

CHAPTER 8: HAZARDOUS WASTE

This chapter summarises the management of hazardous waste at a Northern Ireland level. It addresses the current arrangements for managing Hazardous waste and recent changes in the definition from Special Waste to Hazardous Waste. The volumes of hazardous waste and potential facility requirements are also identified.

BACKGROUND

- 8.1 The 1998 Special Waste Regulations were replaced in July 2005 by the Hazardous Waste Regulations (Northern Ireland) 2005¹ which introduced the revised European Waste Catalogue Hazardous Waste List (2000/532/EC) (EWC HWL). 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. For example, fluorescent tubes, cathode ray tubes (CRT's) used engine oil, used oil filters and some printer toner cartridges.
- 8.2 In 2003 The Environment and Heritage Service agreed to facilitate the establishment of the Hazardous Waste Forum (HWF). This was in response to a proposal in the three sub-regional Waste Management Plans (adopted by 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 given the legislative changes.
- 8.3 In June 2004 the HWF published their Action Plan for the environmentally sound management of hazardous wastes in Northern Ireland.² The Action Plan sets out the key issues and relevant background information, and identifies recommended actions by stakeholders.
- 8.4 One recommendation is the development of a statement of facility needs for the management of Northern Ireland's hazardous wastes³. 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.

¹ Hazardous Waste Regulations (Northern Ireland) 2005. Statutory Rule No 300. ISBN 0 337 96095 X

² Hazardous Waste in Northern Ireland. An Action Plan for its Environmental Sound Management. Northern Ireland Hazardous Waste Forum, June 2004.

³ Statement of Facility Needs for Hazardous Wastes in Northern Ireland. Department of the Environment October 2005.

8.5 This chapter of the Waste Management Plan assesses the:

- types and quantities of hazardous waste currently generated in NI;
- implications of the recent change in definition; and
- potential future capacity to handle NI's hazardous waste.

Hazardous Waste Action and Implementation Plans

8.6 Arc 21 has adopted the Hazardous Waste Action Plan and is a member of the Northern Ireland Hazardous Waste Forum. The Forum published an Action Plan in June 2004 titled *“Hazardous Waste in Northern Ireland – An Action Plan for its Environmentally Sound Management”*.

Further to this the “Implementation Plan 2006” was produced in June of this year and has replaced the Action Plan developed in 2004.

8.7 The following extract details the Objectives and the current Specific Actions that directly involve District Councils and as a consequence arc21:

Objective 1: To provide a clear and robust regulatory system for hazardous waste management consistent with EU, international and national legislation. This must

provide both the clarity of unambiguous legislative requirements and the certainty of consistent and transparent implementation, inspection and enforcement.

➤ 1.1F Imports and exports of waste. The Forum advocates the implementation of the recommendations in the draft review of the UK Management Plan on the Export and Import of Waste, to enable all island solutions for both recovery and disposal operations to be implemented, where these are in accordance with the sub-regional Waste Management Plans:

Department to prepare revised TFS (Trans Frontier Shipment) Regulations and UK Import Export Plan with DEFRA and other Devolved Administrations.

➤ 1.3D The Environment and Heritage Service and District Councils should continue to develop constructive working relationships to monitor, and where appropriate, detect, deter and disrupt illegal and unlicensed activities, particularly in the transitional periods following both the end of co-disposal and the implementation of the new hazardous waste regulations:

New legislation is being introduced in 2006

Illegal activities to be measured to inform decisions and bids funding.

Northern Ireland to join "Flycapture".

Objective 2: To raise awareness of the issues surrounding hazardous waste management in business and industry.

➤ 2.1C The waste management industry (including District Council trade waste services) should seek to provide clear guidance to their clients on what is and is not acceptable in terms of segregation, management and treatment for hazardous waste:

Waste management industry to provide clear guidance to their customers, taking account of the EHS guidance.

➤ 2.2 Separate collection of HHW should be encouraged through the wider dissemination of good practice, the provision of appropriate funding, and the possible use of supporting policy measures.

The HWF should consider HHW further in its next phase of work, focusing in particular on:

1. Policy measures to reduce the hazardous content of consumer products through better design and to promote retailer take-back. The initial focus is likely to include identifying priority candidates for voluntary agreements.
2. Encouraging wider public participation. This needs to be linked to any wider public awareness campaign (see R3.2.C above).
3. The Department and District Councils should seek to agree a joint initiative on production of guidance on safe disposal of household asbestos waste.
4. Provision of adequate infrastructure

Councils to work with DOE and HSE to ensure that more accessible provision is made for acceptance of asbestos wastes from the general public

Councils, DOE and the responsible producers to work together to ensure that appropriate provision is made for acceptance of WEEE from the general public

Councils, industry, government and the NGO sector to work together to develop reuse opportunities for unused paint

Objective 4: *To ensure the provision of the hazardous waste management facilities required to meet the new legislative requirements. A particular concern is to ensure that adequate capacity is available in the short to medium term, during the initial transitional period following the end of co-disposal and the introduction of newly defined hazardous wastes.*

➤ 4.2B Government, district councils and industry should work together to facilitate the development of separate cells for stable non-reactive hazardous wastes on one or more non-hazardous waste landfill sites within Northern Ireland.

The Statement of Facility Needs has established 'need'. The next step is for District Councils to reflect this in their Waste Management Plans.

- 8.8 Table 8.10 details the *Summary of Facility Needs for Hazardous Waste Management* which was developed in October 2005. Particular attention should be paid to the text contained in the column entitled "Priority".
- 8.9 The Implementation Plan as described above is an evolving document and one to which arc21 will give consideration to as it develops and where appropriate take the required actions to deliver on the Implementation Plan.

CURRENT HAZARDOUS WASTE ARISING AND MANAGEMENT ARRANGEMENTS

Background to Hazardous Waste Consignment System

- 8.10 Hazardous wastes may be dispatched directly to their point of disposal/recovery or may pass through one or more transfer stations en route. A consignment note accompanies each movement with relevant information being entered into the EHS Hazardous Waste Arisings Database. The start of each movement is classified as an arising and the arrival at a consignee's premises is recorded as a deposit. For this reason the recorded tonnage of arisings and deposits within the database will be greater than the actual amount of special waste produced due to movements via transfer stations.
- 8.11 In addition, wastes may reduce in weight through treatment processes such as dewatering, or may gain weight through the addition of substances such as lime.

Treatment may also partially or totally recover wastes, or result in a non-hazardous residue. Hazardous waste may also be transported between sub-regional areas and may be exported and then re-imported. These factors make it difficult to calculate an accurate figure for hazardous waste production and to reconcile waste arisings figures with deposits. The situation is further complicated for wastes exported to Great Britain (GB). These consignments have two Consignment Notes, one from the point of arising in NI ending at the port of export (e.g. Belfast) and one from the port of entry into GB covering movement to the treatment/disposal facility.

- 8.12 Due to the consignment note system which requires separate consignment notes for wastes transferred between NI and GB, there is no formal mechanism for accurately identifying the fate of waste exported to GB, and information on final destination is limited.
- 8.13 To address this issue, EHS on behalf of the HWF commissioned an investigation into the destinations of exported wastes within GB and future hazardous waste capacity needs. The work was carried out by Enviros in 2003 and involved a review of the 2002 data.
- 8.14 The Hazardous Waste Regulations (Northern Ireland) 2005¹ introduced the creation of one consignment note for hazardous waste exported to GB all the way to the destination in GB, so that the data problems referred to above should ease over time. The updated consignment notes also require that the Standard Industrial Classification (SIC 2003) Code for the process giving rise to the waste must be entered in Part B of the note. The new regulations also introduce the require consignees to send returns to producers notifying them of receipt of the waste.

Hazardous Waste Arisings

- 8.15 Current data relates to the definition of “special” wastes under the 1998 regulations, since the new Hazardous Waste Regulations (Northern Ireland) 2005² did not come into force until July 2005. Data on special waste arisings in 1999/00 has been collated from datasets provided by EHS and data on arisings in 2002 have been taken from hazardous waste arisings identified in the HWF Action Plan (June 2004)⁴. The total special waste arising for NI in 1999/00 was approximately 44,350 tonnes and in 2002 was 47,432 tonnes. This represents an annual average increase of 3.5%. It should be noted that the widened definition of hazardous waste is likely to result in the quantity of “hazardous waste arisings” being greater than “special waste arisings”. The difference is estimated in paragraph 8.31.

8.16 In addition, a further 6,600 t in 1999/00 and 10,797 t in 2002 of special waste was consigned from transfer stations within the region. A breakdown of the arisings by sub-region and generic type (EWC Chapter Headings), excluding the waste consigned from transfer stations, is summarised in Table 8.1

Table 8.1: Breakdown of 1999/00 and 2002 Special Waste Arisings by sub-region and EWC Chapter Headings (excluding waste consigned from transfer stations)

Waste Description	1999/00	2002
Mining and minerals (01)	0	6
Agriculture, food production (02)	19	156
Wood and paper production (03)	35	69
Leather and textile production (04)	0	0
Petrol, gas and coal refining/treatment (05)	0	0
Inorganic chemical processes (06)	8,326	9,099
Organic chemical processes (07)	4,845	3,594
Paints, varnish, adhesive & inks (08)	1,586	1,939
Photographic industry (09)	146	495
Thermal processes waste (inorganic) (10)	974	129
Metal treatment & coating processes (11)	3,432	2,438
Shaping/treatment of metals & plastics (12)	416	5,368
Oil and oil/water mixtures (13)	15,621	15,139
Solvents (organic) (14)	443	388
Packaging, cloths, filter materials (15)	5	303
Not otherwise specified (16)	2,508	1,914
C&D waste & asbestos (17)	1,485	2,566
Healthcare (18)	363	1,059
Waste/water treatment & water industry (19)	2,959	2,645
Municipal & similar commercial (20)	587	17
Unspecified (99)	604	107
Totals	44,354	47,431

Source: HWF Action Plan (June 2004) ⁴.

- 8.17 A proportion of these wastes were exported to GB for treatment or disposal. In 1999/20, 10,982 tonnes were exported (25% of the total special waste arisings). In 2002, 22,048 tonnes were exported which represents 46% of the total special waste arisings.

Table 8.2: Breakdown of 1999/00 and 2002 Special Waste Arisings exported to GB

Waste Description	1999/00		2002	
	Tonnes	Percentage of total arisings	Tonnes	Percentage of total arisings
Mining and minerals (01)	0	0%	6	100%
Agriculture, food production (02)	1	5%	1	1%
Wood and paper production (03)	12	34%	5	7%
Leather and textile production (04)	0	0%	0	0%
Petrol, gas and coal refining/treatment (05)	0	0%	0	0%
Inorganic chemical processes (06)	2,410	29%	6,553	72%
Organic chemical processes (07)	2,885	60%	3,299	92%
Paints, varnish, adhesive & inks (08)	317	20%	1,463	75%
Photographic industry (09)	0	0%	485	98%
Thermal processes waste (inorganic) (10)	930	95%	77	60%
Metal treatment & coating processes (11)	1,903	55%	994	41%
Shaping/treatment of metals & plastics (12)	66	16%	4,148	77%
Oil and oil/water mixtures (13)	239	2%	321	2%
Solvents (organic) (14)	328	74%	383	99%
Packaging, cloths, filter materials (15)	0	0%	108	36%
Not otherwise specified (16)	1,425	57%	1,169	61%
C&D waste and asbestos (17)	7	0%	102	4%
Healthcare (18)	84	23%	299	28%
Waste/water treatment and water industry (19)	0	0%	2,619	99%
Municipal and similar commercial (20)	367	63%	4	24%
Unspecified (99)	8	1%	12	11%
Totals	10,982	25%	22,048	46%

Source: HWF Action Plan (June 2004) ⁴

8.18 The Special Waste arisings in 1999/00 and 2002 have been identified by treatment/disposal route and summarised in Table 8.3

Table 8.3: Summary of Special Waste Arisings by Treatment/Disposal Route in 1999/00 and 2002

Treatment/Disposal Route	1999/00		2002	
	Tonnes	Percentage of total arisings	Tonnes	Percentage of total arisings
Export	10,982	25%	22,049	46%
Incineration	7	0.02%	1	0.002%
Landfill	7,949	18%	5,283	11%
Sewage treatment	5,250	12%	2,072	4%
Treatment	19,410	44%	18,027	38%
Transfer	755	2%	0	0%
TOTAL	44,353	100%	47,432	100%

Source: HWF Action Plan (June 2004)²

- 8.19 The percentage of special waste landfilled has decreased from 18% in 1999/00 to 11% in 2002. However, the percentage of special waste treated within Northern Ireland has decreased from 56% (12% and 44%) in 1999/00 to 42% (4% and 38%) in 2002.
- 8.20 Due to the consignment note system used prior to the Hazardous Waste Regulations (Northern Ireland) 2005², there were no formal mechanisms for identifying the destination of waste exported to GB in 1998/00. The answer therefore had to be assumed. Although the EHS have no statistical information to support these assumptions, Figure 8.4 predicts the likely fate of wastes exported in 1999/00. Actual data is provided for 2002 as this was part of the investigation carried out by Enviro in 2003.
- 8.21 The overall estimated waste management routes for all Northern Ireland special waste arisings are given in Table 8.4.

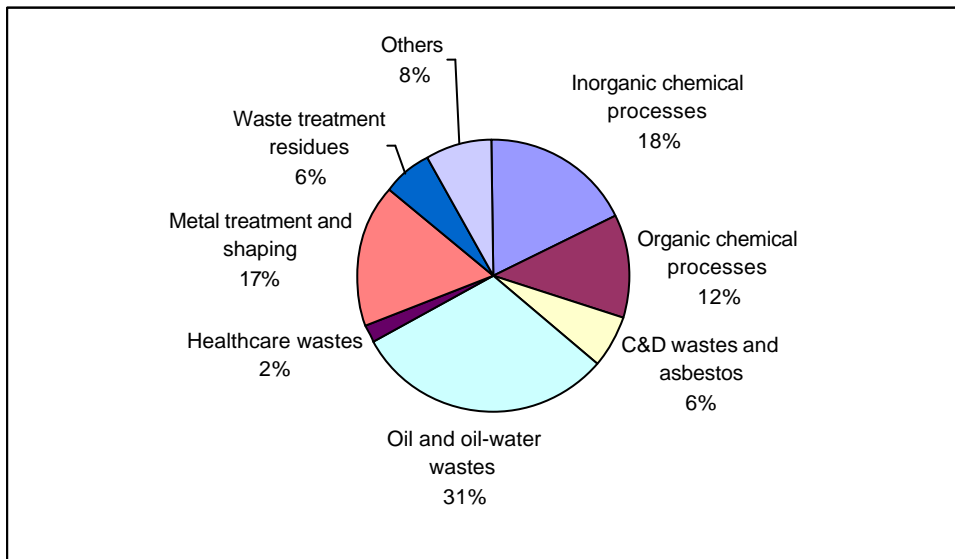
Table 8.4: Estimated Waste Management Routes for All Northern Ireland Special Waste Arisings

Treatment/Disposal Route	1999/00				2002			
	Managed in NI	Managed in GB	Total	Total (%)	Managed in NI	Managed in GB	Total	Total (%)
Incineration	7	880	887	2%	1	1,190	1,191	3%
Landfill	7949	330	8,279	19%	5,280	8,380	13,660	29%
Long term storage	0	0	0	0%	2,070	130	2,200	5%
Recovery	14,096	2,850	16,946	38%	0	4,290	4,290	9%
Transfer	755	2,200	2,955	7%	n/a	170	170	0%
Treatment	10564	4,720	15,284	34%	18,030	7,890	25,920	55%
TOTAL	33,371	10,980	44,351	100%	25,380	22,050	47,430	100%

8.22 As detailed in Table 8.4, the estimated percentage of hazardous waste incinerated increased by 1% in 2002 with respect to 1999/00. Landfill also increased by 10% and treatment by 21%. Waste recovery decreased by 29%. The treatment methods for these wastes include physico-chemical treatment (including stabilisation/solidification) and oil separation and treatment (mainly preparation of recovered fuel oil RFO).

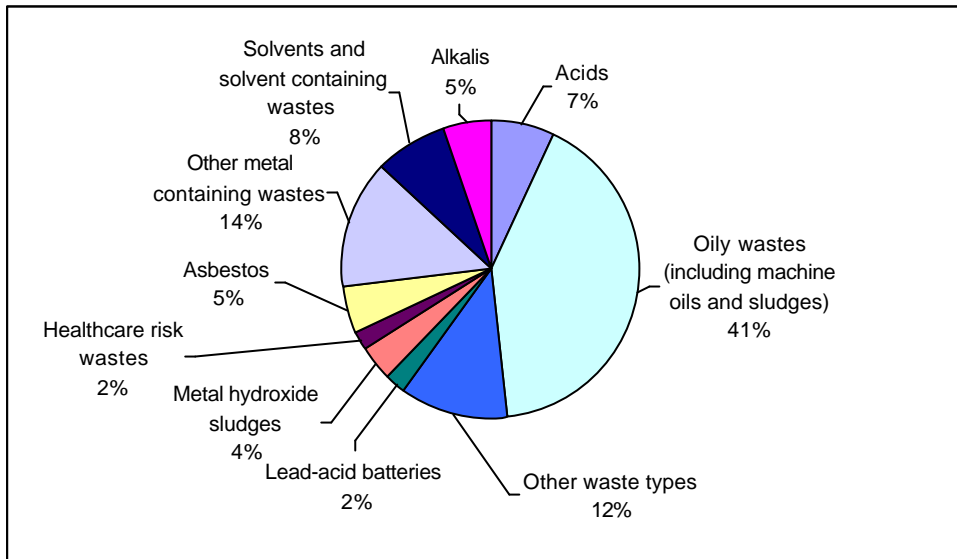
8.23 The distribution of the 47,400 tonnes of special waste reported in 2002 is given in Figures 8.1 and 8.2. Figure 8.1 identifies special waste according to the EWC chapter headings; these mainly relate to the origins of the waste. Figure 8.2 identifies generic types of waste which relate more to the composition of the waste (and thus more to its treatability). The main overlap in categorisation is in oily wastes, where the Figure 8.2 also includes machining oils and sludges from metal treatment and shaping.

Figure 8.1 - Waste Generation by EWC Chapter Heading



Source: HWF Action Plan (June 2004)²

Figure 8.2 - Waste Generation by Generic Waste Type



Source: HWF Action Plan (June 2004)²

Hazardous Waste Facilities in Northern Ireland

8.24 The number of facilities in NI licensed for the treatment or disposal of hazardous wastes in May 2005 are given in Table 8.5.

Table 8.5: Number of Facilities in NI Licensed for Hazardous Wastes

Type of Facility	No. 1999/00*	No. May 2005**
Treatment and Transfer		
Range of hazardous wastes, for acid-alkali neutralisation, oil-water separation and transfer	2	1
Metal recycling and processing/metal bearing wastes	5	1
Car batteries (licensed for separation, but now mainly operating as transfer stations)	-	7
Treatment		
Oil recycling/ treatment	3	3
Steam sterilisation of clinical wastes (including prescription only medicines and sharps)	1	1
Encapsulation of leaded petroleum sludge (now little waste)	-	1
Transfer stations		
Covering a range of hazardous wastes	9	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		
Co-disposal with non hazardous waste	4	0
Single cell for asbestos waste	-	1
Total	24	36

Source: * Arc21 Sub-regional Waste Management Plan, ** HWF Action Plan (June 2004)⁴

- 8.25 Two-thirds of the 36 facilities in existence in May 2005 are small and very specialised. For example, focusing on the transfer of healthcare risk wastes to the centralised steam sterilisation facility in Antrim and to high temperature incineration in GB; car batteries (typically from scrap yards, and now mainly sent to GB for specialised recovery); paint and thinner (returned from customers, and transferred to GB either for solvent recovery or blending prior to cement kiln incineration).
- 8.26 There are only eight large facilities which accept a wider range of waste:
- three focus on treatment of oily wastes, typically producing recovered fuel oil (RFO) for sale;
 - one is licensed both as a transfer station and to undertake some treatment (i.e. neutralisation of acids and alkalis and oil-water separation); and
 - four are licensed as transfer stations, sending wastes to GB for treatment or disposal.
- 8.27 In 2002 the wastewater treatment plant at Cooney Road in Derry was licensed to receive an alkaline waste. This waste has now been classified as non-hazardous.
- 8.28 There are a relatively high number of planning and licensing applications being processed in NI 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 waste recycling centres and material recycling facilities which may collect and sort household hazardous wastes.

RECENT CHANGES

Changes in Arisings since 1999/00

- 8.29 Since 1999/00, there have been noticeable changes in special waste arisings:
- In 1999/00, there was just under 3,000 t of incinerator ash consigned as special waste to landfill. Due to the closure of incineration facilities and the re-classification of some ashes from special to non-special (based on detailed analyses of the ash), there is virtually no incinerator ash currently consigned as special waste. This reduces the special waste arisings from the arc21 Region and reduces the quantity of special waste landfilled in the Southern Region (where the majority of the ash was disposed).
 - Approximately 50% of special waste arising in the North West Region was a single waste stream from inorganic chemical processing (EWC 06) which was consigned to a wastewater treatment plant. It is understood that based on detailed analyses this waste has been reclassified from special to non-special.

As well as halving the North Waste Region's arisings, it reduces the special waste deposited within the region by 97%.

- Over the past two years there has been an increase in the quantity of healthcare wastes consigned as special waste. This has been caused by the closure of hospital incinerators and the consignment of "sharps" that are potentially contaminated with "Prescription Only Medicines" (POMs).
- Wastes from shaping/treatment of metals and plastics (12) have increased from 416 tonnes in 1999/00 to 5,368 tonnes in 2002.

Change in Definition from Special Waste to Hazardous Waste

- 8.30 The change in definition from special to hazardous waste is likely to result in a greater quantity of waste being managed as hazardous waste than is currently managed as special waste.
- 8.31 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 waste stream will be classified as hazardous for the first time. End-of-life vehicles are currently handled through a network of car dismantlers and scrap yards. There are currently four licensed sites which can accept ELV's. This figure is expected to increase in the next few months with a number of provisional licenses being issued. Although it is expected some old sites will shut it is anticipated that once the licenses have been issued there will be adequate capacity.
 - **Discarded equipment containing CFCs, HCFC, HFC (16 02 11*):** This covers refrigerators and freezers. It is likely that enhanced storage/transfer capacity will be required prior to specialist destruction.
 - **Waste containing Cathode Ray Tubes (CRTs) (16 02 13*):** This covers televisions and computer monitors. Again it is likely that enhanced storage/transfer capacity will be required prior to specialist treatment.
- 8.32 Contaminated soils (17 05): The new definition will require these wastes to be evaluated against ecotoxic criteria. This is likely to increase the quantity of contaminated soils classified as hazardous because the threshold concentrations for many heavy metals and their compounds will be lowered.
- 8.33 Other waste containing heavy metals and their compounds: As highlighted above many heavy metals and their compounds will 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 and plastics (12), and waste from incineration (19 01).

8.34 There are a number of wastes that are now covered by “absolute entries”. These are hazardous regardless of the concentration of “dangerous substances” within the waste. 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

8.35 Table 8.6 summarises the changes due to change in waste definition identified in the HWF Action Plan².

Table 8.6 Changes in Hazardous Waste Arisings due to Change in Waste Definition

EWC Code	Description	Comments	Potential Change	Estimated Additional Arisings*
02	Wastes from Agriculture etc	Agricultural wastes are due to be included in the definition of controlled waste. This will result in an increase in hazardous waste mainly in relation to agrochemical, asbestos and oils	Not considered	-
0604	Metal containing wastes	Some metal containing wastes could be included because of the lower thresholds for H10/H14.	Assume a 5% increase in metal containing wastes	300 tpa
07	Organic Chemical processes waste	Some wastes could be included because of the introduction of 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-chemical treatment capacity.	30 tpa
1101	Liquid Wastes and sludges from metal treatment and coating of metals	Some metal containing wastes could be included because of the lower thresholds from H10/H14.	Assume a 5% increase	100 tpa
1104	Other inorganic wastes with metals not otherwise specified			
1201	Wastes from shaping	Some metal containing wastes could be included because of the lower thresholds from 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 dependant on when an ELV is deemed to be waste. However they are likely to be managed through existing routes,	N/A

			although there may be greater permit controls.	
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 and asbestos	The requirement to assess certain Chapter 17 wastes (e.g. contaminated soils) against exotoxic 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
* Rounded to nearest 100 tonnes				

8.36 Therefore these estimates could result in an additional 15,730 tonnes per annum of hazardous wastes, mainly from contaminated soils and hazardous WEEE. In addition, the change in the definition is likely to increase the hazardous waste that arises at CA sites and hence comes from domestic sources. For example, refrigerators and freezers, and wastes containing CRTs. Provisions for such wastes at CA sites may need to improve to ensure that they are separated for appropriate management and disposal.

Change in Landfill Practices

8.37 The overall aim of the Landfill Directive (1999/31/EC) is to minimise the effects of landfill on the environment and human health, and its implementation will bring about major changes in waste management practices. The most significant change in relation to hazardous wastes is the separation of landfills into hazardous, non-hazardous and inert, thus ending the practice of co-disposal. Key issues for hazardous wastes include:

- the banning of liquid disposal to landfill;
- an end to the co-disposal of hazardous and non-hazardous wastes (implemented in NI by the Landfill Regulations (NI) 2003);
- the banning of co-disposal of hazardous waste with non hazardous wastes from 16 July 2004, and
- the requirement for hazardous wastes to be pre-treated prior to landfill (implemented in Northern Ireland by the Landfill (Amendment) Regulations (Northern Ireland) 2004.

8.38 The classification of sites as hazardous, non-hazardous or inert has led to all current landfills being classified as non-hazardous sites. With the exception of the landfill facility at Lisbane, Armagh which was granted a licence in 2005 to operate a single cell for stable non-reactive hazardous waste (SNRHW) restricted to asbestos wastes only, there are no hazardous waste landfill sites in NI.

Hazardous Waste Management Options

8.39 As outlined in PPS11, to achieve planning permission, new hazardous wastes facilities will have to demonstrate BPEO, taking into account the nature of the hazardous waste and available treatment/disposal facilities. The range of options for handling hazardous waste are summarised below:

Prevention/Reduction

8.40 Hazardous waste prevention and reduction is a priority supported by all the Sub-Regional Groups. The ability to prevent or reduce hazardous waste is dependant on the individual hazardous waste. arc21 aim, where possible, to raise awareness of reduction options, such as cleaner technologies, with hazardous waste producers.

Re-use, Recovery and Recycling

8.41 Certain hazardous waste can be re-used, recovered or recycled. The options available are dependent on the nature of the hazardous component of the waste. Table 8.7 provides examples of potential options along with some of the suitable hazardous waste streams.

Table 8.7: Examples of Hazardous Waste Re-use, Recovery and Recycling Options

Option	Suitable waste streams
Recovery for use as fuel	Organic solvents (blended to produce secondary liquid fuel) fine chemicals and biocides
Solvent reclamation/regeneration	Organic solvents including halogenated solvents, phenols, ethers, organohalons can be regenerated.
Recycling/reclamation of metals and metal compounds	Photographic chemicals and materials - recovery of silver Spent catalysts - recovery of precious metals Car batteries - recovery of lead NiCd batteries - recovery of nickel and cadmium Fluorescent light tubes - recovery of mercury Oil filters - recovery of steel
Regeneration of acids and bases	Acids and bases
Recovery/re-refining of used oil	Mineral oils, oil/water and hydrocarbon mixtures

8.42 All the hazardous wastes recovered in 2002 in NI were treated in GB. Due to the requirements of the Waste Incineration Directive (WID) and the Waste Framework Directive (WFD) this practice is no longer a viable option.

Physico-chemical Treatment

8.43 Most physical and chemical treatment methods aim to produce a less hazardous form of the original waste. This often involves a chemical reaction to change the hazardous components into non-hazardous compounds. Residues of hazardous components may also be immobilised chemically or physically.

8.44 Chemical processes primarily change inorganic compounds into a less harmful or hazardous form. They are usually applied to waste with one main chemical constituent and take place in a liquid state. Oxidation, reduction and neutralisation are the main types of treatment. The most common types of physical and chemical treatment technologies are summarised in Table 8.8.

Table 8.8: Summary of Common Physico-chemical Treatment Technologies

Typical Treatment Methods	Summary
Oxidation/reduction	The processes of oxidation and reduction are considered together; one cannot occur without the other. Commonly used to oxidise waste such as chromic acid or reduce wastes such as those containing cyanide. Oxidising agents include hypochlorite, peroxides and persulphates. Chromic acid wastes must be reduced before neutralisation.
Neutralisation	Neutralisation is the adjustment of the pH of a liquid or sludge waste. It involves the mixing of acid or alkaline wastes with a buffering agent to produce a solution (pH=7.0). Acid wastes often contain metals so during neutralisation these are converted to metal hydroxides. Therefore neutralisation and precipitation often go together. Examples include: the treatment of spent acid catalysts; tanning wastes , and acid pickle liquor from metal cleaning.
Precipitation	Precipitation involves the removal of dissolved components in solution by: changing the pH; a chemical reaction, or changing temperature to solidify dissolved components. Precipitation can be combined with processes that remove solids, such as sedimentation, filtration and centrifugation. This method is often used to remove metals from waste water. A variety of re-agents are used to generate metal precipitation thus leaving an effluent to be discharged and a concentrate that can be recycled or disposed to landfill. Reagents can include calcium hydroxide, sodium carbonate or sodium sulphide.
Ion exchange	This involves the removal of dissolved inorganic materials from an aqueous liquid with the use of resin column to which inorganic

	material will become attached.
Solidification	In this process wastes are combined with additives to convert them into a solid product which bonds toxic ions and elements. For example, mixing fly ash or slurry with cement.
Adsorption	Activated carbon or synthetic resins are used to trap contaminants (by adhesion) from hazardous wastes. Adsorption is suitable for gaseous and aqueous waste streams, e.g. the removal of PCB's and organics from waste industrial water.

8.45 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 additional acid wastes, although heavy metal content may be a constraint (about half of the acids arising in 2002 were exported). It is also likely that export will continue to be the only viable option for the smaller quantities of wastes requiring more specialised treatment.

Oil Separation and Treatment

8.46 In NI oily wastes are generally treated 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.

8.47 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 has had two main markets in the UK; as a start-up fuel in coal-fired power stations and as a fuel for roadstone burners (making tarmac at quarry sites). The only market in NI has been roadstone but WID means that this will no longer appropriate.

8.48 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 industry interest in the use of various waste-derived fuels for co-combustion. One of the plants in NI is known to have been conducting 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) and facilities need to be compliant with WID.

8.49 RFO is also produced in the Republic of Ireland but their existing roadstone markets appear to be relatively secure as the government classified RFO as a product and therefore the requirements of WID do not apply.

Energy from Waste

8.50 For environmental and safety reasons, high temperature incineration is considered the most appropriate disposal route for certain hazardous wastes. Such wastes

include agrochemical residues, wastes containing PCBs, solvents, halogenated waste, laboratory chemicals and acid tars.

8.51 Three types of thermal treatment for hazardous wastes were identified in Section 2 of Facility Needs for Hazardous Wastes in Northern Ireland – Supporting Report. October 2005⁴;

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

8.52 There is one steam sterilisation plant in Antrim serving the whole of NI under a centralised contract for wastes from the National Health Service. The plant handles about 90% of the healthcare risk wastes (the remaining 10% is incinerated in GB).

Landfill

8.53 The implementation of the Landfill Directive has had an impact on the type and quantity of hazardous waste landfilled. For certain hazardous waste, landfill is currently, and will remain, the most appropriate disposal route. These wastes include: asbestos, certain treated timber, some contaminated soils and inorganic wastes containing metal compounds.

8.54 In 2002, some 13,700 tonnes of special wastes were consigned to landfill, of which approximately 40% was landfilled within NI and 60% was exported to GB.

8.55 Currently the only landfill licensed for hazardous waste in NI is a single cell for asbestos waste at the Lisbane site in the Armagh district. A BPEO assessment for asbestos wastes was carried out in 2004⁵, which concluded that the best option for asbestos waste is double bagging and landfilling within NI, at two or more sites spatially spread across the Province. Other hazardous waste, previously landfilled in NI will either require the development of hazardous waste landfills (this may be most appropriate for contaminated soils) or need to be exported.

⁴ Statement of Facility Needs for Hazardous Wastes in Northern Ireland – Supporting Report. October 2005. Dr David C Wilson. October 2005

⁵ Environment and Heritage Service. BPEO for the Management of Waste Asbestos
<http://www.eh.sni.gov.uk/pubs/publications/BPEOAsbestos.pdf>

Transfer Station

8.56 There are currently 21 transfer stations licensed to handle hazardous waste within NI (Table 8.5). 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.

FUTURE REQUIREMENTS IN NOTHERN IRELAND

8.57 Facility Needs for Hazardous Wastes in Northern Ireland – Supporting Report. October 2005⁶ incorporates a quantitative estimate of future capacity needs. It takes into account both the end of co-disposal (and the need to pre-treat hazardous wastes prior to landfill) and the additional hazardous wastes resulting from the change in definitions. This is summarised in Table 8.9.

Table 8.9 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	Additional Wastes	Total	Special Waste Currently Treated	Special Waste Currently Landfilled	Additional Wastes	Total
Stabilisation / Solidification	2,120	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	1,760	1,620	24,810	-	1,320	1,220	2,540
Wastewater treatment	-	340	40	550	-	n/a	n/a	n/a
Thermal Treatment	3,570	1,650	1,480	6,700	n/a	n/a	n/a	n/a
Total	31,410	13,060	12,370	56,840	4,240	17,500	16,330	88,070

Source: Statement of Facility Needs for Hazardous Wastes in Northern Ireland. October 2005⁵
 Note: Resultant hazardous capacities are indicative from 2005 onwards

8.58 Table 8.9 is derived from 2002 data and is used as baseline information. There is known to be variability in hazardous waste arisings between years. Future arisings have been estimated in advance of the legislation (Section 8.31). The Facility Needs for Hazardous Wastes in Northern Ireland – Supporting Report. October 2005⁶, states that the analysis should be repeated when the first full year of data under the new regulations becomes available. This information will be for 2006/2007. Additionally, the analysis will require to take account of the disposal of

hazardous residue from an energy from waste facility beyond 2013. Best endeavours will be taken to suitably address any residue from energy from waste facilities with due regard to the waste hierarchy. It is recognised that this may involve waste deemed hazardous and may entail landfill at a designated hazardous waste landfill site. Accordingly the terms of paragraph 8.62 would be pertinent.

KEY ISSUES AND PROPOSALS

- 8.59 arc21 endorses the principles of minimising the quantity of hazardous waste that arises and reducing the hazardous nature of wastes in accordance with the objectives of the waste hierarchy. arc21 will aim, where possible, to raise awareness of reduction options, such as cleaner technologies, with hazardous waste producers.
- 8.60 The analysis of needs identified in the Statement of Facility Needs for Hazardous Wastes in Northern Ireland October 2005⁵, aimed to screen those types of facilities most likely to be justified by need in NI. The next step for short-listed facilities will be to establish if this is indeed the BPEO for the target waste. This will need to take into account the Waste Incineration Directive and the Waste Framework Directive. 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.
- 8.61 A key issue in assessing the requirements for future management facilities for hazardous waste is the size of the arisings within NI in comparison with the UK and Ireland as a whole. The total generation of hazardous wastes in NI of around 50,000 tpa can be compared to current arisings of around 500,000 tpa in the Republic of Ireland and 5 million tpa in England and Wales. The UK Waste Management Plan for Exports and Imports of Waste duly details the regulatory requirements in this regard. In general, it is permissible, under prescribed regulatory control, for waste to be exported from the UK or imported to the UK for the purposes of recovery including recycling, however it is not permissible for waste to be exported from the UK or imported to the UK for the purposes of disposal. Given the range of waste treatment and disposal facilities required for the environmentally sound management of hazardous wastes, and the significant economies of scale required for many of these, it is inevitable that NI will continue to rely on capacity located in GB, and potentially also the Republic of Ireland.
- 8.62 In the short term, current existing facilities in NI for the handling of hazardous and healthcare wastes should continue to provide a service for the management of these wastes, particularly for oily and healthcare wastes. It is recognised that current facilities are limited and landfill space suitable for the disposal of hazardous wastes

and treatment residues has been exhausted. Due to the new Landfill Regulations, no hazardous waste landfill sites have been created. There will therefore be an increasing need to dispose of hazardous waste outside of NI. England currently has the only sites licensed to accept hazardous waste in the UK.

- 8.63 The priority needs identified in the Statement of Facility Needs for Hazardous Wastes in Northern Ireland, October 2005⁵ are:
- to ensure that adequate market outlets remain available for recovered fuel oil;
 - dismantling and pre-processing facilities for Waste Electrical and Electronic Equipment (WEEE);
 - authorised treatment facilities for end of life vehicles;
 - a stabilisation/ solidification facility and an associated single cell for stabilised non-reactive hazardous waste at a non-hazardous waste landfill site;
 - additional transfer stations, both in general, for asbestos wastes and for the collection of household hazardous waste, including WEEE and batteries, and
 - facilities to treat contaminated soils wastes from specific redevelopment sites, or 'mobile' plants to serve several sites in turn.
- 8.64 A number of additional, potential needs have been identified in the Statement of Facility Needs for Hazardous Wastes in Northern Ireland October 2005⁵. This may be rather more 'marginal' in terms of their likely economic feasibility. In terms of all-island co-operation, particular priorities might include the following:
- establishing common markets for recovered fuel oil and for secondary liquid fuel for use in cement kilns;
 - utilising existing or planned treatment facilities on an all-island basis; and
 - exploring the joint development of WEEE treatment facilities.
- 8.65 Table 8.10 summarises the facility needs for hazardous waste management in NI identified in the Statement of Facility Needs for Hazardous Wastes in Northern Ireland, October 2005⁵

Table 8.10 Summary of Facility Needs for Hazardous Waste Management

Facility type	Existing provision	Need		Synergy with Republic of Ireland
		Priority	Potential	
Treatment / Recovery				
Physico-chemical	One acid neutralisation plant, considerable export to GB	-	Could be some potential for expansion or additional facilities	One acid neutralisation plant.
Oil separation and treatment	Four facilities for recovered fuel oil production, adequate capacity: but market is in a state of flux	Priority is to ensure that adequate market outlets for recovered fuel oil remain available	This may require some modification to existing facilities, or even new facilities, to adapt to new market outlets	Existing healthy demand for recovered fuel oil in ROI – not affected by Waste Incineration Directive. Potential to serve the all-island market for recovered fuel oil.
Energy from Waste	None for high temperature incineration	-	Unlikely, as NI quantities very low compared to an economic size of facility	A high temperature incineration facility in County Cork is awaiting a final decision on licensing
	None for organic waste pre-processing to form a secondary liquid fuel for co-incineration	-	Quantities small, but could be an opportunity if NI cement kilns adapt to use secondary liquid fuel	Three organic waste pre-processing facilities exist/ under development in ROI

Facility type	Existing provision	Need		Synergy with Republic of Ireland
		Priority	Potential	
	Two cement kilns could potentially use secondary liquid fuel or other waste derived fuels (e.g. recovered fuel oil) to replace fossil fuels – one has trials in progress	If these go ahead, then storage facilities at the cement plant to accept secondary liquid fuel and/or recovered fuel oil would become a priority need		ROI produces/ will produce substantial quantities of secondary liquid fuel for export. Potential for an all-island market for secondary liquid fuel.
Recovery	One steam sterilisation plant for healthcare risk wastes	-	Capacity adequate	A common procurement procedure led to two steam sterilisation plants being built, one North and one South.
	None in NI	-	Could be some potential for specialised facilities.	Small facilities for solvent recovery, photochemical wastes and fluorescent lamps, but all are also exported.

WEEE	One specialised plant for refrigeration equipment containing chlorinated fluorocarbons	Priority need for one or more WEEE dismantling and recovery plant(s)	May be some opportunities for more specialised facilities, e.g. for fluorescent lamps – economics could favour serving a wider area than Northern Ireland	Priority need both North and South – obvious potential for collaboration
ELVs	Well established network of vehicle dismantlers	Priority need to establish a network of authorised treatment facilities	Likely to be adequate demand to support facilities North and South. Co-operation in border areas could be explored.	
Contaminated soils	None	Facilities to treat wastes from specific redevelopment sites, or 'mobile' plants to serve several sites in turn	A central facility to serve a number of sites	One pre-treatment plant for oil-contaminated soils: otherwise exported.

Facility type	Existing provision	Need		Synergy with Republic of Ireland
		Priority	Potential	
Disposal				
Hazardous waste landfill	None	-	Unlikely to be justified simply to serve NI	See below
Cell for stabilised non-reactive hazardous wastes at a non-hazardous waste landfill site (general)	None	Priority need for a cell for stabilised non-reactive hazardous waste, accepting a range of waste types. Would require a solidification/ stabilisation plant, most likely on same site.		National priority in RoI to establish two cells for stabilised non-reactive hazardous waste – Government has stated that funding may be available. As no current facilities, co-operation could be mutually beneficial.
Cell for asbestos only	One cell operational			One cell operational, for bonded asbestos only. Potential for co-operation.
Collection and Transfer stations	21 transfer stations, six accepting a range of hazardous wastes	Additional general transfer stations and better geographical spread. Urgent: further asbestos transfer stations .	Will be a continuing need for further, more specialised, transfer stations	Co-operation in border areas could be explored.

Facility type	Existing provision	Need		Synergy with Republic of Ireland
		Priority	Potential	
		Network of sites for household hazardous wastes, WEEE, batteries etc.		
Integrated hazardous waste management facility	None	-	Development of an integrated facility, offering some combination of: physico-chemical treatment, oil separation, organic waste pre-processing for secondary liquid fuel, solidification/ stabilisation, landfill and transfer (for export), could help to improve economics.	Several partially integrated facilities already exist (but without solidification or landfill). Potential for co-operation.