



National Hazardous Waste Management Plan 2008-2012

ENVIRONMENTAL PROTECTION AGENCY

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National Hazardous Waste Management Plan 2008-2012

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PREFACE

The National Hazardous Waste Management Plan is prepared and published by the Environmental Protection Agency in accordance with section 26 of the Waste Management Acts 1996 to 2008. The first Plan, originally published in 2001, will be replaced by this Plan, published in 2008.

The National Hazardous Waste Management Plan is a statutory document prepared under Irish law. It also satisfies article 6 of Directive 91/689/EC on hazardous waste which states that Member States shall draw up plans for the management of hazardous waste.

This Plan sets out the priority actions that should be taken within the period of the Plan (2008-2012) in relation to: the prevention of hazardous waste; improved collection rates for certain categories of hazardous waste; the steps that are required to improve Ireland's self-sufficiency in hazardous waste management; and the management of certain legacy hazardous wastes such as contaminated soil. The key to achieving the Plan's objectives is effective implementation. A number of recommendations are made in the Plan, and public bodies have been nominated for their implementation. Section 26(5) of the Waste Management Acts 1996 to 2008 states the relationship between the Plan and public bodies:

“A Minister of the Government, a local authority and any other public authority in whom are vested functions by or under any enactment in relation to the protection of the environment shall have regard to, and in so far as it is considered by the Minister of the Government, local authority or other public authority to be appropriate to do so, shall take measures to implement or otherwise give effect to, recommendations contained in the hazardous waste management plan.”

A summary of the Plan's recommendations, and the nomination of responsible public authorities, is provided in the Executive Summary and in chapter 8. All relevant public bodies were informed of these recommendations as they were being formulated and many made submissions during the consultation period on the Proposed Plan.

Two consultation periods were opened during preparation of this Plan, and a summary of the submissions received is provided in Appendix A.

A Strategic Environmental Assessment (SEA) was carried out during the Plan's development, and an Environmental Report was published for public consultation alongside the Proposed Plan in November 2007. An SEA statement has now been prepared and is published alongside this document. The SEA statement states how the SEA process has influenced and been taken into account in the Plan's preparation.

Feedback and comment on the Plan and its ongoing implementation is welcome. Written submissions should be made to the Environmental Protection Agency at the address provided in the introductory pages to this document.

EXECUTIVE SUMMARY

The Environmental Protection Agency has published this *National Hazardous Waste Management Plan* for the period 2008 to 2012. The Plan sets out the priorities to be pursued over the next five years and beyond to improve the management of hazardous waste in the Republic of Ireland. The objectives of the Plan are:

1. To reduce the generation of hazardous waste by industry and society generally.
2. To minimise unreported hazardous waste with a view to reducing the environmental impact of this unregulated waste stream.
3. To strive for increased self-sufficiency in the management of hazardous waste and to reduce hazardous waste export.
4. To minimise the environmental, social and economic impacts of hazardous waste generation and management.

The Plan is made under section 26 of the Waste Management Acts, 1996 to 2008. A Strategic Environmental Assessment (SEA) was carried out during the Plan's preparation. An Environmental Report was published in November 2007 for consultation as part of the SEA process. An SEA Statement has been prepared and published along with this Plan and states how the strategic environmental assessment process influenced the Plan's development.

A Proposed (draft) Plan was published for public consultation on 7 November 2007. A public information session was held in Portlaoise on 15 November 2007. A total of 58 people attended the event. The consultation period closed on 31 January 2008. A total of 60 submissions were received. A summary of the consultation process and the submissions is provided in Appendix A. In accordance with section 26(4) of the Waste Management Acts, 1996 to 2008, the submissions were taken into account in the preparation of the National Hazardous Waste Management Plan.

Hazardous waste generation and management

The largest quantity of hazardous waste is generated by Irish industry and includes such materials as industrial solvents, waste oils, industrial sludges and chemical wastes. Households, small business, farms and the healthcare and construction sectors also generate large quantities of hazardous waste including batteries, electrical equipment, healthcare risk waste, solvent based paint and varnish waste, sheep dip and fluorescent lamps.

The quantity of hazardous waste generated in 2006 was 284,184 tonnes, an 8% decrease since 2004 but an increase of almost 10% overall since 2001. The majority of this waste is managed properly and in accordance with the law. In 2006, some 31% of hazardous waste was treated *on-site of generation* at IPPC-licensed facilities (see Figure 1). In descending order, this waste was subjected to incineration, solvent recycling, landfill and use as fuel. A further 21% was treated *off-site in Ireland* by a network of authorised hazardous waste treatment facilities in Ireland, and just over half was subjected to disposal operations. The remaining 48% of Irish

hazardous waste was *exported* for treatment and disposal abroad, mostly for thermal treatment (incineration and use as fuel), but also for metal recovery, solvent recovery and landfill.

Figure 2 illustrates the long-term trend in the location of treatment of hazardous waste. It shows that the *on-site* treatment of hazardous waste increased in 2006 after a long decline since 1996. The *off-site* treatment of hazardous waste in Ireland has steadily increased over 10 years. The *export* of hazardous waste has become the dominant outlet for Irish hazardous waste, though a decline is noted since exports peaked in 2003/4.

The generation of contaminated soil continues to increase and in 2006, 406,904 tonnes of contaminated soil were removed from brownfield and docklands redevelopment sites for treatment. In 2006, 91% of contaminated soil was exported for treatment, with the remainder treated at a single facility in Ireland.

An estimated 29,888 tonnes of hazardous waste was 'unreported' in 2006. That is, it is not recorded as having entered the formal waste management industry. The source of this waste is small business, households and farms primarily. The estimated generation of 'unreported' hazardous waste decreased by 36% since 2004, and this reduction is principally attributed to a reported reduction in the use of sheep dip (and its subsequent disposal on land).

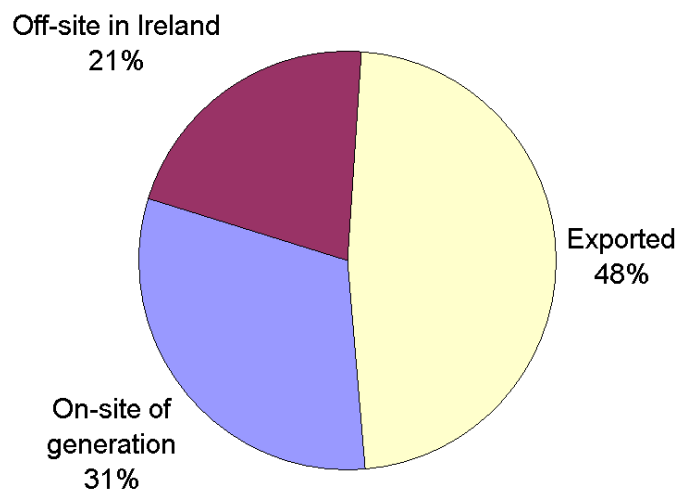


Figure 1 The location of treatment for reported hazardous waste, 2006

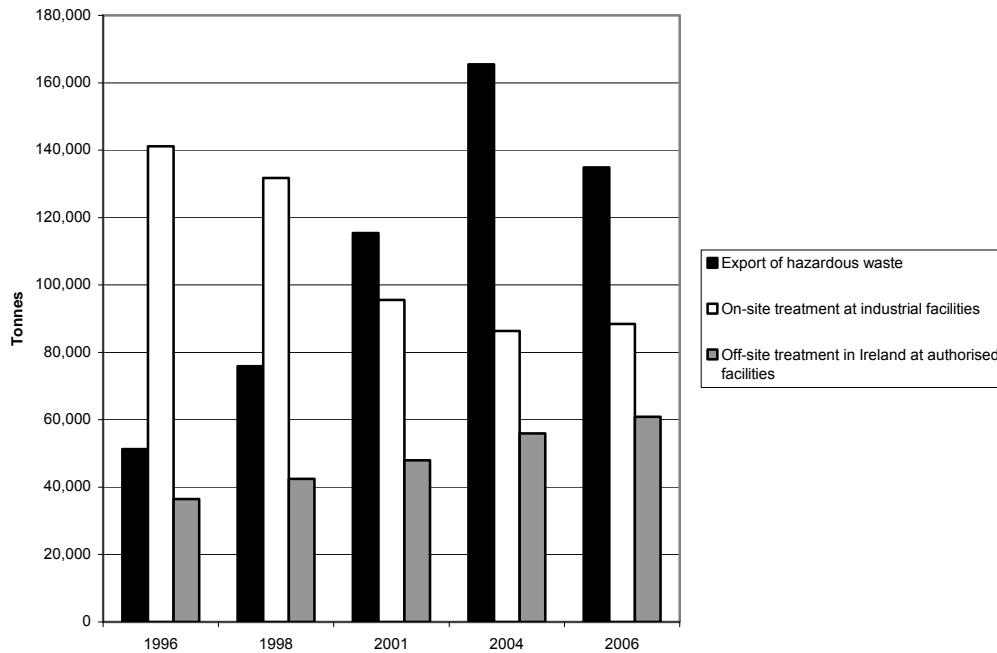


Figure 2 The location of hazardous waste treatment, 1996-2006

The Plan makes 29 recommendations dealing with:

- prevention of hazardous waste;
- collection of hazardous waste and the enforcement of hazardous waste regulations;
- infrastructure and moving towards self-sufficiency in hazardous waste management;
- legacy issues such as contaminated soil and old landfill site management;
- north-south potential for all-island solutions; and
- implementation.

A summary of the recommendations is presented below.

Prevention

A prevention programme to reduce the gross generation of hazardous waste in certain priority industrial sectors and in households will be undertaken by the EPA under the National Waste Prevention Programme.

Collection

A comprehensive and accessible network of local drop-off facilities for householders and small businesses is recommended to tackle the problem of 'unreported' hazardous waste. Certain commercial sectors are also highlighted for priority attention in this regard, principally garages and farms, the source of relatively large amounts of 'unreported' hazardous waste. The EPA will

take concrete steps to develop solutions with these sectors, in consultation with stakeholders, and to focus enforcement efforts.

Self-sufficiency

A policy of moving towards self-sufficiency is recommended. Of the 48% of hazardous waste exported in 2006, a significant proportion could be dealt with in Ireland at existing authorised facilities and in cement kilns. One cement kiln operator has indicated their intention to seek authorisation to burn waste, including hazardous waste. If Ireland were to become fully self-sufficient, hazardous waste landfill and incineration (or alternatives) would be required. It is noted that while a hazardous waste incinerator is licensed to operate in Ringaskiddy, Co. Cork, there are no equivalent proposals on hand for hazardous waste landfill or for technologies that can provide a realistic alternative to the incineration of a wide range of hazardous wastes that are currently exported for incineration.

Legacy issues

Over 90% of contaminated soil removed from contaminated sites in 2006 was exported for treatment, representing a loss of a valuable resource. More treatment of contaminated soil in Ireland is recommended to ensure that treated soil is available here for engineering purposes.

The management of old waste disposal sites, including those that to a significant extent involved the disposal of hazardous waste, are to be managed according to an existing code of practice drawn up by the EPA's Office of Environmental Enforcement.

It is recommended in the Plan that the scale and extent of contamination of port and harbour residues be identified and subjected to planned decontamination or other management approaches.

North-south potential solutions

With the easing of restrictions in United Kingdom policy for the movement of hazardous waste for disposal between Northern Ireland and the Republic of Ireland, an all-island market for hazardous waste disposal is now possible. An all-island market for hazardous waste recovery has existed for some time. The Plan recommends that proposals for hazardous waste disposal infrastructure, including landfills and other large scale infrastructure such as incinerators and alternative treatment installations, should take all-island considerations into account for capacity planning purposes.

Implementation

Each of 29 recommendations in the Plan has a timeline and responsible body identified. The principal implementing bodies will be the Environmental Protection Agency, the Department of the Environment, Heritage and Local Government, and local authorities. Reports on the Plan's

implementation will be prepared by the EPA with the input of the National Waste Prevention Committee.

The following are the Plan's principal recommendations.

Administrative arrangements

1. Affirm the role of the National Waste Prevention Committee in 2008 to act as the principal stakeholder oversight body for the Plan's implementation.

Responsible: Department of the Environment, Heritage and Local Government

2. Nominate the Environmental Protection Agency in 2008 for co-ordinating the Plan's implementation, with responsibility for promoting, monitoring, reporting and, where necessary, guiding the implementation activities of other responsible authorities.

Responsible: Department of the Environment, Heritage and Local Government

3. Nominate local authorities and other public bodies in 2008 for specific tasks as identified in the Plan.

Responsible: Department of the Environment, Heritage and Local Government

4. Local authorities should, in accordance with section 26 of the Waste Management Acts 1996 to 2008, take relevant recommendations of this Plan into account in their implementation and revision of regional and local waste management plans, as well as regional planning guidelines and regional and area development plans.

Responsible: Local authorities

5. Public bodies should, generally, be cognisant of this Plan and, where appropriate, take its provisions and recommendations into account in the execution of their environmental protection, industrial development and other functions, with the objective of improving their own hazardous waste management and that of their clients, customers or other stakeholders.

Responsible: All public bodies

Prevention

6. Develop a hazardous waste prevention programme in 2008, under the auspices of the existing National Waste Prevention Programme, to be implemented over the five-year period of the Plan.

Responsible: Environmental Protection Agency

7. Designate trained¹ prevention officers by 2010, either alone or as regional groupings, such that each local authority area is covered, making use of any funding available through the Local Authority Prevention Network, to, *inter alia*, work with local businesses and communities towards achieving hazardous waste prevention, accessible and cost-effective collection services, and better compliance with regulation.

Responsible: Local authorities

8. Specify a policy for green procurement and provide guidelines for the substitution or reduction in use of hazardous materials in public procurement.

Responsible: Department of the Environment, Heritage and Local Government

Collection of hazardous waste

9. Provide adequate resources to local authorities, commencing in 2008, to provide in each local authority area by 2012 adequate hazardous waste collection facilities for households and small businesses and provide for the expansion of existing facilities and services and/or construction of new facilities.

Responsible: Department of the Environment, Heritage and Local Government

10. Complete a programme by 2012 of providing drop-off facilities at appropriate civic amenity sites and/or other suitable locations (including mobile collections) for use by householders and small business, and consider the use of collective tendering for waste contractor services with other local authorities with a view to reducing costs.

Responsible: Local authorities

11. Prepare a code of practice by 2009 for civic amenity sites where hazardous waste is accepted. Sponsor the development of a training course for initial rollout in 2010 for local authority and private sector operators of civic amenity sites where hazardous waste is accepted.

Responsible: Environmental Protection Agency

12. Conduct local or regional awareness and information campaigns, with preparatory work commencing in 2009, to pro-actively inform individuals and businesses of available hazardous waste collection services, and their obligations. General guidance on common topics such as 'obligations' could be developed nationally in co-operation with national authorities such as the Department of the Environment, Heritage and Local Government and the Environmental Protection Agency.

Responsible: Local authorities

¹ New prevention officers should be enrolled in the next available local authority prevention course.

13. Undertake a pilot audit scheme, commencing in 2008, to examine the merits of ongoing and long-term regulation of the vehicle servicing and garage sector using accredited inspection contractors.

Responsible: Environmental Protection Agency

14. Develop in 2009, in partnership with local authorities, a national information and awareness campaign for garages, with a particular focus on waste oils and their combustion in space heaters.

Responsible: Environmental Protection Agency

15. Commence a programme of local and/or concerted enforcement actions in 2009 with regard to the management of hazardous waste at several categories of small business, including garages, mini-labs, construction sites, industrial, healthcare and others. Enforcement actions should ensure that all generators of hazardous waste are managing hazardous waste in accordance with their statutory obligations and should be repeated periodically during the period of the Plan. The Environmental Enforcement Network may be an appropriate means of co-ordinating concerted actions, procedures and protocols. Recommendations for supporting mechanisms for hazardous waste sectoral enforcement should be made via the environmental enforcement network.

Responsible: Local authorities

16. Commence a hazardous waste producer responsibility project in 2008 and implement the project over the five-year period of the Plan. Assessments of potential new producer responsibility obligations, including the need for legislation or management bodies, on foot of detailed studies into priority waste streams, should be made during the project.

Responsible: Department of the Environment, Heritage and Local Government

17. Investigate the potential, commencing in 2008, for developing a national contract or other means for the cost effective collection of waste laboratory chemicals from schools.

Responsible: Department of Education and Science

18. Commence development of a programme in 2008 to ensure very small-scale healthcare waste arisings, including used, unused and out-of-date medical supplies from public health nurses and self-administering patients, is collected for proper disposal.

Responsible: Health Service Executive

19. Develop guidance or take alternative appropriate steps, commencing in 2008, to assist vessel owners, harbour officials and competent authorities to plan for and manage ship-generated waste in accordance with relevant legislation.

Responsible: Department of Transport and Marine

Infrastructure and self-sufficiency

20. Commission a study in 2009 to clarify the technical and economic aspects of providing hazardous waste landfill capacity.

Responsible: Environmental Protection Agency

21. Keep under review the provision of hazardous waste landfill capacity, and, taking into account any recommendations that may be made in the EPA study (see recommendation 20 above), consider the use of appropriate economic or other instruments to ensure such capacity is provided, whether by the private or public sector, by 2012.

Responsible: Department of the Environment, Heritage and Local Government

22. Commission a study in 2009 on the treatment of waste solvents with particular regard to the potential for solvent recycling.

Responsible: Environmental Protection Agency

23. Ensure that all-island considerations are taken into account in the implementation of recommendations 20 to 22.

*Responsible: Environmental Protection Agency and Department of the Environment,
Heritage and Local Government*

24. Commission a benchmarking and actions study for farm hazardous waste for completion by 2010 examining the initiatives currently underway by stakeholders and future needs and recommendations with regard to the generation, management, collection and treatment of farm hazardous waste.

Responsible: Environmental Protection Agency

25. Provide for, in regional planning guidelines and local area and county development plans, the co-ordinated management of contaminated soil where these plans include the redevelopment of docklands or other brownfield sites. Plans should, where technically and economically feasible and environmentally favourable, provide for the co-ordinated management of contaminated soil from the area as a whole from the

perspective of preferentially treating the soil *in situ* or at authorised facilities in Ireland, in preference to export, thus allowing for the use of treated soil in Ireland.

Responsible: Local authorities, regional authorities, An Bord Pleanála and other planning authorities

Regulatory

26. Keep under review the need to consolidate and reform existing regulations and make provision for new hazardous waste regulations where the need becomes apparent during implementation of this Plan.

Responsible: Department of the Environment, Heritage and Local Government

Old disposal sites, ports and harbours

27. Develop by 2010 a programme for the systematic identification, assessment and action planning for potentially contaminated harbour, port and marina sediments.

Responsible: Department of Transport and Marine

28. Identify, assess and, where necessary, remediate sites where hazardous waste was to a significant extent disposed of in the past. This action should conform with the Code of Practice prepared by the EPA's Office of Environmental Enforcement. Make new regulations to properly and effectively regulate this sector and bring these sites into compliance with the Waste Framework Directive.

Responsible: Local authorities and Department of the Environment, Heritage and Local Government

North-south initiatives

29. Explore, from 2008, with the appropriate Northern Ireland authorities the possible terms of reference of an informal North-South working group on hazardous waste that will identify barriers to co-operative approaches identified in the Plan and make recommendations to overcome those barriers.

Responsible: Department of the Environment, Heritage and Local Government

1 INTRODUCTION

This National Hazardous Waste Management Plan (hereafter referred to as “the Plan”) sets out the priorities to be pursued over the next five years and beyond to improve the management of hazardous waste in the Republic of Ireland. The primary objectives of the Plan are to:

- reduce the generation of hazardous waste by industry and society generally;
- minimise unreported hazardous waste with a view to reducing the environmental impact of this unregulated waste stream;
- strive for increased self-sufficiency in the management of hazardous waste and to reduce hazardous waste export; and
- minimise the environmental, social and economic impacts of hazardous waste generation and management.

The Plan was prepared in accordance with Section 26 of the Waste Management Acts, 1996 to 2008. The Environmental Protection Agency is required to produce a National Hazardous Waste Management Plan that has regard to:

- the prevention and minimisation of hazardous waste;
- the recovery of hazardous waste;
- the collection and movement of hazardous waste; and
- the disposal of such hazardous waste as cannot be prevented or recovered.

The Plan must be reviewed at least once every five years. The first National Hazardous Waste Management Plan (the First Plan) was published by the EPA in 2001. Its review commenced in 2006 and this Plan is the result of that review.

A preliminary consultation phase was held in 2006 and a total of 33 submissions were received. A second consultation phase was held in 2007/8 on the Proposed (draft) National Hazardous Waste Management Plan. A total of 60 submissions were received. Appendix A lists the submissions received during both consultation periods and outlines the principal issues raised in the submissions.

1.1 What can be achieved through this Plan

The National Hazardous Waste Management Plan makes recommendations, in accordance with section 26(2) of the Waste Management Acts, 1996 to 2008, for actions and infrastructure that the Environmental Protection Agency considers necessary and appropriate. The recommendations are based on an analysis of statistical data and the policy and

business environment surrounding hazardous waste management. However, there are certain public policy constraints that were taken into account in preparing the Plan.

First, current policy indicates that large-scale public investment in hazardous waste infrastructure will not be made. The hazardous waste industry in Ireland is entirely owned and operated by the private sector. No public authorities are involved in the commercial collection of hazardous waste, the provision of storage facilities or the treatment of hazardous waste. The only exception is the provision of civic amenity sites by local authorities for the deposit of small quantities of household hazardous waste. There are two recommendations at variance with this general policy in the Plan with regard to (a) the use of civic amenity sites by business (chapter 4) and (b) the possible provision of hazardous waste landfill capacity (chapter 6). These are indicated in the Plan as a clear strategic need and arise from a lack of realistic alternatives.

Second, the EPA, the public sector generally and the Plan can only seek to influence, but not control, private sector investment decisions. Therefore, options for private sector investment are presented solely as options and no attempt is made to evaluate the actual economic feasibility of potential investments. Environmental aspects of options were evaluated in the *Environmental Report relating to the Strategic Environmental Assessment of the Proposed National Hazardous Waste Management Plan* (www.epa.ie). Certain recommendations are made from these options where, in the opinion of the EPA, they are appropriate and necessary if the Plan's objectives are to be achieved. Proposals for hazardous waste management infrastructure would however be expected to have regard to the Plan and any proposals would be expected to describe how the overarching objectives of the Plan will be met.

Additionally, in order to be granted a waste licence or permit, operators must demonstrate, amongst other things, that environmental pollution will not be caused by the operation of a proposed facility. Protection of the environment and human health is assured by this process.

The Plan can seek to have influence over the implementation by public bodies of the Plan's recommendations, as provided for in section 26(5) of the Waste Management Acts 1996 to 2008. Considerable investment by local authorities in fixed hazardous waste collection facilities and enforcement activities is required if the Plan's objectives are to be met. It is essential that local authorities receive the funding and support required to implement these recommendations. Other, less capital- and resource-intensive, activities are proposed for other Government departments and public bodies, and it is considered reasonable to presume that such recommendations can and will be implemented in a timely manner.

The EPA, through this Plan, encourages the development and introduction of new and innovative technologies and techniques for treating hazardous waste where they meet legislative, policy and BAT criteria.

1.2 Structure of the document

Chapter 2 outlines the EU and national legislation governing and influencing the management of hazardous waste and summarises recommendations for new regulations made in the Plan.

Chapter 3 profiles the generation and management of hazardous waste in Ireland. The Plan divides hazardous waste into three broad categories and themes:

A. “Unreported” hazardous waste

An estimated 29,888 tonnes of hazardous waste from households, small business and farms was classified as unreported in 2006. That is, it does not appear to enter the formal hazardous waste management net and is not managed by the authorised hazardous waste management industry. Therefore, for the most part, it is assumed to be unmanaged. In other words, it is most likely that it is mixed in with general refuse and ends up, inappropriately, in landfill. There are exceptions to this. Sheep dip is landspread according to guidelines² issued by the Department of Agriculture, Fisheries and Food. However this disposal of a hazardous waste is undocumented³, and is therefore classified for the purposes of this Plan as *unreported*. The Plan’s proposed priority for unreported hazardous waste is to ensure its proper collection or management. Recommendations are made in chapter 4 for the use of civic amenity sites and producer responsibility initiatives to capture this unreported hazardous waste. Once in the formal management system, proper treatment will follow. The challenge is to get this diverse and varied waste stream into the system in the first place.

B. Managed hazardous waste (industrial and other)

The largest quantity of hazardous waste is generated by Irish industry. Industry as a rule engages the services of authorised, professional hazardous waste contractors. Generally, both waste generators and waste contractors operate in compliance with their respective IPPC and waste licences and with their general regulatory obligations. Any infractions are dealt with as licence non-compliances and are enforced and prosecuted as appropriate. There are no generally known compliance or enforcement issues associated with these practices.

There are however two issues to be addressed with regard to this managed hazardous waste stream. First, the generation of certain categories of hazardous waste could be reduced, and an ambitious prevention programme is proposed that will prioritise the larger hazardous waste generating sectors for intensive study and engagement. Chapter 5 sets out a prevention plan for priority industrial and commercial sectors and also the household sector. Second, in 2006, 47% of Irish hazardous waste (not including contaminated soil) was exported for treatment

² *Specification for REPS planners in the Preparation of REPS 4 Plans*, Department of Agriculture and Food, undated.

³ The REPS guidelines (footnote 2) do not specify that the location, date or conditions of landspreading be recorded. However the *Groundwater Inspection Report Form* for cross-compliance inspections asks “are records maintained to verify that the spent sheep dip has been disposed of by landspreading or removal from the farm”.

and much of this waste could conceivably be treated at equivalent facilities in Ireland. Irish industry faces a choice: support the development by the waste industry of indigenous treatment facilities or continue exporting. Chapter 6 explores the available options for the increased treatment of hazardous waste in Ireland.

C. Contaminated soil and other legacy issues

Contaminated soil is generated incidentally to the redevelopment of some urban brownfield sites. Most notably the Dublin Docklands redevelopment has generated large quantities of contaminated soil due to the historic usage of the area. The Cork Docklands redevelopment is also expected to generate similarly large quantities. Smaller quantities arise on an ongoing basis from the redevelopment of old fuel filling stations, from minor oil leaks and other sources. The generation of this waste stream cannot be prevented – it has come about as a result of historical activities – but it can be, and generally is, managed properly. Chapter 7 considers the options for reducing the large-scale export of contaminated soil for treatment and developing local treatment alternatives. Chapter 7 also updates the policy and practice for dealing with the legacy of closed landfills, and introduces the issue of contaminated sediments in Irish ports and harbours.

Chapter 8 on implementation concludes with an overview and summary of the recommended actions to address the issues discussed in earlier chapters. A number of objectives, targets and indicators are proposed to monitor the Plan's implementation. An implementation schedule is provided with recommended actions identified for EPA, Government departments, local authorities and other public bodies. An assessment of the consequences of doing nothing is also provided in this chapter. A statement on the resources needed to implement the Plan is made and an annual reporting schedule is proposed.

1.3 Radioactive waste

Although strictly speaking outside the scope of the National Hazardous Waste Management Plan⁴, Appendix G provides information on the issue of radioactive waste. The Radiological Protection Institute of Ireland has indicated that there is a deficit in the provision of services to ensure the collection and management of radioactive waste. In particular the RPII identifies issues with legacy radioactive waste (sources that were in use since before the early 1990s and have now reached the end of their useful life).

⁴ See section 3 of the Waste Management Acts 1996 to 2008.

1.4 The objectives of this Plan

Section 26 of the Waste Management Acts, 1996 to 2007, sets out the overarching objectives for the National Hazardous Waste Management Plan. Having regard to these objectives, the following objectives are proposed as priorities for the Plan for the period 2008-2012.

1. To reduce the generation of hazardous waste by industry and society generally.
2. To minimise unreported hazardous waste with a view to reducing the environmental impact of this unregulated waste stream.
3. To strive for increased self-sufficiency in the management of hazardous waste and to reduce hazardous waste export.
4. To minimise the environmental, social and economic impacts of hazardous waste generation and management.

1.5 Strategic Environmental Assessment

An Environmental Report was prepared and contains the findings of an assessment of the likely significant effects on the environment of implementing the Plan. The Environmental Report formed part of the consultation package for the Proposed Plan. It is available to download from www.epa.ie and was presented for public consultation alongside the Proposed Plan. The Environmental Report fulfils the requirements of the Strategic Environmental Assessment Directive (2001/42/EC)⁵ and the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004, S.I. No. 435 of 2004. Best practice was followed throughout the process and relevant published guidance followed. Figure 3 shows the principal steps in carrying out a strategic environmental assessment (SEA). As the final step in the SEA process, an SEA Statement is published with the National Hazardous Waste Management Plan. The statement describes how the EPA took the consultations and the strategic environmental assessment into account in its preparation of the Plan and describes the monitoring measures that will be adopted.

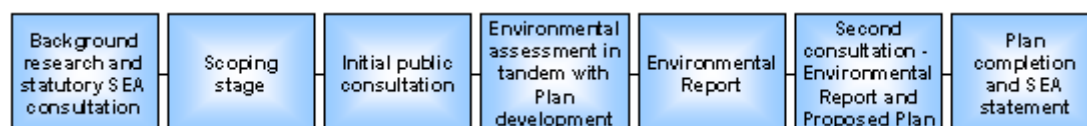


Figure 3 Summary of strategic environmental assessment stages

⁵ Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment, OJ L 197, 21.7.2001, p. 30-37

1.6 Implementation of the First Plan

The First Plan (2001-2006) set out a number of recommendations for the prevention, collection and treatment of hazardous waste and set a target with regard to the disposal of hazardous waste. A report⁶ on the Plan's implementation was prepared in 2004 and notes that "overall, any progress with regard to the Plan's recommendations has been achieved in an unplanned and uncoordinated way." However, a number of improvements have accrued since the Plan's publication in 2001, for example:

- the National Waste Prevention Programme, recommended in the First Plan, includes several projects that will impact on the generation of hazardous waste, including:
 - the Hazred⁷ project recruited SMEs for hazardous waste prevention projects in Ireland,
 - the Local Authority Prevention Demonstration Programme has directly funded dedicated staff in 14 local authorities to build their capacity in promoting and achieving waste prevention in their areas,
 - the Green Business Initiative which is currently in development is expected to have a significant impact on Irish businesses' waste generation and management practices, and
 - An Taisce's Green Home project, supported by the EPA through the National Waste Prevention Programme, aims to promote good environmental practice and waste prevention principles in households;
- in response to commitments made in regional and local waste management plans, a large number of local authority areas are served by comprehensive drop-off facilities for household hazardous waste, mobile collection services and, in some instances, commercial hazardous waste services;
- at least three local authority green business officers are active and other environmental awareness (education) officers are actively engaging with householders and business on waste prevention;
- the hazardous waste management industry has increased its capacity and some companies are actively seeking and evaluating new opportunities.

Table 1 sets out the status up to 2008 with regard to implementation of the First Plan's nine priority recommendations and three long-term priorities. It is essential that this replacement

⁶ National Hazardous Waste Management Plan Implementation Committee – Annual Report – Submitted to the Minister for the Environment, Heritage and Local Government, 6 August 2004. (www.epa.ie)

⁷ www.hazred.org.uk

Plan is more actively promoted and implemented. To this end, resources, responsibilities and timelines are proposed for recommended actions. Responsible bodies will be asked to provide updates on progress for periodic reports on the Plan's implementation.

Table 1 Implementation of First Plan recommendations

| Priority | Position in 2008 |
|--|--|
| 1. The establishment of an Implementation Committee. | The National Waste Prevention Committee has met 10 times since July 2004. |
| 2. The establishment of a Prevention Team to implement the Prevention Programme for hazardous waste. | <p>A National Waste Prevention Programme (NWPP) was launched in April 2004 and is implemented by a Core Prevention Team within the Environmental Protection Agency. Several initiatives are underway, including:</p> <ul style="list-style-type: none"> • Local Authority Prevention Demonstration Programme (2 phases, involving 14 local authorities) • Greenbusiness.ie website and business support service • Green Hospitality Award, for the hotels sector • Green homes programme, operated by An Taisce and supported by the NWPP • Packaging prevention programme, operated by Repak and supported by the NWPP |
| 3. The identification and elimination of unreported hazardous waste. | <p>Unreported hazardous waste reduced by 51% between 1996 and 2001 to 48,402 tonnes.</p> <p>Estimated at 47,011 tonnes in 2004 and 29,888 tonnes in 2006.</p> |
| 4. The identification and assessment of hazardous waste disposal sites. | Progress has been slow and unsystematic. To accelerate and assist progress, the EPA's Office of Environmental Enforcement prepared a <i>Code of Practice for Environmental Risk Assessment for Unregulated Waste Disposal Sites</i> ⁸ in 2007. |
| 5. Establishment of an improved collection infrastructure for hazardous household, agricultural and SME wastes. | <p>Civic waste facilities are increasing in number and all now accept small-scale hazardous waste to a greater or lesser extent.</p> <p>A mobile collection service was used by 18 local authorities in 2003 and 15 local authorities in 2006.</p> <p>Producer responsibility for waste electrical and electronic equipment ensures the availability of facilities for hazardous WEEE, including fridges and freezers, cathode ray tubes (televisions and monitors) and fluorescent lamps.</p> |
| 6. The allocation of financial and technical assistance for the development of hazardous waste recovery and disposal facilities. | <p>No grant aid has been provided to the private sector for the recovery and disposal of hazardous waste since the 1997 grant-aid applications round.</p> <p>No further assistance programmes were put in place.</p> |

⁸ <http://www.epa.ie/whatwedo/advice/waste>.

| Priority | Position in 2008 |
|--|---|
| 7. The development of hazardous waste landfill and thermal treatment capacity for hazardous wastes requiring disposal to achieve self-sufficiency. | No hazardous waste landfill has been proposed. A proposal by Indaver Ireland for a hazardous waste incinerator in Ringaskiddy has been granted planning permission and an EPA licence. |
| 8. Improved public awareness of the impacts of hazardous wastes. | The availability of local authority facilities for household hazardous waste, and the use of the chemcar service in some regions, will improve public awareness generally. Other new regulations, such as those controlling the use of solvent in vehicle refinishing, dry cleaning and paint products will improve business awareness. The waste electrical and electronic equipment regulations, and the new batteries regulations, have and will generate public awareness of these waste streams. |
| 9. Build on on-going prevention, research and demonstration initiatives. | Examples of ongoing initiatives include: Environmentally Superior Products Programme (Enterprise Ireland) Environmental Management Systems Grants (Enterprise Ireland) A third phase of the Cleaner Greener Production Programme was launched under the Environmental Technologies Action Programme. A case studies initiative was commenced in 2007 under the National Waste Prevention Programme to generate and disseminate prevention case studies. |
| Long-term priorities | |
| 1. The achievement of self-sufficiency in hazardous waste management. | Export volumes remain high as a proportion of total generation of hazardous waste. There have been marginal increases in on-site and off-site treatment in Ireland. WEEE treatment in Ireland is increasing. |
| 2. No increase in hazardous waste disposed of over 1996 quantities. | Hazardous waste disposal was: <ul style="list-style-type: none"> • 125,629 tonnes in 2001, • 161,430 tonnes in 2004, and • 149,063 tonnes in 2006. |
| 3. The qualitative reduction (i.e. reduction in the degree of hazard) of hazardous waste. | The ROHS ⁹ , WEEE ¹⁰ , ELV ¹¹ , deco-paints ¹² , packaging ¹³ and batteries ¹⁴ directives restrict the use of certain hazardous substances in a wide range of products. |

⁹ Directive on restriction on hazardous substances – see chapter 2 for more details.

¹⁰ Directive on waste electrical and electronic equipment – see chapter 2 for more details.

¹¹ Directive on end-of-life vehicles – see chapter 2 for more details.

¹² Directive 2004/42/CE of the European Parliament and of the Council of 21 April 2004 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC.

¹³ European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste.

2 HAZARDOUS WASTE LEGISLATION

The management of hazardous waste is governed by comprehensive legislation. The legislation principally originates in EU directives and regulations and is implemented in Ireland by the Waste Management Acts 1996 to 2008, related statutory instruments, and other acts. This chapter provides a listing of the principal EU and Irish statutes governing:

- (a) requirements to prevent hazardous waste and restrict the use of hazardous substances in products;
- (b) the management of hazardous waste that is generated; and
- (c) regulation of the waste management and brokerage industries.

European legislation can be downloaded at <http://eur-lex.europa.eu>. Consolidated versions are often provided that incorporate amendments made to directives and regulations. Irish legislation is available at www.irishstatutebook.ie/. A useful guide to Irish waste legislation is provided by Enterprise Ireland at www.envirocentre.ie.

2.1 European framework for regulating waste and hazardous waste

Waste management at EU level is regulated by the waste framework directive (2006/12/EC)¹⁵. Some of the key provisions of the waste framework directive require that Member States:

- take steps to encourage the prevention of waste and the recovery of waste;
- ensure that waste recovery and disposal takes place without endangering human health or causing environmental pollution;
- “take appropriate measures, in cooperation with other Member States where this is necessary or advisable, to establish an integrated and adequate network of disposal installations, ... [enabling] the Community as a whole to become self-sufficient in waste disposal and the Member States to move towards that aim individually, taking into account geographical circumstances or the need for specialised installations for certain types of waste”;
- draw up waste management plans;
- ensure that waste activities obtain a permit or licence, maintain records and are periodically inspected;

¹⁴ Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC.

¹⁵ Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste. This directive is a codification (or consolidation or clarification) of the provisions of the existing waste directive 75/442/EC, as amended, which is now repealed.

- ensure that waste brokers and dealers are registered;
- implement the polluter pays principle which states that “the cost of disposing of waste must be borne by (a) the holder who has waste handled by a waste collector or [waste facility] and/or (b) the previous holders or the producer of the product from which the waste came”; and
- report on the directive’s implementation every three years.

Additional provisions specifically regulating hazardous waste are provided for in the hazardous waste directive¹⁶. These additional provisions require that Member States:

- ensure that hazardous wastes of different categories are not mixed with each other or with non-hazardous waste by operators who recover, dispose, collect and transport hazardous waste, except under specific authorisation;
- ensure that producers of hazardous waste are subject to appropriate periodic inspections and maintain records on hazardous waste production and management;
- ensure that hazardous waste is properly packed and labelled during collection, transport and temporary storage;
- put in place a consignment note system for the transfer of hazardous waste;
- draw up hazardous waste management plans; and
- inform the Commission annually on operational facilities for the recovery or disposal of hazardous waste.

The directive on waste oils¹⁷ requires that Members States, in addition to the above provisions,:

- “give priority to the processing of waste oils by regeneration ... where technical, economic and organisational constraints allow”;
- ensure that the combustion or disposal of waste oils is carried out under environmentally acceptable and safe conditions;
- take measures to ensure the prohibition of any discharge of waste oils to water, deposit to soil and air pollution from waste oil processing; and
- “carry out public information and promotional campaigns to ensure that waste oils are stored appropriately and collected as far as possible”.

These three directives - waste framework, hazardous waste and waste oils – are the subject of review at present and political agreement has been reached to enable provisions to be combined into a new consolidated waste framework directive designed to reflect modern

¹⁶ Council Directive of 12 December 1991 on hazardous waste (91/689/EEC), amended by Council Directive 94/31/EC.

¹⁷ Council Directive of 16 June 1975 on the disposal of waste oils (75/439/EEC), amended by Council Directive 87/101/EC.

policy and legislative developments. The revised waste framework directive will enter into force twenty days after its publication in the Official Journal of the European Union and it will inform decisions to be made during this Plan's implementation.

The following EU directives and regulations are also of relevance to the National Hazardous Waste Management Plan and in the prevention (principally by restriction of hazardous substances) and management of hazardous waste generally.

- Integrated pollution prevention and control directive¹⁸ - which sets out the licensing procedures and criteria for scheduled activities. All IPPC licences make specific provision for the prevention of waste and for its proper management.
- Waste incineration directive¹⁹ - which sets out the conditions for the authorisation and operation of waste incineration and co-incineration facilities.
- Solvents directive²⁰ - which limits solvent emissions from certain activities and forms the basis for the Accredited Inspection Contractor (AIC) scheme in Ireland;
- Decorative paints directive²¹ - which limits the solvent content of several classes of paint product. An AIC scheme is in place to monitor vehicle refinishing activities.
- PCB (polychlorinated biphenyls) directive²² - requiring the disposal of PCBs and the decommissioning of equipment containing PCBs.
- WEEE (waste electrical and electronic equipment) directive²³ - imposing a producer responsibility obligation in respect of WEEE, several categories of which are classified as hazardous waste.
- ROHS (restriction of hazardous substances) directive²⁴ - restricting the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE) in new electrical and electronic equipment.
- End-of-life vehicles directive²⁵ - putting in place new obligations with regard to the restriction of use of certain hazardous substances in vehicles and the collection, treatment, reuse and recovery of end-of-life vehicles.

¹⁸ Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control.

¹⁹ Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste.

²⁰ Council Directive 1999/31/EC of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations.

²¹ Directive 2004/42/CE of the European Parliament and of the Council of 21 April 2004 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC

²² Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT).

²³ Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE)

²⁴ Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

- Batteries directive²⁶ - putting in place new obligations with regard to the restriction of use of certain hazardous substances and the placing on the market, collection, treatment and recycling of batteries.
- Packaging directive²⁷ - restricts the concentration of heavy metals lead, cadmium, mercury and hexavalent chromium in packaging. Packaging essential requirements are set out such that packaging is so manufactured that the presence of noxious and other hazardous substances and materials as constituents of the packaging material or of any of the packaging components is minimized with regard to their presence in emissions, ash or leachate when packaging or residues from management operations or packaging waste are incinerated or landfilled.
- Transfrontier shipment of waste regulation²⁸ - imposes controls on the import, export and transit of waste, including hazardous waste.
- Animal remedies directive²⁹ - putting in place appropriate collection systems for veterinary medicinal products that are unused or expired.
- REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) Regulation³⁰ – applies to the identification of the properties of chemicals, the provision of safety information and calls for progressive substitution of dangerous chemicals as suitable alternatives are identified.
- Port reception facilities directive³¹ - applies to all ships, including fishing vessels and recreational craft, and aims to reduce the discharge of ship-generated waste and cargo residues into the sea by improving the availability and use of port reception facilities.
- Ozone depleting substances regulation³² – prohibits and restricts the use of 'controlled substances' that have the potential to deplete the ozone layer.

²⁵ Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles.

²⁶ Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC.

²⁷ European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste.

²⁸ Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste.

²⁹ Directive 2001/82/EC of the European Parliament and of the Council of 6 November 2001 on the Community code relating to veterinary medicinal products.

³⁰ Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

³¹ Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues.

³² Regulation (EC) No 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer.

- F-gas regulation³³ - controls fluorinated greenhouse gases through containment and prevention of emissions.
- POPs (Persistent Organic Pollutants) Regulation³⁴ - sets out the requirements for the prohibition, management, monitoring and control of persistent organic pollutants.
- PRTR Regulation³⁵ - sets out the requirements for a European Pollutant Release and Transfer Register.

2.2 New classification of hazardous waste

Several categories of waste were newly classified as hazardous waste on 1 January 2002 on publication of the new European Waste Catalogue³⁶ by the European Commission. The reclassifications of greatest impact are:

- end-of-life vehicles - classified as hazardous waste until they have been depolluted in accordance with the end-of-life vehicles directive;
- asbestos-based construction materials – all asbestos waste is now classified as hazardous waste;
- packaging containing residues of or contaminated by dangerous substances;
- absorbents, filter materials, wiping cloths and protective clothing contaminated by dangerous substances;
- discarded equipment containing CFC, HCFC, HFC, asbestos and other dangerous substances – this also refers to waste electrical and electronic equipment containing these substances;
- construction and demolition waste containing dangerous substances;
- healthcare chemicals, cytotoxic and cytostatic medicines and amalgam waste from dental care; and
- wastes from waste treatment processes containing dangerous substances.

³³ Regulation (EC) No 842/2006 of the European Parliament and of the Council of 17 May 2006 on certain fluorinated greenhouse gases.

³⁴ Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC.

³⁵ Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC

³⁶ Commission Decision of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste. The Decision has been amended three times by Commission Decision 2001/118/EC, Commission Decision 2001/119/EC and Council Decision 2001/573/EC.

The new catalogue introduces so-called “mirror entries” to the list. These allow for certain wastes to be assessed as hazardous or non-hazardous waste depending on the presence at prescribed concentrations of dangerous substances. The following example illustrates how mirror entries are presented:

- 17 05 03* soil and stones containing dangerous substances
- 17 05 04 soil and stones other than those mentioned in 17 05 03

The asterisk signifies a hazardous waste. The presence of dangerous substances in a waste, a contaminated soil in this case, imposes a hazardous waste classification. The waste producer may choose to seek to demonstrate through analysis that the substances are present in concentrations not exceeding prescribed threshold values. A hazardous waste classification tool³⁷ was prepared by the EPA to assist in the process of classifying hazardous waste.

A consolidated version of the European Waste Catalogue³⁸ was published by the EPA and is available at www.epa.ie. No specific amendments to the catalogue are signalled at present. A review of the catalogue is being carried out by the European Commission, and this may lead to amendments to the catalogue. A globally harmonised system for the classification, labelling and packaging of substances and mixtures, currently being negotiated by the EU Commission, is likely to have implications for hazardous waste classifications.

2.3 National legislation for hazardous waste

The Waste Management Acts, 1996 to 2008, provide the framework for waste and hazardous waste management in Ireland. The transposition of EU waste directives is enacted for the most part through these Acts. The Environmental Protection Agency Act, 1992, provides the framework for several other EPA functions including the issuing of IPPC licences.

The following regulations govern the production and management of hazardous waste³⁹.

- Waste Management (Hazardous Waste) Regulations, S.I. No. 163 of 1998 – makes certain provisions for the supply of batteries; the management and disposal of polychlorinated biphenyls, waste asbestos and waste oils; imposes record-keeping obligations on hazardous waste producers; and prohibits the mixing of hazardous wastes.
- Waste Management (Licensing) Regulations, S.I. No. 395 of 2004 – provide for the issuing and enforcement of waste licences by the EPA.

³⁷ Available at <http://www.epa.ie/whatwedo/resource/hazardous/class/>.

³⁸ *European Waste Catalogue and Hazardous Waste List – Valid from 1 January 2002*, EPA, 2002.

³⁹ Acts and statutory instruments can be downloaded at www.irishstatutebook.ie or purchased from Government Publications 01 6793513.

- Waste Management (Facility Permit and Registration) Regulations, S.I. No. 821 of 2007 – provide for the issuing and enforcement of waste facility permits and certificates of registration for prescribed activities.
- Waste Management (Collection Permit) Regulations, S.I. No. 820 of 2007 – provide for the issuing and enforcement of waste collection permits on a regional basis by local authorities.
- Waste Management (Movement of Hazardous Waste) Regulations, S.I. No. 147 of 1998 – provide for regulating the movement of hazardous waste by local authorities and the use of C1 consignment notes for point-to-point transfers of hazardous waste within the State. Replacement regulations are expected.
- Waste Management (Shipments of Waste) Regulations, S.I. No. 419 of 2007 – implement the EU TFS Regulation 1013/2006 and nominate Dublin City Council as sole competent authority in respect of the export into, import from and transit of waste through Ireland.
- Waste Management (Planning) Regulations, S.I. No. 137 of 1997 – provide for, in part, the relationship between this Plan and local and regional waste management plans.
- Waste Management (Electrical and Electronic Equipment) Regulations, S.I. No. 290 of 2005 – amend the Waste Management Act to give legislative effect to the WEEE and ROHS directives.
- Waste Management (Waste Electrical and Electronic Equipment) Regulations, S.I. No. 340 of 2005 – implement the provisions of the WEEE directive in Ireland.
- Waste Management (Restriction of Certain Hazardous Substances in Electrical and Electronic Equipment) Regulations, S.I. No. 341 of 2005 – implement the provisions of the ROHS directive in Ireland.
- The Control of Substances that Deplete the Ozone Layer Regulations, S.I. No. 281 of 2006 – make provisions for the full and effective implementation of EU Regulation No 2037/2000 on substances that deplete the ozone layer.
- Animal Remedies Regulations, S.I. No. 734 of 2005 – made by the Minister for Agriculture and Food - these regulations require a retail take back system be put in place for unused or out of date animal remedies.
- European Communities (Port Reception Facilities for Ship-generated Waste and Cargo Residues) Regulations, S.I. No. 117 of 2003 – made by the Minister for Communications, Marine and Natural Resources, these regulations oblige harbour masters and port authorities to prepare waste management plans for the management of ship-generated waste and cargo residues at Irish ports and harbours.
- Waste Management (Batteries and Accumulators) Regulations, 2008, S.I. No. 268 of 2008 – implement the batteries directive in Ireland.

2.4 Recommended new regulations

Several new regulatory obligations are recommended in the Plan. It is recommended that the need for a consolidated set of regulations be kept under review to amalgamate certain existing provisions of existing regulations and to provide for new obligations. Any new regulations should at least replace the articles of the existing Waste Management (Hazardous Waste) Regulations (S.I. No. 163 of 1998) that remain relevant and consider the introduction of the following new obligations (and other provisions that may arise):

- reduce the waste oils reporting threshold, subject to the outcome of the awareness raising and enforcement pilot proposed in section 4.2.1.1 of the Plan, from 500 litres per annum – to facilitate the regulation of a greater number of garages; and
- introduce hazardous farm waste obligations subject to the outcome of the farm waste study recommended in section 4.2.1.2 of the Plan – to facilitate the regulation, and particularly the collection, of farm waste.

In relation to the collection and transport of hazardous waste the following items should be addressed by legislation:

Every movement of hazardous waste within the State must be accompanied by a “C1” consignment note. The regulations covering C1 notes are inconsistently applied by different local authorities, particularly with regard to the fees charged, and this creates difficulties for businesses. Reform of the system has been signalled by the Department of the Environment, Heritage and Local Government and should be implemented without delay.

At present, the transport of even very small quantities of hazardous waste must be covered by a collection permit and this creates barriers to the commercial collection of certain very small hazardous waste streams (e.g. home-administered medical waste). The collection permit system should provide for a reasonable and proportional level of regulation for essential and approved small-scale services.

In relation to the management of historical waste disposal sites, new regulations should be developed to properly and effectively regulate this issue and bring these sites into compliance with the Waste Framework Directive (see section 7.2).

Any proposals for new national legislation governing hazardous waste should take into account the revision of the Waste Framework Directive currently underway and any other relevant legal provision not specifically mentioned here.

3 THE NATIONAL HAZARDOUS WASTE PROFILE

Information on hazardous waste generation and management presented in this chapter follows the categorisation made in chapter 1 – unreported hazardous waste (section 3.1), managed hazardous waste (section 3.2) and contaminated soil (arising as a legacy waste, section 3.2.3). The source of all data presented in this chapter is the national waste report⁴⁰, unless otherwise indicated. Additional detailed information on a number of specific hazardous waste streams is provided in Appendix D, commencing on page 125.

3.1 Unreported hazardous waste

An estimated 29,888 tonnes of hazardous waste were classified as unreported in 2006, that is, it was not managed by the formal hazardous waste management industry. By its definition, the undocumented fate of unreported hazardous waste means that it has the potential to have a greater environmental impact than reported hazardous waste. Some unreported waste may end up in general domestic or commercial waste, or it may be disposed of in an uncontrolled manner by burning, burying or discharge to sewer, water or ground. The characteristics and sources of unreported hazardous wastes are shown in Table 2. It is clear from the table that unreported hazardous waste is characterised by wastes that originate from numerous small-scale sources. The generation of spent sheep dip has reportedly decreased significantly in recent years and this decrease is attributed to a decrease in the number of sheep and the increased use of pour-on products in smaller flocks. Chapter 4 proposes actions for the improved collection of hazardous waste with a focus on small-scale generators.

Unreported hazardous waste is estimated by two main methodologies:

- *Mass flow analysis*: There is a direct relationship between the use of certain products and the amount of hazardous waste that arises as a result of their use. Central Statistics Office data on imports and exports, combined with data on indigenous production, allowed estimates to be made of the sale of certain products and hence the likely level of waste generation. Examples are batteries and lubrication oil.
- *Examination of hazardous waste arisings in other countries*: For some sectors, no comprehensive records exist in Ireland and quantities were estimated from factors derived from international data.

Other methodologies use data from a wide variety of sources, and on specific studies carried out on certain products or hazardous waste streams.

⁴⁰ National waste (database) reports for the years 1995, 1998 and 2001 to 2006 are available at www.epa.ie/whatwedo/resource/hwr/.

Table 2 Characteristics and estimated scale of unreported hazardous waste in 2006

| Hazardous waste category | Characteristics | Estimated unreported in 2006 (tonnes) |
|---|--|--|
| Paint and ink packaging | Unused or surplus paint and ink from households, trade and industry. A poor collection infrastructure for householders and the trade contributes to the problem. | 7,513 |
| Small batteries ⁴¹ | Certain portable (consumer) batteries and button cells are hazardous waste, such as nickel-cadmium batteries and mercury cells. These are usually mixed in with non-hazardous batteries such as alkaline batteries, so the mixtures are classified as hazardous. Very little separate collection of batteries takes place. | 5,361 |
| Sheep dip | Organophosphate sheep dip, while declining, is still in substantial use. Spent dip is landspread and a code of practice is provided in REPS guidance ⁴² . | 3,600 |
| Fluorescent lamps | Tubes and compact fluorescent lamps (CFLs – low energy bulbs). Fluorescent lamps contain mercury. | ⁴³ 2,267 |
| Waste oils | Used engine and machine lubrication oil from garages, industry, DIY, maintenance etc. | 2,000 |
| Oil filters | Vehicle oil filters from the servicing of road vehicles. | 362 |
| Solvents | From dry cleaners and other small scale commercial users. | 220 |
| Lead acid batteries ⁴¹ | Lead is recovered from lead acid batteries for its market value, though not always at authorised outlets. Arising through unauthorised collection from garages or DIY. | 177 |
| Dental amalgam | Dental amalgam contains mercury. | 0.5 |
| Other household hazardous waste | A range of hazardous wastes are put in the bin and end up in landfill. For example, household chemicals, garden chemicals, cleaning agents, medicines and other materials. | 4,890 |
| Other agricultural hazardous waste | Comprising oily wastes, animal medicines and contaminated containers and others. Waste oils and other wastes are included in estimates above. | 3,218 |
| Other office and commercial waste | A wide range of product wastes, batteries, fluorescent lamps, printer inks and toner, cleaning agents, and other wastes. | 280 |
| Total estimated generation of unreported hazardous waste | | 29,888 tonnes |

⁴¹ The batteries directive (2006/66/EC) provides a greater number of classes of batteries than is presented here, including portable batteries, button cells, automotive batteries and industrial batteries.

⁴² *Specification for REPS planners in the Preparation of REPS 4 Plans*, Department of Agriculture and Food, undated.

⁴³ Claims are made for zero unreported fluorescent lamps waste to 992 tonnes. The figure will be further clarified in future reports.

3.2 Managed (reported) hazardous waste

A complete statistical dataset on reported hazardous waste generation and management is prepared every second year by the Environmental Protection Agency for the national waste report. The hazardous waste dataset is based on reports of hazardous waste treatment, and is comprised of three parts, with the data obtained from three different sources:

- on-site treatment of hazardous waste at integrated pollution prevention and control (IPPC) licensed facilities – data is obtained from annual environmental reports provided by licensed facilities;
- off-site treatment of hazardous waste at authorised facilities in Ireland – data is obtained from a survey questionnaire issued to authorised facilities; and
- exported hazardous waste – summary data is obtained and reported annually from records of notified waste exports held by local authorities.

3.2.1 Generation of specific hazardous waste categories

Table 3 provides key statistics in relation to the generation and management of the principal categories of hazardous waste generated by Irish industry and society. The figures are dominated by organic solvents generated principally by the pharmaceutical and chemical sectors.

Table 3 Location of treatment of reported hazardous waste, 2006

| Category | On-site at industry (tonnes) | Off-site in Ireland (tonnes) | Exported (tonnes) | Total (tonnes) |
|--|------------------------------|------------------------------|-------------------|----------------|
| Solvents | 31,141 | 1,821 | 39,058 | 72,020 |
| Solvents (halogenated, where specified) | 34,985 | 42 | 9,871 | 44,898 |
| Oil waste (mineral oil) | 315 | 26,091 | 1,169 | 27,575 |
| Industrial hazardous waste (other) | 3,753 | 2,441 | 11,801 | 17,995 |
| Salts and saltcake | 13,748 | | 10 | 13,758 |
| Healthcare risk waste | | 8,111 | 1,520 | 9,631 |
| Oily sludges | 18 | 11,671 | | 11,689 |
| Lead-acid batteries | | | 8,590 | 8,590 |
| Equipment (electrical, electronic, mechanical) | | * | 8,528 | 8,528 |
| Chemical waste (other) | 0.5 | 1,379 | 2,851 | 4,231 |
| Paint, ink and varnish waste (including packaging) | 4 | 928 | 3,045 | 3,977 |
| Acid and alkali waste | 6 | 2,923 | 3,685 | 6,614 |
| Asbestos waste | 11 | 2,524 | 5,294 | 7,829 |
| Aqueous washing liquids and mother liquors (07 __ 01*) | 3,533 | 1,005 | 21,842 | 26,380 |
| Solid wastes from MFSU of pharmaceuticals (07 05 13*) | 589 | 0 | 6,348 | 6,937 |
| Sludges and filter cakes | 92 | 249 | 5,147 | 5,488 |
| Batteries (small, non-lead acid) | | 23 | 346 | 369 |
| Packaging (contaminated or containing residues) | 90 | 144 | 881 | 1,115 |
| Photographic chemical waste | 1 | 220 | 1,315 | 1,536 |
| Oil filters | | 886 | | 886 |
| Construction and demolition waste (hazardous) | | | 40 | 40 |
| Metal- and heavy metal-containing waste | 68 | 42 | 1,597 | 1,707 |
| Absorbents, wiping cloths etc. (EWC 150202) | 38 | 0.3 | 843 | 881 |
| Fluorescent lamps | | 329 | 79 | 408 |
| Pesticides, herbicides | | | 54 | 54 |
| Laboratory and general chemical waste | 14 | 44 | 176 | 234 |
| Thermal treatment and combustion residues | | | 705 | 705 |
| Medicines | | | 20 | 20 |
| Municipal hazardous waste (other) | | 0.2 | 45 | 45 |
| Polychlorinated biphenyls | | | 43 | 43 |
| Total | 88,409 | 60,872 | 134,904 | 284,185 |

(source: National Waste Report 2006)

* A reported 5,746 tonnes of televisions and monitors (all types) were collected for treatment in Ireland in 2006. Only cathode ray tubes are classified as hazardous waste, not LCD or plasma displays.

3.2.2 Hazardous waste treatment

A summary of the reported location of treatment of hazardous waste (excluding contaminated soil) is presented in Table 4 and further detail is provided in Table 5. Figure 4 presents the long-term trend in the location of hazardous treatment from 1996 and this clearly shows that:

- the treatment of waste on-site at industrial facilities **increased** in 2006 after a decline over several years;
- the treatment of waste off-site in Ireland at authorised facilities is **increasing** steadily;
- the export of hazardous waste has been **decreasing** after a massive increase in exports between 1996 and 2003.

Table 4 Summary of hazardous waste management, 2001-2006

(all data in tonnes) (shaded cells indicate that data was not compiled in that year)

| Category | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---------------------|----------------|---------|---------|----------------|---------|----------------|
| On-site treatment* | 95,566 | | | 86,328 | | 88,409 |
| Off-site treatment* | 48,013 | | | 55,952 | | 60,872 |
| Exported* | 115,366 | 109,545 | 170,678 | 165,498 | 146,811 | 134,904 |
| Total | 258,945 | | | 307,778 | | 284,184 |

* Not including contaminated soil.

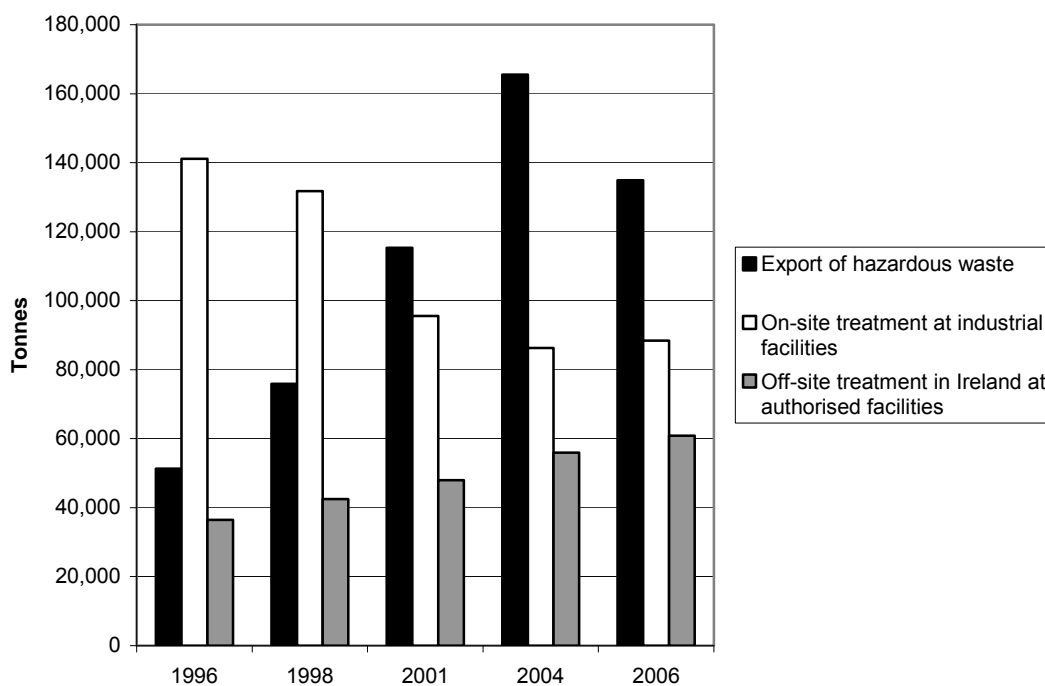


Figure 4 The location of hazardous waste treatment, 1996-2006

Table 5 Recovery and disposal of hazardous waste in 2006

| | Disposal or recovery activity | On-site | Off-site | Exported | Total |
|-----|---------------------------------------|----------------|-----------------|-----------------|----------------|
| D1 | Landfill | 13,748 | 2,524 | 11,685 | 27,957 |
| D4 | Impoundment | 18 | | 1 | 19 |
| D5 | Engineered landfill | | | 498 | 498 |
| D8 | Biological treatment | 479 | | 1,699 | 2,178 |
| D9 | Physico-chemical treatment | 499 | 31,372 | 1,709 | 33,579 |
| D10 | Incineration | 35,121 | | 47,854 | 82,976 |
| D13 | Blending or mixing | 0 | | 1,639 | 1,639 |
| D14 | Repackaging prior to disposal | 22 | | | 22 |
| D15 | Storage pending disposal | 150 | | 45 | 195 |
| | Sub-total disposal | 50,037 | 33,896 | 65,130 | 149,062 |
| R1 | Use as fuel | 9,919 | 5 | 14,805 | 24,729 |
| R2 | Solvent recovery | 25,956 | 1,840 | 16,477 | 44,273 |
| R3 | Organic substance recovery | 2,215 | | 5,596 | 7,811 |
| R4 | Metal recovery | 68 | 1,214 | 21,668 | 22,950 |
| R5 | Inorganic substance recovery | | | 2,650 | 2,650 |
| R6 | Regeneration of acids and bases | | | 2,150 | 2,150 |
| R8 | Recovery of components from catalysts | | | 89 | 89 |
| R9 | Oil recovery | 214 | 23,917 | | 24,131 |
| R12 | Waste exchange | | | 1,520 | 1,520 |
| R13 | Storage pending recovery | | | 4,560 | 4,560 |
| | Sub-total recovery | 38,372 | 26,976 | 69,515 | 134,863 |
| U | Unspecified | | | 259 | 259 |
| | | 88,409 | 60,872 | 134,903 | 284,184 |

There are four observations to be made on this high level data. First, the overall generation of hazardous waste increased by almost 10% between 2001 and 2006, with a spike observed in 2004. Between 2004 and 2006, an 8% decrease is observed. Second, the downward trend for on-site treatment of hazardous waste, evident up to 2004, ceased in 2006 and a slight increase is evident. Third, the treatment of hazardous waste off-site in Ireland at commercial facilities increased by 17% between 2001 and 2004 and 9% between 2004 and 2006. The treatment techniques employed are relatively small in scale compared to the scale of comparable exports. This is illustrated in Table 3 - with some notable exceptions, more of each category of waste is exported than is treated in Ireland. This may signify several things – the lack of return to justify larger capital investments; the lack of manufacturing industry commitment to large-scale indigenous investment by the waste industry; and the relative ease and cheapness of export particularly to large-scale infrastructure such as cement kilns,

incinerators and landfills abroad. Fourth, the reported disposal of hazardous waste decreased between 2004 and 2006 by 8% while recovery decreased by 14%.

3.2.2.1 On-site treatment at IPPC licensed facilities

In 2006, 23 IPPC-licensed facilities managed on-site treatment operations for hazardous waste and treated 88,149 tonnes of hazardous waste. The facilities and operations are presented in Appendix B (Table 24, page 119). By comparison, in 2004, 26 IPPC-licensed facilities treated 86,303 tonnes of hazardous waste on-site. IPPC-licensed operations are regulated and monitored by the EPA's Office of Environmental Enforcement in accordance with licence conditions. In the interest of reducing transport emissions and the export of hazardous waste, the promotion of on-site treatment of hazardous waste is recommended, primarily in the pharmachem sector, where this is technically and economically feasible and permissible by licence conditions (see chapter 5).

3.2.2.2 Off-site treatment in Ireland of hazardous waste

A total of nine facilities were licensed or permitted to treat hazardous waste and were operational in 2006. (A further six treat waste electrical and electronic equipment, some of which is classified as hazardous waste). Appendix C lists all licensed and operational facilities and the operations they engage in. All of these facilities are privately owned. The treatment of hazardous waste at these nine (non-WEEE) facilities steadily but slowly increased from 55,953 tonnes in 2004 to 60,872 tonnes in 2006, not including contaminated soil or WEEE. The increase includes more treatment of acid/alkali waste, solvents and general chemical waste since 2004. Almost all facilities report consistent increases in hazardous waste treatment volumes. In recent years, there has been considerable interest in the blending of waste solvents, and four facilities have been licensed by the EPA to blend solvents for use as fuel in cement kilns abroad (three are currently operational).

3.2.2.3 Export of hazardous waste

Since 2001, over 40% of the hazardous waste generated in Ireland each year has been exported for treatment. The rate of export increased from 22% in 1996 to 47% in 2006, with a spike of 54% in 2004 (see Figure 5). The principal destination is Great Britain, followed in descending order by Germany, Belgium and Denmark (see Figure 6 and Table 6). Further information on the export of specific hazardous waste streams is presented in chapter 5.

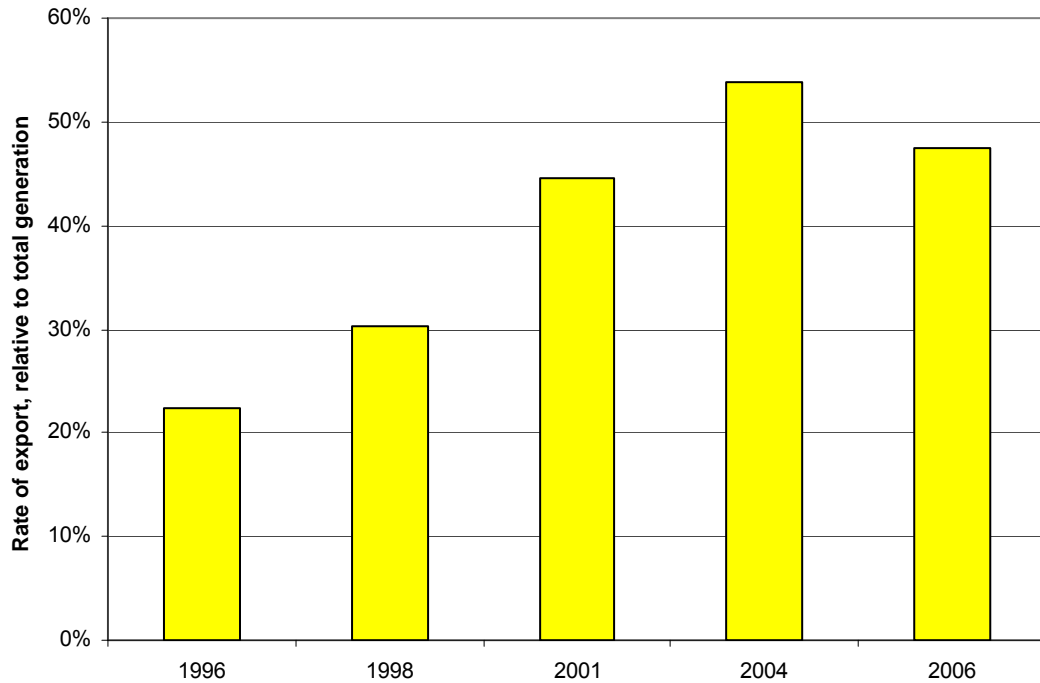


Figure 5 Rate of export of hazardous waste, 1996 to 2006
 (as a ratio of exports against treatment in Ireland – not including unreported hazardous waste and not including contaminated soil)

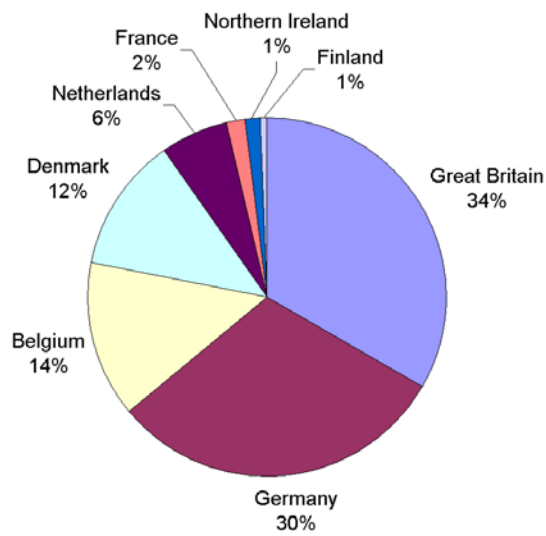


Figure 6 Destination of exported hazardous waste, 2006 (not incl. contaminated soil)

Table 6 Destination and fate of notified hazardous waste exports, excluding contaminated soil, 2006

| | Disposal (tonnes) | | | | | Recovery (tonnes) | | | | | Unspecified treatment (tonnes) | Total exports | |
|------------------|----------------------|---------------|-------------------------------|-------------------|-------------------|----------------------|---------------------|-------------------|-------------------|-------------------|--------------------------------------|----------------|--------|
| | Landfill | Incineration | Physico-chemical treatment | Other disposal | Total disposal | Use as fuel | Solvent recovery | Metal recovery | Other recovery | Total recovery | | Tonnes | % |
| Great Britain | | 4,539 | | | 4,539 | 6,243 | 15,666 | 12,347 | 6,063 | 40,319 | | 44,858 | 33.3% |
| Germany | 12,123 | 18,064 | 382 | 743 | 31,312 | 2,409 | 78 | 3,007 | 4,296 | 9,790 | | 41,102 | 30.5% |
| Belgium | | 8,524 | 803 | 952 | 10,280 | 3,868 | | 3,428 | 1,517 | 8,813 | | 19,093 | 14.2% |
| Denmark | | 15,665 | | | 15,665 | 1,150 | | | | 1,150 | | 16,815 | 12.5% |
| Netherlands | 60 | 519 | 524 | 1,688 | 2,791 | 291 | 144 | 57 | 4,602 | 5,093 | | 7,885 | 5.8% |
| France | | 0 | | | 0 | | 589 | 1,776 | | 2,365 | | 2,365 | 1.8% |
| Northern Ireland | | | | | | 844 | | 1,035 | | 1,879 | | 1,879 | 1.4% |
| Finland | | 543 | | | 543 | | | | | | 259 | 801 | 0.6% |
| Italy | | | | | | | | | 89 | 89 | | 89 | 0.1% |
| USA | | | | | | | | 19 | | 19 | | 19 | 0.0% |
| Total | 12,183 | 47,854 | 1,709 | 3,384 | 65,130 | 14,805 | 16,477 | 21,668 | 16,565 | 69,515 | 259 | 134,904 | 100.0% |

3.2.3 Industrial hazardous waste generation

The profile of industrial hazardous waste generation has not changed significantly since 2001. Its generation is dominated by the 'pharmaceutical and chemical' ("pharmachem") industry sector (62% of total industrial hazardous waste), with large contributions also from the non-metallic manufacturing sector (8%), the 'metal and metal products' manufacturing sector (7%), and the 'paper, printing and publishing' sector (6%). Table 7 shows industrial hazardous waste generation by sector in 2006. Figure 7 illustrates the overall trend in industrial hazardous waste generation since 1996 and the fact that industrial hazardous waste generation is gradually increasing. Chapter 4 sets out the Plan's objectives in relation to the prevention of hazardous waste, that is, a reduction in its gross generation.

It should be noted that this dataset is separate to that reported in sections 3.2.1 and 3.2.2 above. It is presented here to illustrate and compare the scale of hazardous waste generation by industrial sectors.

Table 7 Generation of hazardous waste by industry, 2006

| Sector | NACE code | 2006 Tonnes of hazardous waste generated (projected ⁴⁴) |
|--|------------|--|
| Chemicals, chemical products and man made fibres | DG | 168,179 |
| Other non-metallic mineral products | DI | 21,156 |
| Basic metals and fabricated metal products | DJ | 19,303 |
| Pulp, paper and paper products; printing, publishing | DE | 17,152 |
| Electrical and optical equipment | DL | 11,764 |
| Food | DA | 2,482 |
| Machinery and equipment not elsewhere classified | DK | 1,964 |
| Rubber and plastic products | DH | 1,866 |
| Textiles and textile products | DB | 1,343 |
| Transport equipment | DM | 1,333 |
| Wood and wood products | DD | 420 |
| Manufacturing not elsewhere classified | DN, DF, DC | 1,687 |
| Sub-total manufacturing | | 248,648 |
| Electricity, gas and water supply | E | 13,426 |
| Mining and quarrying | C | 9,929 |
| Total | | 271,999 |

⁴⁴ Projected means a total estimated generation of hazardous waste within a sector, based on data reported by companies within that sector, scaled up on the basis of a factor describing hazardous waste generated per employee in the sector as a whole.

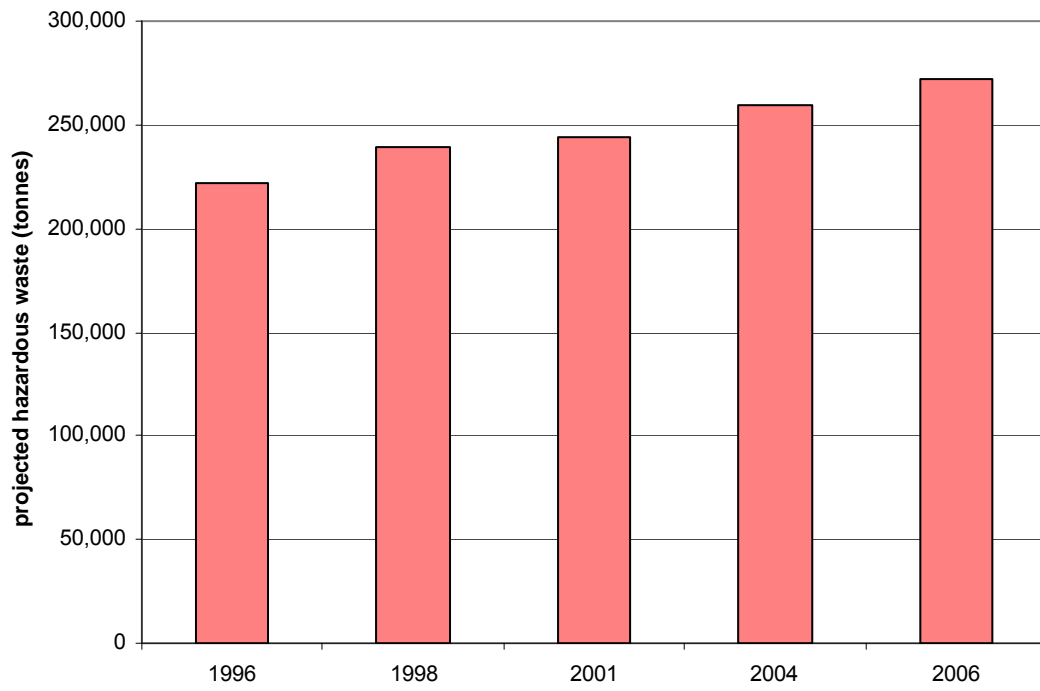


Figure 7 Trends in industrial hazardous waste generation, 1996 to 2006

3.3 Contaminated soil

The quantity of contaminated soil generated each year varies as it arises from the remediation and redevelopment of contaminated urban sites. Table 8 outlines contaminated soil generation, management and export since 2001. Envva's Portlaoise facility is authorised to treat up to 40,000 tonnes of contaminated soil each year. Any additional contaminated soil arising is treated on-site of generation or exported for treatment abroad. Treatment abroad can be as simple as screening to remove rubble or may involve other physical or biological processes. The post-treatment fate of exported contaminated soil includes construction use, landfill cover, landfill road construction or simply landfill disposal. Options for the treatment of contaminated soil in Ireland are presented in chapter 7.

Table 8 Management of contaminated soil, 1998-2006

| | 2001 (tonnes) | 2004 (tonnes) | 2005 (tonnes) | 2006 (tonnes) |
|--|-------------------------|-------------------------|-------------------------|-------------------------|
| Reported off-site treatment of contaminated soil | 168,579 | 221,137 | - | 406,904 |
| <i>Of which ...</i> | | | | |
| Treatment in Ireland | 8,636 (r) | 14,838 (r) | - | 36,872 (r) |
| Exported (total) | 159,943 | 206,299 | 140,442 | 370,032 |
| <i>Exported to:</i> | | | | |
| <i>Belgium</i> | 145,192 (r) | 22,531 (r) | | |
| <i>Germany</i> | 14,063 (r) | 172,948 (d) | 120,455 (d) | 341,158(d) 28,570(r) |
| <i>Netherlands</i> | | 10,691 (r) | | 305(r) |
| <i>Elsewhere in Europe</i> | 742 (r) | 126 (r) | 19,986 (d) | |

Note: (r) = predominantly recovery or recycling; (d) = predominantly disposal.

4 UNREPORTED HAZARDOUS WASTE

It is proposed that the problem of unreported hazardous waste is a key issue to be addressed during the period of the Plan. Chapter 3 illustrates the scale of the issue and shows that, in 2006, an estimated 29,888 tonnes of hazardous waste were classified as unreported. The problem of unreported waste is exacerbated by a lack of collection facilities for hazardous waste from a diverse range of sources, mostly small scale, including households, small businesses and farms. The challenge and particular priority for the Plan is to minimise and seek to eliminate the phenomenon of unreported hazardous waste. The solution to this problem is centred on providing comprehensive collection services and infrastructure, the availability of which needs to be widely and systematically publicised. This must be backed up by consistent and intensive inspection, enforcement and reporting, supported for some waste streams by producer responsibility obligations. The remainder of this chapter outlines the options for implementing these solutions. Recommendations are made for concerted action by public sector bodies that, if implemented, will minimise the improper management of hazardous waste.

4.1 The current situation

Any generator of hazardous waste has four main legal choices of service at present, depending on the scale and nature of the waste generated:

- commercial hazardous waste collection (at source), mainly serving industrial and certain commercial customers, where waste is taken to a treatment facility in Ireland, is directly exported or is stored at an authorised transfer station;
- civic amenity sites, designed to accept small quantities of waste from householders and, in limited circumstances, small businesses;
- retail take-back, limited at present largely to waste electrical and electronic equipment, batteries and end-of-life vehicles (the latter in the form of free deposit at authorised treatment facilities); and,
- mobile and periodic drop-off services provided by local authorities and serving communities on an intermittent basis.

4.1.1 Commercial hazardous waste collection

The private hazardous waste industry plays a key role in serving Irish industry and commerce. It enables the proper movement, treatment and/or preparation of hazardous waste for export and is available at commercial cost to industry. This full commercial cost is often prohibitive to smaller industry and commerce where smaller quantities of hazardous waste are generated and unit costs are higher. There is a need to provide for the collection of small quantities of

hazardous waste from business, commercial and public sector organisations that are not currently served, for whatever reason, by existing commercial services.

4.1.2 Civic amenity sites (recycling centres)

A network of 86 civic amenity sites was operated by local authorities and the private sector in 2006. Figure 8 shows that all local authority areas are served by *at least* one facility that will accept batteries, electrical equipment and waste oils. For other household hazardous wastes, the service is less than adequate, as shown in the figure. Most of the 86 facilities do not accept similar hazardous waste from small businesses, despite the fact that the nature and quantity of the waste is more or less the same. There is a need to develop this static collection network to ensure that householders *and* small businesses can dispose of a full range of hazardous wastes.

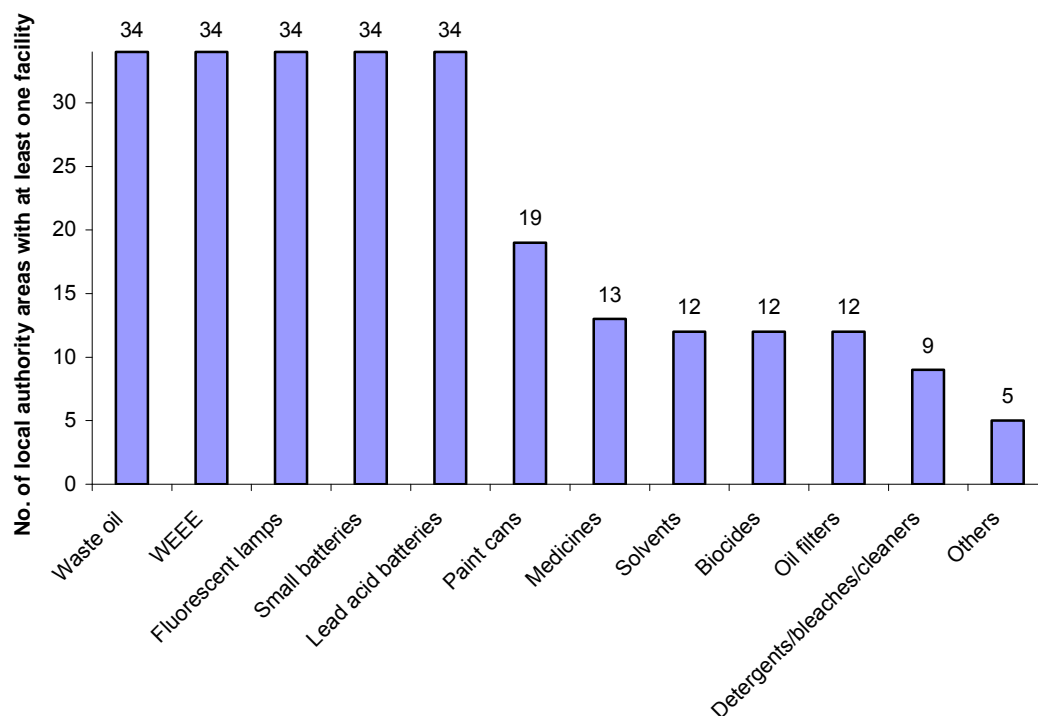


Figure 8 Hazardous wastes accepted at civic amenity sites (recycling centres), 2007

4.1.3 Retail take-back

Retail take back is a useful method of collecting small quantities of hazardous waste from the public. Retailers will generally, and understandably, provide this service only when obliged to do so. At present, retail take back obligations exist solely for waste electrical and electronic equipment and batteries, the latter commencing in September 2008. The model for waste electrical and electronic equipment has worked well since 2005 and proposals for its

replication for a range of hazardous wastes are made below. Some pharmacists will take back unused medicines and the HSE has operated medicine take back schemes in several areas⁵². But there is no obligation on pharmacists to take back medicines and this means the service is neither advertised nor nationwide.

4.1.4 Mobile collection services

One private company offers a contract mobile collection service to local authorities for use by the public. In 2006, 15 local authorities contracted the service and 145 tonnes of hazardous waste were collected (the largest waste streams collected being paint, lead acid batteries and engine oil). The service involves a hazardous waste collection vehicle parking in a public place, such as a shopping centre carpark, for a period of some hours, and accepting hazardous waste from members of the public. This is an expensive service for local authorities to provide but it provides publicity and awareness of hazardous waste collection and is a useful compliment to permanently available static facilities such as civic amenity sites.

4.2 Recommendations for the improved collection of hazardous waste

Solutions are recommended below that focus on the small-scale hazardous waste streams that arise at small business, households, farms, local healthcare services and other sources. Other hazardous waste streams not specifically identified below may also need to be addressed via one of the identified routes.

4.2.1 Commercial collection at source

As discussed above, hazardous waste collection services are provided at source by an existing network of brokers, hauliers and transfer stations. The waste industry is operating in a competitive environment and therefore focuses only on waste streams that offer a commercial return. However there are situations where the collection of small-scale unreported hazardous waste is best done by commercial services offered at source. Policy, economic or enforcement drivers will be required to ensure that this happens. The following sources of hazardous waste are proposed as priorities for action:

- garages and other locations where vehicles are serviced or dismantled;
- farms;
- ships and vessels, particularly fishing vessels; and
- healthcare risk waste from individual households and public health nurses.

It is also thought that opportunities for improved hazardous waste management is possible by facilitating local or sectoral industry to act co-operatively in their management of hazardous waste and engagement with the waste industry, and such action is promoted in this section. Other sectors are dealt with in a more general manner in section 4.2.1.6.

4.2.1.1 Garages and other vehicle service and dismantling locations⁴⁵

Waste oils from the servicing of vehicles are currently collected from the majority of garages though in winter the unauthorised use of this waste oil in space heaters is reported to be widespread. The supply of cleaning solvent and associated equipment for cleaning machine or engine parts and spray guns, and the collection of spent solvent, is also a readily available commercial service. Though services are available for other hazardous waste streams like oil filters, lead acid batteries and cleaning rags, it is evident that these may not always enter the correct hazardous waste management routes. The key to improved hazardous waste management at garages is information, awareness and enforcement. In this regard, the following actions are proposed:

- Guidance will be developed by the EPA in consultation with the sector on best practice for the sector.
- A pilot audit scheme will be undertaken by the EPA to examine the merits of ongoing and long-term regulation of the sector by local authorities using accredited inspection contractors.
- A national information and awareness campaign for all hazardous garage and vehicle (including end-of-life vehicle) waste, with a particular focus on waste oils and the prohibition of their combustion in space heaters, will be developed by the EPA.

Similar principles should be applied to other transport related infrastructure and activities, such as rail and air transport.

4.2.1.2 Farms

Accessible and affordable commercial collection of hazardous waste is not currently available for farmers. An equitable and accessible farm waste collection system should be developed for a range of farm hazardous wastes. The service could cover the collection of animal and plant protection product containers, unused or out-of-date animal remedies, waste oils, oil filters and other hazardous farm wastes. The service should be available at a reasonable cost to farmers and costs could be covered in whole or in part by producer responsibility obligations on producers and suppliers of products that give rise to farm hazardous waste. The service could comprise a network of static facilities at convenient locations such as co-

⁴⁵ This sector is well served by several commercial waste collectors and treatment facilities.

ops, marts, pharmacies (where these supply the agricultural sector) and civic amenity sites. This network could be supplemented by a milk-round-type of collection service calling at larger farm premises. As a first step, a comprehensive study of farm waste generation and management, focusing primarily on hazardous farm waste, will be commissioned by the EPA. The scope of the study will be finalised in consultation with relevant stakeholders and will seek to build on progress made to date by stakeholders in this sector. The study will seek to:

- evaluate the extent of sheep dipping, methods of spent sheep dip management and the regulation of the potential for environmental impact;
- quantify and characterise farm waste and set benchmarks for best practice in hazardous farm waste generation and management;
- review the efficacy of triple-rinsing of plant chemical containers to, *inter alia*, render them non-hazardous and suitable for general recycling - taking into account the pilot triple-rinsing and collection initiative conducted in 2006 in Offaly and replicated since then in other areas;
- recommend actions and their projected costs for improved on-farm regulation and management of hazardous waste (including spent sheep dip), collection of hazardous waste and mechanisms for organising and paying for collection services; and
- consider whether associated farm waste regulations are necessary for effective implementation.

It is anticipated that the study will be completed no later than 12 months after commencement (and in any event no later than 2010) and recommendations implemented by nominated bodies according to an agreed schedule. The co-operation and participation of farm representative and other relevant industry representative groups will be sought for the study and implementation phases of this work.

4.2.1.3 Ports and harbours

The European Communities (Port Reception Facilities for Ship-generated Waste and Cargo Residues) Regulations, S.I. No. 117 of 2003, oblige harbour masters and port authorities to prepare waste management plans for the management of ship-generated waste and cargo residues at Irish ports and harbours. The Department of Communications, Marine and Natural Resources⁴⁶ raised the issue of difficulties with compliance with the Regulations at fishing harbours. It is recommended that the Department of Transport and Marine develop guidance or take alternative appropriate steps from 2008 to assist vessel owners, harbour officials and competent authorities to plan for and manage ship-generated waste in accordance with relevant legislation.

⁴⁶ This is now the Department of Communications, Energy and Natural Resources. Responsibility for marine issues is passing to the Department of Transport and Marine.

4.2.1.4 Healthcare risk waste from small sources

Considerable efforts are ongoing on the part of the Health Service Executive to ensure that healthcare non-risk waste and healthcare risk waste are properly managed in a cost-effective manner. However, issues have been identified by some sectors of the HSE in relation to the management of small quantities of healthcare risk waste arising particularly from treatment by public health nurses, self-administration of medicines and procedures carried out in the home. The Health Service Executive should ensure that adequate and suitable systems are in place to manage healthcare risk waste for which it is responsible from the smallest sources. The EPA will engage with the Health Service Executive and other relevant stakeholders on this issue.

4.2.1.5 Industrial estates and commercial clusters

Local authorities should work with local industry and commerce (whether on a geographical or sectoral basis) to seek commercially favourable hazardous waste collection solutions for industry and to encourage the networking and sharing of experiences that can lead to better hazardous waste management practices in general. Moreover, there may be opportunities at the planning stage for new commercial or industrial areas to provide centralised or co-ordinated approaches to waste and particularly hazardous waste management. Local authority green business officers should be empowered to assist industries to club together to create networks and get collective deals on waste services to the benefit of all parties, generator and service provider alike. Green business officers could also be empowered to advise local authority planning sections on sustainable commercial and industrial centre design. The EPA will seek to make funding available to local authorities from 2009 for this type of work through the Local Authority Prevention Network, subject to the Network being approved for funding (see chapter 5).

4.2.1.6 Other sectors

A large number of other sectors (e.g. construction, industrial, retail, private healthcare) are sources of unreported hazardous waste and rely predominantly on commercial waste companies to collect hazardous waste at source. Local authorities should undertake enforcement campaigns to ensure that all generators of hazardous waste are managing hazardous waste in accordance with their statutory obligations. The Environmental Enforcement Network may be an appropriate means of co-ordinating concerted actions, procedures and protocols.

The commercial collection of waste or out of date laboratory chemicals from schools is a service apparently subject to high unit costs that is currently organised and paid for by schools individually. This has the potential to cause schools to stockpile waste and this is not a desirable situation. It is recommended that a collective approach is explored by schools,

possibly led by the Department of Education and Science, to reduce the administrative and cost burden on schools.

4.2.2 Civic amenity sites and recycling centres

Figure 8 (page 30) shows the current availability of civic amenity sites (sometimes called recycling centres) across the State for the collection of household and small quantities of business hazardous waste. As noted in section 4.1.2, there are some gaps in service that should be addressed. Local authorities, where they have not already done so, should be adequately resourced by the Department of the Environment, Heritage and Local Government to provide for the collection of a full range of hazardous waste at civic amenity sites in their areas. Finance could be raised from producer responsibility initiatives to help pay for this infrastructure.

The EPA will prepare, in consultation with local authorities and other relevant parties including the Health and Safety Authority, a code of practice on the minimum operational and environmental standards for accepting hazardous waste at civic amenity sites and on the types of hazardous waste that a civic amenity site would be expected to accept. To disseminate the code of practice, and to ensure health, safety and environmental protection, the EPA will sponsor the development of a training course for civic amenity site staff to be made available through training organisations for local authorities.

Local authorities should be resourced and then directed by the Department of the Environment, Heritage and Local Government to make hazardous waste collection facilities at civic amenity sites in their areas available to local businesses. Small businesses could be charged equitable not-for-profit rates for this service. Businesses could be subject to caps or quotas on the amount of waste that can be deposited per company in a defined period⁴⁷. Misuse of this service could be made an offence under revised hazardous waste regulations and this should be kept under review. Innovative means of facilitating business use and payment, for example through pre-registration of waste delivery via a secure internet site, could minimise abuse of the service while making the service convenient and economic for businesses and allow them to track their own deposits.

Collective approach by local authorities

It may be appropriate for local authorities to plan the provision of civic amenity site services to householders and businesses in a collective manner, whether nationally or as waste regions. A certain level of consistency in service, particularly to businesses, would be considered desirable. Moreover, sharing of information within a region (e.g. through shared on-line pre-

⁴⁷ The reason for this proposal is to ensure that businesses that generate large quantities of hazardous waste only use commercial collection sources and do not overburden the local authority system.

registration services) on business use of facilities could minimise businesses “shopping around” civic amenity sites. Collective tendering by local authorities for contracts to manage the deposited waste from several civic amenity sites would likely reduce unit costs to local authorities and service providers alike.

Asbestos

Large amounts of asbestos are collected annually, but anecdotal evidence suggests that substantial quantities of asbestos waste are still managed illegally, either due to ignorance of legal obligations or the high cost of employing specialist contractors for small jobs. A network of collection and transfer facilities should be established to capture the small-scale arisings from DIY and small contracting jobs. Local authorities should be resourced and then directed by the Department of the Environment, Heritage and Local Government to provide at least one transfer station for small quantities of asbestos in each local authority area. An obvious solution is to use the existing civic amenity site network, although not all existing sites will be suitable for such use. Where local authority-owned sites are not available or suitable, it may be possible for local authorities to contract authorised private sector waste facilities to accept asbestos on their behalf. The EPA will prepare guidance, in consultation with local authorities and the Health and Safety Authority, on the minimum operational and environmental standards for managing asbestos at such sites. The development of this network would be expected to provide reassurance that there is no reason for illegal or “backyard” disposal or accumulation of asbestos.

Information to householders and small businesses

Householders and small businesses should be informed through ongoing information campaigns conducted by or on behalf of local authorities of the hazardous waste collection services available in their areas. Practical guidelines on the segregation and storage of hazardous waste at households and business should be provided. Central co-ordination of information campaigns, particularly the creation of messages and the design and printing of materials, may be appropriate. Finance could be raised from producer responsibility initiatives to help pay for information campaigns.

Mobile collection services for householders

Local authorities should provide periodic community mobile “chemcar” services as a means of highlighting and creating awareness about household hazardous waste. Mobile services are also useful to fill geographical gaps in static facilities’ service provision and should be considered in the context of geographical areas that are remote or distant from civic amenity sites. Mobile collection services can be used to highlight seasonal wastes, for example the

collection of surplus garden chemicals at the end of summer. Mobile collection services are expensive, and should only be deployed strategically to meet specific needs and objectives. They should not be considered as an alternative to a permanent civic amenity site accepting a full range of household and similar hazardous waste.

Collection benchmark

Table 9 shows that an average 0.16 kg of hazardous waste per capita was collected at civic amenity sites in 2006, not including waste electrical and electronic equipment and batteries⁴⁸. It is recommended that a benchmark performance level of 0.3 kg per capita be reached by 2010 to allow local authorities to gauge the uptake of services provided in their functional areas. The EPA will monitor performance against this benchmark and it may be appropriate for waste-specific benchmarks to be set or adjusted as new services are made available and the availability and quality of data improves.

Table 9 Collection of hazardous waste at civic amenity sites, 2006, not including WEEE and batteries

| Material | Quantity collected (tonnes) |
|--|--|
| waste paint and varnish (including containers) | 403 |
| waste mineral oils | 266 |
| oil filters (vehicles) | 17 |
| oil containers (mineral oil) - plastic + metal | 0.8 |
| Total | 687 tonnes |
| Collected per capita | 0.16 kg per capita⁴⁹ |

Implementation timetable

Public authorities should endeavour to develop a comprehensive hazardous waste collection network for householders and small business within the lifetime of the Plan, i.e. by end 2012. The Department of the Environment, Heritage and Local Government should facilitate the convening of a working group made up of relevant Government departments, local authority and EPA representatives, producer responsibility representative organisations and other stakeholders to progress the recommendations in this section.

⁴⁸ These materials are subject to collection targets in their own right under the WEEE and batteries directives.

⁴⁹ Based on a population for 2006 of 4,239,848 - cso.ie.

Costs

It is not possible to determine the national cost for bringing all local authority services up to the standard that will be in the code of practice. Costs can only be determined locally and will depend on a range of issues, including the availability and extent of existing services and the size and general suitability of existing facilities.

4.2.3 Producer responsibility and retailer take-back

Producer responsibility is based on the principle that producers⁵⁰ of products take responsibility for the management of those products at end-of-life. It is an economic means for producers to maximise the collection and recycling of products at their end-of-life. It can also lead to better life-cycle management of hazardous materials. Producer responsibility obligations have become a mandatory requirement for a number of waste and hazardous waste streams - packaging waste, farm plastics, waste electrical and electronic equipment, end-of-life vehicles and batteries – see Table 10. Both packaging and waste electrical and electronic equipment collection and recycling rates have increased as a result of producer responsibility. The collection of waste electrical and electronic equipment has been particularly successful in a very short time for many reasons, not least of which is the one-for-one take back obligation imposed on retailers.

Table 10 Existing producer responsibility obligations for hazardous waste

| Material | Collection route(s) | Funding model |
|---|--|---|
| Waste electrical and electronic equipment (introduced 2005) | 1. Retail/producer take back or no-less-convenient alternative 2. Civic amenity sites | Visible environmental management cost (vEMC) paid into a producer recycling fund (PRF) managed by producers |
| End-of-life vehicles (introduced 2006) | Free-of-charge delivery at authorised treatment facilities (ATFs) | Producers are ultimately liable for full cost of treatment |
| Animal remedies (introduced 2005) | Retail (veterinary/pharmacy/co-op) take back | None established |
| Batteries (introduced September 2008) | 1. Retail take back 2. Civic amenity sites | Collection and recycling costs to be borne by producers. |

Following the success of the packaging and WEEE producer responsibility schemes, the consideration of producer responsibility obligations for several hazardous waste streams is recommended. Proposed models of producer responsibility will vary depending on the waste

⁵⁰ Generally defined in producer responsibility legislation as manufacturers or importers – being the persons who place goods on the Irish market at the top of the supply chain.

stream and the purpose of imposing the obligation. For example, the waste stream may be prohibitively expensive for local authorities to manage at civic amenity sites. Alternatively, retail take back as part of producer responsibility may be the best means of improving collection rates. Some particular advantages of retail take back include:

- high public participation and awareness rates can be achieved due to the frequent use of retail outlets;
- a new-for-old pattern of consumption could become the norm;
- deposit-refund mechanisms are suited to retail take back models and may be suitable for some materials;
- additional car-based trips to civic amenity sites can be avoided;
- producers and industry can employ reverse logistics in the retail supply chain⁵¹; and
- producers take full responsibility for the waste, in theory stimulating redesign of products and supply chains to minimise costs to producers and customers thus reducing environmental impacts.

Not all hazardous wastes are suited to retail take back. For example, liquid hazardous wastes could present a risk to retail staff and consumers. Retail take back obligations should take account of health, safety and environmental concerns in the storage and management of hazardous waste in retail outlets, particularly small outlets.

Table 11 sets out a range of hazardous wastes for which new producer responsibility obligations should be considered in the first instance. The collection routes and models are indicative and should be subject to rigorous review and evaluation. The Department of the Environment, Heritage and Local Government should evaluate these proposals in consultation with relevant stakeholders within the lifetime of this Plan. Industry buy-in is also important for the success of producer responsibility and industry should be involved at an early stage. It is recognised that evaluating, designing, implementing and enforcing producer responsibility obligations is time-consuming and resource-intensive for private and public sector alike. Any final recommendation for producer responsibility obligations made on foot of this Plan should be based on sound data demonstrating the environmental and economic benefits of the proposed obligation.

⁵¹ Reverse logistics means transporting end-of-life goods on vehicles on their return journey after they have delivered new goods to the retailer.

Table 11 New producer responsibility obligations recommended for evaluation

| Material | Potential collection route(s) | Potential funding model(s) |
|---|--|--|
| Medicines (human) | Retail take back - return of out of date or unused medicines to pharmacists ⁵² | Public funding with contributions from major suppliers (based on market share) may be appropriate. |
| Farm chemical containers ⁵³ (plant and animal protection products and medicines) | Options: - Retail take back - Civic amenity sites (clean containers only) - Milk-round collection | The viability of visible environmental management costs and producer recycling funds could be explored. Synergies with existing farm plastic schemes could be explored. Deposit-refund for containers could be explored. |
| Waste oil | Collection at source from garages Civic amenity sites and other convenient locations such as large service stations | A producer recycling or collection fund may be a means of allowing producers to subsidise waste oil collections should the net positive value of waste oil change. |
| Oil filters | Collection at source from garages Civic amenity sites and other convenient locations such as large service stations | A producer recycling or collection fund could be considered as a means of increasing collection and recycling. |
| Paint and paint containers | Return of paint and paint tins to retail outlets (perhaps with reuse of paint tins by refilling) Civic amenity sites (with paint reuse where appropriate) | Any funding model should incentivise consumers to bring back paint tins and old paint. A deposit-refund or “reward-for-refill” scheme may be appropriate for retail or wholesale take back. |
| Pesticides and herbicides (household) | Return of domestic unused, residual and out of date chemicals and packaging to retail outlets (e.g. garden centres, co-ops) Civic amenity sites | Any funding model should incentivise consumers to bring materials. A deposit-refund scheme may be appropriate for retail take back. |
| Ink and ink containers from publishing | Reverse logistics within the publishing and printing industry supply chain | A producer recycling or collection fund could be considered as a means of product innovation and waste collection within the trade. |

⁵² The Dispose of Unused Medicines Properly (DUMP) scheme is organised by the HSE and pharmacists. It is a free service for the return of unused and out of date medicines primarily as a suicide prevention initiative but also to ensure their proper management. DUMP campaigns have been conducted in the South Western Area Health Board and in Counties Cork and Kerry. An estimated 20 tonnes of medicines have in total been collected since 2004.

⁵³ Possibly incorporating the animal remedies scheme provided for in the Animal Remedies Regulations 2005.

4.3 Potential for all-island co-operation

The management of small quantities of hazardous waste at dispersed locations results in relatively high unit costs that will be borne by local authorities. There is considerable scope for regional and all-island cross-border initiatives to reduce these costs.

- It is recommended as stated above that local authorities should consider acting collectively in letting contracts for the collection and management of hazardous waste deposited at civic amenity sites. Local authorities in border areas should also seek to work with their counterparts in Northern Ireland to investigate the scale of savings possible through collective approaches to managing such hazardous waste.
- A common approach to civic amenity site standardisation of operation should be investigated by the Department of the Environment, Heritage and Local Government, supported by the EPA in its tasks of preparing a code of practice for the operation of civic amenity sites and co-ordinating the development of a training course for site management and operators.

5 PREVENTION OF HAZARDOUS WASTE

Chapter 3 describes the generation of hazardous waste by Irish industry and society. As outlined in chapter 1, there are two challenges to be met in relation to this diverse hazardous waste stream: prevention and self-sufficiency in treatment. This chapter sets out a programme for hazardous waste prevention that will strive to reduce the gross generation of hazardous waste in targeted sectors of industry and society. Chapter 6 takes up the theme of national self-sufficiency and sets out options for the expansion of hazardous waste treatment services in Ireland.

5.1 Definition of prevention

Prevention is at the top of the waste hierarchy, and represents the preferred policy approach to materials management and an alternative to the wastage of materials. The prevention of waste is preferable to its generation and to the monetary and environmental costs incurred as a result of its generation. A new and revitalised approach to prevention is taken in the revised waste framework directive. Prevention is defined in the revised waste framework directive as:

"Prevention" means measures taken before a substance, material or product has become waste, that reduce:

- a) the quantity of waste, including through the re-use of products or the extension of life span of products;
- b) the adverse impacts of the generated waste on the environment and human health; or
- c) the content of harmful substances in materials and products.

The new definition clearly incorporates the principle of reducing the hazardousness of waste as a means of preventing environmental pollution.

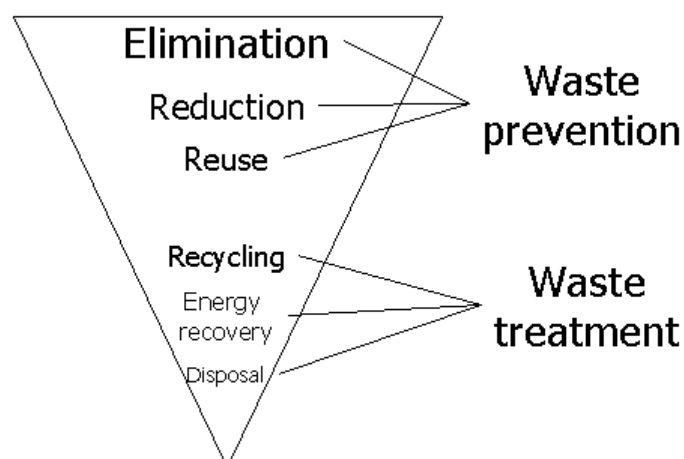


Figure 9 The waste hierarchy, highlighting prevention of waste as the preferred option

5.2 Approach to prevention

The philosophy of waste prevention is concerned with the causes and sources of waste, and is *not* concerned with waste management *per se*. Therefore, techniques for preventing waste should look at industrial processes and material inputs in a way that links them to wasted inputs (i.e. waste). The problem with prevention is that mention of the word “waste” causes people to think about waste recycling and disposal, and not to consider the material and cost savings that can accrue from a real preventive approach to business process efficiency. The challenge and particular priority for the period of the Plan (2008-2012) is to bring about a cultural change that makes businesses look again at efficiency in order to bring about a step change in the material intensity of Irish industry. The solution for this problem is to work closely with prioritised sectors to examine their material usage and waste generation profiles and to propose solutions. With expert knowledge, insights and technical and financial supports, industry can be incentivised to bring about the changes necessary to satisfy this new paradigm for environmentally efficient industrial production.

The prevention of waste is always preferable to the generation of waste from two points of view. First, if a waste is not generated, it will have no opportunity to cause environmental pollution. Second, the holder of the waste does not have to pay for its management. The latter would appear to present a compelling case for businesses to prevent waste. However the slow adoption of preventive measures, even when their benefits are well proven and known, demonstrates that achieving prevention is as much a socio-economic and psychological problem as a technical one. Consequently, if prevention is to be promoted and achieved, a mix of cumulative, integrated policy measures are required. This chapter sets out the recommended approach to promoting and achieving the prevention of hazardous waste.

In considering the scope for prevention, the existing waste management status of a sector and the degree to which the sector itself can make changes that will achieve prevention are important. There may be an “evolutionary pathway” whereby a sector improves its waste management by achieving compliance and effectively segregating wastes, thereby minimising the quantity of hazardous waste for disposal. However improvement may stop at this point and not progress further to prevention (as opposed to recycling) unless there are external drivers for continuous improvement. The proposed approach will encourage improved segregation by generators of hazardous waste, allow them to identify the scale and origins of individual waste streams, and draw their attention to the more significant elements of their wastage where improvement is possible and may bring about cost savings. Figure 10 illustrates the division of emphasis in this two-phase approach to achieving prevention: firstly concentrating on general environmental improvements and secondly identifying opportunities for prevention.

The hazardous waste prevention initiatives suggested in this Plan will be incorporated into the EPA’s existing National Waste Prevention Programme⁵⁴ (NWPP). The NWPP is broad in its scope and other opportunities to engage with sectors not mentioned in this chapter will be explored. The NWPP satisfies the new obligation in the revised waste framework directive for Member States to prepare prevention plans that set out the State’s waste prevention objectives. Article 29 of the revised directive states that “the aim of such objectives and [prevention] measures shall be to break the link between economic growth and the environmental impacts associated with the generation of waste.”

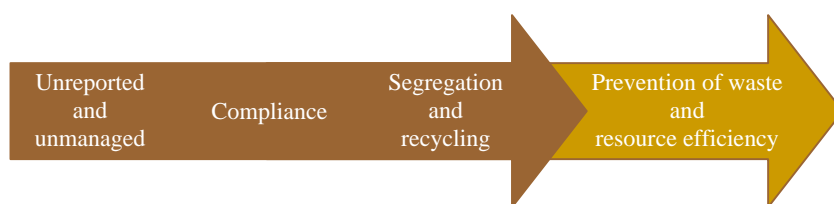


Figure 10 The ‘evolutionary pathway’ to prevention of waste and resource efficiency

5.3 Prevention plans for prioritised sectors

A quantitative approach was adopted to identify the six priority sectors listed in Table 12 for engagement on hazardous waste prevention. The priority list will remain flexible with addition or deletion of sectors as further study, information or opportunities might dictate.

Table 12 Six priority sectors for hazardous waste prevention.

| Process sectors | | Product sectors | |
|-------------------------|---|-----------------|---|
| Sector | Typical wastes | Sector | Typical wastes |
| Pharmachem | solvents, other industrial hazardous waste | Transport | waste mineral oil, oily sludge, lead-acid batteries |
| Publishing and printing | ink and varnish waste | Agriculture | sheep dip, pesticides, veterinary medicines |
| Healthcare | dressings, contaminated medical products, medicines | Households | paint, pesticides, pharmaceuticals, batteries, bulbs etc. |

⁵⁴ The National Waste Prevention Programme was established in 2004 and is led by the Environmental Protection Agency. There are two principal strands to the Programme: the local authority sector, headlined by the Local Authority Prevention Demonstration Programme; and the business sector, headlined by the Green Business Initiative, comprised of the greenbusiness.ie free advisory service for improved business efficiency and the [Green Hospitality Award](#) for sustainable practices in the hotel and related sectors. See www.nwpp.ie for more information.

The general tools outlined in Table 13 should be used as appropriate in engaging with the sectors identified as a priority for intensive action under the National Waste Prevention Programme. The sectoral approach should remain flexible and able to respond to specific sectoral needs that may arise during implementation.

With regard to obtaining good data on waste generation and resource use, environmental reporting requirements under IPPC licences are being reviewed by the EPA (to include reporting requirements under the pollutant release and transfer register - PRTR⁵⁵) and should ensure that production statistics are available so that normalised waste statistics can be generated to enable valid company comparisons. This data will need to be kept confidential. This should be determined and reasonable data handling arrangements made where appropriate.

⁵⁵ Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC

Table 13 Toolbox for sectoral engagement on waste prevention and resource use minimisation

| Tool | Approach |
|---|--|
| <i>Engagement with the sector</i> | A review and advisory (steering) group should be established for each sector with membership drawn from sectoral representative, regulatory and other organisations. The sectoral representatives would serve as a two-way conduit for communications. Agreement should be sought on all proposed initiatives, though it should be recognised that consensus may not always be possible. |
| <i>Engagement with individual companies</i> | Companies should be supported through site visits to determine the origins of good (or poor) performance. Detailed company-specific assessments should be carried out with specific reports generated for the company. The aim of the visits would be to identify transferable practices and technologies (or pitfalls), subject to commercial confidentiality, and to generate financial or environmental returns for companies. These visits should be clearly distinct from inspection or audit visits and should be intended to support and assist companies. Data should be used to contribute to sectoral performance comparisons on a confidential basis where necessary. |
| <i>Performance comparison and benchmarking</i> | Detailed waste information is available from annual environmental reports (from IPPC-licensed companies) and general waste statistics. Company-specific data can be extracted and analysed for comparison, review of trends and identification of significant improvement (or deterioration) on a company and sectoral basis. A report should be published for the sector highlighting general trends. A seminar should be convened. Examples of good performance should be published as case studies. Data should be analysed for best practice benchmarks that can be applied sector-wide. Company-specific information should be kept confidential except where it is already publicly available. |
| <i>Environmental objectives and targets</i> | Many industrial facilities have integrated pollution prevention and control (IPPC) licences. There is an explicit requirement for prevention to be addressed in each licence through a set of environmental objectives and targets. Licensees are obliged to ensure that these targets are challenging and are addressed. A review of the objectives and targets developed by licensees within a sector will illustrate the level of ambition within the sector and, if adequately challenging, can be used to set a benchmark for sectoral environmental objectives and targets. Where sectors are not covered by IPPC licences, alternative sources of benchmarking information should be sought. |
| <i>Research dissemination and studies</i> | New research and case studies on best environmental practice, technologies and techniques should be disseminated within each sector. Funding should also be available for once-off sector-specific research that may be required. |
| <i>Financial support</i> | Grant-aid to assist in material and equipment investment may be appropriate for certain sectors and may prove catalytic in driving innovation, efficiency and better environmental performance. |

Pharmaceutical and chemical industry - sectoral prevention plan

(to be read in conjunction with Table 13)

Background: This sector is very important to Ireland's economy. Current manufacturing processes are dominated by the use of organic solvents, which in turn become the single largest hazardous waste stream in Ireland, much of which is recovered or recycled. Changes in the sector are resulting in a greater proportion of products being manufactured by biochemical routes, avoiding the use of organic solvents. Nevertheless, manufacture by chemical routes will continue to be important. The sector is likely to seek more efficient manufacturing routes of its own accord (e.g. fewer steps, alternative or no solvents, continuous processing, green chemistry etc.), but the changing nature of individual products and the associated synthesis routes means that predicting the inherent trend in waste arisings is uncertain. The sector should be facilitated and guided in its efforts to improve.

| Tool | Approach |
|--|--|
| Engagement with the sector | <p>PharmaChemical Ireland is the main representative body for the sector.</p> <p>Notwithstanding the fact that IPPC licences are facility and company specific, sectoral co-operation should be encouraged and facilitated.</p> <p>Sectoral agreements may be appropriate and their use should be explored.</p> |
| Engagement with individual companies | <p>The pharmachem sector is technically highly competent. Engagement with companies should take place through equally experienced and competent personnel.</p> |
| Performance comparison and benchmarking | <p>Detailed waste generation information is readily available from annual environmental reports prepared by companies in the sector and provided to the EPA. These reports are publicly available. The data should be extracted, analysed and published annually. The data should be normalised against production data to ensure valid comparisons are made.</p> |
| Environmental objectives and targets | <p>Most companies in this sector have integrated pollution prevention and control licences issued by the EPA. Detailed information on individual company's environmental objective and targets is readily and publicly available. The data should be extracted, analysed and published annually. The sector's level of ambition in environmental objectives and targets should be analysed.</p> |
| Research dissemination and once-off studies | <p>The annual Responsible Care report, published by Pharmachemical Ireland, demonstrates the extent of waste prevention already being carried out by the sector. The National Waste Prevention Programme should work with the Responsible Care initiative and seek to intensify the "reinvestment" of this and other relevant research back into the sector.</p> <p>Research and technological development efforts could be directed to areas such as improved synthesis pathways (e.g. fewer steps, improved specificity, less hazardous solvents), continuous processing, improved recovery and enhanced process monitoring and control. The use of "environmental technologies" should be supported, but in the context of prevention, with an emphasis on avoidance, reduction and recovery.</p> |
| Financial support | <p>Any financial support to this sector will be small in relation to the sector's invested capital and turnover. A research and innovation fund should be made available to assist technological innovations, examples of which are given above. On-going support should be provided for training and education of staff in the sector.</p> |

Publishing and printing industry - sectoral prevention plan

(to be read in conjunction with Table 13)

Background: Major changes have occurred in this sector with the move towards digital systems. It is conceivable that developments in “electronic paper” will provide radical innovations, thereby reducing the scale of actual printing on paper. Until that emerges, the use of inks based on organic solvents leads to hazardous waste arising in this sector. Waste ink, containers, cleaning rags and solvents associated with cleaning are generated. The sector includes manufacturers of inks as well as consumers of ink, i.e. the printers. These operations vary in scale from local print shops for advertising leaflets, to newspaper printers and packaging suppliers. Minor improvements are likely to be possible for smaller operations, with the potential for major improvements, for example in the types of ink used, arising from partnership arrangements between ink suppliers and ink users. The EPA has already supported several projects to investigate the use of non-organic-solvent inks. The trend of waste generation is uncertain, but the lessons already learned should be widely applied.

| Tool | Approach |
|--|--|
| Engagement with the sector | <p>The Irish Printing Federation is the main representative body for the sector. Sectoral co-operation should be encouraged and facilitated. Mentors and champions should be sought from the larger IPPC-licensed operations and from progressive smaller operations.</p> <p>Sectoral agreements may be appropriate and their use should be explored.</p> |
| Engagement with individual companies | <p>This sector is specialised and experienced personnel should be sought to engage with individual companies. Priority should be given in the first instance to the larger, licensed operations. Good practice demonstration should be provided to smaller operations that perhaps do not have the technical and financial resources to seek assistance in production and environmental efficiencies.</p> <p>An appropriate regulatory system (“IPPC-light” or accredited inspection contractors are possible models) should be considered for smaller unlicensed operations on foot of outcomes from the early stages of sectoral engagement. This could be used to drive environmental efficiencies and obtain monitoring information.</p> |
| Performance comparison and benchmarking | <p>Detailed waste generation information is readily available from annual environmental reports prepared by IPPC-licensed companies in the sector. These reports are publicly available. The data should be extracted, analysed and published annually. Many operators are not licensed and other means of obtaining statistical information will be required. The data should be normalised against production data to ensure valid comparisons are made.</p> |
| Environmental objectives and targets | <p>The larger companies in this sector have integrated pollution prevention and control licences issued by the EPA. Detailed information on individual company’s environmental objective and targets is readily and publicly available. The data should be extracted, analysed and published annually. The sector’s level of ambition in environmental objectives and targets should be analysed.</p> |
| Research dissemination and once-off studies | <p>A once-off best practice study should be commissioned for the sector to determine and benchmark Irish and international best practice.</p> <p>The public sector commissions a significant proportion of the output from this sector. Environmental considerations should be included in public procurement criteria, in particular the specification of inks, to be developed by the Market Development Group.</p> |
| Financial support | <p>The sector should be supported in responding to environmental criteria in public procurement and for training and education of staff in the sector.</p> |

Transport industry - sectoral prevention plan

(to be read in conjunction with Table 13)

Background: This business sector refers to road, rail, ship and air transport. As well as numerous private cars serviced by local garages, there are fleet cars, major fleet operators (e.g. An Post, Eircom, ESB, Bus Éireann, Dublin Bus, Iarnród Éireann), distribution companies, public service vehicles, visiting ships and aircraft. Hazardous waste is associated with the maintenance of these vehicles, typically being the replacement of spent or contaminated fluids and cleaning of parts. The scope for prevention is limited, though condition-based maintenance (based on distance travelled rather than time, for example) could be applicable for fleet operators and alternative paints relevant to repainting. Application of the decopaints directive should be taken into account in this sector. Proper collection, segregation and reporting presents the greatest initial potential to improve performance in this sector and identify future actions for prevention. The HAZRED project, to which the EPA is a partner, includes motor vehicle maintenance and repair as a priority.

| Tool | Approach |
|--|--|
| Engagement with the sector | There are numerous large fleet operators and garages within the sector. An engagement plan should be devised at the outset to ensure good representation of the sector on the review and advisory (steering) group. |
| Engagement with individual companies | The greater priority for this sector is ensuring compliance with existing waste management regulations. The larger operators should be contacted individually from the outset. Smaller operators and general garages should be engaged with in the first instance through enforcement studies and campaigns, as set out in section 4.2.1.1 (page 32). As compliance levels increase, and information begins to feed back from enforcement studies and campaigns, greater opportunities should arise for engagement with the sector on preventive approaches and encouraging good environmental practices. |
| Performance comparison and benchmarking | As data becomes available, perhaps through dedicated studies, it may be possible to objectively set benchmarks for certain classes of activity in the sector. |
| Environmental objectives and targets | The sector is not highly regulated and data is not generally available. As data becomes available, it may be possible to set environmental objectives and targets for the sector as a whole or for certain activities or operations. |
| Research dissemination and once-off studies | <p>Condition-based maintenance, based for example on distance travelled and condition of the vehicle (as opposed to servicing at set time intervals), may provide some waste reduction and is an integral part of some vehicles' design and computer-aided operation. A best performance study should be undertaken to identify the range of performance with regard to materials use and waste management actually occurring within the sector, the benchmarks that are achieved, associated best practices and opportunities for improvements and cost savings. These outcomes should be disseminated within the industry.</p> <p>Guidance on record keeping and provision of waste data to regulatory authorities, as required under existing legislation, should be provided. Sectoral level data is key to planning for greater environmental efficiencies and preventive approaches.</p> |
| Financial support | The sector should be supported in responding to new developments and for training and education of staff in the sector. |

Agriculture - sectoral prevention plan

(to be read in conjunction with Table 13)

Background: This business sector is geographically dispersed and composed of enterprises varying widely in scale and activity: tillage, dairying, sheep, etc. Veterinary medicine waste (and packaging) and plant protection product packaging wastes are also common. Sheep dip represents a major waste stream.

The scope for prevention is limited in the first instance and the initial focus should be on better management and collection of used containers. While animal numbers may decrease, there may be an increase in horticulture. Changes may also occur in the specific medicines or products in use. Waste origins and composition may therefore change.

A major study into the generation and management of non-organic agricultural waste is recommended in chapter 4 and this study will inform opportunities for the prevention and collection of agricultural waste.

| Tool | Approach |
|--|---|
| Engagement with the sector | <p>Several representative bodies exist for farmers and the agricultural sector. Other key sectoral interests will include the Department of Agriculture, Fisheries and Food, An Bórd Bia, Teagasc, APHA and FARM.</p> <p>Sectoral agreements may be appropriate and their use should be explored.</p> |
| Engagement with individual companies | <p>Engagement with individual farmers may not provide the most efficient means of achieving waste prevention, except in the provision of training or demonstration of techniques.</p> <p>The usefulness of on-farm waste management (and reduction) plans should be explored.</p> |
| Performance comparison and benchmarking | <p>As data becomes available, for example, through the recommended sectoral study, it may be possible to objectively set benchmarks for certain classes of activity in the sector.</p> |
| Environmental objectives and targets | <p>The sector is highly regulated in many respects, but gaps exist in waste management best practice and opportunities for waste prevention. As data becomes available, for example, through the recommended sectoral study, it may be possible to set environmental objectives and targets for the sector as a whole or for certain activities or operations.</p> |
| Research dissemination and once-off studies | <p>Surplus sheep dip is disposed of by landspreading and is subject to a code of practice. The activity is not regulated however and it is recommended that an appropriate level of regulation be assessed as part of the agricultural waste study. If necessary, policy and economic instruments should be used to facilitate favourable changes in parasite management practices. The potential to concentrate dipping operations with specialist contractors or specific locations should be examined from both economic and environmental viewpoints.</p> <p>Proper handling and collection of hazardous waste should be included in the seminars arranged by farm advisory bodies and farmer representative organisations and in the educational and training programmes provided by farmer education organisations. This will have medium to long-term benefit.</p> |
| Financial support | <p>Financial supports to farm and farm advisory bodies should be considered where necessary.</p> |

Healthcare - sectoral prevention plan

(to be read in conjunction with Table 13)

Background: The healthcare sector is predominantly publicly owned though with important and large private facilities and practices. A different approach is likely to be demanded by either side of the sector, though cost savings are likely to prove an attractive driver across the board. A relatively small proportion of healthcare waste is classified as hazardous waste, but it is a waste stream of major concern from environmental, occupational health and safety and public health concerns. Infection control nurses advise on segregation of infectious and sharps waste and poor segregation can result in unnecessary costs being incurred for waste management. Infection control remains the overriding concern in this sector.

The cost of healthcare risk waste disposal is relatively high, and there is scope for reducing this cost through good and incentivised (or enforced) waste segregation at ward level. The scope for prevention might be more difficult to quantify. However, by seeking to reduce the size of the hazardous waste stream and improving recycling as a whole, opportunities for prevention are likely to become apparent.

| Tool | Approach |
|---|---|
| <i>Engagement with the sector</i> | <p>The principal focus at national level will be with the Health Service Executive. Considerable work is ongoing in relation to promoting good waste management practices within the HSE. It will be equally important to engage with private facilities and the small-scale private sector of general practitioners, dentists and others.</p> <p>Sectoral agreements may be appropriate and their use should be explored.</p> |
| <i>Engagement with individual companies</i> | <p>Evidence from recent EPA-funded projects suggests that there is scope for obtaining greater value for money for individual facilities. Engagement with individual facilities should focus around advising on waste management and reduction plans with a focus on recycling in the first instance and moving on to examining gross waste generation. Good waste management control is most effective at the level of individual facilities and requires the day-to-day intervention of motivated and cost-conscious local managers. This work should build on the HSE's awareness-raising, training and good practice monitoring projects.</p> |
| <i>Performance comparison and benchmarking</i> | <p>A small number of case studies (from existing and future projects) would provide initial benchmarking data in relation to waste and hazardous waste generation, segregation and costs. International benchmarks will also be useful in this sector. Individual facilities should be encouraged to measure their own performance for comparison against sectoral benchmarks.</p> |
| <i>Environmental objectives and targets</i> | <p>A combined top-down and bottom-up approach might be most appropriate for this sector with national benchmarks being set by the Health Service Executive or Department of Health and Children, and local targets put in place by local managers and budget-holders.</p> |
| <i>Research dissemination and once-off studies</i> | <p>Recent EPA-funded research has shown that raising awareness and taking simple steps can bring about major improvements in waste recycling and reduced waste management costs. The dissemination of case studies and relevant guidelines within the sector should be ongoing through pro-active site visits and regional or local seminars.</p> |
| <i>Financial support</i> | <p>The sector should be supported in responding to environmental criteria in public procurement and for training and education of staff in the sector.</p> |

Households - sectoral prevention plan

(to be read in conjunction with Table 13)

Background: Households individually produce a small amount of hazardous waste, but this is often “unreported”, possibly being mixed with general household waste or discharged to drain. Householders may be unaware generally of the hazardous waste they produce or how it should be managed. The waste electrical and electronic equipment (WEEE) and the forthcoming batteries initiatives are highlighting certain issues, but a more concerted effort is required to fully engage with the general public on its generation and management of hazardous waste.

A wide range of hazardous product wastes are generated in households, for example: fluorescent (energy-saving) bulbs, solvent (VOC)-based paint and varnish, paint thinners, medicines, batteries, some WEEE, leftover pesticide and herbicide, and waste oil and other DIY vehicle servicing waste.

| Tool | Approach |
|--|--|
| Engagement with the sector | <p>While there is no representative body <i>per se</i> for the household sector, there are certain programmes aimed generally at householders. The EPA is supporting An Taisce’s Green Home initiative. This is building on the successful Green Schools programme and seeks to take the environmental sustainability message into communities.</p> <p>Local authorities’ general waste awareness and education activities are also key to making householders aware of hazardous waste and informing them of good practices and local facilities. The EPA-funded Local Authority Prevention Demonstration Programme is building capacity in local authorities in the waste prevention and resource efficiency fields.</p> |
| Engagement with individuals | <p>This will be achieved principally through such mechanisms as those mentioned above.</p> |
| Performance comparison and benchmarking | <p>The collection of 0.16kg of household hazardous waste per capita in 2006 is reported in section 4.2.2. This should serve as a benchmark on household activities, though improved collection should increase this number.</p> <p>Periodic household waste characterisation studies, commissioned by the EPA or local authorities, will provide information on the disposal of hazardous waste in waste and recycling bins. A national municipal waste characterisation study is ongoing in 2008 and will be repeated periodically.</p> |
| Environmental objectives and targets | <p>The initial focus for engagement with householders should be on improving collection rates and reducing the inappropriate disposal of household hazardous waste. The disposal of household hazardous waste in waste and recycling bins should be expected to decrease as: (a) information and awareness campaigns take effect; (b) more and better local facilities and collection services are made available; and (c) the influence and effect of one-for-one take back of WEEE (including fluorescent lamps) and batteries continues to grow.</p> |
| Research dissemination and once-off studies | <p>An important factor in the prevention of household hazardous waste is to provide information on ‘green products’ and alternatives to the use of hazardous cleaning, decoration and garden products. The promotion and use of eco-labels and other information mechanisms should be explored.</p> |
| Financial support | <p>The EPA will, where funding is available, continue to support An Taisce’s Green Homes project and will continue to support local authorities through the Local Authority Prevention Demonstration Programme. A funding or grant-aid mechanism should be made available to support other projects aimed at the prevention of household waste and resource efficiency in households.</p> |

5.4 Implementation

5.4.1 Role of the EPA in the prevention plan

The EPA's National Waste Prevention Programme will promote the co-ordination of these prevention initiatives. The EPA and the National Waste Prevention Programme should be adequately resourced to co-ordinate and take the lead in the principal initiatives proposed and create opportunities for engagement at the sectoral and enterprise level. It will be critical that sectoral representatives and individual organisations actively engage with the programme. Any sectoral resistance to change will unnecessarily delay progress. Prevention is a long-term initiative that, quick wins aside, may take many years to register success at the sectoral or national level.

5.4.2 Local implementation of the prevention plan

Local authorities should provide the necessary out-reach to industry and small businesses in their functional areas from the National Waste Prevention Programme. Prevention forms an important part of all local and regional waste management plans, and these provisions should be implemented in full, especially in relation to hazardous waste. Local authorities are currently supported by the National Waste Prevention Programme via the Local Authority Prevention Demonstration (LAPD) Programme⁵⁶. To date, fourteen local authorities have been grant-aided to demonstrate prevention and resource efficiency in their own offices, in airports, shopping centres, communities, farms, construction sites and local businesses. The work done by these local authorities has demonstrated that considerable progress can be made when staff are dedicated solely to waste prevention projects. A well-functioning network is forming around these local authorities, co-ordinated by the EPA and other participating (expert) organisations. The network is now being extended as a means of allowing all parties to learn about prevention together and share experiences and information. A HETAC accredited training course has been developed for local authority staff and 19 prevention officers were trained in 2007/8.

In support of existing local authority prevention officers, and prioritising the appointment of Green Business Officers, the EPA is promoting a Local Authority Prevention Network as a successor to the LAPD Programme. The primary objectives are to keep the newly trained and experienced prevention officers at work in this field, and provide for the participation of all local authorities. It is envisaged that this network will be directed by a high level steering group made up of local authority directors of service, established prevention officers, EPA and technical experts. The Local Authority Prevention Network is envisaged as a 'supported network' of local authority staff. The network will have two key ingredients:

⁵⁶ The LAPD programme is an initiative of the National Waste Prevention Programme administered by the EPA and funded by the Department of the Environment, Heritage and Local Government from the Environment Fund.

- (1) a network core, including website, to keep members informed, co-ordinate information sharing, operate working groups, organise meetings and conferences, and run training courses; and
- (2) access to project-based grant-aid, to support projects and provide local authorities with the financial means to allocate staff to prevention projects.

The potential benefits of providing the two elements of the proposed LAPN are considerable – (1) a network of trained, motivated and professional prevention officers providing services and advice to their own organisations, local business and communities on waste prevention and environmental sustainability and (2) senior local authority management interested and engaged in waste prevention.

The EPA will engage with local authorities and the Department of the Environment, Heritage and Local Government in seeking to establish the Local Authority Prevention Network. Subject to funding approval for the Network, a call document will be issued in 2008 inviting local authorities (alone, as regional groupings or in other partnerships) to apply for funding aimed at maintaining experienced prevention officers in place and training new officers.

Prevention officers should be empowered to assist local business, industry and public sector organisations to develop preventive approaches to all their activities. Prevention officers should also be empowered to form internal green teams with relevant colleagues to ensure that local authorities' own internal activities and practices demonstrate best environmental practice in relation to prevention in particular.

5.5 Potential for all-island co-operation

The industrial profile and consumption patterns in Northern Ireland are not markedly different to those in the Republic of Ireland, though some key differences exist. The potential for cross-border initiatives in hazardous waste prevention should be explored by the Department of the Environment, Heritage and Local Government, supported by the EPA in its role of implementing the National Waste Prevention Programme. The production of benchmarking data, sectoral studies and household hazardous waste prevention guides may have relevance in both jurisdictions and common issues should be identified at an early stage thus ensuring that enterprises and individuals north and south have access to the best available information, guidance and tools.

6 TREATMENT OF HAZARDOUS WASTE

The treatment of Irish hazardous waste generally takes place under regulated and controlled conditions. Currently almost half of this treatment takes place abroad, in other EU Member States for the most part. The EU waste framework directive requires that a policy of national self-sufficiency in disposal installations be adopted by Member States where this is possible on the grounds of strategic need and conformance with the proximity principle (see page 59). This chapter sets out options for the expansion of hazardous waste treatment services in Ireland in order to reduce exports.

It should be noted that it is not the intention of this Plan to nominate specific technologies to be employed for treating specific wastes. Specific technologies are identified and discussed in this chapter. The promotion of some technologies (namely cement kilns and landfill) is actively encouraged in the interest of reducing exports by using existing infrastructure. However, there is usually more than one treatment option available for a given waste stream, and no realistic proposal for hazardous waste treatment in Ireland should be excluded on foot of this Plan. Any proposal will of course require a waste licence or permit before operations can begin and this will ensure that operational facilities operate in a manner that represents BAT⁵⁷ and will not cause environmental pollution.

6.1 The current situation

Figure 4 (page 21) illustrates the location of treatment of Irish hazardous waste. Almost half (47.5%) of Irish hazardous waste (not including contaminated soil) was exported for treatment abroad in 2006. Some 31% was treated on-site of generation, for the most part at IPPC-licensed facilities. The remaining 21% was treated at authorised hazardous waste facilities in Ireland. Figure 4 shows that since 1996 treatment on-site of generation has steadily decreased, although this trend appears to have reversed in 2006. The figure also shows that treatment at commercial facilities in Ireland has gradually increased over the years. Export trends are more volatile and show very large increases up to 2003 before falling gradually, but have consistently been the dominant outlet for hazardous waste treatment since 2001.

Table 14 below shows the headline treatment techniques used for Irish hazardous waste – both in Ireland and abroad. The data shows that thermal treatment technologies, incineration and use as fuel, dominate the export column, accounting for 62% of all exports in 2004 and 46% in 2006. Solvent recycling is also important, as is metal recovery.

Table 15 builds on this data and provides an overview of the principal waste types exported for the various treatment options. It is likely that some hazardous waste that is exported could be treated, or at least pre-treated, at existing indigenous facilities – for example solvents,

⁵⁷ BAT means “best available technique” and forms the basis for EPA licensing of facilities. Techniques or technologies must meet BAT criteria published periodically by the EPA.

electrical equipment, photochemicals, acid/alkali waste (subject to licence and waste acceptance restrictions at existing facilities). Considerable quantities of Irish waste are exported for use as fuel. This predominantly means the combustion of waste solvent in cement kilns or other combustion plant. Cement kilns currently are in operation in the Republic of Ireland (4) and Northern Ireland (2) and could potentially use certain hazardous wastes as a fuel substitute for fossil fuels. Not all operations would necessarily be suitable nor available to using waste as fuel. Much greater quantities of hazardous waste are exported for incineration.

Table 14 Comparison of treatment technologies employed for Irish hazardous waste

| Hazardous waste treatment category or technology ⁵⁸ | 2004 | | 2006 | |
|--|--|-------------------------|--|-------------------------|
| | Treated in Ireland (tonnes) | Treated abroad (tonnes) | Treated in Ireland (tonnes) | Treated abroad (tonnes) |
| Incineration (D10) | 37,304 on-site | 54,314 | 35,121 on-site | 47,854 |
| Use as fuel (R1) | 6,025 on-site | 36,518 | 9,919 on-site 5 off-site | 14,805 |
| Solvent recycling (R2) | 26,597 on-site 837 off-site | 19,772 | 25,956 on-site 1,840 off-site | 16,477 |
| Metal recovery (R4) | 29 on-site 2,428 off-site | 20,026 | 68 on-site 1,214 off-site | 21,668 |
| Physico-chemical treatment (D9) | 72 on-site 28,397 off-site | 4,179 | 499 on-site 31,372 off-site | 1,709 |
| Landfill (D1, D5) | 13,657 on-site 3,109 off-site | 5,976 | 13,748 on-site 2,524 off-site | 12,183 |
| Inorganic material recovery (R5) | 0 | 4,758 | 0 | 2,650 |
| Acid/base regeneration (R6) | 0 | 3,122 | 0 | 2,150 |
| Organic substance recovery (non-solvent) (R3) | 78 on-site | 2,681 | 2,215 on-site | 5,596 |
| Oil recovery (R9) | 169 on-site 21,181 off-site | 4 | 214 on-site 23,917 off-site | 0 |
| Other (D2-D4, D6-D8, R7, R8) ⁵⁹ plus unspecified treatments | 2,398 on-site | 14,149 | 668 on-site | 9,812 |
| Totals | 86,328 on-site <u>55,952</u> off-site <u>142,280</u> total | <u>165,499</u> | 88,409 on-site <u>60,872</u> off-site <u>149,281</u> total | <u>134,904</u> |
| | 307,779 | | 284,185 | |

⁵⁸ These technologies are defined according to the list of waste disposal and recovery operations in the Annex to the Waste Framework Directive. Many of the categories do not clearly or particularly usefully indicate the treatment *technology* used on the waste in question – these categories are grouped together in the “other” category in this table.

⁵⁹ D2, land treatment; D3, deep injection; D4, surface impoundment; D6, release to water body; D7, release to sea/ocean; D8, biological treatment; R7, recovery of components used for pollution abatement; R8, recovery of catalysts.

Table 15 List of dominant waste streams exported for various treatment techniques, 2004

| Hazardous waste treatment category or technology | 2004 | 2006 |
|--|---|--|
| | Principal waste types exported | Principal waste types exported |
| | (percentages are calculated with reference to the data in Table 14) | |
| Incineration (D10) | Solvents (69%) Other industrial waste (17%) ⁶⁰ Other chemical waste (6%) | Solvents (32%) Other industrial waste (56%) Other chemical waste (4%) |
| Use as fuel (R1) | Solvents (67%) Other industrial waste (11%) Other chemical waste (7%) | Solvents (71%) Other industrial waste (17%) Waste oil (7%) |
| Solvent recycling (R2) | Solvents (97%) | Solvents (99%) |
| Metal recovery (R4) | Equipment (43%) Batteries (34%) Photochemicals (8%) | Equipment (39%) Batteries (33%) Photochemicals (18%) |
| Physico-chemical treatment (D9) | C&D waste (38%) Other industrial waste (36%) Sludges (12%) Acid/alkali (10%) | Other industrial waste (69%) Acid/alkali (31%) |
| Landfill (D1, D5) | Asbestos (68%) Sludges (19%) Other industrial waste (13%) | Asbestos (54%) Other industrial waste (23%) Sludges (19%) |
| Inorganic material recovery (R5) | Other industrial waste (42%) Sludges (19%) Acid and alkali waste (20%) | Other industrial waste (58%) Solvents (22%) Contaminated packaging (11%) |
| Acid/base regeneration (R6) | Acid and alkali waste (75%) Solvent-based waste (25%) | Acid and alkali waste (100%) |
| Organic substance recovery (R3) | Solvents (67%) Other industrial waste (26%) | Paint, ink, varnish waste (54%) Other industrial waste (18%) Equipment (8%) Other chemical waste (8%) |

⁶⁰ This is principally process waste from the pharmachem sector.

6.2 Self-sufficiency versus export of hazardous waste

The data above shows that significant quantities of hazardous waste are exported for treatment to other European countries. Broadly speaking, this export of waste takes place in a stable marketplace. The Waste Framework Directive (2006/12) states (and this principle is broadly carried forward into the proposed revision to that directive) that:

Member States shall take appropriate measures, in cooperation with other Member States where it is necessary or advisable, to establish an integrated and adequate network of disposal installations, taking account of the best available technology not involving excessive costs. The network must enable the Community as a whole to become self-sufficient in waste disposal and the Member States to move towards that aim individually, taking into account geographical circumstances of the need for specialised installations for certain types of waste.

Given this principle established in European law, and considering the data presented in section 6.1, it is recommended that Ireland should strive for greater self-sufficiency in hazardous waste management where this is technically⁶¹ and economically⁶² feasible.

This recommendation is in line with several objectives. First, it recognises the proximity principle established in the Waste Framework Directive (above). Second, it seeks to reduce the export of hazardous waste. There are two environmental benefits deriving from such a reduction. Overland and marine transport of hazardous waste is avoided, removing the potential for hazardous waste spillage on land and at sea in the event of an accident. It is also estimated that the treatment of a notional 100,000 tonnes of solvent waste in Ireland, as opposed to its export, would reduce transport-based greenhouse gas emissions by an estimated 88%⁶³ - thus contributing towards implementation of Ireland's Climate Change Strategy. Third, it seeks to provide for "security-of-supply" in outlets, and particularly disposal outlets, for hazardous waste in the unlikely event that it becomes problematic to export hazardous waste to other Member States. However, it is recognised that Ireland is unlikely to achieve complete self-sufficiency. Policies of enforced self-sufficiency have been abandoned in other Member States as a result of pressures exerted by the open and competitive waste market in the European Union. The recommendation to strive for greater self-sufficiency is

⁶¹ Technical feasibility means that a project must be able to obtain a waste licence and other relevant authorisations to proceed. It must therefore meet or exceed BAT (best available technique) and must be efficacious in the treatment of waste while not causing environmental pollution.

⁶² Economic feasibility means that a project must provide an economic return. Such investments will, for the most part, be funded wholly by the private sector though there may be scope for public private partnerships to be considered for appropriate projects. Certain supports are proposed below, but these would be relatively minor in the context of total project costs. The one potential exception to this rule is hazardous waste landfill, as outlined in section 6.5 below.

⁶³ This calculation is presented in the *Environmental Report relating to the Strategic Environmental Assessment of the Proposed National Hazardous Waste Management Plan* which accompanied the Proposed Plan as a consultation document – see section 1.5 for more information on strategic environmental assessment.

intended to maximise the treatment and disposal of hazardous waste in Ireland, where economically and technically feasible, with the abovementioned policy, environmental and security-of-supply benefits. There would also be economic benefits in terms of investment in infrastructure and employment.

It is of note that the export of several major categories of hazardous waste decreased in 2006 compared to 2005 and 2004, as shown in Figure 11. The decline in the reported export of waste solvents is particularly notable. Exports decreased by 48% from a total of 93,751 tonnes in 2004 to 48,462 tonnes in 2006. This reduction may affect the economic case for developing indigenous solvent treatment facilities. Nevertheless, there are options for the treatment of waste solvent in Ireland that will be explored below. Of equal note is the significant increase in the export of “other” industrial hazardous waste in 2005 and 2006. This export category is comprised for the most part of aqueous waste streams (21,626 tonnes of EWC code 07 05 01*) and solid wastes (6,348 tonnes of EWC code 07 05 13*)⁶⁴ from the pharmachem sector.

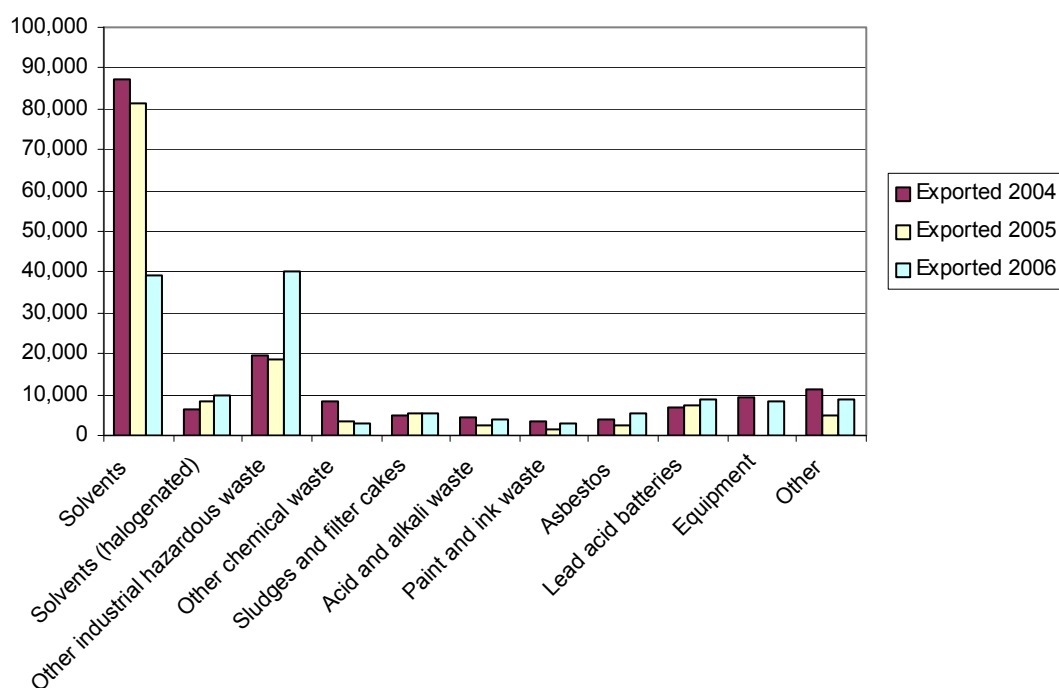


Figure 11 Export of some major hazardous waste streams, 2004-2006

Based on the data presented in this chapter and in chapter 3, three overarching strategic needs have been identified for action if additional hazardous waste is to be treated in Ireland and export is to be avoided:

⁶⁴ 07 05 01* - aqueous washing liquids and mother liquors; 07 05 13* - solid wastes containing dangerous substances. These categories have been separated out in Table 3 from the main category – ‘industrial hazardous waste (other)’.

- addressing the deficit in capacity for the substantial waste stream currently exported for thermal treatment (i.e. co-incineration, use as fuel or incineration) – see sections 6.3 and 6.4;
- development of landfill capacity to manage non-recoverable and non-combustible hazardous wastes and residues, including asbestos – see section 6.5; and
- expansion of other recovery and treatment capacity in Ireland for waste that does not need thermal treatment or landfill – generally referred to as physico-chemical treatment – see section 6.6.

It should be clearly understood that while this Plan can set out options and make recommendations, based on environmental criteria, on the need for treatment facilities for hazardous waste, infrastructure is provided by private organisations or through public private partnerships. The development of new capacity for the treatment of hazardous waste, whether in new or expanded facilities, would be expected, given competitive gate fees, to reduce the export of hazardous waste.

6.3 Options proposed as alternative treatment techniques

A number of alternative treatment methods are available for several different hazardous waste streams, including such techniques as:

- | | |
|---------------------------------|---------------------------------|
| o alkaline hydrolysis | o molten slag |
| o ball milling | o 'PCB Gone' |
| o base catalysed dechlorination | o plasma arc technologies |
| o catalytic treatment | o 'Silver II' |
| o 'Cerox' | o solvated electron technology |
| o gasification | o steam detoxification |
| o gas-phase chemical reduction | o supercritical water oxidation |
| o molten metal | o thermal desorption |
| o molten salt | |

A brief technical description of these technologies is provided in Appendix E. There are clear possibilities for the use of some of these technologies for the treatment of hazardous waste in Ireland. The Plan supports the provision of such technologies where technically and economically feasible. Some of these alternatives are niche-market treatment options (often for such wastes as persistent organic pollutants or chlorinated chemicals). Some are currently in development or have not yet been commercially proven. In many cases, their application is technically limited and adequate supplies of waste would be needed to justify investment. However, in order to ensure that realistic alternatives are given adequate consideration, the following is recommended:

- research grants should be made available through the EPA STRIVE research programme, or from other suitable sources, to develop hazardous waste and waste treatment technologies from conceptual to laboratory and pilot scales; and
- supports should be available for the commercial development of treatment capacity (see section 6.7).

Any proposals for alternative technologies would need to be evaluated on the basis of BAT. The potential for increased import of hazardous waste into Ireland to supply alternative or niche processes should be addressed by policy-makers if the need arises. The possible scenario whereby the import of hazardous waste into Ireland for niche treatment techniques could exceed the quantities actually arising in Ireland should be avoided.

6.4 Management of solvents and other wastes currently exported for thermal treatment

For several categories of hazardous waste, thermal treatment (whether in a dedicated incinerator or cement kiln) is a commonly used treatment technology. Some relevant data is summarised in Table 16. The location of treatment (on-site, off-site or abroad) for some categories of hazardous waste are shown against the relevant treatment classification used. Data on use as fuel (R1) and incineration (D10) are shown. For the purposes of comparison, solvent recycling (R2) is also shown as this is a competing technology for waste solvent against use as fuel and incineration.

Table 16 shows that a total of 62,659 tonnes of hazardous waste were exported for thermal treatment (use as fuel and incineration) in 2006. Some 47,854 tonnes were exported for incineration and 14,805 tonnes for use as fuel. This is a considerable reduction since 2004 when a total 90,832 tonnes were exported for similar treatment. The decrease in solvent exports is accompanied by an increase in the export of “other” industrial hazardous waste, comprising aqueous-based and solid wastes. All of these wastes are generated predominantly by the pharmachem sector. It is uncertain whether the downward trend will continue although a general downward trend in waste shipments from the sector is observed by the waste industry⁶⁵. There was a small 4% increase in the on-site thermal treatment of hazardous waste between 2004 and 2006.

It is a recommended objective of this Plan to reduce export and increase indigenous (including on-site) treatment of hazardous waste. To achieve this objective, capacity is required at solvent treatment facilities in Ireland – either solvent recycling (R2), in existing cement kilns or other combustion plant (R1), purpose built incinerators (D10) and/or

⁶⁵ Various reasons are being put forward for this trend: more use of biotechnology and therefore more aqueous-based manufacturing; greater attention to scale up (and waste) issues during product design; increased emphasis on “total waste management” with more focus on prevention and recycling in the holistic sense; corporate policy; costs; and Pharmachem Ireland’s “Responsible Care” initiative raising awareness generally within the sector.

alternatives (as outlined in section 6.3). Domestic capacity could be provided in either of two locations: on-site of generation, or off-site at commercial facilities in Ireland.

Table 16 Thermal treatment of waste solvents and other hazardous waste, 2004-2006⁶⁶

| | 2004 | | | 2005 | 2006 | | |
|---|---------------|----------|---------------|---------------|---------------|-------------------|---------------|
| | On-site | Off-site | Exported | Exported | On-site | Off-site | Exported |
| Solvents (total shown, including halogenated solvents where these were specified) | | | | | | | |
| Recycling ⁶⁷ (R2) | 26,597 | 837 | 19,172 | 23,283 | 25,952 | ⁶⁸ 940 | 16,105 |
| Use as fuel (R1) | 2,324 | 0 | 24,676 | 28,719 | 6,201 | 0 | 10,472 |
| Incineration (D10) | 35,214 | 0 | 35,884 | 27,301 | 31,368 | 0 | 15,424 |
| Other industrial hazardous waste (mostly pharmachem sector – aqueous mother liquors, reaction residues, solid wastes – often containing solvents but not as a principal constituent) | | | | | | | |
| Use as fuel (R1) | 3,676 | 0 | 4,206 | 2,617 | 3,703 | 0 | 2,790 |
| Incineration (D10) | 1,956 | 0 | 10,127 | 10,472 | 3,536 | 0 | 27,056 |
| Chemical waste not otherwise specified (mostly organic and inorganic chemicals 16 05 07* and 16 05 08*) | | | | | | | |
| Use as fuel (R1) | 0 | 0 | 2,421 | 40 | 0 | 0 | 83 |
| Incineration (D10) | 0 | 0 | 3,731 | 1,923 | 0 | 0 | 1,673 |
| All others (mostly waste oil, waste paint, absorbents and filter materials and contaminated packaging) | | | | | | | |
| Use as fuel (R1) | 25 | 0 | 5,215 | 2,094 | 15 | 0 | 1,460 |
| Incineration (D10) | 134 | 0 | 4,571 | 4,023 | 218 | 0 | 3,702 |
| Sub-total - Use as fuel (R1) | 6,024 | 0 | 36,518 | 33,470 | 9,918 | 0 | 14,805 |
| Sub-total – Incineration (D10) | 37,304 | 0 | 54,314 | 43,719 | 35,121 | 0 | 47,854 |
| Total | 43,328 | 0 | 90,832 | 77,189 | 45,040 | 0 | 62,659 |

⁶⁶ Data for on-site and off-site management of hazardous waste is reported every second year. Export data is collated annually from local authority records.

⁶⁷ Solvent recycling (R2) is presented in this table not as a thermal treatment technique, but to illustrate the scale of solvent recycling vis-à-vis thermal treatment (R1 + D10). (Note: R1 means use as fuel, i.e. recovery of heat/energy; R2 means material recycling, e.g. by distillation; D10 means incineration).

⁶⁸ Solvent recycling by distillation. The blending of 900 tonnes of solvent for export for use as fuel is not counted here.

With regard to *on-site* treatment of solvents, in 2006, eighteen IPPC-licensed companies employed solvent distillation (to recycle solvents back into a process stream) or thermal treatment (to use as fuel or dispose of solvent) – see Appendix B (Table 24, page 119). It is recommended that further opportunities for on-site treatment of waste, particularly in the IPPC-licensed sector, be explored and that relevant IPPC-licensed companies examine their processes for the potential to incorporate on-site solvent treatment techniques. The promotion of this activity should be undertaken as part of the prevention initiatives proposed for the pharmaceutical and chemical sector in chapter 4.

For solvent waste that is transported *off-site*, there are two options: treatment in Ireland or treatment abroad. A single waste treatment company, Soltec, is authorised to accept waste solvents for recycling by distillation. Three facilities, Indaver, AVR Safeway and Enva Shannon, blend waste solvents to optimise their calorific value for subsequent use as fuel. The blended waste solvents are currently transported abroad to cement kilns. This business endeavour is relatively new and reportedly growing. At least one Irish cement kiln operator has expressed interest in using blended solvent as a fuel.

Overall, 25,896 tonnes of waste solvent were *exported* for incineration or use as fuel in 2006. This was a considerable decrease from 60,560 tonnes in 2004 and this variability introduces an element of uncertainty in the analysis. However, there is clearly a quantity of solvent waste that could be treated commercially in Ireland. The options to achieve this are as follows:

- recycling – i.e. distillation or other physico-chemical treatment resulting in a recycled solvent suitable for reuse;
- co-incineration and energy recovery in cement kilns or electricity/heat generation facilities; and
- incineration – i.e. combustion in dedicated incineration plant with recovery of energy.

The order of their presentation reflects the accepted waste hierarchy, namely that preference should be given to recovery, and especially recycling; minimising the disposal of waste; and treating waste for disposal as close as possible to its place of generation. The current use of the three options is reflected in Table 16.

Domestic solvent waste contractors generally operate a similar triage hierarchy for waste solvents. Waste solvent is directed to the most suitable treatment option – recycling, use as fuel or incineration – depending on such factors as the nature of the solvent, its level of contamination, the client's requirements and relative costs. Waste solvents that are unsuitable for either recycling or use as fuel are sent for incineration. It is noted that elements of all three of these treatment options are in place in Ireland, as outlined above: (1) Considerable solvent recycling is carried out at IPPC-licensed facilities and at one commercial facility. (2) The major solvent transfer facilities in Ireland are now equipped with solvent blending equipment. When waste solvents are suitable for blending and for subsequent use as fuel in cement kilns, then

they are directed to this route, where the outlets are available. (3) There remains a proposal for a hazardous waste incinerator at Ringaskiddy, Co. Cork.

Recycling

Authorised capacity for the recycling of solvents by distillation at one commercial facility⁶⁹ (off-site of generation) is 5,000 tonnes per annum, though just over 1,000 tonnes was treated in 2006. There may be barriers to the economic feasibility of large-scale distillation or recycling of solvents in Ireland. The principal barrier is the apparent limited market for recycled solvent in Ireland. Recycled solvent would thus have to be exported to gain critical scale, probably to the United Kingdom. Given also that several large-scale solvent recyclers already operate in Great Britain, investment in a new substantial recycling facility in Ireland may be unattractive. Environmentally, the location of solvent recycling is neutral in its effect. There is little difference between recycling solvent in Ireland and exporting the recycled solvent on the one hand, and exporting waste solvent for recycling abroad on the other. The transport distances remain substantially the same. Nevertheless, a study will be commissioned by the EPA to fully elucidate the economic and technical aspects of these barriers. The results of the study should inform decision-makers as to whether expansion of the commercial solvent recycling industry in Ireland should be actively promoted and supported. Such promotion and support would require parallel efforts to market recycled solvent in Ireland and the assistance of the Market Development Group may be appropriate in this regard. It should be noted however that a solvent recycling industry in Ireland is likely to remain a niche market and account for a relatively small proportion of solvent waste arisings.

Co-incineration

The total operational blending capacity in Ireland is reported to be 66,000 tonnes per annum (at three facilities⁷⁰) – though only a small fraction of this capacity is currently used. No blended solvent is currently used as a fuel in the Republic of Ireland – it is all exported to the United Kingdom.

In the interest of promoting self-sufficiency and maximising fossil fuel substitution, it is recommended that the combustion of blended solvent should take place in Ireland, within the constraints of planning requirements, IPPC licences and the Waste Incineration Directive, in preference to export. Indigenous cement kilns may be suitable users of blended solvent, although power stations or other combustion plant may also be appropriate. Irish Cement has signalled its intention to burn solvent-based fuel from late 2008, subject to authorisation.

⁶⁹ Soltec, waste licence register number W0115-01.

⁷⁰ Indaver, Dublin Port (20,000 tonnes per annum), Enva Shannon (6,000 tpa) and AVR Safeway, Fermoy (40,000 tpa), are operational. Irish Bulk Liquid Storage, Foynes, is licensed but the project has not commenced.

Incineration

Co-incineration of waste solvent cannot provide the whole solution to managing Irish waste solvents or other waste streams suitable for or requiring thermal treatment. Co-incineration plants will only, justifiably, seek to burn the best material with the optimal calorific value. The remaining wastes (see Table 16), plus solvent waste unsuitable for blending and co-incineration, will still require an alternative treatment. The most widely used alternative for these wastes is currently incineration in dedicated facilities.

Incineration is a thermal treatment technology that provides flexibility in the management of combustible hazardous waste. A wide range of hazardous wastes can be accepted – not only solvents, but also other liquid and solid hazardous wastes such as those listed in chapter 3 and summarised in Table 16.

Table 17 calculates the approximate quantity of hazardous waste that would still have been exported for incineration in a given year even if all potentially recyclable waste solvent was to be diverted to recycling or for use as fuel. The calculation is based on the *total* quantity of hazardous waste that is exported for incineration (D10) minus the quantity of *solvents* that are exported for incineration (D10). Table 17 shows that even with full diversion of all available waste solvent to recycling facilities and for use as fuel, a remaining 32,430 tonnes of hazardous waste would still have been exported for incineration in 2006. The equivalent calculations for 2005 and 2004 show some variability in the quantity of waste potentially available for or requiring incineration after all possible recycling of solvent has taken place.

Table 17 Calculation of quantity of hazardous waste potentially available for incineration in Ireland

| | 2004 (tonnes) | 2005 (tonnes) | 2006 (tonnes) |
|---|-------------------------|-------------------------|-----------------------------|
| Total quantity of hazardous waste exported for incineration (D10) | 54,314 | 43,719 | 47,854 |
| <i>Deduct</i> the actual quantity of <u>solvent</u> exported for incineration (D10) that may have the potential to be diverted for recycling or use as fuel | (35,884) | (27,301) | (15,424) |
| Minimum potentially available for incineration in Ireland <u>that is currently incinerated abroad</u> | 18,430 | 16,418 | ⁷¹ 32,430 |

⁷¹ Includes 27,056 tonnes of 'other industrial hazardous waste' from the pharmachem sector (predominantly EWC codes 07 05 01* and 07 05 13*), 1,673 tonnes of 'other' chemical waste, 1,520 tonnes of healthcare risk waste, and miscellaneous other wastes.

Obviously it is difficult to predict how much hazardous waste will remain after, and even if, all suitable material is diverted for recycling and use as a fuel. However, it is clear that diverting less solvent to recycling or for use as fuel in cement kilns would leave greater quantities sent for incineration, whether in Ireland or abroad. It should be noted that the export of this material is currently taking place in a secure, competitive and available marketplace abroad. Irish waste is not likely to be restricted from entering other Member States, although there are some policy barriers to the UK disposal market⁷² and capacity barriers in the German incineration market⁷³. It is therefore a matter for the private sector to judge whether investment in an Irish hazardous waste incineration facility, or alternative treatment technologies, would make commercial sense in the context of the evolving European market.

It is however evident from this analysis that there is a quantity of hazardous waste that is currently exported for incineration for which incineration will remain the most likely management route in the continued absence of commercialised alternative treatment techniques. It must therefore be concluded that, in combination with the blending of waste solvent for use in cement kilns, or indeed in the absence of cement kilns in the mix (whether indigenous or foreign), and in the absence of alternative techniques that are capable of treating a wide range of diverse waste streams, incineration will be needed in order for Ireland to move towards self-sufficiency in the treatment of hazardous waste.

The proposed incineration facility for Ringaskiddy⁷⁴ is authorised to treat up to 50,000 tonnes of hazardous waste per annum.

6.5 Landfill of asbestos and other hazardous waste

Table 18 shows the scale of landfilling of Irish hazardous waste. Other than contaminated soil, asbestos is the single largest hazardous waste stream that requires landfill disposal. Inorganic sludges and other industrial hazardous wastes are also landfilled. In 2006, a large amount of contaminated soil was exported for landfill disposal.

One facility, KTK Landfill (waste licence register number W0081-03), is authorised to accept up to 6,000 tonnes of waste construction materials containing asbestos (EWC code 17 06 05*). This facility is scheduled to close by 2009. No other commercially available capacity exists for hazardous waste landfill in Ireland and there are no facilities currently proposed to replace KTK's asbestos disposal capacity from 2009.

⁷² The *UK Plan for Shipments of Waste* prohibits most imports of waste for disposal from Ireland into Great Britain, but allows for certain hazardous waste imports for disposal into Northern Ireland (and exports from Northern Ireland). There are no restrictions on access to recovery or recycling markets. See section 6.8 below.

⁷³ In Germany, implementation of the landfill directive has reduced available incineration capacity. A ban on the landfill of untreated waste has driven large quantities of municipal waste into German incinerators, reducing the capacity available to the import market.

⁷⁴ Indaver, waste licence register number W0186-01.

In 2006, 2,524 tonnes of asbestos waste was landfilled at KTK Landfill. A further 5,294 tonnes of asbestos waste was exported to Germany. Some 6,890 tonnes of other hazardous waste (not including contaminated soil) were also exported to Germany in 2006. Table 18 outlines the use of landfill for Irish hazardous waste in Ireland and abroad and indicates a current need for 10,000-15,000 tonnes of capacity per annum. An increase in the export of hazardous waste for landfill is noted between 2004 and 2006, and relates primarily to increased export for landfill of asbestos, sludges and filter cakes.

Table 18 Commercial landfilling of Irish hazardous waste, 2004-2006

| | 2004 (tonnes) | | 2006 (tonnes) | |
|--|---------------------|---------------------|---------------------|---------------------|
| | Off-site | Exported | Off-site | Exported |
| Asbestos | ⁷⁵ 3,109 | ⁷⁶ 4,058 | ⁷⁵ 2,524 | ⁷⁷ 5,294 |
| Sludges and filter cakes | | 1,122 | | 2,896 |
| Industrial waste (other) | | 795 | | 3,994 |
| Contaminated soil | | 289 | | 21,138 |
| Total | 3,109 | 6,264 | 2,524 | 33,321 |
| | | | | |
| Total off-site landfill <u>excluding</u> contaminated soil | 9,084 tonnes | | 14,708 tonnes | |
| Total off-site landfill of <u>asbestos</u> | 7,167 tonnes | | 7,818 tonnes | |

The landfilling of asbestos is subject to a unique set of criteria. As a 'stabilised non-reactive hazardous waste', construction materials containing asbestos (EWC 17 06 05*) and other suitable asbestos waste may be accepted at non-hazardous landfills, subject to a set of strict waste acceptance and waste management criteria being followed⁷⁸. For example, asbestos must be landfilled alone and separate to the main body of non-hazardous waste; it must be clearly marked on all site maps; and its presence in a dedicated area means that a landfill licence cannot be surrendered in relation to that area. The latter is the greatest barrier for

⁷⁵ Landfilled at KTK Landfill, Co. Kildare.

⁷⁶ Exported to Germany, of which 3,109 tonnes of construction materials containing asbestos (EWC 17 06 05*) and 949 tonnes of insulation materials containing asbestos (EWC 17 06 01*)

⁷⁷ Exported to Germany, of which 3,430 tonnes of construction materials containing asbestos (EWC 17 06 05*) and 1,863 tonnes of insulation materials containing asbestos (EWC 17 06 01*)

⁷⁸ As set out in article 6(c)(iii) of the Landfill Directive (1999/31/EC) and section 2.3.3 of the Annex to Council Decision 2003/33/EC.

landfill operators that might consider accepting asbestos or any other hazardous waste. In addition, any existing licence would need to be reviewed before asbestos could be accepted.

Given these regulatory requirements, it appears appropriate that providing landfill capacity for asbestos waste should be actively promoted. The cost of exporting asbestos waste is prohibitive, particularly for small scale or DIY operators. This is in all likelihood driving asbestos into the unreported or illegal waste sectors. The generation of asbestos is a legacy of construction materials used in the past and is linked to the rate of renovation, demolition or extraction of asbestos from older buildings. The quantities shown in Table 18 represent the current requirement for landfill capacity for *reported* asbestos waste. It is proposed that additional capacity is allowed to account for illegal disposal of asbestos and to take account of increased promotion of legal collections of asbestos⁷⁹. Thus capacity for up to 20,000 tonnes of asbestos waste per annum is recommended for capacity planning purposes.

Other than asbestos, a relatively small amount of hazardous waste (other than contaminated soil) requires access to off-site commercial landfill – approximately 1,917 tonnes in 2004 and 6,890 tonnes in 2006. It is likely that licence conditions for the landfill disposal of this material would require an element of pre-treatment (such as stabilisation or solidification) which would increase the volume of landfilled waste. Therefore, up to 10,000 tonnes per annum is recommended for capacity planning purposes.

It is recommended that at least one hazardous waste landfill be developed in Ireland, capable of accepting the wide range of hazardous wastes that would otherwise be exported for landfill. Such a facility would be expected to provide a key national service and should have an available capacity of at least 25,000 tonnes per annum. A national facility should facilitate good transport links with the main urban and industrial centres. The facility could be co-located with an existing or planned landfill facility with the objective of utilising existing infrastructure such as site roads, weighbridges and staff facilities, thereby saving costs.

It is further recommended that at least one other non-hazardous landfill facility be authorised to accept construction materials containing asbestos⁷⁸. Such a facility would be expected to provide (at least) a “regional” service to supplement a region or regions that are more distant from a national facility. A capacity of up to 5,000 tonnes of construction materials containing asbestos per annum should be accommodated.

These recommendations for two landfill facilities are summarised in Table 19.

⁷⁹ In chapter 4, a network of asbestos transfer stations operating from civic amenity sites is proposed. The availability of drop off facilities at equitable cost should minimise the illegal disposal or backyard accumulation of asbestos.

Table 19 Recommended capacity for hazardous waste landfill facilities

| Materials requiring landfill disposal | Facility 1 National facility | Facility 2 'Regional' facility |
|--|---------------------------------|-----------------------------------|
| | (tonnes) | (tonnes) |
| Asbestos (all asbestos, including insulation materials) | 15,000 | |
| Asbestos (material as per footnote 78 on page 68) | | 5,000 |
| Other hazardous wastes for which landfill is the sole option | 10,000 | |
| Total recommended annual capacity | 25,000 | 5,000 |

In support of these recommendations, and to clarify the issues and barriers, the EPA will commission a study to explore the technical and economic aspects of developing hazardous waste landfill capacity. The technical input of the waste generating and waste management sectors will be sought. The study will examine the trends in hazardous waste landfill and evaluate future waste generation.

A commitment to an export ban on hazardous waste that requires landfill may provide additional incentive to local authorities and/or potential investors. An export ban should be carefully considered and designed but only be implemented upon commencement of waste acceptance at a facility. Policy safeguards would be required to avoid excessive or opportunistic gate fees being imposed by the operator. An export ban should not restrict the movement of hazardous waste to authorised Northern Ireland landfills. An export levy on hazardous waste for landfill disposal could equally incentivise investment and should be considered as an alternative to an export ban. Unlike an outright ban on export, a levy allows industry to access overseas facilities and provides a safety valve against uncompetitive gate fees in Ireland.

If the private or local authority sectors fail to initiate a proposal for a facility on foot of this Plan by the end of 2009, then the situation should be reviewed by the Department of the Environment, Heritage and Local Government and consideration given to appropriate policy or economic instruments designed to deliver a domestic hazardous waste landfill. Such instruments might include:

- policy directions or incentives for existing local authority or private sector landfill operators;
- a national contract or public private partnership; and/or
- an export ban or levy as discussed above.

It should also be noted that the operation of hazardous and municipal waste incinerators will result in the generation of a hazardous ash that would require landfilling. The proposed capacity of any national landfill facility, particularly one established on foot of any initiative provided by a public authority, should take into account this capacity requirement.

6.6 Physico-chemical treatment

Physico-chemical treatment is used to treat hazardous liquid, solid and sludge waste. The principal physico-chemical treatment⁸⁰ operations are material conversion (e.g. neutralisation, oxidation and reduction) and material separation (e.g. filtration, sedimentation, distillation and ion exchange). Physico-chemical treatment plants can use many processes, some processes being common to several treatments. Physico-chemical processes are a useful way of concentrating certain hazardous wastes or transforming them into less problematic compounds (for further disposal or recycling).

A total of 31,372 tonnes of hazardous waste were treated off-site in Ireland in 2006 by physico-chemical methods (in its strictest interpretation as disposal operation D9) at four facilities⁸¹. In a broader interpretation, all hazardous waste treatment facilities strictly speaking carry out “physico-chemical” treatment processes in the sense that a waste is subjected to physical or chemical treatment processes to concentrate or recover materials. These operations tend however to be classified according to recovery codes (see Table 5 on page 22 and Appendix C on page 121). An additional 1,709 tonnes were exported for disposal by physico-chemical treatment. There are no major technical barriers for Irish facilities to increase their capacities or to expand their processes to treat a wider range of waste streams. Some facilities are actually operating below authorised and equipment capacity levels. However, there are other barriers to expansion: in the form of low waste generation or poor collection rates (to justify investment) and lack of disposal facilities for treatment residues (resulting, for example, in the export of filter cakes). Much of the exported waste is sent to large-scale specialised physico-chemical treatment centres in Germany and other countries. Smaller-scale Irish facilities could find it difficult to compete on many waste streams with these larger continental operations.

There are several benefits to promoting increased physico-chemical treatment of hazardous waste in Ireland. It is a relatively low cost (capital and operating) method of dealing with certain hazardous wastes. Pre-treating or concentrating waste can reduce subsequent

⁸⁰ The classification of “physico-chemical treatment” in the legislation as a disposal option is unhelpful. Many treatment methods that are physical or chemical in nature actually result in waste being recycled – and many waste operators describe their activities in this manner and take little cognisance of the fact that it is a disposal code. Thus physico-chemical treatment will be discussed here as a catch-all classification for a range of disposal and recycling techniques, including, for example: chemical neutralisation, mechanical material separation, solvent distillation and recycling (of metal, organic or inorganic constituents).

⁸¹ In descending order of quantity treated, Rilta, SRCL (formerly Sterile Technologies Group), Enva Shannon and SRCL (formerly EcoSafe).

transport costs⁸². New or expanded processes could provide employment and investment in companies operating in Ireland and could contribute towards the creation of recycling markets in Ireland. Given that the barriers are less technical and more economic in nature, the role of business development supports become important. Considerable business supports are available from Enterprise Ireland (see section 6.7) and county and city enterprise boards (www.enterpriseboards.ie). It is important that the waste industry, particularly small businesses, is actively supported by enterprise agencies to ensure they are in a position to exploit opportunities to expand their treatment base and create new investment and employment. Provision of capacity for the pre-treatment of the following hazardous waste streams is in particular recommended (though supports should not necessarily be confined to this non-exhaustive list of wastes):

- paint and varnish waste – though not always hazardous waste, it is often mixed and difficult to segregate.
- agricultural plastic containers – though herbicide and sheep dip containers will often be triple rinsed, pre-treatment of animal remedies may be appropriate. In any event, pre-treatment of hazardous packaging residues should be considered as a means of promoting their recycling.
- waste electrical and electronic equipment – although WEEE Ireland claims that no whole items will be exported outside the EU, the WEEE reuse, dismantling and recycling industries in Ireland should be allowed to continue their development and should be supported.
- end-of-life vehicles – it is a stated requirement of the end-of-life vehicles regulations that a national network of authorised treatment facilities be established and some facilities may need support.
- oil filters – though often pre-treated (by separating oil, metal and other materials) when they are collected, collection rates need to improve and greater capacity for their pre-treatment is recommended.
- lead acid batteries (automotive and industrial) – large volumes of liquid acid are exported with batteries, adding to export weights and transport costs. The feasibility of draining batteries and neutralising or recycling acid in Ireland should be explored, with consideration for the separation of lead, other metals and plastic prior to recycling.
- acid and alkali waste – large quantities are exported. Existing capacity is small scale and there is probably scope for expansion. The feasibility of expanding treatment of this stream should be explored.

⁸² For example, dismantling of WEEE and fluorescent lamps achieves this objective. Likewise, the separation of waste paint from its containers and their squashing or shredding will reduce the amount of empty space in shipping containers. Lead acid batteries are another example of this potential.

6.6.1 Explosive and unstable waste

There is no treatment capacity in Ireland for explosive or chemically unstable waste that arises in relatively small quantities from time to time. On occasion, laboratories find they are in possession of unidentified and potentially unstable chemical waste. On other occasions, explosive waste, such as time expired pyrotechnics (marine distress signals) and old military ordnance, requires removal and destruction. These wastes are often too unstable for long distance transport, and overseas transport in particular. The Defence Forces have stepped in in the past to destroy these wastes by controlled explosion. However, this ad hoc approach to managing explosive and unstable wastes should not continue. An appropriate agent of the State should be designated with the responsibility to undertake, in exceptional circumstances, the destruction of explosive and unstable wastes that cannot otherwise be treated in Ireland or shipped abroad. Preferably, a fixed facility should be established to deal with these wastes. However, there are likely to be instances where a fixed facility cannot be reached by certain materials. In such cases, general environmental, procedural and infrastructural conditions should be agreed to deal with issues such as location, process management, and management of emissions and residues. A standing team of experts from relevant public and private organisations⁸³ should be created to initially discuss and plan the general approach to be adopted in dealing with explosive and unstable chemical wastes and subsequently to be on hand to respond to instances of unstable wastes arising and needing treatment.

6.7 Waste industry business development support

Given the competitive European environment in hazardous waste management and treatment, the role of industrial development authorities is key in the development of indigenous companies involved in hazardous waste management. Enterprise Ireland has a clear function in the development of business opportunities for indigenous firms in Ireland and encourages and supports its clients along all stages of the business development process to help them succeed in the global economic environment. Enterprise Ireland clients are primarily manufacturing and internationally traded services companies employing ten or more people. Enterprise Ireland's focus is on five main areas of activity: achieving export sales; investing in research and innovation; competing through productivity; starting up and scaling up; and driving regional enterprise. Enterprise Ireland has developed a range of programmes and supports to suit the varying phases of company and business development from early stage start up companies to companies achieving annual sales of >€20m.

The main focus of Enterprise Ireland supports in the environmental sector relates to the commercialisation and development of technologies, products and/or processes that have a

⁸³ Including relevant government departments, emergency services, local authorities, Defence Forces, EPA and others. Expert advice on chemicals management, hazardous waste management, emergency response co-ordination, controlled explosion and environmental protection is likely, at a minimum, to be needed.

commercial potential. Enterprise Ireland provides feasibility and R&D support to companies that are operating in this sector. Commercialisation funding and support for industry-led research projects are also available for research projects based in third level institutions. Feasibility study grants are at a maximum of 50%. The R&D support varies from 25% to 45% depending on location and size of company. Details on supports available from Enterprise Ireland can be found at www.enterprise-ireland.com.

County and city enterprise boards⁸⁴ provide many equivalent supports to small businesses, including information services, grants for feasibility studies, financial supports, 'soft supports' such as mentoring and training, and other services such as 'techcheck' that provides mentored assessments towards the effective use of technology (www.techcheck.ie).

The Business Expansion Scheme (BES) supports investment in "recycling activities in relation to waste material, which has been subjected to any process or treatment, which results in value-added material that is reusable"⁸⁵.

Intertrade Ireland's⁸⁶ role includes the development and delivery of programmes to help companies take advantage of the business opportunities available across the island of Ireland. It also supports networks that enable businesses to share their experience and expertise, develop new products and identify new markets.

6.8 Potential for all-island co-operation

There are potentially considerable economies of scale to be achieved through full opening of the Northern Ireland and Republic of Ireland waste markets. Certain companies already operate on an all-island basis and certain hazardous waste streams currently move across the border, including waste oils, fluorescent lamps and waste electrical and electronic equipment.

There are no policy or legislative barriers to the movement of waste for recovery or recycling. Such movements are however subject to the EU Regulation on the transfrontier shipment of waste⁸⁷ and companies must set aside administrative and financial resources to satisfy the competent authorities in both jurisdictions. There is no scope to reduce the fundamental requirement to comply with the Regulation.

The *UK Plan for Shipments of Waste*⁸⁸, which came into force on 9 August 2007, allows "shipments of hazardous waste [for disposal] between Northern Ireland and the Republic of Ireland, in either direction, ... where the waste is generated and disposed of within Northern

⁸⁴ www.enterpriseboards.ie

⁸⁵ Leaflet IT55, Revenue Commissioners, www.revenue.ie.

⁸⁶ www.intertradeireland.com

⁸⁷ Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste.

⁸⁸ DEFRA, 2007. *UK Plan for Shipments of Waste*.

Ireland or the Republic of Ireland.” Shipments made under this policy “are restricted to those destined for the following disposal operations:

- D5 specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment, etc);
- D10 incineration on land; and
- D9 physico-chemical treatment which results in final compounds or mixtures which are discarded by means of any of the operations above.”

Therefore the provision of common all-island landfill capacity for hazardous waste, including asbestos waste, is possible within UK policy and is not prohibited in Irish policy. Similarly, all-island incineration and physico-chemical treatment capacity may now be planned for and taken into consideration by treatment operators.

The Department of the Environment, Heritage and Local Government should seek to clarify the potential for joint north-south approaches and co-operation in the provision of hazardous waste landfill⁸⁹ and other treatment facilities as proposals arise. The outcome of any such examination, with particular reference to the potential for the long-term availability of a suitable all-island facility, should be taken into account prior to a national landfill facility being established.

⁸⁹ The Department of the Environment in Northern Ireland in its “Statement of Facility Needs” has indicated that over 20,000 tonnes of hazardous waste, including asbestos, requires landfill each year. Northern Ireland regulations state that only pre-treated hazardous waste may be landfilled. The Statement of Facility Needs also indicated that disposal capacity for around 2,500 tonnes of asbestos per annum should be provided in at least two locations in Northern Ireland. A network of asbestos transfer stations is also recommended.

7 LEGACY ISSUES

Quite distinct from the need to provide disposal capacity for waste asbestos generated from the renovation or demolition of older buildings (as described in section 6.5), recommendations are made in relation to the following “legacy issues” in the context of hazardous waste:

- soil and ground contamination is associated with a wide range of historical activities such as coal gasification, land reclamation and filling stations (garages). “Contaminated soil” is that material that requires treatment and management and is often dug up and removed from the site during redevelopment (see section 7.1);
- the legacy of historical waste disposal practices is a large number of old landfills, many undocumented, around the country. While most of these old landfills would not be expected to contain significant quantities of hazardous waste, an identification, assessment and action-planning exercise is required to deal with them (section 7.2); and
- the chemical contamination of many port and harbour sediments has possibly taken place over long periods of time and should be subject to systematic assessment and action-planning (section 7.3).

7.1 Contaminated soil

The current high level of generation of contaminated soil (>400,000 tonnes sent off site for treatment in 2006) will continue as and when more brownfield sites and docklands are redeveloped. Figure 12 illustrates the reported quantity and treatment location of contaminated soil removed from development sites since 1998. By far the greater proportion of contaminated soil that is removed from redevelopment sites is exported, with less than 10% being treated in Ireland. The actual scale of future arisings is unknown, however, it is clear that the lack of treatment capacity in Ireland to manage this waste stream is leading to the export of significant quantities of soil. If contaminated soil were to be treated in Ireland, treated soil would be potentially available as an engineering resource for the same redevelopment works where it was generated.

While contaminated soil is generated mainly in the redevelopment of former industrial sites, it is also generated through fuel-oil and chemical spills and accidents and from the remediation of former waste disposal sites. Figure 13 sets out the general routes and options for contaminated soil management. An arbitrary distinction is drawn between recently contaminated soil and historically contaminated sites. ‘New contamination’ is that which typically arises from petrol or oil spills at service stations or domestic houses as a result of poor facility management or equipment failure. In-situ remediation is sometimes carried out.

So-called 'historical contamination' is typically associated with contamination by heavy metals, polyaromatic hydrocarbons and other difficult chemicals. There is a limited number of such sites, mainly related to former industrial activities such as coal gasification. The management of contaminated soil at such sites is controlled under planning and development legislation. A waste permit or licence is generally required where on-site recovery or disposal activities are proposed.

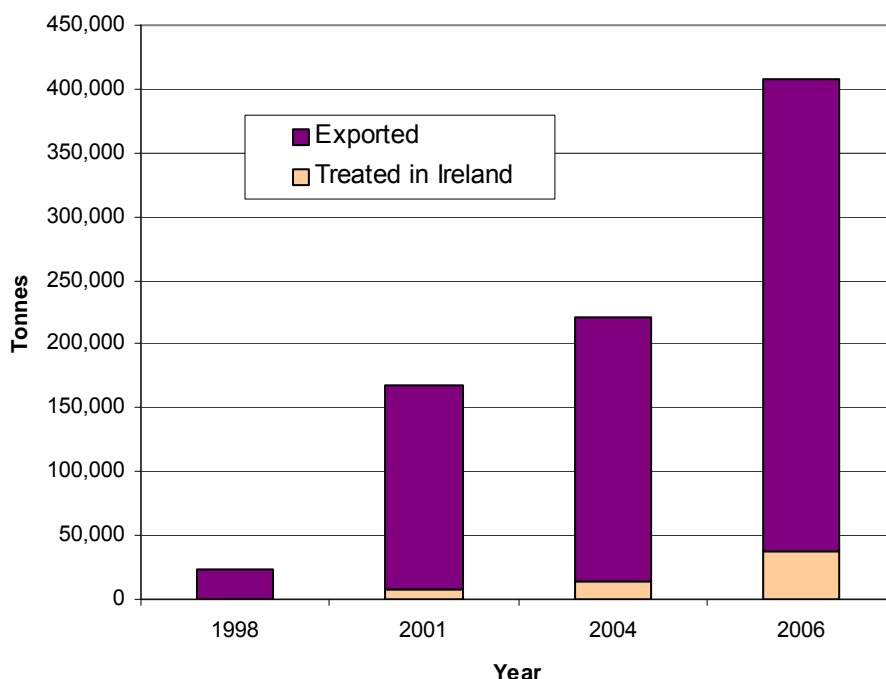


Figure 12 Location of treatment of reported contaminated soil

The alternative to on-site treatment is to remove contaminated soil for treatment off-site. One facility⁹⁰ in Ireland is licensed to treat up to 40,000 tonnes of contaminated soil per annum. All other off-site treatment currently takes place abroad. Table 8 (page 28) shows that the principal destination for Irish contaminated soil is Germany. Soil is typically treated by some form of physical treatment and it is then landfilled or reused in a low grade application, depending on the quality of the final treated soil. Given the apparent lack of sophistication in treatment methods used, there would appear to be no obvious technical barriers to providing more facilities for the commercial treatment of contaminated soil in Ireland. The barriers are more likely to be logistical and economic, including:

- contaminated soil is often generated in large quantities from the redevelopment of city docklands (Dublin in particular to date). It can be cost effective to load the soil from such locations directly onto ships for bulk export, avoiding extensive and relatively expensive road transport;

⁹⁰ Enva Portlaoise, waste licence register number W0184-01.

- low gate fees for large consignments in established facilities abroad make it difficult for new domestic facilities to compete;
- uncertainty in future arisings makes business planning difficult. There is a perception that there is a limited number of contaminated sites in Ireland and this discourages investment in contaminated soil treatment facilities.

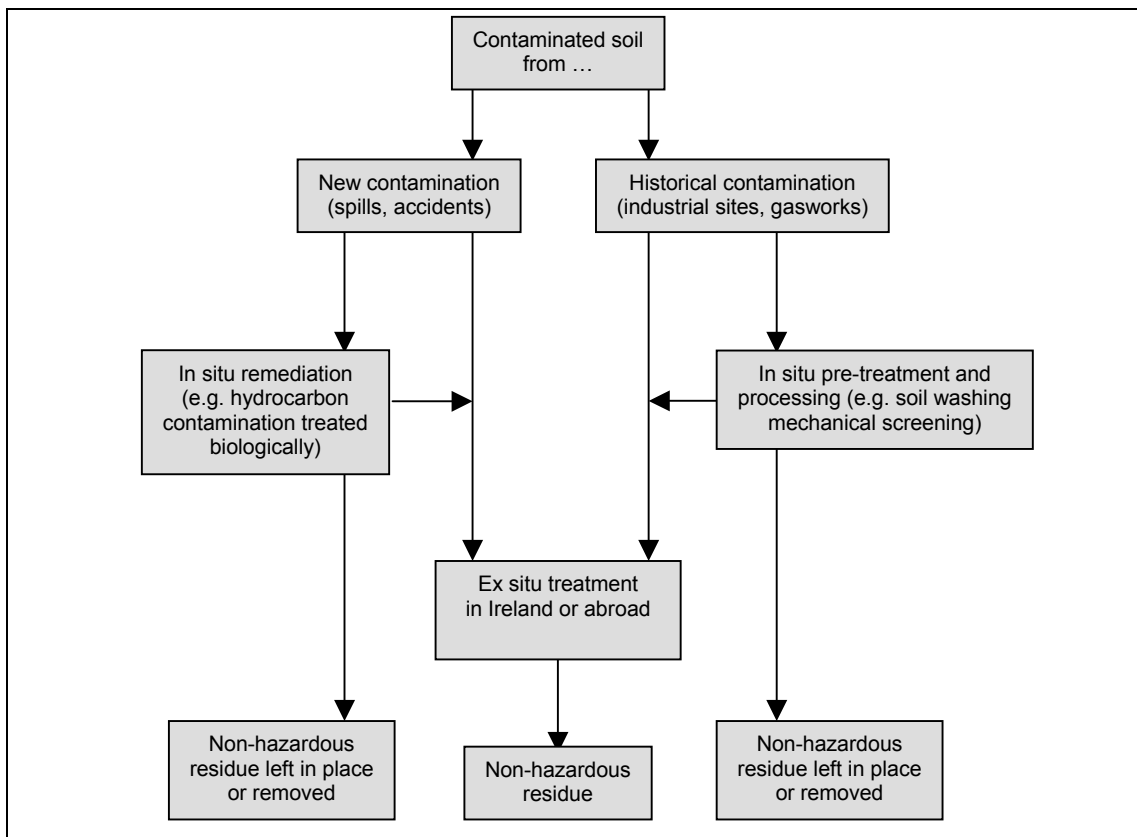


Figure 13 Overview of contaminated soil management routes and options

7.1.1 Options for management of contaminated soil in Ireland

The absence of a published register of contaminated sites makes it difficult to plan ahead for this waste stream. Development of a register of contaminated sites, and a concerted programme to investigate and remediate these, may change the outlook for developing treatment facilities in Ireland.

At the time of writing there is a proposal at EU level for a framework directive on the protection of soil. The most recent text, on which Member States failed to reach agreement in 2007, would have required the identification and listing of contaminated sites and the development of a remediation strategy to deal with identified sites. It is not clear at time of writing what will be the shape of a revised proposal.

Local authorities could, where they have not already done so, take a pro-active approach in planning for docklands redevelopment and other brownfield remediation by, for example, requiring the coordination of contaminated soil management by developers. This could enable a single, if temporary, point of treatment to be established with the appropriate environmental authorisations and controls to serve the overall area in question. This would mean that treated soil is then available for engineering or other uses, assuming adequate quality standards are achieved. Area and development plans that include the redevelopment of docklands or other brownfield sites should take the management of contaminated soil into consideration from this perspective. Plans should set an objective to avoid export where treatment in Ireland is technically and economically feasible and where such treatment would not result in greater emissions or other impacts being generated from transport. This objective is already disseminated to planning and development authorities by the EPA in carrying out its role as environmental authority under the Strategic Environmental Assessment Regulations.

Regional Planning Guidelines would appear to be a useful route to co-ordinated management of environmental issues arising from brownfield and harbour management. The inclusion of a comprehensive section dealing with contaminated land should be considered during the next revision of regional planning guidelines. Area and development plans must have regard to regional planning guidelines.

Where possible and environmentally acceptable, in-situ remediation should be considered. This has the potential to reduce the excavation, transport and replacement of soil. In-situ treatment should be considered in all relevant projects.

Mobile plant provides a flexible mechanism for providing in-situ treatment and recycling of soil and avoiding export. Mobile plant requires a waste licence under the Waste Management (Licensing) Regulations, 2004, or a waste facility permit under the Waste Management (Facility Permit and Registration) Regulation, 2007. The regulations require detailed assessments of treatment sites and this reportedly deters investment in equipment or the entry of Northern Ireland or overseas operators to the Irish market. The result is that no mobile plant operates in Ireland. The use of mobile plant in other jurisdictions could be examined with a view to considering new ways of regulating the activity in a manner that does not cause environmental pollution.

7.2 Old unregulated hazardous waste disposal sites

Local authorities are obliged under section 22(7)(h) of the Waste Management Acts 1996 to 2007 to identify sites at which waste disposal or recovery activities have been carried on, to assess those sites and to take measures to prevent environmental pollution. In a related measure, section 26(2)(c) of the Acts requires equivalent identification and assessment of sites at which waste disposal activities were carried out that to a significant extent involved

hazardous waste. Since publication of the Waste Management Act in 1996, very few local authorities have addressed either of these obligations.

The first National Hazardous Waste Management Plan set out a detailed identification and preliminary assessment methodology to be followed by local authorities in relation to the latter obligation. The EPA, through the ERTDI programme, funded a pilot project to trial the methodology in County Laois. The EPA's Office of Environmental Enforcement (OEE) is now co-ordinating the national response to the investigation and remediation of formerly unregulated waste disposal sites. In 2007, the OEE published a *Code of Practice for Environmental Risk Assessment for Unregulated Waste Disposal Sites*. The Code of Practice was published under section 76 of the Environmental Protection Agency Act 1992 and includes guidance on identifying waste disposal and recovery sites. The Code of Practice sets out a risk-based assessment procedure that should be applied to sites identified in accordance with sections 22(7)(h) and 26(2)(c) of the Waste Management Acts. The Code of Practice provides the framework to establish the intrinsic risk posed to the environment by old and previously unregulated disposal sites. However legislation is still awaited regarding the regulation of these sites vis-à-vis compliance with the Waste Framework Directive.

Section 26(2)(c) states that the National Hazardous Waste Management Plan shall:

“provide for, as appropriate, the identification of sites at which waste disposal activities, being activities that to a significant extent involved hazardous waste, have been carried on, the assessment of any risk of environmental pollution arising as a result of such activities, the taking or recommendation of measures in order to prevent or limit any such environmental pollution, the identification of necessary remedial measures in respect of such sites, and the recommendation of measures to be taken to achieve such remediation, having regard to the cost-effectiveness of available remediation techniques.”

The Code of Practice, and any amendments thereto, and its implementation by the Office of Environmental Enforcement, satisfies the requirements of section 26(2)(c) of the Waste Management Acts and serves as a revision and update to chapter 7 of the First Plan.

7.3 Harbour sediments assessment for contamination

In 2006, the Marine Institute, at the request of the Department of Communications, Marine and Natural Resources, published *Guidelines for the Assessment of Dredge Material for Disposal in Irish Waters*⁹¹. The Guidelines set out a new approach for assessing applications for the marine disposal of dredge spoil. The Guidelines identify the problem of contaminated

⁹¹ Marine Institute, Marine Environment and Health Series, No. 24, 2006.

dredge spoil and indicate that the principal anthropogenic contaminants of concern are organotin compounds (especially tributyl tin), heavy metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs) and oils. As the Guidelines acknowledge, “marine sediments ... can be a sink for contaminants that end up in our harbours and ports” and “contaminants in sediments can act as a source of long-term environmental pollution”. Certain substances can also be “bioaccumulated in benthic organisms resulting in biomagnifications at higher levels in the food chain.” As a result of these concerns, it is recommended that the assessment procedure set out in the Guidelines be applied to port and harbour sediments around the coast in order to provide for the systematic identification, assessment and action planning for potentially contaminated harbours, ports and marinas. Consideration should be given to the development of policy and action thresholds for sediment contamination, the exceedence of which would result in more detailed site investigation to determine an appropriate course of action – e.g. dredging, treatment in situ or leave in place.

Port and harbour sediments are not currently included within the scope of the proposed framework directive for the protection of soil, referred to in section 7.1.1.

8 IMPLEMENTATION

Implementation of the National Hazardous Waste Management Plan will not happen automatically or by accident. New financial and personnel resources need to be put in place to ensure that all recommendations in the Plan are acted upon by the nominated bodies and within specified timescales. The principal implementation and monitoring bodies for the Plan are as follows:

- The **Environmental Protection Agency** will promote and co-ordinate the Plan's implementation, and will take responsibility for:
 - o chairing the National Waste Prevention Committee with oversight of the Plan's implementation;
 - o fulfilling specific implementation roles as identified in the Plan; and
 - o monitoring and reporting on the Plan's implementation.
- The **Department of the Environment, Heritage and Local Government** should adopt a policy leadership and sponsoring role for the Plan's implementation by:
 - o making resources available for the Plan's implementation;
 - o fulfilling specific implementation roles as identified in the Plan;
 - o making new regulations where necessary and appropriate; and
 - o ensuring other Government departments and public bodies fulfil their roles and responsibilities identified in the Plan.
- The **National Waste Prevention Committee** should continue to act as the principal stakeholder oversight body for the Plan's implementation, with responsibility for:
 - o enabling two-way communication with sectoral and stakeholder interests;
 - o participating on sub-groups that may be established for specific purposes, as may be decided by the Committee; and
 - o providing review, feedback and comment on implementation reports prepared by the Environmental Protection Agency.
- **Local authorities** are essential for promoting good hazardous waste management practices and are the subject of a considerable number of specific recommendations. They should:
 - o ensure that local and regional waste management plans, as well as regional and area development plans, take this Plan into account;
 - o fulfil their important role in providing small-scale collection services and generally raising awareness in hazardous waste management; and
 - o engage with the Local Authority Prevention Network.

8.1 Summary of recommended actions, responsibilities and schedule

This summary of recommendations is not necessarily presented in the order in which they could or should be implemented.

Administrative arrangements

1. Affirm the role of the National Waste Prevention Committee in 2008 to act as the principal stakeholder oversight body for the Plan's implementation.

Responsible: Department of the Environment, Heritage and Local Government

2. Nominate the Environmental Protection Agency in 2008 for co-ordinating the Plan's implementation, with responsibility for promoting, monitoring, reporting and, where necessary, guiding the implementation activities of other responsible authorities.

Responsible: Department of the Environment, Heritage and Local Government

3. Nominate local authorities and other public bodies in 2008 for specific tasks as identified in the Plan.

Responsible: Department of the Environment, Heritage and Local Government

4. Local authorities should, in accordance with section 26 of the Waste Management Acts 1996 to 2008, take relevant recommendations of this Plan into account in their implementation and revision of regional and local waste management plans, as well as regional planning guidelines and regional and area development plans.

Responsible: Local authorities

5. Public bodies should, generally, be cognisant of this Plan and, where appropriate, take its provisions and recommendations into account in the execution of their environmental protection, industrial development and other functions, with the objective of improving their own hazardous waste management and that of their clients, customers or other stakeholders.

Responsible: All public bodies

Prevention

6. Develop a hazardous waste prevention programme in 2008, under the auspices of the existing National Waste Prevention Programme, to be implemented over the five-year period of the Plan.

Responsible: Environmental Protection Agency

7. Designate trained⁹² prevention officers by 2010, either alone or as regional groupings, such that each local authority area is covered, making use of any funding

⁹² New prevention officers should be enrolled in the next available local authority prevention course.

available through the Local Authority Prevention Network, to, *inter alia*, work with local businesses and communities towards achieving hazardous waste prevention, accessible and cost-effective collection services, and better compliance with regulation.

Responsible: Local authorities

8. Specify a policy for green procurement and provide guidelines for the substitution or reduction in use of hazardous materials in public procurement.

Responsible: Department of the Environment, Heritage and Local Government

Collection of hazardous waste

9. Provide adequate resources to local authorities, commencing in 2008, to provide in each local authority area by 2012 adequate hazardous waste collection facilities for households and small businesses and provide for the expansion of existing facilities and services and/or construction of new facilities.

Responsible: Department of the Environment, Heritage and Local Government

10. Complete a programme by 2012 of providing drop-off facilities at appropriate civic amenity sites and/or other suitable locations (including mobile collections) for use by householders and small business, and consider the use of collective tendering for waste contractor services with other local authorities with a view to reducing costs.

Responsible: Local authorities

11. Prepare a code of practice by 2009 for civic amenity sites where hazardous waste is accepted. Sponsor the development of a training course for initial rollout in 2010 for local authority and private sector operators of civic amenity sites where hazardous waste is accepted.

Responsible: Environmental Protection Agency

12. Conduct local or regional awareness and information campaigns, with preparatory work commencing in 2009, to pro-actively inform individuals and businesses of available hazardous waste collection services, and their obligations. General guidance on common topics such as 'obligations' could be developed nationally in co-operation with national authorities such as the Department of the Environment, Heritage and Local Government and the Environmental Protection Agency.

Responsible: Local authorities

13. Undertake a pilot audit scheme, commencing in 2008, to examine the merits of ongoing and long-term regulation of the vehicle servicing and garage sector using accredited inspection contractors.

Responsible: Environmental Protection Agency

14. Develop in 2009, in partnership with local authorities, a national information and awareness campaign for garages, with a particular focus on waste oils and their combustion in space heaters.

Responsible: Environmental Protection Agency

15. Commence a programme of local and/or concerted enforcement actions in 2009 with regard to the management of hazardous waste at several categories of small business, including garages, mini-labs, construction sites, industrial, healthcare and others. Enforcement actions should ensure that all generators of hazardous waste are managing hazardous waste in accordance with their statutory obligations and should be repeated periodically during the period of the Plan. The Environmental Enforcement Network may be an appropriate means of co-ordinating concerted actions, procedures and protocols. Recommendations for supporting mechanisms for hazardous waste sectoral enforcement should be made via the environmental enforcement network.

Responsible: Local authorities

16. Commence a hazardous waste producer responsibility project in 2008 and implement the project over the five-year period of the Plan. Assessments of potential new producer responsibility obligations, including the need for legislation or management bodies, on foot of detailed studies into priority waste streams, should be made during the project.

Responsible: Department of the Environment, Heritage and Local Government

17. Investigate the potential, commencing in 2008, for developing a national contract or other means for the cost effective collection of waste laboratory chemicals from schools.

Responsible: Department of Education and Science

18. Commence development of a programme in 2008 to ensure very small-scale healthcare waste arisings, including used, unused and out-of-date medical supplies from public health nurses and self-administering patients, is collected for proper disposal.

Responsible: Health Service Executive

19. Develop guidance or take alternative appropriate steps, commencing in 2008, to assist vessel owners, harbour officials and competent authorities to plan for and manage ship-generated waste in accordance with relevant legislation.

Responsible: Department of Transport and Marine

Infrastructure and self-sufficiency

20. Commission a study in 2009 to clarify the technical and economic aspects of providing hazardous waste landfill capacity.

Responsible: Environmental Protection Agency

21. Keep under review the provision of hazardous waste landfill capacity, and, taking into account any recommendations that may be made in the EPA study (see recommendation 20 above), consider the use of appropriate economic or other instruments to ensure such capacity is provided, whether by the private or public sector, by 2012.

Responsible: Department of the Environment, Heritage and Local Government

22. Commission a study in 2009 on the treatment of waste solvents with particular regard to the potential for solvent recycling.

Responsible: Environmental Protection Agency

23. Ensure that all-island considerations are taken into account in the implementation of recommendations 20 to 22.

Responsible: Environmental Protection Agency and Department of the Environment, Heritage and Local Government

24. Commission a benchmarking and actions study for farm hazardous waste for completion by 2010 examining the initiatives currently underway by stakeholders and future needs and recommendations with regard to the generation, management, collection and treatment of farm hazardous waste.

Responsible: Environmental Protection Agency

25. Provide for, in regional planning guidelines and local area and county development plans, the co-ordinated management of contaminated soil where these plans include the redevelopment of docklands or other brownfield sites. Plans should, where technically and economically feasible and environmentally favourable, provide for the co-ordinated management of contaminated soil from the area as a whole from the perspective of preferentially treating the soil *in situ* or at authorised facilities in Ireland, in preference to export, thus allowing for the use of treated soil in Ireland.

Responsible: Local authorities, regional authorities, An Bord Pleanála and other planning authorities

Regulatory

26. Keep under review the need to consolidate and reform existing regulations and make provision for new hazardous waste regulations where the need becomes apparent during implementation of this Plan.

Responsible: Department of the Environment, Heritage and Local Government

Old disposal sites, ports and harbours

27. Develop by 2010 a programme for the systematic identification, assessment and action planning for potentially contaminated harbour, port and marina sediments.

Responsible: Department of Transport and Marine

28. Identify, assess and, where necessary, remediate sites where hazardous waste was to a significant extent disposed of in the past. This action should conform with the Code of Practice prepared by the EPA's Office of Environmental Enforcement. Make new regulations to properly and effectively regulate this sector and bring these sites into compliance with the Waste Framework Directive.

Responsible: Local authorities and Department of the Environment, Heritage and Local Government

North-south initiatives

29. Explore, from 2008, with the appropriate Northern Ireland authorities the possible terms of reference of an informal North-South working group on hazardous waste that will identify barriers to co-operative approaches identified in the Plan and make recommendations to overcome those barriers.

Responsible: Department of the Environment, Heritage and Local Government

8.2 Resource requirements for the Plan

There are two essential prerequisites to ensure that the Plan is implemented – sufficient staff and financial resources. It will not be sufficient to nominate and request governmental organisations and agencies to implement certain parts of the Plan and not provide an appropriate level of new resources. Public bodies should assess what resources they need to respond to the recommendations for action made in this Plan (as summarised in section 8.1). Failure on the part of public bodies to allocate resources to the Plan's implementation will result in the Plan not being implemented.

8.3 Consequences of not implementing the Plan

Some of the consequences of not putting in place a programme to implement the National Hazardous Waste Management Plan are as follows:

- many generators of hazardous waste will remain unaware of their obligations in respect of the management of hazardous waste;
- levels of unreported hazardous waste will remain high and could grow;
- small businesses and households will continue to have limited access to affordable collection services, resulting in small scale hazardous waste being disposed of with general refuse in landfills not designed or licensed for hazardous waste;
- improvements and consistent high standards in civic amenity site storage of hazardous waste will not materialise, resulting in potential for poor management of deposited materials;
- producers will not be made responsible for the proper management of hazardous waste resulting from products placed by them on the market;
- knowledge will not be developed on available and optimal hazardous waste management routes in Ireland to avoid large-scale export of waste for thermal treatment;
- hazardous waste landfill capacity will not become available, ensuring that large quantities of asbestos waste in particular will continue to be exported or disposed of in an unauthorised manner.

8.4 Objectives, targets and indicators

Table 20 summarises the objectives that will be adopted for the National Hazardous Waste Management Plan (section 1.4) and includes environmental objectives identified during the strategic environmental assessment (section 1.5). Table 21 and Table 22 summarise the targets and indicators that will provide a means of measuring progress towards these objectives. Targets and indicators are intended to allow for monitoring the implementation of the Plan (management indicators) and monitoring any environmental effects of the Plan's implementation (environmental indicators). There are two principal mechanisms for reporting on the Plan's implementation progress. The national waste report will provide annual or biannual statistics on hazardous waste generation, treatment and export. A periodic report on the implementation of the Plan will also be prepared – see section 8.5.

Table 20 Summary of Plan and environmental objectives

Summary of Plan objectives (see section 1.4)

1. To reduce the generation of hazardous waste by industry and society generally.
2. To minimise unreported hazardous waste with a view to reducing the environmental impact of this unregulated waste stream.
3. To strive for increased self-sufficiency in the management of hazardous waste and to reduce hazardous waste export.
4. To minimise the environmental, social and economic impacts of hazardous waste generation and management.

Summary of environmental objectives

(from chapter 7 of the Environmental Report - see section 1.5 of this document)

1. To protect water quality (rivers, lakes, marine and groundwater) from hazardous waste
2. To protect air quality from hazardous waste and/or reduce air pollution or limit to levels that do not damage the natural environment or human health
3. To minimise greenhouse gas emissions associated with hazardous waste management (including transport)
4. To safeguard soil quality and quantity from hazardous waste and reduce soil contamination
5. To maximise use of material assets including the built environment, energy and raw materials
6. To minimise the export of hazardous waste for treatment and/or disposal and reduce emissions due to transportation
7. To conserve and enhance biodiversity, including flora and fauna, and integrate biodiversity considerations wherever possible into the National Hazardous Waste Management Plan
8. To protect human health from hazardous waste

Table 21 Plan targets and indicators

| Target for lifetime of plan (i.e. end 2012) | Indicator | Data availability and source | Freq- uency |
|---|--|---|------------------------|
| Initiate and implement hazardous waste prevention projects | Scoping, commencement and progress reports for individual projects | EPA – National Waste Prevention Programme | Annual |
| Reduce the generation of hazardous waste relative to production at targeted, participating or reporting organisations or sectors | Reduction in hazardous waste generation relative to production at relevant, participating or targeted organisations or sectors | EPA - all prevention projects will have built-in quantitative and qualitative indicators | Annual |
| Minimise the generation of unreported hazardous waste | Estimation of unreported hazardous waste | EPA - estimation will be made every two years for the national waste report | Every 2 years |
| Increase the deposit of household and small business hazardous waste at <ul style="list-style-type: none"> - civic amenity sites; - other static collection points; and - mobile services. | Quantity of household and small business hazardous waste deposited at static facilities Availability of collection/deposit services | EPA - national waste report | Annual |
| Establish new producer responsibility obligations | Development of new producer responsibility obligations Quantity of (hazardous) waste collected on foot of producer responsibility obligations | Department of Environment, Heritage and Local Government EPA – national waste report | Annual |
| Increase on-site treatment of hazardous waste generated at IPPC-licensed facilities | Quantity of hazardous waste treated at IPPC-licensed facilities | EPA - national waste report | Annual |
| Increase off-site treatment of hazardous waste in Ireland | Quantity of hazardous waste treated or landfilled at merchant facilities in Republic of Ireland | EPA - national waste report | Annual |
| Reduce export of hazardous waste | Quantity of hazardous waste exported Quantity of contaminated soil exported | EPA - national waste report | Annual |
| Identify, assess and remediate as necessary all sites where hazardous waste to a significant extent was disposed of | Number of sites identified, assessed and remedial actions undertaken | EPA OEE – Code of Practice implementation records | Every 2 years |

Table 22 Environmental targets and indicators

| Target for lifetime of plan (i.e. end 2012) | Ref to envtl objective (Table 20) | Indicator | Data availability and source | Frequency |
|--|--------------------------------------|---|---|----------------|
| Minimise exceedences of emission limits to water and air from licensed hazardous waste facilities | Water Air | Number of hazardous waste facilities in breach of emission limits to surface water, groundwater and air | EPA OEE – licence enforcement files | Every 2 years |
| Legacy hazardous waste disposal sites to be managed in accordance with Code of Practice | Water Soil | Number of legacy disposal sites to which Code of Practice is applied | EPA OEE – Code of Practice implementation records | Every 2 years |
| In the vicinity of hazardous waste incinerators, no increase in dioxin levels in ambient environment | Air Human health | Dioxin in cow's milk | EPA – monitoring of cow's milk | When available |
| Maximise the generation of energy from renewable sources | Climate | Quantity of hazardous waste managed via energy recovery (R1) | EPA – national waste report | Annual |
| Minimise distance travelled by hazardous waste | Climate Transport | Tonne-kilometres travelled by road and sea | EPA – to be calculated from best available records (e.g. facility records, 'new C1', TFS) (data not currently collected) | Every 2 years |
| Minimise export of hazardous waste and move towards self-sufficiency | Transport Material assets | Quantity of hazardous waste exported | EPA – national waste report | Annual |
| Minimise the generation of unreported hazardous waste | Human health Soil | Estimation of unreported hazardous waste | EPA - estimation will be made every two years for the national waste report | Every 2 years |
| Increase the <i>in situ</i> treatment of contaminated soil | Soil | Quantity of contaminated soil treated <i>in situ</i> as a proportion of the total | EPA – licence enforcement files (data not currently collected) | Every 2 years |
| Increase the treatment of contaminated soil in Ireland | Soil Material assets | Quantity of contaminated soil treated in Ireland as a proportion of the total | EPA – national waste report and licence enforcement files | Every 2 years |
| Develop any new hazardous waste facilities on previously used land or brownfield sites | Material assets | Area of new hazardous waste facilities on greenfield and brownfield sites | EPA – licensing files (data not currently collected) | Every 2 years |

| Target for lifetime of plan (i.e. end 2012) | Ref to envtl objective (Table 20) | Indicator | Data availability and source | Freq- uency |
|--|---|--|---|--------------------|
| Avoid loss or damage to designated sites from siting of hazardous waste facilities | Bio- diversity | Area of designated sites used by or proposed for development of hazardous waste facilities | EPA – licensing files | Every 2 years |
| Minimise major incidents of unauthorised disposal of hazardous waste | Human health | Reports of large scale illegal disposal involving hazardous waste (not including relatively small-scale fly-tipping) | EPA – unauthorised waste activities reports | Every 2 years |
| Minimise complaints relating to hazardous waste facilities | Human health | Number of complaints received relating to hazardous waste facilities | EPA – licence enforcement files | Every 2 years |

8.5 Reporting schedule

An implementation report will be prepared every two years by the Environmental Protection Agency and submitted to the National Waste Prevention Committee for input prior to publication. Reports from implementing bodies will be sought for incorporation into the implementation report. The first implementation report will be prepared in respect of the calendar years 2008 and 2009 and will be published by June 2010. The second implementation report will be prepared in time to inform the next full review of the Plan in 2012. The national waste report will present annual statistics on hazardous waste treatment and progress relative to other targets.

APPENDIX A – SUMMARY OF SUBMISSIONS

This appendix contains information on the two public consultation periods that were held during preparation of the National Hazardous Waste Management Plan. On this page, commentary is made on the consultation for the Proposed Plan. On page 109, commentary is made on the initial consultation period held in 2006 (as published in the Proposed Plan).

Summary of submissions made during consultation 2007/8

The following is a brief overview of the issues raised in the 60 submissions made in response to the Proposed National Hazardous Waste Management Plan. The consultation period was open between November 2007 and January 2008. The content of all submissions was taken into account in the finalisation of this Plan. Submissions were made by:

1. Adelaide and Meath Hospital, Dublin, incorporating the National Children's Hospital
2. Agency Consumer Products Ltd
3. Allan J. Navratil
4. An Garda Síochána
5. Animal and Plant Health Association
6. B Bourke
7. Carrigaline Area for a Safe Environment
8. Clodagh O'Connor
9. Connacht Region Waste Authorities
10. Connolly Hospital, Blanchardstown
11. Cork Harbour Alliance for a Safe Environment
12. Countryside Council for Wales
13. County and City Managers' Association
14. Department of Agriculture, Fisheries and Food
15. Department of Communications, Energy and Natural Resources
16. Department of Education and Science
17. Department of Health and Children
18. Department of the Environment, Heritage and Local Government
19. Department of the Environment, Northern Ireland
20. Dublin City Council
21. Dublin City University – Sustainability Initiative
22. Dun Laoghaire Rathdown County Council
23. Eco Congregation Ireland
24. Environment and Heritage Service – Department of the Environment, Northern Ireland
25. FARM – Federation of Agrochemical Retail Merchants
26. Forfás
27. Greenstar Ltd
28. Health Services Executive – Helen Maher
29. Health Services Executive – Martina Hunt
30. Healthcare Waste Management Services
31. Historic Scotland

32. IDA Ireland
33. Indaver Ireland
34. Institute of Public Health in Ireland
35. Irish Cement Ltd
36. Irish Co-operative Organisation Society (ICOS)
37. Irish Doctors' Environmental Association
38. Irish Farmers' Association
39. Irish Lamp Recycling
40. Irish Waste Management Association
41. Joint Managerial Body on behalf of Voluntary Secondary Schools
42. Laois County Council
43. Limerick Clare Kerry Regional Waste Management Office
44. Longford County Council
45. Maurice Fitzgerald
46. Monkstown, Glenbrook and Passage Branch of CHASE (Cork Harbour Alliance for a Safe Environment)
47. Mrs. Natasha Harty
48. N Eacha (3 submissions)
49. Nicholas Murphy
50. Offaly County Council
51. Peter H North
52. Repak Ltd.
53. Scottish Environmental Protection Agency (SEPA)
54. Swedish Environmental Protection Agency - Naturvårdsverket
55. Tegral Building Products Ltd
56. The Infection Prevention Society, Irish Branch (incorporating the ICNA)
57. Tobin Consulting Engineers
58. WEEE Ireland
59. West Regional Authority
60. Wicklow County Council

The following text highlights the principal issues addressed in the submissions.

PREVENTION

It was highlighted several times that prevention of waste was one of the major positives of the first plan. Through the stakeholder meetings and the submissions received, it was evident that a majority support the idea of keeping prevention as one of the most important themes in the review of the NHWMP.

However, there were some that felt that prevention of waste was not pursued to a large enough degree in the Proposed Plan. Some submissions also expressed a disappointment in the level of actual implementation of prevention initiatives in the first Plan.

The IWMA suggests that absolute restraints on waste generation, as per the last Plan, are unfeasible economically and an effective cap on inward investment. The Plan and economic development must be considered together.

There was strong support from all sectors for the provision of funding to support a wide range of prevention initiatives. Examples of the types of initiatives that could be considered include:

- Initiatives to encourage cleaner production e.g. CGPP,
- Initiatives to support a reduction in the use of toxic or hazardous substances in products,
- Initiatives to develop non-hazardous alternatives for member of the public, and
- Funding for research on new techniques and processes that would eliminate the use of toxic materials.

In keeping with this, it has been suggested that an agency similar to the Toxic Use Reduction Institute in Massachusetts be formed. Such an agency would be equipped with the best expertise available in the minimisation of the use of toxic materials and subsequently it could be mandatory that every new production procedure using toxic material must be approved by this agency to ensure the best practicable environmental option is used.

The view was expressed that prevention of hazardous waste is at the core of sustainable waste management and the investment of resources in waste prevention and minimisation can result in potential long-term benefits for all types of enterprises. The development of incineration and/or landfill facilities for hazardous waste may only serve to hinder waste prevention. To this end, the need for the Plan to thoroughly examine alternative technologies across the world, both currently in use or emerging, was raised. Ultimately, the goal should be 'Zero Waste'.

In industry, many of the large producers of hazardous waste come under IPPC licensing. This means that they must look at recovery options for their waste and in some cases 'efficiency audits of raw material usage' are required. This places an emphasis on material efficiency and on waste minimisation. The high cost of hazardous waste management influences companies to reduce/minimise waste.

Awareness/Education

There is a consensus that awareness needs to be increased across the board in targeted campaigns on a national basis. In general, it was felt that there was a need for an increased awareness amongst the general public on hazardous waste. It has been acknowledged that campaigns such as Race Against Waste was successful with regard to the issue of household waste and so a public awareness campaign on hazardous waste would be beneficial.

As part of an information campaign, the idea of an informative website was raised. It could include information on how to manage household hazardous waste, where it should be disposed of etc. For example, with the impending rollout of CFL bulbs, it would be useful for

the public to know how to manage the waste generated. It could also be beneficial in the event of local authorities seeking planning for the acceptance of hazardous waste at recycling centres insofar as a greater level of awareness/education amongst the public on hazardous waste would help the process. Any public awareness campaigns could also be linked up with the Green Schools scheme. However, there was also the caveat that awareness campaigns should be mindful of the recovery/disposal options available. Some of the areas flagged as being in need of awareness/education include:

- Construction, demolition, farming and motor trade sectors in order to improve segregation and management of hazardous waste.
- The HSE has also engaged a consultant to deliver a HSE Waste Training Programme to be delivered during 2008. However, it is felt that there is not enough awareness of HSE waste take-back schemes.
- Businesses are unaware of their obligations under the WEEE Directive.
- It was suggested that public awareness on asbestos waste should be addressed. One option mooted was the creation of a website detailing the issues related to asbestos waste and how it should be dealt with, and
- Potential for product or material substitution.

It was also suggested that case studies be conducted in the key sectors. Where case studies are carried out, it is important that the knowledge gained be disseminated throughout the relevant sector using seminars etc.

There is also a need for guidance documents on management of hazardous waste, in particular: asbestos, agricultural waste and healthcare waste.

It was suggested that funding should be made available for seminars specifically dealing with hazardous waste. The Cleaner Greener Production Programme (CGPP) was endorsed by small businesses and the implementation of further such initiatives is supported. It is felt that there is more scope within the CGPP programme for dealing with hazardous waste.

Financial Incentives

Some submissions proposed taxation of “bad” packaging (or products) to fully internalise the cost of dealing with products that are not readily recyclable or safely bio-degradable.

An example of this is the principle of solidarity of materials. This approach means that producers of packaging materials pay into a compliance scheme irrespective of whether the material is collected or not. This is based on the environmental and economic principles of collecting the easy to get/easy to recycle materials, sometimes to a much greater degree than their individual material targets. Consequently, materials such as the multi-foil laminates, exotic materials and hazardous materials pay twice: once to the packaging scheme and once again to have the hazardous components dealt with. The funds in the compliance scheme are

used to fund the additional and higher levels of collection for some materials, e.g. paper, cardboard, glass, etc., to levels in advance of targets without unfairly penalising those producers.

Overall, there was strong support for keeping prevention of hazardous waste at the core of the review of the NHWMP. It was mentioned on several occasions that proper implementation of this plan is essential to achieving the targets set for hazardous waste prevention or it could otherwise be seen as a failure as the original NHWMP is. Integration of the NHWMP into both the Regional Waste Management Plans and the National Development Plan is also seen as a way of ensuring better implementation and delivery.

COLLECTION/TRANSPORT

Many of the submissions on the collection of waste included points relating to the use of recycling centres and producer responsibility schemes as a collection method for hazardous waste from households and small businesses.

Healthcare waste was an issue in several submissions. It was proposed that the EPA liaise with the HSE in order to draft guidelines for collection of healthcare wastes. There are many sources of healthcare waste outside of hospitals, e.g. veterinary surgeries, dental surgeries, universities, research laboratories, etc., but it is not known if the waste from all these sources is collected appropriately. All regions need to have an appropriate collection service for waste from all such sources. The HSE have in place a mechanism for the return of waste from self-medication in the home but this is not available in all HSE regions. One suggestion was put forward that if suitable containers were available the waste could be mailed back to a HSE contact. Such a service exists in the USA.

Another area where recording and collection of waste is poor is the area of printing processes. Many within this industry discharge their water-based products to foul sewer rather than collecting and disposing of them properly. The collection and recovery of silver from photographic and x-ray solutions should also be investigated.

It was suggested that a centrally organised scheme for the disposal of hazardous waste from schools should be considered.

Additional collection methods suggested in the submissions are the following:

- The use of containers for mailing medical waste from home, as used in America, is a possible method to increase collection.
- Collection events/open days at licensed waste facilities should be considered, and
- Farm waste: One off collection event / amnesty / integrated collection event for hazardous and non-hazardous farm waste.

The waste industry would expect to be consulted on developing solutions for the collection of hazardous waste.

Recycling Centres

Many submissions on the collection of hazardous waste from recycling centres supported their role in the collection of hazardous waste but highlighted potential issues: staffing, funding, training, public acceptability, licensing and health & safety. Some of the submissions suggested an expansion of the range of materials accepted at recycling centres to allow for the collection of other hazardous waste such as adhesives, weed killers, aerosols and cleaning agents. In some cases, when the Chemcar service was offered, the collection capacity was reached before the end of the allotted time and so waste was left at the site. Collection of hazardous waste at a recycling centre would prevent such incidents. A 'roving' Chemcar service could be offered to those with no permanent recycling centre within a reasonable distance. The use of recycling centres as a drop-off point for certain types of agricultural waste was suggested with one-off collection events for materials such as unwanted pesticides could also be held at recycling centres.

The definition of a 'small business' should be clarified to protect such a system from abuse by larger companies.

Many submissions highlighted the issues of using recycling centres as drop-off points for hazardous waste. The main issues for this are centred on the training, expertise and staff resources that would be required. It was suggested that a scientist would be required on site to inspect the hazardous waste coming in and that a Dangerous Goods safety Advisor would also be needed. Operatives at any facility, including recycling centres that accept hazardous waste, should be trained in the handling of hazardous waste. It was suggested that FÁS include hazardous waste handling and management in their training courses. It may also require extra staff to cater for an increased level of waste intake. It would be expected that planning for the increased intake of waste would be problematic, not least because of concern amongst local householders who would oppose the collection of hazardous waste in close proximity to their homes. In addition, the status of recycling centres with regards to planning and licensing would need to be clarified.

Another issue raised in several of the submissions was that of the collection of asbestos waste. One or two suggested the use of recycling centres as a drop-off point for small-scale asbestos waste, i.e. from households. However, the general consensus was that though it is a priority waste, it should not be collected at recycling centres because of health and safety issues. A scheme whereby a contractor removed the waste, at a small cost to the householder, was suggested.

It should also be noted that not all recycling centres may be suitable to accept hazardous waste.

Producer Responsibility

It is believed that that producer responsibility initiatives (PRIs) can form part of the solution for hazardous waste management. Several submissions suggested materials for which there should be PRIs:

- Aerosols,
- Oils and oil filters,
- Hazardous agricultural waste,
- Paints, and
- Batteries

Money raised by PRIs could go towards a central fund to help local authorities manage this waste. It would also encourage producers to find non-hazardous components. The NGO sector felt it was important to get greater involvement of those creating and supplying hazardous products to play a role in their collection and recovery.

Transport

One of the issues raised with regard to the movement of hazardous waste was the fact that Ireland currently exports the majority of it for treatment, which puts the country at the mercy of European/world markets. There is concern in some sectors that if the borders close to waste from Ireland, there will be a severe lack of options for recovery and disposal of hazardous waste. This has led many submissions to suggest that Ireland should be self sufficient in terms of managing its hazardous waste.

However, some felt that Ireland would never reach the critical mass required to warrant its own hazardous waste facilities such as landfills or incinerators. They felt that with the current trend for reduction in hazardous waste and the potential for emerging new technologies that would be more amenable to all, the introduction of incineration was premature. They felt that whilst the capacity for treatment exists abroad, Ireland should export the waste that arises as well as continuing to aim towards the prevention of hazardous waste.

The other main issue with regard to the transport of hazardous waste was that of C1 forms. It was mentioned that the range of charges for C1 forms across the different local authorities, was a reason for some evading the C1 system. Some raised the point that the cost of a waste permit application is disassociated from the volume of waste collected. This can lead to small-scale collectors the storing the hazardous waste on site until it makes more financial sense to move it. Several submissions commented on the need for a new C1 system. Most companies that use the system are moving the same types of waste each time but in varying quantities. It was suggested that an annual C1 form with a movement form, similar to the TFS system, would be better. One-off forms could be used for events such as spill clean-ups, i.e.

movements that are not the normal business of the company. It was also proposed that the registration of hazardous waste producers could be incorporated into a new C1 system.

RECOVERY AND TREATMENT

Many submissions supported recovery of hazardous waste but also emphasised Ireland's weakness due to reliance on export and the need to increase capacity for recovery and reprocessing of materials. More specific comments have been grouped together below.

General (Recovery)

General comments in relation to recovery of materials include:

- Triple-rinsed containers should be classified as non-hazardous. The European Crop Protection Association analysed triple-rinsed containers in a study on Germany and such containers were shown to meet below the hazardous threshold. Triple-rinsed containers are suitable for recycling once they are not used as containers for food products,
- Solvent waste could be returned to the producer for recovery, and
- There were concerns expressed about use of recycled products from hazardous waste sources (e.g. possibility of contamination if used in food applications).

Technology

Preferred technologies for recovery include:

- Alternative recovery and disposal methods should be examined – thermal treatment does not have to mean “incineration”.
- The plan should support technologies such as solvent blending. However, it has been suggested that to use blended solvents as a fuel in waste kilns would require greater treatment systems to meet emissions standards.
- Studies into the technical and economic feasibility of co-incineration should be conducted

Incineration

There were mixed reactions to incineration as a technology. Some submissions outlined that incineration should be included as an option while others stated that it would undermine prevention and the incentives to recover and reuse. A number of issues were raised in relation to incineration, including:

- More consideration should be given to alternatives to mass incineration than there is in the Proposed Plan,
- Incineration is premature given the reduction in hazardous waste since 2004 and the scope for reduction. It was advised that whilst there is capacity for treatment abroad, Ireland should

continue to use this option whilst looking at alternative options amongst current and emerging technologies,

- The Plan states that thermal treatment in Ringaskiddy would cater for 18-20,000 tonnes of waste. The EPA licence for the proposed incinerator allows for 50,000 tonnes. Only 10% of this would come from Cork. If the incinerator is being considered as an all-island facility, it is goes against the proximity principle,
- There is a concern that because commercial incinerators need guaranteed quantities of waste to be viable, recovery of waste would be hindered,
- The impact of incineration and hazardous landfill on human health should be given greater consideration,
- Government policy has moved away from incineration and the Plan should reflect this, and
- Is there a case to suggest that all incinerator ash could be classed as hazardous?

Contaminated Soil

The general consensus is that contaminated soil should be treated as close to the point of generation as possible. Points made in relation to this are:

- Where possible, contaminated soil remediation facilities should be set up adjacent to landfills to be used as cover,
- Consideration should be given to the concept of 'soil hospitals' as used in the reclamation of soil in The Netherlands, and
- Do the new waste regulations allow for mobile treatment plants for the recovery of contaminated soil?

DISPOSAL

Landfill

There were mixed views as to whether or not Ireland should develop hazardous waste disposal cells. Issues outlined in relation to the provision of hazardous waste landfill cells include:

- The development of landfill capacity for hazardous waste should be open to both the public and private sector,
- Landfills for hazardous waste should be considered on a regional basis,
- There may not be sufficient capacity in proposed landfill sites to cater for hazardous waste to be landfilled when the ash from incineration is factored in,
- Studies have shown that there may be an association between chromosomal anomalies and hazardous waste landfills, and

- In relation to the disposal of asbestos, the non-surrender of a landfill licence creates too many problems. Bonded asbestos waste is very stable and unreactive and presents no problems when deposited in an appropriately designed landfill cell. A suggested approach would be to list the site as site where hazardous waste has been deposited. The site is registered as such with the local authority which allows for the identification of such land in development plans as land on which certain development is prohibited so as to prevent disturbance of the waste.

Minerals Industry

Mining activities are regulated by Directive (2006/21/EC) on the management of waste from extractive industries and most, but not all, such activities are IPPC licensed. The National Waste Prevention Programme: Outline Work Plan (2004-2008) states that mining waste is significant but generally non hazardous. However, chapter 1 of the European Waste Catalogue lists several hazardous wastes from the sector. Directive 2004/35/EC contains a number of specific provisions relating to hazardous waste from the extractive industry. It is therefore important that the disposal of this hazardous waste stream be considered in the Plan. Hazardous waste from extractive industries is not addressed directly outside of Table 8.

Harbours

The view was raised that policy and action thresholds on foot of identification and assessment of ports should be developed. However, they may be covered in the Water Framework Directive or Martine Strategy. This should be clarified.

There appears to be no mention of inland harbours/mooring facilities. There is considerable use of chemicals for sanitary purposes, bilge cleaning, antifouling paint, etc. Containers of these chemicals require correct disposal.

It was suggested that it would be preferable that contaminated dredge soil should be treated and disposed of within the State rather than exported.

STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)

The submission from one NGO notes that the Health Research Bureau has stated that Ireland has insufficient resources to carry out adequate risk assessments on waste management facilities. This is an issue considering that monitoring and regulation are central to the SEA process. There are some hazardous wastes at abandoned/historic mine sites and these should therefore be accounted for in legacy Issues. An inventory of historic mine sites is currently being prepared and should help provide a clearer picture of the extent of hazardous waste at these sites. The SEA should also be more considerate of potential impacts on human health.

GENERAL ISSUES FROM SUBMISSIONS

Local Authorities

The need for state funding in order to implement many of the measures outlined was outlined. If local authorities are expected to accept hazardous materials at recycling centres, then funding will need to be provided to facilitate this operation. The Plan refers to such expansion being funded by the Department of the Environment, Heritage and Local Government but there does not yet appear to be any guarantee of such funding.

Adequate staff resources are also a primary requirement, not just in relation to operating recycling centres but to be able to fulfil the greater enforcement duties expected. There appears to be a need for the clarification of the distinct roles of the Green Business Officer and Waste Prevention Officer. Also, Environmental Awareness Officers (EAO) and Green Business Officers should be afforded the status that their role in prevention and minimisation warrants. Local Authorities should be explicitly recognised as among the implementation and monitoring bodies of the National Hazardous Waste Management Plan.

It was proposed that the registration of hazardous waste producers could be incorporated into a new C1 system. The concept of waste facility permit holders and waste collection permit holders reporting on the type and quantities of waste generated by their customers was not agreed with. With the permit holders having to do their own annual environmental report, a separate report on their customers would amount to double reporting.

The waste management industry welcomes collective tendering on mobile collection and the management of waste at recycling centres. However, some local authorities are unsure if it is viable because some of the recycling centres in Dublin are already operated under contract. However, there is scope for discussion on whether local authorities or the private sector should provide for these facilities.

Agriculture

The management of hazardous agricultural waste is an important aspect of the Plan because of the quantities and types of waste produced on farms. This waste includes herbicides, pesticides, fungicides, fertilizer bags, contaminated plastic waste and veterinary waste. As it stands, farmers are a commercial business and must deal with hazardous waste in the same way as any commercial business. The development of a farm waste collection system with costs being met “in whole or in part by producer responsibility obligations on certain products such as animal and plant protection containers” would have implications for the operation of the packaging waste recovery regime. It should be amended to specifically propose that the cost of any such system be subvented by all producers of all products that give rise to hazardous agricultural waste.

The Animal Remedies Regulation (S.I. No. 734 of 2005) put into effect a ‘bring back’ scheme for out of date and/or partially used animal remedies. Waste management legislation suggests that to receive these animal remedies, a practice must have a waste transfer permit

and in some cases a hazardous waste transfer licence. However, this is impractical, uneconomical and unworkable. A similar scheme to the DUMP (Disposal of Unused Medicines) project could encourage the veterinary profession to engage in the spirit of the animal remedies regulations and the introduction of a scheme to encourage farmers to return veterinary waste to a collection point on a specific day could be encouraged.

One of the suggestions was that there should be a study to ascertain what levels of hazardous waste were present on the average farm. Agrochemical waste and its packaging is the main concern for farmers. Whilst triple rinsing of containers renders the containers non-hazardous, concern was expressed in one or two submissions about where the washings go. In some cases the washings would be used but there may potentially be chemicals being diluted and disposed of to a foul sewer. Allowing farmers to transport hazardous agricultural waste to a drop-off point for disposal without the need for a permit would facilitate a greater level of appropriate disposal of waste. There appears to be no mention of large-scale agricultural waste, e.g. BSE-infected carcasses that would need to be disposed of.

Data

There were some queries related to data in the Proposed Plan:

- In the section on unreported waste, the figure for 'fluorescent lamps' was 2,267 tonnes, which is equivalent to 12,000,000 lamps. In the Environmental Report it gives a figure of 254 tonnes (1,390,000) lamps. This would appear to be more realistic since there were 7,000,000 such lamps sold in Ireland in 2006,
- One NGO has suggested that there is inconsistency regarding the quantities of hazardous waste generated, i.e. that on Page 7 the Plan says 560,000 tonnes of hazardous waste was produced in 2004, inclusive of contaminated soil. On Page 22 it says states that Ireland produces 700,000 tonnes of hazardous waste annually. With respect to this, it was suggested that the Plan be put on hold until there was a review of the hazardous waste figures similar to the Minister for the Environment's review of non-hazardous waste figures,
- The quoted figure of 1.2kg of hazardous waste collected per capita appears to be low considering that it does include WEEE, and
- As a general comment, figures used should be consistent with documents such as the National Waste Report.

Implementation

It was felt that any references to the implementation, or lack thereof, of the original NHWMP should include who was responsible for its implementation. The Waste Management Act requires each Government Minister, a local authority and any other public authority in whom are vested functions in relation to the protection of the environment to have regard to the plan and, where the Minister, local authority or public body considers it appropriate to do so, they are obliged to take measures to implement or otherwise give effect to recommendations

contained in the NHWMP. It is important to state this as implementation responsibility falls on different bodies. Ultimately though, it should be made clear in the summary of recommended actions and responsibilities in the Plan that ownership of the process of overseeing the implementation of the NHWMP should rest with the EPA.

NGOs would like an independent expert on 'zero waste', an ecologist and a representative from an NGO on the Implementation Committee.

Infrastructure

Many submissions stated that they felt there was a lack of infrastructure in Ireland to deal with hazardous waste and that Ireland needs more facilities for the treatment and disposal for hazardous (incl. WEEE) within the country. There was some criticism of the poor progress in relation to the development of waste recovery and disposal capacity here and a belief that there will not be much progress over the course of this Plan unless economic incentives are offered.

Many submissions outlined the need to provide facilities for the disposal of household hazardous waste – mostly at recycling centres – to allow the public to dispose of hazardous waste in a safe manner. Currently, it is believed that much of this waste is disposed of to landfill.

It was recommended that a system or strategy be developed for the provision of clinical waste collections to householder who need to dispose of medical waste resulting from treatment at home.

Asbestos disposal is another big issue relating to hazardous waste disposal. Some submissions suggested that recycling centres could accept small quantities of asbestos removed from households. With regard to this, it was suggested that a website be set up to explain how to properly package and label this asbestos. However, many other submissions recommended against the use of recycling centres as drop-off points for household asbestos citing the expertise, training and staff resources needed as well as the potential planning problems.

Waste Management Planning

It was stated that proper selection criteria and risk assessment must be the basis for nominating and deciding on any disposal/recovery strategy. Proposed technologies and facilities need to be determined and their spatial requirements determined also in order to create a clear implementation mechanism.

It was outlined that waste needs to be addressed on a national level and should link all regional and national waste plans together. The current plan is disconnected from those implementing it on the ground and from other regional and national waste plans. The plan should be recognised by An Bord Pleanála and be integrated into both the regional waste

management plans and the NDP. The current planning and licensing system is perceived to be significantly delaying licensing and planning and thus delivery of infrastructure.

Legislation & Regulation

Across the board, the consolidation of existing regulations, particularly with respect to reporting requirements, was welcomed. Several submissions raised the point that the Plan needed to take the new waste facility permit and waste collection permit regulations into account. The need for clarification on the status of recycling centres, after being cleared to accept hazardous waste, was raised. Article 21 of the waste facility permit regulations refers to authorisation required for mobile plants. The mobile plant in Section 7.1.1 of the Plan should be differentiated from the regulations.

One submission suggested that legislation or regulations be put in place that prevented garages from storing hazardous waste for long periods of time.

It should also be clarified that in cases where there is clear evidence of pollution arising from illegally deposited hazardous waste that Section 55 of the Waste Management Act takes precedence over the Planning Act as a basis for remediating the site.

As a general point, the overview on national legislation should include:

- Directive 2006/21/EC on the Management of Waste from Extractive Industries,
- The proposed Soil Framework Directive,
- Waste Management (Hazardous Waste) (Amendment) Regulations (S.I. No. 73 of 2000),
- European Communities (Carriage of Dangerous Goods by Road)(ADR Miscellaneous Provisions) Regulations 2007 (S.I. No. 289 of 2007), and
- Regulation (EC) No 850/2004 on persistent organic pollutants.

Self-Sufficiency

In general, the concept of self-sufficiency was welcomed. However, the waste industry expressed the view that self-sufficiency should be encouraged where technically and economically feasible as opposed to just regulating against export. It was also suggested that progress with regard to self-sufficiency would continue to be slow unless economic incentives are offered.

There is a need for a hazardous waste landfill on the island of Ireland. However, the capacity of the landfill should be related to the expected levels of incineration residues that may arise.

Concern was raised in relation to the view that co-incineration at cement kilns would result in higher costs at incineration plants because of the loss of a high-calorie fuel, i.e. blended solvents. An incineration facility must be taking in all types of hazardous waste.

It was felt that Ireland should be self sufficient with regard to physico-chemical treatment of waste. There should be investment in the research of other methods of acid neutralisation that do not produce large volumes of filter cake.

Enforcement

In general, the need for greater levels of enforcement was agreed upon. However, several submissions pointed out that there were several barriers to this. Increasing the level of enforcement means a greater level of resources is needed. It also needs continuity and a local expertise, with respect to the enforcement staff, to be more effective. However, many current enforcement staff are on short-term contracts. Thus to increase enforcement levels, the local authorities will need adequate financial and staff resources. There was also the suggestion that it is more important to improve the enforcement of current legislation rather than introducing new legislation – it was felt that the current legislation was adequate but that it just wasn't being enforced properly. It was also put forward that the retail take-back of WEEE needed to be subject to greater enforcement in terms of compliance with the terms of the WEEE regulations and the required storage facilities.

It is expected that the Department of Agriculture, Fisheries & Food (DAFF) have a role to play in the enforcement of the Animal Remedies Regulations and also in relation to the storage, handling, usage and recording of plant protection products. Such enforcement would fit into DAFF cross-compliance inspections and so the local authorities would not be burdened with the task.

There was also a call for a greater interrogation of C1 records. However, this would be dependent on staff resources.

Should the management of hazardous waste be considered on an all-island basis, the necessary enforcement measures would need to be in place to ensure that waste crossing the border into Northern Ireland is not shipped to Britain or further afield.

Targets & Indicators

It has been suggested that studies should be carried out in order to find out the levels and composition of certain waste streams being generated. This will allow for performance indicators to be developed.

The HSE suggested that the Comptroller & Auditor General report 'Value for Money of Waste Management in Hospitals' findings be used as benchmarks where applicable.

The view was raised that whilst the indicators and targets listed were reasonable, a 2007 baseline rate should be established. Performance indicators should also be divided into primary and secondary targets, as some would have more of an impact than others.

Another submission called for targets to be derived from international best practice and that quantities collected be one of the performance indicators.

Unreported Hazardous Waste

In relation to fluorescent lamps, there were some suggestions that fluorescent lamps should not be included in the unreported waste category because (i) it suggests inappropriate management of the waste and (ii) it is part of the WEEE stream.

It is believed that the key to reducing unreported waste is to increase awareness amongst both the waste producers and the public and having accessible collection systems in place.

Other Comments/Issues

Some general comments that arose include:

- The electronics manufacturing sector should be considered for priority action given the solvents and hazardous compounds it uses,
- Waste oil burners should not be promoted amongst farmers and the motor trade since they are not an appropriate form of disposal for waste oils,
- As service from permitted collectors is considered too expensive for small-scale jobs, the cost burden on small-scale collection and small-scale depots should be reduced,
- Industry was in favour of assistance from a body such as Enterprise Ireland in order to develop treatment technologies,
- As the Plan is not expected to be complete and published until mid-2008, it is suggested that the first implementation report would be best published in June 2010,
- A list of references at the end of the document would be useful, and
- The figures used should be double checked to ensure they are consistent.

Summary of submissions made during consultation 2006

The following is a brief overview of the issues raised in the 33 submissions made during the initial consultation period in 2006. The content of all submissions was taken into account in the preparation of this Proposed Plan. Submissions were made by:

An Garda Síochána
Animal and Plant Health Association
Atlas
AVR Safeway
Bord na Móna
Carrigaline Area for a Safe Environment
Clare County Council
Cobh Action for Clean Air
Cork Environmental Forum
Cork Harbour Alliance for a Safe Environment
Department of Communications, Marine and Natural Resources
Dun Laoghaire Rathdown County Council
East Cork Green Party
Forfás (including Enterprise Ireland and IDA Ireland)
Health Service Executive
Irish Doctors' Environmental Association
Irish Planning Institute
Irish Waste Management Association
Kinsale Environment Watch
Limerick City Council
Longford County Council
Marcia D'Alton, on behalf of five Members of Passage West Town Council
Monkstown, Glenbrook and Passage Branch of CHASE (Cork Harbour Alliance for a Safe Environment)
Mrs. Natasha Harty
N Echa
North Tipperary County Council
Peter H North
Ringaskiddy and District Residents Association Ltd.
South Tipperary County Council
The Committee of East Cork for Safe Environment
Tralee and Fenit Harbour Commissioners
Veterinary Environmental Management
WEEE Ireland

The following text highlights the principal issues addressed in the submissions.

Prevention

Considerable emphasis was placed on prevention, in particular from the public and environmental NGOs. There is broad consensus that prevention needs to be the top priority of the Plan. However the First Plan was criticised for not living up to expectations in terms of the actual implementation of prevention initiatives. In response, it is fair to say that it took a number of years to establish the National Waste Prevention Committee and the Core Prevention Team within the EPA. There are also practical barriers to developing prevention: including the need to develop expertise and improve awareness.

The fact that smaller industrial enterprises do not come under IPC/IPPC licensing was raised several times. It was felt by some that as there are no licensing controls for these small businesses, they are not dealing with hazardous waste in an appropriate manner or looking towards the prevention of hazardous waste. There can also be problems with the correct classification of waste in small industries, which can again lead to its incorrect management.

Industries, in particular the pharmaceutical companies, pointed out that there are constraints on what can be achieved in relation to prevention. For example:

- the use of anything other than virgin materials in pharmaceuticals is not encouraged, meaning the potential for recycling of waste solvents or active ingredients is seen as limited;
- where new products (e.g. drugs) are being developed, there is an unavoidable generation of waste until the process is fully approved and in production, at which point prevention/efficiency drives can be made;
- in some industries, prevention cannot be achieved in Ireland alone, since production processes are designed abroad, or the products are manufactured abroad. Pharmaceutical companies are concerned about the downstream liabilities they might suffer if waste they generate is not effectively destroyed.

There was positive feedback from this sector suggesting gains in prevention are being made. Within some licensed industries, the EPA is requesting 'efficiency audits of raw material usage' and setting continual improvement targets under the IPPC licence. This is providing some gains in waste prevention. Other trends reported were a reduction in the use of halogens (e.g. chlorine, bromine) and the gradual switch to water-based as opposed to solvent-based paints and cleaning agents.

It was suggested that prevention efforts should be fully implemented *before* any treatment or disposal elements are implemented, i.e. the Plan should be implemented in sequence. In response, while it is recognised that prevention must be a priority of the Plan, it is not practical or wise to delay all other elements of the Plan until prevention is implemented. Preventing waste takes many years to achieve and, in the interim, systems to collect, treat and dispose of hazardous waste must be developed and improved.

Hazardous waste collection companies report a reduction in hazardous waste arisings within the pharmaceutical sector, pointing to a change from chemical manufacturing to biotechnological

manufacturing. It is reported that greater care is being paid to waste prevention (and the use of less hazardous substances) at the design stage for new products. An increased emphasis on 'total waste management' was noted, whereby industries now require prevention solutions and recycling options from the waste collection company, as opposed to just safe disposal. The waste collectors identify the main drivers as being corporate policies (including the 'Responsible Care' initiative of Pharmaceutical Ireland), and waste costs.

It was suggested that the First Plan was unrealistic in setting absolute targets for waste prevention. It was stated that this ignores the economic reality of increasing waste generation in a growing economy that is actively seeking inward investment and new employers.

Some specific proposals and suggestions that emerged included:

- Industry encouraged the EPA to build incentives into the IPPC system - for example, companies that achieve reduction in waste and improved environmental efficiency could benefit from reduced fees, or increased allocations under other schemes.
- A national agency should be established to train staff in smaller industries and businesses on the correct way to classify hazardous waste. This agency should be funded centrally and provide a free advice and training service to smaller businesses.
- Further research into alternative non-hazardous household products and promotion of their use should be encouraged by the EPA.
- Grants should be made available to fund initiatives or research leading to a reduction in the use of toxic or hazardous substances in products.
- A toxic use reduction agency should be formed, equipped with the best expertise available in the minimisation of the use of toxic materials. It should be made mandatory that every new production procedure using toxic material must be approved by this agency to ensure the best practicable environmental option is used.
- Preferential tax treatment for re-use and recovery systems for hazardous waste would encourage private enterprise and enable novel solutions to be applied.

It was acknowledged that several initiatives have been successful at increasing the awareness of waste issues at a basic level (e.g. Race Against Waste), but more needs to be done with regard to hazardous waste, particularly for SMEs, the public and the farming sector. Awareness should be raised on how to identify hazardous waste, provide information about where to safely recover and dispose of hazardous waste and raise awareness about using safer household cleaning products.

Overall, there was strong support for keeping prevention of hazardous waste at the core of the revised Plan. Integration of the Plan into Regional Waste Management Plans and the National Development Plan (NDP) is also seen as a way of ensuring better implementation and delivery.

Collection and movement of hazardous waste

Adequate collection infrastructure is needed for household hazardous waste. Submissions outlined the problem of access to recycling centres for small enterprises and farmers. Some recycling

centres accept commercial waste and others don't. It was stated that businesses would be prepared to pay to be able to use these facilities.

It was suggested that perhaps a mobile collection service is the most practical way of raising awareness and encouraging people to bring their waste to recycling centres. On the other hand it was also outlined that Chemcars are expensive and it is hard to justify their expense if hazardous waste only accounts for 1% of the household waste stream. It was also stated that the current Chemcar system is haphazard as households don't know when it will arrive.

The pharmaceutical sector would like to see more innovation by waste companies in terms of the collection services offered and the pursuit of novel recovery solutions. There is a perception that waste companies are happy to stay with established recovery and disposal options.

The current C1 and TFS forms - the mechanisms used to regulate hazardous waste movement within Ireland (C1) and internationally (TFS) - were identified as a barrier to effective collection and transport of hazardous waste. Detailed submissions were made by waste companies outlining recommended reforms and dealing with the cost, complexity and administration of the system. There was also a suggestion that there is inaccurate use of C1 and TFS forms.

A concern was also expressed by waste-producing industries with regard to the 'gap period' between waste leaving their facility and reaching its final destination and how liable the producer might be if an incident occurs in that time. A desire to see more audits/spot checks carried out on all waste movement in Ireland (as in other European countries) was also voiced.

Some specific proposals that emerged include:

- It was suggested that national guidelines be developed for hazardous waste acceptance at recycling centres.
- A desire to see more audits/spot checks carried out on all waste movement in Ireland (as in other European countries) was voiced.
- A review of the current regulatory systems (including C1, TFS and Waste Collection Permit systems) was requested, and required changes were set out.

Recovery and treatment

With regard to waste recovery, the reliance on export to other countries was emphasized by many submissions as a strategic weakness for Ireland: greater capability to recover and reprocess materials in Ireland was recommended.

It was pointed out that Ireland must currently export the majority of its hazardous waste due to infrastructure deficits in Ireland. This puts the country at the mercy of European markets. There is concern in some sectors that if the borders were to close to Irish waste, there would be a severe lack of options for recovery and disposal of hazardous waste.

Waste producers and management companies want to improve the infrastructure available in Ireland for many hazardous waste streams. They contend that solvent blending (for use as fuel) should be considered, and that co-incineration options should also be examined. The waste

industry gave a guarded welcome to the proposals by Indaver Ireland to develop a hazardous waste incineration plant in Ireland. The possibility to treat waste here is seen as beneficial, but competitors do not wish to see a monopoly situation arise.

Some specific suggestions emerged from the waste industry as regards improving self-sufficiency:

- The commitment to establish and operate infrastructure within Ireland should be strengthened. Whilst complete self-sufficiency in Ireland may be unlikely given the limited size of the market, further measures should be introduced to encourage progress towards such an ideal, and to reduce the strategic risk to industry.
- Grant assistance should be available to assist in justifying the development of required infrastructure that is not currently present. Where the capital cost of a technology exceeds the economics of operating in a limited market size such as Ireland, financial assistance could bridge the gap making additional technologies viable in Ireland.
- Certain waste streams are available within the market at volumes that may only justify a single processing facility. In such cases, the plant will only be commercially viable when it has a guaranteed supply of the entire waste stream arisings. A national contract would facilitate this, and long term contracts will offer stability over a set period of time so as to justify the risk taken by industry in capital investment. This would not be anti-competitive as the contract would be tendered for competitively.
- There is a lack of knowledge within Irish industry of the existing hazardous waste infrastructure available to them within Ireland. This is partly because of the misconception that because we don't have an incinerator, no hazardous waste can be processed in Ireland. Existing treatment or recovery facilities in Ireland (such as metal recovery, solvent bulking and blending, waste oil recovery, physico-chemical, electro-chemical and biological treatment for various hazardous wastes) should be promoted through the Plan and under IPPC licensing.

It was suggested that Ireland is too small to have major hazardous waste treatment facilities and we should continue to co-operate with other countries who have the economy of scale to enable state-of-the-art treatment approaches.

Environmental groups are concerned about the health impacts of incineration, and see it as counterproductive to waste prevention policies. They also feel that alternatives such as solvent recovery and non-incineration recovery options need to be pursued further. They feel that Ireland is not necessarily big enough to require dedicated hazardous waste facilities for certain waste streams.

It was also recommended that it become mandatory under IPC/IPPC licensing to eliminate or reduce as much as possible the cross-contamination of toxic waste material so segregated materials can be recovered more effectively and the need to incinerate is reduced.

It was claimed that incineration is an expensive technology in economic and health terms. A number of issues were raised in relation to health issues and incineration and these include:

- It was stated that there should be a freeze (moratorium) on the incineration of all toxic and hazardous waste until all the possible alternatives have been explored, and until a baseline study of human health is conducted and systems for comprehensive monitoring of human health are in place.
- Health impacts should be included in the assessment of alternatives
- Particulate matter has a much greater health effects than previously understood.

A number of submissions included copies of a document entitled *The Health Effects of Waste Incinerators - 4th Report of the British Society for Ecological Medicine*. This is a recent report that examines issues such as the emissions from incineration, monitoring requirements, health impacts due to emissions, 'safe levels' of pollutants, low dose toxicity and other issues. It was suggested that once the health impacts from incineration emissions are considered, it becomes a very poor solution.

Disposal

Industry bodies criticised the lack of delivery of waste disposal infrastructure (including hazardous landfill disposal cells), as recommended in the First Plan, which they see as a failure by the public authorities.

There seems to be recognition in most quarters that some form of hazardous disposal facility is needed in Ireland. There appears to be some misgiving among environmental NGOs about any co-treatment facilities where non-hazardous and hazardous materials are treated side by side, whereas the industry sector is favourable towards the development of co-treatment arrangements if these are safe and cost effective. It was suggested that best practice models for disposal from other countries – e.g. Nova Scotia – be considered.

It was suggested by the private waste industry that once the proposed waste to energy facilities are in operation in Ireland, that a landfill operator would be likely to develop a hazardous waste disposal cell. The main barrier at present would be the negative public perception and high costs (and delays) for what is not a very large waste stream. Incentives could encourage proposals from the private sector.

All-island options

Waste management companies generally feel that restrictions from entering the Northern Irish market are unhelpful to Industry when it is logistically easier to collect from parts of the North than it is to collect in Cork or Donegal for example. Opening up the North to trade and removing the need for TFS would be beneficial.

This contrasts with the view of some NGOs, who feel that should Irish facilities be allowed to treat waste from the north, and then we may end up treating hazardous waste from all over the UK.

Additional Issues

Submissions outlined that even though household hazardous waste only accounts for 1% of hazardous waste, there needs a more organised and regulated service which will make it possible for all members of the public to dispose of hazardous waste in a safe manner. This should extend to disposal of medical items for people who administer medication at home.

Farm waste is important to the plan as farms produce a lot of hazardous waste that includes packaging for herbicides, pesticides, fungicides, and including fertilizer bags, contaminated plastic waste and veterinary waste. It is difficult for farmers to deal with hazardous waste in the same way as other commercial businesses. The quantities produced are relatively small and the distances involved are high, making commercial hazardous waste services too expensive.

Hazardous waste from the marine and coastal environments was referred to. There is concern over how small fishing vessels dispose of their hazardous waste – e.g. how can harbour masters identify and quantify hazardous waste? It was also suggested that contaminated dredge soil should preferably be treated and disposed of within the State rather than exported.

Waste management companies complained that lack of enforcement of legislation among smaller commercial activities is undermining many of the larger operators. The regulatory authorities “tend to go after” the soft targets such as the licensed facilities and focus on minor compliance issues. Resources should instead be directed at the illegal collectors, the small producers, and in general to the unreported hazardous waste. Examples cited include waste oil being burned in garages, photolabs discharging to sewer, end-of-life vehicles not being de-polluted properly and so on.

APPENDIX B – Hazardous waste generation and treatment data

The following tables are contained in this appendix:

- Table 23 Indicators for hazardous waste generation and management
- Table 24 Treatment of hazardous waste on-site of generation at IPPC licensed facilities in 2006

Table 23 Indicators for hazardous waste generation and management

All data from National Hazardous Waste Management Plan (2001) and National Waste Reports (1998, 2001-2006)

| Indicator | 1996 | 1998 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|--|----------|----------|----------|----------|----------|----------|----------|----------|
| | (tonnes) | (tonnes) | (tonnes) | (tonnes) | (tonnes) | (tonnes) | (tonnes) | (tonnes) |
| Industrial hazardous waste treated on-site of generation (predominantly at IPPC-licensed facilities) | 141,156 | 131,738 | 95,566 | | | 86,328 | | 88,409 |
| ... recovered (tonnes) | 85,690 | 75,440 | 40,900 | | | 32,899 | | 38,372 |
| ... disposed (tonnes) | 55,464 | 56,298 | 54,666 | | | 53,429 | | 50,037 |
| | | | | | | | | |
| Hazardous waste treated off-site in Ireland at authorised facilities (not including contaminated soil) | 36,434 | 42,485 | 48,013 | | | 55,952 | | 60,872 |
| ... recovered (tonnes) | 29,228 | 28,868 | 32,401 | | | 24,446 | | 26,976 |
| ... disposed (tonnes) | 3,921 | 13,541 | 15,612 | | | 31,506 | | 33,896 |
| | | | | | | | | |
| Hazardous waste exported (not including contaminated soil) | 51,327 | 75,907 | 115,366 | 109,545 | 170,678 | 165,498 | 146,811 | 134,904 |
| ... for recovery | 23,651 | 48,210 | 67,751 | 63,706 | 80,852 | 100,134 | 91,418 | 69,515 |
| ... for disposal | 27,369 | 50,180 | 47,140 | 41,975 | 88,197 | 76,494 | 55,392 | 65,130 |
| ... for unspecified treatment | 307 | 1,208 | 476 | 3,864 | 1,629 | 372 | 0 | 259 |
| | | | | | | | | |
| Unreported hazardous waste (estimate) | 98,228 | 74,311 | 48,402 | | | 47,011 | | 29,888 |
| | | | | | | | | |

| Indicator | 1996 | 1998 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | (tonnes) | (tonnes) | (tonnes) | (tonnes) | (tonnes) | (tonnes) | (tonnes) | (tonnes) |
| Contaminated soil | 400 | 45,486 | 168,579 | | | 221,137 | | 406,904 |
| ... recovered in Ireland | 0 | 0 | 8,535 | | | 14,838 | | 36,872 |
| ... disposed in Ireland | 0 | 0 | 101 | | | 0 | | 0 |
| Exported contaminated soil | 400 | 23,691 | 159,943 | 139,892 | 218,521 | 206,299 | 140,442 | 370,032 |
| ... recovered abroad | 400 | | 159,153 | 139,449 | 143,897 | 35,555 | 7,184 | 28,875 |
| ... disposed abroad | 0 | | 789 | 443 | 74,264 | 170,744 | 133,258 | 341,158 |
| | | | | | | | | |
| Industrial hazardous waste generated | | | | | | | | |
| ... reported (i.e. sample) | 192,789 | 219,974 | 202,502 | | | 209,197 | | 216,411 |
| ... projected (i.e. total) | 222,107 | 238,892 | 244,426 | | | 259,487 | | 271,755 |
| ... recovered (tonnes) | | 110,702 | | | | 87,794 | | 101,173 |
| ... disposed (tonnes) | | 109,156 | | | | 120,159 | | 114,041 |
| ...unspecified recovery or disposal (tonnes) | | | | | | | | 1,197 |

Table 24 Treatment of hazardous waste on-site of generation at IPPC licensed facilities in 2006

| Facility name | IPPC register number | Waste type | Operation (see below for key) | Quantity treated in 2006 (tonnes) |
|---|----------------------|---|-------------------------------|-----------------------------------|
| Aughinish Alumina | P0035-02 | Saltcake (process residue) | D1 | 13,748 |
| | | Waste oils | R9 | 13 |
| Arran Chemical Company | P0110-01 | Solvent | R2 | 601 |
| Bristol Myers Squibb | P0552-01 | Solvent | D10 | 3,060 |
| | | | R2 | 2,632 |
| Swords Laboratories (incinerated at sister site P0552-01) | P0014-03 | Solvent | D10 | 2,437 |
| Eli Lilly | P0009-03 | Solvent | R2 | 1,493 |
| | | | D10 | 9,290 |
| Temmeler Ireland | P0018-01 | Solvent | R3 | 587 |
| | | | R2 | 2,280 |
| Liebherr Container Cranes | P0146-01 | Solvent | R2 | 4 |
| Mallinckrodt Medical Imaging – Ireland | P0050-02 | Solvent | R2 | 8,167 |
| | | | D8 | 479 |
| | | | D9 | 101 |
| Pfizer Cork | P0103-01 | Solvent | R2 | 205 |
| Pfizer Ireland Pharmaceuticals | P0013-04 | Solvent | R2 | 4,088 |
| Roche Ireland | P0012-04 | Solvent | R1 | 4,159 |
| | | Solvent | R3 | 1,628 |
| Glaxosmithkline | P0004-02 | Solvent | D10 | 16,184 |
| | | | R2 | 1,100 |
| Novartis Ringaskiddy | P0006-03 | Solvent, aqueous washing liquids and mother liquors, other wastes | D10 | 2,146 |
| | | | R2 | 4,212 |
| | | | R1 | 2,042 |
| | | | D9 | 397 |
| Astellas Ireland | P0007-03 | Solvents, aqueous washing liquids and mother liquors | D10 | 1,918 |

| | | | | |
|--------------------------------------|----------|----------------------------------|----|-------|
| Cognis Ireland | P0052-01 | Process distillation residues | R1 | 3,703 |
| DIS Enbi Seals Ireland | P0064-01 | Hydraulic oil | R9 | 1 |
| Boliden Tara Mines | P0516-01 | Machinery degreasing waste water | D4 | 18 |
| Conoco Phillips Bantry Bay Terminals | P0419-01 | Oil | R9 | 200 |
| Molex Ireland | P0288-02 | Plating solutions, containers | R4 | 69 |
| Arch Chemicals | P0060-01 | Solvent | R2 | 146 |
| Edenderry Power | P0482-02 | Oil | R1 | 15 |
| Millipore Ireland | P0571-01 | Solvent | R2 | 1028 |
| Richard Keenan & Co | P0555-01 | Solvent | R2 | 0.5 |

| Key to D/R codes: | |
|--|--|
| <p>D codes</p> <p>D1 Landfill</p> <p>D4 Surface impoundment</p> <p>D8 Biological treatment</p> <p>D9 Physico-chemical treatment</p> <p>D10 Incineration</p> | <p>R codes</p> <p>R1 Use as a fuel</p> <p>R2 Solvent recycling</p> <p>R3 Organic substance recycling (other than solvent)</p> <p>R4 Metal recycling</p> <p>R9 Waste oil recycling</p> |

APPENDIX C - HAZARDOUS WASTE FACILITIES

Table 25 Licensed and permitted facilities for hazardous waste treatment and transfer, 2006

| Company name | Licence or Permit Reg. No. | Treatment or transfer facility | Hazardous waste operations | Principal hazardous wastes authorised for <u>treatment</u> | Quantity of hazardous waste <u>treated</u> in 2006 (tonnes) |
|-------------------|----------------------------|--------------------------------|---|--|---|
| AVR-Safeway | W0050-01 | Transfer and treatment | General chemical and other hazardous waste storage prior to export | Solvents blending and recycling | 247 |
| Eco-Safe Systems | W0054-02 | Transfer and treatment | Healthcare risk waste processing by heat treatment (disinfection) and shredding prior to landfill | Healthcare risk waste | 1,468 |
| Enva (Portlaoise) | W0184-01 | Transfer and treatment | Oils and oil filters processing, contaminated soils processing | Waste oils and sludges, contaminated soils | 61,728 |
| Enva (Shannon) | W0041-01 | Treatment and transfer | General chemical waste treatment and storage prior to export | Acid and alkali waste, photographic waste, industrial sludges, laboratory waste, solvents blending, other industrial and commercial chemical waste | 6,154 |
| Indaver Ireland | W0036-02 | Transfer and treatment | General chemical and other hazardous waste treatment and storage prior to export | Solvents blending | 653 |
| KTK Landfill | W0081-03 | Landfill | Asbestos waste landfill | Asbestos disposal | 2,524 |
| Rilta | W0192-01 | Transfer and treatment | General chemical and other hazardous waste treatment and storage prior to export | Oily sludges, waste oils, oil filters, photographic waste, contaminated soil, contaminated drums, containers and IBCs, WEEE | 17,140 |
| Soltec (Ireland) | W0115-01 | Transfer and treatment | Solvent distillation and recycling | Solvents distillation | 940 |

| Company name | Licence or Permit Reg. No. | Treatment or transfer facility | Hazardous waste operations | Principal hazardous wastes authorised for <u>treatment</u> | Quantity of hazardous waste <u>treated</u> in 2006 (tonnes) |
|---|----------------------------|--------------------------------|---|--|---|
| Sterile Technologies Ireland | W0055-01 | Treatment | Healthcare risk waste processing by shredding and heat treatment (disinfection) prior to landfill | Healthcare risk waste | 6,610 |
| Irish Lamp Recycling | 02/2000 | Treatment | Fluorescent lamps pre-treatment prior to export of segregated materials and other wastes | WEEE (fluorescent lamps) | 280 |
| Cedar Resource Management | W0185-01 | Transfer and treatment | General chemical and other hazardous waste storage prior to export WEEE treatment | WEEE | 5,746 (WEEE) |
| Electronic Recycling | WP98109 | Treatment | WEEE treatment | WEEE | |
| KMK Metals Recycling | W0113-02 | Transfer and treatment | Metal-rich wastes and sludges storage prior to export WEEE treatment | WEEE | |
| Recycling Village | 2004/015 | Treatment | WEEE treatment | WEEE | |
| Techrec | W0233-01 | Treatment | WEEE treatment | WEEE | |
| Enva (Dublin) | W0196-01 | Pre-treatment and transfer | Waste oil and oily sludges transfer | Waste oils and oily sludges (not operational) | - |
| Enva (Cork) | W0145-01 | Treatment and transfer | Waste oil transfer | Healthcare risk waste (not operational) | - |
| Returnbatt | 17/2002 | Transfer | Batteries (lead acid and small batteries) storage prior to export | None | - |
| Safety-Kleen Ireland | W0099-01 | Transfer | Solvents and chemical waste storage prior to export | None | - |
| Silver Lining Industries (Ireland) | W0122-01 | Transfer | General chemical and electronic waste storage prior to export | None | - |
| Sorundon (Irish Environmental Services) | W0040-01 | Transfer | General chemical and other hazardous waste storage prior to export | None | - |

Total number of facilities in operation: 21
 ... of which processors: 9 other than WEEE
 6 WEEE
 ... of which transfer only: 6

Facilities licensed but not operating

| Company name | Licence or Permit Reg. No. | Treatment or transfer facility | Hazardous waste operations | Principal hazardous wastes authorised for <u>treatment</u> | Quantity of hazardous waste <u>treated</u> in 2006 (tonnes) |
|---------------------------|----------------------------|---|--|--|---|
| Irish Bulk Liquid Storage | W0193-01 | Treatment and transfer (licence issued July 04) | Solvents and waste oils storage prior to export | Solvents blending | Not operational |
| Indaver Ireland | W0186-01 | Treatment | Integrated waste management facility, including incineration | Chemical waste including solvents | Not operational |

Hazardous Waste Facilities

| REG NO | NAME |
|------------------------|---|
| Operational | |
| W0099-02 | Indaver Ireland Ltd |
| W0040-01 | Sorundon Ltd Via Irish Environmental Services |
| W0041-01 | Envia Ireland Limited |
| W0054-02 | AWR Safeway Ltd |
| W0054-02 | Eco-Safe Systems Ltd |
| W0055-02 | Steris Technologies Ltd |
| W0081-03 | KTK Landfill Ltd |
| W0099-01 | Safety-Kleen Ireland Ltd |
| W0113-02 | KMK Metals Recycling Ltd |
| W0115-01 | Scotec (Ireland) Ltd |
| W0122-01 | Silver Lining Industries Ltd |
| W0184-01 | Envia Ireland Limited |
| W0185-01 | Ceder Resource Management |
| W0192-01 | Rita Environmental Limited |
| W0193-01 | Irish Bulk Liquid Storage Ltd |
| W0233-01 | Techrec Ireland Ltd |
| WP/TN/53 | Hi Vok Ireland Ltd |
| 2004/015 | Recycling Village |
| WP98109 | Electronic Recycling |
| 02/2000A | Irish Lamp Recycling |
| 17/2002 | Retumbat |
| Not Operational | |
| W0145-02 | Envia Ireland Limited |
| W0185-01 | Indaver Ireland Ltd |
| W0193-01 | Irish Bulk Liquid Storage Ltd |
| W0194-01 | MacAnulty Clear Drains |



Figure 14 Authorised hazardous waste facilities in Ireland

APPENDIX D – IDENTIFICATION OF ISSUES FOR SPECIFIC WASTES

There are a diverse range of hazardous wastes arising, each requiring different and often specialist treatment. Therefore there is no one-size-fits-all solution to the management of hazardous waste. For some waste streams and sectors, there is obvious potential for preventing and reducing hazardous waste generation. For others, collection is the key for proper management of hazardous waste. For the remainder, the issue is the treatment of the hazardous waste, especially if it is currently exported. This appendix identifies the principal issues and development requirements or opportunities for the main hazardous waste streams identified in chapter 3. The following is a table of contents for this appendix.

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APPENDIX D.1 - SOLVENTS

| | |
|---|---|
| Waste type | Solvents |
| Main source | Bulk solvent waste from industry |
| Quantity generated in 2006 | 143,353 tonnes + 119 tonnes unreported |
| Quantity generated in 2004 | 161,162 tonnes |
| Main recovery or disposal route(s) currently used | <ol style="list-style-type: none"> 1. Solvent distillation or combustion at IPPC sites. 2. Solvent distillation at one authorised waste site (Soltec). 3. Solvent blending at three waste sites (AVR Safeway, Indaver, Enva Shannon) and export of blends to combustion plant in UK. 4. Export of solvent waste for recycling, blending or direct incineration. |
| Treatment facilities in Ireland | The majority of solvent treatment takes place on-site of generation at IPPC-licensed industrial facilities. Soltec operate a solvent distillation unit, with a licensed capacity of 5,000 tpa. Three facilities (AVR Safeway, Enva Shannon and Indaver) blend solvents for reuse as fuel (in the UK). |
| Current treatment capacity in Ireland | <p>Some IPPC sites recycle solvent in a closed loop through their processes.</p> <p>Recycling: commercially available recycling capacity is inadequate. Less than 10% of solvent recycling off-site of production takes place in Ireland (at Soltec). The remainder is exported.</p> <p>Recovery/disposal by thermal treatment – inadequate, no commercial facilities are available although some IPPC sites operate thermal treatment plants for their own waste.</p> |
| Treatment residues generated in Ireland | Small quantity of treatment residues, typically exported for treatment. |
| Issues relating to collection | Bulk solvent from industry is dealt with by the hazardous waste industry and is largely compliant with regulations and competent. Small-scale quantities of solvent are generated by such sectors as dry cleaning and garages including vehicle refinishers. The Solvents Regulations ⁹³ and the Decorative Paints Regulations ⁹⁴ place considerable registration, management, monitoring and reporting obligations on these solvent-users. |
| Issues relation to treatment and recovery | Commercial off-site treatment is based almost wholly around export to the large UK market. Significant pre-treatment (blending) capacity was developed in Ireland in recent years, but scope remains for final treatment options to be developed in Ireland. Any strategy to manage more waste solvents in Ireland should consider the further treatment on-site of solvents, the development of recycling capacity in Ireland, the exploitation of solvents as fuel for cement kilns and other existing combustion plant, and their incineration in dedicated plant. |
| Summary of Plan recommendations | Initiate prevention programme with the pharmachem sector – the main generator of solvent waste – and also promote on-site treatment and recovery of solvents where technically feasible. Commission study on potential for increased solvent recycling in Ireland. |

⁹³ Emissions of Volatile Organic Compounds from Organic Solvents Regulations 2002 (S.I. No. 543 of 2002)

⁹⁴ Limitation of Emissions of Volatile Organic Compounds due to the use of Organic Solvents in Certain Paints, Varnishes and Vehicle Refinishing Products Regulations 2007.

APPENDIX D.2 – WASTE OIL

| | |
|---|--|
| Waste type | Waste oil, including oily sludges |
| Quantity generated in 2006 | waste oil: 27,575 tonnes; oily sludges: 11,689 tonnes + 2,000 tonnes unreported |
| Quantity generated in 2004 | waste oil: 24,472 tonnes; oily sludges: 8,687 tonnes |
| Main source | Waste oil: commercial garages, fleet maintenance, machine maintenance, rail, ports, airports, industry, DIY Oily sludges: surface water interceptors, tank cleaning |
| Main recovery or disposal route(s) currently used | Waste oil and oily sludge pre-treatment and recycling to generate reprocessed fuel oil. |
| Treatment facilities in Ireland | Enva Portlaoise is licensed to treat 35,000 tonnes per annum of waste oil and oily sludges and 1,000 tonnes of oil filters. Rilta and Enva Dublin have authorised treatment capacity for 30,000 to 35,000 tpa of oily sludges and oily wastes by centrifugation and settlement in place. Enva generate a “reprocessed fuel oil” that meets quality standards specified in the facility’s waste licence. Rilta operate an oily sludge and oily waste recycling facility. Enva Dublin is not in operation at present. Enva Shannon treat small quantities of difficult-to-treat waste oils by specialist techniques. |
| Current treatment capacity in Ireland | Adequate. Waste oils and mineral oil waste is the one waste stream for which Ireland is substantially self-sufficient. Some movement to and from Northern Ireland takes place. Enva has a presence in both jurisdictions. Very small amounts are shipped outside of the island of Ireland. Rilta and Enva treat the vast majority of waste oil, oily sludges and oil contaminated liquids in Ireland. |
| Treatment residues generated in Ireland | Sludge to landfill or further processing Waste water to sewer |
| Issues relating to collection | The unauthorised small-scale combustion of waste oil in space heaters is classified as hazardous waste incineration and as an unauthorised activity is in contravention of the waste incineration directive and the waste licensing regulations. There is a need to enforce this provision on waste oil generators (garages) to ensure that waste oil is collected only for authorised treatment. |
| Issues relation to treatment and recovery | Treatment is taking place in a regulated and compliant environment. There are no changes signalled at present. |
| Summary of Plan recommendations | Collection rates for waste oil from garages are reportedly close to 100%. Seasonal reductions in collection rates should be countered by local enforcement actions. A pilot project should be undertaken with a view to informing a national enforcement policy for garages and waste oils and in particular to evaluate the use of accredited inspection contractors for the sector as a whole. Civic amenity sites typically accept waste oils. These facilities should be available for small quantities from non-household sectors. |

APPENDIX D.3 – OIL FILTERS

| | |
|---|--|
| Waste type | Oil filters |
| Quantity generated in 2006 | 886 tonnes + 362 tonnes unreported |
| Quantity generated in 2004 | 603 tonnes |
| Main source | Commercial garages, fleet maintenance, machine maintenance, industry, DIY |
| Main recovery or disposal route(s) currently used | Filters are crushed and oil drained Oil is recycled Steel is exported for recycling |
| Treatment facilities in Ireland | Enva Portlaoise is licensed to pre-treat 1,000 tonnes of oil filters. Other licensed facilities treat oil filters. |
| Current treatment capacity in Ireland | Pre-treatment capacity (draining and crushing) is adequate at several facilities. Oil is recycled in Ireland. Steel is exported. |
| Treatment residues generated in Ireland | Residual waste oil (see Appendix D.2 – Waste oil), steel, paper residues |
| Issues relating to collection | Collection rates for waste oil filters from garages were an estimated 71% in 2006. Oil filters are collected by several contractors. Collection rates could be improved, perhaps through a producer responsibility obligation. Fewer than half of local authorities provide oil filter collections at civic amenity sites. |
| Issues relation to treatment and recovery | Collection is the key for improving oil filters management. Treatment is not a capital intensive or technically difficult and involves the simple separation of liquid and solid materials. |
| Summary of Plan recommendations | Collection rates should be improved and policy or economic drivers should be used. Civic amenity sites should provide facilities across the country and be available for small quantities from non-household sectors. Producer responsibility should be explored. |

APPENDIX D.4 – LEAD ACID BATTERIES

| | |
|---|---|
| Waste type | Lead acid batteries ⁹⁵ |
| Quantity generated in 2006 | 8,590 tonnes + 177 tonnes unreported |
| Quantity generated in 2004 | 6,677 tonnes |
| Main source | Transport, industrial equipment. In the context of the batteries directive (2006/66/EC), this category would include automotive batteries and industrial lead acid batteries. |
| Main recovery or disposal route(s) currently used | Whole batteries are exported. Lead is recycled (this is the main economic driver for recycling). Acid electrolyte is neutralised or recycled. Plastic is recoverable. Lead acid batteries are collected by several contractors for direct export. |
| Treatment facilities in Ireland | None |
| Current treatment capacity in Ireland | None |
| Treatment residues generated in Ireland | None |
| Issues relating to collection | Collection rates for lead acid batteries were an estimated 98% in 2006 though it seems difficult to believe such levels of compliance given the level of illegal activity in the past regarding lead acid batteries. All local authorities already provide lead acid battery collections at civic amenity sites. The batteries directive will bring producer responsibility and impose collection and recycling targets for batteries. The end-of-life vehicles directive requires the removal of lead acid batteries from vehicles during depollution. |
| Issues relation to treatment and recovery | Investment in pre-treatment capacity to extract battery acid would avoid export of this liquid waste. Further extraction of lead, steel and plastic could add value to waste exports. |
| Summary of Plan recommendations | Collection rates will be maximised through implementation of the batteries directive. Civic amenity sites should be available for small quantities from non-household sectors. The private sector should be supported in examining the feasibility of investing in pre-treatment capacity. |

⁹⁵ The batteries directive (2006/66/EC) provides a greater number of classes of batteries than is presented in this Plan, including portable batteries, button cells, automotive batteries and industrial batteries.

APPENDIX D.5 – SMALL (CONSUMER) BATTERIES

| | |
|---|---|
| Waste type | Small (consumer) batteries ⁹⁶ |
| Quantity generated in 2006 | 369 tonnes + 5,361 tonnes unreported |
| Quantity generated in 2004 | 120 tonnes |
| Main source | Consumers, plus commercial uses of similar batteries. In the context of the batteries directive (2006/66/EC), this category would include portable batteries and button cells. The hazardous classification refers to cadmium and mercury content of certain batteries. Most end-of-life consumer batteries in use are not classified as hazardous waste but the waste stream is often mixed making segregation of hazardous and non-hazardous streams unpractical. |
| Main recovery or disposal route(s) currently used | Landfill in Ireland as unreported waste – batteries are mostly unsegregated from general refuse Export of collected batteries for recycling Batteries are collected by several contractors for direct export. |
| Treatment facilities in Ireland | None |
| Current treatment capacity in Ireland | None |
| Treatment residues generated in Ireland | None |
| Issues relating to collection | Collection rates were an estimated 6% in 2004. A limited collection network exists, though it is expanding into civic amenity sites, schools and other locations. Implementation of the batteries directive will impose collection targets. All local authorities already provide battery collections at civic amenity sites. |
| Issues relation to treatment and recovery | There is no realistic potential for treatment of batteries in Ireland due to small scale of market (only 2-3 facilities exist in the whole of Europe). |
| Summary of Plan recommendations | Collection rates are expected to improve through implementation of the batteries directive. The distribution of small battery receptacles should continue to be expanded to make them commonplace and visible in public places. |

⁹⁶ The batteries directive (2006/66/EC) provides a greater number of classes of batteries than is presented in this Plan, including portable batteries, button cells, automotive batteries and industrial batteries.

APPENDIX D.6 – FLUORESCENT LAMPS

| | |
|---|---|
| Waste type | Fluorescent lamps |
| Quantity generated in 2006 | 408 tonnes + 2,267 tonnes unreported |
| Quantity generated in 2004 | 199 tonnes |
| Main source | Buildings – commercial, industrial, public and household. The hazardous classification refers to the mercury used in fluorescent lamps. |
| Main recovery or disposal route(s) currently used | Lamps are broken up (pre-treatment) and mercury, glass and metal are recycled. Lamps are collected by several contractors for direct export. |
| Treatment facilities in Ireland | Irish Lamp Recycling and Enva use equipment to separate the glass, metal and fluorescent powder. |
| Current treatment capacity in Ireland | Adequate |
| Treatment residues generated in Ireland | All pre-treatment residues are exported for further recycling. |
| Issues relating to collection | Collection rates were estimated at 15% in 2006. Fluorescent tubes are awkward in shape and prone to breakage. From buildings maintenance projects, where volumes can be high, they are typically collected at source. Practices need to be improved to avoid breakages and guidance on good practice disseminated and enforced. For householders and other “sporadic” generation of waste lamps, civic amenity sites are available in all local authority areas. Fluorescent lamps are covered under the WEEE Regulations and are subject to retail takeback, i.e. they can be returned to retailers when buying new lamps. |
| Issues relation to treatment and recovery | More pre-treatment could be undertaken to reduce transport volumes and costs for export. |
| Summary of Plan recommendations | Collection rates are expected to improve through continued implementation of the WEEE regulations. The private sector should be supported in examining the feasibility of investing in pre-treatment capacity. |

APPENDIX D.7 – PHOTOCHEMICAL WASTE

| | |
|---|---|
| Waste type | Photochemical waste |
| Quantity generated in 2006 | 1,536 tonnes |
| Quantity generated in 2004 | 1,950 tonnes |
| Main source | Commercial outlets – photolabs and minilabs |
| Main recovery or disposal route(s) currently used | Silver and other chemical recovery through electrolysis and/or chemical precipitation |
| Treatment facilities in Ireland | Enva operate a silver recovery unit. |
| Current treatment capacity in Ireland | A large part of Irish photo laboratories' chemical waste is exported and absorbed into the much larger United Kingdom market. |
| Treatment residues generated in Ireland | Authorised treatment results in a controlled waste water discharge. On-site pre-treatment at minilabs results in an uncontrolled discharge to sewer. |
| Issues relating to collection | Good collection rates are generally reported. Waste chemical is often collected by original (new) chemical suppliers and this appears to be the most suitable means of maximising collection and could be used to maximise collection rates. Both Silver Lining and Enva provide dedicated waste photochemical collection services. Information and enforcement campaigns should be conducted at local level to maximise its use. Civic amenity sites should be made available for small quantities from the non-household sector. |
| Issues relation to treatment and recovery | The efficacy of on-site treatment units, where "treated" chemical is discharged to sewer, should be investigated with a view to prohibiting their use unless proved effective. |
| Summary of Plan recommendations | Conduct local enforcement to ensure photolabs are compliant. Investigate the efficacy of on-site treatment systems. |

APPENDIX D.8 – HEALTHCARE RISK WASTE

| | |
|---|--|
| Waste type | Healthcare risk waste |
| Quantity generated in 2006 | 9,631 tonnes |
| Quantity generated in 2004 | 13,051 tonnes |
| Main source | Hospitals and healthcare facilities, GP, dental and veterinary surgeries, households |
| Main recovery or disposal route(s) currently used | <p>Potentially infectious healthcare risk waste is treated at non-burn disinfection facilities in Ireland followed by deep burial landfill of treatment residues.</p> <p>The remaining fraction (about 5% of total risk waste) is exported for incineration and is comprised of chemical wastes, blood and blood products and recognisable anatomical waste.</p> |
| Treatment facilities in Ireland | SRCL (formerly Sterile Technologies Group) operate two non-burn steam disinfection facilities (one of which was formerly run by EcoSafe) in Dublin. |
| Current treatment capacity in Ireland | <p>Treatment capacity is adequate for potentially infectious waste. Some 20,000 tonnes of capacity, employing heat treatment and shredding, exists at these two private facilities.</p> <p>There is no treatment capacity for the fraction that is exported for incineration.</p> |
| Treatment residues generated in Ireland | Disinfected waste is disposed of to non-hazardous landfill. |
| Issues relating to collection | <p>Segregation at ward level should be assured to avoid unnecessary and expensive treatment of non-hazardous waste.</p> <p>There are issues with certain small-scale arisings of healthcare risk waste from households and small healthcare facilities.</p> <p>The collection of out of date or unused medicines is poorly catered for.</p> |
| Issues relation to treatment and recovery | The fact that one company now owns both treatment facilities is stated as a cause for concern by the Health Services Executive. The potential for recycling the non-hazardous sterilised residues should continue to be investigated. |
| Summary of Plan recommendations | <p>Solutions should be found to provide for the collection of medical supplies from patients who self-administer medicines or procedures in their homes.</p> <p>The Health Service Executive should consider a national roll-out of the DUMP scheme for the return or unused or out-of-date medicines.</p> <p>An enforcement campaign covering the GP, veterinary and dentist sectors should be developed by local authorities to ensure all are managing hazardous waste appropriately.</p> |

APPENDIX D.9 – SLUDGES

| Waste type | Sludges |
|---|--|
| Quantity generated in 2006 | 5,488 tonnes |
| Quantity generated in 2004 | 5,179 tonnes |
| Main source | Manufacturing industry and waste treatment industry |
| Main recovery or disposal route(s) currently used | Export for incineration, landfill or metal recovery (the latter for some specialist wastes) Some sludge pre-treatment (e.g. dewatering) is carried out in Ireland |
| Treatment facilities in Ireland | Sludges are often generated following physico-chemical of waste or waste water and are often hazardous due to heavy metal content or other contamination. Treatment of sludges at Enva Shannon is limited to concentration, pressing or other pre-treatment steps, resulting in cake and other residue that is typically exported. |
| Current treatment capacity in Ireland | None for final destination of hazardous sludges (incineration or landfill) |
| Treatment residues generated in Ireland | Processed sludges for further treatment or disposal, typically abroad |
| Issues relating to collection | None. |
| Issues relation to treatment and recovery | No incineration capacity for sludges with oil or other volatile contamination. All are exported. No landfill capacity for hazardous inorganic sludges from industrial and waste treatment processes. All are exported. It is difficult to determine a general treatment solution for sludges given their diversity of source and constituents. Landfill will provide the best all round solution to sludge disposal, supplemented by incineration for those sludges amenable to combustion (i.e. those with lower inorganic and metal content). The export market is likely to remain the favoured option for specialist recycling, e.g. to recover valuable metals. |
| Summary of Plan recommendations | Hazardous waste landfill capacity should be provided with public policy intervention if necessary. The private sector should be supported in examining the feasibility of investing in pre-treatment, recycling and final disposal capacity. |

APPENDIX D.10 – ACID AND ALKALI (BASE) WASTE

| | |
|---|---|
| Waste type | Acid and alkali (base) waste |
| Quantity generated in 2006 | 5,763 tonnes |
| Quantity generated in 2004 | 6,384 tonnes |
| Main source | Industry |
| Main recovery or disposal route(s) currently used | Neutralisation in Ireland or abroad. Some is exported for regeneration or recycling. |
| Treatment facilities in Ireland | One facility (Enva Shannon) employs acid-base neutralisation as a means of disposing of acid and alkali waste. Authorised capacity is 5,000 tonnes per annum – just over 2,900 tonnes were treated in 2004. The resulting sludge residue is exported for landfill (see Appendix D.9 – Sludges). |
| Current treatment capacity in Ireland | Neutralisation capacity at one facility. No acid/base recycling capacity. The sole treatment option used in Ireland is destruction. |
| Treatment residues generated in Ireland | From the neutralisation process: <ul style="list-style-type: none"> • liquid residues to waste water treatment • solid residues (hazardous inorganic sludges) to export (see Appendix D.9 – Sludges) |
| Issues relating to collection | None |
| Issues relation to treatment and recovery | The feasibility of higher value recovery and recycling options could be investigated. A gradual expansion of existing and new domestic facilities and new processes for recycling and regeneration are needed to counteract exports. |
| Summary of Plan recommendations | The private sector should be supported in examining the feasibility of investing in treatment and recycling capacity. |

APPENDIX D.11 – PAINT AND INK WASTE AND ITS PACKAGING

| | |
|---|--|
| Waste type | Paint and ink waste and its packaging |
| Quantity generated in 2006 | 3,914 tonnes + 7,513 tonnes unreported |
| Quantity generated in 2004 | 3,744 tonnes |
| Main source | Industry, trade (decorators), printers and households |
| Main recovery or disposal route(s) currently used | Varied waste stream, product and process wastes. Some landfill of waste products, some treatment and export of process wastes. |
| Treatment facilities in Ireland | Enva Shannon is the sole facility that treats paint and ink waste. |
| Current treatment capacity in Ireland | None for paint product waste which is the main consumer waste generated. |
| Treatment residues generated in Ireland | No significant treatment in Ireland. |
| Issues relating to collection | <p>An estimated 7,513 tonnes of consumer paint and packaging are estimated as unreported (i.e. not managed). Segregation and collection of paint and containers needs to be improved at consumer, trade and industrial levels</p> <p>Printers and other ink users need to be provided with information and collection services</p> |
| Issues relation to treatment and recovery | The nature of this waste stream is very varied and requires various treatments – encompassing chemical treatment of bulk paints and inks, and physical treatment for contaminated packaging. However, the predominant use of thermal treatment (incineration and use as fuel) options abroad for these wastes indicates that a general hazardous waste incinerator would provide much of the necessary capacity to manage these wastes in Ireland. |
| Summary of Plan recommendations | Just over half of local authorities have provided for paint collection at civic amenity sites. This service should be expanded nationally and should be available for small quantities from non-household sectors. The private sector should be supported in examining the feasibility of investing in treatment and recycling capacity. Producer responsibility should be explored to maximise collection from consumer and trade. |

APPENDIX D.12 – AGROCHEMICAL WASTE AND ITS PACKAGING

| | |
|---|---|
| Waste type | Agrochemical waste and its packaging |
| Quantity generated in 2006 | 71 tonnes managed + 3,218 tonnes unreported + 3,600 tonnes unreported sheep dip disposal |
| Main source | Farms, co-ops, veterinary surgeries, pharmacies |
| Main recovery or disposal route(s) currently used | Varied. Chemical containers are often triple rinsed and managed as non-hazardous waste. Whether waste oils and similar vehicle (transport) waste are managed appropriately is not reported. Sheep dip is landspread according to a code of practice though no records of this disposal exist. |
| Treatment facilities in Ireland | This is a wide ranging waste stream and includes waste oils, plant chemicals, animal medicines and other materials. There is no one "farm waste" treatment facility. Many existing facilities would be suitable to treat many hazardous farm wastes. |
| Current treatment capacity in Ireland | - |
| Treatment residues generated in Ireland | - |
| Issues relating to collection | The animal remedies regulations ⁹⁷ provide for retailer/veterinary take back of unused or out of date medicines. These regulations need to be implemented and enforced. New collection arrangements are needed for a wide range of hazardous farm wastes. |
| Issues relation to treatment and recovery | Sheep dip – no comprehensive monitoring or evaluation of disposal outlets is carried out. Sheep dip is a hazardous waste and should not be landspread in the absence of a waste licence. |
| Summary of Plan recommendations | Conduct an all-encompassing study into hazardous farm waste generation and management. Make recommendations for improved management and collection of agricultural hazardous waste. Make recommendations if appropriate for hazardous farm waste regulations. |

⁹⁷ Animal Remedies Regulations, 2005 (S.I. No. 734 of 2005)

APPENDIX D.13 – ASBESTOS

| | |
|---|--|
| Waste type | Asbestos |
| Quantity generated in 2006 | 7,829 tonnes |
| Quantity generated in 2004 | 7,177 tonnes |
| Main source | Buildings – commercial, public and households. See http://www.epa.ie/whatwedo/advice/asbestos/ for information on asbestos. |
| Main recovery or disposal route(s) currently used | Landfill |
| Treatment facilities in Ireland | One landfill authorised to dispose of certain asbestos wastes. |
| Current treatment capacity in Ireland | KTK Landfill is authorised to accept 6,000 tonnes per annum of construction materials containing asbestos though it is nearing capacity and is expected to close ca. 2009. All other asbestos is exported including insulation materials containing asbestos. |
| Treatment residues generated in Ireland | No treatment permitted, therefore no residues generated. |
| Issues relating to collection | Lack of collection network for small-scale generators of asbestos. Though large amounts of asbestos are collected annually, there is anecdotal evidence that some is managed illegally - probably due to ignorance of legal obligations or the high cost of employing specialist contractors for small jobs. |
| Issues relation to treatment and recovery | Lack of adequate landfill capacity beyond 2009 and lack of capacity at present for insulation materials. |
| Summary of Plan recommendations | A network of transfer facilities should be established at existing civic amenity sites or alternative locations to ensure that there is no reason for illegal or “backyard” disposal or accumulation of asbestos. Hazardous waste landfill capacity should be provided with public policy intervention if necessary. |

APPENDIX D.14 – POLYCHLORINATED BIPHENYLS (PCBs)

| | |
|--|--|
| Waste type | Polychlorinated biphenyls (PCBs) and PCB contaminated equipment |
| Quantity generated in 2006 | 43 tonnes |
| Quantity generated in 2004 | 19 tonnes |
| Main source | Industry, electricity supply utilities, farms, household and commercial equipment - potentially any location with old electrical equipment |
| Main recovery or disposal route(s) currently used (with 2006 tonnages) | Export for incineration or permissible alternative thermal or chemical treatment |
| Treatment facilities in Ireland | None |
| Current treatment capacity in Ireland | None |
| Treatment residues generated in Ireland | No treatment in Ireland, therefore no residues generated |
| Issues relating to collection | Holders of PCBs are obliged to dispose of PCBs and decommission or decontaminate PCB-containing equipment. Historical holdings only arise and new use of PCBs is banned. The 2010 decommissioning deadline for large holdings (>5dm ³) is approaching. A revised PCB Management Plan, code of practice and inventory will be published in 2008 to prepare for the deadline and to accelerate decontamination and disposal of small holdings. |
| Issues relation to treatment and recovery | None |
| Summary of Plan recommendations | Revise and implement the PCB Management Plan. |

APPENDIX D.15 – CONTAMINATED SOIL

| | |
|---|--|
| Waste type | Contaminated soil |
| Quantity generated in 2006 | 406,904 tonnes |
| Quantity generated in 2004 | 221,137 tonnes |
| Main source | Urban redevelopment projects, filling station redevelopment, small oil spillages |
| Main recovery or disposal route(s) currently used | Mostly exported for treatment followed by disposal or low grade recycling. Some is treated in Ireland. Some is treated <i>in situ</i> . |
| Treatment facilities in Ireland | Enva Portlaoise is authorised to process 40,000 tonnes of contaminated soil per annum. Rilta's facility handles bulk storage of contaminated soil for export. For the most part, other exports are shipped directly from the development sites (which are often at dockside). |
| Current treatment capacity in Ireland | Relatively small compared to total exported. |
| Treatment residues generated in Ireland | Treated soils for low grade uses. |
| Issues relating to collection | None |
| Issues relation to treatment and recovery | Some expansion of Irish capacity and mobile plant could be feasible. Given the variability of generation and constituents (e.g. hydrocarbon or chemical contamination), it seems unlikely that a large-scale treatment facility will be established in Ireland. There are several such facilities used around Europe with varying treatment methods and end-uses for treated soil. Gate fees are competitive for large consignments. A register of contaminated sites (developed by local authorities) and a concerted programme to investigate and remediate these may change the outlook for the commercial development of treatment facilities in Ireland. More on-site remediation, mobile plant and new small scale fixed facilities in strategic locations would extend the range of treatment options in Ireland. |
| Summary of Plan recommendations | Planning authorities should take contaminated soil treatment into account and should prioritise <i>in situ</i> and treatment in Ireland in preference to export. The private sector should be supported in examining the feasibility of investing in treatment and recycling capacity. |

APPENDIX D.16 – CONTAMINATED DREDGING SPOIL

| | |
|--|--|
| Waste type | Contaminated dredging spoil |
| Quantity generated in 2006 Quantity generated in 2004 | No information |
| Main source | Marine and harbour (re)development projects |
| Main recovery or disposal route(s) currently used | Dredging spoil is generally disposed at sea. |
| Treatment facilities in Ireland | None |
| Current treatment capacity in Ireland | No treatment in Ireland. |
| Treatment residues generated in Ireland | None |
| Issues relating to collection | None |
| Issues relation to treatment and recovery | No systematic monitoring of potentially contaminated harbour sediments is carried out. Treatment on land is preferred by marine authorities. |
| Summary of Plan recommendations | The marine authorities should instigate a monitoring programme for port and harbour sediments with a view to assessing and dealing with contamination. |

APPENDIX D.17 – THERMAL TREATMENT RESIDUES

| | |
|---|---|
| Waste type | Residues classified as hazardous waste from the thermal treatment of waste |
| Quantity generated in 2006 | 705 tonnes |
| Quantity generated in 2004 | 309 tonnes |
| Main source | Boilers and incinerators (and from proposed incinerators if built). |
| Main recovery or disposal route(s) currently used | Exported for landfill |
| Treatment facilities in Ireland | None |
| Current treatment capacity in Ireland | No landfill capacity exists for residues classified as hazardous waste. |
| Treatment residues generated in Ireland | No treatment. |
| Issues relating to collection | None |
| Issues relation to treatment and recovery | No hazardous combustion and incineration residues are recovered or disposed off-site in the Republic of Ireland. Arisings will grow substantially if commercial incineration facilities are established and landfill capacity will be required. |
| Summary of Plan recommendations | In the event that generation increases, landfill capacity should be provided to handle residues. |

APPENDIX D.18 – WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

| | |
|---|--|
| Waste type | Waste electrical and electronic equipment (WEEE) |
| Quantity generated in 2006 | 13,434 tonnes ('fridges and freezers' and 'TVs and other monitors', not all of which would be classified as hazardous waste) |
| Main source | Industry, commercial, households, individuals |
| Main recovery or disposal route(s) currently used | Disassembly, shredding and recovery of materials for recycling (metal, plastic, components, etc). |
| Treatment facilities in Ireland | Two WEEE recyclers and several WEEE disassembly facilities are operating. Some WEEE is exported whole. |
| Current treatment capacity in Ireland | Two recycling facilities (Techrec and Cedar) and three disassembly facilities (Electronic Recycling, KMK Metals, Recycling Village) have a capacity of ca 40,000 tonnes per annum. Most components from WEEE disassembly and recycling are exported for recycling or reuse of materials. |
| Treatment residues generated in Ireland | Disassembled components or materials for further processing and recycling. |
| Issues relating to collection | The collection network is well established, being subject to the WEEE Regulations and Directive. Collection rates for fluorescent lamps are low (see page 131). |
| Issues relation to treatment and recovery | Investment in further recycling capacity might prove feasible, and add value to WEEE processing and avoid export of whole WEEE. |
| Summary of Plan recommendations | Implementation and enforcement of the WEEE regulations is underway and no additional policy interventions are required at present. |

APPENDIX D.19 – END-OF-LIFE VEHICLES (ELVs)

| | |
|--|--|
| Waste type | End-of-life vehicles (ELVs) |
| Quantity generated in 2006 Quantity generated in 2004 | No firm data exists, though implementation of the end-of-life vehicles regulations should yield good statistics |
| Main source | Transport (private and commercial) |
| Main recovery or disposal route(s) currently used | Depollution prior to shredding and export of recyclable materials (metals primarily) |
| Treatment facilities in Ireland | Three shredders and a large number of authorised treatment facilities (ATFs) for depollution of ELVs (there will be at least one ATF in each local authority area) |
| Current treatment capacity in Ireland | At time of writing, approximately 82 authorised treatment facilities were in operation. Two companies (Hammond Lane Metal Company and Hegarty Metal Recycling) operate three vehicle shredders in the Republic of Ireland. |
| Treatment residues generated in Ireland | Shredder residue for landfill |
| Issues relating to collection | Certificates of destruction should be issued by all treatment centres in relation to all ELVs |
| Issues relation to treatment and recovery | Number of ATFs needs to increase to ensure that all ELVs are managed according to the Regulations and Directive |
| Summary of Plan recommendations | Implementation and enforcement of the ELV regulations is underway and no additional policy interventions are required at present. |

APPENDIX D.20 – WOOD - CONTAMINATED OR CHEMICALLY TREATED

| | |
|--|--|
| Waste type | Contaminated or chemically treated wood |
| Quantity generated in 2006 Quantity generated in 2004 | No complete data. |
| Main source | Construction and demolition, including DIY. Railway sleepers. The use of certain chemicals in the treatment of wood is prohibited. |
| Main recovery or disposal route(s) currently used | Not known for general contaminated wood. Sleepers are generally sold through hardware wholesalers and retailers. Their supply to householders and for other specified uses is prohibited. |
| Treatment facilities in Ireland | None |
| Current treatment capacity in Ireland | None |
| Treatment residues generated in Ireland | None |
| Issues relating to collection | Little or no information is routinely recorded by industry on the generation and management of waste treated wood. It is often mixed with untreated wood, although recyclers will often not accept treated wood. |
| Issues relation to treatment and recovery | <p>There is no information on the generation of waste treated wood (whether from manufacture or use), on appropriate management routes or on current practices. Detailed research is needed.</p> <p>Though prohibited, there is anecdotal evidence of the unauthorised sale of old railway sleepers to householders and for prohibited applications. The use of second-hand creosote-treated wood is controlled by the European Communities (Dangerous Substances and Preparations) (Marketing and Use) Regulations 2003 and regulated by the Pesticide Control Service of the Department of Agriculture and Food.</p> |
| Summary of Plan recommendations | <p>Research should be conducted on treated wood generation and management with a view to prescribing collection and management routes.</p> <p>The Pesticide Control Service should implement enforcement measures to combat the inappropriate supply and/or use of used creosote-treated railway sleepers.</p> |

APPENDIX D.21 – LABORATORY WASTE (SCHOOLS AND COLLEGES)

| | |
|--|--|
| Waste type | Laboratory waste from schools and colleges |
| Quantity generated in 2006 Quantity generated in 2004 | No data |
| Main source | Schools and colleges |
| Main recovery or disposal route(s) currently used | When collected and brought within the formal hazardous waste industry, they are pre-treated or exported directly for destruction. |
| Treatment facilities in Ireland | Enva carry out pre-treatment and neutralisation of certain laboratory chemicals and kits. |
| Current treatment capacity in Ireland | Not quantified. |
| Treatment residues generated in Ireland | Some treatment residues for further treatment. |
| Issues relating to collection | It is reported that schools will often stockpile chemicals in order to reduce the unit cost for their collection and management. Difficulties can arise with regard to old, unlabelled or unstable chemicals. |
| Issues relation to treatment and recovery | None. Authorised collectors will ensure that appropriate treatment facilities are used. |
| Summary of Plan recommendations | The Department of Education and Science should examine the feasibility and effect of a national contract to provide timely, periodic and value-for-money collection services for laboratory chemical waste at schools. |

APPENDIX D.22 – SHIP GENERATED WASTE

| | |
|---|--|
| Waste type | Ship generated waste |
| Quantity generated in 2006 | No data |
| Quantity generated in 2004 | |
| Main source | Ships and boats |
| Main recovery or disposal route(s) currently used | Varied waste stream. When collected they follow the appropriate routes for similar transport wastes such as waste oils. |
| Treatment facilities in Ireland | As other transport wastes, e.g. waste oils |
| Current treatment capacity in Ireland | As other transport wastes, e.g. waste oils |
| Treatment residues generated in Ireland | As other transport wastes, e.g. waste oils |
| Issues relating to collection | The Department of Communications, Marine and Natural Resources (in 2006) indicated difficulties with implementation of the Directive and regulations at fishing ports. |
| Issues relation to treatment and recovery | None |
| Summary of Plan recommendations | Guidance should be issued to assist in the implementation of the directive and regulations. |

APPENDIX D.23 – GENERAL CHEMICAL WASTE

| | |
|---|--|
| Waste type | Chemical waste (where not otherwise specified) |
| Quantity generated in 2006 | 4,231 tonnes |
| Quantity generated in 2004 | 8,306 tonnes |
| Main source | Varied sources. A varied waste stream including, for example, laboratory waste, pesticides, herbicides, wood preserving chemicals, inorganic and organic chemicals, gases. |
| Main recovery or disposal route(s) currently used | A wide range of chemical wastes are generated and exported for the most part. |
| Treatment facilities in Ireland | Envva, Rilta |
| Current treatment capacity in Ireland | Cannot be quantified due to variance in the definition of this waste stream |
| Treatment residues generated in Ireland | Varied |
| Issues relating to collection | The collection of certain small-scale arisings of chemical waste are dealt with elsewhere in this appendix (e.g. farm waste, schools laboratory waste etc.) |
| Issues relation to treatment and recovery | The nature of this waste stream is very varied and requires various treatments. Given the range of chemical wastes generated, it is difficult to plan generally for chemical waste treatment. Many will require specialist management, pre-treatment and disposal techniques. However, the predominant use of thermal treatment (incineration and use as fuel) options abroad for these wastes indicates that cement kilns and a general hazardous waste incinerator would provide much of the necessary capacity to manage these wastes in Ireland. Reliance on specialist treatment outlets abroad is likely to remain the position for certain streams. |
| Summary of Plan recommendations | The private sector should be supported in examining the feasibility of investing in pre-treatment, recycling and final disposal capacity. |

APPENDIX D.24 – EXPLOSIVE AND UNSTABLE WASTE

| | |
|--|---|
| Waste type | Explosives, time-expired pyrotechnics (marine distress signals), propellants, unstable military and other waste (where not otherwise specified) |
| Quantity generated in 2006 Quantity generated in 2004 | No data, although quantities are small and infrequent. |
| Main source | A varied waste stream including, for example, old military ordnance, marine flares and unstable chemicals. No data exists on its frequency of generation or quantity, but it will be recurring. |
| Main recovery or disposal route(s) currently used | Controlled combustion or explosion. |
| Treatment facilities in Ireland | None |
| Current treatment capacity in Ireland | None |
| Treatment residues generated in Ireland | No data, likely to be minimal |
| Issues relating to collection | The collection and management of this waste stream is generally handled by the emergency services or the Defence Forces due to their experience in handling explosive materials. The Department of Transport has indicated that large numbers of time-expired pyrotechnics (marine flares or distress signals) are currently held in store at a number of chandler's premises, at private locations and on vessels. |
| Issues relation to treatment and recovery | This material classification covers materials that cannot be exported as specialist materials for disposal due to the risk of explosion or violent chemical reaction during shipping, movement or handling. The preferred scenario is for a permanent facility or location to be set aside for this work, with a trained and competent operator taking responsibility for its operation. |
| Summary of Plan recommendations | An appropriate agent of the state, mostly likely the emergency services of a local authority or the Defence Forces, should be designated with the responsibility to undertake, in exceptional circumstances, the destruction of unstable wastes that cannot otherwise be treated in Ireland or shipped abroad. In the absence of a fixed facility for which a waste licence could be issued, general environmental, procedural and infrastructural conditions should be agreed dealing with issues such as location, process management, and management of emissions and residues. |

APPENDIX E – Alternative hazardous waste treatment techniques

Table 26 Alternative hazardous waste treatment techniques

| Technology | Description | Status | Relevance in Ireland |
|--------------------------------------|--|-------------|--|
| Ball Milling | Dry, solid and non-concentrated persistent organic pollutants (POPs) are dehalogenated and converted to a fine powder through mechano-chemical processes. | Emerging | Ireland produces a limited amount of the relevant POPs and is therefore unlikely to be a relevant location for the application of this technology at commercial scale. |
| Base Catalysed De-chlorination (BCD) | BCD is a thermal process involving the removal of chlorine from PCB waste by the addition of a base and a catalyst. | Established | Ireland produces a limited amount of chlorinated solvents and is therefore unlikely to be a relevant location for the application of this technology at commercial scale. Were it to become available in EU countries it could offer a treatment avenue for chlorinated wastes from Ireland to compete with incineration. |
| Catalytic Treatment | Catalysts can convert hazardous waste into inert or safer material using lower temperatures and allowing for safer incineration. This technology is applicable to difficult waste streams such as POPs and chlorinated solvents. | Emerging | Were the technology to become available at commercial scale in EU countries it could offer a treatment avenue for chlorinated wastes from Ireland to compete with incineration. |
| Gasification | Gasification is a process that converts carbon based waste streams under low pressure and high temperature in the absence of oxygen into a gas product which can be used to generate electricity or steam. | Established | Gasification is a proven technology for treatment of several waste streams. |
| Gas Phase Chemical Reduction (GPCR) | The process involves the chemical reduction of organic compounds, such as PCBs, dioxins and POPs, by hydrogen at 875°C to methane, hydrogen chloride and small amounts of low molecular weight hydrocarbons | Established | The technology is costly to operate and not cost-effective for low strength waste or small scale operations. Given the high costs, the technology is likely to be first employed on difficult waste streams such as POPs and chlorinated solvents, of which Ireland produces limited quantities. Were the technology to become available at commercial scale in EU countries it could offer a treatment avenue for chlorinated wastes from Ireland to compete with incineration. |
| Molten Metal | A molten metal bath causes the dissociation of the hazardous waste into their elements, which dissolve in the liquid metal solution. Adding co-reactants and/or controlling the operating conditions can produce products of commercial value. All waste types with the exception of soil, sludges and other solids with high mineral content. | Emerging | This process is applicable to wastes which are in reasonably homogeneous phases. Wastes comprising predominantly inert material such as soil cannot be treated. The technology is costly to operate due to significant volumes of off-gases that require treatment using conventional gas cleaning systems, which involve considerable capital cost. |
| Molten Slag | Waste is mixed with steelworks dust and fluxing agents, which is dried and then fed on to molten iron in an electric arc smelter. | Promising | This technology has not been proven. |

| Technology | Description | Status | Relevance in Ireland |
|--|---|--|---|
| | The metal oxides are reduced to metals and the organic materials are converted to their basic elements. | | |
| Molten Salt Oxidation (MSO) | Molten Salt is a thermal treatment process for hazardous waste, which oxidises the organic material while retaining the inorganic material in the salt. Organic liquids (high and low volatility) and other materials with a significant organic content. Inert waste is not suitable for treatment in the molten salt system. | Established | Generally, the cost of treatment with this technology is relatively high because of the high capital cost of the equipment, the labour requirements and the high energy cost. Given high costs, the technology is likely to be first employed on difficult waste streams such as POPs and chlorinated solvents, of which Ireland produces limited quantities. |
| PCB Gone | The process reduces the concentration of PCB in transformer oil by dechlorination. | Established | The process is limited to transformer oils. It is unlikely that the quantities generated in Ireland will make a facility cost-effective. |
| Plasma Arc Technologies (PACT / PWC / Plascon) | The Plasma Arc process involves the use of high temperatures to destroy feed material. Organic material is vaporised and decomposed by the heat and then ionised by the air. Inorganic material is vitrified. | Established (Plascon), Emerging (PWC), Transition (Pact) | The technology is costly to operate and not cost-effective for low strength waste or small scale operations. Were the technology to become available at commercial scale in EU countries It could offer a treatment avenue for asbestos and fly ash from Ireland to compete with landfilling. |
| Supercritical Water Oxidation (SCWO) | SCWO destroys organic hazardous waste at temperatures and pressures above the waste's thermodynamic critical point. Under these conditions the water becomes fluid causing the chlorinated hydrocarbons to become soluble and the salts to precipitate out. This technology is limited to the treatment of waste which is liquid or has a particle size less than 200 µm and is most applicable to wastes with an organic content of less than 20%. | Emerging | Due to the limitation in waste accepted by the technology, it is unlikely that the quantities generated in Ireland will make a facility cost-effective. |
| Solvated Electron Technology | The process involves mixing anhydrous ammonia with the hazardous waste producing a solvated electron solution. The solvated electrons bond to the ions of the contaminated material neutralising the waste. | Emerging | Ireland produces a limited amount of the relevant POPs and is therefore unlikely to be a relevant location for the application of this technology at commercial scale. |
| Steam Detoxifier | High temperature steam (100 - 1500°C) is used to destroy waste. Vent gases are carbon dioxide and water. This technology is mainly limited to the treatment of liquid or aqueous wastes. | Promising | Limited data available on this technology |
| Thermal Desorption | The process involves the physical separation under temperature ranging from 90 to 650°C of volatile and semi-volatile contaminants from soils, sediments, slurries, and filter cakes. | Established | This technology is relevant in the Irish context as it can treat a wide range of contaminants and the system can be mobile. After treatment, additional soil processing may be required. |
| Alkaline Hydrolysis | A metal hydroxide-based solution reacts with contaminated bone | Established | This technology is relevant in the Irish context as a localised solution to treat |

| Technology | Description | Status | Relevance in Ireland |
|---------------------|---|-----------|--|
| | meal, animal-by-products, bovine risk material, hospital cytotoxic wastes to break down the major constituent of cells and tissues. | | animal or human tissues. Processing capacity may be limited. |
| CEROX and Silver II | Mediated electro-chemical oxidation. | Promising | No commercial experience of this technology |

APPENDIX F – RADIOACTIVE WASTE

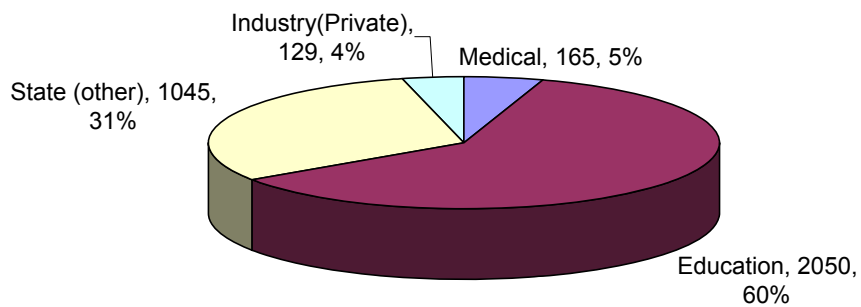
The Radiological Protection Institute of Ireland (RPII) is the Competent Authority in Ireland with responsibility for, *inter alia*, the licensing and regulation of radioactive sources. Since the establishment of the radiological licensing framework in 1977, the RPII (and its forerunner the Nuclear Energy Board) has expressed concern at the lack of indigenous infrastructure to deal with radioactive waste arising from the legitimate use of radioactive sources in Ireland.

Since the early 1990s licences for the custody and use of radioactive sources have only been granted by the RPII where a ‘take-back’ agreement has been entered into with the supplier. This policy was adopted with a view to minimising the amount of radioactive waste to be managed in Ireland once sources are no longer required. While this approach is not without some problems it has worked reasonably well in the intervening period. However, as radioactive sources had been in use or custody in Ireland for many decades prior to the adoption of this policy there are a significant number of legacy sources that are of no further use and these remain without a return or disposal route in Ireland.

As of June 2006, it is estimated that there are 3,389 radioactive sources in Ireland with half-lives greater than ten years for which no further use is foreseen and which are awaiting disposal (Figure 1 below). These sources are held at 80 different locations throughout the country and will require significant management in terms of safety and security until a central waste storage facility is established or a disposal route is identified. In addition, there are other sources of less radiological concern but with similar difficulties in terms of storage and disposal. These include technetium-99m (Tc-99m) generator cores held by hospitals, small disused sources and thorium and uranium compounds held by post primary schools. While responsibility for radioactive sources clearly rests with licensees, the safety and security of sources, particularly when they have a high radioactive content and/or are no longer in use, gives rise to a heightened level of concern. This concern is reflected internationally where the potential for the diversion of such sources for malevolent purposes is now under active consideration. In addition, some of the most lethal radiological accidents globally have involved disused sources falling out of regulatory control and have resulted in the loss of life as well as widespread radioactive contamination of the environment.

Ireland does not have a national storage facility to assist in the management and storage of disused sources as well as those that are occasionally discovered – the so called ‘orphan’ sources. The RPII has identified the lack of such a facility as a serious gap in the current waste management infrastructure with potential implications for safety and security. Recommendation: The RPII reiterates its long held view that a central radioactive waste storage facility be established in Ireland for the interim storage and management of radioactive waste materials while final disposal options are explored.

Figure 1: Sources with a half-life > 10 y by Sector



(excluding sources held by post primary schools and Tc-99m generators held by hospitals)