlin	1582-09-8	WFD Annex X
34	DDT		DSD List I
	4,4'-isomer	50-29-3	DSD List I
	2,4'-isomer	789-02-6	DSD List I
35	Aldrin	309-00-2	DSD List I
36	Endrin	60-57-1	DSD List I
37	Dieldrin	72-20-8	DSD List I
38	Isodrin	465-73-6	DSD List I
39	Carbon Tetrachloride	56-23-5	DSD List I
40	Trichloroethylene	79-01-6	DSD List I
41	Perchloroethylene	127-18-4	DSD List I

Note: Numbers are for reference and do not imply rank

2.2 Candidate Relevant Pollutant Substances

Annex VIII provides an indicative list of main pollutants representing the "universe of chemicals". potentially all substances not identified as priority action substances (Annex IX & Annex X of the WFD) need to be considered as candidate relevant pollutants or candidate general components.

In accordance with the IMPRESS guidance, assessment of existing obligations was undertaken to develop the candidate relevant substances list, commencing with the DSD's requirements.

DSD 76/464/EEC

Since all of the DSD List I parameters have been addressed on the priority action substances list, all DSD List II substances need to be considered for inclusion on the WFD candidate relevant pollutants list by each Member State. According to WRc report UC6201 (2003), clear justification would need to be given if any of these individual List II substances where considered not to be of national concern and therefore omitted from the list.

When the DSD entered into force in 1976, 25 individual substances were identified in the Annex to the DSD as List II substances.

In 1982 the Commission communicated to the Council (OJ C 176 of 14 July 1982, p. 3) a list that included 129 substances. Three more substances were subsequently added to that list. The eventual total of 132 substances was considered by the Commission as potential List I substances under the DSD. Of these 132 potential substances, 18 were the subject of council (daughter) directives and therefore became List I substances. The 18 List I substances under the DSD have already been incorporated into the priority action substances list. The residual 114 substances currently have List II status as confirmed by a European Court Decision in 1990. These additional List II substances include 15 substances which were the subject of a subsequently withdrawn proposal for List I control, and 99 other proposed List I substances.

DSD List II substances therefore comprise 139 substances, containing the 25 individual substances as listed in the DSD Annex, plus the 15 candidate List I substances and the 99 substances resulting from the 1990 European Court Decision.

Of these 139 substances, 12 are already specifically included in Annex X and are, therefore, on the priority action substances list and three are included on the candidate general components list. Thirty individual List II substances were represented within more general groups already present on the lists. Three pesticides were screened off because they were banned for use in Ireland and therefore were not considered of relevance in an Irish context. These were Chlordane, Heptachlor and 2,4,5-T. The remaining 91 DSD List II substances were included on the candidate relevant pollutants list on the precautionary principle as being of potential relevance in Irish river basins.

The following existing obligation programmes were also identified for consideration in accordance with the IMPRESS guidance.

Clean Technology Centre (CTC) project – '*Inventory and tracking of Dangerous Substances in Ireland and Development of Measures to Reduce their Emissions/Losses to the Environment'*

This study collected data regarding substance usage in Ireland by a review of:

- IPC license and pollution emission registers;
- Classification, packaging and labelling regulations databases;
- Customs and excise databases;
- Central Statistics Office datasets; and
- Pesticides Control Service databases.

The CTC study also consulted a group of experts and as a result produced guidance for 22 substances, which were identified as relevant in Irish waters. Three of the CTC list substances were not already contained in the priority action, candidate relevant pollutant or candidate general components lists and these were included on the candidate relevant pollutants list on the basis of their potential significance.

UNEP POPs - United Nations Environmental Programme - Persistent Organic Pollutants (POPs)

Twelve chemical substances were prioritised under the Stockholm Convention on the basis of their likelihood to persist in the environment, bioaccumulate through the food web, and pose a risk of causing adverse effects to human health and the environment. Four UNEP – POP substances were not already contained in the priority action, candidate relevant pollutant or candidate general components lists. The expert group considered that two of these four substances could be of potential relevance in Irish river basins and on the precautionary principle these were included on the candidate list. However, the other two substances (Toxaphene and Mirex) were screened off the candidate relevant pollutants list because neither of the substances has been detected at elevated concentrations by marine monitoring programmes and they are banned for use in Ireland.

OSPAR - The Convention for the Protection of the Marine Environment of the North-East Atlantic

The OSPAR Convention utilised DYNAMEC (a top-down screening process concentrating on marine water status) to develop a list of substances of possible concern. The result of this process was a list containing approximately 380 substances. Fifty of these were identified for priority action. Nineteen of these 50 OSPAR priority action substances were either a) used in closed systems or b) not currently in use or production. Consequently these 19 were therefore not further considered. Of the remaining 31 substances, 24 currently have a guidance document which provides detailed assessment of level of concern, uses and monitoring protocols. Only those substances with guidance documents were further considered. Guidance documents will be prepared at a later date for the remaining seven which will be assessed for inclusion during the review of the relevant pollutant list. Sixteen of the 24 substances with guidance documents were already contained in the priority action, candidate relevant pollutant or candidate general components lists. Out of the remaining eight identified substances, two substances were screened off due to their prohibited use in Ireland; these were Dicofol and Methoxychlor. Detailed review of the guidance documents for the remaining six identified one further substance, triphenyl phosphine, which was an intermediate, only used in closed systems and was therefore screened off. Two others were considered to be of low concern in the Marine environment and were screened off; these were 4-tert-butytoluene and 2,4,6-tri-butylphenol. Consequently three substances were added to the candidate relevant pollutants list. The OSPAR lists will be kept under review so that further substances can be considered for inclusion once guidance becomes available.

EPER - European Pollutant Emissions Register

In July 2000, the European Commission adopted a Decision on the implementation of a European Pollutant Emission Register (EPER) according to Article 15 of Council Directive 96/61/EC concerning Integrated Pollution Prevention and Control (IPPC). Based on inventories from these significant licensed industrial activities, guidance has been developed for 26 prioritised aquatic pollutants. Two of these substances had not already been adequately covered on the priority action, candidate relevant pollutants or candidate general components lists and these were included on the candidate relevant pollutants list based on the precautionary principle.

Other Lists Considered

In addition to the main lists of substances identified by IMPRESS the expert group assessed the inclusion of other groups of pollutants associated with significant commercial activities in Ireland. These included substances associated with pesticides usage, aquaculture and weed control products. The expert group also considered findings of recent studies into endocrine disrupting substances.

Pesticides of Possible Relevance

The Pesticide Control Service of the Department of Agriculture and Food maintains a database of plant protection active substances (pesticides) authorised for use in Ireland. Pesticides from this database were considered for inclusion on the national relevant pollutants list and were selected on the basis of an analysis of the substances licensed as of February 2004, taking account of potential effects of substances in the aquatic environment and information indicating how widely the substances might be used. The selection of substances based on how commonly they are used in Ireland was conducted by analysing indicative information concerning the amounts of plant protection products placed on the market (for the year 2000). It should be noted that this data is based on sales and import figures and cannot give an accurate representation of the amounts of pesticides that were actually used. The selection of substances based on effect(s) considerations was initially conducted by examining the pesticides for which The Netherlands has established Maximum Permissible Concentrations (MPC values) in water. Substances selected by The Netherlands were chosen on the basis of available ecotoxicological data for the aquatic environment. In order to ensure that as many potentially relevant pesticides as possible were considered for inclusion, the list of Finnish National Priority Pesticides and the pesticides for which the UK has established EQS values were also examined. Finnish National Priority Pesticides were selected by expert judgement using a draft Pesticide Risk Indicator, which takes into account mobility, persistence, toxicity and bioaccumulation potential, and combines this information with sales volumes. UK decisions on which substances to select for setting an EQS value are largely based on the results from monitoring programmes. The analysis performed resulted in 42 additional pesticides, which are currently authorised for use in Ireland, being included on the candidate relevant pollutants list.

Control Products Introduced to the Aquatic Environment

Aquaculture products were investigated by the expert group. Two sea-lice treatments were considered as nationally significant, one of these was already included on the list of candidate relevant pollutants, and the other substance was included on the candidate list based on the precautionary principle.

Aquatic weed control products used in canals were also investigated by the expert group. One herbicide was considered as nationally significant and was included on the candidate relevant pollutant list on the precautionary principle.

Endocrine disrupting substances were raised as an area of concern during early consultations through the South Eastern and Shannon River Basin District projects. The output of three recent projects was reviewed.

BKH- Report

The EU Commission appointed consultants BKH to prepare a report in 2000 entitled '*Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption - preparation of a candidate list of substances as a basis for priority setting*'. The study considered 564 chemicals that had been suggested by various organisations or by published papers or reports as being suspected endocrine disruptors. From this set, 147 chemicals were considered likely to be either persistent in the environment or produced at high volumes. Clear evidence of endocrine disrupting activity was noted for 66 of these substances which were designated Category 1 using the criteria adopted in the study. Of the Category 1 endocrine disrupting substances, 11 were not already included on the priority action, candidate relevant pollutants or candidate general components lists. The experts screened off three of these 11 substances (Nitrofen, vinclozolin and acetochlor) because they were not authorised for use as pesticides in an Irish context and included eight substances on the candidate relevant pollutant list based on the precautionary principle.

WRc – Usage Review in an Irish Context

WRc-NSF, a UK-based environmental research organisation, completed an in-depth evaluation on 12 candidate endocrine disruptors substances. This list of substances was reviewed in an Irish context by the EPA in 2000 to ascertain whether any of these substances were used by Irish industry. Five substances were shown to be used by Irish industry; one of these was already included on the priority action list and the remaining four substances were included on the list of candidate relevant pollutants based on the precautionary principle.

COM (2001)/262 – Usage Review in an Irish Context

Following the adoption by the Commission of a Communication to Council and European Parliament on a Community Strategy for Endocrine Disruptors in December 1999 (COM(1999)706), the Council invited the Commission to report regularly on the progress of work. They reported for the first time in early 2001 on the implementation of the Community Strategy for Endocrine Disruptors - a range of substances suspected of interfering with the hormone systems of humans and wildlife. The study

considered a candidate list of 553 substances and identified a sub list of 115 substances which showed evidence of endocrine disrupting activity and were either regulated or were being addressed to be regulated. These identified substances were reviewed on a national context, by an EPA study in 2000 to ascertain whether any of these substances were used in Irish industry. Four substances not already on the priority action, candidate relevant pollutants or candidate general components lists were found to be used in Irish industries and were included on the list of candidate relevant pollutants on the precautionary principle.

Summary

The total number of substances/groups listed in the national candidate relevant pollutant list is 161 (Table 2). Table 3 summarises the numbers of substances which were included on the candidate relevant pollutants list as a result of the expert review.

Table 2 - Candidate Relevant Pollutant Substances List

Number	List of Substances	CAS Number	Source of Substance
1	2-Amino-4-chlorophenol	95-85-2	DSD (99)
2	Arsenic and its mineral compounds	7440-38-2	DSD (99), Irl DSD, CTC, EPER
3	Benzidine	92-87-5	DSD (99)
4	Benzylchloride (Alpha-chlorotoluene)	100-44-7	DSD (99)
5	Benzylidenechloride (Alpha, alpha-dichlorotoluene)	98-87-3	DSD (99)
6	Biphenyl	92-52-4	DSD (99), BKH
7	Chloral hydrate	302-17-0	DSD (99)
8	Chloroacetic acid	79-11-8	DSD (99)
9	2-Chloroaniline	95-51-2	DSD (99)
10	*Mono*-Chlorobenzene	108-90-7	DSD (99)
11	1-Chloro-2,4-dinitrobenzene	97-00-7	DSD (99)
12	2-Chloroethanol	107-07-3	DSD (99)
13	4-Chloro-3-methylphenol	59-50-7	DSD (99)
14	1-Chloronaphthalene	90-13-1	DSD (99)
15	Chloronaphthalenes (technical mixture)	n/a	DSD (99)
16	4-Chloro-2-nitroaniline	89-63-4	DSD (99)
	Chloro-Nitrobenzene	n/a	n/a
	1-Chloro-2-nitrobenzene	89-21-4	DSD (99)
	1-Chloro-3-nitrobenzene	88-73-3	DSD (99)
17	1-Chloro-4-nitrobenzene	121-73-3	DSD (99)
18	4-Chloro-2-nitrotoluene	89-59-8	DSD (99)
19	Chloronitrotoluenes (other than 4-Chloro-2-nitrotoluene)	25567-68-4	DSD (99)
20	Mono-Chlorophenol	n/a	DSD (99)
21	Chloroprene (2-Chloro-1,3-butadiene)	126-99-8	DSD (99)
22	3-Chloropropene (Ally chloride)	107-05-1	DSD (99)
	Chlorotoluene	n/a	
	2-Chlorotoluene	95-49-8	DSD (99)
	3-Chlorotoluene	108-41-8	DSD (99)
23	4-Chlorotoluene	106-43-4	DSD (99)
24	Mono-Chlorotoluidines	n/a	DSD (99)
25	Cyanuric chloride (2,4,6-Trichloro-1,3,5-triazine)	108-77-0	DSD (99)

Number	List of Substances	CAS Number	Source of Substance
26	2,4-D (including 2,4-D-salts and 2,4-D-esters)	94-75-7	DSD (99), Pes., IRL. Usage
27	1,2-Dibromoethane	106-93-4	DSD (99)
28	Dibutyltin (DBT)	n/a	DSD (99)
29	Dichloroanilines	n/a	DSD (99)
30	Dichlorobenzene	n/a	DSD (99)
31	Dichlorobenzidines	1331-47-1	DSD (99)
32	Dichloro-di-isopropyl ether	108-60-1	DSD (99)
33	1,1-Dichloroethane	75-34-3	DSD (99)
34	1,1-Dichloroethylene (Vinylidene chloride)	75-35-4	DSD (99)
35	1,2-Dichloroethylene	540-59-0	DSD (99)
36	Dichloronitrobenzenes	27900-75-0	DSD (99)
37	2,4-Dichlorophenol	120-83-2	DSD (99)
38	1,2-Dichloropropane	78-87-5	DSD (99)
39	1,3-Dichloropropan-2-ol	96-23-1	DSD (99)
40	1,3-Dichloropropene	542-75-6	DSD (99)
41	2,3-Dichloropropene	78-88-6	DSD (99)
42	Dichlorprop	120-36-5	DSD (99), Pes.
43	Diethylamine	109-89-7	DSD (99)
44	Dimethoate	60-51-5	DSD (99), Pes.
45	Dimethylamine	124-40-3	DSD (99)
46	Epichlorohydrin	106-89-8	DSD (99)
47	Ethylbenzene	100-41-4	DSD (99), EPER
48	Hexachloroethane	118-74-1	DSD (99)
49	Isopropyl benzene	87-68-3	DSD (99)
50	Linuron	330-55-2	DSD (99), BKH, Pes.,
51	MCPA	94-74-6	DSD (99), Pes.
52	Mecoprop	93-65-2, 7085-19-0	DSD (99), CTC, Pes.
53	Monolinuron	1746-81-2	DSD (99)
54	Oxydemeton-methyl	301-12-2	DSD (99), Pes.
55	PCB (including PCT)	n/a	DSD (99), UNEP POP, OSPAR, BKH
56	Chloridazon (Pyrazon)	1698-60-8	DSD (99), Pes.
57	Tetrabutyltin	1461-25-2	DSD (99)
58	1,2,4,5-Tetrachlorobenzene	95-94-3	DSD (99)
59	1,1,2,2-Tetrachloroethane	79-34-5	DSD (99)
60	Toluene	108-88-3	DSD (99), IRl DSD, EPER
61	Tributyl phosphate	126-73-8	DSD (99)
62	Trichlorfon	52-68-6	DSD (99), Pes.
63	1,1,1-Trichloroethane	71-55-6	DSD (99)
64	1,1,2-Trichloroethane	79-00-5	DSD (99)
65	Trichlorophenols	95-95-4	DSD (99)
66	1,1,2-Tri-chloro-tri-fluoro-ethane	76-13-1	DSD (99)
67	Vinyl chloride (Chloroethylene)	75-01-4	DSD (99)
68	Xylenes (technical mixture of isomers)	1330-20-7	DSD (99), Irl DSD, CTC, EPER
69	Bentazone	25057-89-0	DSD (99), Pes.
70	Fenitrothion	122-14-5	DSD (15)
71	Malathion	121-75-5	DSD (15) , Pes.
72	Triphenyltin	n/a	DSD (15), OSPAR, BKH

Number	List of Substances	CAS Number	Source of Substance
73	Zinc	7440-66-6	DSD (List l) , Irl DSD, EPER
74	Copper	7440-50-8	DSD (List l), Irl DSD, EPER
75	Chromium	7440-47-3	DSD (List l), Irl DSD, EPER
76	Selenium	7782-49-2	DSD (List I)
77	Antimony	7440-36-0	DSD (List l)
78	Molybdenum	7439-98-7	DSD (List l)
79	Titanium	7440-32-6	DSD (List l)
80	Tin	7440-31-5	DSD (List l), CTC, EPER
81	Barium	7440-39-3	DSD (List l)
82	Beryllium	7440-41-7	DSD (List l)
83	Boron	7440-42-8	DSD (List l)
84	Uranium	7440-61-1	DSD (List l)
85	Vanadium	7440-62-2	DSD (List l)
86	Cobalt	7440-48-4	DSD (List l)
87	Thallium	7440-28-0	DSD (List l)
88	Tellurium	1349-80-9	DSD (List l)
89	Silver	7440-22-4	DSD (List l)
90	Cyanide	57-12-5	DSD (List l), IRl DSD, EPER
91	Fluorides	16984-48-8	DSD (List l), IRl DSD, EPER
92	Nitrobenzene	98-95-3	CTC
93	Butylbenzylphthalate	85-68-7	CTC, BKH,Com (2001)262- IRL. Usage
94	Permethrin	52645-53-1	CTC
95	PCDD	n/a	UNEP POP, OSPAR
96	PCDF	n/a	UNEP POP, OSPAR
97	Nonyl-Phenol Ethoxylate	37340-60-6	OSPAR
98	HBCD (hexabromocyclododecane)	25637-99-4	OSPAR
99	Tetrabromobisphenol A (TBBP-A)	79-94-7	OSPAR
100	Chloride	16887-00-6	EPER
101	Phenols	n/a	EPER
102	Azoxystrobin	131860-33-8	Pes.
103	Captan	133-06-2	Pes.
104	Carbendazim	10605-21-7	Pes.,Com (2001)262- IRL.Usage
105	Carbofuran	1563-66-2	Pes.
106	Chlormequat	7003-89-6	Pes.
107	Cypermethrin	52315-07-8/ 66841-24-5	Pes.
108	Deltamethrin	52918-63-5	Pes.
109	Epoxiconazole	135319-73-2	Pes.
110	Ethoprophos	13194-48-4	Pes.
111	Fenpropimorph	67306-03-0/ 67564-91-4	Pes.
112	Ferrous Sulphate	7720-78-7	Pes.
113	Glyphosate	1071-83-6	Pes.
114	Glyphosate trimesium	81591-81-3	Pes.
115	Kresoxim methyl	143390-89-0	Pes.
116	Mancozeb	8018'-01-7	Pes.
117	Maneb	124727-38-2	Pes., BKH
118	Metamitron	41394-05-2	Pes.
119	Metam-sodium	137-42-8 / 6734-80-1 for dihydrate	Pes., BKH

Number	List of Substances	CAS Number	Source of Substance
120	Metazachlor	67129-08-2	Pes.
121	Oxamyl	23135-22-0	Pes.
122	Paraquat	1910-42-5 for dichloride salt / 4685-14-7 for dictation	Pes.
123	Pirimicarb	23103-98-2	Pes.
124	Propachlor	1918-16-7	Pes.
125	Thiram	137-26-8	Pes., BKH, Com(2001) 262- IRL. Usage
126	Tolclofos-methyl	57018-04-9	Pes.
127	Tri-allate	2303-17-5	Pes.
128	Bromoxynil	1689-84-5	Pes.
129	Chlorpropham	101-21-3	Pes.
130	Chlorotoluron	15545-48-9	Pes.
131	Cyfluthrin	68359-37-5	Pes.
132	Diflubenzuron	35367-38-5	Pes.
133	Ethofumesate	26225-79-6	Pes.
134	Flusilazole	85509-19-9	Pes.
135	Ioxynil	1689-83-4	Pes.
136	Methiocarb	2032-65-7	Pes.
137	Pendimethalin	40487-42-1	Pes.
138	Pirimiphos-methyl	29232-93-7	Pes.
139	Prochloraz	67747-09-5	Pes.
140	Propyzamide	23950-58-5	Pes.
141	Thiabendazole	148-79-8	Pes.
142	Tribenuron-methyl	101200-48-0	Pes.
143	Zineb	12122-67-7	Pes., BKH
144	Styrene	100-42-5	BKH, Com (2001)262-IRL. Usage
145	Di-n-butylphthalate (DBP)	84-74-2	BKH,Com (2001)262- IRL. Usage
146	2,2-Bis(4-hydroxyphenyl)propan=4,4'-isopropylidenediphenol= Bisphenol A	80-05-7	BKH, WRc, Com (2001)262- IRL. Usage
147	Tri-n-propyltin (TPrT)	2279-76-7	BKH
148	Resorcinol	108-46-3	BKH
149	Amitrole = Aminotriazol	61-82-5	BKH,Com (2001)262- IRL. Uasage
150	4-tert-Octylphenol=1,1,3,3-Tetramethyl-4-butylphenol	140-66-9	BKH
151	4-Nitrotoluene	99-99-0	BKH
152	Emamectin benzoate	137512-74-4	Control Product in Aquatic Systems
153	Dichlobenil	1194-65-6	Control Product in Aquatic Systems
154	Ethinyl Oestradiol	57-63-6	WRc/IRL. Usage
155	2,2-bis(4-(2,3-epoxypropoxy)phenyl) propane	1675-54-3	WRc/IRL. Usage
156	Oestradiol	50-28-2	WRc/IRL. Usage
157	Carbon Disulphide	75-15-0	WRc/IRL. Usage
158	Methybromide (bromomethane)	74-83-9	COM (2001) 262/IRL. Usage
159	Diisononyl phthalate=1,2-Benzene dicarboxylic acid, Diisononyl ester (DINP)	28533-12-0	COM (2001) 262/IRL. Usage
160	Oestrone	53-16-7	COM (2001) 262/IRL. Usage
161	Progesterone	n/a	COM (2001) 262/IRL. Usage

Note: Numbers are for reference and do not imply rank

Abbreviations

Aquaculture	Product used in aquaculture
BKH	Substances arising as possible endocrine disruptors from BKH report
COM (2001)262	Implementation of the Community Strategy for Endocrine Disruptors-a range of substances suspected of interfering with hormones systems of humans and wildlife
CTC	Clean Technology Centre project
DSD (List l)	25 Individual List l substances in the Dangerous Substances Directive
DSD (15)	15 Candidate Substances from the 1990 European Court Decision on dangerous Substances Directive
DSD (99)	99 substances resulting from 1990 European Court Decision on Dangerous Substances Directive
DW	Drinking Water Regulation EQS's
EPER	European Pollution Emissions Register
EQualS	Information Sourced from EQualS database by National Centre for Environmental Toxicology
Irl. DSD	Irish Dangerous Substances Regulations
OSPAR	The Convention for the Protection of the Marine Environment of the North-East Atlantic
Pes.	Pesticides Used in Ireland
UK-DSD	Information Sourced from United Kingdom derived Dangerous Substances Directive EQS's
UNEP POP	United Nations Environmental Programme- Persistent Organic Pollutants
WRc	WrC Endocrine Disruptor list of 12 substances

Table 3 - Summary of Substances added to Candidate Relevant Pollutants List

Source of Substances	**Total Number of Substances/ Groups added to Relevant Pollutants List**
DSD List II	91
CTC Project	3
UNEP POPs	2
OSPAR	3
EPER	2
Pesticides of possible relevance	42
Control Products Introduced to the Aquatic Environment	2
Endocrine disrupting substances - BKH report	8
Endocrine disrupting substances - WRc - Usage Review in an Irish Context	4
Endocrine disrupting substances - Com(2001)262 – Usage Review in an Irish Context	4
Total Number of Substances /Groups	**161**

2.3 Candidate General Component Substances

General components relate to materials in suspension, substances which contribute to eutrophication (in particular, nitrates and phosphates) and substances which have an unfavourable influence on the oxygen balance (and can be measured using parameters such as BOD, COD, etc.). Guidance states that the relevant pollutants and general physico-chemical components should be considered separately; consequently Table 4 presents a list of candidate general components.

Table 4 - Candidate General Components List

Number	Substance
1	Transparency
2	Temperature
3	Dissolved oxygen
4	Salinity
5	Electrical conductivity
6	pH
7	Alkalinity
8	Total phosphorus
9	Soluble reactive phosphorus
10	Total nitrogen
11	Nitrate
12	Nitrite
13	Ammonium
14	Suspended solids
15	Turbidity
16	Total organic carbon (TOC)
17	Biochemical oxygen demand (BOD)
18	Chemical oxygen demand (COD)

Note: Numbers are for reference and do not imply rank

3.0 National Substances Screening Monitoring Programme

Having undertaken the screening process to develop lists of candidate relevant pollutants and candidate general components the next step is to test these substances for relevance by selecting those that are likely to cause, or are already causing, harm to the Irish aquatic environment.

Assessment of data from existing monitoring programmes in Ireland enabled some screening of the candidate lists as part of step 2. The programmes in place at present, however, were not specifically designed to provide the frequency of data or to deal with the range of substances required to be considered under the WFD. Consequently, it is proposed to implement a National Substances Screening Monitoring Programme. The resultant concentrations will be compared with suitable interim benchmark values to allow refining of the candidate lists.

The substances on the priority action list have been identified at European level and there is no discretion regarding their inclusion on the priority action list. Consequently the priority action substances were not screened (step 2) and do not need to be tested for relevance (step 3). It is, however, proposed to include data collection regarding priority action substances whilst the specialist screening programme is being undertaken.

3.1 Design of a National Substances Screening Monitoring Programme

The expert group has developed proposals for a national programme to test the candidate lists of relevant pollutants and general components. The programme is being funded by the National Development Plan (NDP) via contributions from river basin district management system projects being undertaken to assist with the implementation of the WFD.

The purpose of the screening monitoring programme is to assess if substances on the candidate lists are detected and, where they are detected, to obtain concentration data for these substances and compare these against suitable benchmarks.

The output from the National Substances Screening Monitoring Programme will provide a cost effective way of refining the candidate relevant pollutant and candidate general component lists. This will identify which substances should be considered in support of ecological status thus enabling detailed investigations to focus on genuine water quality issues.

The WFD initiates monitoring of water bodies experiencing pressures and, depending on the outcome of the monitoring, requires that measures are put in place aimed at achieving improvement in water status. The directive establishes a six yearly planning cycle whereby effectiveness of the measures is checked by further monitoring and, if necessary, the measures are refined. If a water body fails to achieve good ecological status as a result of pollution by chemical substances, measures must be put in place to address the causes of the failure. The review cycle process provides a safety net which ensures

that the substances identified as candidate relevant pollutants and candidate general components within the initial river basin plan are re-examined at least every six years.

Substances on candidate lists which are not found at significant concentrations by the screening monitoring programme will be relegated from the candidate substance list when developing detailed relevant pollutant chemical monitoring programmes for individual River Basin Districts, however, the safety net ensures that substances remain on the candidate list and may be reinvestigated in instances where discharges to particular waters are identified.

Substances on candidate lists which are found at significant concentrations by the National Substances Screening Monitoring Programme will be further investigated to identify their source. The National Substances Screening Monitoring Programme includes a phased development process to permit initial investigations during the screening process with further investigation to be undertaken as part of individual River Basin District monitoring programmes to be developed and implemented under the WFD by 2006.

Surface Waters

A phased monitoring approach is incorporated in the developed screening monitoring programme.

The first phase will investigate evidence of substances at specific locations in the vicinity of likely major potential sources of pollutants. This will provide a general overview of the presence or absence of substances. In the second phase, further target sites will be selected to isolate the causes of individual substances identified by the initial investigations.

Site Selection

Much of the potential usage of chemicals, e.g. households, transport routes, industries, waste disposal facilities, construction sites, etc is concentrated in major urban centres. It is proposed to sample in the vicinity of Ireland's major population centres as part of the initial programme to collect data on the presence or absence of substances associated with such activities.

The majority of Ireland largest cities are located near the coastline, often at the downstream end of major catchments:

- Drogheda – River Boyne
- Dublin – River Liffey
- Waterford – Rivers Barrow, Nore and Suir
- Cork – River Lee
- Limerick – River Shannon
- Galway – River Corrib.

The initial programme will also include sampling a site downstream of Athlone on the River Shannon and another site downstream of Mullingar and Tullamore on the River Brosna. These sites will provide data for large inland towns with a good mix of industrial activities and would also be representative of large upstream catchment areas.

Diffuse use substances associated with agriculture, mining and forestry activities and rural households will be tested in the initial programme by sampling at additional inland sites in the major catchments. Several of the diffuse source substances are products specifically associated with tillage and horticulture and these activities are concentrated within the Eastern and South Eastern River Basin Districts. Sheep farming is generally concentrated to the west of the Shannon. Sites have been selected from the national EPA inland surface waters programme to provide information on diffuse use substances.

Monitoring for the type of chemicals on the candidate lists in the marine environment is challenging: the existing OSPAR marine monitoring programmes already incorporates a range of chemicals with established protocols. However, given that Ireland's main towns and cities are generally coastal, with discharges to tidal waters, some sampling within embayments has been included in the screening programme (i.e. Dublin Bay, Waterford Estuary, Cork Harbour).

Table 5 - Surface Water Sites for the National Substances Screening Monitoring Programme

Number	River/Embayment	Location
1	River Boyne	Downstream of Drogheda
2	River Liffey	Upstream of Dublin City
3	River Liffey	Downstream of Dublin City
4	River Barrow	Upstream of St. Mullins
5	River Nore	Upstream of tidal limits
6	River Suir	Upstream of tidal limits
7	River Suir	Downstream of Waterford City
8	River Lee	Downstream of Cork City
9	River Shannon	Downstream of Limerick City
10	River Corrib	Downstream of Galway City
11	River Shannon	Downstream of Athlone
12	River Brosna	Downstream of Mullingar and Tullamore
13	River Barrow	Upstream of Carlow town
14	River Suck	Downstream of Ballinasloe
15	Dublin Bay*	Downstream of Dublin City
16	Waterford Estuary*	Downstream of Waterford City
17	Cork Harbour*	Downstream of Cork City

* Tissue samples (with cofactors) at embayment sites

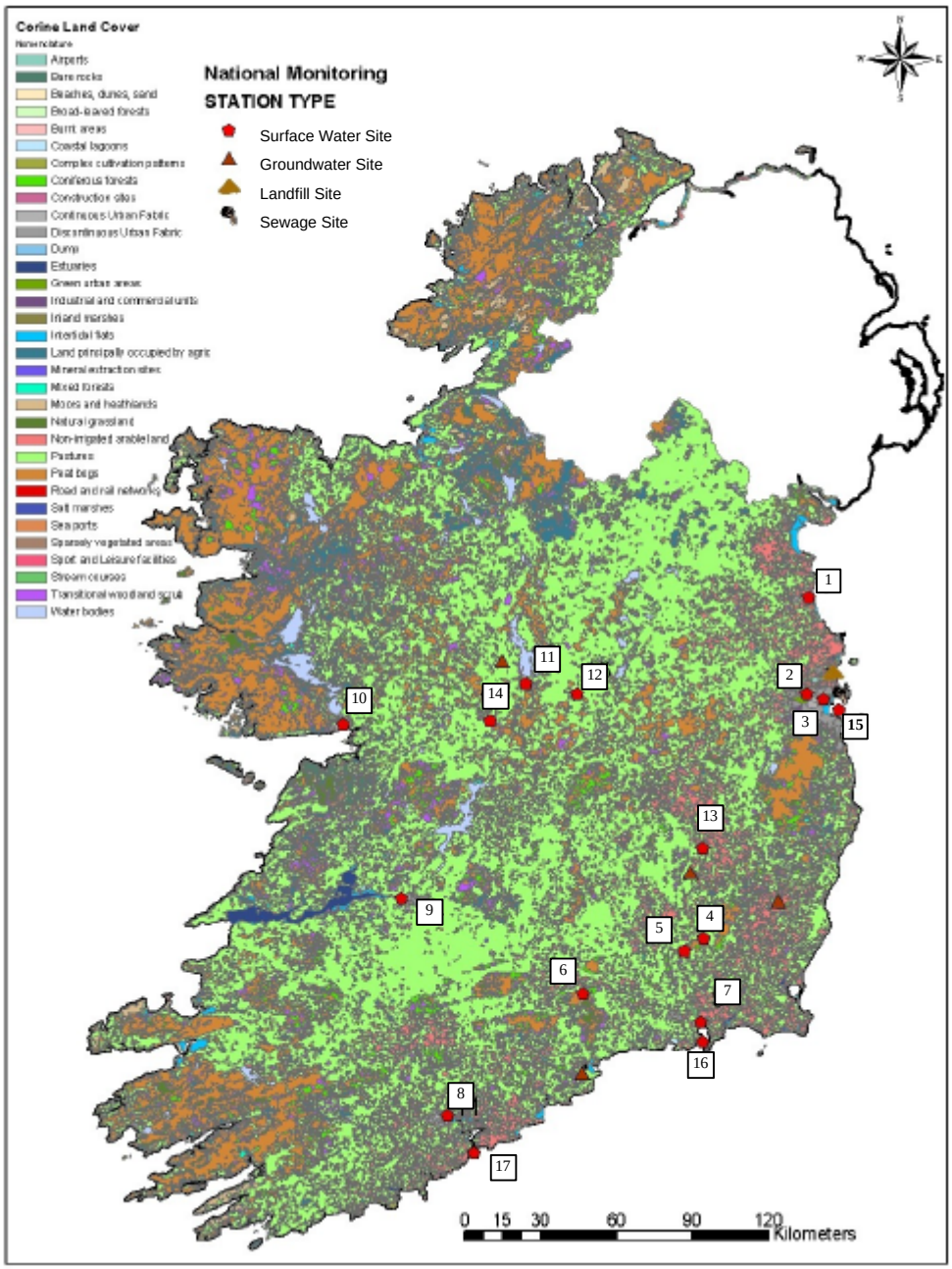

Figure 4 - Initial Monitoring Sites for National Substances Screening Monitoring Programme

These 17 selected initial sample sites will address the discharges from the main population centres in the country as well as providing coverage of the largest river basins in Ireland and therefore monitoring the variety of diffuse activities within these basins.

It was also proposed to monitor at one of Ireland's major sewage treatment facilities (Ringsend WWTP, Dublin) and to monitor the leachate from one of Ireland's major landfill sites (Balleally, Co. Dublin). This would address diffuse use substances that are related to product use (e.g. pharmaceuticals and household products) as well as urban run off and light industry (e.g. solvents) and provide an indication of presence/absence that could be assessed before dilution in the receiving water.

Following analysis of the results of the initial programme further target sites will be identified. Knowledge of the commercial usage of substances and information in relation to the distribution of human activities will assist with locating the target sites and identifying what substances to investigate, for example, particular substances might be associated with individual industrial activities or forestry practices.

Parameters to be tested

It is proposed that the full lists of priority action, candidate relevant pollutant and candidate general component substances are included in the screening monitoring programme for freshwater sites. This will test for the relevance of all candidate parameters and will provide data towards the further requirement to establish EQS levels for Irish surface waters. The programme will also collect appropriate "co-factors" (e.g. grain size of sediments) which are used to normalise sample results for comparison.

The list of parameters at target sites may be reduced to take into account the upstream activities and the chemicals which might be present in the waters.

Media

Water testing can be the simplest analytical approach and concentrations generally reflect the current situation better than sediment or biota samples. However, many of the candidate substances have very low water solubility but can accumulate in sediments. For these substances, sediment analysis therefore gives a robust time integrated sample. Similarly biota sampling can provide indication of exposure to substances that bioaccumulate.

The Irish screening programme will generally include sample collection of sediments, biota and waters at the surface water sites to optimise the range of substances detected.

The substances that are most relevant for the marine environment are those that are persistent and liable to bioaccumulate. These substances are hydrophobic in nature and are detected in biota monitoring, even though they are often not detected in water monitoring. Mussels *Mytilus* sp. are considered by the expert group to be the best marine matrix, as contaminant concentrations reflect the surrounding environment quite well and normalisation is easier than for sediments. Due to the challenges of marine

monitoring it is proposed that mussel tissue monitoring is carried out at three embayments to sample for a selection of the candidate substances to support the screening programme.

Duration

The trial programme will take place over a total of 18 months.

The initial site programme will continue for 1 year i.e. months 1-12. The results of the initial programme will be reviewed after six months to allow development of the second phase of the target site programme. The timescale of the initial programme will also deliver information to assist the preparation of the WFD Article 5 Characterisation Report. The Characterisation Report must be produced for each target river basin district by December 2004.

The target site programme will be developed in response to the findings of the first six months of initial site sampling and will continue for a full year, i.e. months 7-18.

Frequency

A single sediment and single biota sample will be collected and analysed at each site once during the screening programme.

Water samples will be collected and analysed on a monthly basis at each site. This will take account of any seasonal variations and complies with the likely sampling frequency for waters that will be required to determine chemical status under the WFD.

Sample Collection

Samples will be collected on behalf of the national programme by the monitoring team of the SERBD project with assistance from other organisations. A well defined and documented sampling protocol is essential. Training and a "quality" approach to the management of the sampling will be provided for.

Sample Analysis

Sample analysis will be carried out by a specialist laboratory contracted to undertake the programme. The laboratory will also provide sample collection and storage protocols and report on the results of the monitoring programme. The laboratory will be required to demonstrate that appropriate analytical Quality Control systems are in place.

The national screening monitoring programme proposals will be initiated in 2004 and completed in early 2006. The programme has been developed using a similar approach to that adopted by the EPA for the inland surface waters programme. It is proposed that the EPA continues the rolling inland waters programme whilst the screening is undertaken to provide supplementary data.

Groundwaters

It is further proposed to sample groundwaters at sites representative of the range of hydrogeological conditions in Ireland. This will achieve economies and ensure co-ordination and consistency of approaches. The substances analysed in groundwaters will include the core and site specific parameters identified in the EPA Interim Guideline Value report for groundwaters.

3.2 Future Establishment of Environmental Quality Standards for Dangerous Substances

In the short term it is necessary to use benchmark values for substances to allow assessment of significance and therefore enable refining of the candidate lists. In the longer term each Member State must adopt or develop statutory EQS values for synthetic and non-synthetic relevant pollutants to enable identification of good status water bodies.

The substances for which long term EQS values will be required will be based on the results of the screening monitoring programme. Consideration of EQS values at this stage therefore relates only to the adoption of benchmark standards for the design of the screening monitoring programme. The selected EQS influences the complexity of the required analyses and therefore the cost of analyses.

The European Commission, advised by the European Advisory Forum (EAF), is in the process of establishing EQSs for the substances listed in Annex X and these standards will be applied to the Irish priority action substances list. EQS's already exist for the eight substances which were placed on the priority action substance list due to their standing as DSD List I substances. Therefore EQS will be available soon for the complete priority action substances on the Irish list.

The expert group agreed to benchmark EQS by applying values from other Member States for the short term. Several sources of information were examined in order to establish EQS's for candidate relevant pollutant substances. The benchmarking process collated standards for waters, sediments and biota where available.

Contact was made with a number of Member States to make comparison with substances included on their lists and also to compare EQSs. Information was received from several countries which are advancing their approaches to dangerous substances, namely Germany, The Netherlands and Denmark. All EQS values received were applied to the Irish lists, allowing comparison where different countries have developed different standards for a particular substance. Published EQS's developed by the UK under the DSD were also reviewed and applied to the Irish candidate lists.

The EQualS database, which was produced by the National Centre for Environmental Toxicology, contains up to date information on legislative standards and guidelines for the UK for, amongst others, surface waters and drinking waters. All applicable EQS's were extracted from the EQualS database and applied to the Irish candidate lists.

The EPA proposals for EQS's for Irish surface waters published in 1997 were also considered. The Interim Guideline Values for groundwaters (Interim EPA Report 2003) were included for comparison and will be applied when considering site specific and relevant pollutants in groundwaters. EQS from the Irish Drinking Water Regulations (S.I. No. 439 of 2000) were also applied to the Irish candidate lists.

For a small number of substances where EQS values were not available, to give a working estimate of the order of magnitude of likely EQS, information regarding Limits of Detection (LOD's), Limits of Quantitation/Determination (LOQ) and preferred monitoring techniques were extracted from the EQualS database, a US-EPA pesticides analysis website www.epa.gov/oppbead1/methods/ecm12b.htm and Analytical Methods for Pesticides (Annex I of Council Directive 91/414/EEC) - EU review process for plant protection active substances. These values were included in the absence of EQS values.

The above process resulted in a series of EQS from various sources for most candidate relevant pollutant substances. However, there remain 17 substances for which benchmark EQS are not yet available. These substances will be kept under review regarding inclusion in monitoring programmes to identify benchmark EQS if and when they become available.

For the cases where a particular substance has a choice of EQS from differing sources, the expert group decided, on a precautionary basis, to use the lowest EQS value providing that monitoring techniques could detect this level.

This process has enabled the compilation of an interim list of screening benchmark values which allows the development of the monitoring system proposals. This process does not propose to set statutory EQS's for substances: that task awaits the outcome of various European research projects and the analyses of datasets that would be generated by the proposed Irish substances screening monitoring programme.

3.3 Concluding Remarks

The expert group have developed the proposals for the substances screening monitoring programme and are progressing the procurement of a contract to provide analysis capabilities.

It is important to note that the approach to dangerous substance is an iterative one and further review of the lists will be carried out.

4.0 References

CEC (Council of the European Communities), 2000. Directive 2000/60/EC of the European Parliament and of the Council of the 23 October 2000 establishing a framework for Community action in the field of water policy (2000/60/EC). O.J.L 327/70.

CEC (Council of the European Communities), 2001. Amended proposal for Decision of the European Parliament and of the Council establishing the list of priority substances in the field of water policy. COM (2001) 17 final, 2000/0035 (COD).

CEC (Council of European Communities), 2000. Commission Decision 2000/479/EC on the implementation of a European Pollutant Emission Register (EPER), July 2000. O.J. L192/36.

CEC (Council of European Communities), 1991. Council Directive of the 15 July 1991 concerning the placing of plant protection products on the market (91/414/EEC). O.J.L 170.

CEC (Council of European Communities), 1999. Council Directive of the 3 November 1998 on the quality of water intended for human consumption (98/83/EC). O.J.L330/32.

CEC (Commission of the European Communities). COM (2001) 262(01) Communication From The Commission To The Council And The European Parliament on the implementation of the Community Strategy for Endocrine Disruptors - a range of substances suspected of interfering with the hormone systems of humans and wildlife (COM (1999) 706) June 2001.

CIS Working Group 2.1. IMPRESS. Guidance for the analysis of Pressure and Impact In accordance with the Water Framework Directive, 2002.

Duffy N. *et al.,* 1999. Inventory and Tracking of dangerous substances used in Ireland and development of measures to reduce their emissions/losses to the environment. Cork Institute of Technology, Cork on behalf of Environmental Protection Agency.

European Commission, 2001. Identification of Priority Hazardous Substances. Working Document ENV/191000/01 final of the Commission Services.

Environmental Protection Agency, 2001. A Survey of Dangerous Substances in Surface Freshwaters 1999-2000. Environmental Protection Agency, Dublin.

Environmental Protection Agency, 1997. Environmental Quality Objectives & Environmental Quality Standards - Aquatic Environment. Environmental Protection Agency, Wexford.

Environmental Protection Agency, 2003. Interim Report-Towards Setting Guideline values for the protection of groundwater in Ireland. Environmental Protection Agency, Wexford.

Environmental Protection Agency, 2001. Parameters of Water Quality, Interpretation & Standards. Environmental Protection Agency, Wexford.

Environmental Protection Agency, 2001. Phosphorus Regulations National Implementation Report, 2001. Environmental Protection Agency, Wexford.

Environmental Protection Agency, 2003. Phosphorus Regulations National Implementation Report, 2003. Environmental Protection Agency, Wexford.

Environmental Protection Agency, 2001. The Quality of Bathing Water in Ireland, 2001.
Environmental Protection Agency, Wexford.

Environmental Protection Agency, 2001. The Quality of Drinking Water in Ireland- A report for the year 2001. Environmental Protection Agency, Wexford.

Environmental Protection Agency, 2003. Towards Setting Guideline Values for the Protection of Groundwater in Ireland. Interim Report. Environmental Protection Agency, Wexford.

Environmental Protection Agency, 2002. Water Quality in Ireland 1998-2000. Environmental Protection Agency, Wexford.

Glynn D., *et al.*, 2003. Trace Metals and Chlorinated Hydrocarbons Concentrations in Shellfish from Irish Waters, 2000. MEHS Series No. 7. Marine Institute, Abbotstown.

Glynn D., *et al.*, 2003b. Trace Metals and Chlorinated Hydrocarbons Concentrations in Shellfish from Irish Waters, 2001. MEHS Series No. 10. Marine Institute, Abbotstown.

Groshart Ch. & Okkerman P.C., 2000. Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption- preparation of a candidate list of substances as a basis for priority setting. BKH Consulting Engineers, Netherlands.

Horth H., & France, S., & Zabel, T., Pollution Reduction Programmes in Europe. Updated report on the assessment of programmes under article 7 of directive 76/464/EEC. WRc, Swindon.

Lepper P., 2002. Towards the Derivation of Quality Standards for Priority Substances in the Context of the Water Framework Directive - Identification of quality standards for priority substances in the field of water policy. Fraunhofer-Institute Molecular Biology and Applied Ecology.

Marine Institute, 1999. Ireland's Marine and Coastal Areas and Adjacent Seas- An Environmental Assessment. Department of the Environment and Local Government and Department of the Marine & Natural Resources.

McHugh B., 2003. The Occurrence and Risk Assessment of the Pesticide Toxaphene in Fish from Irish Waters. MEHS No. 12 Marine Institute, Abbotstown.

McGovern E., *et al.*, 2001. Trace Metals and Chlorinated Hydrocarbons Concentrations in Shellfish from Irish Waters 1997-1999. MEHS Series No. 2. Marine Institute, Abbotstown.

McGovern E., *et. al.,2002*. Winter Nutrient Monitoring of the Western Irish Sea. 1990-2000. MEHS Series No. 6. Marine Institute, Galway.

Minchin D., 2003. Monitoring of Tributyl Tin contamination in six marine inlets using biological indicators. MEHS Series No. 6. Marine Institute, Galway.

Rees Y. & Zabel T., 2003. Draft Guidance for the Preparation of Pollution Reduction Programmes in Particular the Selection of Relevant Pollutants. Part of the project 'Transitional provisions for Council Directive 76/464/EEC and related directives to the water framework directive 2000/60/EC. Ref No.- UC6201. WRc, Swindon.

Scannell, Y., 1995. Environmental and Planning Law in Ireland. Round Hall Press.

Traas T.P., 2001. Guidance Document on deriving Environmental Risk Limits. Research for Man and Environment, Netherlands.

Tyrrell L., *et al*., 2003. Trace Metals and Chlorinated Hydrocarbons Concentrations in Various Fish Species Landed at Selected Irish Ports, 1997-2000. MEHS Series No. 8. Marine Institute, Abbotstown.

Tyrrell L., *et al*., 2003b Trace Metals and Chlorinated Hydrocarbons Concentrations in Various Fish Species Landed at Selected Irish Ports, 1997-2000. MEHS Series No. 13. Marine Institute, Abbotstown.

Zabel T. & Rees Y., 2003. Review of the Daughter Directives (82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC) of the Discharge of Dangerous Substances Directive. WRc, Swindon.

Appendix A - Irish Standards Set by Legislation under the Dangerous Substances Directive

Overall parameter limits and emissions limits for Phosphorus Regulations, Dangerous Substances Regulations and Dangerous Substances Daughter Regulations.

1 - Phosphorus Regulations

1 PHOSPHORUS	
EU	**National**
Council Directive 76/464/EC on Pollution caused by certain Dangerous Substances Discharged into the Aquatic Environment.	**S.I. No. 258 of 1998**. Local Government (Water Pollution) Act 1977 (Water Quality Standards for Phosphorus) Regulations, 1998.
	Phosphorus Bye laws.

Table A1.1 Phosphorus Quality Standards for Rivers.

Existing Biological Quality (Q) Rating/Q Index	Minimum Target Biological Quality (Q) Rating/Q Index	Molybdate-Reactive Phosphate Median Concentration*(µgP/L)
Unpolluted		
5	5	15
4-5	4-5	20
4	4	30
Slightly Polluted		
3-4	4	30
Moderately Polluted		
3	3-4	50
2-3	3	70
Seriously Polluted		
< = 2	3	70

Table A1.2 Phosphorus Quality Standards for Lakes

Existing Trophic Status	Minimum Target Trophic Status	Total Phosphorus Average Concentration* (µgP/L)
Satisfactory		
Ultra-Oligotrophic	Ultra-Oligotrophic	<=5
Oligotrophic	Oligotrophic	>5 <= 10
Mesotrophic	Mesotrophic	< 10<= 20
Unsatisfactory		
Eutrophic	Mesotrophic	< 10<=20
Hypertrophic	Eutrophic	< 20<=50

***-** When to monitor

When to Monitor- sampling frequency

The Phosphorus Regulations require that the 1995 to 1997 water quality dataset be used as the baseline for the setting of targets to be achieved by 2007.

For Rivers: *Median concentration to be determined using as a minimum ten samples taken at intervals of four weeks or longer in any twelve consecutive month period. Where the requisite number of samples has not been taken within such period, the median concentration shall be determined from

sampling conducted over such period, being a period not exceeding twenty four months, as required to obtain a minimum of fifteen samples taken at intervals of four weeks or longer.

For Lakes: *Average concentration to be determined using as a minimum ten samples taken at intervals of four weeks or longer in any twelve consecutive month period. Where the requisite number of samples has not been taken within such period, the average concentration shall be determined from sampling conducted over such period being a period not exceeding twenty four months, as required to obtain a minimum or fifteen samples taken at intervals of four weeks or longer.

Waters surveyed in the 1995-1997 period must meet their targets by 2007 at the latest. For waters first surveyed in 1997, targets must be met within a maximum of ten years.

2 - Dangerous Substances Directive and Daughter Directives

2 DANGEROUS SUBSTANCES REGULATIONS	
EU	**National**
Council Directive 76/464/EEC of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community	**S.I. No. 12 of 2001**. Water Quality (Dangerous Substances) Regulations, 2001. **S.I. No. 258 of 1998**. Local Government (Water Pollution) Act 1977 (Water Quality Standards for Phosphorus) Regulations, 1998

Table A2.1: Pesticides and Solvents

Substance	Standard (ug/L)
Atrazine	1.0
Dichloromethane	10.0
Simazine	1.0
Toluene	10.0
Tributyltin	0.001
Xylenes	10.0
The standard for Tributyltin shall apply in relation to tidal waters only and shall be deemed to be met if the results of monitoring for biological effects indicate no reproductive impairment in gastropods.	

Table A2.2: Metals and other substances

Substance	Standard (µg/L) for fresh Waters		Standard (µg/L) for tidal waters
	Hardness of water measured in mg/L $CaCO_3$		
	<=100	>100	
Arsenic	25	25	20
Chromium	5	30	15
Copper	5	30	5
Cyanide	10	10	10
Fluoride	500	500	1,500
Lead	5	10	5
Nickel	8	50	25
Zinc	(see notes)	100	40

Values for metals are for total metal concentration (dissolved and colloidal/s.s.).
The term <=100 means less than or equal to 100.
The term >100 means greater than 100.
In the case of Zinc, the standard shall be -
8 µg/L for water hardness less than or equal to 10 mg/L $CaCO_3$
50 µg/L for water hardness greater than 10 mg/L $CaCO_3$ and less than or equal to 100 mg/L $CaCO_3$

2.1 DANGEROUS SUBSTANCES DISCHARGE (Daughter Directives)

EU	National
Parent Directive	
Council Directive 76/464/EEC of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community	
Daughter Directives:	
Council Directive 86/280/EEC on limit values and quality objectives for discharges of certain Dangerous Substances included in List I of the Annex to Directive 76/464/EEC.	**S.I. No. 43/1994**: Local Government (Water Pollution) Acts, 1977 and 1990 (Control of Carbon Tetrachloride, DDT and Pentachlorophenol Discharges) Regulations, 1994.
Council Directive 88/347/EEC amends the 1986 Directive by adding quality objectives for aldrin, dieldrin, endrin and isodrin, hexachlorobenzene, hexachlorobutadiene and chloroform.	**S.I. No. 348/1993**: Local Government (Water Pollution) Acts, 1977 and 1990 (control of Aldrin, Dieldrin, Endrin, Isodrin, HCB, HCBD and CHC13 Discharges) Regulations, 1993
Council Directive 90/415/EEC amends Annex II of 86/280/EEC on limit values and quality objectives for discharges of certain dangerous substances included in List I of the Annex to Council Directive 76/464/EEC.	**SI No. 245 of 1994**. Local Government (Water Pollution) Acts, 1977 and 1990 (Control of EDC, TRI, PER and TCB Discharges) Regulations, 1994

Table A2.1.1: Parameters and Emission Limits

Type of Industrial Plant (1) (2)	Type of average value	Limit Values expressed as (^{3})	
		weight	concentration
1. Carbon tetrachloride production by perchlorination	Monthly	a) Process involving washing: 40g $CC1_4$ per tonne of total production capacity of $CC1_4$ and per-chlorination.	1.5 mg/L
		b) process not involving washing: 2.5 g/tonne	1.5 mg/L
	Daily	a) Process involving washing: 80 g/tonne.	3 mg/L
		b) Process not involving washing: 5 g/tonne.	3 mg/L
2. Production of chloro-methanes by methane chlorination (including high-pressure electrolytic chlorine generation) and from methanol.	Monthly	10 g $CC1_4$ per tonne of total production capacity of chloromethanes.	1.5 mg/L
	Daily	20 g/tonne	3 mg/L
3. Production of chlorofluorocarbons	Monthly	-	-
	Daily	-	-

(1) Among the industrial establishments referred to under heading A, point 3, of Annex I, reference is made in particular to plants using carbon tetrachloride as a solvent.
(2) A simplified monitoring procedure may be introduced if annual discharges do not exceed 30 kg a year.
(3) In view of the volatility of carbon tetrachloride and in order to ensure compliance with Article 3(6), where a process involving agitation in the open air of effluent containing carbon tetrachloride is used, the Member States shall require compliance with the limit values upstream of the plant concerned; they shall ensure that all water likely to be polluted is taken fully into account.
(4) It is not possible at present to adopt limit values for this sector. The Council is to adopt such limit values at a later date, acting on a Commission Report.

Quality Objectives:

The above parameters must be sampled for in the area affected by discharges of the substances.

Quality Objectives: Parameters and Quality Objectives are given under Heading B as in Table A2.1.2.

Table A2.1.2 Quality Objectives

Environment	Quality Objective	Unit of Measurement
Inland surface waters	12	µg/L $CC1_4$
Estuary waters		
Internal coastal waters other than estuary waters.		
Territorial Waters		

Without prejudice to Article 6(3) of Directive 76/464/EEC, where there is no evidence of any problem in meeting and continuously maintaining the quality objective set above, a simplified monitoring procedure may be introduced.

Table A2.1.3 Limit Values for Emission Limits for DDT

Type of Industrial Plant (3) (4)	Type of average value	Limit Values expressed as ([3])	
		g/tonne of substances produced, handled or used	mg/L of water discharged
Production of DDT including formulation of DDT on the same side	Monthly	4	0.2
	Daily	8	0.4

(1) With regard to new plants, the best technical means must already make it possible to lay down, for DDT, emissions standards lower than 1 g/tonne substances produced.
(2) On the basis of experience gained in implementing this directive, the Commission will submit to the Council, pursuant to Article 6 (3) of this directive, in good time, proposals aimed at fixing more stringent limit values to enter into force by 1994.
(3) Among the industrial plants referred to under heading A, point 3 of Annex I, reference is made in particular to plants formulating DDT away from the production site and to the dicofol production industry.
(4) A simplified monitoring procedure may be introduced if annual discharges do not exceed 1kg a year.

Table A2.1.4 Quality Objectives for DDT

Environment	Quality Objective	Unit of Measurement
Inland surface waters	10 for isomer para-DDT 25 for total DDT	µg/L
Estuary waters		
Internal coastal waters other than estuary waters.		
Territorial Waters		

Table A2.1.5 Limit Values for Emission Limits for Pentachlorophenate

Type of Industrial Plant (1) (2)	Type of average value	Limit Values expressed as	
		g/tonne production/utilization capacity	mg/L of water discharged
Production of sodium pentachlorophenate by hydrolysis of hexachlorobenzene	Monthly	25	1
	Daily	50	2

(1) Among the industrial plants referred to under heading A, point 3, of Annex I, reference is made in particular to plants producing sodium pentachlorophenate by saponification and those producing pentachlorophenol by chlorination.
(2) A simplified monitoring procedure may be introduced if annual discharges do not exceed 3kg a year.

Table A2.1.6 Quality Objectives for Pentachlorophenate

Environment	Quality Objective	Unit of Measurement
Inland surface waters	2	µg/L
Estuary waters		
Internal coastal waters other than estuary waters.		
Territorial Waters		

Table A2.1.7: Limit Values for Emission Limits for Aldrin, Dieldrin, Endrin and Isodrin

Type of Industrial Plant (2)	Type of average value	Limit Values expressed as	
		weight	Concentration in effluent µg/L of water discharged ([3])
Production of aldrin and/or dieldrin and/or endrin including formulation of these substances on the same site.	Monthly	3g per tonne of total production capacity (g/tonne)	2
	Daily	15g per tonne of total production capacity (g/tonne) ([4])	10([4])

(1) The limit values indicated in this heading shall apply to the total discharge of aldrin, dieldrin and endrin.
If the effluent resulting from the production or use of aldrin, dieldrin and/or endrin (including formulation of these substances) also contains isodrin, the limit values laid down above shall apply to the total discharges of aldrin, dieldrin, endrin and isodrin.
(2) Among the industrial plants referred to under heading A, point 3 of Annex I, reference is made in particular to plants formulating aldrin, and/or dieldrin and/or endrin away from the production site.
(3) These figures take account of the total amount of water passing through the plant.
(4) If possible, daily values should not exceed twice the monthly value.

Table A2.1.8: Quality Objectives for Aldrin, Dieldrin, Endrin and Isodrin

Environment	Substance	Quality Objectives ng/L to be complied with as from	
		1.1.1989	1.1.1994
Inland surface waters	Aldrin	30 for the four substances in total with a maximum of 5 for endrin.	10
Estuary waters	Dieldrin		10
Internal coastal waters other than estuary waters.	Endrin		5
Territorial Waters	Isodrin		5
Standstill: The concentration(s) of aldrin and/or dieldrin and/or endrin and/or isodrin in sediments and/or molluscs and/pr shellfish and/or fish must not increase significantly with time.			

Table A2.1.9: Limit Values for Emission Standards for Hexachlorobenzene (HCB)

Type of Industrial Plant (1) (2) (3)		Limit Values expressed as	
		weight	concentration
1. HCB production and processing	Monthly	10 g HCB/tonne of HCB production capacity.	1 mg/L of HCB
	Daily	20 g HCB/tonne of HCB production capacity.	2 mg/L of HCB
2. production of perchloroethylene (PER) and carbon tetrachloride (CCl_4) by perchlorination	monthly	1.5 g HCB/tonne of PER + CCl_4 total production capacity	1.5 mg/L of HCB
	Daily	3 g HCB/tonne of PER + + CCl_4 total production capacity	3 mg/L of HCB
3. production of trichloroethylene and/or perchloroethylene by any other process([4])	Monthly	-	-
	daily	-	-

Table A2.1.10: Quality Objectives for Hexachlorobenzene (HCB)

Environment	Quality Objective	Unit of measurement
Inland surface waters	0.03	µg/L
Estuary waters		
Internal coastal waters other than estuary waters.		
Territorial Waters		
Standstill: the concentrations of HCB in sediments and/or molluscs and/or shellfish and/or fish must not increase significantly with time.		

Table A2.1.11: Limit Values for Emission Standards for Hexachlorobutadiene (HCBD)

Type of Industrial Plant (1) (2) (3)	Type of average value	Limit Values expressed as	
		weight	Concentration
1. production of perchloroethylene (PER) and carbon tetrachloride (CCl_4) by perchlorination	monthly	1.5 g HCBD/tonne of total production capacity of PER + CCl_4.	1.5 mg/L of HCB
	Daily	3 g HCBD/tonne of total production capacity of PER + + CCl_4	3 mg/L of HCB
2. production of trichloroethylene and/or perchloroethylene by any other process([4])	Monthly	-	-
	daily	-	-

(1) A simplified monitoring procedure may be introduced if annual discharges do not exceed 1kg a year.
(2) Among industrial plants referred to in Annex I, heading A, point 3, reference is made in particular to industrial plants using HCBD for technical purposes.
(3) On the basis of experience gained in implementing this Directive, and taking into account the fact that the use of best technical means already makes it possible to apply in some cases much more stringent limit values than those indicated above, the Council shall decide, on the basis of proposals from the Commission, upon more stringent limit values, such decision to be taken by January 1995.
(4) It is not possible at present to adopt limit values for this sector. The council shall adopt such limit values at a later stage, acting on a proposal from the commission. In the meantime, Member States will apply national emission standards in accordance with Annex I, heading A, point 3.
Standstill: There must be no significant direct or indirect increase over time in pollution arising from discharges of HCB and affecting concentrations in sediments and/or molluscs and/or shellfish and/or fish.

Table A2.1.12: Quality Objectives for Hexachlorobutadiene (HCBD) ([1])

Environment	Quality Objective	Unit of measurement	To be complied with as from
Inland surface waters	0.1	µg/L	1.1.1990
Estuary waters			
Internal coastal waters other than estuary waters.			
Territorial Waters			
Standstill: the concentrations of HCBD in sediments and/or molluscs and/or shellfish and/or fish must not increase significantly with time.			

(1) The Commission shall keep under review the possibility of setting more stringent quality objectives taking into account measured concentrations of HCBD in sediments and/or molluscs and/or shellfish and/or fish, and will report to the Council by January 1995, for decision as to whether any changes should be made to the Directive.

Table A2.1.13: Limit Values for Emission Standards for Chloroform ($CHCl_3$) ([1])

Type of Industrial Plant (2) (3)	Limit Values (monthly average) expressed as ([4])([5])		To be complied with as from
	weight	concentration	
1. production of chloromethanes from methanol or from a combination of methanol and methane ([6])	10 g $CHCl_3$ /tonne of total production capacity of chloromethanes.	1 mg/L	1.1.1990
2. Production of chloromethanes by chlorination of methane.	7.5 g $CHCl_3$ /tonne of total production capacity of chloromethanes.	1 mg/L	1.1.1990
3. Production of chlorofluorocarbon (CFC) ([7])	-	-	-

(1) In the case of chloroform, Article 3 of Directive 76/464/EEC shall apply to discharges from industrial processes which may in themselves contribute significantly to the level of chloroform in the aqueous effluent; in particular it shall apply to those mentioned under Heading A of this Annex. Article 5 of this Directive applies if sources other than those listed in this Annex are identified.
(2) Among the industrial plants referred to under Heading A, point 3 of Annex I, special reference is made, in the case of chloroform, to plants manufacturing monomer vinyl chloride using dichlorethane pyrolysis, those producing bleached pulp and other plants using $CHCl_3$ as a solvent and plants in which cooling waters or other effluents are chlorinated. The Council shall adopt limit values for these sectors at a later stage, acting on proposals from the Commission.
(3) A simplified monitoring procedure may be introduced if annual discharged do not exceed 30kg a year.
(4) Daily average limit values are equal to twice the monthly average values.
(5) In view of the volatility of chloroform and in order to ensure compliance with Article 3 (6), where a process involving agitation in the open air of effluent containing chloroform is used, the Member State shall require compliance with the limit values upstream of the plant concerned; they shall ensure that all water likely to be polluted is taken fully into account.
(6) i.e. by hydrochlorination of methanol, then chlorination of methyl chloride.
(7) It is not possible at present to adopt limit values for this sector. The Council shall adopt such limit values at a later date, acting on a proposal from the Commission. In the meantime, Member States will apply national emission standards in accordance with Annex I, heading A, point 3.

Table A2.1.14: Quality Objectives for Chloroform ($CHCl_3$) ([1])

Environment	Quality Objective	Unit of measurement	To be complied with as from
Inland surface waters	12	µg/L	1.1.1990
Estuary waters			
Internal coastal waters other than estuary waters.			
Territorial Waters			

(1) Without prejudice to Article 6 (3) of Directive 76/464/EEC, where there is no evidence of any problem in meeting and continuously maintaining the quality objective set out above, a simplified monitoring procedure may be introduced.

Table A2.1.15: Limit Values for Emission Standards ([1]) for 1,2-Dichloroethane (EDC)

Type of Industrial Plant (2) (3)	Type of average value	Limit Values expressed as		To be complied with as from
		Weight (g/tonne) ([4])	Concentration (mg/litre) ([5])	
a) production only of 1,2-dichloroethane (without processing or use on the same site)	monthly	4	2	1.1.1993
		2.5	1.25	1.1.1995
	Daily	8	4	1.1.1993
		5	2.5	1.1.1995
b) Production of 1,2-dichloroethane, and processing or use at the same site, except for the use defines in e) below.([6])([7])	Monthly	12	6	1.1.1993
		5	2.5	1.1.1995
	Daily	24	12	1.1.1993
		10	5	1.1.1995
c) Processing of 1,2-dichloroethane into substances other than vinyl chloride. ([8])	Monthly	2.5	1	1.1.1993
	Daily	5	2	1.1.1993
d) Use of EDC for degreasing metals (away from an industrial site covered by b)) ([9])	Monthly	-	0.1	1.1.1993
	Daily	-	0.2	1.1.1993
e) Use of EDC in the production of ion exchangers ([10])	Monthly	-	-	-
	Daily	-	-	-

(1) In view of the volatility of EDC and in order to ensure compliance with Article 3 (6) of Directive 86/280/EEC, where the process used involves open-air agitation of the effluents containing EDC, Member States must require compliance with the limit values upstream of the plants concerned; they must ensure that all waters likely to be polluted are properly taken into account.
2) The purified EDC production capacity includes that fraction of the EDC which is not cracked in the vinyl chloride (VC) production unit associated with the EDC production unit and which is recycled to the EDC purification section of the plant. Production or processing capacity is the capacity authorized by the administration or, failing that, the highest annual quantity produced or processed over the four years prior to the granting or review of the authorization. The capacity authorized by the administration should not differ greatly from actual production
(3) A simplified monitoring procedure may be introduced where annual discharges do not exceed 30 kg/year.
(4) These limit values relate: - for sectors (a) and (b), to purified EDC production capacity expressed in tonnes - for sector (c), to EDC processing capacity expressed in tonnes. However, in the case of sector (b), if the processing and utilization capacity is greater than the production capacity, the limit values shall be applied in relation to the global processing and utilization capacity. If there are several plants on the same site, the limit values shall apply to the plants taken together.
(5) Without prejudice to the provisions of heading A (4) in Annex I, these concentration limits relate to the following reference volumes: (a) 2 m3/tonne of purified EDC production capacity; (b) 2,5 m3/tonne of purified EDC production capacity; (c) 2,5 m3/tonne of EDC processing capacity.
(6) The limit values take account of all diffuse internal sources and/or of EDC used as a solvent within the industrial production site; this will ensure a reduction in EDC discharges of more than 99 %. . Nevertheless, the combination of the best available technology and the absence of any diffuse internal source enables reduction amounts greater than 99,9 % to be achieved. On the basis of the experience acquired in the application of the present measures, the Commission will present to the Council in good time proposals for more severe limit values to be applied from 1998.
(7) Where a Member State takes the view that, owing to the integration of EDC production with the manufacture of other chlorinated hydrocarbons, an EDC production process is unlikely to comply with these limit values by the 1 January 1993 deadline, it must advise the Commission thereof before 1 January 1991. A programme for the reduction of EDC discharges which will enable these limit values to be complied with by 1 January 1997 will be submitted to the Commission no later than 31 December 1993. The following limit value must, meanwhile, be complied with as at 1 January 1993: - 40 g EDC/tonne of purified EDC production capacity (monthly and daily averages). The limit value expressed as concentration is deduced on the basis of the volume of water discharged by the plant(s) concerned.
(8) The production of the following substances specifically is involved here: ethylene diamine, ethylene polyamine, 1.1.1.-trichloroethane, trichloroethylene and perchloroethylene.
(9) These limit values apply only to plants the annual discharges from which exceed 30 kg/year.
(10) It is not possible at present to adopt limit values for this sector. The Council shall adopt such limit values at a later stage, acting on a proposal from the Commission. In the meantime, Member States will apply national limit values in accordance with Annex I, heading A, point 3

Table A2.1.16: Quality Objectives for 1,2-Dichloroethane (EDC)

Environment	Quality Objective	Unit of measurement
Inland surface waters	10	µg/L
Estuary waters		
Internal coastal waters other than estuary waters.		
Territorial Waters		

Table A2.1.17: Limit Values for Emission Standards ([1]) for Trichloroethylene (TRI)

Type of Industrial Plant [2]	Type of average value	Limit Values expressed as	
		Weight (g/tonne) ([3])	Concentration (mg/litre) ([4])
a) Trichloroethylene (TRI) and perchloroethylene (PER) production.	Monthly	10	2
		2.5	0.5
	Daily	20	4
		5	1
b) Use of TRI for degreasing metals ([5])	Monthly	-	0.1
	Daily	-	0.2

1) In view of the volatility of trichloroethylene and in order to ensure compliance with Article 3 (6) of Directive 86/280/EEC, where the process used involves open-air agitation of the effluents containing tricholoroethylene, Member States must require compliance with the limit values upstream of the plants concerned; they must ensure that all waters likely to be polluted are properly taken into account. (2) A simplified monitoring procedure may be introduced where annual discharges do not exceed 30 kg/year. (3) For sector (a), limit values for TRI discharges relate to overall TRI + PER production capacity.
For existing plant using dehydrochlorination of tetrachloroethane, the capacity of production is equivalent to the capacity of TRI-PER production, the ratio of TRI-PER production taken at one third. Production or processing capacity is the capacity authorized by the administration or, failing that, the highest annual quantity produced or processed over the four years prior to the granting or review of the authorization. The capacity authorized by the administration should not differ greatly from actual production. (4) Without prejudice to the provisions of heading A (4) in Annex I, TRI limit concentrations relate to the following reference values:
- sector (a), 5 m3/tonne of TRI + PER production. (5) These limit values apply only to industrial plants the annual discharges from which exceed 30 kg/year

Table A2.1.18: Quality Objectives for Trichloroethylene

Environment	Quality Objective	Unit of measurement
Inland surface waters	10	µg/L
Estuary waters		
Internal coastal waters other than estuary waters.		
Territorial Waters		

Table A2.1.19: Limit Values for Emission Standards ([1]) for Perchloroethylene (PER)

Type of Industrial Plant [2]	Type of average value	Limit Values expressed as	
		Weight (g/tonne) ([3])	Concentration (mg/litre) ([4])
a) trichloroethylene (TRI) and perchloroethylene (PER) production (TRI-PER processes.	Monthly	10	2
		2.5	0.5
	Daily	20	4
		5	1
b) Carbon tetrachloride and perchloroethylene production (TETRA-PER processes)	Monthly	10	5
		2.5	1.25
	Daily	20	10
		5	2.5
c) Use of PER for degreasing metals ([5])	Monthly	-	0.1
	Daily	-	0.2
d) chlorofluorocarbon production ([6])	Monthly	-	-
	Daily	-	-

1) In view of the volatility of perchloroethylene and in order to ensure compliance with Article 3 (6) of Directive 86/280/EEC, where the process used involves open-air agitation of the effluents containing perchloroethylene, the Member States must require compliance with the limit values upstream of the plants concerned; they must ensure that all waters likely to be polluted are properly taken into account.
(2) A simplified monitoring procedure may be introduced where annual discharges do not exceed 30 kg/year.
(3) For sectors (a) and (b) the limit values for PER discharges relate either to overall TRI + PER production capacity or to overall TETRA + PER production capacity. Production or processing capacity is the capacity authorized by the administration or, failing that, the highest annual quantity produced or processed over the four years prior to the granting or review of the authorization. The capacity authorized by the administration should not differ greatly from actual production.
(4) Without prejudice to the provisions of heading A (4) in Annex I, PER limit concentrations relate to the following reference volumes:
- (a), 5 m3/tonne of TRI + PER production,
- (b), 2 m3/tonne of TETRA + PER production.
(5) These limit values apply only to industrial plants the annual discharges from which exceed 30 kg/year.
(6) It is not possible at present to adopt limit values for this sector. The Council shall adopt them at a later stage, acting on a proposal from the Commission. In the meantime, Member States will apply national emission standards in accordance with Annex I, heading A, point 3.

Table A2.1.20 Quality Objectives for Perchloroethylene (PER)

Environment	Quality Objective	Unit of measurement
Inland surface waters	10	µg/L
Estuary waters		
Internal coastal waters other than estuary waters.		
Territorial Waters		

Table A2.1.21: Limit Values for Emission Standards ([1]) for Trichlorobenzene (TCB)

Type of Industrial Plant	Type of average value	Limit Values expressed as	
		Weight (g/tonne) ([1])	Concentration (mg/litre) ([2])
a) Production of TCB via dehydrochlorination of HCH and/or processing TCB	Monthly	25	2.5
		10	1
	Daily	50	5
		20	2
b) Production and/or processing of chlorobenzenes via chlorination of benzene ([3]).	Monthly	5	0.5
		0.5	0.05
	Daily	10	1
		1	0.1

(1) The limit values for discharges of TCB (sum of the three isomers) are given:
- for sector (a): in relation to the total TCB production capacity,
- for sector (b): in relation to the total production or processing capacity for mono- and dichlorobenzenes. Production or processing capacity is the capacity authorized by the administration or, failing that, the highest annual quantity produced or processed over the four years prior to the granting or review of the authorization. The capacity authorized by the administration should not differ greatly from actual production.
(2) Without prejudice to the provisions of heading A (4) in Annex I, limit concentrations relate to the following reference volumes:
- sector (a): 10 m3/tonne of TCB produced or processed,
- sector (b): 10 m3/tonne of mono- and dichlorobenzene produced or processed.
(3) For the existing plants discharging less than 50 kg/year by 1 January 1995, the limit values which are to be complied with at this date are equal to half of the limit values which are to be complied with as from 1 January 1993

Table A2.1.22: Quality Objectives for Trichlorobenzene

Environment	Quality Objective	Unit of measurement
Inland surface waters	0.4	µg/L
Estuary waters		
Internal coastal waters other than estuary waters.		
Territorial Waters		

2.2 - Mercury

2.2 MERCURY DISCHARGES	
EU	**National**
Council Directive 84/156/EEC on Mercury Discharges by Sectors other than the Chlor-alkali Electrolysis Industry.	**S.I. No. 55/1986**. Local Government (Water Pollution) Act, 1977, (Control of Hexachlorocyclohexane and Mercury Discharges) Regulations.
Council Directive 82/176/EEC on Mercury Discharges by the Chlor-alkali Electrolysis Industry.	Note: Directive 82/176/EEC has not been transposed into Irish Regulations as no industries of this type exist in Ireland which discharge Mercury.
Council Directive 91/692/EEC of 23 December 1991 standardizing and rationalizing reports on the implementation of certain Directives relating to the environment	

Table A 2.2.1: Quality Standards for Discharges of Mercury

Industrial Sector	Unit of Measurement		Quality Standards to be complied with from:	
			1 July 1986	1 July 1989
1. Chemical industries using mercury catalysts.	A. Average concentration of mercury expressed as milligrams of mercury per litre of effluent discharged—	(a) maximum monthly	0.1	0.05
		(b) maximum daily	0.2	0.1
— in the production of vinyl chloride	B. Discharge of mercury expressed as grams per tonne of installed vinyl chloride production capacity—	(a) maximum monthly	0.2	0.1
		(b) maximum daily	0.4	0.2
— in other processes	Discharge of mercury expressed as grams per kilogram of mercury processed—	(a) maximum monthly	10	5
		(b) maximum daily	20	10
2. Manufacture of mercury catalysts used in the production of vinyl chloride	A. Average concentration of mercury expressed as milligrams of mercury per litre of effluent discharged—	(a) maximum monthly	0.1	0.05
		(b) maximum daily	0.2	0.1
	B. Discharge of mercury expressed as grams per kilogram of mercury processed—	(a) maximum monthly	1.4	0.7
		(b) maximum daily	2.8	1.4
3. Manufacture of organic and non-organic mercury compounds (except for products referred to in industrial sector 2)	A. Average concentration of mercury expressed as milligrams of mercury per litre of effluent discharged—	(a) maximum monthly	0.1	0.05
		(b) maximum daily	0.2	0.1
	B. Discharge of mercury expressed as grams per kilogram of mercury processed.	(a) maximum monthly	0.1	0.05
		(b) maximum daily	0.2	0.1
4. Manufacture of primary batteries containing mercury	A. Average concentration of mercury expressed as milligrams of mercury per litre of effluent discharged.	(a) maximum monthly	0.1	0.05
		(b) maximum daily	0.2	0.1
	B. Discharge of mercury expressed as grams per kilogram of mercury processed—	(a) maximum monthly	0.05	0.03
		(b) maximum daily	0.1	0.06
5. Non-ferrous metal industry	Average concentration of mercury expressed as milligrams of mercury per litre of effluent discharged—	(a) maximum monthly	0.1	0.05
		(b) maximum daily	0.2	0.1
6. Plants for the treatment of toxic wastes containing mercury	Average concentration of mercury expressed as milligrams of mercury per litre of effluent discharged—	(a) maximum monthly	0.1	0.05
		(b) maximum daily	0.2	0.1

2.3 - Cadmium

2.3 CADMIUM DISCHARGES	
EU	**National**
Council Directive 83/513/EEC Limit Values and Quality Objectives for Cadmium Discharges.	**S.I. No. 294/1985**. Local Government (Water Pollution) Act. (Control of Cadmium Discharges) Regulations, 1985.
Council Directive 91/692/EEC of 23 December 1991 standardizing and rationalizing reports on the implementation of certain Directives relating to the environment	

Table A2.3.1: Quality Standards for Discharges of Cadmium

Industrial Sector	Unit of Measurement		Quality Standards to be complied with from	
			1/1/1986	1/1/1989
1. Zinc mining, lead and zinc refining, cadmium metal and non-ferrous metal industry.	Flow-weighted average concentration of total cadmium expressed as milligrams of cadmium per litre of effluent discharged.	(a) monthly	0.3	0.2
		(b) daily	0.6	0.4
2. Manufacture of cadmium compounds.	A. Flow-weighted average concentration of total cadmium expressed as milligrams of cadmium per litre of effluent discharged	(a) monthly	0.5	0.2
		(b) daily	1.0	0.4
	B. Average discharge of cadmium expressed as grams per kilogram of cadmium used—	(a) monthly	0.5	0.5
		(b) daily	1.0	1.0

Industrial Sector	Unit of Measurement		Quality Standards to be complied with from	
			1/1/1986	1/1/1989
3. Manufacture of pigments.	A. Flow-weighted average concentration of total cadmium expressed as milligrams of cadmium per litre of effluent discharged	(a) monthly	0.5	0.2
		(b) daily	1.0	0.4
	B. Average discharge of cadmium expressed as grams per kilogram of cadmium used	(a) monthly	0.3	0.3
		(b) daily	0.6	0.6
4. Manufacture of stabilizers.	A. Flow-weighted average concentration of total cadmium expressed as milligrams of cadmium per litre of effluent discharged	(a) monthly	0.5	0.2
		(b) daily	1.0	0.4
	B. Average discharge of cadmium expressed as grams per kilogram of cadmium used	(a) monthly	0.5	0.5
		(b) daily	1.0	1.0
5. Manufacture of primary and secondary batteries	A. Flow-weighted average concentration of total cadmium expressed as milligrams of cadmium per litre of effluent discharged	(a) monthly	0.5	0.2
		(b) daily	1.0	0.4
	B. Average discharge of cadmium expressed as grams per kilogram of cadmium used.	(a) monthly	1.5	1.5
		(b) daily	3.0	3.0
6. Electroplating.	A. Flow-weighted average concentration of total cadmium expressed as milligrams of cadmium per litre of effluent discharged	(a) monthly	0.5	0.2
		(b) daily	1.0	0.4
	B. Average discharge of cadmium expressed as grams per kilogram of cadmium used	(a) monthly	0.3	0.3

2.4 - Hexachlorocyclohexane (HCH)

2.4 HEXACHLOROCYCLOHEXANE (HCH) DISCHARGES	
EU	**National**
Council Directive 84/491/EEC on Limit Values and Quality Objectives for Discharges of Hexachlorocyclohexane.	**S.I. No. 55/1986.** Local Government (Water Pollution) Act, 1977, (Control of Hexachlorocyclohexane and Mercury Discharges) Regulations.
Council Directive 91/692/EEC of 23 December 1991 standardizing and rationalizing reports on the implementation of certain Directives relating to the environment	

Table A 2.4.1: Quality Standards for Discharges of HCH.

Industrial Sector	Unit of Measurement		Quality Standards to be complied with from:	
			01/04/1986	01/04/1988
1. Plant for the production of HCH	A. Flow weighted average concentration of HCH expressed as milligrams of HCH per litre of effluent discharged.	a) maximum monthly	3	2
		b) maximum daily	6	4
	B. Average discharge of HCH expressed as grams of HCH per tonne of HCH produced.	a) maximum monthly	3	2
		b) maximum daily	6	4
2. Plant for the extraction of Lindane	A. Flow weighted average concentration of HCH expressed as milligrams of HCH per litre of effluent discharged.	a) maximum monthly	8	2
		b) maximum daily	16	4
	B. Average discharge of HCH expressed as grams of HCH per tonne of HCH used.	a) maximum monthly	15	4
		b) maximum daily	30	8
3. Plant where the production and extraction of Lindane is carried out.	A. Flow weighted average concentration of HCH expressed as milligrams of HCH per litre of effluent discharged.	a) maximum monthly	6	2
		b) maximum daily	12	4
	B. Average discharge of HCH expressed as grams of HCH per tonne of HCH produced.	a) maximum monthly	16	5
		b) maximum daily	32	10

Appendix B - Overview of Monitoring Programmes

The results of the monitoring programmes listed below will be further assessed as part of the RBD characterisation process

- A survey of Dangerous Substances in surface freshwaters 1999-2000 found that there was no evidence from any of the targeted pesticides and other organic substances in the 74 sites which were surveyed. However, in two cases concentrations of copper, lead and zinc were found, which exceeded recognised limits for freshwaters. In addition, concentrations of aluminium or barium were found to exceed standards at ten locations. This dangerous substance monitoring is ongoing annually at a smaller number of sites. From 2002-03 monthly monitoring was conducted at 15 sites on the main draining rivers in Ireland. The selected sites were downstream of all potential sources of pollution (urban areas, industrial facilities, arable and market farming areas). The results were as follows. Volatile Organic Compounds (VOC's)- No VOC's were detected at any of the sites (178 samples in total). Pesticides and PCB's- 193 samples were tested for Simazine. A total of 21 samples from seven different sites tested positive for Simazine. Atrazine- 193 samples were tested for atrazine. A total of 18 samples from seven different sites tested positive for atrazine. Lindane- 165 samples were tested for Lindane. One sample tested positive for Lindane. Chlorinated pesticides- 165 samples were tested for chlorinated pesticides but no sample tested positive. (Poly)Chloro-BiPhenyls (CB's) - 165 samples were tested, only one sample tested positive for CB 52, CB101, CB118 and CB153.

- Dangerous substance screening monitoring was completed under monitoring and management system projects. However the findings of these programmes were not conclusive due to sample analysis inconsistencies.

- The Phosphorus Regulations require that water quality be maintained or improved in reference to the baseline quality rating (rivers) or trophic status (lakes) assigned by the agency in the 1995-1997 review period or at the first occasion thereafter. Water quality targets set in the regulations must be met by 2007 for waters which were surveyed by the EPA in the 1995-1997 periods or within a maximum of ten years after they were surveyed. The National Implementation report 2003 showed that the water quality at 61.8% of the monitoring stations nationally is compliant with the Regulations i.e., the water quality at these stations meets the biological and the phosphorus targets which were put in place by the Regulations. This represented an increase of 1.1% in compliance from the previous reporting period of 2001.

- The Dangerous Substances Regulations, 2001, deals with water quality standards in relation to certain substances in surface waters, e.g., rivers, lakes and tidal waters. The substances include certain pesticides (atrazine, simazine, and tributyltin), solvents (dichloromethane, toluene, and xylene), metals (arsenic, chromium, copper, lead, nickel, zinc) and certain other compounds (cyanide and fluoride). The Regulations require each Local Authority to prepare a Dangerous Substances Report, setting out the measures to be taken to ensure compliance with the

specified standards for Dangerous Substances in line with Regulations. There was a requirement to submit this report to the EPA by 31st July 2002. Each Local Authority shall then submit an Implementation report on the progress being made by 31st July 2004. Within nine months of this, 31st March 2005, the agency is required to prepare and publish reports on the progress made in relation to the implementation of the Regulations including any recommendations as it considers appropriate. Three hundred and twenty six sites were monitored nationally to date under the Dangerous Substances Regulations in over 150 rivers. Of these 326 sites, 78.5% were compliant. The majority of sites which failed compliance did so in relation to metals such as zinc, copper, lead and chromium.

- The European Pollution Emission Register was developed under the Integrated Pollution Prevention and Control Directive according to Article 15 of Council Directive 96/61/EC and covers all of the industrial activities that are covered by the Directive itself. It involves reporting on a total of 50 different substances that are released to air and/or water. There are only 26 which are directly prioritised aquatic pollutants. Since February this year the EPER website provides, for the first time, a consistent set of data reporting details of pollutants that have been released into air and water from industrial facilities across all countries within the European Union. In Ireland in terms of waters. The totals show that Nickel, Copper, Dichloromethane, Total Nitrogen, Total Phosphorus, Zinc and Chromium appear above there thresholds in certain industries.

- Determination of water quality, trace metals and chlorinated hydrocarbons in shellfish waters is carried out by the Marine Institute in part fulfilment of the monitoring requirements of various EU legislation, including: 79/923/EEC- Quality required of shellfish growing waters and 91/492/EEC-health conditions for the production and placing on the market of live bivalve molluscs. Shellfish are collected annually from approximately 24 locations around Ireland. These are tested for Mercury, trace metals Lead (Pb), Cadmium (Cd), Chromium (Cr) Copper (Cu), Zinc (Zn), Nickel (Ni), Silver (Ag) and chlorinated hydrocarbons (Polychlorinated biphenyls (PCB's) and organochlorine pesticides (OCP's). The levels were compared with the available EU human consumption maximum limits (Hg, Cd, Pb). Where these were not available strictest standards and guidance values for human consumption used by other OSPAR member states were used. The water quality from shellfish growing areas was good and conformed to guidelines and requirements of the directive. The levels in shellfish are generally low and do not exceed the human consumption standards. A 10 year review of shellfish monitoring data is currently being undertaken. This will include an environmental assessment of levels and trends of these contaminants in areas sampled.

- The Marine Institute collected dogwhelk and periwinkle specimens from six bays and estuaries in 2000, where Tributyl Tin (TBT) contamination was suspected. It was decided as part of the OSPAR program that certain regions in Ireland should be studied every six years. In four estuaries, shells of dead Pacific oysters were collected from 7 sites. Observations on

imposex in dogwhelks, intersex in periwinkles and shell thickness in the Pacific oysters were used to assess the degree of TBT contamination. The results showed low levels of contamination, which are unlikely to have detrimental effects to mollusc culture or fisheries in Mulroy Bay, Valentia Harbour or Tralee Bay. Thickening of oyster shells was detected in Carlingford Lough, Waterford Harbour, Cork Harbour and Fountainstown.

- In 1988 the Paris Commission initiated a programme to study riverine inputs. The objective of the programme was to quantify river-borne loads of selected priority contaminants at the freshwater limits of rivers discharging to marine areas. The substances which were to be monitored were mercury, cadmium, copper, lead, zinc, hexachlorocyclohexane (lindane), ortho-phosphate, total phosphorus, total nitrogen and suspended solids. A pilot programme was conducted in Ireland in 1986 and 1987. Additional parameters were monitored including biochemical oxygen demand (BOD) and the pesticides aldrin, dieldrin, parathion and endrin. Follow up studies were undertaken from 1990 to 1996. The rivers were sampled during the winter months to coincide with the high flows each year. The results from this study can be seen below taken from Marine Institute report "Irelands Marine and Coastal Areas and Adjacent Seas.

Nutrients

Table Annex 1 1.1 Estimated annual loads (ktonnes) of oxidised nitrogen (nitrate & nitrite) between 1986-1996 (flow weighted annual concentrations multiplied by annual mass) for the principle rivers discharging to Irish marine areas.

	1986	**1987**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
Irish Sea	10.90	10.83	12.16	15.27	8.94	14.76	14.88	13.07	19.70
Celtic Sea	n/a	n/a	26.27	29.51	16.51	25.28	31.91	32.28	38.60
Atlantic	n/a	n/a	22.08	23.00	14.86	14.68	16.43	14.83	27.02
Total	n/a	n/a	60.51	67.78	40.31	54.72	63.22	60.18	82.32

Table Annex 1 1.2 Estimated annual loads (ktonnes) of Ammonia-N from 1990-1996 (flow weighted annual concentrations multiplied by annual mass) for the principle rivers discharging to Irish marine areas.

	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
Irish Sea	3.74	5.93	2.54	6.28	3.94	1.45	1.09
Celtic Sea	0.91	0.46	0.76	1.10	1.49	1.23	1.46
Atlantic	0.52	0.44	0.34	0.63	0.67	0.86	0.54
Total	5.17	6.83	3.64	8.01	6.10	3.54	3.09

Table Annex 1 1.3 Estimated annual loads (ktonnes) of total nitrogen from 1990-1996 (flow weighted annual concentrations multiplied by annual mass) for the principle rivers discharging to Irish marine areas.

	1990	1991	1992	1993	1994	1995	1996
Irish Sea	24.04	31.88	22.50	34.90	28.76	18.72	24.60
Celtic Sea	35.77	37.80	24.05	38.63	46.51	41.61	50.30
Atlantic	35.86	30.56	27.45	27.79	32.96	27.29	35.90
Total	95.67	100.24	74.00	101.32	108.23	81.62	110.80

Table Annex 1 1.4 Estimated annual loads (tonnes) of soluble reactive phosphorus (SRP) 1986-96 (flow weighted annual concentrations multiplied by annual mass) for the principle rivers discharging to Irish marine areas.

	1986	1987	1990	1991	1992	1993	1994	1995	1996
Irish Sea	254	218	225	220	221	362	317	302	210
Celtic Sea	n/a	n/a	613	485	701	952	1030	773	850
Atlantic	n/a	n/a	540	491	611	639	789	771	500
Total	n/a	n/a	1378	1196	1533	1953	2136	1846	1560

Table Annex 1 1.5 Estimated annual loads (tonnes) of metals, 1990-1996 (flow weighted annual concentrations multiplied by annual mass) for the principle rivers discharging to Irish marine areas.

	1990	1992	1993	1994	1995	1996
Copper	12.3	8.71	15.8	15.9	8.34	13.47
Zinc	122.8	69.4	153.6	168.4	113.7	155.9
Lead	2.62	1.22	2.4	2.37	4.66	2.46
Cadmium	0.436	0.255	0.437	0.463	0.201	0.481

During the initial pilot study conducted in the Irish Sea region in 1986 and 1987 the measurement of pesticides encountered generally low levels. In the later studies these were discontinued.

- The Marine Institute carries out an annual Winter nutrient monitoring survey in the Western Irish Sea and into the Celtic Sea. A 10 year review (1990-2000) of monitoring was recently published (McGovern 2002). It concluded that although there was evidence for nutrient enrichment in some estuarine waters and possibly to a lesser extent in some coastal waters, there is little evidence for generally elevated nutrient levels in coastal and offshore waters in the Western Irish Sea. Trend analysis suggested a decrease in ortho-P levels, although more evidence is required and further investigations in regional trends due to, for instance, climatic

change is required. Estimated trends in winter nutrient concentrations were not consistent with estimated trends in Irish riverine inputs.

- The Marine Institute annually sample fish at 5 major fishing ports (1997-2000) Castletownbere (West Cork), Dunmore East (Waterford), Howth (Dublin), Rossaveal (Galway), Killybegs (Donegal). These were analysed for Mercury (Hg) and selected samples from each port were analysed for other trace metals Lead (Pb), Cadmium (Cd), Chromium (Cr) Copper (Cu), Zinc (Zn) and chlorinated hydrocarbons (Polychlorinated biphenyls (PCB's) and organochlorine pesticides (OCP's). The levels were compared with the available strictest standards and guidance values for human consumption used by other OSPAR member states were used. Overall the levels of lead and cadmium detected in the edible portion of the fish were low and within the standards. The levels of the additional contaminants were all well below the strictest values listed.

- The Marine Institute in 1997 collected 55 samples, covering 18 different fish species, which were measured for Toxaphene. Overall no samples were shown to exceed existing German MRL or Canadian recommendations. This was carried out as part of the EU funded MATT project.

- The Marine Institute collected environmental data in accordance the OSPAR CEMP and other national requirements. This includes fish and mussel temporal trends as well as a sediment monitoring dataset. Sediment surveys of major estuaries have been carried out in recent years and trace metals, PCB's, Organochlorine pesticides, brominated flame retardants, PAH and organotins have been tested. Monitoring data is currently undergoing assessment

- The Marine Institute, (1999), reviewed data from sediment sampling in harbour areas in 22 sites since 1988. They reviewed such parameters as Mercury, Cadmium, Tributlytin (TBT), Lead, Zinc, Copper, Chromium, Arsenic, Nickel, PCB's and DDT.
    - Mercury - 18 harbour sites were sampled for mercury analysis, four of these sites showed elevated concentrations (>0.05 mg/kg). These were Dublin Port, Dun Laoghaire, and Cork Harbour and in a small area of Bantry harbour.
    - Cadmium - Elevated cadmium concentrations (>1.0 mg/kg) have been detected repeatedly in sediment samples from Dublin and Cork harbour areas.
    - Tributyl Tin (TBT) - Seven of the ten sites investigated detected levels in the sediment (>0.8 mg/kg). It is likely that this contamination comes from the use of TBT-based antifouling paints on vessels.
    - Lead - Elevated lead concentrations (>50 mg/kg) have been detected in sediments at Dublin Port, Dun Laoghaire, Avoca estuary and Bantry harbour.
    - Zinc - Elevated levels of zinc (>80 mg/kg) have been found at a number of harbours around the coast. The Boyne and Avoca estuaries, Dublin Port, Dun Laoghaire, New Ross and Waterford Ports, Cork Harbour and Bantry

- Copper - Elevated copper concentrations (>20 mg/kg) have been detected in Cork and Dun Laoghaire but the highest occur in the Avoca estuary (highest-due to mining), Bantry harbour, Dublin Port.
- Chromium - Elevated levels of Chromium (>30 mg/kg) have been detected in Dungarvan harbour, upper Suir estuary above Waterford, Dublin Port, Dun Laoghaire harbour and New Ross.
- Arsenic - Elevated levels of arsenic (>10 mg/kg) have been detected in the Boyne estuary, Dublin Port, Dun Laoghaire, Avoca and Bantry Harbour.
- Nickel - Elevated levels of nickel (25 mg/kg) were detected in Dublin Port.
- PCB - PCB's were detectable at all 65 sites samples. Contamination above background was evident at just five sites. Three of these sites were in Cork harbour and two in Dublin port.
- DDT - Normalisation of data against organic carbon revealed six outliers that represent slight contamination above the background levels. The locations of these are as follows; two in Cork harbour, one in Dublin port and three in the Irish seas.

USER COMMENT FORM

NOTE: Completed comments to be forwarded to: Ms Mary Boothman, Department of the Environment, Heritage and Local Government, Custom House, Dublin 1

Document Title: Discussion Document - Rationale for Deriving National Priority Action, Candidate Relevant Pollutant and Candidate General Component Substances Lists for Surface Waters

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