Water Quality (Dangerous Substances) Regulations, 2001

S.I. No. 12 of 2001

GUIDANCE MANUAL TO LOCAL AUTHORITIES ON PREPARATION AND SUBMISSION OF MEASURES AND IMPLEMENTATION REPORTS

Environmental Protection Agency

An Ghníomhaireacht um Chaomhnú Comhshaoil

MEASURES AND IMPLEMENTATION REPORTS

PREAMBLE

The Dangerous Substances Regulations, 2001, prescribe 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, tributyltin[1]), solvents (dichloromethane, toluene, xylene), metals (arsenic, chromium, copper, lead, nickel, zinc) and certain other compounds (cyanide and fluoride). The Regulations give further effect to the EU Dangerous Substances Directive (76/464/EC) and give effect to certain provisions of the EU Water Framework Directive (2000/60/EC).

This document sets out a general framework for the Dangerous Substances Measures and Implementation reports along with guidance on what the reports should contain. The purpose of preparing this document is to facilitate a consistent approach to implementation of the Regulations and reporting of same.

Reporting obligations set out in the Regulations are attached as Annex A.

SUBMISSION OF THE MEASURES AND IMPLEMENTATION REPORTS

Each local authority is required to submit a Measures Report to the EPA by 31 July 2002 in line with Article 10(1) of the Regulations. This report should clearly set out the status of dangerous substances in waters in their functional area; the targets to be achieved; an analysis of potential pressures; and a programme of measures to achieve the standards required in the Regulations.

In addition, under Article 10(2), each local authority must submit an Implementation Report to the EPA by 31 July 2004 and every two years thereafter. This report should detail the current water quality and targets; any further information gathered on potential pressures; and the progress made in implementing the proposed measures in each local authority area. It is also important that each local authority should provide information on problems that they may have encountered in the implementation of the Regulations and highlight successes. In particular, local authorities should discuss the relative success of measures applied.

Only reports prepared specifically for the implementation of these Regulations will suffice. Other reports, such as those by Catchment Management & Monitoring Schemes or River Basin Management System Projects, will not be considered. However, it is strongly recommended that further information on dangerous substances arising as a result of these projects be considered by local authorities in the implementation of the Regulations and be reported on in local authority Measures/Implementation Reports where relevant.

[1] The standard for tributyltin applies 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.

Measures and Implementation Reports prepared for the purpose of the Dangerous Substances Regulations may be submitted with reports required under the Phosphorus Regulations, 1998. The Report should be concise. The main body of the report should be restricted to approximately 20 pages with maps and data attached as Appendices. In addition to a hard copy of the Report, the main body of the report together with any tabular appendices should also be provided in electronic format.

GENERAL APPROACH

The EPA recommends the use of an environmental management systems approach to implementation of the Regulations. This approach operates on the basic principle of **continual improvement**, which is at the heart of the Regulations. The common principles underpinning an environmental management system approach are outlined in Figure 1, adapted to the requirements of the Regulations.

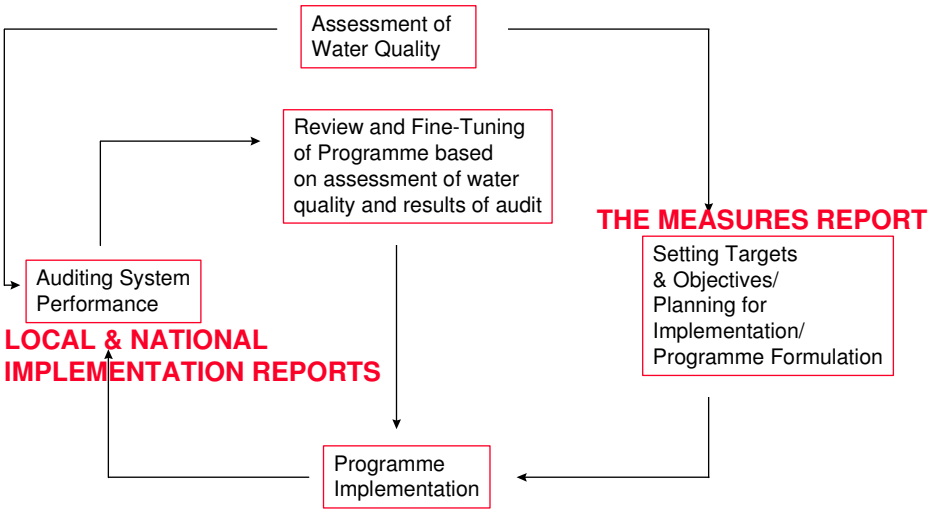

Figure 1 Generalised Environmental Management Systems Approach Adapted to Requirements of the Regulations

On an operational level the environmental management system consists of:

- initial review (in this case baseline status of water quality, analysis of pressures on water resources, review of monitoring programmes etc.);
- formulation of measures and targets;
- formulating an environmental management programme or, in this case, an implementation programme for achieving the targets;
- assigning responsibility for achieving targets and implementing actions;
- implementing the programme;
- auditing the performance of the programme; and
- reviewing and fine tuning the programme until the standards are met.

The environmental management programme is often described as the engine for continual improvement. However, targets will only be met by keeping the system

dynamic and subjecting the system to periodic auditing to assess the relative success of measures chosen for meeting the targets. Auditing, in turn, provides information that can be used for reviewing and fine tuning the system so that changes or modifications can be made where necessary.

As local authorities are obliged to report every two years to the EPA on the implementation of the Regulations, the EPA recommends that a system audit be conducted prior to preparation of each Implementation Report. Therefore any changes or modifications necessary to meet the standards can be included in the updated Implementation reports.

MAIN HEADINGS FOR MEASURES AND IMPLEMENTATION REPORTS

The EPA recommends the following main headings for the Measures and Implementation Reports. The Measures Report should report on Sections 1-3 and the Implementation Reports should report on Sections 1-4. Each local authority is to follow this general layout so that consistent reporting is achieved. This guidance provides details about the type of information that should be submitted in each section of the Report.

SECTION 1 - CURRENT WATER QUALITY STATUS AND TARGETS

SECTION 2 - IDENTIFICATION OF POTENTIAL PRESSURES

SECTION 3 - PROGRAMME FOR IMPLEMENTATION

SECTION 4 – PROGRESS TO DATE (IMPLEMENTATION REPORT ONLY)

Template Tables are provided in Annex C which are to be used for provision of summary information on:

- current status of water quality with regard to all of the dangerous substances
- standards to be achieved by 2010
- measures, targets and actions to be implemented

SECTION 1: CURRENT WATER QUALITY STATUS AND TARGETS

This section should include current information on dangerous substances in waters in a local authority functional area and standards to be achieved by 2010. Information to be provided should include:

- The existing condition of a water body for each parameter specified in the Regulations, where the existing condition is defined as the condition most recently determined by a local authority or the EPA prior to the making of the Regulations. Where such condition has not been so determined, the condition of a water body as first determined by a local authority or the EPA after the making of the Regulations.

- Clear identification of the condition of water bodies in relation to the standards specified in Table 1 and 2 of the Schedule under the following headings:
  - satisfactory – waters that require protection;
  - unsatisfactory – waters that require improvement to a specified standard.

- Clear identification of the standards a local authority is required to achieve by December 31, 2010. Performance will ultimately be measured against the achievement of these standards.

- Identification of any water bodies where the specified standard shall not apply for such a period (not exceeding five years), subject to the approval of the EPA, due to the water body being so affected by human activity that compliance with the relevant standard within that period is not feasible or would be disproportionately expensive (Article 9(1)).

- Identification of any water bodies so permanently affected by naturally occurring conditions or by past human activity that compliance with the relevant standard is not feasible or would be disproportionately expensive, subject to the approval of the EPA (Article 9(2)).

- If Article 9(1) extensions or Article 9(2) exemptions are proposed, the basis for such extensions/exemptions should be elaborated upon. Local authorities should also differentiate between cases where IPC activities are involved and those where they are not involved. This has implications for the decision making process associated with such extensions/exemptions, where they might apply. The decision in relation to whether an Article 9(1) extension or Article 9(2) exemption is appropriate is subject to consideration by the EPA.

- A Template Table is provided in Annex C for provision of the above information. An electronic version of this table will also be provided. Further maps/data on the condition of water bodies may be attached as Appendices to the report. The maps/data should also indicate where extensions are proposed under Article 9(1) and where there is a proposal for a water body to be exempted under Article 9(2).

SECTION 2: IDENTIFICATION OF POTENTIAL PRESSURES

This section should include an assessment of the use of each dangerous substance in the local authority area. Information is provided in Annex D on the potential uses of each dangerous substance, to provide assistance in identifying and quantifying potential pollution sources. It is important to note that Annex D is not necessarily exhaustive and that each local authority should identify likely sources of each dangerous substance within its functional area.

Information to be provided should include:

- A preliminary identification of pressures, which may pose a threat to water quality in relation to the relevant dangerous substances, and therefore require further investigation. An assessment should be made of activities that may potentially be contributing to unsatisfactory levels of dangerous substances in rivers/lakes/tidal waters. This should include a consideration of point and non-point source inputs of both rural and urban origin relevant in the particular catchment and/or sub-catchment, such as inputs from:

    - wastewater and drinking water treatment works
    - urban stormwater overflows and runoff
    - industrial and other point-source discharges
    - mining activities
    - illegal / legal landfills
    - agricultural run-off
    - discharges from farm yards
    - groundwater – e.g. movement of dangerous substances from soil through groundwater into rivers and lakes
    - afforestation

- A catchment-based analysis of causes of unsatisfactory levels of dangerous substances and threats to waters currently considered to be of satisfactory quality. An attempt should be made to identify the primary cause or causes of elevated levels of dangerous substances for each part of river/lake/tidal water affected so that appropriate sub-catchment measures can be identified and included in the **Implementation Programme**.

- Proposed new monitoring locations where considered necessary, to ensure that surface waters at **highest risk** of pollution from dangerous substances are identified and monitored.

This section should be updated in subsequent implementation reports as further information on dangerous substances arises.

SECTION 3: PROGRAMME FOR IMPLEMENTATION

In the **Measures Report** a programme for implementation of the requirements of the Regulations should be drawn up for:

a) the County as a whole, and
b) each river / lake / tidal water or catchment / subcatchment

These Programmes should be designed to be dynamic and are to be subjected to regular review depending on the relative success of their implementation. As stated above, the EPA recommends an environmental management systems approach to the implementation of the Regulations and the preparation and implementation of these programmes.

The programmes should identify or seek to identify the particular measures suitable to deal with specific problems in the County and specific rivers/lakes/tidal waters or catchments/sub-catchments within the county. Vague aspirational statements should be avoided (e.g., avoid statements such as 'enforcement of Water Pollution Acts' - instead state which aspects of the Acts are to be or are being enforced, with numbers of Section notices issued, licences to be reviewed, etc.). A list of general measures grouped under a number of headings is provided in Annex B as a general guide to measures available. This is not presented as an exhaustive list and each local authority will need to consider what specific measures are appropriate for its own situation. For specific measures, targets can be defined for catchments/sub-catchments or for the County as a whole.

It is recognised that a certain amount of flexibility will be required with regard to the use of various measures over the lifetime of the Regulations. However, it is important, in the early stages of implementation, to think about which specific measures are appropriate for specific problems so that workable and achievable Implementation Programmes can be put in place.

Programmes should specify measures for both the preservation and improvement of water quality and how the local authority intends to implement these measures both at County level and for individual catchments. This will include the setting of targets for specific measures and a description of the actions required to meet those targets.

The programme(s) should also identify what is planned to be achieved at both county and catchment level in:

- the immediate term (by July 31, 2004);
- the short term (by July 31, 2006);
- the medium term (by July 31, 2008); and
- the long term (by July 31, 2010 and beyond).

The dates suggested coincide with those specified for submission of the Implementation Reports (see Annex A).

The summary **Implementation Programme Tables** provided in Annex C are provided as a guide for tracking the implementation of measures at catchment/sub-catchment level. An electronic version of these tables will also be provided. They provide for a summary description of measures, targets, actions, timeframes and assigned responsibilities. More detailed descriptions of the various Programmes for

Implementation at County / River / Lake / Tidal Water level may be included in the main body of the Report.

In the **Implementation Reports** an update should be given on the status of each measure, in order to track implementation of the measures proposed in the Measures Report. This should include a concise summary of action taken since the previous report and whether the measure has been completed or not. If the measure has not been completed a revised timescale for completion should be proposed, where appropriate. For measures that are ongoing, progress to date should be reported.

As implementation of the Regulations will be an iterative process and depend largely on whether water quality is improving or being preserved and possible legislative or policy developments, it is expected that new measures will be proposed over the lifetime of the Regulations. These new measures, with timescales and responsibility assigned, should be clearly identified.

SECTION 4 – PROGRESS TO DATE (IMPLEMENTATION REPORT ONLY)

It is important that, in the main body of the report, local authorities highlight successes they have had in implementation of the Regulations, with particular reference to measures that have been effective. In addition, local authorities should outline any problems they have encountered in implementation of the Regulations and suggest possible solutions. Each local authority should also outline its future plans and any new initiatives proposed for implementation of the Regulations.

The measures proposed for implementation fall into five general categories (Annex B). This list of measures is not exhaustive but should serve as a useful reference. The layout of this Section in the Implementation Report should follow that presented below.

4.1 Planning Control and Enforcement Measures
a) Progress During Reporting Period
b) Problems Encountered
c) Future Plans/New Directions

4.2 Consultative and Co-operative Measures
a) Progress During Reporting Period
b) Problems Encountered
c) Future Plans/New Directions

4.3 Monitoring Measures
a) Progress During Reporting Period
b) Problems Encountered
c) Future Plans/New Directions

4.4 Public Education and Advisory Measures
a) Progress During Reporting Period
b) Problems Encountered
c) Future Plans/New Directions

4.5 Other National and Miscellaneous Measures relevant to Dangerous Substances
a) Progress During Reporting Period
b) Problems Encountered
c) Future Plans/New Directions

4.6 Summary and Conclusions
a) Progress During Reporting Period
b) Problems Encountered
c) Future Plans/New Directions

Useful References

Water Quality (Dangerous Substances) Regulations, 2001 (S.I. No. 12 of 2001)

Stephens, 2001. A Survey of Dangerous Substances in Surface Freshwaters 1999-2000. EPA, Ireland

An Foras Talúntais, 1980. Soil Associations of Ireland and their Land Use Potential. Soil Survey Bulletin No. 36. An Foras Talúntais.

Bowden, 1994. A Study of Heavy Metals in the Natural Environment in proposed Mining Areas. EC Stride Environment Subprogramme Measure 1. EPA Regional Water Laboratory, Kilkenny.

Bowman, J.J., 2000. River Shannon. Lake Water Quality Monitoring 1998 and 1999. EPA, Ireland.

Bowman, J.J. and Toner, P.F., 2001. National Lake Water Quality Monitoring Programme. A Discussion Document. EPA, Ireland.

Department of Agriculture, Food and Rural Development, 2000. Agri-Environmental Specifications for REPS 2000.

Department of Agriculture, Food and Rural Development, 2000. Farm Waste Management Scheme.

Department of Agriculture, Food and Rural Development, 2001. Good Farming Practice.

Department of the Environment and Local Government, 1997. Sustainable Development, A Strategy for Ireland.

Department of the Environment and Local Government, Environmental Protection Agency & Geological Survey of Ireland, 1999. Groundwater Protection Schemes.

Department of the Environment and Local Government. Code of Good Practice for the Use of Biosolids in Agriculture. Guidelines for Farmers. Fehily, Timoney and Company.

Department of the Environment and Local Government. Code of Good Practice for the Use of Biosolids in Agriculture. Guidelines for Local Authorities. Fehily, Timoney and Company.

EPA, 1997. Environmental Quality Objectives and Environmental Quality Standards, The Aquatic Environment, A Discussion Document.

EPA, 2000. Ireland's Environment: A Millennium Report.

EPA, 2001. Parameters of Water Quality: Interpretations and Standards.

EPA, 2001. The Quality of Drinking Water in Ireland.

EPA, 2002. National River Water Quality Monitoring Programme. A Discussion Document. EPA, Ireland.

EPA, various. BATNEEC Guidance Notes.

Existing Water Quality Management Plans.

Groundwater Protection Schemes and Source Protection Areas for County.

International Standards Organisation, 1996. ISO 14001 Environmental Management Systems - specifications with guidance for use.

Local Authority Development Plans.

O'Donnell, C., 1980. Organic Micropollutants in Irish Waters. An Foras Forbartha.

O'Donnell, C. 1996. Pesticides in Drinking Waters. EPA, Ireland

Teagasc, 1994. Soil Analysis & Fertiliser, Lime, Animal Manure & Trace Element Recommendations.

Waste Management Plans and Strategies.

Waste Management (Use of Sewage Sludge in Agriculture) Regulations, 1998 (S.I. No. 148 of 1998).

ANNEX A: REPORTING REQUIREMENTS

Reporting obligations under the Dangerous Substances Regulations

Local Authority Reports	EPA Reports
31 July 2002 (Measures)	
31 July 2004 (Implementation)	30 April 2005 (National Implementation)
31 July 2006 (Implementation)	30 April 2007 (National Implementation)
31 July 2008 (Implementation)	30 April 2009 (National Implementation)
31 July 2010 (Implementation)	30 April 2011 (National Implementation)
31 July 2012 (Implementation)	30 April 2013 (National Implementation)

- **'Measures Report'**

Local authorities to submit report to EPA by **July 31, 2002**, setting out measures to be taken to implement the Regulations.

- **'Local Authority Implementation Reports'**

Local authorities to submit biennial progress reports to the EPA, by 31 July 2004, 2006, 2008, 2010 etc.

- **'National Implementation Reports'**

National reports on the implementation of the Regulations to be published by the EPA within nine months of receipt of local authority reports (i.e. by 30 April 2005, 2007, 2009, 2011 etc.) with recommendations where considered necessary.

ANNEX B: MEASURES AVAILABLE FOR IMPLEMENTATION

The primary sources for identifying measures available for implementation are:

- The Principal Acts (Local Government (Water Pollution) Act, 1977 as amended by the Local Government (Water Pollution) Act, 1990.
- Dangerous Substances Regulations, 2001
- Information arising from work undertaken by the River Basin Management System Projects

New measures are likely to emerge over the coming years, for instance, through new legislation or the creation of new initiatives. Each local authority will need to keep abreast of changes and developments that might impact on the implementation of the Regulations.

Measures can be considered under various headings. The following are suggested:

- **Planning, Control and Enforcement Measures**
- **Consultative and Co-operative Measures**
- **Monitoring Measures**
- **Public Education and Advisory Measures**
- **Other National and Miscellaneous Measures**

The following is a list of measures that could be considered. This is not presented as an exhaustive list and each local authority will need to consider what specific measures are appropriate for its own situation.

B.1 PLANNING CONTROL AND ENFORCEMENT MEASURES

Water Quality Management Planning

A key planning measure available to local authorities is the power to make a water quality management plan for any waters in its functional area or which adjoin that area. Any review of existing water quality management plans or development of new water quality management plans should take into account the requirements of the Dangerous Substances Regulations, as well as the requirements of the Phosphorus Regulations, 1998, the Water Framework Directive and other relevant pieces of water quality legislation. Other plans that should take into account these pieces of legislation include Groundwater Protection Plans, and waste and sludge management plans. Water Quality Management Plans should be included in the 'Development Plan' for the County.

Planning and Control Measures

For point-source discharges within catchments:

- Issuing and enforcing licenses under section 4 of the Act to control point source discharges
- Review of existing section 4 licences in light of the requirements of the Dangerous Substances Regulations
- Issuing and enforcement of licenses under section 16 of the Act to control discharges to sewer that might, in turn, discharge to waters
- Review of existing section 16 licences in light of the requirements of the Dangerous Substances Regulations
- Upgrading urban wastewater discharges to reduce dangerous substances inputs from WWTPs
- Control of discharges from septic tanks and other small-scale sewage treatment systems either through the planning system or through licensing under the Water Pollution Act.
- Survey and/or upgrade surface water and foul sewer/drainage systems
- Remedy storm water overflows and urban runoff
- Farm surveys
- Catchment surveys for point source pollution from licensed/unlicensed discharges
- Upgrading of landfills
- Recycling / safe disposal of wastes
- Assess water abstractions
- Leakage control
- Controls on quarries, sheep dips, peat extraction industry
- Prosecution for non-compliance with licences
- Prosecutions for other contraventions of the Water Pollution Acts.

For non point-source discharges within catchments

- Regulation and control of certain agricultural activities under section 21 of the Act of 1990: i.e., the making of bye-laws
- Farm surveys and pesticide use surveys
- Review licensed landspreading
- Ensure Best Farm Management Practices
- Controls on forestry
- Prosecutions for contravention of the Water Pollution Acts.

General Enforcement Measures

- Enforcement of section 3 of the Water Pollution Act (General prohibition on the entry of polluting matter to waters)
- Issue and enforcement of Section 10 notices (powers of courts, local authorities and regional boards in relation to the mitigation and remedying of effects of pollution)
- Issue and enforcement of Section 12 notices (power to require measures to be taken to prevent water pollution)
- Use of Section 13 powers (power to prevent and abate pollution in certain circumstances)
- Enforcement of Section 14 (notification of accidental discharges)
- Issue of Section 23 notices (power to require information on activities which may cause pollution)
- Enforcement of licences issued under sections 4 and 16. Enforcement actions could include:
    - regular monitoring/sampling
    - regular site inspections
    - audits
- Prosecutions for contravention of the Water Pollution Acts.

B.2 CONSULTATIVE AND COOPERATIVE MEASURES

Establishment of Multi-Sectoral Catchment Management Groups

Setting up consultative and co-operative structures that involve all stakeholders, such as multi-sectoral catchment management groups, is essential to the successful management of a catchment. This will be particularly important where both point and diffuse inputs are responsible for deterioration of water quality as reversal of the trend may require a range of actions across a number of sectors. The EPA recommends that multi-sectoral catchment management groups be set up to deal with water quality issues arising at a catchment level. Any management group set up should address the requirements of the Dangerous Substances Regulations, as well as the requirements of the Phosphorus Regulations, 1998, the Water Framework Directive and other relevant pieces of water quality legislation.

Each local authority should identify key stakeholders both at county and catchment level. Stakeholders can roughly be identified as those who either are contributing to

the problem and therefore need to be involved as part of the solution and those that are beneficiaries of improvements in water quality, as well as statutory bodies with responsibilities for protection and improvement of water quality. Stakeholders include:

- Central and Regional Fisheries Boards
- Teagasc
- Geological Survey of Ireland
- Industry associations such as IBEC, SFA, ISME and artificial fertiliser groups
- Agricultural representative organisations such as the IFA and the ICMSA
- Forestry companies and associations
- Specific industries/activities identified as being contributors to dangerous substance discharge
- Tourist boards, fishery organisations, and other sectoral interests with a beneficial interest in water quality improvement
- Community-based organisations
- Partnership organisations such as the LEADER groups

Other possible measures that may be implemented under this heading include the establishment of:

- a public consultation forum
- a local authority steering group / implementation committee to implement both the Dangerous Substances Regulations and the Phosphorus Regulations
- a working group on point / non-point sources
- liaison structures with other local authorities
- liaison with the EPA on IPC and waste facilities
- liaison with relevant stakeholders
- the appointment of a specialist advisor on various relevant topics

B.3 MONITORING MEASURES

The Regulations have specific requirements in terms of:

i. the establishment of baseline water quality conditions, and
ii. monitoring progress with regard to the achievement of necessary improvements in water quality.

There is limited information presently available on dangerous substances in Irish waters. In relation to rivers, the EPA surveyed eleven of the fourteen substances listed in the Regulations at seventy-four sites in 1999-2000 (Stephens, 2001). It is proposed under the National Rivers Monitoring Programme (EPA, 2002) that the EPA will sample monthly for thirteen of the fourteen dangerous substances at fifteen river locations nationally. (Under the legislation tributyltin is to be monitored in tidal waters only, using gastropods.) The EPA will monitor a further eight sites, covering the main mining locations in the country, specifically for heavy metals. Depending on the outcome, this monitoring programme will be revised and other potential sources of dangerous substances will be examined instead.

The EPA proposes to conduct an initial survey of the priority substances listed in Annex X of the Water Framework Directive at a core group of high and good quality river sites that are representative of the major ecological types defined for Irish rivers in Annex II of the Directive. An initial screening approach for priority substances is also proposed for less pristine rivers (EPA, 2002). There is some overlap between the list of priority substances in the Water Framework Directive and the substances listed in the Dangerous Substances Regulations (e.g., atrazine, dichloromethane, lead, nickel, simazine and tributyltin).

In relation to lakes, there has been limited monitoring of dangerous substances to date and the EPA does not propose to monitor these substances in its current national lake water quality monitoring programme (Bowman and Toner, 2001). Very limited information is available on metals in the Shannon lakes (Bowman, 2000) and on selected acid lakes in recent years. An assessment is ongoing of potential requirements in this area under the Water Framework Directive.

In relation to tidal waters, the Fisheries Research Centre have collected data on concentrations in sediments and/or biota (mainly fish and shellfish flesh) for many of the metals listed in the Dangerous Substances Regulations. In the case of tributyltin, a biological effects monitoring programme, which has been in operation for a number of years, is thought likely to fulfil the requirements of the Regulations. However, data on concentrations in water of the dangerous substances are almost entirely lacking.

Other information available on dangerous substances in Irish waters include an An Foras Forbartha report on organic micropollutants in Irish waters (O'Donnell, 1980); an EC Stride study on heavy metals in proposed mining areas in Kilkenny and Tipperary NR (Bowden, 1994); an EPA survey of pesticides in drinking waters in 1994-95 (O'Donnell, 1996); and the annual EPA drinking water reports (e.g., EPA,

2001). In addition, local authorities and the Agency may have data arising from the monitoring of licensable activities or special investigations.

Many local authorities have well established monitoring programmes in place though these generally do not provide information on dangerous substances. Examination of discharge licences and an assessment of sales of dangerous substances should be among the measures used by local authorities to provide information on likely sources of dangerous substances and therefore to ascertain potential monitoring locations. Local Authorities may utilise the River Basin Management System Projects to identify and catalogue actual or potential discharges of dangerous substances within each River Basin District and then to target individual substances for monitoring and assessment.

There may be a number of potential sources of information available on dangerous substances in the local authority functional area. For example local authorities may utilise results from monitoring undertaken for the Surface Water Abstraction Regulations, 1989; from monitoring of discharge licences; or from monitoring of EPA licensed IPPC and Waste facilities. Any results available should be presented in the local authority reports.

It is recommended that the local authority would monitor a limited number of high risk sites intensively throughout the year (monthly/bi-monthly if possible). These sites do not have to be EPA monitoring stations. Monitoring for the herbicides, atrazine and simizine, need only be undertaken in the spring, summer and autumn periods. Where monitoring results do not indicate significant levels of these substances, different sites may be chosen. The local authority should consult with EPA monitoring staff in Dublin (Dr Ciaran O'Donnell) regarding the selection of monitoring sites as the EPA have undertaken a national monitoring programme for dangerous substances. Where point sources are to be monitored it is recommended that upstream and downstream samples are taken to allow for natural background levels and to exclude the possibility of other pollution sources.

Detection limits for analytical methods used, should be adequate to assess compliance with the Regulations. Where monitoring for dangerous substances is undertaken and results are presented in the Implementation Reports - an indication of the sampling frequency should be given beside any median or average values. Total hardness should always be monitored and reported when assessing heavy metal levels.

It should be noted that different standards apply for certain substances in the Regulations (i.e., arsenic, chromium, copper, cyanide, fluoride, lead, nickel and zinc) depending on water hardness levels and whether samples are taken in freshwater or tidal water. For this reason different tables should be filled in for each water body type (i.e. separately for rivers, lakes and tidal waters as presented in Annex C, Table 1), and water hardness levels should be reported for samples taken for these substances in freshwaters.

'Monitoring', in relation to the implementation of the Regulations, should be considered in the broader context of monitoring progress towards the achievement of

the targets in the Regulations. Specific monitoring measures that should be considered include:

- integration of monitoring of dangerous substances by the local authorities, EPA, River Basin Management System Projects, Marine Institute etc. to avoid unnecessary duplication of effort
- hazard identification from existing industrial, municipal and agricultural activities
- development of specific catchment/sub-catchment monitoring programmes where necessary
- investigate causes of surface water/ groundwater pollution
- use of geographic information systems for storage and interrogation of data on a catchment basis
- review of field sampling programmes and quality control/quality assurance procedures
- development of site inspection/auditing programmes for activities identified as high-risk in relation to dangerous substances risk potential
- monitoring of point / non-point pollution sources
- upgrading of council facilities / equipment
- undertake specific research projects.

B.4 PUBLIC EDUCATION & ADVISORY MEASURES

- Public Education Campaigns
- Provision of Technical Advice and Assistance
- Publicity campaigns such as use of TV, radio, newspapers and other media
- Schools education programmes
- Promotion of Catchment Planning through public signs, leaflets etc.
- Development of sectoral education programmes
- Appointment of environmental education officer

B.5 OTHER NATIONAL & MISCELLANEOUS MEASURES

- Section 29 (funding for research, surveys or investigations in relation to water pollution)
- REPS
- Farm Waste Management Scheme
- Targeted use of fines imposed by Courts and awarded to prosecuting local authority
- Measures by local authorities to maximise local sources of funding to be directed at Catchment Management (e.g. from local business, commercial and tourism interests etc.)
- Secure finance from Government
- Recruit staff

ANNEX C - TEMPLATE TABLES

Table 1: Summary of Current Status of River/Lake/Tidal Water Quality in Functional Area and Standards to be Achieved

Local Authority Name		Report Year						
River/Lake/Tidal Water Name	River/Lake/ Tidal Water Code	Monitoring Station Code	Station Location Name	Grid Reference	Dangerous Substance	Baseline Condition (µg/l)	Water Hardness (mg/l $CaCO_3$) (where applicable)	Is Baseline Quality Satisfactory? Yes/No

Table 1 (continued)

Current Condition (µg/l)	Water Hardness (mg/l $CaCO_3$) (where applicable)	Standard to be Achieved by 2010 (µg/l)	Has Standard Been Achieved?	Is an Article 9(1) Extension Proposed?	If Yes, What is the proposed compliance date?	Is an Article 9(2) Exemption Proposed?	Where Quality is Unsatisfactory What is the Principal Source of Pollution?	If there is an identifiable source, please enter details

The purpose of the following Tables is firstly to summarise the standards to be achieved before the statutory deadline and at shorter terms within that deadline and secondly to link the standards with the measures to be implemented, the specific targets set for those measures together with actions required to meet those targets, associated timeframes and assigned responsibilities. They are provided as a guide for tracking the implementation of measures at catchment/sub-catchment level. The table should be completed separately for measures to be implemented at a county level, and for measures to be implemented in each river, lake and tidal water or catchment/subcatchment. Examples are given as a guide.

Table 2.1: County Implementation Programme

Standard to be achieved	Measures	Targets	Actions	Timeframe	Responsible for Implementation	Progress to Date	Corrective Actions	Action completed within timeframe? (Y/N)	If not, state revised timeframe
NAME OF COUNTY									
To improve unsatisfactory water quality and to maintain satisfactory water quality in County X	*Review and enforcement of all section 4 licences in light of Regulations*	*Reduce dangerous substances inputs from licensed premises*	*Determine dangerous substance loads from licensed premises, assimilative capacity of receiving waters and determine whether changes are required to licences*	*31/7/2003*	*SEE, Environment*	*All Licences reviewed: 40 Section 4's*		*Y*	
			Prosecution for non-compliance with licences	*Ongoing*	*SEE, Environment*	*10 prosecutions taken since 2001*		*Ongoing*	
	Wastewater treatment plants	*Reduce dangerous substance inputs from WWTPs*	*Establish dangerous substances loads from WWTPs*	*1/6/2005*	*SEE, Environment*	*Monitoring ongoing but dangerous substance loads to be established*	*Appoint additional staff*	*N*	*1/6/2006*
			Establish priority list of WWTP to be upgraded	*1/12/2003*	*SEE, Sanitary Services*	*Ongoing*		*N/A*	

Table 2.2: Implementation Programme Summary Table For Each River / Lake / Tidal Water

Standard	Measures	Targets	Actions	Timeframe	Responsible for Implementation	Progress to Date	Corrective Action	Action Completed within timeframe? (Y/N)	If not, state revised timeframe
NAME OF RIVER / LAKE / TIDAL WATER									
To improve water quality at stations on river X	*Farm surveys*	*Assess farm management to reduce dangerous substances inputs to river*	*Review water quality data to determine where farm surveys required.*	*1/6/2003*	*SEE, Environment*	*Water quality reviewed*		*Y*	
			Carry out 100 farm surveys in hot spot areas of catchment.	*1/6/2002*	*SEE, Environment*	*50 farm surveys complete*		*N/A*	
	Enforce Water Pollution Act	*Reduce dangerous substances inputs to river*	*Issue and enforce section 3, 10, 12 and 13 notices*	*Ongoing*	*SEE, Environment*	*Notices issued: 10 Section 3 6 Section 10's 2 Section 12's 1 Section 13*		*Ongoing*	

ANNEX D: Guide to Potential Sources of Dangerous Substances listed in the Dangerous Substances Regulations, 2001.

Dangerous substance	Background Information	Potential Sources
Atrazine	Atrazine belongs to the triazine class of herbicides.	• It is used for control of broadleaf and grassy weeds in corn, orchards, turf grass sod, forestry, grasslands, grass crops and roses.
Simazine	Simazine belongs to the triazine class of herbicides.	• It is used for control of broadleaf and grassy weeds in corn, orchards, turf grass sod, forestry, grasslands, grass crops and roses. It may also be used as an algaecide in ponds.
Tributyltin	Tributlytin (TBT) is an organotin. TBT by itself is unstable and will break down in the environment unless it is combined with an element such as oxygen. One of the most common TBT compounds is bis(tributyltin) oxide, or TBTO.	• It is used as a fungicide and molluscicide. • Antifouling agent for boats to discourage growth of marine organisms. • Used for manufacture of other pesticides. • Used to combat freshwater snails. • Preservative in industrial applications e.g. as a wood and textile preservative and disinfectant. • Used for prevention of slimes in industrial recirculating water systems. • Stabilizer in PVC resin – plastic manufacturing. • Paper and pulp mills. • Cooling towers. • Breweries. • Leather processing facilities.
Dichloro-methane	Dichloromethane is a volatile organic carbon.	• Used as a process chemical in the pharmaceutical sector, in the production of paints and adhesives, and as a solvent for paint removers. • Used as a cleaning fluid and as a degreasing agent.
Toluene	Toluene is a volatile organic carbon. It is a petroleum component.	• Automobile exhaust. • Consumer product paints. • Paint thinners. • Fingernail polish. • Lacquers. • Adhesives. • Solvent in fine chemicals industry.
Xylenes	Xylene is a volatile organic carbon and it is a petroleum component. It is a colourless, flammable liquid with a sweet odour. There are three forms of xylene in which the methyl groups vary on the benzene ring: meta-xylene, ortho-xylene, and para-xylene (m-, o-, and p-xylene). These different forms are referred to as isomers. The term total xylenes refers to all three isomers of xylene. Mixed xylene is a mixture of the three isomers and usually also contains 6-15 percent ethylbenzene. Xylene is also known as xylol or dimethylbenzene. Xylene is primarily a synthetic chemical. Chemical industries produce xylene from petroleum. Xylene also occurs naturally in petroleum	• Xylene is a constituent of gasoline and this results in a wide distribution of very large amounts. • The isomer mixture is used as a solvent for alkyl resins, coatings and lacquers. • o-xylene is mainly (95% globally) used for synthesis of phthalic acid anyhdride. • p-xylene is consumed (66% globally) for synthesis of dimethylterephthalate and 33% globally for terephthalic acid. • m-xylene is used for the synthesis of isophthalic acid and m-toluic acid. • All three isomers are intermediates for vitamins, dyes, pharmaceuticals, pesticides, flavouring agents and other fine chemicals. • Many industrial uses, most notably as a fuel additive and as a solvent for numerous materials, e.g., in the printing, rubber, and leather industries. Used in photographic industry • Along with other solvents, xylene is also used as a cleaning agent, a paint thinner, and in varnishes. • Xylene is used as a material in the chemical, plastics, and synthetic fibre industries and as an ingredient in the coating of fabrics and papers. • Aromatic hydrocarbons used by rubber and insecticide industries, chemical, pharmaceutical and explosive manufacturers.

	and coal tar and is formed during forest fires.	
Arsenic	Metal	• Widely used in wood preservation. • Glass and semi-conductor industries. • Fungicide in timber processing. • Natural dissolution of minerals and ores. • Base metal (tin, bauxite) extraction. • Smelting/refining of lead, lead-scrape, zinc, copper. • Steel manufacture dusts/sludges from off-gas purification. • Tanning and depilation of hides. • Dusts from flues. • Paint manufacture (arsenic may be used as a pigment). • Biocide manufacture, formulation, marketing or use. • Adhesive manufacturing (particularly for metals). • Manufacture/maintenance of zerographic machines. • Textile industry, oil cloths, calico printing and dyeing.
Chromium	Metal	• Electroplating industry. • Tanning and textile plants. • Paint and dyeing plants. • Natural dissolution of minerals and ores. • Metallic products. • Refractories. • To form alloys with iron, nickel, or cobalt. • Final composition of stainless steels. • Used for high-speed metal-cutting tools. • Widely used as body trim on automobiles and other vehicles.
Copper	Metal	• Mining waste. • Electroplating waste. • Algicide. • Natural dissolution of minerals and ores. • Photographic processes. • Treatment and finishing of metals. • Paint, ink manufacturing. • Timber and hide preservation. • Production/use of pigments, ceramics manufacture, textile dyeing and printing. • Copper wire used in electronic transmission.
Lead	Metal	• Mining waste. • Electroplating waste. • Discarded batteries. • Cable coverings. • Ammunition. • Trace components in copper and zinc concentrates, coal, oil. • Stabilisers. • Semi-finished products. • Solders. • Glass and ceramics. • Others including fishing industry. • Natural dissolution of ores.
Nickel	Metal	• Electroplating waste • Natural dissolution of minerals • Nickel is used chiefly in making alloys. • A protective and ornamental coating for metals • Nickel steel is used in automobile parts such as axles, crankshafts, gears, valves, and rods; in machine parts; and in armor plate. • Some of the most important nickel-containing alloys are German

		silver, Invar, Monel metal, Nichrome, and Permalloy. • Also a key component of nickel-cadmium batteries.
Zinc	Metal	• Mining waste • Natural dissolution of minerals • Principally used as a protective coating, or galvanizer, for iron and steel, as an ingredient of various alloys. • As plates for dry electric cells and for die castings. • Zinc oxide is used as a paint pigment, a filler in rubber tyres and is employed in medicine as an antiseptic ointment. • Zinc chloride is used as a wood preservative and as a soldering fluid. • Zinc sulfide is useful in applications involving electroluminescence, photoconductivity, and semiconductivity and has other electronic uses. It is employed as a phosphor for the screens of television tubes and in fluorescent coatings.
Cyanide	Cyanide is a carbon-nitrogen chemical unit that combines with many organic and inorganic compounds.	• Industrial effluents principally from electroplating processes and electric components manufacture • Heat-treatment of metals and finishing operations. • Cyanide pesticides used as fumigants. • Coal-gas purification, steel industries where ferri/cyanide containing wastes are produced. • Chemical synthesis, photography and pigment manufacture are other areas in which ionic cyanides and ferri/ferrocyanides are used. • Organic cyanides may take the form of chemical intermediaries in the synthesis of antioxidants, pharmaceuticals, dyes and surface-active agents. • The plastics, surface coatings and adhesive industries may all involve the use of organic cyanides.
Fluoride	Halogen	• Arises from fluoridation of public water supplies and industrial discharges. • Municipal sewage. • Occurs naturally in quite rare instances. • The chlorofluorocarbons were used as dispersing agents in aerosol sprays and as refrigerants but have been largely replaced due to the restrictions of the Montreal Protocol. • Teflon, a fluorine plastic is used to make such products as motor gaskets and dashboard accessories in the automobile industry. It is also used as a coating on the inner surface of frying pans and other kitchen utensils. • Perfluorocarbons and sulfur hexafluoride used in semi-conductor industry. • Hydrogen fluoride is used as an etchant in glass industry and semi-conductor industries. • Liquid fluorinated hydrocarbons derived from petroleum are useful as highly stable lubricating oils. • Fluoride wastes are by-products of phosphate fertilizer production.