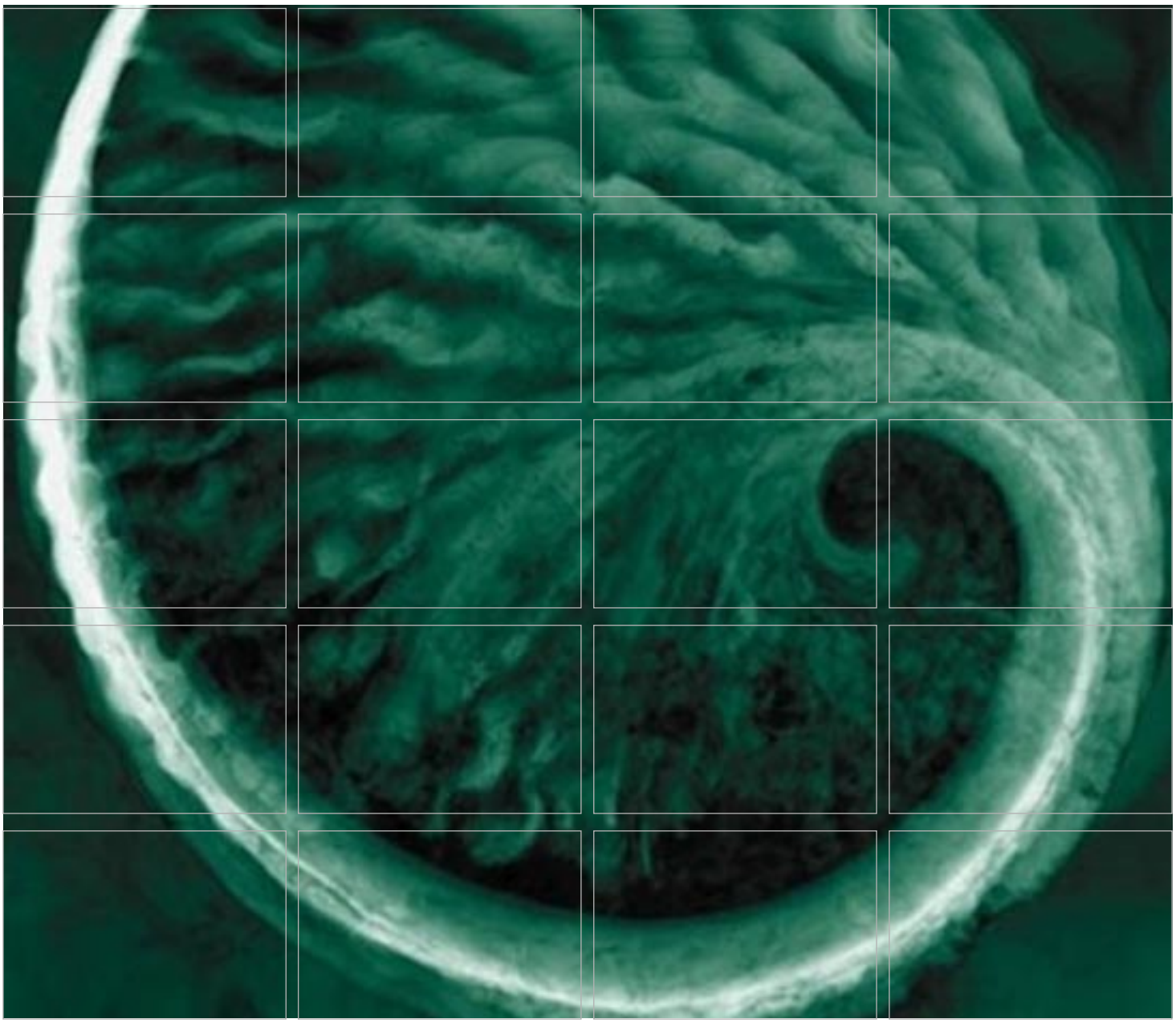

Statement of Facility Needs for Hazardous Wastes in Northern Ireland – Supporting Report

Environment & Heritage Service (EHS)

October 2005

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1 INTRODUCTION TO THE SUPPORTING REPORT

1.1 BACKGROUND TO THE STATEMENT OF FACILITY NEEDS

Northern Ireland has always had relatively few facilities for the treatment or disposal of hazardous wastes, and both the end of co-disposal landfill in July 2004, the extension of the definition of hazardous wastes in July 2005, and the introduction of the waste incineration directive (WID) in December 2005 has made/could make this situation worse.

The Hazardous Waste Forum (HWF) was set up in 2003, in response to a proposal made in the three sub-regional Waste Management Plans, adopted in January 2003 by the District Councils, that a working group be established to identify the preferred hazardous waste management solutions for the longer term, particularly in the light of these upcoming legislative changes. The HWF Action Plan was published in June 2004i.

One recommendation in the HWF Action Plan was:

> *4.1 'An authoritative 'statement of facility needs' for the management of Northern Ireland's hazardous wastes is required as a matter of urgency. This should address the three parallel issues of the facilities/capacity which need to be developed urgently within Northern Ireland; the requirements for continued export to Great Britain; and co-operation within the island of Ireland. The information to underpin this statement has been prepared for the Hazardous Waste Forum and can be found in Annex 2.'*

This supporting report has been prepared for the Department of the Environment in response to that recommendation, to underpin such a Statement.

1.2 BACKGROUND TO THE HWF ACTION PLAN RECOMMENDATION

The following comments accompanied Recommendation 4.1 in the HWF Action Plan (June 2004):

- 'Around 25,000 tonnes per annum (approximately 50% of the total arisings) of hazardous wastes are currently managed in Northern Ireland (including about 15,000 tonnes of waste oils processed to Recovered Fuel Oil (RFO) and 5,000 tonnes co-disposed in landfill), with the remaining 50% exported to Great Britain. With the end of co-disposal in Northern Ireland and Great Britain on 16 July 2004, and with questions over the future markets for (recovered fuel oil) RFO (see Recommendation 4.2.E), the majority of Northern Ireland's hazardous wastes may need to find alternative outlets.
- Providing an appropriate climate to encourage investor confidence, so that the waste management industry can invest in such facilities, requires legislative and regulatory certainty (see the detail under Recommendation 1).
- A parallel requirement is for an authoritative 'statement of facility needs' (or 'Northern Ireland plan') as proposed here. This will provide planners, planning inspectors (i.e. PAC commissioners) and the public with a framework for judging planning applications. The statement will also underpin the business case for any investment in new facilities.
- Consideration should be given to the best form for issuing this statement.

- The statement should focus in particular on those options which can be delivered in the short-term, and should include both currently co-disposed wastes and 'new' hazardous wastes (e.g. WEEE and ELV).'

1.3 THE PURPOSE AND CONTEXT OF THE STATEMENT OF FACILITY NEEDS

PPS11 on *Planning and Waste Management* (December 2002)[ii] states its main objective as to:

- 'Promote the development, in appropriate locations, of waste management facilities that offer BPEO (*best practicable environmental option*) in meeting need as identified by the relevant WMP….'

Policies WM2 and WM3 of PPS11 state that proposals for waste treatment or disposal facilities will be permitted where:

a) 'there is a need for the facility as established through the WMS and the relevant WMP…; and
b) the proposed facility is BPEO; and'
c) (*it meets various locational and other criteria*)

Given the perceived urgency of establishing new hazardous waste facilities to replace co-disposal landfill, the HWF recommended the preparation of a 'Statement of Facility Needs' (SoFN) in advance of the planned revision of the Waste Management Plans (WMPs), in order to meet the requirement to establish 'need' as in bullet (a) of policies WM2 and WM3.

The planned review of the three sub-regional WMPs is now underway, with a deadline of submission to the Department by June 2006. Those WMPs are required to cover all controlled wastes, specifically including hazardous wastes, in accordance with District Councils' statutory responsibilities under the Waste and Contaminated Land (Northern Ireland) Order 1997. The Department considers that the best way in which it can respond to the HWF recommendation is to prepare a short Statement assessing the likely future facility needs for hazardous wastes in Northern Ireland. The purpose of the Statement is to provide a framework to guide the sub-regional Waste Groups and business in the planning and procurement of new hazardous waste infrastructure. Waste Groups should take this framework into account when preparing their revised Waste Management Plans.

The statement is supported by this technical report. The analysis presented in this supporting report is a first step, aimed at screening those types of facilities most likely to be justified by need within Northern Ireland. A next step for a 'priority' facility identified here would be to establish if this is indeed the BPEO for the target waste stream(s); a BPEO report has already been published for asbestos wastes. In addition, any prospective facility developer would need to carry out their own detailed investment, financial, market and environmental appraisals.

This supporting report has taken the likely economic viability of facilities as one of the core screening criteria for 'need'. It is possible that an entrepreneur may identify market opportunities for hazardous waste facilities in addition to those listed here. In such a case, the applicants are free to make their case by demonstrating that the project is a BPEO solution that meets need (such an approach deals with two important hurdles to be overcome in planning policy). Planning Service would then seek advice from the competent waste planning authority and the relevant sub

regional waste planning group in assessing need and BPEO in the consideration of a related planning application.

1.4 OUTLINE OF THE SUPPORTING REPORT

- *Section 1* provides the background and sets out the purpose and status of the Statement of Facility Needs and its supporting report.

- *Section 2* provides data on hazardous wastes management in Northern Ireland, including the quantities arising and treatment and disposal routes, both prior to the ban on co-disposal and taking into account two major changes, namely the need to pre-treat hazardous wastes prior to landfill and the new definitions, which have been in force since July 2005.

- *Section 3* examines facility needs for hazardous waste treatment, recovery and disposal within Northern Ireland.

- *Section 4* looks at the potential for co-operation on the island of Ireland.

- *Section 5* discusses the requirements for continued export to Great Britain.

The supporting report does not contain conclusions and recommendations – rather these are provided by the Statement itself.

2 HAZARDOUS WASTES IN NORTHERN IRELAND – ARISINGS, TREATMENT AND DISPOSAL

2.1 OVERVIEW

The European Hazardous Waste Directive (91/689/EEC) was first implemented by the Special Waste Regulations (Northern Ireland) 1998. These regulations introduced a consignment note system for tracking special wastes from their point of production to their final destination for disposal or recovery. Copies of all consignment notes go to the competent regulatory authority, the Environment and Heritage Service (EHS).

In principle, the consignment note system provides reliable data on the sources and destinations of special wastes. Unfortunately, about half of Northern Ireland's special wastes have historically been exported to Great Britain, and the consignment notes only identify the destination as the port of export. In order to circumvent this problem, EHS on behalf of the HWF commissioned consultants (Enviros) in 2003 to investigate the destinations of exported wastes within Great Britain, and to quantify future hazardous waste capacity needs. The results are contained in Annex 2 of the HWF Action Plan, and form the basis of the analysis in this report. The data used are thus for 2002, which is the only year for which this additional level of detail is available.

The 1998 Special Waste regulations were replaced in July 2005 by the new Hazardous Waste Regulations (Northern Ireland) 2005[iii]. In Northern Ireland, the basic control system via consignment notes is working well, and the main changes in this respect are to introduce one consignment note all the way to the destination in Great Britain[1], so that the data problems referred to above should ease over time; and to require consignees to send returns to producers notifying them of receipt of the waste. Other changes implement additional requirements of the European Directive which had not been fully reflected in the 1998 regulations.

The new List of Waste (Northern Ireland) Regulations 2005[iv] introduced the revised European Waste Catalogue (EWC). This changed the current definition of 'special waste' to bring it into line with the European definition of hazardous waste (this term is now being used in Northern Ireland). The change in classification has resulted in more waste being defined as hazardous waste, than under the pevious definition of special waste.

2.2 ARISINGS

Table 2.1 tabulates special waste arisings for Northern Ireland in 2002, and exports to Great Britain, classified by generic type (EWC Chapter headings).

[1]Mutual recognition of consignment notes requires appropriate requirements in the regulations of both administrations. This is currently the case in the new regulations in England and in Wales, but not yet in Scotland.

Table 2.1 Summary of Special Waste Arising and Exported By Generic Type

Waste Description	Special Waste Arisings 2002 (tonnes)	
	Total	Exported to GB
Mining and minerals (01)	6	6
Agriculture, food production (02)	156	1
Wood and paper production (03)	69	5
Leather and textile production (04)	-	
Petrol, gas and coal refining / treatment (05)	-	
Inorganic chemical processes (06)	9,099	6,553
Organic chemical processes (07)	3,594	3,299
Paints, varnish, adhesive & inks (08)	1,939	1,463
Photographic industry (09)	495	485
Thermal processes waste (inorganic) (10)	129	77
Metal treatment & coating processes (11)	2,438	994
Shaping / treatment of metals & plastics (12)	5,368	4,148
Oil and oil / water mixtures (13)	15,139	321
Solvents (organic) (14)	388	383
Packaging, cloths, filter materials (15)	303	108
Not otherwise specified (16)	1,914	1,169
C&D waste & asbestos (17)	2,566	102
Healthcare (18)	1,059	299
Waste / water treatment & water industry (19)	2,645	2,619
Municipal & similar commercial (20)	17	4
Unspecified (99)	107	12
Totals	**47,432**	**22,049**

Source: HWF Action Plan, Annex 2, Table 3

The report prepared for the HWF also examined the potential effects of the new definition of hazardous wastes on the quantities arising. Increased quantities are expected for three main reasons as set out in *Box 2.1*.

Box 2.1 Potential Increases in Hazardous Waste Quantities from the Changes in Definitions

1. Under the Special Waste Regulations, the assessment of "ecotoxic" was limited to those wastes on the Hazardous Waste List. On the EWC 2002, many of these wastes are covered by "*mirror entries*" (i.e. they may be either hazardous or non-hazardous, depending on their hazardous properties) and therefore need to be assessed against all 14 hazardous properties including ecotoxic. This is highlighted by contaminated soils (17 05) which will need to be evaluated against ecotoxic criteria. This is likely to increase the quantity of contaminated soils that are classified as hazardous because many heavy metals and their compounds will have lower threshold concentrations than at present.

Other wastes containing heavy metals and their compounds will also have lower threshold concentrations, which will result in more waste being classified as hazardous. Categories affected could include; inorganic chemical processes (06), thermal process waste (inorganic) (10), metal treatment & coating processes (11), shaping/treatment of metals & plastics (12) and waste from incineration (19 01).

2. There are a number of new hazardous entries on the EWC not previously classified as special waste, these include:

- End-of-life vehicles (16 01 04*): this entry covers all end-of-life vehicles that have not been de-polluted.
- Waste containing Cathode Ray Tubes (CRTs) and activated glass (16 02 13*): This covers televisions and computer monitors.

3. There are a number of wastes that are now covered by "absolute entries" which are hazardous regardless of the concentration of "dangerous substances" within the waste, when previously they would have been assessed against the threshold concentrations. These include:

- All oils (excluding edible oils) (Chapter 13)
- The majority of wood preservatives (03 02)
- Many acids and alkalis; and
- All photographic chemicals

The estimated increases in quantities of hazardous wastes in Northern Ireland resulting from these changes are summarised in *Table 2.2*.

Table 2.2 Summary of Estimated Changes Due to Change in Definition

EWC Code	Description	Comments	Potential Change due to Definition	Estimated Additional Arisings [a]
02	Wastes From Agriculture etc	Agricultural wastes are due to be brought under the definition of controlled waste. This will result in an increase in hazardous waste mainly in relation to agrochemical, asbestos and oils	Not considered in this assessment	-
0604	Metal containing wastes	There could be some metal containing wastes which will be caught by lower thresholds for H10/H14.	Assume a 5% increase in metal containing wastes	300 tpa
07	Organic chemical processes waste	There could be some wastes which will be caught by absolute entries or lower thresholds for ecotoxic.	Assume 10% increase in the hazardous waste currently landfilled. There may also be a need for some additional physico-chemcial treatment capacity	30 tpa
1101	Liquid wastes and sludges from metal treatment and coating of metals	There could be some metal containing wastes which will be caught by lower thresholds for H10/H14.	Assume a 5% increase	100 tpa
1104	Other inorganic wastes with metals not otherwise specified			
1201	Wastes from shaping	There could be some metal containing wastes which will be caught by lower thresholds for H10/H14.	Assume a 5% increase	300 tpa
1202	Wastes from mechanical surface treatment processes			
1601	End of life vehicles	All un-depolluted ELVs will be hazardous, although new and existing facilities will be developed as a result of the requirements of the ELV Directive.	Will be dependent on when an ELV is deemed to be waste. However they are likely to be managed through existing routes, although there may be greater permit controls	N/a

EWC Code	Description	Comments	Potential Change due to Definition	Estimated Additional Arisings [a]
1602	Discarded equipment and shredder residues	Capacity for refrigeration equipment being developed as a result of ODS Regulations. Extent of other hazardous WEEE unclear, although potential for 50k to 100k tpa of CRT containing equipment across UK, capacity likely to develop as a result of the requirements of the WEEE Directive	Assume 5,000 tpa of Hazardous WEEE	5,000 tpa
17	C&D waste & asbestos	The requirement to assess certain Chapter 17 wastes (e.g. contaminated soils) against ecotoxic could significantly increase the quantities classified as hazardous	Expect increase in the quantity of contaminated soils. Very little consigned in 2002 therefore difficult to apply a % increase. Across UK, Chapter 17 waste accounts for 25% of special waste arisings. Therefore assume an additional 10,000 tpa	10,000 tpa
a. Rounded to nearest 100 tonnes				

Source: HWF Action Plan, Annex 2, Table 8

A regulatory impact analysis (RIA) of the key impacts of the changes to the Hazardous Waste List accompanied the Department's consultation document of the new regulations[v]. The focus was on estimating the increase in the number of consignments, so the calculations focused on the total number of units of equipment pre annum rather than the total quantities.

Two entries in *Table 2.2* dominate the quantities. The first is hazardous waste electrical and electronic equipment (WEEE). Estimates on the number of units scrapped per annum in Northern Ireland are as follows:

- **Domestic fridges and freezers** *(containing hazardous refrigerants)*: 65,740 were collected in the first 12 months (to January 2005) of the centralised contract for Northern Ireland. If this was assumed to account for 94% of the total (i.e reducing by half the percentage uncollected, compared to the 88% collection rate estimated in 1998), the total arising would be around 70,000.

- **Commercial fridges, freezers, cold stores and air conditioning units**: The industry estimates that the number of commercial units is roughly 1/6 of the domestic units collected, or about 11,000 per annum (this compares to an RIA estimate of 7,300).

- **Personal computers** *(containing inter-alia lead in cathode ray tubes (CRTs))*: the RIA estimates that 100,000 PCs are discarded annually, 75% from commercial sources.

- **Televisions** *(both CRTs and brominated flame retardants and cadmium pigments in plastics)*: the RIA estimates the annual arisings at more than 400,000, 85% from households.

- **Fluorescent tubes** (mercury): the RIA estimates that 1.8 million are discarded per annum, 90% from commercial sources, and that 20% of these are sent to recycling and a further 10% to crushers.

In order to provide a better estimate of the quantities of WEEE, EHS recently organised a pilot collection scheme for 6 months[vi], at two community recycling centres (CRCs – also known as civic amenity sites), one urban and one rural. Four categories of WEEE were separated, namely white goods, fridges, wastes containing CRTs and small WEEE. Quantities collected were equivalent to between 3.8 - 7.9 kg WEEE per head of population per year for the urban site, and 6.1 - 11.9 for the rural site (these figures compare to a collection rate of 4.0 kg WEEE per head of population per year which the Directive requires to be achieved by December 2006). On this basis, the report estimates total household WEEE arisings in Northern Ireland at between 6,500 – 20,000 tonnes per annum. If it is assumed that commercial arisings would contribute about half as much again, the total would be in the range 10,000-30,000 tonnes per annum.

The pilot site divided collected WEEE into 4 categories, of which two (white good and small WEEE) are predominantly non-hazardous and two (fridges and cathode ray tubes (CRTs) hazardous. The % distribution between the 4 categories at the 2 pilot sites is shown in *Box 2.2*:

Box 2.2 Percentage Distribution of WEEE Collected in the Pilot Project

Site	Dromore CRC (Rural)	Alexandra Park Avenue CRC (Urban)
WEEE Category	**%**	**%**
White Goods	46	49
Fridges/ Freezers	14	25
CRTs	23	15
Small WEEE	17	11
Total hazardous	*37*	*40*

The % distribution for fridges/ freezers and for CRTs differs markedly between the two pilot sites, but the total % of the two hazardous categories is relatively consistent (around 40%). If this % is applied to the estimated total household WEEE arisings from the pilot scheme, the hazardous WEEE arisings from households would be in the range 2,500- 8,000 tonnes per annum.

The data above on the number of units of different types of hazardous WEEE suggests that perhaps 65-80% by weight of both fridges/ freezers and CRTs comes from the domestic sector (for fridges, this assumes that commercial units are between 1.5 and 3 times larger/ heavier than domestic units, while for CRTs, it attempts to combine the data for TVs and computer monitors). This would give a total estimate for hazardous WEEE in the range 3,000 – 12,000 tonnes per annum. This is a large range of uncertainty, and further work to improve the data is recommended. However, the data would appear to suggest that the estimate of 5,000 tonnes per annum in *Table 2.2* may be too low.

The other large figure in *Table 2.2* is for contaminated soil, where a figure of 10,000 tonnes per annum is estimated. However, the uncertainty in this figure, and the likely variability between years, is even greater than for all the other data presented in this Section.

There is one further entry in *Table 2.2* that is worthy of comment, that for end of life vehicles (ELVs). No quantity was estimated, partly because it had not yet been decided at what point an ELV is deemed to be waste, and partly as it was assumed that they would be managed through existing facilities (albeit with an increased level of control). The RIA accompanying the draft regulations estimated that around 75,000 ELVs would arise at vehicle dismantlers across Northern Ireland. Of the almost 100 existing facilities, some 85% are classified as 'low throughput' (handling on average 200 ELVs per annum) and 15% 'high throughput' (handling on average 3,500 vehicles per annum).

2.3 FORMER TREATMENT AND DISPOSAL ROUTES

Table 2.3 estimates the waste management routes for all special wastes arising in Northern Ireland in 2002.

Table 2.3 Estimated Waste Management Routes for All Northern Ireland Special Wastes

Route	Managed in NI	Managed in GB	Total
	Quantity in 2002 (Tonnes)		
Incineration	1	1,190	1,190
Landfill	5,280	8,380	13,660
Wastewater Treatment	2,070	-	2,070
Recovery	-	4,290	4,290
Treatment	18,030	7,890	25,920
Transfer/ Long Term Storage in GB	N/a	300	300
Total	**25,380**	**22,050**	**47,430**
Note: Figures rounded to nearest 10 tonnes			

Source: HWF Action Plan, Annex 2, Table 6

Of particular interest here are the figures for hazardous waste landfill. It is believed that all of these wastes in 2002 were going without pre-treatment to co-disposal landfill sites. The Landfill Regulations (Northern Ireland) 2003 banned the co-disposal of liquid wastes, while the Landfill (Amendment) Regulations (Northern Ireland) 2004 banned co-disposal from 16 July 2004 and required hazardous wastes to be pre-treated prior to landfill.

The 4 co-disposal landfills in Northern Ireland, located at Dargan Road in Belfast, Tullyvar in Dungannon & South Tyrone, Lisbane in Armagh and Culmore in Derry, all closed their gates to hazardous wastes before July 2004, so that no hazardous waste landfill facilities were available locally. The landfill facility at Lisbane was granted a license in Spring 2005 to operate a single cell for stable non-reactive hazardous waste (SNRHW) on a municipal waste landfill site – in this case restricted to asbestos wastes only – it is expected that this will become operational later in 2005. Otherwise, there are currently no landfill facilities for hazardous wastes within Northern Ireland. In Great Britain, the number of hazardous waste landfills has fallen drastically (see Section 5 below), while pre-treatment is also required.

Table 2.4 summarises the main types of special wastes landfilled in 2002, by 6-digit EWC code.

One wastewater treatment plant (Cooney Road in Derry) was licensed in 2002 to receive an alkaline waste. This waste has now been reclassified as non-hazardous.

The remainder of the facilities operating in Northern Ireland in 2002 were largely for waste treatment and/or transfer. The next section looks at sites currently licensed in 2005, as well as providing details of the special wastes treated in 2002.

Table 2.4 Summary of the Main Types of Special Wastes Landfilled in 2002 a

EWC 6 Digit Code	Waste type	Quantity 2002 (Tonnes)[b]	
		In GB	In NI
020304	Wastes from food processing – materials unsuitable for consumption or processing	-	150
030204	Inorganic wood preservatives	-	40
060299	Alkaline solutions – wastes not otherwise specified (nos)	0	20
060301	Waste salts and their solutions – carbonates	-	10
060405	Metal containing wastes – wastes containing other heavy metals	4,730	30
060499	Metal containing wastes – wastes nos	680	120
060501	Sludges from on site effluent treatment	-	20
070599	Waste from the manufacture, formulation, supply and use (MFSU) of pharmaceuticals – waste nos	-	250
070601	Waste from the MFSU of fats, grease, soaps, detergents, disinfectants and cosmetics – aqueous washing liquids and mother liquors	-	10
0801	Wastes from MFSU of paint and varnish – various 6-digit codes	10	410
080399	Waste from MFSU of printing inks – wastes nos	-	30
080499	Wastes from MFSU of adhesives and sealants – wastes nos	0	20
090109	wastes from photographic industry – single use cameras with batteries	-	10
100399	wastes from aluminium thermal metallurgy – wastes nos	-	10
110103	Liquid wastes and sludges from metal treatment and coating of metals – cyanide-free wastes containing chromium	-	20
110401	Other inorganic wastes with metals not otherwise specified	-	20
120101	Wastes from shaping – ferrous metal filings and turnings	20	-
120109	Wastes from shaping - waste machining emulsions free of halogens	420	
120111	Wastes from shaping – machining sludges	1530	
120199	Wastes from shaping – wastes nos	150	
120201	Wastes from mechanical surface treatment processes – spent blasting grit	60	30
120299	Wastes from mechanical surface treatment processes – wastes nos	-	90
130503	Oil/water separator contents – interceptor sludges	-	150
130601	Oil waste not otherwise specified	90	1,050
150201	Absorbents, filter materials, wiping cloths and protective clothing	90	140
160204	Discarded equipment containing free asbestos	30	0
160706	Waste from storage tank cleaning, containing oil	-	50
170105	Asbestos containing construction materials	-	1740
170501	Soil and stones	-	<10[c]
170601	Insulation materials containing asbestos	-	700
190201	Wastes from specific physico/chemical treatments of industrial wastes	470	-
190804	Wastes from water treatment plants not otherwise specified	50	-
2001	Separately collected fractions – various 6-digit codes	-	10
999999	Waste not otherwise specified	-	70
	Other relatively minor waste types[a]	50	80
	Landfill Total	**8,380**	**5,280**

a. Analysis based on the 'major' waste types. 6-digit EWC codes with less than 10 tonnes/annum were omitted (included in the 'balancing' row at the end)
b. Figures rounded to nearest 10 tonnes
c. No contaminated soil consigned in 2002, but this was considered unusual

Source: Spreadsheets from the study carried out for the HWF by Enviros

2.4 FACILITIES FOR HAZARDOUS WASTE TREATMENT AND DISPOSAL IN NORTHERN IRELAND

Table 2.5 shows the number of facilities in Northern Ireland which were licensed for the treatment or disposal of hazardous wastes in May 2005.

Table 2.5 Number of Facilities in Northern Ireland Licensed for Hazardous Wastes

Type of Facility	Number
Treatment and Transfer	
♦ Range of hazardous wastes, for acid-alkali neutralisation, oil-water separation and transfer	1
♦ Metal bearing wastes	1
♦ Car batteries (licensed for separation, but now mainly operating as transfer stations)	7
Treatment	
♦ Oil recycling/ treatment	3
♦ Steam sterilisation of clinical wastes (including prescription only medicines and sharps)	1
♦ Encapsulation of leaded petroleum sludge (now little waste)	1
Transfer stations	
♦ Covering a range of hazardous wastes	4
♦ Prescription only medicines and sharps	11
♦ Paints and thinners (take-back of used materials from customers)	4
♦ Batteries	1
♦ In-house wastes only	1
Landfill	
♦ Single cell for asbestos waste	1
Total	**36**

Source: Data provided by EHS, May 2005

About two-thirds of the 36 facilities listed in *Table 2.5* are both small and very specialised – focusing for example on the transfer of healthcare risk wastes to the centralised steam sterilisation facility and to high temperature incineration in Great Britain; on car batteries (typically from scrap yards, and now mainly sent to Great Britain for specialised recovery); and on paints and thinners (returned from customers, and transferred to Great Britain either for solvent recovery or blending prior to cement kiln incineration).

There are only 8 facilities which are either larger, or accept a wider range of waste:

- 3 focus on treatment of oily wastes, typically producing recovered fuel oil (RFO) for sale (see S*ection 3.2.3* below);
- 1 is licensed both as a transfer station and to undertake some treatment (i.e. neutralisation of acids and alkalis and oil-water separation); and
- 4 are licensed only as transfer stations, sending wastes to Great Britain for treatment or disposal.

There are a relatively high number of planning and licensing applications under processing in Northern Ireland, which will in due course affect the numbers and types of licensed facilities. The two main categories are authorised treatment facilities (ATFs) for end of life vehicles (ELVs); and household recycling centres and

material recycling facilities which are collecting and sorting household hazardous wastes.

Although relatively few facilities are licensed for waste treatment, the proportion of hazardous wastes managed in Northern Ireland which are treated is relatively high – 71% of special wastes in 2002 when co-disposal was still practiced. Adding the 4,300 tonnes exported to the 18,000 tonnes treated in Northern Ireland, the proportion of the total treated in 2002 was 55%. A summary of the waste types treated and the treatment methods most likely used is shown in *Table 2.6*.

Table 2.6 Summary of Special Wastes Treated in 2002

Waste type	Likely treatment method	Waste quantity in 2002 (tonnes) [a]		
		Managed in NI	Exported to GB	Total
Acids	Neutralisation	1600	1650	3250
Alkalis	Neutralisation	60	160	220
Various metal finishing wastes	Various chemical treatments	50	190	240
Metal hydroxide and other wastewater treatment sludges	Stabilisation/ Solidification	20	2090	2120
Photographic wastes	Chemical treatment	0	90	90
Other inorganic wastes	Various chemical treatments	140	60	200
Sub-total	**Physico-chemical treatment**	**1880**	**4240**	**6120**
Waste oils	Oil treatment (preparation of recovered fuel oil - RFO)	8020	30	8050
Bilge oils	Oil separation and treatment (RFO)	3560	0	3560
Interceptor sludges	Oil separation and treatment (RFO)	2040	0	2040
Sludges from oil storage tanks	Oil separation and treatment (RFO)	570	0	570
Machining oils and emulsions	Oil separation and treatment (RFO)	1070	1010	2070
Machining sludges	Oil separation and treatment (RFO)	30	900	910
Solid wastes containing oils	Oil separation and treatment (RFO)	60	0	60
Sub-total: Oily wastes	*Oil separation and treatment (RFO preparation)*	*15350*	*1940*	*17280*
Solvents	Organic waste pre-treatment (OWP) – i.e blending for cement kiln co-incineration	20	1530	1550
Healthcare risk wastes	Steam sterilisation (in Northern Ireland)/ Incineration (in GB)	760	70	830
Sub-total	**Organic waste treatment**	**16120**	**3540**	**19660**
Unclassified [b]		30	120	150
Total	**All waste treatment**	**18030**	**7890**	**25920**

a. Figures rounded to the nearest 10 (thus rounding errors in totals)
b. Summary based on an analysis of the major waste types, by 6-digit code. This row represents those smaller quantity EWC codes omitted from the analysis.

Source: Spreadsheets from the study carried out for the HWF by Enviros

2.5 PREDICTED FUTURE REQUIREMENTS FOR TREATMENT AND DISPOSAL

One of the main aims of the work carried out by Enviros for the Hazardous Waste Forum was to estimate the changes in the future requirements for hazardous waste treatment and disposal. They looked in turn at the likely changes due to

i. diversion of wastes from landfill; and
ii. additional requirements for newly classified hazardous wastes.

The categories of treatment / disposal used in the tables which follow include three which are similar to those used in *Table 2.3* above, namely:

- physico-chemical treatment:
- wastewater treatment; and
- thermal treatment (high temperature incineration (HTI) or co-incineration in a cement kiln),

plus two additional categories, namely:

- stabilisation/ solidification, which is a type of physico-chemical treatment particularly suitable for pre-treatment of inorganic waste streams prior to hazardous waste landfill, but which results in a considerable increase in the quantities to be landfilled; and
- landfill after pre-treatment but without significant volume increase.

The tables are each divided into two parts, the first showing estimated quantities of wastes input to each type of treatment or disposal, and the second the resulting quantities of waste requiring hazardous waste landfill. Each of these estimates is highly dependent of the assumptions made.

- Enviros assigned each of the waste types (from *Table 2.4* for previously landfilled wastes and *Table 2.2* for 'new' wastes, using 6-digit EWC codes) to one of the treatement processes, using a mixture of the waste acceptance criteria, the EA/SEPA joint guidance on waste treatment under the Landfill Directive, information from the Environmental Services Association (ESA) and the British Cement Association (BCA), and professional judgement.

- The Landfill (Amendment) Regulations (Northern Ireland) 2004 require that all hazardous wastes be pre-treated before landfill. The Enviros baseline assumption was that all wastes not going to thermal, physico-chemical, or wastewater treatment would require stabilisation/ solidification prior to landfill. Here it is assumed instead that asbestos wastes will continue to be 'double-bagged' and landfilled, and that 50% of contaminated soils will be stabilised/ solidified while 50% will be landfilled after some sort of pre-treatment which does not result in a significant increase in volume/ weight.

- Enviros assumed that stabilisation/ solidification results in a twofold volume/ weight increase in the waste requiring landfill – the tables also show the sensitivity of the quantities requiring landfill if this assumption is varied to a 1.5 or a 3-fold increase. Similar assumptions were made regarding the outputs of physico-chemical treatment (75% of the input quantity requires landfill – a relatively high figure which allows for some of the wastewater treatment sludges to be stabilised/ solidified prior to landfill) and thermal treatment (no residue requires landfill – which is reasonable for cement kiln co-incineration but very low for high-temperature incineration).

- Enviros also assumed that all outputs from stabilisation/ solidification or physico-chemical treatment require landfill as hazardous wastes. This follows the joint Environment Agencies guidance on Hazardous Waste definition [vii].

Based on these assumptions, the required capacities by treatment / disposal method are summarised in the tables which follow:

- *Table 2.7* summarises the additional generic treatment/ disposal route capacity needed for special wastes landfilled in 2002;
- *Table 2.8* provides similar information for new hazardous wastes; and
- *Table 2.9* combines the two tables, with information also from *Table 2.6* and *Table 2.3* on current treatment and recovery capacities, to predict likely total future capacity needs by generic treatment/ disposal route.

Table 2.7 Summary of Generic Treatment/ Disposal Route Capacity for Special Waste Landfilled in 2002 (tonnes per annum)

Generic Treatment / Disposal Route	Estimated Treatment/ Disposal Capacity Need for Special Waste Currently Landfilled [a, b]	Resultant Hazardous Waste Landfill Required, including Residues/ Outputs from Treatment Processes		
	Base Assumption	Base Assumption	S1 [e]	S2 [f]
Stabilisation/ Solidification	**6,870**	**13,740**[d(i)]	10,300	20610
Landfill after pre-treatment (no significant increase in weight)[c]	**2,440**[c]	**2,440**	2,440	2,440
Physico-chemical treatment	**1,760**	**1,320** [d(ii)]	1,320	1,320
Wastewater treatment	**340**	**n/a**	n/a	n/a
Thermal treatment	**1,650**	**n/a**	n/a	n/a
Total	**13,060**	**17,500**	14,060	24,370

a. Figures rounded to nearest 10 tonnes

b. ~600 tonnes of special waste currently landfilled would be classified as non-hazardous under EWC2002. This is because under certain Sub-Chapters of the EWC2002 there are no hazardous entries identified (e.g. 0202 to 0207)

c. It is assumed that asbestos will continue to be 'double bagged' and landfilled

d. Resultant landfill capacity for treated wastes assuming:

i. Stabilisation/solidification will increase the weight of waste by a factor of 2 and all stabilised/solidified waste remains hazardous; and

ii. Physico-chemical treatment will produce a residue requiring landfill equivalent to 75% of the waste input by weight and the residues are hazardous waste.

e. Sensitivity 1: stabilisation/solidification increasing the weight of waste by a factor of 1.5

f. Sensitivity 2: stabilisation/solidification increasing the weight of waste by a factor of 3 (although this would an extreme case)

Source: Adapted from HWF Action Plan, Annex 2, Table 7

Table 2.8 Summary of Generic Treatment/ Disposal Route Capacity for Additional Hazardous Wastes (tonnes per annum)

Generic Treatment / Disposal Route	Estimated Treatment/ Disposal Capacity Need for Additional Wastes [a, b]	Resultant Hazardous Waste Landfill Required, including Residues/ Outputs from Treatment Processes
	Base Assumption	Base Assumption
Stabilisation/ Solidification	**5,880**	**11,760** [d(i)]
Landfill after pre-treatment (no significant increase in weight)[c]	**3,350** [c]	**3,350**
Physico-chemical treatment	**1,620**	**1,220** [d(ii)]
Wastewater treatment	**40**	**n/a**
Thermal treatment	**1,480**	**n/a**
Total	**12,370**	**16,330**

a. Figures rounded to nearest 10 tonnes

b. ~600 tonnes of special waste currently landfilled would be classified as non-hazardous under EWC2002. This is because the under certain Sub-Chapters of the EWC2002 there are no hazardous entries identified (e.g. 0202 to 0207)

c. It is assumed that 50% of the contaminated soils require stabilisation/ solidification, while 50% can be landfilled directly or after pre-treatment which does not result in a significant increase in volume/ weight

d. Resultant landfill capacity for treated wastes assuming:

i. Stabilisation/solidification will increase the weight of waste by a factor of 2 and all stabilised/solidified waste remains hazardous; and

ii. Physico-chemical treatment will produce a residue requiring landfill equivalent to 75% of the waste input by weight and the residues are hazardous waste.

Source: Adapted from HWF Action Plan, Annex 2, Table 9

Table 2.9 Summary of Generic Treatment/ Disposal Route Capacity Needs (tonnes per annum)

Generic Treatment Route	Estimated Treatment/ Disposal Capacity Needs				Resultant Hazardous Waste Landfill Capacity Required for Residues/Outputs from Treatment Process			
	Special Waste Currently Treated	Special Waste Currently Landfilled [a]	Additional Wastes [a]	Total	Special Waste Currently Treated	Special Waste Currently Landfilled [a]	Additional Wastes [a]	Total
Stabilisation/ Solidification	2,120 [b]	6,870	5,880	**14,870**	4,240	13,740	11,760	**29,740**
Landfill after pre-treatment (no significant increase in weight)	-	2,440	3,350	**5,790**	-	2,440	3,350	**5,790**
Physico-chemical treatment	21,430 [c]	1,760	1,620	**24,810**	- [g]	1,320	1,220	**2,540**
Wastewater treatment	- [d]	340	40	**380**	-	n/a	n/a	n/a
Thermal treatment	3,570 [e]	1,650	1,480	**6,700**	n/a	n/a	n/a	n/a
Recovery	4,290 [f]	-	-	**4,290**	n/a	-	-	n/a
Total	31,410	13,060	12,370	**56,840**	4,240	17,500	16,330	**38,070**

a. This table should be read alongside the assumptions set out in the text, and in the notes to *Table 2.7* and *Table 2.8*

b. Data taken from *Table 2.6*; baseline assumption of twofold increase in quantity for landfill used

c. Data taken from *Table 2.6*; includes both inorganic physical-chemical treatment + oil- separation and treatment + unclassified treatment

d. Discounts the WWT data from *Table 2.3*, as this disposal route is not longer used

e. Includes the data for incineration from *Table 2.3*, and the data for both organic waste pre-treatment prior to cement kiln incineration, and steam sterilisation, from *Table 2.6*

f. Recovery data from *Table 2.3* included for completeness

g. The residues from existing treatment plants will already be included directly in the special wastes arising data, so are not included here, to avoid double counting

3 EXAMINATION OF FACILITY NEEDS WITHIN NORTHERN IRELAND

3.1 METHODOLOGY

In *Section 2*, information is provided on arisings of hazardous wastes and on the methods used for treatment and disposal in 2002; on likely capacity needs for wastes displaced from landfill after the regulatory changes in July 2004; and on likely effects on hazardous waste quantities of the changes in hazardous waste definitions being introduced in July 2005. *Table 2.9* pulled the available information together into a summary of estimated capacity needs.

Based on that information, this Section will focus on the apparent 'need' for various types of hazardous waste facilities within Northern Ireland, based on current and likely future arisings within Northern Ireland and on the likely economic scale of facilities. The intention is to provide a preliminary 'screening' analysis, so that future more detailed work can focus on a shortlist of facilities for which the need is greatest.

It is necessary at the outset to understand some of the limitations of this analysis.

- The purpose, as discussed in *Section 1*, is to establish at a broad level the likely 'need' for a particular type of facility, as required by Planning Policy Statement PPS11.

- The data in *Section 2* are inherently uncertain. One year (2002) has been used as a baseline, and there is known to be variability in hazardous waste arisings between years. Future arisings have been estimated in advance of the legislation (*Table 2.2* does take account of the first point to some extent, in that the increase in quantities of contaminated soil does allow for the low (zero) figure in 2002). Also, it is to be hoped that hazardous waste producers will respond to the new regulations by investing in waste prevention and minimisation at source. However, when the first full year's data under the new regulations becomes available (for 2006-2007), the analysis here will need to be repeated.

- The initial analysis of need in this Section is based on hazardous waste arisings in Northern Ireland, while the potential for co-operation in facility provision on an all island basis is discussed in *Section 4*. Clearly, a facility developer may wish to make the case for facility need based on the island of Ireland rather than just Northern Ireland, or indeed on the basis of the British Isles. It would be unreasonable for Northern Ireland to expect either Great Britain or the Republic of Ireland to allow the import of our hazardous wastes to their facilities, while not allowing the reciprocal situation to take place. Nevertheless, given Northern Ireland's small size and relative geographical isolation, financial feasibility would generally be expected to require at least a 'baseload' of locally produced wastes to minimise transport costs.

- The analysis here is a first step, aimed at screening those types of facilities most likely to be justified by need within Northern Ireland. A next step for short-listed facilities would be to establish if this is indeed the BPEO for the target waste streams. (This has already been done for asbestos wastes). In addition, any prospective facility developer would need to carry out their own detailed investment, financial, market and environmental appraisals.

3.2 Need for Treatment/ Recovery Facilities

3.2.1 Introduction

In this section, treatment and recovery facilities are discussed under the following sub-heads:

- Physico-chemical treatment;
- Oil separation and treatment;
- Thermal treatment, including high-temperature incineration, fuel blending/ cement-kiln co-incineration and steam sterilisation of healthcare wastes;
- Recovery; and
- Special requirements for treatment of several waste types, i.e. WEEE , ELVs and contaminated soil.

Stabilisation/ solidification is primarily being discussed as a pre-treatment for landfill, and so is discussed in *Section 3.3* on landfill.

Collection and transfer facilities, to accumulate sufficient quantities for economic transport to treatment or disposal facilities, either within Northern Ireland or Great Britain (or the Republic of Ireland), will continue to be important, and this is discussed in *Section 3.4*.

All of these distinctions between types of treatment technology, and between treatment and transfer, are relatively arbitrary, and indeed some possible anomalies in the categorisation used historically will appear in the discussion. *Section 3.5* thus discusses the opportunities for a more integrated treatment/transfer/ disposal facility.

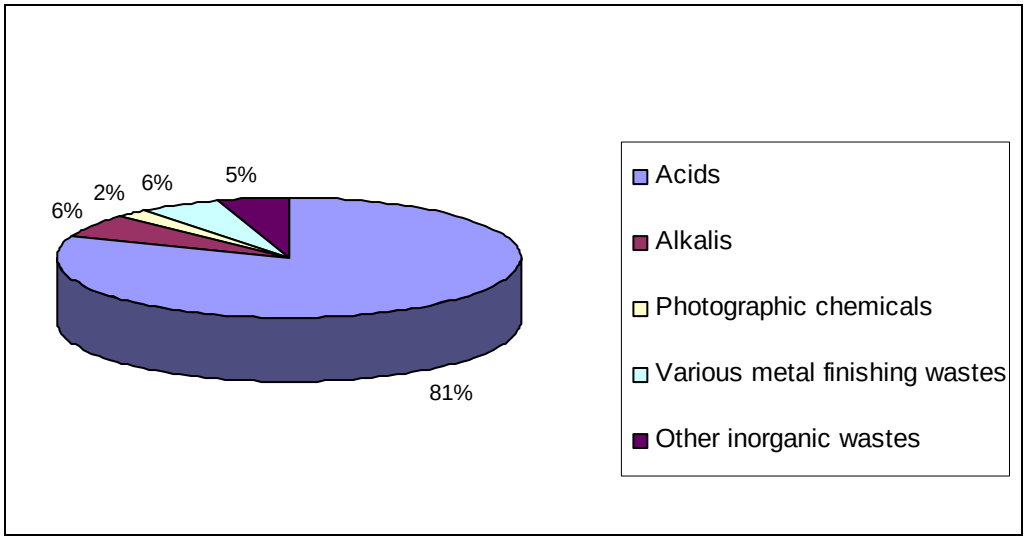
From the data in *Table 2.9*, the combined quantities of special wastes being treated or recovered in 2002 was more than 29,000 tonnes (31,000 tonnes including stabilisation/solidification), which is predicted to rise to 36,000 tonnes (51,000 tonnes including stabilisation/solidification) allowing for diversion of wastes from landfill and for new hazardous wastes.

3.2.2 Physico-chemical Treatment

In this section, attention is focussed on a range of physico-chemical treatments (P/CT), including oxidation of cyanide, reduction of chromium (VI) to chromium (III), acid-alkali neutralisation, hydrolysis, precipitation and dewatering. Solidification of resultant metal hydroxide/sulphide sludges and of wastes not subjected to physical/chemical treatment, and oil-water separation, are discussed later (*Sections 3.3* and *3.2.3* respectively).

Table 2.6 identified some 4,000 tonnes of such wastes in 2002, of which more than 80% was acids, some of which will contain heavy metal salts (*Figure 3.1*). Of the total, just under 50% was treated within Northern Ireland. *Table 2.9* predicts an additional 3,400 tonnes of wastes for either physico-chemical treatment or oil separation and treatment, coming from both landfill diversion and newly defined hazardous wastes.

Figure 3.1 Special Wastes Treated by Physico-chemical Treatment in 2002



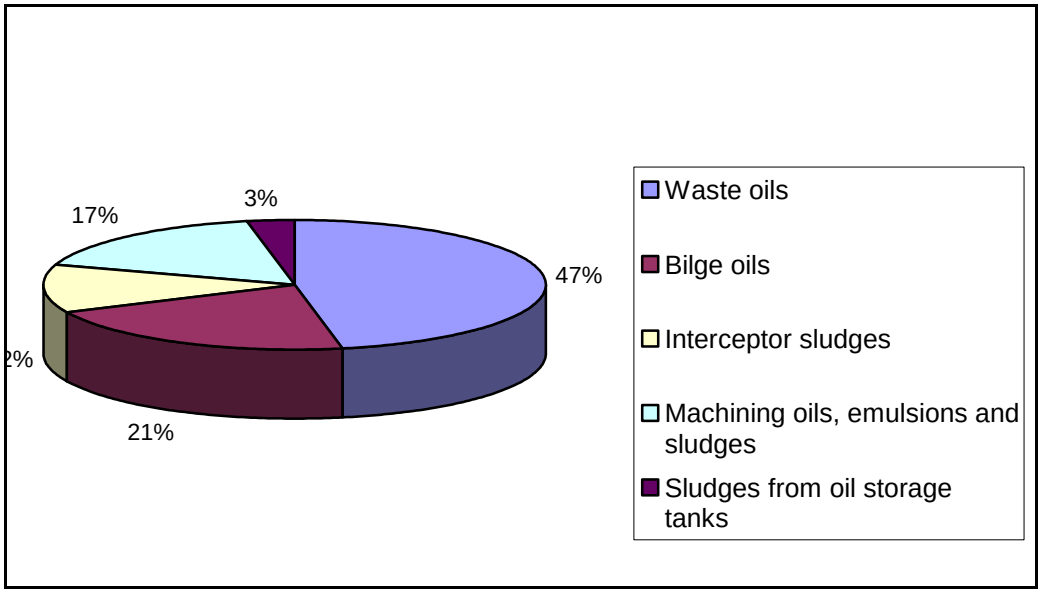
Viable physical/chemical treatment facilities typically have had capacities in excess of 10,000 tonnes per annum and indeed in Great Britain during the decline in demand in the 1980s, several P/CT facilities ceased operation when their throughputs dropped below approximately 3,500 tonnes per annum.

There is already one partially 'integrated' treatment / transfer facility operating in Northern Ireland, which is licensed for acid-alkali neutralisation, oil-water separation and transfer. This may have sufficient capacity to accept any additional acid wastes which it is capable of treating, although heavy metal content may be a constraint (about half of the acids arising in 2002 were exported). It may be that some extension of the existing facility, or the development of a new facility, could be justified within Northern Ireland. However, it is also likely that export will continue to be the only viable option for the smaller quantities of wastes requiring more specialised treatment.

3.2.3 Oil Separation and Treatment

Table 2.6 identified more than 15,000 tonnes of oily wastes, which were treated at 4 facilities in Northern Ireland, plus another 2,000 tonnes which were exported to Great Britain. Future increases are predicted to be relatively small – 3,400 tonnes is identified in *Table 2.9* as requiring either physico-chemical treatment or oil separation and treatment. The 2002 distribution of waste oils by source is summarised in *Figure 3.2*.

Figure 3.2 Oily Wastes Treated in 2002



Oily wastes are generally treated in Northern Ireland by processing to recovered fuel oil (RFO). Almost all of the exported oily wastes are machining oils and sludges, some of which require more specialised treatment.

RFO is the general product in both the UK and the Republic of Ireland (a few EU countries have re-refining facilities to regenerate a lubricating oil for the approximately 50% of oils which originate from automotive use). RFO in the UK has two main markets, as a start-up fuel in coal-fired power stations and as a fuel for roadstone burners (making tarmac at quarry sites). In Great Britain, these markets are split about 50:50, but in Northern Ireland, roadstone is the only current market.

RFO preparation is classified here as a treatment rather than as a recovery option, because the UK classifies RFO as still a 'waste' rather than as a 'product'. As a result, facilities burning RFO will need to comply with the requirements of the Waste Incineration Directive (WID), which comes into force in December 2005. This would impose a large cost burden on the (mainly small) roadstone plants in Northern Ireland, and it is likely that some if not all will decide to convert to alternative fuels. This could pose a major problem, if it was to undermine the current, very efficient free collection service provided by the RFO industry to garages, civic amenity sites and other generators of waste oils.

The only alternative market for RFO in Northern Ireland is potentially the two cement kilns. The high energy usage of cement kilns has led to worldwide interest within the industry in the use of various waste-derived fuels for co-combustion: one of the Northern Ireland plants is known to have been conducting its own test burns. RFO would be easy to burn in cement kilns: however, the price paid for the fuel is likely to be much lower than at present (or even negative).

It is worth noting that RFO is also produced in the Republic of Ireland, and that their existing roadstone markets appear to be relatively secure, as the Republic of Ireland government classify RFO as a product, so that the requirements of WID do not apply.

Whatever the markets, it is likely that oily waste treatment and RFO preparation will continue in Northern Ireland. Given the relatively small changes in quantities of

oily wastes that are predicted, and the uncertainties in the market, it is likely that the demand can be met by the current facilities. If, however, major changes are required, e.g. to prepare RFO for cement kilns, some adaptation of the existing facilities, or even new facilities, may be needed.

3.2.4 Thermal Treatment

Three types of thermal treatment for hazardous wastes were identified in *Section 2*:

- Export to specialised high-temperature incineration (HTI) facilities for hazardous wastes;
- Blending of organic wastes to produce a 'secondary liquid fuel' SLF, for co-incineration in a cement-kiln; and
- steam sterilisation of healthcare wastes.

There is one steam sterilisation plant serving the whole of Northern Ireland under a centralised contract for wastes from the National Health Service, and handling about 90% of the healthcare risk wastes (the remaining 10% goes to incineration in Great Britain).

With regard to the first two options for thermal treatment, organic hazardous wastes must be pre-processed before thermal treatment to give the feedstock for either a high temperature incinerator (HTI) or cement kiln. In the case of a HTI, this pre-processing is an integral part of the HTI facility but in the case of the cement plant it is either an "add-on" at the cement kiln or provided as a separate organic waste pre-treatment (OWP) merchant service, which then sends the SLF to the cement kiln.

The quantities of wastes arising in Northern Ireland which potentially require thermal treatment in either an HTI or via co-combustion, are relatively small:

- 1,190 tonnes per annum (tpa) of current wastes, exported to Great Britain for incineration in 2002 (*Table 2.3*);

- A further 1,550 tpa of solvent wastes was included in the treatment figures in *Table 2.6* – this was almost certainly destined for an OWP facility in Great Britain, and hence to a cement kiln;

- 1,650 tpa potentially to be diverted from co-disposal landfill (*Table 2.7*); and

- 1,480 tpa of predicted 'new' hazardous wastes (*Table 2.8*).

- This gives a total quantity less than 6,000 tpa. As the last two categories are likely to comprise 'more difficult' (and lower calorific value) waste types (the 'easier' solvents are already included in the current figures), the overall split between HTI and co-combustion may be skewed in favour of HTI, with working estimates of 3-4,000 tonnes to HTI and 2-3,000 tonnes to fuel blending.

This sub-total of 3- 4,000 tpa, is very small compared to the size of commercial HTI plants (typically a minimum of 15,000 tpa; the proposed new facility in County Cork would have a capacity for hazardous wastes around 50,000 tpa (see *Section 4.4*). So there is most unlikely to be a need for a dedicated high-temperature incinerator for hazardous wastes in Northern Ireland.

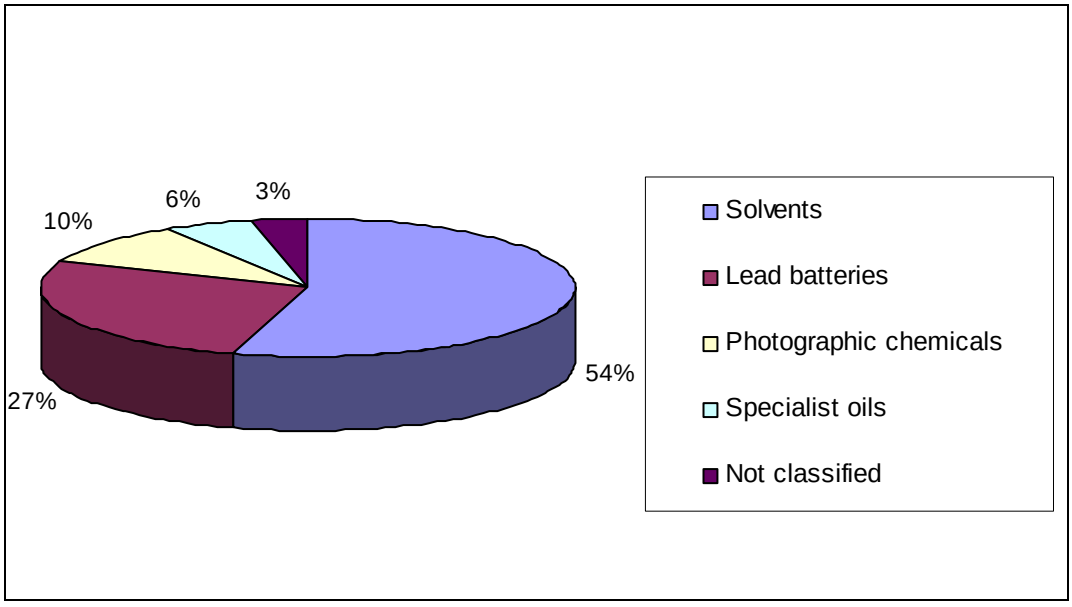
Equally, a quantity of 2- 3,000 tpa is too low to justify on purely economic grounds the development of an organic waste pre-treatment (blending) facility (OWP) for preparation of secondary liquid fuels (SLF) for cement kilns. Cement kilns in Great Britain that are most actively using SLF accept between 10,000 and 37,500 tonnes per annum of SLF per kiln. The anticipated quantities of waste are far below this unless waste oils (RFO) are included – the total figure could be within the economic range of such facilities. As noted in *Section 3.2.3*, cement kiln operators are becoming more and more interested in accepting waste derived substitute fuels, in order to demonstrate that they are reducing their high consumption of carbon based primary fuels.

3.2.5 Recovery

Around 9% of the total arisings of hazardous wastes in Northern Ireland were classified as going for recovery in 2002, all through export to Great Britain (*Table 2.3*). The Enviros report did not suggest that either wastes diverted from landfill, nor newly classified hazardous wastes, would increase this figure.

Examination of the 2002 export data shows that the 4,290 tonnes of wastes exported for recovery were classified under 25 4-digit EWC codes, of which half accounted for more than 97% of the total. Detailed analysis of these dominant waste types provides the breakdown between recovery routes shown in *Figure 3.3*.

Figure 3.3 Breakdown of Wastes Exported for Recovery by Recovery Process



The predominant waste types recovered are solvents. Solvent recovery processes accepting waste solvents, paints and inks are viable on a relatively large scale, with successful facilities processing many thousands of tonnes per annum. These facilities are generally viable when large volumes of individual types of solvent wastes are available; they become uneconomic when smaller volumes of a wide variety of solvents are generated as in Northern Ireland. In Great Britain, the largest solvent recovery facility is moving more towards SLF production for cement kilns and indeed is now owned by Heidelburg one of the worlds largest cement companies. There is a relatively small, 5,000 tpa distillation facility in Dublin, but this is under utilised and significant Republic of Ireland solvents are exported for recovery (see *Section 4.3* below). Again, this supports the conclusion that solvent recovery is only likely to be viable at a scale much larger than the 2,300 tonnes per annum produced

by Northern Ireland in 2002, or as part of an integrated hazardous waste management facility.

The other wastes sent for recovery in Great Britain arose in even smaller quantities. Lead-acid battery recovery is becoming more sophisticated and environmentally demanding, with facilities generally having capacities well into the tens of thousands of tonnes, because they are often associated with lead smelting works. Silver recovery can be relatively simple, but again processes are tending to become more complex, and the quantities arising in Northern Ireland (less than 100 tonnes per annum) are tiny (see also *Table 4.3 and Table 4.5* below). It is thus unlikely that a facility for hazardous waste recovery would be viable purely on the basis of wastes from Northern Ireland, although there could still be some potential either for recovery as part of an integrated hazardous waste management facility, or for specialised facilities, particularly if they served a wider geographical area.

3.2.6 Treatment of WEEE and ELVs

The estimates by Enviros of future capacity needs for 'new' hazardous wastes (*Table 2.8*) already include an allowance for WEEE but not for ELVs.

The total arisings of WEEE in Northern Ireland, from both domestic and commercial sources, is perhaps in the range of 10,000 – 30,000 tonnes per annum, of which hazardous WEEE is in the range 3,000 – 12,000 tonnes per annum (*Section 2.2*). In terms of treatment facilities, domestic fridges are presently being collected centrally and sent to Great Britain for dismantling and recovery. A fridge dismantling facility has recently started operations, and another one is in the pipeline.

The quantities of WEEE expected to arise within Northern Ireland are relatively large, so that a network of facilities for collection and storage will be needed. For treatment, there is also a need for one or more facilities, at least for equipment dismantling and pre-processing. Exactly how many facilities, or their level of sophistication, is more of an economic issue which will need to be explored by potential facility developers, particularly when better data on arisings becomes available.

Fluorescent tubes are another particular waste stream for which there could in the future be a need for at least a pre-processing (crushing and segregation) facility. However, in the short-term, the emphasis should perhaps be on improving collection rates from the domestic waste stream.

There is already a traditional network of facilities in Northern Ireland for vehicle dismantling. For Northern Ireland to continue to be self sufficient in this important sector, there is a clear need for the upgrading of these facilities, or the development of new ones, to provide a well-distributed network of authorised treatment facilities (ATFs) for end of life vehicles. Indeed, there are currently around 10 planning applications for ATFs under consideration.

3.2.7 Treatment of contaminated soil

In *Section 2.2*, it was noted that annual arisings of contaminated soil classified as hazardous wastes fluctuates widely – indeed, the figure was zero in the base year for the current data, 2002. *Table 2.2* gave an estimate for planning purposes of 10,000 tonnes per annum. However, in practice, arisings will depend on the timing and extent of remediation works required at individual sites for redevelopment, and the

quantities in some years could be much larger than this estimate. Further uncertainty arises from the wide range that can be expected in the nature and extent of contamination - the types of treatment required will thus be highly site dependent.

In these circumstances, the economics of developing centralised facilities for the treatment of contaminated soil in Northern Ireland is likely to be challenging. More likely, specific facilities, which may be located on the contaminated site itself or off-site, would be developed to deal with individual sites or groups of sites as they are redeveloped. Such facilities could be entirely site specific (e.g. for on-site bio-remediation) or could take the form of 'mobile' or 're-locatable' plant which could be set up at one site for a period, and then dismantled and moved to another site as required.
Whichever option is chosen, there is a clear need for facilities to treat contaminated soil, to enable Northern Ireland to bring back into productive use its heritage of sites contaminated by past industrial use.

3.3 NEED FOR LANDFILL FACILITIES

In 2002, some 13,700 tonnes of special wastes were going to landfill, of which approximately 40% was landfilled within Northern Ireland and 60% was exported to Great Britain. With both the ban on co-disposal, the requirement for pre-treatment prior to landfill and the changing definitions of hazardous wastes, *Tables 2.7 - 2.9* estimate a requirement to landfill, or to stabilise/ solidify prior to landfill, over 20,000 tonnes of waste a year, with a total requirement for landfilling after pre-treatment (assuming that solidification doubles the quantity requiring landfill) around 38,000 tonnes per year. The arisings of asbestos waste in 2002 was about 2,500 tonnes.

The only landfill licensed for hazardous waste in Northern Ireland is currently a single cell for asbestos waste at the Lisbane site in Armagh district. A BPEO assessment for asbestos wastes was carried out in 2004[viii], which concluded that the BPEO for asbestos waste is double bagging and landfilling within Northern Ireland, at two or more sites spatially spread across the Province. There is thus still a need for one or more additional single cells for asbestos waste at landfill sites within Northern Ireland. There have been many permit applications in England and Wales for single cells accepting asbestos wastes only, many of which have been in the range 1,000 – 5,000 tonnes per annum, although there are also some much larger ones (up to 50,000 tpa or more).

Even allowing for diversion to other treatment options, there is estimated to be a further 18,000 tonnes of waste, in addition to asbestos, which will require solidification and landfilling – this gives a total requirement for landfill of up to 35,000 tonnes. Given the potential doubling in weight following solidification, it will generally be most economic to carry out this pre-treatment at the landfill site. At present, all of this waste has to be exported to Great Britain.

There has been much speculation in the waste industry as to the likely costs and economies of scale for either a dedicated hazardous waste landfill site, or for a single cell for stable non-reactive hazardous waste (SHRHW) at a non-hazardous waste landfill site. The EA and CIWM maintain a website of permit applications for hazardous waste landfill sites in England and Wales[ix] - by November 2004 some 60 applications had been received, of which about one third appeared to be for dedicated hazardous waste landfills, with the remainder for single cells.

- For the dedicated sites, the range of annual permitted capacities is 25,000 – 450,000 tonnes per year. Apart from two asbestos-only sites, there appear to be only 2 which have sought permits for less than 50,000 tonnes per year, while half of the total are for 100,000 tpa or more.

- For single cells for SNRHW accepting a wide range of wastes, 5 of the 10 applications for which data are provided are in the range of 17,000 – 50,000 tpa, while the other 5 are in the range 70,000 – 125,000 tpa.

With Northern Ireland potentially generating more than 30,000 tonnes per year of (treated) waste for landfill (in addition to asbestos and some contaminated soils – see *Tables 2.7 – 2.9*), the conclusion is that there is both a need, and likely also an economic case, for one facility, comprising a stabilisation/ solidification plant plus a cell for SNRHW at a non-hazardous waste landfill, and handling a range of hazardous wastes.

This conclusion is further strengthened by a consideration of relative prices between Northern Ireland and Great Britain. When co-disposal was still practiced in Northern Ireland, gate prices were in the range of £175-250/tonne, compared to Great Britain prices of £15-50. While Great Britain prices have increased sharply, to £50-150/tonne, it is likely that a Northern Ireland site would still be able to charge a substantial premium.

3.4 NEED FOR COLLECTION AND TRANSFER STATIONS

There are currently 22 transfer stations licensed to handle hazardous waste within Northern Ireland (*Table 2.5*), although most of these are either small and/or quite specialised. This number has doubled since 2000, largely due to the development of a network of specialised transfer stations to serve the new centralised treatment facility for healthcare wastes.

There is likely to be a need to further extend this network of transfer stations. There are currently just 6 facilities which accept a range of hazardous wastes, of which 3 are located in Belfast and the others in Antrim, Lisburn and Craigavon. Given the lack of any hazardous waste landfill sites in Northern Ireland and the consequent increase in exports, and also the relative concentration of these present sites, there is likely be a need for further, more general, transfer stations.

The need for more specialised facilities has also increased. For example, the BPEO for asbestos waste recommended that a network of transfer/storage stations be established, where small quantities of asbestos could be accumulated, before being transferred on to landfills (either in Northern Ireland or Great Britain) for final disposal. The amount of waste that might be stored should be decided on a case-by-case basis, taking local factors into account. At the time of writing (August 2005), there are only two transfer stations licensed for asbestos waste, so there is an urgent need for further asbestos transfer stations.

A major increase in the numbers of transfer stations is likely following a change in the regulations, which now requires both household recycling centres (HRCs) and material recycling facilities (MRFs), which collect household hazardous wastes, to become licensed hazardous waste facilities. Many HRCs and MRFs already accept e.g fridges, car batteries and waste oils from the public, and both the range of materials they accept, and the numbers providing such facilities is likely to increase as more people respond to concerns about the environmental and public health impacts of

including these materials in the normal household waste stream. Thus, a clear need exists for these types of facilities.

There are already several other transfer stations handling fridges. Now that some waste electrical and electronic waste (WEEE) has become hazardous wastes, both existing and any future transfer facilities will require licensing as hazardous waste sites. Again, there is a clear need for WEEE transfer stations.

Future legislation will require the collection and recycling of post-consumer batteries, most of which will be hazardous wastes. There is currently just one transfer station licensed for a range of batteries (in addition to 8 licensed just for car batteries). Again, there is a clear need for such facilities.

3.5 DEVELOPMENT OF AN INTEGRATED HAZARDOUS WASTE MANAGEMENT FACILITY

Given the relatively low, and from a financial viewpoint, perhaps quite 'marginal', quantities of the various types of hazardous waste generated, which require different management techniques, it seems possible that the most viable way of meeting the limited demand in Northern Ireland could be through development of a single integrated facility offering a variety of waste treatment options. Such a facility could offer, for example, physical/chemical treatment, oil-water separation/ treatment, organic waste processing for SLF, (perhaps some recovery operations), stabilisation/solidification and landfill, as well as the transfer/ export of wastes that cannot be treated on-site The common infrastructure (waste reception, site access, security, laboratory facilities) would be less of an economic barrier to development than if separate facilities were to be developed for separate waste management services.

Alternatively, a landfill operator could consider developing a hazardous waste cell for SNRHW along with a physical/chemical treatment plant and a stabilisation/solidification plant.

Nevertheless, the relatively small quantities generated may still be seen by potential developers as too high a risk to justify development, as they would have to be convinced that they could capture a high proportion of the wastes generated.

4 POTENTIAL FOR CO-OPERATION ON THE ISLAND OF IRELAND

4.1 INTRODUCTION

A key recommendation of the 'common chapter' on hazardous wastes in the three sub-regional waste management plans adopted in January 2003 was that a 'Northern Ireland Working Group is set up to assess the potential for developing an all island approach and to identify the preferred hazardous waste management solutions for the longer term'. As noted in *Section 1.1*, this led to the formation of the Northern Ireland Hazardous Waste Forum, which includes representation of both the Department of the Environment, Heritage and Local Government (DOEHLG) and the Environmental Protection Agency (EPA) from the Republic of Ireland. Given the specific reference in the WMPs to the potential for an all-island solution, this merits a specific chapter in this report.

In the Republic of Ireland, the National Waste Prevention Committee was established in April 2004, to provide strategic direction to the EPA in implementing the National Waste Prevention Programme. The Committee replaced and subsumed the work of the National Hazardous Waste Management Plan Implementation Committee. It is understood that this Committee will also be giving consideration to the potential for co-operation in facility provision on the island of Ireland.

There is already a precedent for all-island co-operation on specific hazardous waste issues. A common procurement exercise was undertaken for the treatment and disposal of healthcare risk wastes, which led to separate contracts being let, and separate steam sterilisation facilities being built, north and south of the border. Similarly, a common tendering exercise was undertaken for collection and treatment of domestic fridges, which led to the award of a single contract for the treatment of all domestic fridges collected by local authorities (currently being taken to Great Britain for treatment).

A key barrier to developing an all island solution is likely to be the *UK Management Plan on the Export and Import of Waste*[v], which bans export or import of wastes for disposal. The draft review of this plan, published in March 2000, recommended, *inter alia*, a number of changes that would enable all island solutions for both recovery *and* disposal to be implemented, where these are in accordance with the respective sub-regional Waste Management Plans. The Hazardous Waste Forum recommended that these changes be implemented as soon as possible. However, amendments to the EU Waste Shipment Regulations are currently in the European Parliament, so the revision of the UK Export – Import Plan has been delayed so that it can take these amendments into account. A revised plan is thus not likely to be in place until 2007 at the earliest.

A second factor to be taken into consideration is the administrative fees applied by both competent authorities in carrying out their function under the Waste Shipment Regulations. In Northern Ireland these costs include a notification fee of £450.00 per notification and a fee of £25.00 per shipment. All shipments of waste must also be covered by the provision of a financial guarantee.

4.2 HAZARDOUS WASTE ARISINGS IN THE REPUBLIC OF IRELAND

A National Hazardous Waste Management Plan[xi] was published in July 2001. Work has recently started to update this plan.

The plan contains data on hazardous waste generation and management for 1996 and 1998. The latest complete dataset on hazardous waste is in the National Waste Database Report 2001[xii], which was published in 2003. The next complete dataset is due to be published in 2005 in relation to the year 2004. Two interim reports for 2002[xiii] and 2003[xiv] provide data on hazardous waste exports.

Total hazardous waste arisings (excluding contaminated soils) for 1996, 1998 and 2001 remained fairly steady at around 325,000 tonnes per annum. The quantity of contaminated soils, however, varied widely, with figures for the 3 years of 400, 45,000 and 169,000 tonnes respectively. Exports of contaminated soils in 2002 and 2003 were 140,000 and 215,000 tonnes respectively.

The data are presented in the waste database reports by generic waste types: for their work for the Northern Ireland HWF, Enviros assigned EWC codes to the generic waste types to re-present the data in a form that is comparable with Northern Ireland data. *Table 4.1* shows a summary of Republic of Ireland hazardous waste arisings and destinations by EWC chapter headings for 2001, while *Table 4.2* presents combined arisings for the island of Ireland.

Table 4.1 Summary of Republic of Ireland Hazardous Waste Arisings and Destinations by EWC Chapter Headings for 2001

Data in tonnes, including contaminated soils

EWC Chap	On Site (in-house)	Off Site	Export	Total reported	Wastes not reported	Total hazardous waste
Agriculture, food production (02)	0	0	21	21	19,350	19,371
Inorganic chemical processes (06)	30,523	8,441	2,753	41,717	0	41,717
Organic chemical processes (07)	9,573	3,870	15,135	28,578	0	28,578
Paints, varnish, adhesive & inks (08)	11	836	1,351	2,198	0	2,198
Photographic industry (09)	0	173	393	567	0	567
Thermal processes waste (inorganic) (10)	0	475	746	1,221	0	1,221
Oil and oil/water mixtures (13)	742	29,085	674	30,499	2,349	33,048
Solvents (organic) (14)	37,075	12,351	81,893	131,319	42	131,361
Packaging, cloths, filter materials (15)	0	51	429	480	7,912	8,392
Not otherwise specified (16)	21	1,265	9,186	10,473	10,261	20,734
C&D waste & asbestos (17)	0	8,661	160,765	169,426	0	169,426
Healthcare (18)	0	5,492	341	5,833	467	6,300
Waste/water treatment & water industry (19)	41	1,158	1,570	2,769	0	2,769
Municipal & similar commercial (20)	0	86	43	129	8,021	8,151
Unspecified (99)	17,581	448	7	18,036	0	18,036
Total	**95,567**	**72,392**	**275,307**	**443,266**	**48,402**	**491,869**

Source: HWF Action Plan, Annex 2, Table 10

Table 4.2 Combined Arisings for Northern Ireland and the Republic of Ireland by EWC Chapter Headings

Waste Description	NI Arisings 2002	RoI Arisings 2001[a]	Indicative "all-island" Total
Mining and minerals (01)	6	-	-
Agriculture[b], food production (02)	156	19,371	19,500
Wood and paper production (03)	69	-	100
Leather and textile production (04)	-	-	-
Petrol, gas and coal refining/treatment (05)	-	-	-
Inorganic chemical processes (06)	9,099	41,717	50,800
Organic chemical processes (07)	3,594	28,578	32,200
Paints, varnish, adhesive & inks (08)	1,939	2,198	4,100
Photographic industry (09)	495	567	1,100
Thermal processes waste (inorganic) (10)	129	1,221	1,400
Metal treatment & coating processes (11)	2,438	-	2,400
Shaping/treatment of metals & plastics (12)	5,368	-	5,400
Oil and oil/water mixtures (13)	15,139	33,048	48,200
Solvents (organic) (14)	388	131,361	131,700
Packaging, cloths, filter materials (15)	303	8,392	8,700
Not otherwise specified (16)	1,914	20,734	22,600
C&D waste & asbestos (17)	2,566	169,426	172,000
Healthcare (18)	1,059	6,300	7,400
Waste/water treatment & water industry (19)	2,645	2,769	5,400
Municipal & similar commercial (20)	17	8,151	8,200
Unspecified (99)	107	18,036	18,100
Totals	**47,432**	**491,869**	**539,300**

a. Includes unreported wastes
b. Agricultural waste is not controlled waste in UK

Source: HWF Action Plan, Annex 2, Table 11

It is clear that hazardous waste arisings in the Republic of Ireland are an order of magnitude greater than in Northern Ireland, even allowing for the inclusion on the Republic of Ireland data of 'unreported' wastes. These unreported wastes are estimated on the basis of usage data and known collection rates – they include sheep dip, DIY waste oil, photo-processing waste, batteries, medicines, fluorescent tubes, paint and ink packaging and household hazardous wastes. The proportion of these unreported wastes is estimated to have fallen in the Republic of Ireland from 30% of total hazardous wastes in 1996 to 15% in 2001.

4.3 HAZARDOUS WASTE DISPOSAL ROUTES IN THE REPUBLIC OF IRELAND

Data on the disposal and recovery of hazardous wastes are summarised in *Table 4.3*. This shows that, of the reported hazardous wastes in 2001, around 22% were managed on-site by the waste generator, 16% off-site within Ireland and 62% were exported (more than 80% of exports in 2003 were to Germany (61%) and Great Britain (22%)). If one assumes that the generation of hazardous wastes excluding contaminated soil was fairly constant between 2001 and 2003, then the proportion exported had risen to around 78% by 2003 (with the increase split roughly 50:50 between hazardous wastes and contaminated soils).

Table 4.3 Summary Data on Disposal and Recovery of Hazardous Waste Arising in the Republic Of Ireland

Disposal or Recovery operation		2001 data				2003 data Export	
D/R	Description	Total reported	On-site	Off-site (Ireland)	Export	Hazardous waste	Contaminated soil
D1	Landfill	34,707	28,656	4,674	1,377	6,210	0
D5	Engineered landfill	188	0	19	170	5,451	40,736
D9	Physico-chemical pre-treatment	19,008	2,379	16,387	243	437	33,877
D10	Incineration on land	64,465	21,491	0	42,974	74,420	11
	Other disposal options	7,261	2,140	1,953	3,165	1,679	0
	Sub-total disposal	**125,629**	**54,666**	**23,033**	**47,929**	**88,197**	**74,624**
R0	Reuse in existing form	1,480	1,283	243	0	0	0
R1	Use as a fuel	33,086	9.560	3,124	20,402	33,919	0
R2	Solvent reclamation/ regeneration	42,733	9,413	11,115	22,205	17,732	0
R3	Recycling or reclamation of organic materials other than solvents	25,009	18,284	203	6,522	5,751	0
R4	Recycling or reclamation of metals	12,056	0	1,487	10,569	17,509	0
R5	Recycling or reclamation of inorganic materials	167, 967	2,121	8,632	157,213	581	143,854
R9	Used oil re-refining or reuse of waste oil	23,238	260	22,978	0	956	0
	Other recovery options	11,444	24	1,427	9,993	4,404	43
	Sub-total recovery	**317,013**	**40,900**	**49,209**	**226,904**	**80,852**	**143,897**
	Undefined recovery or disposal	625	0	149	625	1,629	0
	Total	**443,266**	**95,566**	**72,391**	**275,309**	**170,678**	**218,521**

Source: Data taken from the National Waste Database, Report 2001 (*reference 12*) and Interim Report 2003 (*reference 14*).

4.4 CURRENT AND PROPOSED FACILITIES FOR HAZARDOUS WASTES IN THE REPUBLIC OF IRELAND

Table 4.4 summarises the availability of off-site treatment and transfer facilities for hazardous wastes within the Republic of Ireland[xv]. This includes 3 facilities licensed in the last year, which have not yet commenced operations.

Table 4.4 Facilities in the Republic of Ireland Licensed for Hazardous Wastes Treatment, Transfer and Landfill

Type of Facility	Number
Treatment facilities (*some also bulk up for export*)	
♦ Range of hazardous wastes, offering some combination of acid-alkali neutralisation, photochemical waste treatment, solvent blending, oily water treatment, drum cleaning/ recycling and transfer	2
♦ Solvent blending (*also 1 of above facilities*)	2
♦ Oily waste and contaminated soil treatment	1

Type of Facility	Number
♦ Other oily waste treatment (*giving a total of 4 facilities offering oily waste treatment)*	1
♦ Solvent distillation and recycling	1
♦ Pre-treatment of fluorescent tubes prior to export of the separated fractions	1
♦ Steam sterilisation of clinical wastes (including prescription only medicines and sharps)	2
Transfer stations (the larger ones tend to do some treatment – listed above)	
♦ Covering a range of hazardous wastes	6
♦ Metal wastes	1
♦ Batteries	1
Landfill	
♦ Single cell for bonded asbestos only	1
Total	**19**

Sources: National Hazardous Waste Management Plan Implementation Committee, Annual Report, August, 2004 (*reference 15*); and data provided by EPA, August 2005.

Table 4.4 shows a total of 19 licensed facilities, a significantly smaller number than the 36 shown in *Table 2,5* for Northern Ireland. However, it was noted there that most of the facilities are either very small and/or specialised. In the Republic of Ireland, two of the facilities have licensed capacities in excess of 50,000 tonnes per annum, and a further 6 have a capacity of 20,000 tpa or more. Moreover, 7 out of these 8 large facilities are licensed for some sort of treatment, and 4 of those have been licensed (or received a significant license extension) within the last year. So, despite the smaller number of facilities, the range and capacity of treatment available in the Republic of Ireland is significantly greater than in Northern Ireland and is actively being developed, as one would expect given the relative quantities of hazardous waste generated and the current high dependence on export.

The National Hazardous Waste Management Plan recommended that Ireland should strive for self-sufficiency in hazardous waste recovery and disposal capacity. In particular, it identified as a priority the development of at least two engineered cells for the disposal of hazardous waste adjacent to existing landfill sites, and of one thermal treatment facility for hazardous wastes.

There is currently just one landfill site with an engineered cell that is licensed for hazardous waste – the KTK Landfill in County Kildare. However, this site is licensed only for bonded asbestos (up to 3,000 tonnes per annum).

Planning permission has been granted and a draft license issued for a major thermal treatment facility for hazardous wastes at Ringaskiddy in Co Cork, which would include capacity for about 50,000 tonnes per annum of hazardous wastes for co-burning with non-hazardous wastes in a fluidised bed incinerator (total capacity of 100,000 tonnes per annum).

4.5 PREDICTED FUTURE REQUIREMENTS FOR HAZARDOUS WASTE FACILITIES IN THE REPUBLIC OF IRELAND

The Hazardous Waste Plan considered capacity issues for 18 discrete waste types, representing both the principal categories of hazardous wastes arising in Ireland and those for which particular concern was expressed during the consultation phases in preparation of the plan. This information was updated by the Implementation Committee in its first report. A summary is provided in *Table 4.5*.

Table 4.5 Hazardous Waste Categories and their Management in the Republic of Ireland

Waste type	Main recovery or disposal route	Capacity in Ireland	Bottlenecks
Waste oils	Recovery for use as a fuel	Adequate on an all island basis – potential for expansion	Lack of disposal routes for the residual sludge - exported
Oil filters	Oil and metal recovery	Adequate for pre-processing and oil recovery. Steel exported	Collection rates low (<40%)
Lead-acid batteries	Recycling to recover lead and battery acid	Only facility has closed. Now exported	Significant scope to increase collection rates
Other batteries	Landfill. Scope for recycling	None. Limited no of battery recycling facilities in Europe	Focus on improving collection rates from their current very low level
Fluorescent lamps	Pre-treatment by crushing and segregation into glass, metal and powder for recycling	One facility in Ireland. Significant export of whole units for recycling	Little technical justification for additional capacity. Focus on improving collection rates
Photochemical waste	Silver recovery	One plant in Ireland, significant quantities (70%) also exported to GB	Economies of scale reported to make GB plants more efficient
Solvents	Solvent recovery, solvent blending (OWP) as fuel	Inadequate. Only 1 small (partly used) recovery plant, + 3 OWP (stand-alone or as part of more integrated facilities)	Two of the OWP plants have been licensed in the last year but have not yet commenced operations
Healthcare risk waste	Steam sterilisation +5% exported for incineration	Two steam sterilisation plants	Ensuring segregation of waste types at ward level
Sludges	Generally exported, to landfill, stabilisation or thermal treatment	Inadequate	Need landfill, stabilisation/ solidification and thermal treatment facilities in Ireland (only the latter is in development)
Acid and alkali waste	Neutralisation	Adequate, potential for expansion of existing facilities	Inadequate landfill capacity for sludges

Waste type	Main recovery or disposal route	Capacity in Ireland	Bottlenecks
Paint and ink waste and its packaging	Landfill. Scope for recovery or thermal treatment	Inadequate	One priority is to improve collection rates, the other to provide recovery/ treatment facilities
Agrochemical and its packaging	Generally not collected separately	None	Sheep dip identified as a major issue, but use is declining. Management of contaminated packaging is next challenge
Contaminated drums and large containers	Washing and either re-use or crushing and export for steel recycling	Adequate. Several facilities in operation (as part of integrated waste facilities)	Increased regulation of unauthorised activities required
Asbestos	Landfill	One small facility licensed for bonded asbestos only (3,000 tpa)	Lack of landfill capacity – should be available in Ireland for all asbestos waste
Polychlorinated biphenyls (PCBs) and contaminated equipment	Export for high temperature incineration	None. Management Plan for PCBs published in 2002	Finalised inventory of holders of PCB equipment to be prepared
Contaminated soil	Now requires pre-treatment prior to landfill	One treatment plant for oil-contaminated soils: otherwise exported.	Large but fluctuating quantities and variable composition make the economics of domestic treatment challenging
Residues classified as hazardous from thermal treatment of waste	Likely to be landfill after pre-treatment	None	Would arise in the future from the HTI incinerator and MSW energy from waste plants
Source: Developed from information in the National Hazardous Waste Management Plan (section 6.4) (*reference 11*) and the first report of the Implementation Committee (Appendix E) (*reference 15*)			

4.6 PARTICULAR OPPORTUNITIES FOR CO-OPERATION IN FACILITY PROVISION ON THE ISLAND OF IRELAND

- Northern Ireland generates less than 10% of the total hazardous waste arisings on the island of Ireland, while the Republic of Ireland exports between 60-80% of its hazardous wastes. Exploring the potential for all-island solutions would appear to make sense from the point of view of both North and South.

- The particular opportunities are discussed here in the same sequence as for the facility needs in Northern Ireland in Section 3.

- **Physico-chemical treatment** (PC/T): both Northern Ireland and the Republic of Ireland each have one facility which, among other treatment processes, offers acid-alkali neutraliasation, but not more specialised PC/T. An all-island market

for PC/T services could potentially assist in making Ireland more self-sufficient in this sector.

- **Oil separation and treatment**: there are a number of substantial processing facilities, both North and South, and the all-island capacity is generally considered to be adequate. The problem lies more in the continuation of existing markets in the roadstone industry for the recovered fuel oil (RFO). RFO is considered a product in the Republic of Ireland, but is regulated as a waste in the UK, so that the roadstone burners in Northern Ireland will need to comply with the waste incineration directive (WID) if they are to continue burning RFO beyond December 2005. Adopting an all-island approach to the marketing of RFO would help to alleviate a potential problem facing Northern Ireland.

- **Thermal treatment**: the quantities of hazardous waste requiring either high temperature incineration (HTI), or organic waste pre-processing (OWP) to prepare a synthetic liquid fuel (SLF) prior to cement kiln co-incineration, are very much higher in the Republic of Ireland than in Northern Ireland (by a factor of 20 rather than 10). The need for an HTI was one of the main priorities identified in the 2001 Republic of Ireland National HWM Plan. Republic of Ireland already has one operational OWP facilities (as part of a more integrated treatment facility), and a further two which are licensed but not yet operational. In addition, one facility including HTI has received planning permission and the licensing process is on-going. These facilities could in principle serve an all-island market, both in terms of accepting wastes and supplying potential fuel users (at least one cement kiln in Northern Ireland is currently conducting test burns on SLF imported from Great Britain, while all the SLF produced in Republic of Ireland is currently exported). There is a precedent for an all-island approach in this sector, as the healthcare risk waste contract was tendered jointly, although separate facilities were built North and South.

- **Recovery**: the majority of wastes going to recovery form Northern Ireland are solvents, while there is a small, underutilised solvent recovery facility in Dublin. Having said that, the industry trend appears to be moving towards a more integrated approach to solvent utilisation, with more emphasis on blending for use as a fuel. There are also small recycling or pre-processing facilities in the Republic of Ireland for photochemical wastes and for fluorescent lamps. The economics of both the existing and any future recovery facilities would be greatly enhanced if they were to serve an all-island market, although even then economies of scale may still favour more pan-European facilities (e.g for battery recycling).

- **WEEE**: the new regulations require substantial collection rates to be achieved by the end of 2006, with an estimate of some 3,000 – 12,000 tonnes per annum of hazardous WEEE for Northern Ireland alone. Domestic fridges form part of this, and are already collected under a joint, all-island contract (and exported to Great Britain for recovery), although a facility for dismantling refrigeration equipment has recently received a waste management licence in Northern Ireland. Developing one or more facility(ies), at least for dismantling and pre-processing of WEEE, was identified as a need for Northern Ireland. On an all-island basis, developing a joint approach to the management and recycling of WEEE represents a substantial economic opportunity.

- **ELVs**: scrap vehicles are already managed regionally across Ireland. It is expected that the existing facilities will be developed, upgraded and/or expanded to provide the infrastructure needed for ELVs. The demand is likely to be adequate

to support a well distributed, regional network of Authorised Treatment Facilities (ATFs), but co-operation in border areas should be explored.

- **Contaminated soil**: Although there is one treatment plant in the Republic of Ireland for oil-contaminated soil, most contaminated soil is still exported. A combination of the widely fluctuating quantities, and the wide range of likely contaminants and appropriate treatments, will make the development and widespread use of centralised treatment plants challenging, both North and South. The opportunity to utilise such plants, or to move 'mobile' plants to sites, on an all-island basis could be useful.

- **Landfill**: there are currently no operational, merchant facilities for hazardous waste landfill on the island of Ireland, and just two single cells on non-hazardous waste landfills which are licensed to accept small quantities of asbestos waste (one North and one South, the latter restricted to bonded asbestos). The 2001 Republic of Ireland National HWM Plan (*reference 11*) identified providing at least two engineered cells for the disposal of hazardous waste adjacent to existing landfill sites as a major priority, while the 2004 Implementation Report (reference 15) stated that government policy indicates that funding may be available towards the provision of hazardous waste landfill capacity. This report considers that a separate hazardous waste landfill would be unlikely to be economic in Northern Ireland, but has identified a need for a single cell for stable non-reactive hazardous waste (SNRHW) at a non-hazardous waste landfill, although even in this case the scale would be at the lower end of what appears to be the economic range. Again, there may be a substantial opportunity here for co-operation on the island of Ireland.

- **Collection and Transfer stations**. A regional network of collection and transfer stations is required, to provide for both general hazardous wastes and more specialised needs. There is likely to be adequate demand to support facilities both North and South, but there may be some opportunity for co-operation in border areas.

- **Integrated hazardous waste management facility**. Several partially integrated facilities exist in the Republic of Ireland. There is the potential for co-operation in the development and use of such integrated facilities.

In the foregoing sections, we have broadly concluded that the quantities of waste generated in Northern Ireland are marginally viable with respect to development of facilities within Northern Ireland to manage them.

It seems likely that in the short term and possibly medium term there will be a need to continue to export significant quantities of hazardous waste to Great Britain. It is important therefore to consider capacity availability in Great Britain.

The Defra Hazardous Waste Forum commissioned a sub-group to examine treatment and disposal capacity needs in England and Wales, and they produced their final draft status report in June 2004[xvi]. Information on estimated capacities by treatment route is summarised in *Table 5.1*.

Table 5.1 Estimated Capacity for Hazardous Waste Treatment and Disposal in England and Wales

Treatment/ Disposal Technology	Estimated Capacity in 2004
High temperature incineration (HTI)	115,000
Co-incineration	400,000
Solvent recovery	215,000
Stabilisation/ Solidification	-[a]
Physico-chemical treatment	1,500,000
Landfill	1,100,000- 1,500,000
a. Existing facilities included under physico-chemical treatment	

Source: Defra HWF Capacity Sub-group report (*reference 16*)

With regard to high temperature incineration (HTI) there has been a decline in the level of utilisation of the large strategic incineration facilities due to growth in cement kiln incineration. For this reason, the merchant HTI operators in the UK have excess capacity and a strong desire to obtain sufficient waste to utilise this capacity resulting in reasonable pricing policies.

Equally, the cement kiln co-incineration market is continuing to grow and seeking more wastes for SLF. The HWF report estimates that current throughput is around 100,000 tpa, compared to a capacity of around 400,000 tpa.

Heidelburg (owners of Castle Cement) recently purchased the largest merchant solvent recovery facility in Great Britain, renaming it a "solvent resources management" facility, and is substantially refocusing the company's activities towards preparation of SLF – this confirms the continued strong demand in Great Britain for these wastes as a fuel.

For physico/chemical treatment facilities, there would appear to be merchant facilities with available capacity. Earlier work by the HWF sub-group indicated that around 20% of available capacity (300,000tpa) would be available for additional wastes diverted from landfill.

The picture is less clear with regard to hazardous waste landfill capacity. There were six large hazardous waste landfills operational in England in November 2004 (*reference 9*), with a further 20 smaller facilities believed to be operational and 30

more in the permitting process (although it was believed that a number of these, for cells for SNRHW at non-hazardous landfill sites, were more 'speculative', with a decision yet to be made as to whether or not to engineer the facility depending on market demand). By June 2005,, it appeared that likely capacity could be around 2 million tonnes per annum[xvii], rather than the 1.1-1.5 million tonnes shown in *Table 5.1*. Whether this capacity will be sufficient to meet demand is still an open question, as the market is still in a state of flux in the interim year between the end of co-disposal and the introduction of the waste acceptance criteria.

From this discussion, it would appear that even the maximum quantity of about 40,000 tonnes of hazardous wastes predicted as potentially being exported from Northern Ireland in the immediate future (taken from the data in *Table 2.9*, less the existing quantities treated in Northern Ireland from *Table 2.6*), is small compared to both the arisings and the capacities available in Great Britain. This is certainly true for 'traditional' treatment and recovery routes (i.e. excluding stabilisation/ solidification as a pre-treatment prior to landfill). For landfill, and pre-treatment prior to landfill, the Great Britain market is still developing, and additional capacity may still be required in the future, but whether or not Northern Ireland wastes have to be included in their totals will make relatively little difference to the overall situation in Great Britain.

REFERENCES

[i] Northern Ireland Hazardous Waste Forum. Hazardous Waste in Northern Ireland – An Action Plan for its Environmentally Sound Management. June 2004. http://www.ehsni.gov.uk/pubs/publications/Hazardous_Waste.pdf

[ii] Department of the Environment. Planning and Waste Management. Planning Policy Statement (PPS) 11, December 2002.

[iii] The Hazardous Waste Regulations (Northern Ireland) 2005. Statutory Rule No 300. ISBN 0 337 96064 X

[iv] The List of Wastes (Northern Ireland) Regulations 2005. Statutory Rule No 301, ISBN 0 337 96095 X.

[v] Review of the Special Waste Regulations (Northern Ireland) 1998 - Proposals for replacement Hazardous Waste Regulations and List of Waste Regulations. Annex C – Regulatory Impact Assessment. Issued for consultation by DOE, 21 December 2004.

[vi] Producer Responsibility Unit, Environment and Heritage Service. Waste Electrical and Electronic Equipment WEEE) – Pilot Scheme report. May 2005.

[vii] WM2 - Hazardous Waste: Interpretation of the definition and classification of Hazardous of Waste
http://www.ehsni.gov.uk/pubs/publications/hazardous_complete.pdf

[viii] Environment and Heritage Service. BPEO for the Management of Waste Asbestos http://www.ehsni.gov.uk/pubs/publications/BPEOAsbestos.pdf

[ix] Environment Agency. Interactive Map of hazardous Waste Landfill Sites. Updated 19 November 2004. http://www.ciwm.co.uk/mediastore/FILES/11116.pps

[x] UK Management Plan on Import and Export of Waste. ISBN 0 11 753181 2

[xi] National Hazardous Waste Management Plan. Environmental Protection Agency 2001. ISBN 1-84095-074-9.
http://www.epa.ie/TechnicalGuidanceandAdvice/NationalHazardousWasteManagementPlan/

[xii] National Waste Database Report 2001, EPA 2003. Available at www.epa.ie

[xiii] National Waste Database Interim Report 2002, EPA 2004. Available at www.epa.ie

[xiv] National Waste Database Interim Report 2003, EPA 2004. Available at www.epa.ie

[xv] National Hazardous Waste Management Plan Implementation Committee, Annual Report. 6, August, 2004. EPA Available at www.epa.ie

[xvi] Defra Hazardous Waste Forum, Treatment and Capacity Sub-group. Final Draft Status Report, June 2004.
http://www.defra.gov.uk/environment/waste/hazforum/pdf/tctf-statusreport.pdf

[xvii] DC Wilson and R Smith, The hazwaste dilemma – How the UK is coping with the demise of landfill co-disposal for hazardous waste. Waste Management World, September 2005.