



DANGEROUS SUBSTANCES REGULATIONS NATIONAL IMPLEMENTATION REPORT, 2005

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DANGEROUS SUBSTANCES REGULATIONS

NATIONAL IMPLEMENTATION REPORT, 2005

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

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Executive Summary

The Agency has compiled this National Implementation Report to provide information on the implementation of the Water Quality (Dangerous Substances) Regulations, 2001 (S.I. No. 12 of 2001). The Agency must publish a National Report on Implementation of the Regulations every two years. Local authorities were required to submit an Implementation Report to the Agency by 31 July 2004 on the measures they have taken to prevent water pollution from dangerous substances so as to meet the standards set by the Regulations. This report has been prepared primarily from information and water quality data submitted by local authorities in their Measures and Implementation Reports and from additional data collected by the Agency and the Marine Institute. In this first report, information collected as part of the EPA licensing process was not included unless specifically submitted by the local authorities.

The Regulations prescribe water quality targets in respect of 14 dangerous substances in rivers, lakes and tidal waters to be met by 2010. The substances concerned include pesticides (atrazine, simazine, tributyltin), solvents (dichloromethane, toluene, xylene) metals (arsenic, chromium, copper, lead, nickel, zinc) and other substances (cyanide, fluoride). They were selected primarily on the basis of their likely use or presence in Ireland and their potential impacts on waters by virtue of toxicity, persistence and bioaccumulation.

The Main Conclusions of this report are:

With the exception of tributyltin, the majority of exceedances detected relate to either historical mining activities or are due to the geology of an area contributing to naturally elevated levels of heavy metals in surface waters.

In relation to tributyltin (TBT), data collected from Marine Institute publications and from a small number of local authority reports indicates widespread TBT contamination in Irish waters. It is to be expected that future monitoring will demonstrate a gradual diminution of the threat from TBT over the coming years as the use of this product is phased out due to EU requirements.

Values in excess of the standards in the Regulations were reported at 143 river stations, 45 lake stations and 24 tidal water monitoring stations. These data do not necessarily give an accurate national picture of the level of dangerous substances in surface waters due to the limited extent of monitoring data available, both in terms of monitoring frequency and coverage. In addition, due to the risk assessment approach taken by many local authorities, monitoring was generally concentrated in areas where exceedances were most likely to occur. In addition, the data is heavily influenced by large amounts of reporting by a small number of local authorities.

Most of the exceedances reported related to the heavy metals zinc, copper, chromium and lead. As discussed in the report the vast majority of these exceedances are due to natural causes and not pollution.

There were no exceedances of the toluene and xylene standards at any station, and there were very few exceedances of the dichloromethane, arsenic, simazine and fluoride standards reported.

The EPA has found that sampling programmes at some local authorities where sewage sludge is reused in agriculture are either non-existent or in need of improvement, and there is inadequate maintenance of sludge registers. All local authorities should have regard to EPA recommendations in relation to management of sewage sludge (Smith *et al.*, 2004).

There continues to be a particular problem with the illegal dumping of sludge from diesel laundering activities, and the subsequent impact on water quality.

As the local authorities collect more information on the usage of dangerous substances and the levels of dangerous substances in the aquatic environment, it will be possible for them to refine their measures programmes to tackle any exceedances identified. Where elevated levels of these substances are found, potential sources will have to be identified and addressed.

Many of the measures being implemented by local authorities to meet the standards in the Phosphorus Regulations, 1998 (S.I. No 258 of 1998) should also assist them in meeting the targets of the Dangerous Substances Regulations. Measures proposed by each local authority and the EPA to bring about compliance with the targets set in the Regulations are documented in this report.

Local authorities will play a key role in the implementation of the Water Framework Directive in Ireland. The River Basin Management projects, which have been established to facilitate implementation of the Directive, should help provide local authorities with the information necessary to protect and improve water quality within their functional areas.

As a result of landfill remediation work been undertaken at closed landfills, exceedances of a number of dangerous substances that were detected in 2002 and 2003, were not detected in 2004.

Some key recommendations of this report are:

- Local authorities should continue to identify and assess those activities that may be potential sources of dangerous substances. This will enable appropriate implementation programs to be put in place where any breaches of the standards occur.
- Mining activity has contributed to elevated levels of heavy metals in certain areas. The recent Government decision to remediate the Silvermines area is a very welcome one. Further consideration should also be given to addressing mining impacts in other areas.
- The Environmental Protection Agency or local/sanitary authorities should continue to review licences granted under the Local Government (Water Pollution) Act, 1977, the

Environmental Protection Agency Act, 1992 and the Waste Management Act, 1996 to ensure that they meet the prescribed standards by 1st July, 2006¹;

- Local authorities should require an inventory of all chemicals used or held on sites where a discharge licence exists or is sought. If dangerous substances are used on site, provision should be made within the licence for their monitoring and control to reduce the potential threat to the aquatic environment.
- There is a need for local authorities to compile a register of outfalls and overflows from urban areas and gather monitoring data for the quality of effluent from such systems. As part of this work drainage misconceptions, which result in foul waters entering surface waters and which may lead to significant contamination, should be prevented.
- Coastal local authorities should consider the preparation of guidance leaflets on the use of TBT, in consultation with all of the harbour masters in their area.
- Monitoring by Local Authorities should focus intensively (monthly if possible) at high risk surface waters potentially impacted on by point discharges e.g., WWTPs, landfills (legal/illegal, open/closed), relevant industries, mining operations. Sampling should be conducted above and below point discharges, where possible, to eliminate other potential sources of pollution.
- Where monitoring over the period of a year or more indicates that the level of dangerous substances is satisfactory, monitoring may be retargeted at other high risk stations. Where elevated levels of a dangerous substance are detected local authorities must develop a programme of measures to identify and address the potential source.
- Data from existing monitoring programs should be examined in more detail. In particular, local authorities should examine monitoring carried out under existing legislation for the generation of baseline or current dangerous substances data.
- When monitoring for heavy metals, the hardness of surface waters needs to be determined in order to assess compliance with the standards in the Regulations.
- Local authorities must report the current condition of surface waters as an annual mean where more than one determination has been carried out during the year.
- All local authorities should co-ordinate their monitoring efforts with the relevant state bodies and the RBD Projects to rationalise and expand, where necessary, their existing monitoring programs. Co-ordination is also required to ensure the avoidance of duplication of effort and to target the areas most at risk.
- The considerable slippage on the statutory submission date of Measures and Implementation Reports by local authorities listed in this report should be corrected.

¹ There is a provision for extension of the five year period by a further period not exceeding five years where the competent authority is satisfied that the best available techniques are being used to treat direct discharges or emissions.

1. Introduction

Ireland does not have a long history of industrial development. As a result, the potential sources of pollution from toxic or dangerous substances are limited. A consequence of this is that limited monitoring of waters has occurred for these substances in the past. The most commonly encountered forms of pollution in this country are eutrophication and organic pollution, and biological and chemical monitoring programmes have been particularly aimed at assessing the extent and impacts of these types of pollution. Dangerous substances, on the other hand, have received relatively little attention. Recent monitoring of dangerous substances in Ireland suggests that there does not appear to be a significant problem (e.g., Stephens, 2001; Toner *et al.*, 2005).

The Water Quality (Dangerous Substances) Regulations (S.I. No. 12 of 2001) were introduced to give further effect to Council Directive 76/464/EEC on pollution caused by certain dangerous substances discharged into the aquatic environment and to support implementation of the Water Framework Directive (2000/60/EC). The Regulations prescribe water quality standards in respect of 14 dangerous substances in surface waters, e.g., rivers, lakes and tidal waters (Table 1 and Table 2). The standards are stringent and consistent with the recommendations (where available) of the EU Commission's Advisory Scientific Committee on Toxicity, Ecotoxicity and the Environment (SCTEE). The substances concerned include pesticides (atrazine, simazine, tributyltin), solvents (dichloromethane, toluene, xylene), metals (arsenic, chromium, copper, lead, nickel, zinc) and other substances (cyanide, fluoride). They were selected primarily on the basis of their high priority internationally (EU/OSPAR) and also having regard to their likely use or presence in Ireland and their potential impacts on waters by virtue of toxicity, persistence and bioaccumulation. The standards apply to the annual mean concentration of the specified substance in a water body.

Metals with a high atomic weight are known as heavy metals and have widespread industrial use. They are poisonous and tend to persist in organisms once consumed and can accumulate in selective organs such as the brain, liver and kidneys. Pesticides include herbicides (e.g., atrazine and simazine), fungicides, insecticides, molluscicides (e.g., tributyltin), rodenticides, growth regulators and masonry and timber preservatives. Their use extends to agriculture, roads, rail tracks, boats, homes and gardens, sheep dips and public health. Pesticides may cause mortality or severe reproductive or genetic problems in fauna as well as having carcinogenic, mutagenic or teratogenic properties. Pesticides may bioaccumulate in fish and other organisms, and may be retained in the sediments. Volatile organic compounds (VOCs), such as dichloromethane, toluene and xylene, arise from petrol-powered motor vehicles and industrial processes that use organic solvents. They are potential carcinogens and may be harmful to the central nervous system, the kidneys and the liver.

Table 1. Standards for Pesticides and Solvents

Substance	Standard (µg/l)
Atrazine	1.0
Dichloromethane	10.0
Simazine	1.0
Toluene	10.0
Tributyltin ²	0.001
Xylenes	10.0

Table 2. Standards for Metals³ and Other Substances.

Substance	Standard (µg/l) for Fresh Waters Hardness of water measured in mg/l CaCO ₃		Standard (µg/l) for Tidal Waters
	≤ 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 ⁴	100	40

The main provisions of the Regulations include:

- a requirement that licences granted by the Environmental Protection Agency or local/sanitary authorities under the Local Government (Water Pollution) Act, 1977, the Environmental Protection Agency Act, 1992 and the Waste Management Act, 1996 must reflect the prescribed standards with immediate effect (from 1st July, 2001) in relation to new licence applications. Existing licences must be reviewed and where necessary revised on the basis of meeting the prescribed standards by 1st July, 2006⁵;
- the placing of an onus on the Environmental Protection Agency and on local/sanitary authorities to ensure that the standards are complied with by 31 December, 2010 and that, where the existing condition of waters does not meet a particular standard, there is no disimprovement in water quality in the meantime;

² 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.

³ Values for metals are for total metal concentration (dissolved and colloidal/s.s.). Toxic effects are generally markedly less in hard water.

⁴ In the case of Zinc, the standard shall be 8 µg/l for water hardness less than or equal to 10 mg/l CaCO₃ or 50 µg/l for water hardness greater than 10 mg/l CaCO₃ and less than or equal to 100 mg/l CaCO₃.

⁵ There is a provision for extension of the five year period by a further period not exceeding five years where the competent authority is satisfied that the best available techniques are being used to treat direct discharges or emissions.

- that the Environmental Protection Agency may grant an interim exemption not exceeding five years (from 31 December 2010) for a water body from a specified standard where it is satisfied that the water body is so affected by human activity that compliance with a specified standard within that period would not be feasible or would be disproportionately expensive. A permanent exemption may be granted by the Environmental Protection Agency where a water body is permanently affected by naturally occurring conditions or by past human activity.

The Regulations also require that each local authority must submit a Measures Report and Implementation Reports to the Environmental Protection Agency at the intervals specified in Table 3. The Measures Report must set out the measures to be pursued by the local authority to secure compliance with the standards and the Implementation Reports must provide information in relation to progress on the implementation of the measures. The Environmental Protection Agency is required to prepare National Implementation Reports at two-yearly intervals in relation to progress in implementation of the Regulations (Table 3).

Table 3. Reporting Obligations Under the Dangerous Substances Regulations

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

2. Measures and Implementation Reports – General Information

The local authority Measures and Implementation Reports are generally divided into a number of sections based on the recommendations of the EPA Guidance Manual (EPA, 2002). The Measures Reports consist of sections on current water quality status in the local authority functional area; an identification of potential pressures; and a programme for implementation. The Implementation Reports also include a section on progress to date; problems encountered and future plans. The EPA Guidance Manual was used as a template for the majority of Measures and Implementation Reports. This helped to ensure consistency of reporting and that relevant information would be included in the reports. The local authorities generally supplied the information requested. However, there was considerable slippage on the statutory submission date of Measures and Implementation Reports by most local authorities (see Appendix 2). Cork City Council did not submit a Measures Report and Limerick and Clare County Councils did not submit Implementation Reports.

Under Article 9(1) of the Regulations, the period set for compliance (i.e. 2010) may be extended for a period not exceeding five years for a water body, if, but only if, the Agency is satisfied that the water body is so affected by human activity that compliance with the standard by 2010 is not feasible or would be disproportionately expensive. Under Article 9(2) of the Regulations, a specified standard shall not apply in relation to a water body where the Agency is satisfied that the water body is so permanently affected by naturally occurring conditions or by past human activity that compliance with the standard is not feasible or would be disproportionately expensive.

North Tipperary County Council has requested Article 9(2) extensions for stations on a number of rivers (Kilmastulla, Yellow, Silvermines and Foillborig) in the Silvermines area. North Tipperary County Council has stated that these areas have naturally high concentrations of heavy metals due to the indigenous geology and they have been affected by historical mining activities. Therefore it would be prohibitively expensive to achieve the relevant standards. Monaghan County Council has stated that it is likely that Lough Minor will require an Article 9(2) exemption because of past human activity (at Ballybay Tanners and MI Metals) leading to elevated levels of heavy metals. Monaghan County Council has also stated that it will seek Article 9(2) exemptions as a result of naturally high levels of metals detected in soft water lakes in the county. Wicklow County Council proposes that an Article 9(2) exemption is required for the Avoca River downstream of the now abandoned Avoca Mines, which have seriously contaminated the river with heavy metals. Donegal County Council has requested derogations for chromium, copper and zinc in the county due to the naturally high levels recorded there.

All of the local authorities that have submitted Reports to the Agency have endorsed the environmental management systems approach to the implementation of the Regulations as recommended in the EPA Guidance Manual. 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 are outlined in Figure 1, adapted to the requirements of the Regulations.

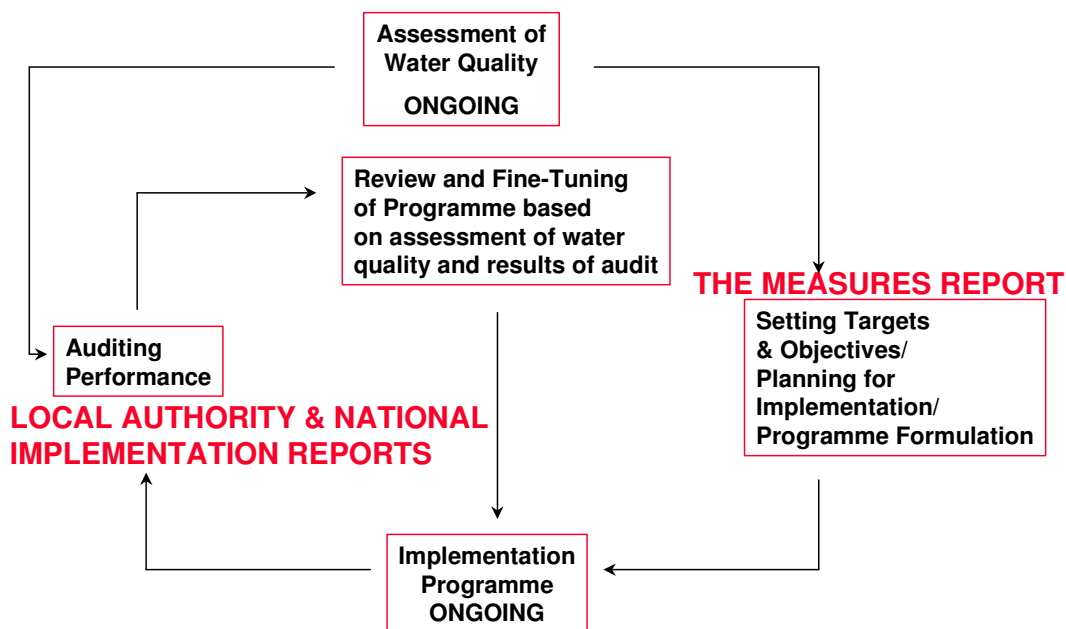


Figure 1 Generalised environmental management systems approach adapted to requirements of the Regulations

On an operational level the environmental management system consists of:

- initial review (i.e. reviews of physical background, water quality, pressures on water resources, monitoring programmes and results 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
- review and fine tuning of 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. The Dangerous Substances Regulations are particularly suited to an environmental management systems approach given the requirement that local authorities must report every two years to the Agency on the implementation of the Regulations. The Agency recommends that a system audit be conducted prior to preparation of each Implementation Report so that any changes or modifications necessary to meet the standards can be included in the updated report. 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.

3. Monitoring

3.1 Dangerous Substances Water Quality Review

It is the duty of the EPA and each local/sanitary authority to take all appropriate steps to ensure that, where the existing condition of a water body does not meet a specified standard in relation to a substance, there shall be no disimprovement in the condition of the water body in relation to that substance; and to secure compliance with the specified standards by 31 December 2010. The “existing condition” of a water body is defined in Article 8(2) of the Regulations as “the condition of the water body as most recently determined by a local authority or the Agency prior to the making of these Regulations or, where such condition has not been so determined, the condition of that water body as first determined by a local authority or the Agency after the making of these Regulations”.

There has been limited monitoring of dangerous substances in Ireland prior to the introduction of the Regulations, therefore the level and extent of dangerous substances in Irish waters has yet to be determined in many areas. Some historical monitoring has been carried out by the local authorities, usually in response to specific potential sources of pollution by dangerous substances. Most local authorities are currently undertaking, or propose to undertake, monitoring programmes designed to provide information on the levels of dangerous substances in their functional areas.

The EPA has carried out monitoring of dangerous substances, though generally as part of periodic short-term studies. The EPA conducted a survey of pesticides in drinking waters in 1994-1995, which included atrazine and simazine. The results of this survey indicated that there was no significant background level of pesticides in Irish drinking waters, suggesting that the raw water sources for these supplies were also free of pollution from the substances investigated (O'Donnell, 1996). A previous study by An Foras Forbatha also indicated that pesticide levels in Irish rivers were very low (though levels of polynuclear aromatic hydrocarbons – which are not covered by the Regulations – were relatively higher) (O'Donnell, 1980). Kerry County Council has also noted elevated levels of PAHs in recent surveys (Kerry County Council, 2002). An EC Stride Project investigated the levels of fifteen heavy metals in rivers outside of and within proposed mining areas in the southeast of Ireland. This survey included monitoring of chromium, copper, lead, nickel and zinc. The survey indicated that the heavy metals were within the limits set by the Regulations at most stations, though elevated levels of all these metals were found at some stations (Bowden, 1994).

Elevated levels of copper were found in the Erne catchment in a survey undertaken between 1992-1994, as part of a cross-border initiative. Copper is a very important feed additive in the pig industry and this is a possible source of its presence in the Erne via the application of pig slurries to lands (Cavan County Council, 2002).

The Lough Derg/Lough Ree Catchment Monitoring and Management System carried out surveys for dangerous substances at ten sites in the catchment in 2000. The levels of all

of the dangerous substances were found to be compliant with the standards in the Regulations. However, metals, pesticides and VOCs were all detected in the sediments at a number of locations (KMM, 2001). The Lough Leane Catchment Monitoring and Management Project carried out dangerous substances monitoring of rivers and lakes in the catchment at five locations on up to four different occasions. There was little evidence of dangerous substances in the surface waters but higher than expected levels of some of the substances (particularly copper and zinc) were found in certain sediments, particularly those from Ross Bay on Lough Leane, which could be natural or as a result of old mine workings on Ross Island (KMM and Pettit, 2003).

The EPA conducted a national survey of a wide array of dangerous substances in surface freshwaters in 1999-2000 (Stephens, 2001). This survey covered all of the parameters specified in the Dangerous Substances Regulations, with the exception of fluoride, cyanide and tributyltin (the survey did not cover tidal waters). The survey focused on 74 stations where pollution from the selected sources was most likely to be present. The main finding of this survey was that there was no evidence of pollution from any of the targeted pesticides and other organic substances. However, in two cases concentrations of copper, lead and zinc were found, which exceeded the limits specified in the Regulations. Overall, the survey indicated that the concentrations of dangerous substances in Irish waters are very low. Some local authorities have used the results of this survey as the baseline condition for the waters that were covered in the survey. The EPA has subsequently carried out surveys in 2002-2003 at 22 sites for a total of 102 substances including the relevant substances from the Dangerous Substances Regulations. The overall findings of the 2002-2003 measurements confirmed the assessment based on the earlier survey that the levels of dangerous substances in Irish waters are, in general, very low (Toner *et al.*, 2005).

Marine environmental monitoring is carried out in accordance with national requirements and also with regional requirements as defined by the Oslo Paris Commission (OSPAR) under the Joint Assessment and Monitoring Programme (JAMP). The EPA conducts monitoring to assess riverine inputs to the marine environment (OSPAR RID). The Marine Institute is involved in OSPAR at a number of levels including in the development of monitoring programmes and regional assessment of data. The monitoring programme carried out by the Marine Institute includes spatial and temporal trends of metals, PCBs and organochlorine pesticides in biota and sediments from Irish waters. For example, the Marine Institute has monitored trace metal and chlorinated hydrocarbon concentrations in various marine fish species and shellfish (Glynn *et al.*, 2004 and 2003; Tyrrell *et al.*, 2003) and has carried out biological monitoring for tributyltin in various tidal waters on a six-year and ad hoc cycle (e.g., Minchin, 2003). Over the last number of years sediment samples have been taken from Dublin Bay, Cork Harbour, Shannon Estuary and Waterford Harbour for monitoring of contaminants, including heavy metals.

Monitoring data collected by the Marine Institute is maintained in the national monitoring database and reported to the International Council for the Exploration of the Sea (ICES) for regional assessments by OSPAR such as in the Quality Status Report (Marine Institute, 1999). Whilst the standards in the Dangerous Substances Regulations apply to the levels of these substances in waters (as opposed to biota or sediments), local authorities may be able to utilise results from Marine Institute monitoring to indicate where potential problem areas may occur. It should be borne in mind however that

elevated levels of dangerous substances in sediments may be due to historic contamination. The EPA has published a national environmental monitoring programme for tidal waters (EPA, 2003).

Other potential sources of monitoring data include:

- monitoring of raw waters under the European Communities (Quality of Water Intended for the Abstraction of Surface Waters) Regulations, 1989 (S.I. No. 294 of 1989) (for fluoride, copper, zinc, lead, nickel and chromium);
- monitoring of quality of salmonid waters under the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988) (for copper and zinc);
- monitoring carried out by the WFD River Basin Management Projects;
- monitoring carried out as part of catchment water quality monitoring and management systems, e.g., the Three Rivers Project;
- monitoring of receiving waters carried out by licensees under the requirements of IPPC Licensing or Waste Management Licensing;
- monitoring carried out as the result of special investigations e.g., Silvermines, Avoca, Tynagh mines;
- European Pollution Emission Registers (EPER) industry self-monitoring programmes;
- OSPAR convention monitoring programmes and reports e.g., the Quality Status Report for the marine environment (Marine Institute, 1999) and other relevant Marine Institute reports;
- Department of Agriculture and Food pesticide usage surveys.

A National Dangerous Substances Expert Group has been established to assist with developing lists of national priority action, candidate relevant pollutant and candidate general component substances lists for surface waters in Ireland. The Expert Group is monitoring the progress of a substances screening monitoring programme as part of the implementation of the WFD (DEHLG, 2004). This screening programme is currently underway and includes all of the substances listed in the Dangerous Substances Regulations.

3.2 Monitoring Results on a Local Authority Basis

To date monitoring results have been compiled based on information submitted by the local authorities (some of this data may originate from monitoring carried out by the EPA, IPPC/Waste Licensed facilities; and from information collected by the Water Quality Monitoring and Management System Projects under the Water Framework Directive). The extent of monitoring of the existing condition of rivers, lakes and tidal waters are detailed below (see Tables 4, 5 and 6 respectively) with non-compliant waters highlighted.

Table 4. Summary of the Monitoring Data for Rivers/Streams on a Local Authority Basis

County	No. of Rivers/Streams Monitored	No. of Sites Monitored	No. of Sites not Complying	Names of Non-Compliant Rivers/Streams (and Non-Compliant Substance)
Carlow	3	3	None	
Cavan	24	61	7	Sruhanagh (Cn), Bailieborough landfill stream (Cr) Corranure landfill stream (Cr, Cu)
Clare	7	21	3	Inagh (Atrazine)
Cork City and County	10	18	None	
Donegal	35	36	30	Ramelton Impoundment (Cr, Zn), Gort Lough (Cr, Zn), Drumhalla Str (Cr, Cu, Zn), Bigburn (Cr), Crana R. (Cr, Cu), Muckish Str (Cr, Zn), Burnfoot R (Cr), Glenaddragh R (Cr), Carrowmullin Str (Cr, Cu), Burnfoot Mountain Str (Cr), Str at Ballymacarthy (Cr, Zn), Tober Castelthirid Spring and Str (Cr), Moville Impoundment (Cr), Malinmor/beg Mountain Str (Cr), Rosses Regional Str Intake (Cr), Loughanure R (Cr), Owenerk R (Cr, Zn), Fintown Mountain Str (Cr, Cu, Zn), R Esk (Cr, Cu), Meenaveen Glencolmcille (Cr, Cu, Zn), Pollan Dam (Cr, Cu), White R (Cr, Zn), Keenagh R (Cr, Zn), Malin head Small R (Cr, Cu, Zn), Owencarrow R (Cr, Zn), Mountain Str Glenveagh Castle System (Cr, Cu, Zn), Malinbeg old supply Str & Spring (Cr), Townawilly Str (Cr, Zn), Meenboll (Dunlewy)Str (Cr, Zn), Tirlydan/Glenvar Str (Cr, Zn)
Dublin City	8	24	7	Dodder (Atrazine) Santry (Simazine) Tolka (Cyanide) Camac (Atrazine), Poddle (Atrazine)
Dun Laoghaire - Rathdown	3	13	1	Glencullen River (Cu)
Fingal	13	25	6	Ballough (Zn) Broadmeadow (Zn) Ward and Pinkeen (both Atrazine)
South Dublin	7	18	4	Brittas (Cu) and Dodder (Cu) Poddle (Atrazine)
Galway City and County	4	4	None	
Kerry	19	62	28	Woodford River (Cu) Flesk River (Cu) Brown Flesk (Cu) Cottoner's Laune (Cu) Feale (Cu) Gaddagh (Cu) Laune (Cu, Cr) Smearlagh (Cu)
Kildare	4	6	1	Liffey (Dichloromethane, Cyanide, Zinc)
Kilkenny	3	7	None	
Laois	5	14	1	Triogue (Zn)
Leitrim	1	3	None	
Limerick City and County	3	4	None	
Longford	8	20	1	Black (Fl)
Louth	18	33	1	Glyde (Cn)
Mayo	7	14	None	
Meath	13	20	None	
Monaghan	7	7	2	Tributary of River Lackey (Zn, Fl, Pb), Fane/Derrycreevy Br.(Ni, Cr)
North Tipperary	9	48	25	Yellow (Cu, Pb, Zn), Killmastulla (Cu, Pb, Zn), Silvermines (Pb, Zn), Rossestown (Zn), Drish (Pb, Zn) and Foillborrig (Zn)
Offaly	5	6	None	
Roscommon	5	8	4	Lung (Zn), Suck (Zn)
Sligo	No monitoring data submitted			

County	No. of Rivers/Streams Monitored	No. of Sites Monitored	No. of Sites not Complying	Names of Non-Compliant Rivers/Streams (and Non-Compliant Substance)
South Tipperary	11	18	None	
Waterford City and County	5	13	None	
Westmeath	15	36	None	
Wexford	2	4	None	
Wicklow	38	40	22	Avoca (Cu, Ni, Zn,Pb,) Avonmore(Pb, Zn, Cu) Aughrim(Ni, Zn, Cu) Glenealo (Pb, Zn) Ow (Zn, Cn) Kings (Ni, Pb, Cn, Cr) Avonbeg (Ni, Pb) Derry/Slaney Trib.(Ni, Pb, Cr Cn, Cu) Dereen (Ni, Pb, Cn, Cr,) Glendasan (Pb, Zn) Liffey (Cn) Dargle (Cn) Derrywater (Cn) Glencree (Cn) Glenmacnass (Cn) Vartry (Cn) Shankill (Cu, Cn) Carrigower (Cn) Swan (Cr)
Total	292	586	143	

Table 5. Summary of the Monitoring Data for Lakes on a Local Authority Basis

County	No. of Lakes Monitored	No. of Sites Monitored	No. of Sites not-complying	Names of Non-Compliant Lakes
Carlow	None			
Cavan	13	13	4	Cornaseer(Cn), Coragh (Cn), Nadrageel (Cr, Fl) and Skeagh Lough (Zn)
Clare	12	12	0	
Cork City and County	5	5	0	
Donegal	38	41	37	L. Shannagh (Cr), L. Colm (Cr), L. Naglea (Zn)L. Na Creaght (Cr), L. Nambraddan (Cr, Zn), L. Namentog (Cr, Zn), L. Keel (Cr, Zn), L. Salt (Cr), L. Mourne (Cr), L. Reelan (Cr), L. Agher (Cr), L. Lagha (Cr), L. Fad (Cr), L. Nalaughraman (Cr), L. Keel (Cr), L. Muck (Cr), L. Derkmore (Cr, Zn), L. Doo (Cr, Cu, Zn), L. Colmcille (Cr, Zn), L. Unshin (Cr, Cu), L. Birroge (Cr, Cu, Zn), Cullionboy L. (Cr, Cu, Zn), L. Adeery (Cr, Cu, Zn), L. Aroshin (Cr, Zn), L. Fad / Meendaran (Cr, Zn), L. Gartan (Cr, Cu, Zn), L. Connie (Cr, Zn), Ballaghfill L. (Cr, Zn), L. Pollrory (Cr, Zn), St. Peters L. (Cr, Zn), L. Croagh (Cr, Zn), L. Anna (Cr, Zn), L. Shore (Cr, Zn), L. Aghooy (Zn), Kiltoorish L. (Cr, Zn), Glencoagh L. (Cr, Zn), Glen L. (CN)
Dublin City	None			
Dun Laoghaire - Rathdown	None			
Fingal	None			
South Dublin	None			
Galway City and County	1	1	0	
Kerry	1	1	1	Lough Lein (Cu)
Kildare	None			
Kilkenny	None			
Laois	None			
Leitrim	1	2	0	
Limerick City and County	None			
Longford	2	2	0	
Louth	2	2	0	
Mayo	None			
Meath	7	7	0	
Monaghan	30	76	3	Lough Minor (Cr) and Emy Lough (Zn,Cu) Crinkell Lake (Cu)
North Tipperary	1	1	0	
Offaly	None			
Roscommon	None			
Sligo	None			
South Tipperary	None			
Waterford City	None			
Waterford County	None			
Westmeath	5	8	0	
Wexford	None			
Wicklow	None			
Total	118	171	45	

Table 6. Summary of the Monitoring Data for Tidal Waters on a Local Authority Basis

County	No. of Tidal Waters Monitored	No. of Monitoring Sites	No. of Sites not Complying	Names of Non-Compliant Tidal Areas
Carlow	None			
Cavan	None			
Clare	None			
Cork City and County	1	7	6	Cork Harbour (Cr, Cu, Pb and Zn)
Donegal	None			
Dublin City	None			
Dun Laoghaire - Rathdown	None			
Fingal	3	20	11	Broadmeadow Estuary Inner (Cu)
South Dublin	None			
Galway City and County	None			
Kerry	None			
Kildare	None			
Kilkenny	None			
Laois	None			
Leitrim	None			
Limerick City and County	None			
Longford	None			
Louth	5	5	5	Clogherhead (Cr, Cu, As), Gyles Quay (Cr, Cu, As, Zn) Port (Cr, Cu, As) Seapoint (Cr, Cu, As) Shellinhgill (Cu, As, Cr).
Mayo	None			
Meath	None			
Monaghan	None			
North Tipperary	None			
Offaly	None			
Roscommon	None			
Sligo	None			
South Tipperary	None			
Waterford City	None			
Waterford County	1	6	0	
Westmeath	None			
Wexford	None			
Wicklow	2	2	2	Avoca (Zn, Pb, Cu) Redcross (Zn, Cu, Cr, As)
Total	12	40	24	

3.3 Monitoring Results on a Parameter Basis

In this section the monitoring results are discussed on a parameter by parameter basis.

3.3.1 ATRAZINE

Introduction

- Atrazine is a chemical belonging to the triazine class of herbicides. It is used for control of broadleaf and grassy weeds in corn, orchards, turf grass sod, forestry, grass crops and roses. Atrazine may potentially arise through use in forestry, horticultural, agricultural (including tillage, and particularly forage maize growers) and gardening activities (including landscapers, garden nurseries, garden centres, golf courses, sports pitches, and those carrying out weed control, most particularly on road verges). It works by inhibiting photosynthesis.
- Approval for re-registration of atrazine was not allowed by the EU's Standing Committee on Food Chain and Animal Health in October, 2003, so manufacture of this herbicide has ceased. Atrazine will be phased out of use in Ireland by December 2007, following the EU Commission Decision, which precludes it from entry to Annex 1 of Directive 91/414/EEC concerning the placing of plant protection products on the market. The use of atrazine may be authorised in Ireland on forestry and maize until 31.12.2007.

Monitoring

The monitoring results are presented in Figure 2. A summary of the sampling nationally is presented in Table 7.

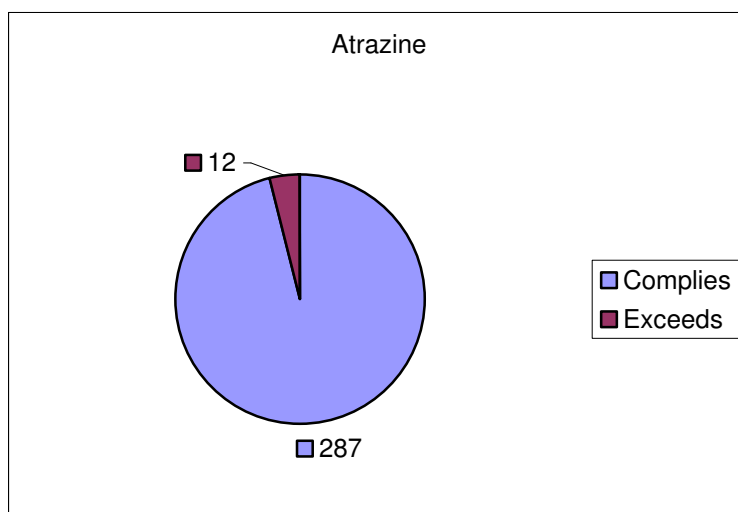


Figure 2. Overall Compliance with the Atrazine Standard.

Table 7. Summary of Monitoring for Atrazine.

	Rivers	Lakes	Tidal Waters
No. of Stations Monitored:	274	17	8
No. of Non-Compliant Stations:	12	0	0
No. of Compliant Stations	262	17	8

Identification of Pressures

South Dublin County Council states that the elevated level of atrazine recorded in the Poddle River was due to a one-off sample and that this may have resulted from its use in domestic gardens or in parks in the area. Fingal County Council reports elevated atrazine levels in the Ward and Pinkeen rivers, the causes of which are believed to be from the use of herbicides in agriculture or in the maintenance of parks or golf courses. As these rivers enter Fingal from Meath, it is proposed that, through appropriate liaison between the councils and investigative monitoring by Meath County Council, the source of the contaminant may be located. Dublin City Council reports slight atrazine exceedances in the Poddle, Camac and Dodder Rivers. Elevated levels of atrazine were also detected in the Inagh River in Clare though the specific source of the herbicide in this case is unknown. Further monitoring is to be carried out. Herbicide use in a number of parklands is being investigated as a possible source. There is very little information on atrazine in marine waters, though it has been detected in the Irish sea at very low levels (Marine Institute, 1999).

3.3.2 SIMAZINE

Introduction

- Simazine is a chemical belonging to the triazine class of herbicides. It is used for control of broadleaf and grassy weeds in corn, orchards, turf grass sod, forestry, grass crops and roses. It may also be used as an algaecide in ponds. Main sources of this substance include gardening activities and runoff from agricultural and afforested land.
- Approval for re-registration of simazine was not allowed by the EU's Standing Committee on Food Chain and Animal Health in October, 2003, so manufacture of this herbicide has ceased. Simazine will be phased out of use in Ireland by December 2007, following the EU Commission Decision, which precludes it from entry to Annex 1 of Directive 91/414/EEC concerning the placing of plant protection products on the market. The use of simazine may be authorised in Ireland until 31.12.2007 on crops such as potatoes, rhubarb, asparagus and soft fruits.

Monitoring

The monitoring results are presented in Figure 3. A summary of the sampling nationally is presented in Table 8.

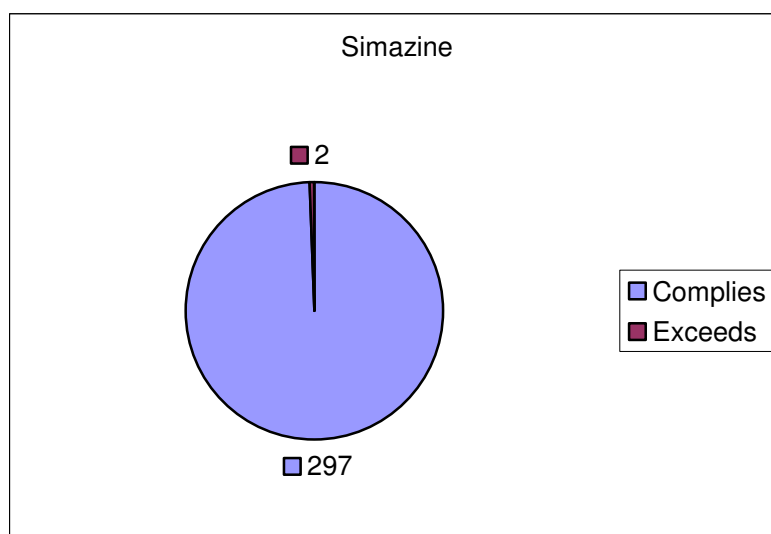


Figure 3. Overall Compliance with the Simazine Standard.

Table 8. Summary of Monitoring for Simazine.

	Rivers	Lakes	Tidal Waters
No. of Stations Monitored:	274	17	8
No. of Non-Compliant Stations:	2	0	0
No. of compliant stations	272	17	8

Identification of Pressures

Dublin City Council reports slight exceedances of the standard at two monitoring stations on the River Santry. The use of herbicides in parklands is being investigated as the possible source. There is very little information on simazine in marine waters, though it has been detected in the Irish Sea at very low levels (Marine Institute, 1999).

3.3.3 TRIBUTYLTIN

Introduction

Tributyltin (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.

TBT is an effective anti-fouling agent that has been used in marine paints for shipping and for fish cages. It is known to be an endocrine disruptor and is sufficiently toxic to harm many marine organisms at very low levels. TBT is known to cause growth retardation and deformities in both tissues and shell structure of molluscs, as well as masculinisation (imposex) of females.

The sources and uses of TBT include:

- fungicide and molluscicide
- antifouling agent for boats to discourage growth of marine organisms
- manufacture of other pesticides
- combating freshwater snails
- preservative in industrial applications
- prevention of slimes in industrial recirculating systems
- stabiliser in PVC resin
- paper and pulp mills
- cooling towers
- breweries
- leather processing facilities

The standard for TBT only applies in relation to tidal waters and hence monitoring of freshwaters for the substance is not a requirement.

Monitoring

The first controls on the use of TBT based anti-foulants were introduced on a voluntary basis by the salmon industry in 1985 and these were followed in 1987 by a ban on the application of TBT paints on all vessels under 25m in length, and, with a few exceptions, on all aquatic structures, including fish farm cages. However, recent monitoring reveals that imposex in dogwhelks *Nucella lapillus* is still a widespread phenomenon in Irish coastal waters, indicating widespread pollution with TBT (Marine Institute, 1999; Minchin, 2003). Areas seriously impacted include Cork Harbour, Bantry Bay and Kinsale Harbour, Cork; Kilmore Quay, Wexford; Waterford Harbour; Dublin Bay; and Killybegs, Donegal.

A surveillance monitoring programme in respect of TBT and its biological effects was initiated in 1987 and is repeated at varying locations every six years. An expanded programme of biological effects monitoring by the Marine Institute for TBT is proposed to ensure all key areas are covered (EPA, 2003).

Cork County Council commissioned a survey in 2004 of its main harbours and bays for tributyltin, using imposex levels in dogwhelks, and in areas where dogwhelks

were absent, intersex levels in the periwinkle *Littorina littorea* were used. The areas sampled were Bantry Harbour, Castletown Bere, Cork Harbour, Glandore Harbour, Kinsale and Youghal. An additional site in an area where there are no appreciable TBT sources was chosen as a control site. This site is located at Galley Head. Results indicate that pollution levels for TBT are high in Castletown Bere, Cork Harbour and Kinsale. Levels of pollution in Glandore Harbour and Kinsale were measured using the periwinkle and showed moderate to low levels of pollution. Levels in Bantry Harbour appear to have improved since the implementation of the 1987 ban on TBT use.

Waterford County Council reports evidence of reproductive impairment in dogwhelks at some sites in Dungarvan Harbour.

Identification of Pressures

The primary source of TBT in the environment is likely to be antifouling paint used on boats in either lakes or estuarine waters. TBT is only moderately persistent and degradation will typically take place under aerobic conditions within three months. However, in circumstances where TBT has become bound up in the sediments, it can persist and may be released on disturbance.

The European Union has adopted Regulation 782/2003 (EP and CEC, 2003) banning application of organotin compounds on ships flying the flag of an EU Member State from 1 July 2003, and imposing a general prohibition of active organotin on ships sailing to or from EU ports from January 2008. It also imposes the same prohibitions on non-EU ships as and when the Convention on the Control of Harmful Anti-fouling Systems on Ships (the AFS Convention), adopted by the International Maritime Organisation in October 2001, enters into force. It is to be expected that future monitoring will demonstrate a gradual diminution of the threat of TBT over the coming years.

The impact of TBT antifouling paints on the environment has resulted in a new public awareness regarding methods of fouling control and resulting increased costs associated with environmental and health compliance. This has meant that the development of new, persistent toxic compounds to control fouling is neither socially acceptable nor economically viable. In the short-term, copper-based antifouling paints will be used on the majority of vessels. However research is now focussing on the development and evaluation of a variety of benign antifouling strategies, including methods to interfere with bioadhesion of the fouling organisms (e.g., Callow and Callow, 2002). Cork County Council has prepared a guidance leaflet on the use of TBT, in consultation with all of the harbour masters in Cork County.

Dredged material from harbour areas should be assessed for the presence of TBT prior to the disposal of materials on land.

3.3.4 DICHLOROMETHANE

Introduction

Dichloromethane is a volatile organic compound (VOC) that is used as a process chemical in the pharmaceutical sector, in the production of paints and adhesives, and as a solvent for paint removers. It is also used as a cleaning fluid and as a degreasing agent. Solvents are in general disposed of off-site as hazardous waste, usually for thermal treatment abroad or recycling under IPPC or waste licences. The discharge of solvents to foul sewer is strictly regulated by licence to avoid flammable or explosive vapour build-up in the confined space of the sewerage system and to avoid exposure of the workers in the sewerage system. Potential waters at risk include downstream of industry, urban stormwater overflows and runoff, and WWTPs.

Monitoring

The monitoring results are presented in Figure 4. A summary of the sampling nationally is presented in Table 9.

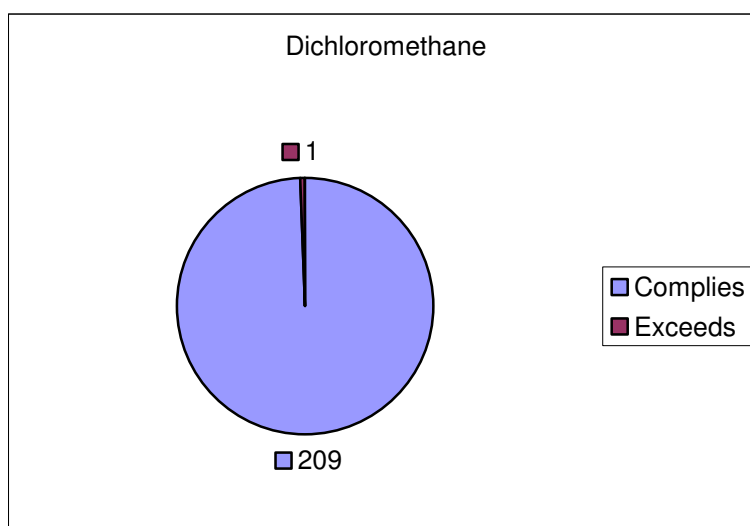


Figure 4. Overall Compliance with the Dichloromethane Standard.

Table 9. Summary of Monitoring for Dichloromethane.

	Rivers	Lakes	Tidal Waters
No. of Stations Monitored:	192	11	7
No. of Non-Compliant Stations:	1	0	0
No. of Compliant Stations:	191	11	7

Identification of Pressures

Kildare County Council has reported an exceedance of the dichloromethane standard downstream of Osberstown WWTP (20 µg/l). There were no exceedances of the dichloromethane standard noted in the baseline monitoring results submitted as part of

the measures reports. Further monitoring is required to confirm that this parameter is not likely to be a significant problem.

3.3.5 TOLUENE

Introduction

Toluene is a volatile organic compound (VOC). It is a component of petroleum. It is present in automobile exhausts, consumer paint products, paint thinners, laquers, adhesives and solvents in the fine chemicals industry. Solvents are in general disposed of off-site as hazardous waste, usually for thermal treatment abroad or recycling under IPPC or waste licences. The discharge of solvents to foul sewer is strictly regulated by licence to avoid flammable or explosive vapour build-up in the confined space of the sewerage system and to avoid exposure of the workers in the sewerage system. In addition, as toluene is a volatile component of petroleum products it may arise from hydrocarbon leakage and accidental spills. Areas likely to be contaminated by spills and seepages include railway stations, garages, oil terminals, ports, industrial sites, industrial and domestic heating systems and road runoff. Potential waters at risk include those downstream of industry, urban stormwater overflows and runoff, and WWTPs.

Monitoring

The monitoring results are presented in Figure 5. A summary of the sampling nationally is presented in Table 10.

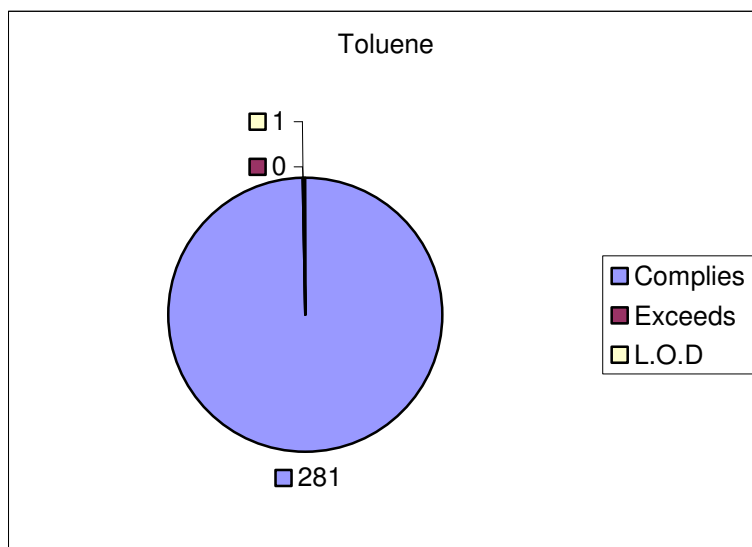


Figure 5. Overall Compliance with the Toluene Standard.⁶

Table 10. Summary of Monitoring for Toluene.

	Rivers	Lakes	Tidal Waters
No. of Stations Monitored:	254	14	14
No. of Non-Compliant Stations:	0	0	0
No of Compliant Stations:	253	14	14

⁶ L.O.D: Limit of detection was too high to determine compliance with the standard.

Identification of Pressures

There were no exceedances of the toluene standard noted in the monitoring results submitted to the Agency. Further monitoring is required to confirm that this parameter is not likely to be a significant problem. Potential sources are discussed above.

3.3.6 XYLENES

Introduction

Xylene is a volatile organic compound (VOC) 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 and coal tar and is formed during forest fires. Some of the main uses of xylene include:

- constituent of gasoline;
- the isomer mixture is used as a solvent for alkyl resins, coatings and laquers;
- o-xylene is mainly (95% globally) used for synthesis of phthalic acid anhydride;
- p-xylene is consumed (66% globally) for synthesis of dimethylterphthalate and (33% globally) for terephthalic acid;
- intermediate for vitamins, dyes, pharmaceuticals, pesticides, flavouring agents and other fine chemicals;
- solvents in printing, rubber and leather industries – production of rubber/tyres;
- constituent of cleaning agents, paint thinners, coatings and varnishes;
- use in wood treatment industries as a thinner for paint and varnishes.

Solvents are in general disposed of off-site as hazardous waste, usually for thermal treatment abroad or recycling under IPPC or waste licences. The discharge of solvents to foul sewer is strictly regulated by licence to avoid flammable or explosive vapour build-up in the confined space of the sewerage system and to avoid exposure of the workers in the sewerage system. In addition, as xylene is a volatile component of petroleum products it may arise from hydrocarbon leakage and accidental spills. Areas likely to be contaminated by spills and seepages include railway stations, garages, oil terminals, ports, industrial sites, industrial and domestic heating systems and road runoff. Potential waters at risk include those downstream of industry, urban stormwater overflows and runoff, and downstream of WWTPs.

Monitoring

The monitoring results are presented in Figure 6. A summary of the sampling nationally is presented in Table 11.

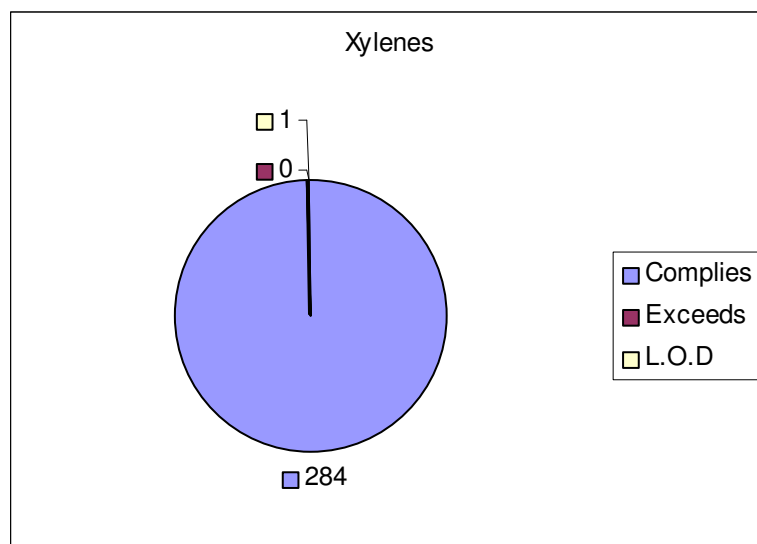


Figure 6. Overall Compliance with the Xylenes Standard.⁷

Table 11. Summary of Monitoring for Xylenes.

	Rivers	Lakes	Tidal Waters
No. of Stations Monitored:	257	14	14
No. of Non-Compliant Stations:	0	0	0
No of Compliant Stations:	256	14	14

Identification of Pressures

There were no exceedances of the xylenes standard noted in the monitoring results submitted to the Agency. Further monitoring is required to confirm that this parameter is not likely to be a significant problem. Potential sources are discussed above.

⁷ L.O.D: Limit of detection was too high to determine compliance with the standard.

3.3.7 ARSENIC

Introduction

Arsenic is a metal that is widely distributed through-out the earth's crust. It is introduced naturally into water through the dissolution of minerals and ores. It is very toxic to humans and long term exposure to arsenic can cause cancer of the skin, lungs, bladder and kidneys. Industrial uses of arsenic include:

- widely used in wood preservation;
- glass and semi-conductor industries;
- fungicide in timber processing;
- base metal (tin, bauxite) extraction;
- smelting/refining of lead, lead-scrap, zinc and copper;
- steel manufacture dusts/sludges from off-gas purification;
- tanning and depilation of hides;
- dusts from flues;
- paint manufacture (may be used as a pigment);
- biocide manufacture, formulation, marketing or use;
- adhesive manufacture;
- manufacture/maintenance of zerographic machines;
- textile industry, oil cloths, calico printing and dyeing.

Potential waters at risk include downstream of jetties, ports, timber yards, industry, contaminated land, landfills, urban stormwater overflows and runoff, and downstream of WWTPs.

Monitoring

The monitoring results are presented in Figure 7. A summary of the sampling nationally is presented in Table 12.

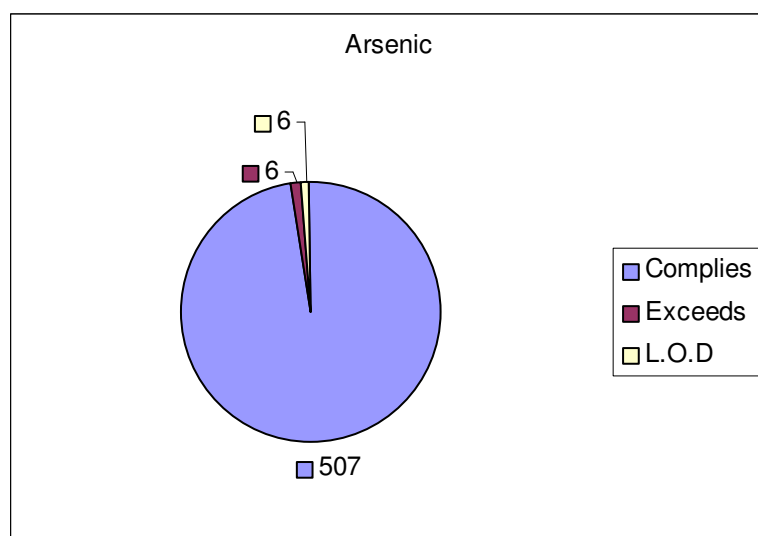


Figure 7. Overall Compliance with the Arsenic Standard.⁸

⁸ L.O.D: Limit of detection was too high to determine compliance with the standard.

Table 12. Summary of Monitoring for Arsenic.

	Rivers	Lakes	Tidal Waters
No. of Stations Monitored:	355	156	8
No. of Non-Compliant Stations:	0	0	6
No. of Compliant Stations:	355	150	2

Identification of Pressures

Louth County Council reports exceedances of the arsenic standard at five tidal bathing waters (Shelling Hill, Gyles Quay, Port and Clogherhead and Seapoint), which are under investigation as there is no obvious source⁹. There were no exceedances of the arsenic standard noted in the baseline monitoring results submitted as part of the measures reports. Though this appears to indicate it may not be a significant problem in terms of surface water, elevated levels of arsenic can be present due to the geology of the underlying bedrock and can be problematic in groundwater. Further monitoring is required to confirm whether this parameter is likely to be a significant problem in surface waters. Wicklow County Council reports a slight exceedance of the arsenic standard in the tidal stretch of the Redcross River. Further monitoring is proposed at this station to investigate this exceedance. It should be noted that elevated levels of arsenic have been detected in marine sediments at Dublin Port, Dun Laoghaire Harbour, the Boyne and Avoca estuaries and Bantry Harbour (Marine Institute, 1999).

⁹ These results may be due to an analytical error.

3.3.8 CHROMIUM

Introduction

Chromium is a metal that naturally occurs in ores although chromium in surface waters arises from industrial discharges. It occurs in the trivalent (Cr^{III}) and hexavalent (Cr^{VI}) forms, the latter being the more toxic form. An association has been found between exposure to chromium (VI) and mortality due to lung cancer. Chromium (VI) is classified as Group 1 (carcinogenic to humans) while chromium (III) is classified as Group 3 (not classifiable as to their carcinogenicity to humans) by the International Agency for Research on Cancer (IARC). Potential sources of anthropogenic chromium include:

- electroplating industry;
- tanning and textile plants;
- paint and dyeing plants;
- metallic products;
- sawmills and timber treatment facilities that use CCA (copper, chromium, arsenic) preservative;
- from alloys with iron, nickel or cobalt;
- final composition of stainless steels;
- high-speed metal-cutting tools;
- body trim on automobiles and other vehicles.

Potential waters at risk include those downstream of industry, including sawmills and timber treatment facilities that use CCA preservative, contaminated land, ports, landfills, urban stormwater overflows and runoff, and downstream of WWTPs.

Monitoring

The monitoring results are presented in Figure 8. A summary of the sampling nationally is presented in Table 13.

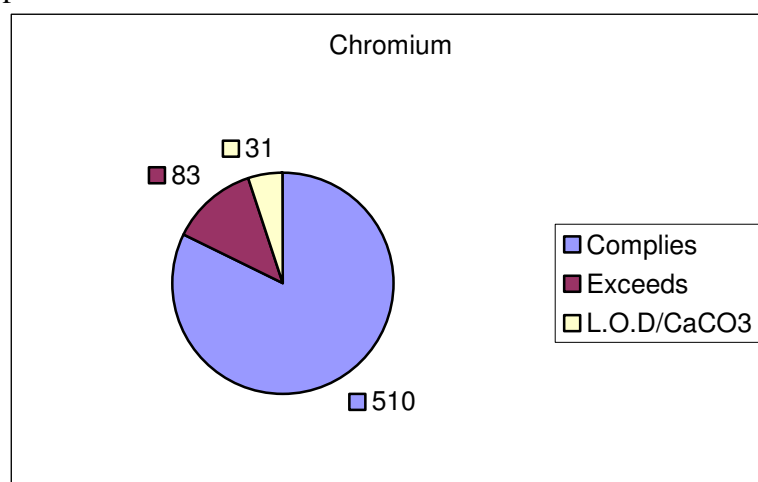


Figure 8. Overall Compliance with the Chromium Standard.¹⁰

¹⁰ L.O.D: Limit of detection was too high to determine compliance with the standard and/or CaCO_3 not calculated to enable determination of compliance.

Table 13. Summary of Monitoring for Chromium.

	Rivers	Lakes	Tidal Waters
No. of Stations Monitored:	433	160	31
No. of Non-Compliant Stations:	40	36	7
No. of Compliant Stations:	379	107	24

Identification of Pressures

Exceedances of the chromium standard in rivers and lakes are almost exclusively found in Donegal. This is due to a combination of the natural geology of the area and the soft waters found in Donegal that necessitate the tighter standard for chromium. Anthropogenic sources are not thought to be a significant contributor to the chromium exceedances in Donegal. Cavan County Council reports exceedances of the chromium standard at two landfills (Corranure and Bailieborough) and Lough Nadrageel. However, EPA monitoring carried out in 2004 and 2005 show the stations associated with landfills to be in compliance with the standard. Monaghan County Council reports two exceedances of chromium - at one river station due to natural sources and on Lough Minor. The source of the latter has been attributed to past industrial discharges from an old tannery.

Louth County Council reports exceedances of the chromium standard at five tidal bathing waters (Shelling Hill, Gyles Quay, Port and Clogherhead and Seapoint), which are under investigation as there is no obvious source¹¹. Wicklow County Council reports elevated chromium on four rivers and at Redcross tidal waters the suspected source being attributed to the old Kilmacoo copper deposits. This is to be confirmed. Cork County Council reports an exceedance at Marino Point in Cork Harbour monitored in 1986. Kerry County Council reports an exceedance of the standard at the River Laune which is attributed to natural sources.

It should be noted that elevated levels of chromium have been detected in marine sediments in Dungarvan Harbour and in the upper Suir estuary above Waterford (both due to tannery effluent), Dublin Port, Dun Laoghaire Harbour and New Ross. Elevated levels of chromium have been detected in mussels from Dungarvan Bay, though this situation is likely to improve following the closure in 1996 of the leather tannery responsible. Concentrations in shellfish from an aquaculture site in the outer bay area are generally much lower (Marine Institute, 1999; Glynn *et al.*, 2003).

In summary, of the 83 reported exceedances for chromium in rivers, lakes and tidal waters 66 were due to natural sources, 4 were due to landfills, 1 was from an old industrial discharge, 1 was from historic mining and 11 were undetermined.

¹¹ These results may be due to an analytical error.

3.3.9 COPPER

Introduction

Copper is a transition metal that is stable in its metallic state and forms monovalent (cuprous) and divalent (cupric) cations. It is an essential dietary requirement though can cause organoleptic (taste) problems at levels above 1 mg/l Cu. The acute lethal dose for adults lies between 1 and 400 mg of copper (II) per kg of body weight. At lower doses copper can cause symptoms typical of food poisoning. Potential anthropogenic sources of copper include:

- mining waste;
- electroplating waste;
- algicide, fungicide, insecticide;
- food additive in pig industry;
- photographic processes;
- treatment and finishing of metals;
- plumbing;
- paint, ink manufacturing;
- timber and hide preservation;
- production/use of pigments, ceramics manufacture, textile dyeing and printing;
- copper wire used in electronic transmission.

Potential waters at risk include downstream of industry, contaminated land, ports, landfills, urban stormwater overflows and runoff, WWTPs and landspreading of animal wastes.

Monitoring

The monitoring results are presented in Figure 9. A summary of the sampling nationally is presented in Table 14.

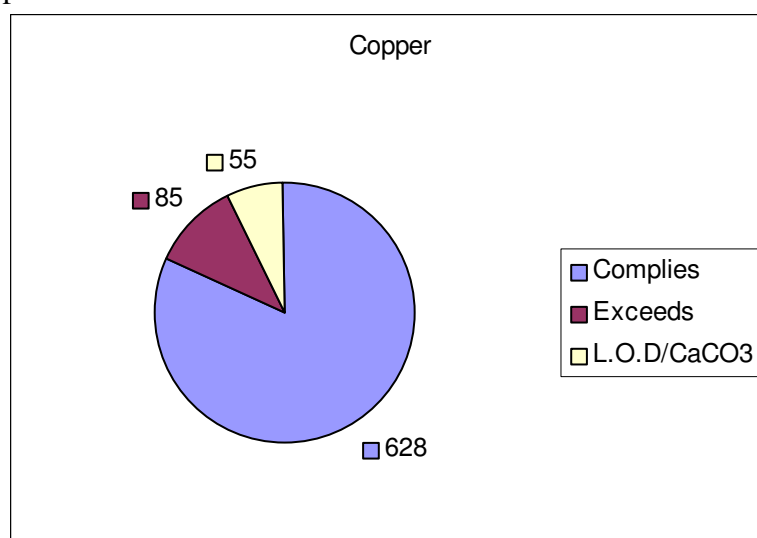


Figure 9. Overall Compliance with the Copper Standard.¹²

¹² L.O.D: Limit of detection was too high to determine compliance with the standard and/or CaCO₃ not calculated to enable determination of compliance.

Table 14. Summary of Monitoring for Copper.

	Rivers	Lakes	Tidal Waters
No. of Stations Monitored:	556	178	34
No. of Non-Compliant Stations:	51	10	24
No. of Compliant Stations:	472	146	10

Identification of Pressures

The main factors influencing the compliance with the copper standard are geology and historical mining activities. Mining of the Silvermines area has lead to some elevated levels of copper in this region while geology and the soft waters of Donegal contribute to the exceedances noted in this region. The reason for the elevated levels of copper recorded in South Dublin are as yet undetermined though it is likely to be of natural origin. Kerry County Council reports slightly elevated levels of copper in many soft water rivers in the county. More analysis is required to determine if this is a result of natural conditions. The cause of elevated copper levels in Crinkell Lake and Emy Lough in Co. Monaghan have not yet been determined though the cause is likely to be natural sources. Dun Laoghaire Rathdown County Council reports very slightly elevated levels of copper in the Glencullen River and attribute this as most likely due to geology. Cavan County Council reports exceedances of the copper standard at two stations adjacent to Corranure landfill. EPA monitoring data from 2005 show these sites to be in compliance with the standard.

The Marine Institute report that the Avoca River in Wicklow, which is subject to acid mine drainage, is the most significant riverine input of dissolved copper to Irish coastal waters. Wicklow County Council reports a slight exceedance of the copper standard at the Avoca tidal water with Redcross exceeding the standard significantly. Cork County Council reports elevated levels of copper at six stations in Cork Harbour. It is important to note however that this data dates from 1978-1986. Further monitoring to establish current results will be carried out in the harbour.

Fingal County Council reports very slight exceedances of the copper standards at 11 stations in the Broadmeadow Estuary (cause unknown). Louth County Council reports exceedances of the copper standard at five tidal bathing waters (Shelling Hill, Gyles Quay, Port and Clogherhead and Seapoint), which are under investigation as there is no obvious source¹³. It should be noted that elevated levels of copper have been detected in marine sediments at Dublin Port, Cork and Dun Laoghaire Harbours, the Avoca estuary and Bantry Harbour. Elevated copper levels have also been found in the tissues of mussels and oysters in Tralee Bay, Kerry, as a result of historic discharges from an electroplating plant, though concentrations have declined since the closure of the plant in 1983. Monitoring of copper in native oysters in 2001 indicates that the levels comply with guideline values (Glynn *et al.*, 2003). In the vicinity of the Avoca River, significantly elevated levels of copper have been recorded in the tissues of mussels and winkles on an extensive stretch of coastline from the river mouth northwards to Mizen Head, Co. Wicklow (Marine Institute, 1999).

¹³ These results may be due to analytical error.

In summary, of the 85 reported exceedances in rivers, lakes and tidal waters for copper, 44 were due to natural sources, 9 due to historical mines, 2 due to landfills and 9 were undetermined.

3.3.10 CYANIDE

Introduction

Cyanide is a reactive, highly toxic carbon nitrogen compound that combines with many organic and inorganic compounds. In excessive amounts it can cause mortality rapidly to humans and fish. Cyanide may lower vitamin B₁₂ levels and hence exacerbate vitamin B₁₂ deficiency. It has also been linked to an increased incidence of goitre (cretinism) through effects on iodine uptake by the thyroid. The potential anthropogenic sources of cyanides include:

- industrial effluents principally from electroplating processes and electric components manufacture;
- heat-treatment of metals and finishing operations;
- cyanide pesticides used as fumigants;
- mining;
- 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;
- plastics, surface coatings and adhesive industries may all involve the use of organic cyanides.

Potential waters at risk include downstream of industry, landfills, urban stormwater overflows and runoff, and downstream of WWTPs.

Monitoring

The monitoring results are presented in Figure 10. A summary of the sampling nationally is presented in Table 15.

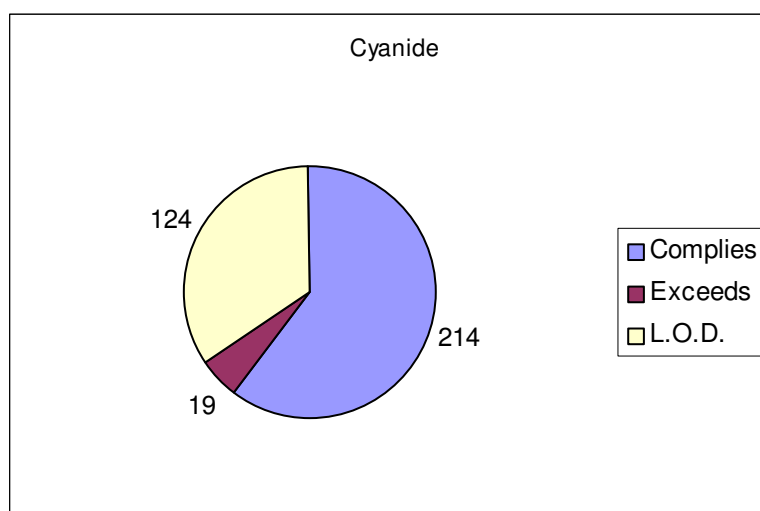


Figure 10. Overall Compliance with the Cyanide Standard.¹⁴

¹⁴ L.O.D: Limit of detection was too high to determine compliance with the standard.

Table 15. Summary of Monitoring for Cyanide.

	Rivers	Lakes	Tidal Waters
No. of Stations Monitored:	244	106	7
No. of Non-Compliant Stations:	16	3	0
No. of Compliant Stations:	158	49	7

Identification of Pressures

Some minor exceedances of the cyanide standard were reported in Cavan and Dublin City rivers, however all were below the current standard in the Drinking Water Regulations (50ug/l) S.I. 439 of 2000. The possible source of cyanide in the Tolka River could be from a combined sewer overflow. Kildare County Council reports an exceedance of the cyanide standard downstream of Osberstown WWTP (26 µg/l). Donegal County Council reports an exceedance of the standard at Glen Lough. Wicklow County Council reports 12 stations exceeding the standard for cyanide. Suspected identified pressures are industry, urban forestry and agricultural pressures. Further investigation and monitoring is required to pinpoint the sources of exceedances.

Louth County Council reports an exceedance of the standard at a station on the River Glyde (20 µg/l) though no exceedance was detected at other points on the river. There does not appear to be an obvious source but if the result is repeated, the County Council plan to undertake appropriate investigations.

3.3.11 FLUORIDE

Introduction

Fluorine is a halogen element that does not occur in its elemental state in the environment due to its high reactivity. It exists as fluorides (F⁻) in a number of minerals and occurs naturally in rare instances. The potential anthropogenic sources of fluoride include:

- fluoridation of public water supplies;
- leakage of mains water from the drinking water distribution system;
- municipal wastewater treatment plants;
- chlorofluorocarbons in aerosol sprays (though these 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 sulphur 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 fertiliser production.

Potential waters at risk include downstream of water treatment plants and WWTPs and areas where there is significant leakage from the drinking water distribution system.

Monitoring

The monitoring results are presented in Figure 11. A summary of the sampling nationally is presented in Table 16.

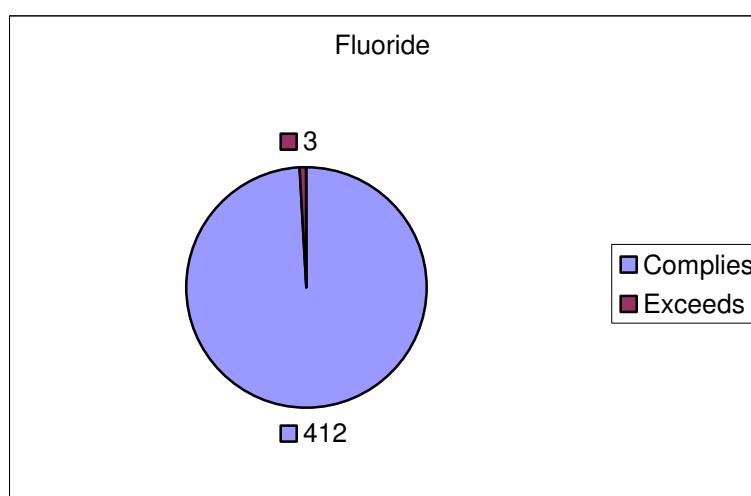


Figure 11. Overall Compliance with the Fluoride Standard.

Table 16. Summary of Monitoring for Fluoride.

	Rivers	Lakes	Tidal Waters
No. of Stations Monitored:	302	111	2
No. of Non-Compliant Stations:	2	1	0
No. of Compliant Stations:	300	110	2

Identification of Pressures

The reports submitted by the local authorities indicated that there were just three exceedances of the standard for fluoride reported by Cavan, Monaghan and Longford County Councils; two of which were most probably associated with the infiltration of drinking water into surface waters. Leaking drinking water distribution mains are a significant potential source of fluoride (as drinking water contains fluoride at levels of between 800 and 1000 µg/l particularly in urban areas). Discharges from urban wastewater treatment plants were also identified as a significant potential source of fluoride.

3.3.12 LEAD

Introduction

Lead is a toxic metal that accumulates in body tissue, with children up to 6 years of age, the foetus and pregnant women being the most susceptible to adverse health effects. It can have serious effects on the central nervous system. It can occur naturally from the dissolution of ores. Ireland is the tenth largest producer of lead in the world. Potential anthropogenic sources of lead include:

- mining waste;
- electroplating waste;
- lead piping;
- leaded petrol
- landfill sites;
- 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 and anglers (lead weights).

Potential waters at risk include downstream of contaminated land, ports, industry, urban stormwater overflows and runoff, landfills and downstream of WWTPs.

Monitoring

The monitoring results are presented in Figure 12. A summary of the sampling nationally is presented in Table 17.

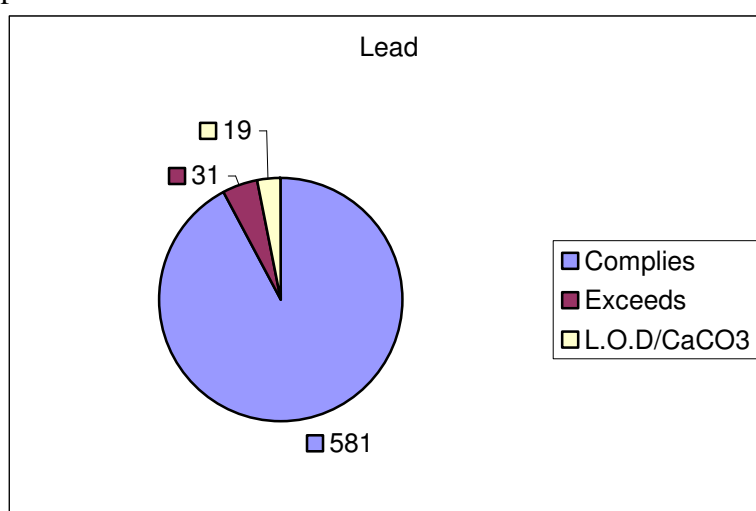


Figure 12. Overall Compliance with the Lead Standard.¹⁵

¹⁵ L.O.D: Limit of detection was too high to determine compliance with the standard and/or CaCO₃ not calculated to enable determination of compliance.

Table 17. Summary of Monitoring for Lead.

	Rivers	Lakes	Tidal Waters
No. of Stations Monitored:	431	166	34
No. of Non-Compliant Stations:	25	0	6
No. of Compliant Stations:	389	164	28

Identification of Pressures

The measures reports submitted by the local authorities have identified historical mining activities as the primary source of lead in surface water. In particular, historical mining in the Silvermines area of North Tipperary and Avoca in Wicklow were responsible for the majority of lead exceedances reported. Exceedances of the lead standard on the River Drish in North Tipperary were attributed to current mining at Anglo American Lisheen Mining Ltd. and natural levels. Monaghan County Council reports contaminated urban storm wastewater as the suspected reason for an exceedance of the standard on the tributary of the River Lackey.

Due to the high particle reactivity of lead, estuarine suspended solids and near-shore sediments act as efficient traps for this metal. Accordingly, dissolved concentrations of lead in off-shore waters tend to be low. However, atmospheric deposition can be an important vector leading to an often patchy distribution (Marine Institute, 1999). Elevated levels of lead reported above are in Cork Harbour and Bantry Bay.

It should be noted that elevated levels of lead have been detected in marine sediments at Dublin Port, Dun Laoghaire Harbour, the Avoca estuary and Bantry harbour. Persistent occurrences of elevated lead levels have also been found in the tissues of mussels in Carlingford Lough, Rogerstown estuary, Dublin Bay, inner Dungarvan Bay and Ringaskiddy in Cork Harbour (Marine Institute, 1999). Monitoring of shellfish in 2001 and 2002 in Dungarvan, Cork Harbour, Carlingford Lough and other shellfish growing areas indicated that lead levels were compliant with European standards (Glynn, *et al.*, 2003, 2004).

In summary, of the 30 reported exceedances of the lead standard in rivers, lakes and tidal waters 20 were due to historical mines, 2 due to combined natural sources and mining, 1 from urban storm water and 8 were undetermined.

3.3.13 NICKEL

Introduction

Nickel is a metal that is classified as possibly carcinogenic (Group 2B) by the International Agency for Research on Cancer (IARC). It is toxic to plant life and is a hazard to fish. It can occur naturally from the dissolution of minerals. Potential anthropogenic sources of nickel include:

- electroplating waste;
- manufacture of alloys;
- landfill sites;
- 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 armour plate;
- nickel-containing alloys such as German silver, Invar, Monel metal, Nichrome, and Permalloy;
- scrap yards;
- nickel-cadmium batteries.

Potential waters at risk include downstream of industry, contaminated land, ports, landfills, urban stormwater overflows and runoff, and downstream of WWTPs.

Monitoring

The monitoring results are presented in Figure 13. A summary of the sampling nationally is presented in Table 18.

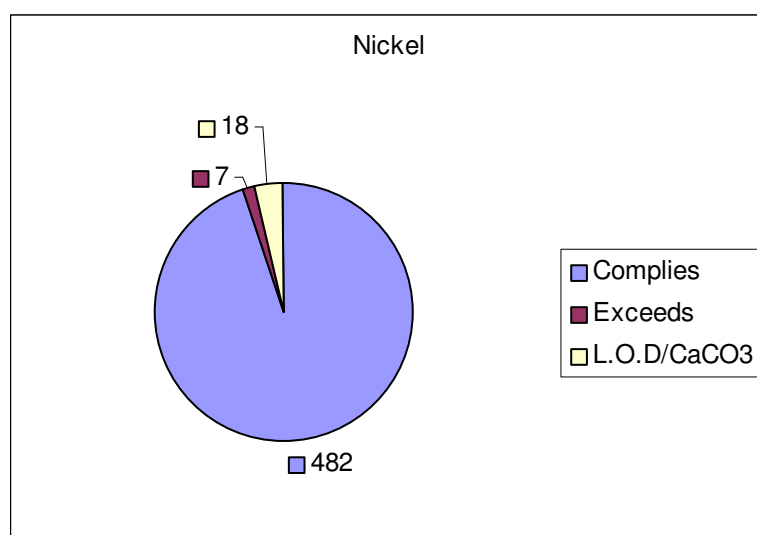


Figure 13. Overall Compliance with the Nickel Standard.¹⁶

¹⁶ L.O.D: Limit of detection was too high to determine compliance with the standard and/or CaCO₃ not calculated to enable determination of compliance.

Table 18. Summary of Monitoring for Nickel.

	Rivers	Lakes	Tidal Waters
No. of Stations Monitored:	379	95	33
No. of Non-Compliant Stations:	7	0	0
No of. Compliant Stations:	354	95	33

Identification of Pressures

Wicklow County Council reports six exceedances of the standard on the Avoca, Avonbeg and Aughrim rivers which are attributable to the abandoned mine site and Kings, Derry and Dereen rivers; further monitoring is required to establish the source of these exceedances. Monaghan County Council reports a slight exceedance at Derrycreevy Bridge which is attributed to natural levels. The Marine Institute report that nickel is unlikely to be a problem in estuaries based on the low levels of contamination found in sediments around the country, with only Dublin Port showing evidence of elevated levels (Marine Institute, 1999).

3.3.14 ZINC

Introduction

Zinc is a metal that occurs in small amounts in almost all igneous rocks. Zinc is an essential element although, if ingested in gross amounts, it has an emetic effect. Potential anthropogenic sources of zinc include:

- mining waste;
- protective coating, or galvanizer, for iron and steel, as an ingredient of various alloys;
- 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 sulphide 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.

Potential waters at risk include downstream of industry, landfills, contaminated land, ports, urban stormwater overflows and runoff, and downstream of WWTPs.

Monitoring

The monitoring results are presented in Figure 14. A summary of the sampling nationally is presented in Table 19.

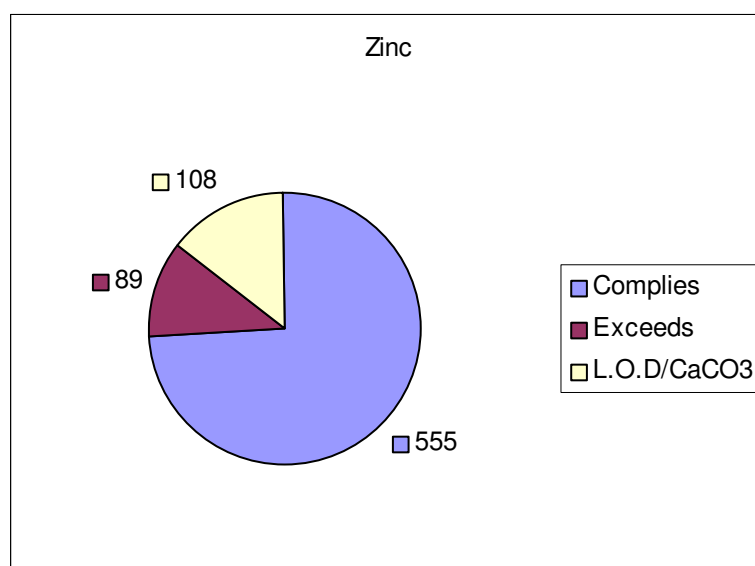


Figure 14. Overall Compliance with the Zinc Standard.¹⁷

¹⁷ L.O.D: Limit of detection was too high to determine compliance with the standard and/or CaCO₃ not calculated to enable determination of compliance.

Table 19. Summary of Monitoring for Zinc.

	Rivers	Lakes	Tidal Waters
No. of Stations Monitored:	540	178	34
No. of Non-Compliant Stations:	56	25	8
No. of Compliant Stations:	408	121	26

Identification of Pressures

The measures reports submitted by the local authorities have identified a significant number of stations where elevated levels of zinc have been detected. A large number of these stations are located in the soft waters of Donegal which is influenced by the geology of the area as well as being subject to the more stringent standard for zinc. Historical mining has been identified as the source of elevated zinc in North Tipperary and Wicklow. An IPPC licenced mining facility has also been identified as a source of elevated zinc in the River Drish in North Tipperary. Discharges from a tannery (now closed) and an engineering works (now discharging to a sewer) are the most likely reasons for exceedances of the standard at Lough Minor, Co. Monaghan reported in the first measures report. Subsequent monitoring indicates that the levels have decreased and are now within the standard. Elevated zinc was also reported at one site in Monaghan coming from untreated urban storm water into a tributary of the River Lackey on the Newtown Butler Road and at one station on Emy Lough. Other unexplained exceedances of the zinc standard were also noted in some local authority areas (Cavan (Skeagh Lough), Fingal (Ballough) and Laois (Triogue)). Kildare County Council reports an exceedance of the zinc standard downstream of Osberstown WWTP.

Five of the seven monitored stations in Cork Harbour recorded elevated zinc levels. This monitoring was undertaken in the 1980's and further investigations are to be carried out. Another minor exceedance is reported in Broadmeadow Estuary, Fingal. It is suspected that this was a result of major bridge construction being carried out on the estuary at the time of sampling. Subsequent monitoring indicates that the level of zinc at the monitoring stations has decreased and is now within the standard required. A slight exceedance of the zinc standard was reported at Gyles Quay Co. Louth however these results may be due to analytical error. The Marine Institute has identified elevated levels of zinc in coastal waters downstream of the Avoca River (due to acid mine drainage). The upper section of the Shannon estuary also appears to be contaminated with zinc, albeit to a much lesser extent than the Avoca system. This is possibly due to mining in the Kilmastulla river catchment at Silvermines (Marine Institute, 1999).

It should be noted that elevated levels of zinc have been detected in marine sediments at Dublin Port, Dun Laoghaire, New Ross and Waterford Ports, the Boyne and Avoca estuaries and Bantry Harbour. Zinc contamination in Dublin Port results largely from losses of metalliferous ore as it is loaded into vessels. The origin of zinc in sediments at Bantry is undetermined.

In summary, of the 89 reported exceedances of zinc in rivers, lakes and tidal waters, 39 were due to natural sources, 28 due to historical mine sites, 5 due to a combination

of natural sources and mining, 5 due to landfills, 2 due to urban waste water and stormwater, 1 due to contaminated silts and 9 undetermined.

4. Review of Measures

Programmes of measures were requested from local authorities for:

- a) the functional area as a whole and
- b) each river/lake/tidal water catchment

The EPA Guidance Manual (EPA, 2002) lists an array of measures that are available to local authorities to protect and improve water quality. Many of these measures have already been reported on in the Phosphorus Regulations National Implementation Report, 2005 (Clenaghan *et al.*, 2005). Additional measures being implemented that specifically relate to the Dangerous Substances Regulations are reported on here.

4.1 Planning Control and Enforcement Measures

Local authorities have a wide array of tools available to implement planning, control and enforcement measures. The primary legislation that supports these measures includes:

- The Planning and Development Act, 2000
- The Water Pollution Act, 1977 and 1990
- The Waste Management Act; 1996 to 2003

4.1.1 Water Quality Management Planning

Water quality management planning is a key measure available to local authorities in the implementation of the Dangerous Substances Regulations. It is now widely accepted that a catchment-based approach to water quality management is appropriate as set out in Government policy and in the EU Water Framework Directive (WFD). All of the local authorities are involved in water quality management planning through implementation of the WFD. This Directive, which came into force in December 2000, requires Member States to draw up River Basin Management (RBM) Plans by 2009. The aim of these plans will be to provide a holistic approach, within each River Basin District (RBD), to the management of surface inland, estuarine and coastal waters, groundwaters, and terrestrial ecosystems dependant on the aquatic environment. Programmes of measures identified in the RBM Plans as necessary to achieve the targets of the Directive must be operational by 2012. The general aim of the Directive is to prevent deterioration of water status and achieve good water status (as defined) by 2015.

At a national level, the Directive is being implemented through a National Co-ordination Group that includes Government Departments and Agencies with responsibility for water protection and management. There are a number of Technical Working Groups focussing on national implementation of particular aspects of the Directive and, in 2004, the EPA convened a Technical Co-ordination Group. One of the Technical Working Groups is focussing on Dangerous Substances (see below). Irish representatives also take part in the North-South Working Group on Water Quality, in the UK Technical Advisory Group on the WFD and in the EU

Strategic Co-ordination Group (including a technical working group on WFD priority substances). WFD activities ongoing at a national level are described on the website www.wfdireland.ie and in a number of recent publications (Clenaghan *et al.*, 2005; Toner *et al.*, 2005).

Eight RBDs have been established in Ireland, north and south (including three cross-border RBDs). River Basin Management (RBM) Projects, involving environmental consultants, have been established in each RBD to facilitate implementation of the WFD. Local authorities have the primary role in promoting, establishing and implementing the RBM Projects. Monitoring of dangerous substances forms part of the remit of the RBD Management Projects. Most local authorities propose to liaise closely with the RBD Projects to maximise collection of information on dangerous substances. The participation of local authorities in the RBM projects should assist them in achieving the objectives of the Dangerous Substances Regulations.

The National Dangerous Substances Expert Group was established in 2003, by the DEHLG, to assist with developing lists of dangerous substances relevant to water quality in an Irish context. Having reviewed available datasets the Expert Group has proposed a list of pollutants that are potentially relevant in Ireland (DEHLG, 2004). The Group recommended a National Dangerous Substances Screening Monitoring Programme, which commenced in 2005. This involves the collection of data on the presence and levels of a wide range of dangerous substances considered to be relevant in the Irish context. The first phase of this programme will investigate evidence of substances at specific locations in the vicinity of likely potential sources of pollutants. In the second phase, further target sites will be selected to isolate the causes of any elevated levels of dangerous substances found. As much of the potential usage of chemicals is concentrated in urban centres, the monitoring programme has been focussed on major population centres initially.

4.1.2 Waste Management

Both operating and closed landfills have been identified as potential sources of dangerous substances. All new landfills licensed by the EPA require leachate collection systems and removal of leachate for treatment minimising any potential risk to the environment. In addition, it is a condition of licences that the leachate is subject to frequent monitoring along with groundwater boreholes and surface water at each site. Some local authorities are in the process of upgrading landfills with leachate collection systems.

Cork County Council proposes to assess leachate risk from closed landfills and implement corrective action for those sites that are found to be contaminating water. Cork County Council has also carried out a review of waste permits for facilities other than landfills and aim to investigate most of these sites further. Leitrim County Council reports exceedances of a number of dangerous substances (arsenic, lead, copper and chromium) in the vicinity of Carrick on Shannon landfill in 2002 and 2003. However, since landfill remediation work has been undertaken at this closed landfill, monitoring in 2004 has not revealed any exceedances. Mayo County Council is monitoring two closed landfill sites at Claremorris and Belmullet for dangerous substances.

Waste management facilities other than landfills include recycling facilities, recovery facilities, composting facilities, waste transfer stations and civic amenity sites. These are licensed either by the EPA or permitted by the local authority depending on the size of the facility. A number of local authorities have proposed to focus on dangerous substances as part of their regular audits and inspections of facilities issued with permits under the Waste Management Act (Permitting) Regulations, 1998 and in their review of permits (e.g., Wexford, Cork County, Kilkenny). Galway County Council proposes enforcement action against certain waste permitted sites that have not submitted monitoring results on dangerous substances. In 2005, the EPA commissioned an investigation into the extent of unauthorised waste activities in Ireland. The information gathered in the course of this investigation has been used by the Office of Environmental Enforcement (OEE) to prepare an action plan to deal with unauthorised waste activities in Ireland. Implementation of this plan is now being coordinated by the OEE through the National Enforcement Network. (EPA, 2005).

There are a number of hazardous waste management facilities and scrap metal recovery facilities throughout the state. Many local authorities have provided hazardous waste deposit facilities at bring facilities and these facilities are being extended nationwide. These pose a potential threat because they reprocess or dispose of industrial hazardous wastes and metals that may contain substances that are prescribed in the Regulations. Local authorities may identify potential sources of dangerous substances by examining records maintained under hazardous waste legislation. North Tipperary County Council operates a collection system for batteries and fluorescent tubes, which are subsequently recycled. These generally contain heavy metals and may pose a significant threat to surface waters when not properly disposed of.

4.1.3 Sludge Management Plans

Many local authorities are preparing or have prepared sludge management plans. The primary piece of European legislation dealing with soil contamination by heavy metals is the EU Sewage Sludge Directive (86/278/EEC). The use of sewage sludge in agriculture in Ireland is regulated by the Waste Management Act, 1996 and relevant regulations (S.I. No. 148 of 1998 and S.I. No. 267 of 2001). This legislation deals with cadmium, copper, mercury, nickel, lead and zinc. A number of other elements, including chromium, are included in national sludge protocols, because of their known impacts. The EPA has found that sampling programmes at some local authorities where sewage sludge is reused in agriculture are inadequate or in need of significant improvement, including maintenance of sludge registers. All local authorities should have regard to EPA recommendations in relation to management of sewage sludge (Smith *et al.*, 2004).

Teagasc has published a report on the significance of heavy metal and organic pollutants in soils (Teagasc, 1999). This study concentrated in the south-east of the country and found naturally high levels of cadmium and nickel in some soils, which may have implications for water quality in these areas.

4.1.4 Discharge Licensing and General Enforcement

Under the Regulations it is a requirement that licences granted by the Environmental Protection Agency or local/sanitary authorities under the Local Government (Water Pollution) Act, 1977, the Environmental Protection Agency Act, 1992 and the Waste Management Act, 1996 must reflect the prescribed standards with immediate effect (from 1st July, 2001) in relation to new licence applications. Existing licences must be reviewed and where necessary revised on the basis of meeting the prescribed standards by 1st July, 2006.

Most local authorities propose to review their discharge licences and carry out enforcement of licences. Information sources on dangerous substances include registers of trade effluent discharges, registers of IPPC licensed facilities, and trade directories. In addition, many local authorities are also concentrating on identifying unlicensed facilities where the trade discharge is unknown and may represent a threat to the receiving water body in relation to dangerous substances (e.g., Galway and Fingal County Councils). Records relating to pollution incidents may also identify where dangerous substances may have been discharged to surface waters.

An enforcement team has been established within the Environment Section of Galway County Council. The team intends to ensure that all car/truck dismantlers in the functional area are permitted by the end of 2005, so that discharges of dangerous substances from these facilities are monitored and appropriate preventative or remediation measures are implemented if necessary. Louth County Council reports the establishment of a new Enforcement Section which will focus on enforcement in the planning, building control and waste areas. This should ensure better compliance with planning conditions for new and existing developments.

North Tipperary County Council is presently compiling an inventory of all chemicals used or held on sites where a discharge licence exists or is sought. Where it is found that dangerous substances are used on site, provision will be made within the licence for their monitoring and control to reduce the potential threat to the aquatic environment. North Tipperary County Council has identified garages as a possible source of dangerous substances from potential spillages and leaking tanks. New petrol/diesel storage tanks and associated pipework is pressure tested in the presence of the Fire Service to ensure prevention of fuel loss to groundwaters. Wholesalers and retailers who stock chemicals which contain dangerous substances are being inspected to ensure that they are stored in a proper manner and that procedures are put in place to ensure that any accidental spillage is adequately contained and managed. North Tipperary County Council recommends that appropriate conditions on management and storage of chemicals should be placed on planning permission conditions. This allows preventative provisions to be put in place prior to development commencement to minimise the risk of contaminants entering waters. It is important that all development proposals are considered with water quality considerations taken into account.

A total of 113 licences / reviews to discharge to sewers and 4 licences / reviews to discharge to waters were screened for dangerous substances during the period July 2002 to July 2004 in the Dublin City Council area. A further 48 discharges to sewers and 9 to waters were dealt with by the Central Laboratory for the three

surrounding Dublin local authorities. The majority of trade effluents in the County Dublin area discharge to the Ringsend WWTP. Enforcement of licence conditions occurs by way of extensive monitoring programmes and compliance reporting by the Central Laboratory to the four Dublin local authorities. Monitoring of the Ringsend effluent for metals commenced in May 2004.

Fingal County Council is endeavouring to target specific risk areas to ensure that bunding of fuel areas or the provision of oil and silt interceptors is undertaken where appropriate. These issues are also considered when issuing discharge licences. Fingal County Council is also surveying all golf courses/clubhouses in the county and issuing discharge licences to ensure that excessive discharges of dangerous substances do not emanate from these properties. A number of local authorities propose liaison with their Parks Departments to control the use of herbicides on local authority property (e.g., Dublin City Council and Fingal County Council). Fingal County Council has commenced monitoring heavy metals and organic pollutants identified in the Use of Sewage Sludge in Agriculture Regulations (S.I. 148 of 1998), and in the Code of Good Practice for the Use of Biosolids in Agriculture, for all trade effluent discharging to sewers. Dun Laoghaire Rathdown County Council proposes to survey golf courses for use of herbicides and fertilisers.

IPPC licensed facilities have been identified by a number of local authorities as potential sources of dangerous substances. All emissions and discharges from IPPC licensed activities are subject to emission limit values as set out in the conditions of the licence. Conditions and emission limit values are set to provide for the protection of the environment by way of control, limitation, treatment and monitoring of emissions. All licensed facilities must ensure compliance with the conditions of their IPPC licence by implementing an environmental management system. Monitoring of IPPC licensed activities has indicated very few problems to date (with the possible exception of some mining activities). Liaison between the local authorities and the EPA is required to address any issues that may arise in this area.

Cork County Council has identified all County Council and EPA licensed facilities that are likely to discharge dangerous substances, identified the discharge route (sewer or water) and compiled recent monitoring data (1999-2003). The Council has identified the disposal routes for sludges from County Council licensed industries. This data has proved very useful for assessing threats to waters. Cork County Council has expressed concerns relating to the levels of dangerous substances in waters surrounding the Irish Ispat plant in Cork Harbour. Historical monitoring indicated elevated levels of metals at Blackpoint. Analysis of sediments and dredge material in Cork Harbour and near to the Naval Base also indicates the presence of dangerous substances. The Council recommends that the tidal waters be monitored prior to, during and post the clean-up of the site. Cork County Council has carried out monitoring of ten major outfalls to tidal and coastal waters in the county. This monitoring indicates that elevated copper levels occur in three of the discharges (Castletownsend, Timoleague and Skibbereen). The Council has examined Foreshore Licences and identified those with discharges to water, which the Council proposes to monitor.

Louth County Council reports a particular problem in the county regarding the illegal dumping of sludge from diesel laundering activities, which is a financial drain on the

Council. To date this type of waste has been disposed of in sealed IBC containers. There is also a problem with diesel laundering activities that may be operating in Northern Ireland and which may influence water quality.

Catchment surveys carried out by Monaghan County Council under the Phosphorus Regulations have included surveys of business/factory premises. Sites are inspected in relation to any risk of discharge of polluting matter including dangerous substances to waters. Waterford City Council states that a comprehensive survey of the drainage system and discharges from the Industrial Development Authority estate in the city is being undertaken.

4.1.5 Waste Water Treatment

Waste water treatment plants (WWTPs) receive waste water from a number of sources including industry, commercial activities, housing estates etc. Therefore there is a potential that the incoming water may be contaminated with dangerous substances, especially with solvents or heavy metals from upstream industrial sources. If dangerous substances are present in the influent then there is the possibility that a certain amount of them may settle out of the treated water and into the sludge collected at the plant (e.g. heavy metals). Some dangerous substances, depending on their properties, may pass through the WWTP and enter the receiving water. Unregulated drainage from industries to sewer collection systems can affect treatment processes in downstream plants resulting in reduced operational efficiency or in the worst case scenario, failure of the plant treatment processes resulting in discharge of untreated industrial and domestic sewage.

There is a dynamic program of upgrading and building wastewater treatment plants underway throughout the country. WWTPs are being upgraded to comply with the requirements of the Urban Waste Water Treatment (UWWT) Regulations, 2001, which specifies the minimum discharge standards required of municipal WWTPs. Upgrade of WWTPs does not guarantee that dangerous substances will not occur in the treated effluent. The UWWT Regulations do not stipulate that monitoring for dangerous substances must be undertaken. However, most local authorities propose to monitor the effluent of WWTPs and receiving waters downstream of the plants for dangerous substances, and propose to evaluate inputs into WWTPs to identify potential sources of dangerous substances.

Dublin City Council report that all metals arriving in sewage to Ringsend WWTP are treated and the majority are removed in the biofert product. The residual metals in the effluent are discharged to the Liffey estuary. Monitoring of Ringsend sewage effluent for heavy metals commenced in May 2004. Loadings of five of the regulated metals to the Liffey Estuary (based on daily mean flows from Ringsend) have been estimated for the May to July 2004 period. Other dangerous substances will be monitored during the next reporting period.

Meath County Council has carried out monitoring for dangerous substances of the final effluent of eleven WWTPs. Meath County Council reports elevated levels of copper and zinc in the effluent of 7 and 2 WWTPs respectively. Monaghan County Council reports monitoring of surface waters below three of the larger urban areas in

the county (Monaghan, Carrickmacross and Ballybay) in June and September 2004 and no exceedances of the standards were detected. Elevated metals recorded in many of the county's 'soft water' lakes were attributed to natural causes. In a small number of cases exceedances could be related to untreated urban wastewaters and historic tannery contamination. Wexford County Council carried out once off monitoring of the effluent of three WWTPs (Wexford, Enniscorthy and Gorey) and did not find elevated levels of dangerous substances. Similarly Wexford County Council carried out a study of nineteen discharges to Bannow Bay (in conjunction with the Department of Communications, Marine and Natural Resources) and all levels recorded were within specified standards.

Cork County Council has instigated a sampling, monitoring and analysis programme for the final treated effluent of all its WWTPs, most of the larger WWTP influents as well as for the larger septic tanks (high population equivalents). The population equivalents of the plants and the dilution factors of receiving water bodies were used to assign a risk rating to each plant. Of the 53 WWTPs and septic tanks assessed, 27 were rated as low risk, 22 as medium risk and four as high risk for dangerous substances. The Council plan to continue monitoring these plants and their receiving waters and identify potential sources of dangerous substances where necessary.

North Tipperary County Council has established quarterly meetings between the Council's Water Services and Environment Sections to improve the transmission of information within the local authority. The Council has carried out additional monitoring of WWTPs that accept industrial discharges and has found that all results were within limits of the Dangerous Substances Regulations.

4.1.6 Storm Water Run-off and Combined Sewer Overflows

Storm water, or urban run-off, is rain or snow that falls on impervious surfaces and is routed to natural or artificial drainage systems or water bodies. This also includes run-off from residential and business premises. Storm water can cause significant problems if it is not adequately managed and treated. When storm water travels over developed land pollutants are carried into the storm water stream. Common storm water pollutants include heavy metals (zinc, copper, lead), oils and greases (toluene, xylene) and organic toxins (pesticides, phenolics etc.). The sources of these pollutants are diverse. Oil, grease and metals can come from motor vehicles and poor household and business practices. Urban stormwater runoff from road discharges to surface water sewers is inevitably contaminated with petroleum hydrocarbons, which is exacerbated by increasing traffic volumes in most urban centres. Residues from all street spillages and tanker accidents, including firewaters, are included in this threat. Improperly used or stored pesticides, paints, preservatives and solvents contribute to organic toxins. Dangerous substances that are discharged through air emissions are also a potential pressure as the pollutants are deposited and may mix with surface water run-off. These pollutants can have significant impacts on aquatic resources.

Combined sewer overflows discharging to waters during rainfall events are a significant threat to compliance with limit values in rivers, particularly in urban areas. Combined sewers and sanitary sewers carry both raw sewage, from residences and industrial sites, and run-off from city streets. In dry weather, combined systems

generally carry sewage wastes to wastewater treatment systems. If the volume of the combined waste water when it rains becomes more than the treatment plant can handle, then the flow may be diverted to outfall points that discharge raw sewage, potentially toxic industrial waste and contaminated storm water to the nearest stream or coastal waterway. These untreated discharges can be as potent as direct sewer emissions. Storm water run-off as well as combined sewer overflows can therefore be considered as potential pressures to meeting water quality standards under the Regulations. There is a need for local authorities to compile a register of outfalls and overflows from urban areas and gather monitoring data for the quality of effluent from such systems. Cork County Council is assessing the significance of these pressures in their functional area. Wicklow County Council propose to sample the discharge from a storm sewer outfall point in one of the larger towns and analyse for the full suite of dangerous substances. The Greater Dublin Strategic Drainage Study (Dublin Drainage Consultancy, 2005) and the National Urban Waste Water Study (DEHLG, 2005) should provide valuable information to help local authorities reduce the impacts of sewage and storm waters on receiving waters (see also Clenaghan *et al.*, 2005).

Drainage misconnections, resulting in foul waters entering surface waters, may lead to significant contamination. A number of local authorities are carrying out work to address this issue (see Clenaghan *et al.*, 2005). For example, Dun Laoghaire Rathdown County Council is conducting misconnection surveys and upgrading drainage systems. Dublin City Council reports significant progress in the implementation of misconnection surveys. Wicklow County Council is actively progressing the upgrading of existing collection systems to prevent contaminated discharges. The Waterford Main Drainage Scheme should eliminate all foul effluent discharges to the River Suir in the environs of the city and from areas of south Kilkenny, including the Belview Port Area. The Limerick Main Drainage Treatment Plant was commissioned in October 2003 with the elimination of over 50 effluent outfalls to the Shannon River.

4.1.7 Drinking Water Treatment

Water treatment plants pose a potential threat to surface waters, e.g., due to the risk element of storage of chemicals at the plants and the practice of discharging water treatment plant sludges to watercourses.

These sludges should be dewatered and landfilled, though the Agency has found that some treatment plants are discharging the sludge directly back into the receiving water with significant impacts on receiving water quality and fauna (Page *et al.*, 2004).

4.1.8 Farm Surveys

Farming can be a source of dangerous substances, particularly regarding the use of pesticides. Run-off from farmland where pesticides have been applied can enter into surface waters either directly, or through groundwater movement, causing pollution. Effluent discharges from farmyards can result in dangerous substances entering surface waters. Dangerous substances may also arise through the use of sheep dip,

silage additives and animal medicines. Some local authorities have proposed adding a section to existing farm survey forms to establish the use and storage of herbicides and other dangerous substances on farms (e.g., Fingal, Mayo, Roscommon County Councils). Farm survey work carried out under the agricultural bye-laws in Cork, Offaly, Westmeath, Cavan and North Tipperary should help eliminate the entry of dangerous substances to waters from relevant farms.

Cork County Council has received advice that maize growers are the principal agricultural users of atrazine and has been in touch with the Department of Agriculture and Food regarding this matter. The DAF advised that the sales and the use of herbicides by county or by region are not monitored on a regular basis. The Council has sourced information on where maize is grown and aims to proceed with further investigations in its next implementation programme. The Council has decided that it would discontinue the use of atrazine and simazine in its own parks department and on public roadways.

Offaly County Council proposes to carry out a survey of Agricultural Co-Operatives within the county to determine the use of commercially available herbicides containing atrazine and simazine. Leitrim County Council proposes to gather information on sales of dangerous substances by suppliers. Carlow County Council proposes to review licensed land spreading, especially spreading of pig slurries, as copper is a very important feed additive in the pig industry. A research programme is currently underway, conducted by Waterford Institute of Technology, to measure the ability of Constructed Wetlands to remove copper, zinc and selenium from farmyard discharges.

The EPA carried out a study of Pesticide Residues in Spent Mushroom Compost, funded by the EU Stride Environment Sub-Programme in 1994. This report concluded that there is a perceptible increase in the level of pesticides determined in surface waters in the immediate vicinity of dumping grounds, though the level of pesticides was very low and below statutory limits. The report recommended that local authorities should ensure that sites used for the disposal of spent mushroom compost be located where there is no risk of leaching into water courses. (Ward, P., 1994).

Sheep dipping in the upland hill farming areas is now being largely replaced with treatment by injection, as allowed in the 1994 amendment to the Sheep Scab Order of 1905 (S.I. No. 291 of 1994). As a consequence there is a reduced amount of spent sheep dip to be disposed of and therefore a reduced risk of pesticide discharges to ground or surface waters through run-off from land-spreading. In Westmeath all local authority sheep dip tanks have been decommissioned and the Council are promoting awareness amongst the farming community in relation to dangerous substances. Westmeath is currently acting as a facilitator in the development of a collection service for the safe disposal of dangerous substances being used on farm and in veterinary practices.

4.1.9 Fish Farms

The Marine Institute sample live farmed fish from marine aquaculture sites under the residues programme (Council Directive 96/23/EC). The Directive specifies a wide

range of substances to be tested, including pesticides and heavy metals such as mercury, cadmium and lead. The Marine Institute proposes to include monitoring of marine fish farm sites in its development of a monitoring programme to meet the requirements set out in both the Dangerous Substances Directive and the Water Framework Directive. Galway County Council state that eight freshwater fish farms and fish processing facilities are licensed under the Water Pollution Act in its functional area, and operators are required to maintain records of chemical usage.

4.1.10 Forestry

Herbicides are primarily used in conifer plantations where bracken, furze, laurel, weeds and rhododendron must be controlled and Bioactive Glyphosate (Roundup) is the primary herbicide used. The Forest Protection Guidelines (Forest Service, 2002) provide guidance on the handling, care, storage and use of herbicides and other chemicals. Compliance with the Guidelines is a condition of grant aid and the Forest Service inspectorate enforces this. Coillte has revised its usage of pesticides in an effort to prevent dangerous substances entering surface water and groundwater. Only pesticides that are currently approved by the Pesticide Control Service of the Department of Agriculture and Food are used. Atrazine and simazine may be used as herbicides in Forest Nurseries. Atrazine may also be used for spot spraying grass growth around young trees in plantations. Coillte is actively implementing a pesticide reduction strategy (Coillte, 2003). A number of local authorities propose engaging in consultation with forestry interests to establish the usage of dangerous substances during forestry activities (e.g., Kilkenny, Roscommon, Mayo, North Tipperary, Cork Co., Offaly, Leitrim, Wicklow and Longford County Councils). Wicklow County Council reports that it has detected elevated levels of cyanide in some afforested catchments. The Council proposes to undertake further monitoring to confirm the results and meet with Forestry management in the area regarding any exceedances detected.

4.1.11 Ports, harbours and marinas

Industrial activities at ports can lead to significant contamination of sediments. For example, Dublin City Council report that lead and zinc arise in the Alexandra Basin and the Liffey Estuary sediments adjoining it, due to bulk ore export from a gantry in the Port and Docks area. Marinas may pose a threat to waters where wood preservatives are used on mooring jetties and as a result of petroleum spillage from boats. In addition, TBT contamination may result where it has been used as an antifouling agent for boats.

North Tipperary County Council proposes to serve notice under the Water Pollution Acts 1977 & 1990 on all marinas in Lough Derg requesting submission of an emergency plan for each facility to prevent the entry of polluting matter to waters. Where it is found that breaches of legislation exist as a result of any inspections, then the general provisions of the legislation will be used and enforced. In 2002, North Tipperary County Council purchased a pollution response unit to clean up oil spillages. This unit is mobilised by the Environment Section of the Council and operated by the Fire Service. It was purchased to contain and remove oil spillages from sites and the aquatic environment.

4.1.12 Mining

Mining activities can lead to elevated levels of heavy metals in surface waters. It is important to note that mining sites by their nature will be located in areas where there is a naturally high geological occurrence of constituents of the ore-body e.g. heavy metals, sulphides etc in the bedrock; however, the disturbance caused by mining and the resulting exposure of the ore-bodies and the generation of various waste streams will result in an increased dispersion of these constituents into the wider environment, causing in some cases, environmental pollution. In addition, the chemicals used by the mining industry in the extraction process may be released into the environment as a result of accidental spillages or poor management practices. Some of the principal concerns at these sites include environmental impacts to lands and watercourses from acid rock drainage and metal leaching; and potential human and livestock exposure and ecotoxicity problems.

The EPA and the Department of Communications Marine and Natural Resources are currently engaged in a collaborative project on the characterisation of historic mine sites in Ireland and their environmental risks. The objectives of this project are to develop an inventory of historic mines sites and to assess the risk posed by these sites to the environment, and human and animal health. Sampling protocols and risk ranking methodologies for historic mine sites will be developed during the two year project. Detailed site investigations will be undertaken on the priority sites that will be identified. The risk ranking methodology will be applied to these historic mine sites. The work of the project will include a review of the impacts of selected historic mine sites on the environment, human health and animal health. The final report, which will include a database and GIS, will draw conclusions and make appropriate recommendations where appropriate in relation to the need for remediation and/or management required. The outputs from this project will allow for the development of a systematic and consistent approach to the remediation, rehabilitation and long-term management of mines sites in Ireland.

Considerable work has been undertaken at a number of historic mines sites in Ireland investigating and managing the risks posed to the environment and human and animal health. For example, the EPA, with the assistance of Galway County Council and the Tynagh Mines Liaison Group, carried out an investigation of the Tynagh Mines site and published a report in 2003 (EPA, 2003).

The key recommendations of the report include:

- unplanned and unauthorized disturbance of the mine waste should not take place,
- planning conditions and relevant environmental protection legislation must be strictly enforced by Galway County Council,
- unauthorized access to the site by the public and unauthorized access to the site and to the Barnacullia stream by livestock should be avoided.
- dredged sediment from the Barnacullia stream with lead concentrations greater than 1000mg/kg_{DW} should not be disposed to agricultural land.

In line with the recommendations of the EPA report, a resident environmental scientist employed by Galway County Council, to ensure compliance with an agreed

Risk Assessment and Management Plan, monitored the construction phase of the Tynagh Energy Ltd power plant at the site.

North Tipperary County Council has identified historical mining in the Silvermines area and at the IPPC licensed Lisheen Mines as posing a threat to water quality. An Inter-Agency Group established by Government carried out a detailed site investigation into the presence and influence of lead in the Silvermines area in 1999-2000. The Inter-Agency Group chaired by the Department of Agriculture and Food published its report in 2000 making 39 recommendations in relation to Silvermines area (DAFRD, 2000). The EPA chaired the Implementation Group established to implement these 39 recommendations. As part of this work, the EPA published a number of reports on metal contamination in the Silvermines area. A Final Report of the Expert Group for Silvermines County Tipperary (EPA, 2004) recommends guideline values and guidance in relation to lead and other metals in the Silvermines area. The Government, through the Department of Communication, Marine and Natural Resources has recently announced € 10.6 million funding for remediation of the Silvermines area to restore the area to sustainable land uses.

Biological monitoring of the Avoca River by both the EPA and An Foras Forbartha over the last 30 years has consistently indicated serious pollution due to the continuous discharge of acid mine drainage. The Avoca-Avonmore LIFE Project, co-ordinated by Wicklow County Council, described the river as 'seriously contaminated (in the lower reaches) with leachate arising from the abandoned Avoca mines and is subject to significantly elevated metal concentrations and is practically devoid of all biological life'. The Avoca Mines ceased operations in 1982. Several studies at a European and national level assessing the feasibility of treating the acid mine drainage have been undertaken. As part of a catchment management programme the Eastern Regional Fisheries Board commissioned the University of Newcastle to undertake a scoping study to identify the costs for remediation measures to restore the Avoca River to a salmonid river. The study recommends an active WWTP to treat the acid mine drainage. Wicklow County Council reports that the Glendalough Lead and Zinc Mines in the upper Avonmore catchment also pose a threat to water quality.

There is a disused lead and zinc mine situated adjacent to Ballisodare Bay, Co. Sligo. Sligo County Council requested the owners of the site to carry out analysis on the old tailings and seepage from the site to the bay. The Council has met the company and the EPA in relation to monitoring and any remediation works to be carried out on site and an environmental reporting system has been agreed between the local authority and the company.

In relation to active mine sites the EPA has instructed Anglo American Lisheen Mining Limited to carry out investigations into the potential impact of Lisheen mines on the River Drish. Kilkenny County Council proposes to increase dangerous substances monitoring of the River Goul in the north of the county, where Arcon Mines Ltd. operates a lead/zinc mine at Galmoy, which is IPPC licensed.

4.1.13 Industrial contaminated land

Industrial contaminated land can pose a threat to surface waters pre-remediation and during the remediation process when dangerous substances may be excavated and exposed to waters or sewers. Uncontrolled leachates from industrially contaminated sites threaten groundwaters and surface waters. It is vital that these sites are thoroughly investigated and that all redevelopment and remediation activities are regulated at all stages, but particularly during the planning stage, as construction or excavation may release contaminant material, potentially containing dangerous substances. Dublin City Council reports that many contaminated sites in the Docklands area of the city have been recently, or are being currently, decontaminated for development (e.g., the former Gas Works site and adjacent sites). Dangerous substances discharging to sewer after treatment on site are individually regulated by consents issued by the council under the Waste Management Act or the Water Pollution Acts.

4.1.14 Parks, Gardens, Horticulture

Slightly elevated levels of the herbicides atrazine and simazine have been detected in rivers in the Dublin region. Dublin City Council is investigating the use of herbicides in the area including parklands (with its Parks Department), sports grounds and golf courses to determine if these could be the possible source. Cork County Council is continuing investigations into potential contamination of surface waters from herbicides used in garden centres, private garden nurseries, golf courses, sports pitches, landscaping etc. It is envisaged that these sources would be most beneficially targeted through education campaigns.

4.2 Monitoring Measures

There is a need for each local authority to carry out a comprehensive assessment of activities within its functional area, so that potential sources of dangerous substances are identified and monitored. It is important that there is liaison between individual local authorities and the RBD projects/EPA before monitoring programmes are finalised to ensure that there is no duplication of effort. The findings of the National Dangerous Substances Screening Monitoring Programme (see above) should also be taken into account when drawing up monitoring programmes.

Dangerous substances can arise in waters as a result of contamination from both point and diffuse sources. The most important point sources typically are municipal waste water discharges, stormwater / combined sewer overflows, drinking water treatment plants, industrial/trade effluent discharge sites, landfill and other waste facilities, and farmyards. Diffuse or non-point pressures in the main are run-off from land either as a result of activities such as farming, horticulture, forestry or mining/quarrying or as urban surface water run-off.

Monitoring data of use for establishing the levels of dangerous substance in waters include monitoring: water abstracted for potable supplies; salmonid waters; river waters; inland and estuarine bathing waters; waste facilities; facilities with discharge licences; and wastewater treatment plants. However, in many cases local authorities reported that the limit of detection used when analysing water for abstraction, or salmonid waters, was too high to be of use in determining compliance with the Dangerous Substances Regulations.

Many local authorities propose to monitor trade effluent discharges and landfills for dangerous substances. It is proposed that monitoring will be co-ordinated with the EPA. Many local authorities also propose to investigate the usage of dangerous substances in their functional area. Cork County Council has carried out a detailed risk assessment procedure aimed at identifying the water bodies at risk of pollution from dangerous substances. This has involved sampling and analysing 45 Council WWTP influents and effluents, 10 outfalls and 8 septic tanks; examining 194 Council and EPA industrial licences and 72 waste management facilities licensed by the EPA or permitted by the Council; reviewing the risks associated with agricultural and forestry practices in the county; and liaising with other relevant bodies. The analysis was done using pressure matrices and the results show that 39 rivers and lakes and 11 harbours are at risk with Cork Harbour being shown as most at risk.

Due to the complexity and varied nature of the methods used in the determination of the substances outlined in the Regulations, and the financial implications involved, many local authorities do not have the facilities to carry out their own analyses of all of the dangerous substances. Many local authorities are in liaison with the RBD projects, the EPA, other local authorities or private laboratories to carry out the necessary analyses. Notwithstanding this, most local authorities are proposing to increase monitoring for dangerous substances in the rivers and lakes of their functional area. Kerry County Council states that their experiences to date in using external laboratories for monitoring of dangerous substances has highlighted the importance of appropriate Quality Assurance procedures being in place including, for

example, the use of appropriate known control samples. When monitoring for dangerous substances in freshwaters, particularly the metals, it is very important to also monitor for water hardness. Toxic effects of metals are generally markedly less in hard water. This is reflected in the standards set in the Regulations.

Potential pressures on tidal waters throughout the country include industrial discharges, WWTP discharges, sewer outfalls, urban run-off, pollution from rivers and TBT antifoulant on boats. Activities that require foreshore licences may also be a potential threat to tidal waters. Cork County Council propose a comprehensive biological and chemical monitoring programme of tidal waters. The Council has been in consultation with Cork City Council, Cork Harbour Commissioners and the Naval Service regarding monitoring in Cork Harbour. Monitoring by the Cork Harbour Commissioners and the Naval Service indicate elevated metal contamination of the sediments in Cork Harbour but it is not possible to compare the results with the water quality standards. Further investigation is necessary. The Council commissioned a survey of the five main harbours and bays for tributyltin, which revealed significant contamination (see section on TBT above). Wicklow County Council intends liaison with the Harbour Authorities and the Marine Institute in relation to monitoring of tidal waters in the county. A number of local authorities propose to include dangerous substances monitoring in their bathing water monitoring programmes (e.g., Fingal County Council). Fingal and Limerick County Councils propose to develop a TBT monitoring programme (gastropod survey) at relevant harbours in the functional area.

The Dublin City Council Central Laboratory co-ordinates monitoring measures for the four Dublin local authorities. Following baseline monitoring to establish existing conditions in freshwaters a quarterly monitoring programme is proposed. This will be supplemented by investigatory monitoring where necessary. The Central Laboratory proposes to develop analytical programmes for dangerous substances in saline waters. Monitoring of effluent from Ringsend WWTP and licensed trade effluents is ongoing. Dublin City Council is implementing a 5-year monitoring programme on the Liffey Estuary and Dublin Bay to comply with the Dublin Bay Water Quality Management Plan and to monitor the improvements in water quality attributable to the upgraded Ringsend WWTP. The programme commenced in June 2000 and the final year of intensive monitoring is currently being implemented. The dangerous substances controlled by the Regulations have not been routinely measured in water samples but some substances have been measured in sediments. It is intended to monitor concentrations of regulated dangerous substances in saline water samples at selected locations in the Liffey Estuary and Dublin Bay when analytical methods are validated.

The Marine Institute monitors hazardous substances in shellfish waters, in finfish landings at major ports and in sediments at selected sites. The Marine Institute is in discussion with the EPA and parent departments with a view to the establishment of a cost effective monitoring programme to provide a scientific database for assessing risk to the marine environment. Increased monitoring will be undertaken in respect of the requirements set out in both the Dangerous Substances Directive and the Water Framework Directive.

Monaghan County Council has carried out extensive monitoring for dangerous substances at 30 lakes in 2003 and at six river sites and three lakes in 2004. The

main finding was evidence of naturally elevated metal levels in many of the soft-water lakes and rivers. Offaly County Council monitored rivers downstream of six urban centres (Ferbane, Rhode, Edenderry, Tullamore, Clara and Birr) in the county and found no evidence of dangerous substance exceedances. South Tipperary County Council reports extensive monitoring of 16 river stations, two WWTPs and an operating landfill carried out in 2002 with more limited monitoring carried out since then. Monitoring data indicate a satisfactory situation regarding dangerous substances but it is believed that one site adjacent to a wood preservation facility is releasing significant quantities of dangerous substances into the environment and requires urgent attention.

4.3 Consultative and Co-operative Measures

All local authorities are involved in the RBM Projects established to facilitate implementation of the Water Framework Directive. These projects aim to enable co-operation between local authorities and all relevant stakeholders. The overall implementation of the Water Framework Directive will involve a high degree of co-ordination and partnership between public authorities in conjunction with extensive public consultation in order to tackle the challenge of water protection. The European Communities (Water Policy) Regulations, 2003 (SI No. 722 of 2003) make provisions for a River Basin District Advisory Council within each RBD, to provide for a forum of systematic involvement of interested parties. A number of local authorities have also made presentations to members of Council Strategic Policy Committees (Environmental Services and Parks) regarding water quality related issues and legislation (e.g., Wexford and Fingal County Councils). The Strategic Policy Committees are made up of elected members and representatives of multi-sectoral organisations.

Several local authorities propose consultation with Teagasc, farming organisations and herbicide suppliers regarding the use of herbicides and the development of education programs (e.g., Fingal, Cork, Offaly County Councils). An inter-county Agricultural Bye-laws working group has been set up, which meets on a quarterly basis and discusses issues relating to the control of agricultural pollution. Some local authorities propose consultation with the forestry sector regarding herbicide use also (see above). Cork County Council has increased liaison between it, Cork City Council, Cork Harbour Commissioners and the Naval Service regarding levels of dangerous substances in Cork Harbour. Cork County Council has prepared an information leaflet on the proper use and disposal of products containing dangerous substances which will be distributed to all the relevant sectors. The same information has been posted on the Council website. A notice regarding the safe use of atrazine and simazine is also included on the website.

North Tipperary County Council has been in extensive consultations with relevant stakeholders with regard to Silvermines (e.g., EPA, 2004) and the Lisheen Mines. In relation to Lisheen Mines, North Tipperary County Council are members of an environmental monitoring committee that meet on a quarterly basis with environmental staff from the facility, representatives from the Department of Communications, Marine and Natural Resources, the Fisheries Board and the EPA.

4.4 Public Education and Advisory Measures

Most local authorities are engaging in public education campaigns, which may include activities such as the production of environmental newsletters, leaflets on water pollution, and advice in local newspapers or on local radio. Many local authorities are also involved in schools education programmes, which include school debating competitions on environmental topics, school visits to Council facilities, and assistance in second and third level student projects. In Cork there is the Green Bus travelling roadshow that travels weekly to schools to give informational talks on waste and water quality issues. There are also many schools around the country involved in the Green Schools Programme, a nationwide initiative promoting

environmental awareness in schools. An Taisce award Green Flags to schools of particular merit. Galway County Council has trialled a teaching package 'Streamscape' in 20 schools and plan to expand its use to more schools in the county. Many local authorities have employed Environmental Awareness Officers, who promote public education campaigns, principally on waste management issues. Many local authorities propose to utilise Council websites to highlight work being undertaken in relation to the Dangerous Substances Regulations.

Local authority staff regularly participate in Teagasc seminars and REPS courses on water quality (e.g., Galway, North Tipperary, Wexford County Councils) and promote Best Farm Management Practices to minimise environmental impacts from farming (e.g., Wicklow County Council). Information leaflets are also available to the farming community on Pesticides and the Environment, which were published by Save Our Lough Derg (SOLD), Save Our Lough Ree (SOLR), Teagasc and the Shannon Regional Fisheries Board. Monaghan County Council's environmental awareness programme has included advice regarding hazardous materials (in the Council's Environmental Newsletter) and at an Industry Information meeting a presentation was given by the Council on fugitive emissions.

North Tipperary County Council has published and distributed a brochure to the farming community on the agricultural bye-laws, a section of which has been dedicated to the safe use of pesticides. North Tipperary County Council sponsors a Farm Environment Awards scheme (in conjunction with Teagasc, Arrabawn Co-op and Centenary Co-op) which promotes protection of water quality. To promote the scheme, approximately 1,500 brochures were distributed to farmers in North Tipperary. North Tipperary County Council was a joint sponsor through the Environmental Partnership Fund during 2003/04 of a project aimed at primary school students highlighting the importance of protecting water quality. This included practical talks and demonstrations on water quality and electrofishing which were given by staff of the Council, Shannon Regional Fisheries Board and Save Our Lough Derg / Ormond Anglers. The Council also promoted International Wetlands Day in February 2004 with a display in the Civic offices and a press release to the local media. South Tipperary County Council has included a category for 'Best Farm' and 'Best Industry' in its annual environmental awards programme.

Cork County Council, in conjunction with Cork County Harbour Masters, has prepared a guidance leaflet on restrictions of use of TBT. This leaflet will be disseminated to marina owners, posted on the Council's website and made available to libraries and members of the public. The Council has developed a leaflet about dangerous substances for public use and posted a notice on the proper use of atrazine and simazine on the Council website. The RBD Projects include a public awareness and consultation program as part of their brief. Information on the household, industrial and agricultural sources of the listed dangerous substances should be included in the various public and sectoral education campaigns.

4.5 Other Agri-environmental and Miscellaneous Measures

Many local authorities encourage farmers to take part in the REPS scheme (e.g., North Tipperary, Wexford County Councils). Measure 6 of the REPS scheme

provides for the restricted use of pesticides and fertilisers near field boundaries, ponds, streams and wells. The objective of this measure is to protect water resources and habitats for flora and fauna. Pesticides are not to be applied within 1.5 metres of field boundaries, hedgerows and waterbodies and within two metres of wells and boreholes.

5. Issues Raised

The EPA Guidance Note advised local authorities to identify problems encountered by them in implementation of the Regulations in their Implementation Reports. The main issues identified through implementation of the Regulations include:

- Shortage of staff and finance to implement measures - many of the measures proposed by the local authorities, as necessary to tackle water quality issues in their functional area, are resource intensive. Difficulty in recruitment and retention of staff, loss of key staff and extensive internal movement and changes of staff are also posing a problem for the delivery of effective water quality protection programmes in a number of local authorities.
- The work of Environment Sections of local authorities has considerably increased in recent years, particularly in the area of waste management. Staff in the Environment Sections of many local authorities have had to focus their efforts on dealing with waste issues, sometimes to the detriment of resources available to tackle water quality issues. Similarly, the primary focus of Environmental Awareness Officers and Enforcement Teams set up in most local authorities has been waste, not water quality.
- A number of local authorities state that in previous monitoring for dangerous substances e.g., under the Salmonid Waters Regulations or the Surface Water Abstraction Regulations, the method detection limits for metals were too high to assess baseline quality according to the standards in the Dangerous Substances Regulations.
- Some local authorities believe that the list of dangerous substances is not wide enough to include all substances of significance to the Irish environment, e.g. polycyclic aromatic hydrocarbons (PAHs). Recent preliminary investigations by Kerry County Council as part of a baseline road construction project in a rural area has revealed the presence of these compounds in excess of Dutch target values in sediment from a salmonid river. PAHs may originate from many sources such as old road building materials, oil spills, use of creosote as a wood preservative or as a result of old forest fires. As these compounds are quite toxic in small amounts and are magnified up through the food chain, more investigation of their occurrence may be warranted. Monitoring being carried out under the WFD should provide further information on these substances.
- Increasing demands on Council laboratories to provide monitoring/analysis services in a number of areas e.g., drinking water quality; and a shortfall in funding for laboratory services in some areas (e.g., Kerry County Council) has meant that monitoring programmes have had to be prioritized and curtailed.
- Some local authorities (e.g., Kerry County Council) state that where external laboratories are used for the monitoring of dangerous substances, it is important that appropriate Quality Assurance procedures are in place, e.g.,

spiked standards auditing etc. It is important that appropriate known control / spiked samples are used.

- There is little data available on dangerous substances in most waters and particularly in tidal waters. It is possible that dangerous substances may occur at elevated levels in some ports and harbours, e.g., the presence of the former Irish Ispat site in Cork Harbour is a potential cause of concern.
- Some local authorities state that there should be enhanced co-operation between themselves and the EPA in relation to sharing of monitoring information regarding IPPC and Waste licensed facilities.
- A number of local authorities recommend that there should be a national education programme on dangerous substances using print and visual media, to assist the programmes of the local authorities.

6. Conclusions

- With the exception of tributyltin, the majority of exceedances detected relate to either historical mining activities or are due to the geology of an area contributing to naturally elevated levels of heavy metals in surface waters.
- In relation to tributyltin (TBT), data collected from Marine Institute publications and from a small number of local authority reports indicates widespread TBT contamination in Irish waters. It is to be expected that future monitoring will demonstrate a gradual diminution of the threat from TBT over the coming years as the use of this product is phased out due to EU requirements.
- In relation to all 13 parameters excluding tributyltin, monitoring data was submitted in the local authority reports for a total of 586 river stations (including 292 rivers/streams/canals), 171 lake stations (including 118 lakes) and 40 tidal water stations (including 12 tidal waters).
- Not all parameters were measured at each station, with dichloromethane monitored at 210 locations (the least reported on parameter) and copper monitored at 768 locations (the most reported on parameter). Very little data was reported on tidal waters.
- Values in excess of the standards in the Regulations were reported at 143 river stations, 45 lake stations and 24 tidal water monitoring stations. These data do not necessarily give an accurate national picture of the level of dangerous substances in surface waters due to the limited extent of monitoring data available, both in terms of monitoring frequency and coverage. In addition, due to the risk assessment approach taken by many local authorities, monitoring was generally concentrated in areas where exceedances were most likely to occur. In addition, the data is heavily influenced by large amounts of reporting by a small number of local authorities.
- Most of the exceedances reported related to the heavy metals zinc, copper, chromium and lead. As discussed in the report the vast majority of these exceedances are due to natural causes and not pollution.
- There were no exceedances of the toluene and xylene standards at any station, and there were very few exceedances of the dichloromethane, arsenic, simazine and fluoride standards reported.
- As a result of landfill remediation work been undertaken at closed landfills, exceedances of a number of dangerous substances that were detected in 2002 and 2003, were not detected in 2004.
- The total hardness of water was not always reported, thus preventing determination of compliance with the heavy metal standards in a significant number of cases. In addition, the limit of detection used for several parameters was too high to determine compliance in a significant number of cases.

- The EPA has found that sampling programmes at some local authorities where sewage sludge is reused in agriculture are either non-existent or in need of improvement, and there is inadequate maintenance of sludge registers. All local authorities should have regard to EPA recommendations in relation to management of sewage sludge (Smith *et al.*, 2004).
- There continues to be a particular problem with the illegal dumping of sludge from diesel laundering activities, and the subsequent impact on water quality.
- As the local authorities collect more information on the usage of dangerous substances and the levels of dangerous substances in the aquatic environment, it will be possible for them to refine their measures programmes to tackle any exceedances identified. Where elevated levels of these substances are found, potential sources will have to be identified and addressed.
- Many of the measures being implemented by local authorities to meet the standards in the Phosphorus Regulations, 1998 (S.I. No 258 of 1998) should also assist them in meeting the targets of the Dangerous Substances Regulations. Measures proposed by each local authority and the EPA to bring about compliance with the targets set in the Regulations are documented in this report. For example, many local authorities aim to gather information on the use of dangerous substances as part of their farm survey work. Most local authorities have either begun the process of reviewing discharge licences, as required by the Regulations, or are proposing to initiate reviews of licences.
- Local authorities will play a key role in the implementation of the Water Framework Directive in Ireland. The River Basin Management projects, which have been established to facilitate implementation of the Directive, should help provide local authorities with the information necessary to protect and improve water quality within their functional areas. The National Screening Monitoring Programme for dangerous substances should also provide valuable information. The setting up of multi-sectoral RBD advisory councils offers an additional mechanism for addressing water quality issues.

7. Recommendations

- Local authorities should continue to identify and assess those activities that may be potential sources of dangerous substances. This will enable appropriate implementation programs to be put in place where any breaches of the standards occur.
- Mining activity has contributed to elevated levels of heavy metals in certain areas. The recent Government decision to remediate the Silvermines area is a very welcome one. Further consideration should also be given to addressing mining impacts in other areas.
- The Environmental Protection Agency or local/sanitary authorities should continue to review licences granted under the Local Government (Water Pollution) Act, 1977, the Environmental Protection Agency Act, 1992 and the Waste Management Act, 1996 to ensure that they meet the prescribed standards by 1st July, 2006¹⁸;
- Local authorities should require an inventory of all chemicals used or held on sites where a discharge licence exists or is sought. If dangerous substances are used on site, provision should be made within the licence for their monitoring and control to reduce the potential threat to the aquatic environment.
- There is a need for local authorities to compile a register of outfalls and overflows from urban areas and gather monitoring data for the quality of effluent from such systems. As part of this work drainage misconnections, which result in foul waters entering surface waters and which may lead to significant contamination, should be prevented.
- Coastal local authorities should consider the preparation of guidance leaflets on the use of TBT, in consultation with all of the harbour masters in their area.
- Monitoring by Local Authorities should focus intensively (monthly if possible) at high risk surface waters potentially impacted on by point discharges e.g., WWTPs, landfills (legal/illegal, open/closed), relevant industries, mining operations. Sampling should be conducted above and below point discharges, where possible, to eliminate other potential sources of pollution.
- Where monitoring over the period of a year or more indicates that the level of dangerous substances is satisfactory, monitoring may be retargeted at other high risk stations. Where elevated levels of a dangerous substance are detected local authorities must develop a programme of measures to identify and address the potential source.
- Data from existing monitoring programs should be examined in more detail. In particular, local authorities should examine monitoring carried out under existing legislation for the generation of baseline or current dangerous substances data.

¹⁸ There is a provision for extension of the five year period by a further period not exceeding five years where the competent authority is satisfied that the best available techniques are being used to treat direct discharges or emissions.

- When monitoring for heavy metals, the hardness of surface waters needs to be determined in order to assess compliance with the standards in the Regulations.
- Local authorities must report the current condition of surface waters as an annual mean where more than one determination has been carried out during the year.
- All local authorities should co-ordinate their monitoring efforts with the relevant state bodies and the RBD Projects to rationalise and expand, where necessary, their existing monitoring programs. Co-ordination is also required to ensure the avoidance of duplication of effort and to target the areas most at risk.
- The considerable slippage on the statutory submission date of Measures and Implementation Reports by local authorities listed in this report should be corrected.
- It is essential for successful implementation of the Regulations that adequate resources should be made available to local authorities and the EPA to implement those measures considered necessary for water quality protection.
- Local authorities should provide accurate six figure XY co-ordinates for every monitoring station where data is reported. The surface water monitored should be clearly identified.
- Monitoring for atrazine and simazine should be concentrated during the times of the year when these herbicides are being used.
- In some cases the use of more accurate analysis methods (i.e., with lower limits of detection) is required to enable compliance with the Regulations to be assessed. Data should be reported in the appropriate units (i.e., µg/l).
- Local authorities should consider monitoring data for sediments/biota where it exists. The level of dangerous substances in these media may indicate locations where water quality monitoring and/or measures are required.
- It is clear from analysis of the Dangerous Substances Implementation Reports that implementation of the Regulations requires co-operation between sections within local authorities; with other local authorities, the EPA, government departments; with other statutory bodies e.g., Harbour Commissioners, Teagasc; and with a wide variety of sectors e.g., industry, agriculture, Forest Service/Coillte. This is required to assess water bodies at risk from dangerous substances and to develop successful management programmes to mitigate this risk.

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Appendix 1 EPA Implementation

Environmental Protection Agency

Under the EPA Act, 1992, the Waste Management Act, 1996 and the Protection of the Environment Act, 2003 a wide range of functions are allocated to the Agency which relate to the protection of water quality. These functions include the provision of support and advisory services for local authorities; the licensing, regulation and control of activities, primarily relating to industrial and waste management activities; monitoring of water quality and establishment of databases of same; and the promotion and co-ordination of research into water quality issues.

Support and Advisory Services

Dangerous Substances Regulations

The Agency has hosted annual seminars on water quality legislation since May 1999 (principally regarding the Phosphorus Regulations, 1998). Since 2002, these seminars have also addressed the requirements of the Dangerous Substances Regulations. The Agency has issued a Guidance Manual to local authorities on preparation and submission of the Measures and Implementation Reports (EPA, 2002). The Agency has subsequently held three more seminars on the Regulations in 2003, 2004 and 2005, which included workshops on particular aspects of measures implementation.

Other Support and Advisory Services

The Agency, in conjunction with the DEHLG, County and City Managers Association and the County and City Engineers Association, has developed a local authority management system (LAMS) for identifying and assessing local authority performance of statutory environmental protection functions. This system was initially piloted in three local authorities, and is now available to all local authorities following a training programme which was delivered in 2004.

The Agency has published a wide range of guidance and reports on issues relevant to water quality protection (see publication list on www.epa.ie). BREF/ BATNEEC notes have been prepared for IPC/IPPC licensing of industry. The Agency has also published a series of landfill manuals; regular reports on EPA licensing of industrial and waste facilities; and a series of wastewater treatment manuals.

In 2005, the Agency established two enforcement networks on the Suir and Erne/Blackwater catchments to encourage co-operation between all the relevant enforcement agencies at a catchment level. These networks include representatives from the EPA, DEHLG, DAF, Fisheries Boards, Local Authorities, RBD projects and Teagasc. The aim of these networks is to facilitate co-operation of the various enforcement agencies in tackling water quality issues, by sharing of expertise, development of common approaches, and pooling of resources.

Licensing and Control of Waste and Industrial Facilities

Waste Management

Discharges from waste disposal and recovery activities have a significant potential to impact on compliance with the specified standards in the Dangerous Substances Regulations. Under the Waste Management Act, 1996, the EPA is responsible for the

licensing of all significant waste recovery and disposal facilities operated by local authorities and private enterprises. The EPA licensing process places stringent conditions on the operation of facilities to ensure that the potential environmental impact is strictly controlled. All local authorities and private companies that are engaged in significant waste disposal and recovery activities are required to apply for a licence from the EPA. All waste licenses are issued and reviewed taking account of the standards set in the Dangerous Substances Regulations. The OEE through the National Enforcement Network is currently coordinating the implementation of an action plan to deal with unauthorised waste activities in Ireland.

Industry

Under the EPA Act, 1992, the EPA was responsible for regulating large/complex industrial and other processes with significant pollution potential, through IPC licensing. Since July 2004, a new EU Directive on Integrated Pollution Prevention and Control (IPPC) replaced the IPC licensing regime. The EPA licensing system had anticipated and implemented most of the requirements of the EU IPPC Directive, aside from a number of technical and procedural elements. One of the main differences is that IPPC increases the emphasis on 'prevention' with the aim of reducing emissions to air, water and land, reducing waste and using energy efficiently. In addition, more activities were brought into the licensing system, in areas such as intensive agriculture, the treatment and processing of milk, the slaughter of cattle, food production, and the production of paper, pulp and board. In 2004, the EPA carried out an administrative review of the licences it had issued over the past ten years to check for compliance with the new IPPC requirements. A programme of licence review to bring all licences into compliance with the Directive commenced in 2005.

All industrial licenses are issued and reviewed taking account of the standards set in the Dangerous Substances Regulations. The Agency reviews the environmental performance of all its licensees to ensure compliance on an ongoing basis, and takes appropriate enforcement action and/or reviews licences as required. Ultimately, all new and existing industrial and manufacturing facilities in the State with a significant pollution generating capacity will be subject to IPPC licensing.

Monitoring

In the past monitoring for Dangerous Substances has been largely on an ad-hoc basis, although a systematic survey of dangerous substances in freshwaters was carried out by the Agency in 1999/2000 (Stephens, 2001). Following the commencement of the Regulations the Agency was requested by the Department of the Environment, Heritage and Local Government to develop a monitoring programme, in consultation with local authorities and other relevant Agencies, so as to ensure full and effective implementation of the Regulations.

The monitoring of dangerous substances has subsequently been incorporated into the National Rivers Monitoring Programme (EPA, 2002). Monthly monitoring for all of the substances specified in the Regulations commenced in March 2002 at 15 river stations while monitoring for the metals commenced at a further 8 stations. The results of this programme were reported in the EPA Water Quality in Ireland 2001-2003 report (Toner *et al.*, 2005).

Research

The Agency is responsible for developing, supporting, implementing and promoting the national Environmental Research Technological Development and Innovation (ERTDI) Programme. Funding for this programme, which will amount to over €32m over the period 2000-2006, is provided by the DEHLG through the National Development Plan. Many research projects have been supported which apply directly to water quality protection and management, with a number of relevance to dangerous substances (e.g., CTC, 2000).

Appendix 2 Local Authority Implementation

Appendix 2 – Explanatory Note

This section of the report provides a summary of the water quality status in each of the local authority areas, in respect of the dangerous substances. In addition, a summary of the measures that are being implemented, or have been proposed, to meet the requirements of the Regulations is described.

The information in this section is a summary of the local authority Measures Reports, 2002 and Implementation Reports, 2004. The Agency did not receive a Measures Report from Cork City Council or Implementation Reports from Limerick and Clare County Councils.

Carlow County Council

Summary of Water Quality Status

- Baseline monitoring was carried out at 3 monitoring stations on 3 rivers, the Barrow, the Slaney and the Burren.
- No values were reported in excess of the standards in the Regulations.
- The EPA received Carlow County Councils Measures Report on 4/6/2003 and the Implementation Report on 17/1/2005.

Implementation Progress

Current Measures

- Monitoring for dangerous substances in the Barrow, Burren and Slaney rivers;
- Since January 2004, the Council has issued 24 new/revised Section 4 licences and 14 new/revised Section 16 licenses;
- Lead authority in the SERBD;
- Participation in REPS lectures;
- Enforcement of the Water Pollution Act.

Proposed Measures

- Monitoring of treated effluent for dangerous substances at selected wastewater treatment plants and at the Powerstown landfill;
- Upgrading of wastewater treatment plants;
- Development of an educational programme targeted at the sectors involved in the usage and emission of target substances.
- Preparation of groundwater protection plans, consultant appointed.

Cavan County Council

Summary of Water Quality Status

- Monitoring data for the existing condition was available for 61 stations on 24 rivers and for 13 lakes.
- There are no tidal waters in the functional area of Cavan County Council.
- One value in excess of the cyanide standard was reported at Sruhanagh Stream.
- Values in excess of the standards were reported in lakes for chromium (1 station), cyanide (2 stations), fluoride (1 station) and zinc (1 station)
- 4 values in excess of the chromium standard and 2 in excess of the copper standard were reported at surface waters associated with Bailieborough and Corranure landfills. EPA monitoring data for 2004 and 2005 show these sites to be in compliance with the standard.
- The EPA received Cavan County Councils Measures Report on the 31/7/2002 and the Implementation Report on 2/09/2004.

Implementation Progress

Current Measures

- River and discharges monitoring programme initiated, 12 stations sampled for dangerous substances;
- Potential users of dangerous substances in the county have been canvassed;
- Monitoring of selected sewage treatment works (e.g., Cavan Town) and industrial facilities has commenced;
- Monitoring of surface water at landfill sites (Corranure, Ballyjamesduff and Bailieborough).

Proposed Measures

- Establish agricultural use of dangerous substances;
- Investigation of the source of copper in rivers identified in previous monitoring;
- Discourage excessive use of pesticide/herbicides by providing advice on balanced requirements;
- Improved leachate control at landfills including capping of two closed landfills and active removal of leachate at an operating site.

Clare County Council

Summary of Water Quality Status

- Data for 21 stations on 7 rivers/streams indicated that there were 3 stations in excess of the atrazine standard. All of these stations were located on the Inagh River.
- Monitoring by the local authority in the Fergus and Gaurus River was restricted to copper and zinc while monitoring in the Bow, Magherabaun and Tobernagat rivers was limited to the parameters listed in Table 2 of the Regulations (i.e. As, Cr, Cu, Cn, Fl, Pb, Ni and Zn). Monitoring in the stream at Ballyduff Beg landfill included all the parameters barr Cn, specified in the Regulations.
- Baseline data for 12 stations on 12 lakes indicate that there were no values reported in excess of the standards.
- The EPA received Clare County Councils Measures Report on the 1/08/2002.

Implementation Progress

Current Measures

- Clare County Council Implementation Report for 2004 was not received by the Agency.

Proposed Measures

- Issuing and enforcing licenses under Section 4 of the Local Government (Water Pollution) Act with associated schedules of monitoring for substances prescribed under the Regulations;
- Review existing Section 4 licences to include monitoring for substances prescribed under the Regulations;
- Monitoring of discharges from urban wastewater treatment plants to include substances prescribed under the Regulations;
- Issuing and enforcement of licences under Section 16 of the Act to control discharges to sewer that might, in turn discharge to waters.
- Set up consultative and co-operative structures between the Shannon River Basin Management team and the Council for all matters relating to water quality;
- Co-ordinate with other Agencies to rationalise and expand where necessary existing monitoring programmes;
- Development of short to medium term measures when further baseline data is provided.

Cork City Council

Summary of Water Quality Status

- No data received by the Agency.

Implementation Progress

Current Measures

- Arrangements were made for a limited number of baseline samples to be taken in 2004;
- Funding for Dangerous Substances Regulations work was obtained in 2005.

Proposed Measures

- Cork City Council Measures Report for 2002 was not received by the Agency.

Cork County Council

Summary of Water Quality Status

- Monitoring data was available for all parameters (except fluoride and cyanide) for 4 monitoring stations on 3 rivers, while monitoring for copper and zinc was available for a further 14 monitoring stations on 7 rivers. Copper and zinc baseline monitoring was also available for 5 lakes. Baseline monitoring data of Cr, Cu, Pb, Ni and Zn was also available for 7 stations in the tidal waters of Cork Harbour.
- There were no exceedances of the standards in the Dangerous Substances Regulations in any of the river or lake waters monitored in the functional area of Cork County Council.
- There were exceedances of the lead, copper, chromium and zinc standards in Cork Harbour. This data was collected in 1978, 1984 and 1986. Further investigations are to be carried out.
- High levels of TBT were reported in Cork Harbour, with lower levels reported in other areas of the County.
- The EPA received Cork County Councils Measures Report on the 12/12/2002 and the Implementation Report on 30/08/2004.
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Implementation Progress

Current Measures

- Regular sampling, monitoring and analysis of all WWTP final effluent for dangerous substances (except cyanide and arsenic);
- Risk rating applied to each WWTP and ongoing monitoring for dangerous substances;
- Identification of industrial point sources with licences to discharge dangerous substances;
- Modification of farm surveys to include herbicides and monitor identified surface waters at risk;
- Monitoring of high risk areas impacted from forestry and consultation with Coillte to agree on corrective actions where necessary;
- Assessing levels of dangerous substances from waste facilities and introduction of corrective actions;
- Biological assessment of tidal waters for TBT;
- Consultation with neighbouring local authorities regarding shared water bodies;
- Inform relevant stakeholders of the Dangerous Substances Measures report.

Proposed Measures

- Develop plan of action based on the Biological Assessment of Tidal Waters;
- Update database of monitoring for dangerous substances at landfills;
- Assess risk of leachate from closed landfills by carrying out site visits and monitor surface waters if necessary;

- Continue sampling, monitoring and analysis of all WWTP's and septic tanks final effluent for dangerous substances;
- Determine the potential of contamination of lakes by dangerous substances;
- Assess potential risk to tidal waters by dangerous substances through outfalls, activities requiring foreshore licences, industrial and WWTP discharges to tidal waters.
- Establish a system of consultation with neighbouring local authorities regarding shared water bodies to devise measures to take account of dangerous substances;
- Continue to inform stakeholders of the County Council's Measures Report;
- Compile and collate herbicide data from agricultural activities for each river basin catchment and monitor rivers at risk;
- Evaluate the need to institute a Bye- Law for herbicide use in agricultural activities under Section 21 of the Local Government (Water Pollution) Act, 1990;
- Consultation with Teagasc and other bodies regarding farming education programmes;
- Review of licences and monitoring data from licensed facilities;
- Continue investigation of sources of potential contamination of surface waters by Atrazine and Simazine;
- Continue to identify and review licensed discharges to water/sewer;
- Improved liaison with Cork City Council and Cork Harbour Commissioners regarding dangerous substances and responsibilities for monitoring in Cork Harbour;
- Establishment of a programme of public awareness and a school education programme;
- Carrying out system audits on the performance of the Implementation Programme.
- Identification of potential pressures from storm water run-off and combined sewer overflows.

Donegal County Council

Summary of Water Quality Status

- Monitoring data was available for 36 monitoring stations on 35 rivers and for 38 lakes. No monitoring data was available for tidal waters.
- In the predominately soft river waters, there were exceedances of the standards for chromium (30 stations), copper (9 stations) and zinc (16 stations). All of the lakes exceeded the standards for at least one of the dangerous substances. Values were reported in excess of the standards for chromium (34 stations), copper (6 stations), cyanide (1 station) and zinc (23 stations).
- The EPA received Donegal County Councils Measures Report on the 21/10/2002 and the Implementation Report on 27/9/2004.

Implementation Progress

Current Measures

- Evaluation of the impact of leachate from existing and closed landfill sites;
- An investigation into the impact of permethrin, which is a pesticide used by the forestry industry, was carried out. It was not possible to detect any impacts, however, the Council states that a co-ordinated monitoring programme by either the end user or a state agency should be considered as part of the licensing process for use of these products.

Proposed Measures

- Establishment of a programme of sampling and analysis (subject to budgetary provisions);
- Retesting of waters where exceedances were recorded;
- Examination of the effects of water and wastewater treatment works.

Dublin City Council

Summary of Water Quality Status

- Monitoring data was available for 24 stations on 8 rivers and canals. There were exceedances of atrazine, simazine and cyanide at 7 stations.
- There are no lakes in the functional area of Dublin City. No monitoring was available for tidal waters.
- The EPA received Dublin City Councils Measures Report on the 16/03/2005 and the Implementation Report on 1/04/2005.

Implementation Progress

Current Measures

- Investigation of the use of atrazine based herbicides in the upstream catchment of the River Poddle in South Dublin County Council, parks in the River Dodder catchment and parks and school grounds in the Camac catchment;
- Investigation of the use of simazine in the parklands of Fingal and Dublin City Council in the Santry catchment;
- Screening for dangerous substances in existing licensed discharges and a review and enforcement of licence conditions;
- Monitoring of Ringsend WWTP final treated effluent for dangerous substances metals;
- Monitoring on a quarterly basis to demonstrate compliance with dangerous substances water quality standards.

Proposed Measures

- Monitoring of Ringsend WWTP final treated effluent for metals and other dangerous substances;
- Increasing the Dublin collection and treatment system capacity to address combined sewer and surface water overflows and discharges from the drainage system;
- Ongoing monitoring of dangerous substances in rivers and management of data by establishing a GIS system for Dublin compatible with the Eastern River Basin District GIS project;
- Screening herbicide use by Dublin City Council Parks Department;
- Ongoing consultation with bordering local authorities to address sources of atrazine and simazine surface water contamination;
- Introduction of a river water quality database on the Dublin City Council website for public awareness.

Dun Laoghaire Rathdown County Council

Summary of Water Quality Status

- Data for 13 monitoring stations on 3 rivers (Shanganagh, Deansgrange and Glencullen) was provided for chromium, copper, fluoride, lead, nickel and zinc.
- Slightly elevated levels of copper were detected at one monitoring station on the Glencullen River
- There are no lakes located in the Dun Laoghaire Rathdown County Council functional area or no monitoring for tidal waters.
- The EPA received Dun Laoghaire Rathdown County Councils Measures Report on the 4/10/2002 and the Implementation Report on 19/11/2004.

Implementation Progress

Current Measures

- Misconnection surveys carried out on 829 properties in July 2002 – July 2004 period;
- Access database for misconnection surveys has been updated;
- Programme of upgrading public water schemes ongoing;
- Council has 83 open trade effluent licences, 10 of which were reviewed in the 2002-2004 period;
- Water Pollution Engineer appointed;
- At least 15 water pollution incidents dealt with in 2002-2004 period, including three medium sized oil spills;
- Monitoring of six dangerous substances in three rivers ongoing, it is proposed to improve and expand water quality monitoring regime. Monitoring of Ballyogan landfill ongoing.

Proposed Measures

- Develop a water quality management plan for county;
- Introduction of planning conditions into planning applications to cover water pollution prevention;
- Introduce Fat Oil and Grease permitting, expand trade effluent licensing and misconnection programs;
- Increase public awareness of pollution and water quality;
- Improve and expand water quality monitoring regime;
- Adopt a consultative approach to reducing dangerous substance pollution liaising with relevant agencies, including farming associations, forestry companies and fishery organisations.

Fingal County Council

Summary of Water Quality Status

- Data for 25 monitoring stations on 13 rivers was provided for the metals (except As) and fluoride. Limited baseline data was available for pesticides (6 stations on 4 rivers). There was no monitoring of rivers for toluene and xylenes.
- Data for 20 monitoring stations in 3 tidal waters was provided for the metals. Limited baseline data was available for pesticides (1 station).
- Elevated levels of atrazine were detected at 4 monitoring stations on the Ward and Pinkeen Rivers. Two rivers exceeded the standards for Zinc (Ballough and Broadmeadow).
- Slightly elevated levels of copper were found at 11 monitoring stations in the Broadmeadow Estuary.
- The EPA received Fingal County Councils Measures Report on the 09/08/2002 and the Implementation Report on 04/10/2004.

Implementation Progress

Current Measures

- Implementation of the Water Framework Directive;
- Enforcement of discharge licences and revision of existing licences to include limits for dangerous substances where relevant;
- Carrying out of farm surveys on a catchment basis;
- Carrying out of a survey of on-site treatment systems on a catchment basis;
- Reduction of leakage of treated drinking water to surface waters.
- Active enforcement of the provisions of the Water Pollution Acts;
- Active involvement of stakeholders (agricultural organisations, golf courses and Parks Departments) in implementing measures to reduce dangerous substances inputs to water;
- Promotion of measures adopted through local media campaigns to make general public and sectoral interests aware of their obligations and so reduce dangerous substances inputs;
- Implementation of Code of Good Farming Practice.

Proposed Measures

- Draft Water Quality Management Plan for the Broadmeadow Estuary in conjunction with Meath County Council;
- Review of current monitoring programme and extend to additional sampling locations;
- Implementation of the Water Quality Management Plan for the Tolka River catchment;
- Utilisation of a Geographic Information System (GIS) for storing and interrogating data more effectively;
- Implementation of the Sludge Management Plan for Fingal County Council;
- Upgrading of Swords, Malahide, Naul, Ballyboghill WWTP's;

- Construction of WWTP's for Balbriggan, Skerries, Rush, Lusk, Donabate and Portrane in accordance with the requirements of the Urban Wastewater Directive;
- Decommissioning of the Balgriffen WWTP (and connection of drainage network to the North Fringe Sewer);
- Redirection of effluent from Howth, Sutton, Baldoyle and Portmarnock effluent from the Howth outfall to the Ringsend WWTP;
- Establishment of testing procedures for all 14 listed substances for both saline and freshwater with accredited laboratory;
- Integration of monitoring measures with the EPA and Marine Institute monitoring;
- Address surface water infiltration in foul drainage system at Garristown;
- Set up liaison structures with Meath and Dublin City Councils to increase efficiency in implementing measures;
- Carrying out misconnection surveys;
- Implement monitoring measures in the vicinity of the Ballealy Landfill.

Galway City and County Council

Summary of Water Quality Status

- Data for 4 monitoring stations on 4 rivers and 1 monitoring station on 1 lake was provided for all of the dangerous substances except cyanide, dichloromethane, fluoride and tributyltin.
- No values in excess of the standards specified in the Dangerous Substances Regulations were recorded.
- The EPA received Galway County Councils Measures Report on the 13/02/2003 and the Implementation Report on 15/04/2005.

Implementation Progress

Current Measures

- Commencement of the Shannon River Basin District Project and the Western River Basin District Project including participation in catchment management consultation groups;
- Review of all effluent discharge licenses including the imposition of stricter conditions where necessary;
- Farm surveys to identify potential sources of dangerous substances;
- Review of all forestry related activities including an assessment of the potential input of dangerous substances;
- Participation in Teagasc and REPS courses for the farming sector.

Proposed Measures

- Monitoring of four locations in the Galway City Council area for dangerous substances;
- Survey of all commercial and industrial premises for the use of dangerous substances;
- New monitoring schedule for the major wastewater treatment plants to include dangerous substances;
- Review of permits issued under the Waste Management (Permit) Regulations, 1998 to take account of dangerous substances;
- Investigation of the potential effects of any dangerous substances used by fish farms on freshwaters;
- Review of current monitoring programme.

Kerry County Council

Summary of Water Quality Status

- Baseline data for 62 monitoring stations on 19 rivers was provided for the zinc and 58 stations on 19 rivers was provided for Copper. Data on simazine levels was available for 4 stations, atrazine, dichloromethane, fluoride, toluene, xylene, lead and nickel for a further station and arsenic, chromium and cyanide for a further 2 sites.
- Data for Lough Lein showed an exceedance for copper. There was no reporting of tidal waters in the functional area of Kerry County Council.
- 27 of the 62 monitoring stations exhibited exceedances, for copper (Woodford River, Flesk River, Brown Flesk, Cottoner's Laune, Feale, Laune, Graddagh and Smearlagh).
- The EPA received Kerry County Councils Measures Report on the 10/7/2003 and the Implementation Report on 26/11/2004.

Implementation Progress

Current Measures

- Review and enforcement of all Section 4 and Section 16 licences in light of the Regulations including the determination of dangerous substances loads from industrial premises, assimilative capacity of receiving waters and whether changes to licences are required and setting up a monitoring programme, site inspections and audits of licensed discharges;
- Enforcement of Section 3 of the Water Pollution Act including investigation of problematic areas;
- Upgrades and investment in new WWTPS;
- Closure plans prepared for a number of discontinued landfill sites;
- Adoption of the Kerry Sludge Management Plan;
- Improved liaison with stakeholders and government bodies on water quality issues.
- Assessment of the likelihood of TBT contamination in the marine environment;
- Drawing up of a monitoring programme for the county;
- Implementation of the Water Framework Directive.

Proposed Measures

- Instigate prosecutions under the Water Pollution Act as required;
- Installation of a catchment- based GIS system to facilitate water quality management;
- Revise the monitoring plan for rivers, lakes and tidal areas;
- Publicise the issue of water quality management through local media;
- Instigate a dedicated surface water quality monitoring programme;
- Monitor WWTP discharges for dangerous substances.

Kildare County Council

Summary of Water Quality Status

- Monitoring data was available for 6 monitoring stations on 4 rivers (Liffey, Rye Water, Athy Stream and Graney). Some of the monitoring data was from the EPA national survey of dangerous substances 1999-2000. The local authority has carried out more recent monitoring on the Liffey, downstream of Osberstown WWTP (where exceedances of the dichloromethane, cyanide and zinc standards were found). Kildare also recently monitored for atrazine and simazine on the River Graney and the Athy Stream where no exceedances were found.
- There are no lakes or tidal waters within Kildare.
- The EPA received Kildare County Councils Measures Report on the 23/10/2002 and the Implementation Report on 06/08/2004.

Implementation Progress

Current Measures

- All new discharge licence applications are assessed for dangerous substances. All existing Section 4 licences and the vast majority of Section 16 licences have been reviewed. Monitoring of facilities with the potential to discharge dangerous substances underway;
- Monitoring of effluent from Osberstown and Leixlip WWTP, and in the Liffey downstream of Osberstown WWTP;
- Assessment ongoing of agricultural use of dangerous substances from farm surveys. Monitoring carried out of Athy Stream and Graney River for atrazine and simazine;
- Environmental Awareness officer managing awareness on a number of levels, namely educational initiatives through the media and through targeted community and voluntary groups.

Proposed Measures

- Review all activities having potential to discharge dangerous substances to surface or groundwaters or sewerage systems;
- Monitor dangerous substances loads discharging from all relevant facilities, including WWTPs, from urban stormwater overflows and in receiving waters. Further work required to assess loads discharging from Osberstown and Leixlip WWTPs;
- Examine potential of fluoride input from Water Treatment Plants;
- Implement Water Pollution Act;
- Carry out farm surveys in the Liffey, Boyne and Barrow catchments;
- Council involved in WFD implementation and River Basin District Advisory Councils.

Kilkenny County Council

Summary of Water Quality Status

- Monitoring data for all the parameters covered by the Dangerous Substances Regulations (except fluoride and cyanide) was available for 7 stations on 3 rivers (Nore, Barrow and Kings).
- There were no values reported in excess of the standards specified in the Regulations at any of the 7 stations.
- The EPA received Kilkenny County Councils Measures Report on the 31/07/2002 and the Implementation Report on 14/09/2004.

Implementation Progress

Current Measures

- Review all existing Section 4 licences in light of the requirements of the Regulations;
- Review all existing Section 16 licences in light of the requirements of the Regulations;
- Review waste permits/licences to prevent dangerous substances being discharged from permitted/licensed activities;
- Review the impact of mining on waters in North Kilkenny including increasing monitoring for inputs of dangerous substances;
- Review agricultural inputs by carrying out farm surveys;
- Carry out a review of feasibility to initiate monitoring in new stations on the Barrow, Nore and Kings River.

Proposed Measures

- Establish loading and reduce dangerous substances inputs from wastewater treatment plants;
- Inform the farming community of the potential adverse impact of pesticides on waters;
- Undertake consultation with Coillte to determine the use of the listed dangerous substances in forestry in County Kilkenny;
- Consultation with the EPA Biologist to determine if any identifiable point sources of pollution was noted during the course of the biological assessment.

Laois County Council

Summary of Water Quality Status

- Monitoring data was provided for 14 monitoring stations on 5 rivers (Triogue, Barrow, Nore, Goul and Clodiagh).
- Elevated levels of zinc were detected at one site on the River Triogue.
- No baseline monitoring data was provided for lakes in the functional area of Laois County Council.
- The EPA received Laois County Councils Measures Report on the 31/07/2002 and the Implementation Report on 22/09/2004.

Implementation Progress

Current Measures

- Remit of the Implementation Committee established under the Phosphorus Regulations expanded to incorporate the Dangerous Substances Regulations;
- Expansion of education programme to raise awareness of Dangerous Substances Regulations to target sectors;
- Monitoring undertaken at eight stations on the Barrow, Nore and Goul Rivers for dangerous substances in 2002-2004 period, no exceedances detected. Annual monitoring programme proposed at existing locations.

Proposed Measures

- Internal Council steering committee proposed to co-ordinate work and improve the knowledge base within the Council;
- Continual review of potential sources;
- Review existing Section 4 and 16 licences in light of the Dangerous Substances Regulations;
- Once off monitoring of effluent from WWTP's for dangerous substances to be undertaken.

Leitrim County Council

Summary of Water Quality Status

- Monitoring data for the “existing condition” was submitted for 3 stations on 1 river (the Shannon) and for 1 lake (Lough Allen). The data was from the EPA national survey of dangerous substances 1999-2000.
- No data for dichloromethane, fluoride and cyanide was submitted.
- There were no values reported in excess of the standards in the Regulations.
- The EPA received Leitrim County Councils Measures Report on the 11/10/2002 and the Implementation Report on 04/03/2005.

Implementation Progress

Current Measures

- Carry out farm surveys;
- Carry out surveys of forestry;
- Review discharge licenses in light of the Regulations;
- Discouragement of malpractice through public education and enforcement of the water pollution legislation.

Proposed Measures

- Gather information on sales of dangerous substances;
- Compile list of hotspots in the county;
- Increase monitoring of new stations for dangerous substances and resample existing sites.

Limerick City Council

Summary of Water Quality Status

- No monitoring data received by the Agency.
- The EPA received Limerick City Councils Measures Report on the 07/10/2002 and the Implementation Report on 02/12/2004.

Implementation Progress

Current Measures

- Some monitoring for dangerous substances is carried out upstream and downstream of the Council's closed landfill at Lonpavement, and at the tidal waters at Westfield Wetlands, on the north side of the city.
- Limerick Main Drainage Treatment Plant was commissioned in October 2003 with the elimination of over 50 effluent outfalls to the Shannon River.
- Standards of Regulations are taken into account when licensing and reviewing trade effluent discharge licences.

Limerick County Council

Summary of Water Quality Status

- Data exists for 4 monitoring stations on 3 rivers (Deel, Maigue, Shannon). The data was from the EPA national survey of dangerous substances 1999-2000. No data was reported for cyanide, fluoride and dichloromethane.
- There is no data reported for lakes or tidal waters in the functional area of Limerick County Council.
- No exceedances of the standards were reported
- The EPA received Limerick County Councils Measures Report on the 16/5/2003.

Implementation Progress

Current Measures

- Limerick County Council Implementation Report for 2004 was not received by the Agency.

Proposed Measures

- Assessment of the impact of existing and closed landfills on receiving waters;
- Issue and review of all new Section 4 and 16 licences in light of the Regulations;
- Enforcement of illegal discharges of dangerous substances.
- Risk assessment to identification of all potential sources of dangerous substances;
- Assessment of all urban wastewater treatment plants for dangerous substances;
- Development of a monitoring network based on the outcome of the risk assessment;
- Assessment of the levels of TBT in estuaries.

Longford County Council

Summary of Water Quality Status

- Monitoring was carried out on a maximum 20 stations on 8 rivers.
- Two lakes were monitored for all of the dangerous substances specified in the regulations.
- There are no tidal waters in the functional area of Longford County Council.
- There was one result reported in excess of the standards specified in the Regulations (fluoride on the Black River). The cause of this exceedance is unknown.
- The EPA received Longford County Councils Measures Report on the 15/10/2002 and the Implementation Report on 03/03/2005.

Implementation Progress

Current Measures

- Establish loads and minimise discharges of dangerous substances from wastewater treatment plants;
- Establish loads and minimise discharge of dangerous substances from closed landfills;
- Conduct a survey of forestry in county and establish use of pesticides;
- Increased number of monitoring stations for dangerous substances;
- Establish extent of use of pesticides by carrying out farm surveys.

Proposed Measures

- There is no update on additional proposed measures.

Louth County Council

Summary of Water Quality Status

- Monitoring data for 33 stations on 18 rivers was submitted for all parameters.
- There was one river station reported in excess of the standards specified in the Regulations for cyanide (Glyde River).
- Monitoring data for two reservoirs/ lake waters was available for all parameters except atrazine, dichloromethane, toluene, simazine and xylene.
- There were 16 exceedances for metals on 5 tidal waters (Chromium, Copper, Arsenic and Zinc). The potential cause has been suggested as an anomaly in the testing process. Further monitoring and investigation will be carried out.
- The EPA received Louth County Councils Measures Report on the 06/06/2004 and the Implementation Report on 13/12/2004.

Implementation Progress

Current Measures

- Monitoring and increased enforcement of discharge licences;
- Increased monitoring of rivers and tidal waters for dangerous substances;
- Ongoing landfill monitoring;
- Establishment of an enforcement unit to tackle planning and waste issues;
- Implementation of the Water Framework Directive.

Proposed Measures

- Initiate Farm and river catchment surveys and integrate GIS/Envisage system;
- Sample surface waters in vicinity of significant industrial sites;
- Inform the public of dangerous substances through local authority magazine, press and website;
- Identification of additional premises which are likely to be sources of dangerous substances through site visits under the Emission of Volatile Organic Compound Regulations;
- Consultation with interested parties (farming organisations, angling groups, industry) and public bodies.

Mayo County Council

Summary of Water Quality Status

- Monitoring of all dangerous substances except fluoride, cyanide and tributyltin was available for 3 monitoring stations on 3 rivers. The data was from the EPA national survey of dangerous substances 1999-2000. Monitoring data for dichloromethane, toluene and xylene were also available for a further 11 stations on 4 rivers in the vicinity of licensed landfills.
- There were no exceedances of the standards in the Dangerous Substances Regulations reported.
- There was no monitoring data available for lakes or tidal waters in the functional area of Mayo County Council.
- The EPA received Mayo County Councils Measures Report on the 15/01/2003 and the Implementation Report on 13/01/2005.

Implementation Progress

Current Measures

- Issue, review and enforcement of licenses under Section 4 and 16 of the Local Government (Water Pollution) Act in light of Dangerous Substances Regulations;
- Improved control of discharges from septic tanks and other small wastewater treatment systems through planning/licensing;
- Survey and upgrade surface water and foul sewer/drainage systems;
- Remedy storm water overflows and urban run-off;
- Upgrading of landfills to ensure compliance with EPA licence;
- Assess water abstractions;

Proposed Measures

- Ongoing review of discharge licences;
- Conduct further monitoring of lakes and rivers;
- Include dangerous substances in farm and catchment surveys;
- Conduct ongoing hazardous waste collections;
- Ensure best farm management practices;
- Request information on sale, use and disposal of dangerous substances from quarries, sheep dips and peat extraction industries.

Meath County Council

Summary of Water Quality Status

- Monitoring for all of the parameters was carried out at 20 stations on 13 rivers.
- There was monitoring of 7 lakes for all parameters. No monitoring of tidal waters in the functional area of Meath County Council was reported.
- There were no exceedances of the standards in the Dangerous Substances Regulations reported.
- The EPA received Meath County Councils Measures Report on the 16/09/2003 and the Implementation Report on 6/04/2005.

Implementation Progress

Current Measures

- Since 2002, the Council has sampled at forty locations around the county for the 14 dangerous substances. The forty samples collected comprised 20 river samples, 7 lake samples, 11 WWTP discharges and two licensed discharge samples. Exceedances were reported for one lake (White Lake – copper) and six of the WWTP discharges (generally copper/zinc). It has not yet been established whether the discharge from the WWTPs is having an adverse effect on the receiving waters;
- Council is actively participating in WFD implementation;
- Process all new applications for licenses under Sections 4 and 16 in light of the Regulations;
- Liaison with Fingal County Council. Joint surveys on cross-border catchments.

Proposed Measures

- Monitoring programme to be continued and expanded;
- Environmental Technician employed who will solely work on farm surveys. Pesticide use will be monitored as part of these surveys;
- Development of a webpage dealing with water quality in Meath;
- Examine causes of any exceedances found and determine impact of WWTP discharges on receiving waters;
- Record on a Geographical Information System all survey information collected.

Monaghan County Council

Summary of Water Quality Status

- Baseline monitoring for all of the parameters, except atrazine, dichloromethane, simazine, toluene and xylene was carried out on a maximum of 30 lakes. Monitoring was undertaken at 6 river stations for Atrazine, Cyanide, Fluoride, Nickel, Simazine, Toluene and Xylenes. Monitoring for the rest of the metals was carried out at 7 river stations. There was no reporting for atrazine, dichloromethane, simazine, toluene or xylenes in lakes or dichloromethane in rivers.
- Copper, zinc and chromium levels in excess of the standards were reported at 3 lakes. Exceedances for zinc, fluoride, lead, nickel and chromium was reported at two river stations.
- Additional monitoring and review of the catchments would suggest natural heavy metal contamination of waters. An exemption will be sought from the EPA for elevated metals in soft water lakes.
- The EPA received Monaghan County Councils Measures Report on the 14/03/2003 and the Implementation Report on 30/03/2005.

Implementation Progress

Current Measures

- Interception, collection and treatment of landfill leachate at landfills;
- Storm water monitoring in the vicinity of a contaminated stream in Clones in conjunction with the EPA;
- Monitoring of 5 river stretches and 5 lakes below urban areas for the presence of dangerous substances;
- Monitoring of all surface waters abstractions for A3 metal parameters and hardness;
- Catchment surveys under the Phosphorus Regulations extended to include identification of sources of dangerous substances;
- Review discharge licences in light of Dangerous Substances Regulations.

Proposed Measures

- Carry out a survey of all unmonitored stations to identify potential sources of dangerous substances;
- Site visits and provision of information by the Environmental Awareness Officer on hazardous wastes;
- Identification of additional premises which are likely to be sources of dangerous substances through site visits under the Emission of Volatile Organic Compound Regulations;
- Examine the feasibility of a research project to address the problems at Lough Minor;
- Lake and sediment monitoring as well as a lake catchment survey of Emy Lough and Drumgoole Lake.

North Tipperary County Council

Summary of Water Quality Status

- Monitoring of the “existing condition” for all of the parameters, except cyanide was carried out at a maximum 48 stations on 9 rivers for the metals while limited monitoring for pesticides, solvents and fluoride was reported for 2 of these stations. Monitoring for all parameters except fluoride and cyanide was carried out at 1 lake (Lough Derg).
- Results in excess of the standards were reported at 25 river stations on 6 rivers (Yellow, Killmastulla, Silvermines, Rossestown, Drish and Folliborrig). These were for copper (3 stations), lead (15 stations) and zinc (22 stations).
- There is a long history of mining for lead, zinc, copper, barite and silver in North Tipperary primarily in Silvermines (historical) and Lisheen (current).
- North Tipperary County Council have applied for a derogation under Article 9(2) for stations on the Killmastulla, Yellow, Silvermines and Folliborrig rivers due to high natural concentrations of heavy metals in the area and the historical affects of mining which has taken place in the Silvermines area since the 9th Century.
- The EPA received North Tipperary County Councils Measures Report on the 15/10/2005 and the Implementation Report on 01/09/2004.

Implementation Progress

Current Measures

- Participation in the River Basins Districts Catchment Management project;
- Review section 4 and 16 licenses;
- Upgrading Borrisoleigh WWTP;
- Upgrading Templemore and Nenagh WWTPs and provide treatment for Terryglass;
- Maintenance clause in planning permission for septic tanks;
- Implementation of water conservation programme to reduce leakages;
- Farm surveys;
- Promotion of Good Agricultural Practice and REPS;
- Use of vaccinations instead of sheep dips for the control of scab;
- Application of pesticides and fertiliser in accordance with Forest Service guidelines;
- Prohibition of dangerous/hazardous substances, ensuring leachate is treated and monitoring of waters at IPC licensed landfill;
- Provision of recycling facilities for batteries and fluorescent tubes;
- Establishment of website to promote environmental awareness;
- Pollution prevention response trailer purchased;
- Pressure testing of new petrol storage tanks and associated pipework.
- Implementation of the recommendations of Inter-Agency Group on Silvermines mining area;

Proposed Measures

- Carry out a study on sludge waste and carry out a sludge management plan including an assessment of the presence of dangerous substances in sludge;
- Monitor urban wastewater discharges for dangerous substances;
- Carry out a detailed study on the impact of forestry on water quality with particular emphasis on aerial fertilisation;
- Improve information on forestry locations;
- Use of planning permission to control the use and discharge of dangerous substances to the environment;
- Distribution of information leaflets, newsletters and brochures to the general public, industry and farming communities;
- Request for an emergency plan to be submitted for all marinas on Lough Derg to prevent the entry of polluting matter to waters;
- Drafting new county development plan;
- Assess presence of dangerous substances in surface waters;
- Consideration of once off monitoring of WWTPs with industrial discharges;
- Survey of supplies of chemicals;
- Liaison with the Department of Agriculture, Regional Fishery Board and Teagasc.

Offaly County Council

Summary of Water Quality Status

- Monitoring data was provided for 6 monitoring stations on 5 rivers for all dangerous substances. No monitoring data was provided for lakes.
- There were no monitoring results that indicated elevated levels of dangerous substances.
- The EPA received Offaly County Councils Measures Report on the 13/08/2002 and the Implementation Report on 05/08/2004.

Implementation Progress

Current Measures

- Review existing Section 4 and 16 licences in light of the Regulations;
- Review licence application procedure in light of the Regulations;
- Promotion of environmental education/environmental awareness;
- Liaison with EPA regarding IPC licensed facilities within the functional area of Offaly County Council.

Proposed Measures

- Identification of manufacturing firms contributing to the production of dangerous substances within Offaly;
- Reduction of dangerous substances loads from WWTPs;
- Upgrading of Monegall, Clara, Ferbane, Ballycumber, Belmont, Tullamore, Edenderry, Rhode, Clonbullogue, Kinitty, Shinrone and Shannonbridge WWTPs;
- Review of farm survey procedures in light of the Regulations;
- Carrying out survey of agricultural co-op's to determine the available pesticides containing atrazine and simazine;
- Liaison with Coillte and other forestry developers regarding the provisions of the Regulations;
- Liaison with River Basin Management Groups regarding the establishment of monitoring procedures for dangerous substances.

Roscommon County Council

Summary of Water Quality Status

- Monitoring data of the existing condition was available for 4 stations for arsenic and nickel with a further 4 stations for, chromium, copper, lead and zinc on 5 rivers.
- Elevated levels of zinc were detected at 4 monitoring stations on the Suck and Lung Rivers, upstream and downstream of Ballaghadreen landfill and Castlerea landfill. Results from EPA monitoring of the Lung upstream and downstream of Ballaghadreen landfill from 2002-2005 do not exceed the standard.
- No baseline monitoring data was available for lakes and there are no tidal waters in the functional area of Roscommon County Council.
- The EPA received Roscommon County Councils Measures Report on the 14/11/2002 and the Implementation Report on 12/11/2004.

Implementation Progress

Current Measures

- Scope of farm surveys extended to determine the use of dangerous substances such as pesticides, herbicides, sheep dip etc;
- Control of the discharge from Arran Chemicals and Elan Corporation;
- Monitoring of closed landfills (Castlerea, Boyle, Strokestown and Roscommon) on a bi-annual basis and monitoring of operational landfill (Ballaghadreen) on an annual basis.

Proposed Measures

- Collection and transfer of leachate from Ballaghadreen and Roscommon landfills to the nearest sewerage treatment facility. Monitoring for dangerous substances upstream and downstream will commence;
- Monitoring downstream of wastewater treatment plants in areas served by fluoridated water;
- Establish the use of dangerous substances during forestry activities and the identification of high risk areas.

Sligo County Council

Summary of Water Quality Status

- No monitoring data has been submitted by Sligo County Council to date.
- The EPA received Sligo County Councils Measures and Implementation Reports on the 04/03/2005.

Implementation Progress

Current Measures

- Enforcement of Water Quality protection powers;
- Introduction of educational campaigns for the farming community in conjunction with farm organisations;
- Public awareness campaigns in relation to proper waste management for products containing dangerous substances;
- Liaison with EPA, Fisheries and Fisheries Research Agency regarding available water quality monitoring data;
- Investigate closed landfills for discharges;
- Investigate possible dangerous substances emissions from disused lead and zinc mine; ongoing liaison with owner and EPA and DCMNR;
- Issue, review and enforce discharge licences in light of regulations.

Proposed Measures

- Liaison with EPA regarding emissions from IPC licensed facilities;
- Identify dangerous substances in WWTP effluents and sewage sludges;
- Consultation with the Forest Service in light of the regulations and identification of high risk areas;
- Investigate the need for bye laws to deal with potential dangerous substances from forestry activities;
- Liaison with the Department of Communication, Marine and Natural Resources;
- Introduce an education campaign on the use of products containing dangerous substances used as antifouling agents for boats.

South Dublin County Council

Summary of Water Quality Status

- Monitoring of all dangerous substances except tributyltin, dichloromethane, toluene and xylene was available for a maximum 18 monitoring stations on 7 rivers.
- Exceedances of the standards were reported in 4 stations on 3 rivers (Brittas Poddle and Dodder) for atrazine and copper.
- There are no lakes or coastal waters in the functional area of South Dublin County Council.
- The EPA received South Dublin County Councils Measures Report on the 11/04/2003 and the Implementation Report on 24/12/2004.

Implementation Progress

Current Measures

- Baseline concentrations for most of the substances listed in the Regulations were established for monitoring stations on the Brittas, Camac, Dodder, Griffeen, Liffey, Owendoher and Poddle rivers.

Proposed Measures

- Monitoring programme to be expanded;
- Investigation of potential sources of contamination and implementation of corrective action where necessary;
- Enforcement of the Water Pollution Acts where necessary.

South Tipperary County Council

Summary of Water Quality Status

- Monitoring was carried out at 18 river stations on 11 rivers. There was no baseline monitoring of lakes in the functional area of South Tipperary.
- There were no exceedances of the standards in the Dangerous Substances Regulations.
- The EPA received South Tipperary County Councils Measures Report on the 16/01/2003 and the Implementation Report on 25/11/2004.

Implementation Progress

Current Measures

- Assessment and control of planning applications where appropriate for dangerous substances;
- Control discharges from septic tanks and small wastewater treatment systems;
- Permitting of facilities under the Waste Management Permitting Regulations;
- Inspection of waste permitted facilities;
- Consultation with stakeholders including EPA, farm bodies, industry and forestry.

Proposed Measures

- Review and enforcement of all Section 4 and Section 16 licences including a survey of the catchments within the county, determination of dangerous substances loads from licensed facilities and associated assimilative capacity of receiving waters, ensuring all discharges are licensed, undertaking an annual audit of each licensee and prosecution where non-compliance occurs;
- Establishment of influent and discharge loading of dangerous substances at WWTPs,
- Establishment of a priority list of WWTPs plants for upgrading;
- Implementation of a public awareness programme in relation to waste;
- Establishment of a catchment management group;
- Implementation of a farm inspection programme;
- Segregation and collection of household hazardous waste;
- Review of the current monitoring programme in light of the Dangerous Substances Regulations including the establishment of new monitoring locations in the vicinity of potential sources of contamination.

Waterford City Council

Summary of Water Quality Status

- There was no monitoring of rivers or tidal waters for dangerous substances in the functional area of Waterford City.
- The EPA received Waterford City Councils Measures Report on the 24/11/2003 and the Implementation Report on 19/11/2004.

Implementation Progress

Current Measures

- Serve notices under the Water Pollution Acts where relevant to have the incidence of dangerous substances minimised or eliminated;
- Implementation of a leachate management system at Kilbarry landfill.

Proposed Measures

- Review of all Section 4 and 16 licences;
- Monitor all trade effluent licences and revise licences where necessary;
- Determine the existence of dangerous substances in the River Suir and St. John's River;
- Identify the source of these dangerous substances if they occur;
- Form alliances with Teagasc and local farmers with regard to agricultural run-off;
- Completion of Waterford City wastewater treatment plant and the Waterford Main Drainage Scheme thus eliminating all foul discharges to the Suir;
- Engagement of IDA at Cork Road Industrial Estate where action is required with the Lisduggan Stream;
- Consider the need to apply for extensions or exemptions;
- Establishment of a catchment management/river basin management scheme for the River Suir.

Waterford County Council

Summary of Water Quality Status

- Monitoring data was provided for 13 monitoring stations on 5 rivers (Bride, Colligan, Clodiagh, Suir and Blackwater) and 1 tidal water for toluene and xylenes (Tramore Backstrand). No monitoring results were available for lakes in the functional area of Waterford County Council.
- There were no exceedances of the standards in the Dangerous Substances Regulations.
- The EPA received Waterford County Councils Measures Report on the 16/08/2002 and the Implementation Report on 25/11/2004.

Implementation Progress

Current Measures

- Various water quality protection plans in place including the River Suir Catchment Water Quality Management Scheme (which was part of the Three Rivers Project), the Water Quality Management Plan for Dungarvan Harbour, and the County Waterford Sludge Management Plan. The Council is currently involved in the South Eastern and South Western RBD Projects;
- Participation in the River Suir Catchment Management Group and the Regional Water Laboratory Management Committee, liaison with the EPA on Waste Management and IPPC facilities, and with farmers groups, Teagasc and the Waterford Institute of Technology;
- All existing Section 4 and 16 licences have been reviewed in light of the Regulations, and seven new licences have been issued;
- Permission for housing developments is usually conditional on the provision of adequate sewage treatment as part of the development;
- Farm surveys modified to include gathering of information on fuel storage facilities and pesticides. Since 2002, 77 surveys were conducted, 22 warning notices were issued, nine Section 12 notices were issued and no prosecutions occurred;
- Five wetlands are being used to treat municipal sewage and twelve to treat farmyard soiled water. Consideration is being given to treatment of road run-off, which may contain hydrocarbons and metals, through a constructed wetland;
- There are a number of monitoring programmes relevant to dangerous substances in the Council area including monitoring of salmonid rivers, Waterford and Dungarvan Harbours, WFD monitoring, Dungarvan and Tramore landfill monitoring, investigative monitoring of other potential pollution sources (e.g., engineering works and tannery landfill);
- Implementation of leachate management control measures at Dungarvan and Tramore landfills; improved waste management measures being implemented.

Proposed Measures

- Upgrades of several WWTPs are planned or under construction;

- Council to develop contacts with marine and coastal agencies such as the marine Institute to co-ordinate monitoring activities in this area. Council will assess water and sediment quality at Boat Harbours, in co-operation with the marine monitoring bodies.

Westmeath County Council

Summary of Water Quality Status

- Monitoring data was provided for 36 monitoring stations on 15 rivers and for 5 lakes.
- There were no exceedances of the standards in the Dangerous Substances Regulations.
- The EPA received Westmeath County Councils Measures Report on the 30/08/2002 and the Implementation Report on 22/11/2004.

Implementation Progress

Current Measures

- Monitoring programme undertaken of potential pressures for dangerous substances including local authority landfills, WWTPs and industry;
- Reviewed all discharge licences, IPPC Licences and other activities within the county that could contribute to discharge of dangerous substances to surface waters
- to establish all possible sources of dangerous substances and to establish the loading to surface waters and local authority wastewater treatment plants;
- Decommissioning of all local authority sheep dip tanks;
- Promotion of the awareness of the Regulations;
- Liaison with Coillte in relation to the use of an alternative substance for the control of weeds and measures employed to prevent dangerous substances entering the watercourses;

Proposed Measures

- Assess local authority wastewater treatment plants to establish the presence of dangerous substances;

Wexford County Council

Summary of Water Quality Status

- Monitoring data was provided for cyanide and fluoride for 2 stations with a further 2 stations monitored on the River Slaney and Banoge for the remaining parameters except the pesticides and dichloromethane. No monitoring of lakes or tidal waters was submitted by Wexford County Council.
- No elevated levels of any of the dangerous substances were detected.
- The EPA received Wexford County Councils Measures Report on the 31/07/2003 and the Implementation Report on 26/11/2004.

Implementation Progress

Current Measures

- Participation in the South East River Basin District (SERBD) Project;
- Application forms for Section 4 and 16 discharge licences under the Water Pollution Acts now account for the listed dangerous substances and limits put on the effluents;
- A once-off monitoring programme was carried out in August 2004 of the effluent from the main wastewater treatment plants in the county (Wexford, Gorey and Enniscorthy) for most of the dangerous substances (except pesticides), no exceedances were reported;
- Once-off samples were taken in August 2004 in two agricultural areas but were not analysed for pesticides. No exceedances of the other dangerous substances were reported.
- In conjunction with the Dept of Communications, Marine and Natural Resources a survey of nineteen direct discharges to Bannow Bay was undertaken and samples analysed for metals. All of the levels recorded were within the specified standards;
- Participation in REPS lectures given by Teagasc.

Proposed Measures

- Review of waste permits issued under the Waste Management (Permit) Regulations, 1998;
- Presentations will be made to the Environment Strategic Policy Committee on water quality.

Wicklow County Council

Summary of Water Quality Status

- Monitoring data was provided for a maximum 40 monitoring stations on 38 rivers. There were no lakes monitored in the functional area of Wicklow County Council. Two tidal waters monitored had elevated levels of zinc, lead, copper, chromium and arsenic.
- 22 stations on 19 rivers monitored had elevated levels of the metals (excluding arsenic) and cyanide standards.
- The EPA received Wicklow County Councils Measures Report on the 28/07/2003 and the Implementation Report on 21/12/2004.

Implementation Progress

Current Measures

- All Section 4 and Section 16 licence applications since 2001 determined according to standards in Regulations;
- Farm surveys undertaken in Potters catchment in 2003;
- Upgrading of existing collection systems to prevent contaminated discharges;
- Liaison with relevant interest groups including local farmers, Teagasc, Coillte, Fisheries Boards, RBD projects, relevant manufacturers and suppliers and the domestic sector. Stakeholder Consultative Group set up in 2004.

Proposed Measures

- Implementation of a lake monitoring programme;
- Liaison with the Harbour Authorities and Marine Institute in relation to monitoring of tidal waters;
- Determine if TBT monitoring has taken place in coastal waters of Wicklow;
- Publication of an annual report on Water Quality on the Council website;
- Increase monitoring of WWTPs, a DWTP, industry, an urban storm water discharge, forestry, mining activities;
- Appoint consultants to review all Section 4 and Section 16 licences granted before 2001;
- Farm surveys proposed in the Derry River catchment.

