



BMT Cordah Limited
ENVIRONMENTAL CONSULTANCY
AND INFORMATION SYSTEMS

**RP 549: Development of a
Protocol for the Treatment
and Disposal of Oily Waste
in the UK**

**Task 2: UK Capacity of Oil
Waste Handling Facilities**

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Appendix 1 – Communication Record

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ABBREVIATIONS

BCA	British Cement Association
BOSCA	British Oil Spill Control Association (now known as UK Spill)
CIA	Chemical Industry Association
DEFRA	Department for Environment Food and Rural Affairs
E&W	England & Wales
EA	Environment Agency for England and Wales
EHSNI	Environment & Heritage Service, Northern Ireland (also known as EHS)
EIC	Environmental Industries Commission
ESA	Environmental Service Association
EWC	European Waste Catalogue
HWD	Hazardous Waste Directive
IPC	Integrated Pollution Control
IPIECA	International Petroleum Industry Environmental Conservation Association
IPPC	Integrated Pollution Prevention and Control
MCA	Maritime & Coastguard Agency
MEHRA	Marine Environmental High Risk Areas
NI	Northern Ireland
NIESA	Northern Ireland Environmental Service Association
OECD	Organisation for Economic Cooperation and Development
ORA	Oil Recycling Association
QPA	Quarry Products Association
RFO	Reprocessed Fuel Oil
SEPA	Scottish Environmental Protection Agency
SESA	Scottish Environmental Service Association
SFP	Substitute Fuels Protocol
SLF	Substitute Liquid Fuel, widely known as SLF or Cemfuel
SWaT	Special Waste Tracking System (used by the Environment Agency)
SWOB	Small Waste Oil Burner
UKSpill	UK Spill Association (formerly the BOSCA)
WAC	Waste Acceptance Criteria
WDD	Waste Data Digest
WESA	Welsh Environmental Service Association
WID	Waste Incineration Directive
WML	Waste Management License
WSA	Waste Strategy Area

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1 EXECUTIVE SUMMARY

As part of a wider study for the Maritime Coastguard Agency (MCA) BMT Cordah Limited (BMT Cordah) have completed a desk-based study to identify the current capacity of the UK for the temporary storage, treatment and disposal of oily waste. This section of work comprises TASK 2 of a wider project.

Landfill as a disposal route is not an option, unless the waste receives (potentially extensive) treatment so that it complies with the requirements of the Hazards Waste Acceptance Criteria. Such legislation places a significant pressure upon both UK regulators and “UK PLC” to identify alternative facilities, so that this type of waste can be effectively managed and disposed of, using suitable facilities. There is a challenge to both the regulators and private industry, in seeking new ways to effectively manage oily waste, and this report aims to clarify the current setting, and also the current gaps that are present in the country as whole.

The main findings from the study are:

1. In the event of a major spill, oil recovered from the coastline will be presumed by the statutory agencies to represent hazardous waste under existing classification criteria.
2. That up-to-date, accurate information concerning the current level of UK capacity to treat or dispose of oily waste, is not readily available within any of the three geographical regions, and that various reports still make references to previous (post-July 2005) capacities. The inclusion of such data within even recent reports, is misleading and significant data gaps currently exist. Consequently, it is not possible at this time to estimate the available capacity to within the UK regions.
3. Specifically, the private sector is currently not ready to assist in the event of a major oil spill. Various industry representatives consistently requested a tri-party meeting between BMT Cordah, MCA and themselves, to try and resolve how regulatory and technical issues can be agreed “in principal” so that they can be prepared, in the event of a major spill.
4. There are a number of significant technical barriers associated with the issue of private sector operations to treat/recover oily waste. Despite repeated, highly targeted requests by BMT Cordah to meet “on the ground” at an oil refinery which is currently engaged in recycling oil, a visit could not be organised due to a lack of willingness on the part of external companies and the wish to bring the industry together under a wider meeting.
5. The UK handling facilities are, in general, inadequate in being ready to handle significant quantities of oily waste within the UK. Large scale potential storage centres do not exist, Memorandum of Understanding (MOU) –type agreements are not in place between MCA and private sector organisations, and much work needs to be undertaken with the aim of bringing various parties together.

2 INTRODUCTION

BMT Cordah Limited (BMT Cordah) was contracted by the Maritime and Coastguard Agency (MCA) to provide consultancy services for Project Reference: RP 549 Development of a Protocol for the Treatment and Disposal of Oily Waste in the UK. This project aims to investigate and provide an analysis of, the existing capacity within the UK to effectively manage large quantities of oily waste, that could be generated following a significant maritime oil spill event.

This report presents the results and wider implications of the current level of UK capacity. A summary of this research project's structure is provided in **Table 1**:

Table 1 Project structure

TASK	Objective	Description
1	To determine the existing level of contingency arrangements in place for all UK Maritime Local Authorities (MLA's).	Project work included a web-based, online questionnaire designed for MLA representatives to input information concerning the local authorities current level of preparedness to manage large quantities of oily waste. Questions asked include whether intermediate waste storage sites have been pre-identified within their geographical boundaries, and the extent that waste management arrangements are currently included in their oil spill contingency plans.
2	Identify potential locations within the UK, where companies could provide storage/recovery/disposal operations for oily waste. Assess the current level of UK capacity.	Desk-based review of information provided by UK statutory authorities, review of industry sectors that may be of assistance (such as cement manufacturing and incineration operations) and provide an assessment of the level of UK capacity.
3	Prepare a detailed, UK-wide inventory of companies that may be able to provide services in the storage/recovery/disposal of oily waste.	Telephone-based interviews with small, intermediate and large companies that either advertise, or listed within trade directories, etc. to obtain specific details concerning their capability to assist within a response effort to deal with large quantities of oily waste.
4	Preparation of a guidance document for general use by MLA's and the provide sector, that captures the latest techniques, tools and technologies associated with the management of oily waste following a maritime spill.	Preparation of a document that uses an easy-to-read format, contains a summary of applicable UK legislation, a statement by statutory regulators detailing the support they will provide and information concerning potential tools, techniques and disposal options that could be employed. In addition, a "blueprint" of an intermediate storage site is provided along with an outline technical specification concerning bottom lining, drainage requirements, and other engineering specifications.

3 BACKGROUND AND TERMINOLOGY

3.1 Hazardous waste

Certain wastes are classified as **hazardous** - a very broad term for a wide range of substances that present different levels of risk. Hazardous waste is essentially waste that contains hazardous properties that may render it harmful to human health or the Environment. The European Commission has issued a Directive on the controlled management of such waste (91/689/EEC) and hazardous waste is defined on the basis of a list referred to as the European Waste Catalogue (EWC¹), which comprises part of the Directive.

The Special Waste Regulations (England & Wales) 1996 extended the definition of hazardous waste to include additional waste streams, including waste oils. Following the introduction of the 1996 regulations, the Environment Agency for England and Wales developed the Special Waste Tracking System (SWAT) to record arisings, movement and treatment of hazardous waste. A number of additional legislative changes have since occurred, and the management of hazardous waste within the UK is both complex and progressive.

3.2 Defining what is oily waste

Mineral oils are oils obtained from mineral sources such as petroleum and are distinct from oils obtained from vegetable and animal sources, or from synthetic oils. For the purpose of this project, waste oils are considered mineral-based oils that have become unfit for the use for which they were originally intended, primarily because of the presence of impurities and/or loss of original properties. Mineral oils are toxic, and take a long time to biodegrade when released into the environment where they can adversely affect wildlife, contaminate land, surface waters and groundwater.

The EWC list of wastes, developed by the European Commission to provide a standard framework for the comparison of waste statistics across the member states, has been used to classify the mineral oil wastes relevant to this study into two main categories:

- **waste mineral oils;** and
- **oily wastes.**

Waste Oils are included in the EWC in Chapter 13 - Oil Wastes and Wastes of Liquid Fuels (except edible oils; and those in chapter 05, 12 and 19). They are all marked as hazardous. There are a number of references in the EWC to wastes specifically containing oil; or where oil (and other dangerous substances) may be a contaminant.

Individual wastes are listed on the EWC by means of a 6-digit code (made up of three 'two digit' sub-codes) and a waste description:

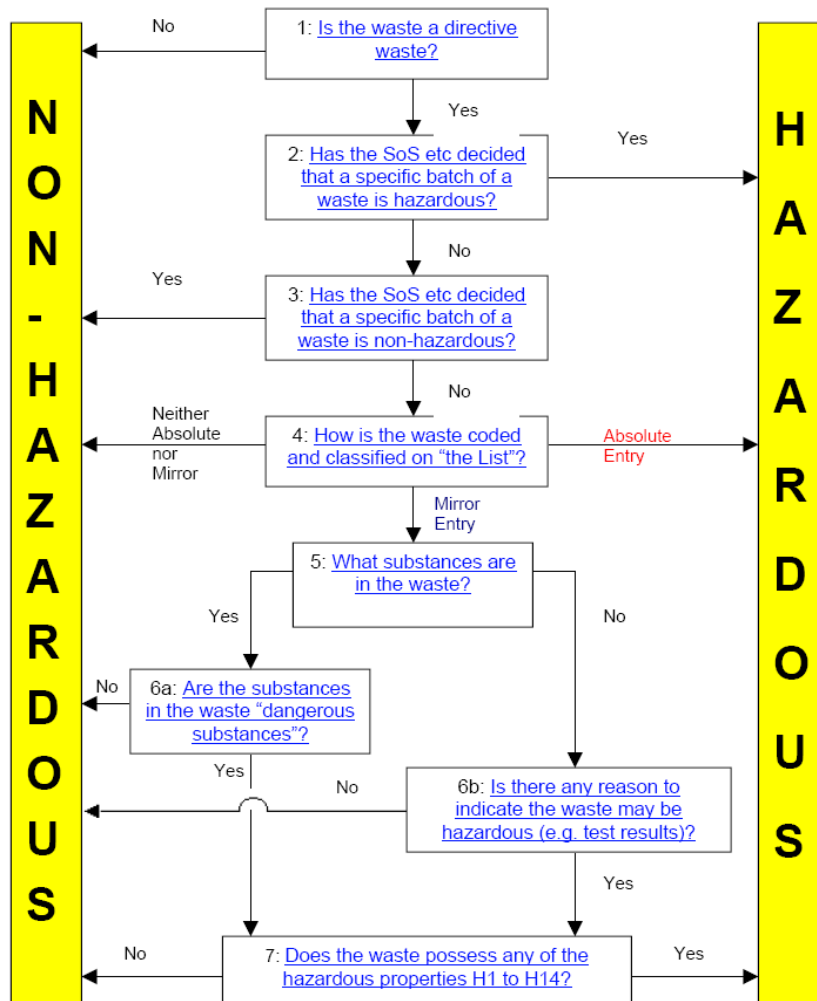
¹ http://europa.eu.int/eur-lex/en/consleg/pdf/2000/en_2000D0532_do_001.pdf

13 ** ** Oil wastes and wastes of liquid fuels (except edible oils, 05 and 12)

Typically, **waste mineral oils** comprise waste oil arising from vehicles, engines and other mechanical equipment, including waste lubricating oils (engines, turbines and gears), waste hydraulic fluids (transmission and brake fluids), waste metal working fluids (cutting, grinding and quenching) and insulating fluids or coolants (transformer fluids). Waste lubricating oils are a significant subset of the waste mineral oils category because of their suitability for re-refining into lubricant base-oils.

Oily wastes are non-oil wastes that have been contaminated by mineral oil (for example, shoreline pebbles, sand and mud containing oil, oil and water separator filters, etc). In general, the proportion of oily waste that is directly attributable to waste oil will be small compared to the non-oil waste component. Waste mineral oils generally arise as either liquids or emulsions whereas oily wastes may arise as liquids, emulsions, sludges or solid wastes.

The UK Environment Agency (EA) has produced a guidance document (WM2), last updated in October 2006, which aims to answer the question: “what is hazardous waste?”. This guidance document is due to be updated in 2007 following the results of an external stakeholder consultation activity. This guidance document provides a useful flowchart that can be used to determine whether a waste can be considered to be “hazardous” and this chart is given below. Note that Secretary of State is abbreviated to SOS:



According to the EA, all waste oils, with the exception of edible oil, will be considered hazardous wastes regardless of their composition, biodegradability, synthetic nature, or otherwise following a maritime spill event.

3.3 The Landfill Option

The Landfill Directive is setting tighter standards on wastes that can go to landfill, and such standards are referred to as waste acceptance criteria (WAC), applicable to hazardous waste from 16th July 2005. The WAC sets leaching and other limit values that components of the waste stream must meet in order to be landfilled. Application of these uniform standards across Europe, represents a significant change in the way waste going to landfill is handled and the change has significant implications to the use of landfills as a disposal route for oily waste.

The current situation now (March 2007), is that landfills cannot accept liquid waste, nor waste that has not been treated or oily waste that has a total organic carbon content of over 6%. From a practical position, landfilling of significant quantities of oily sludges provides an emplacement / stability problem and also landfill liners are adversely effected by mineral oils. Following implementation of the Landfill Directive, it is unlikely that landfill represents a realistic option for the disposal of oily waste, as such material will have to undergo extensive treatment to meet the strict WAC quality criteria.

4 METHODOLOGY FOR TASK 2 – ASSESSING EXISTING UK CAPACITY

Information concerning the capacity within the UK to manage oily waste was gathered from (1) Government and statutory agencies, and (2) industry sector representatives.

4.1 Government and statutory agencies

The **Department for Environment Food and Rural Affairs (DEFRA)** *Treatment and Capacity Task Force* of the Hazardous Waste Forum published a Status Report² in 2004 to pull together all the currently available information on hazardous waste. The report included details of:

- a description of current capacity levels specifically prepared for the 2004 Hazardous Waste Forum;
- EA data used during preparation of the report;
- capacity information provided by the waste management industry; and
- information concerning priority hazardous wastes, including waste oil.

² <http://www.defra.gov.uk/environment/waste/hazforum/pdf/tctf-statusreport.pdf>

The key parts of this document are presented and discussed in section 5 of this report. However, the report only provides a limited amount of information relating to this study, due to two factors:

1. the report is dated 2004 and used historical data sets, the most recent being 2003 which is now 4 years out of date; and
2. capacity information associated with the disposal of oily waste was prepared before implementation of the Landfill Directive and the introduction of WAC. Consequently, the levels of capacity presented within the report are, in effect, misleading. However, the report still contains useful information and the results have been considered, with caution.

In addition to the review of historical reports, the **Environment & Heritage Service, Northern Ireland** (EHSNI) was contacted and a response from the Hazardous Waste Division provided a detailed report on the locations, waste types, permitted quantities and notes of the 8 licensed waste management stations in Northern Ireland.

Representatives from the EA were contacted and the Project Team liaised with numerous regional and head office contacts. Information concerning all current licensed oil treatment and storage facilities (60 individual Waste Management Licenses) within England and Wales were gathered.

The hazardous waste data report on the EA's website also provided data from 2003 which represents the historical distributions of treatment and disposal of oily waste and is the most up to date data at the time of writing. As stated previously, such information has to be treated with caution as this does not reflect current UK capacity, given the legislative changes and introduction of WAC.

The **Scottish Environment Protection Agency** (SEPA) processed BMT Cordah's request for information and responded to provide all licensed oil treatment and storage facilities (covering 63 Waste Management Licenses) within Scotland. SEPA also publishes an annual Waste Data Digest (WDD) of data collected by, or on behalf of, SEPA on controlled waste in Scotland which details waste arisings, recovery and disposal of and locations of waste-related operational activities. The digest WDD5 dated 2005 was obtained via SEPA's website³ and is presented along with information extracted from a recent report on the *National Best Practice Project: Mineral Oil Wastes Final Phase 1 Report*⁴.

4.2 Industry associations and representatives

The **Environmental Service Association** (ESA), incorporating the Northern Ireland (NIESA), Welsh (WESA) and Scottish (SESA) Associations, was contacted and the objectives of the study discussed with the membership director, Barry Dennis. Membership contact details were identified for TASK 3. Detailed knowledge of the 200+ members is not held centrally by ESA, however we requested and were given overview environmental

³ http://www.sepa.org.uk/nws/data/data_digest.htm

⁴ http://www.sepa.org.uk/pdf/nws/data/pws/finalreport_mineral.pdf

performance information which is supplied by approximately 42% of the waste management sector.

The **Oil Recycling Association** (ORA) was contacted but their members are predominantly handlers of post-use oils (lubricants and fuel mixes) and not crude oil. Roger Cresswell was able to provide details of the sector in general and his involvement in the Hazardous Waste Forum meetings is presented in various sections.

The **UK Spill Association** (UKSpill) is a new trade association, replacing the British Oil Spill Control Association (BOSCA) as the national organisation and recognised by the UK Regulators as representing the commercial and related interests of the UK Oil Spill Industry. UKSpill membership is drawn from all parts of the UK industry and includes the leading providers of manufacturing technology, responder services and consultancy. As with other associations detailed information about members are not held, although contact details were provided to help complete TASK 3 activities.

Additional industry representatives, such as the **Chemicals Industry Association** (CIA), **Chemical Recoveries**, **The British Cement Association**, **The Quarry Products Association**, **UK Steel Association**, **Corus**, **Biffa Waste**, **The Energy Institute** (formerly the Institute of Petroleum), and the **Environmental Industries Commission** (EIC), were also contacted and their websites researched for the latest information. A full list of external contacts made by the Project Team is included as a **Appendix 1** and their comments incorporated into this report, where appropriate.

Independent consultants Oakdene Hollins Ltd were also contacted to obtain an update since the publication of their reports on the used oil sector. Oakdene Hollins has prepared two reports on used oil on behalf of the UK Government⁵, and a paper on the economics of used oil for the OECD. Their key sections relevant to this study are presented, where relevant.

⁵ <http://www.oakdenehollins.co.uk/pdf/wasteoilsreport.pdf> and
<http://www.oakdenehollins.co.uk/pdf/WasteOils2200309.pdf>

5 RESULTS

5.1 Coverage over the United Kingdom

The regions referenced in the maps below in **Figure 1** will be used throughout the remainder of this document.

Figure 1: Scotland and its local authorities taken from SEPA Waste Data Digest 5 ,2005



Figure 2: Northern Ireland and its local authorities

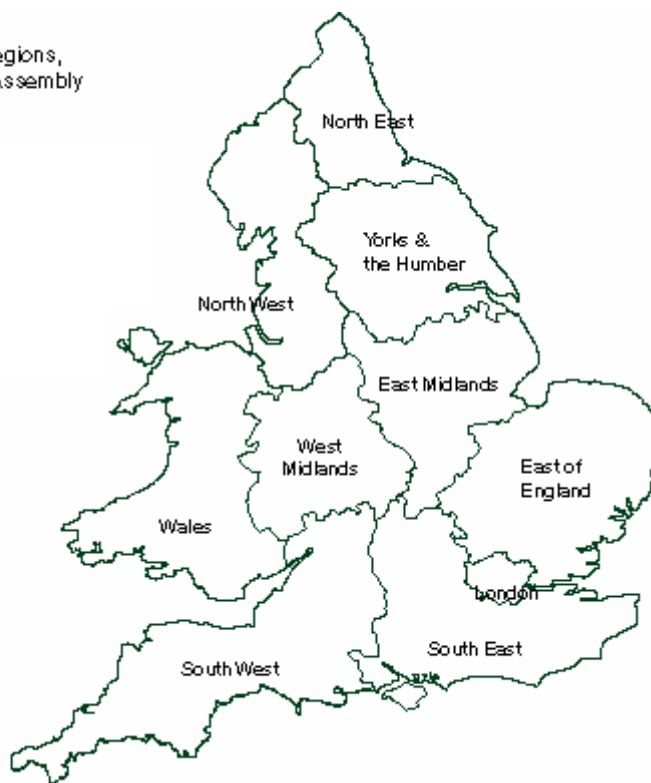


The unitary authorities which make up Northern Ireland can be found at the following Government link: <http://www.statistics.gov.uk/geography/downloads/NINUTS.pdf>

Figure 3: England and Wales planning regions

Taken from the Environment Agency <http://www.environment-agency.gov.uk/commondata/figureimages/goregions.gif>

PLANNING REGIONS
These are Government Office regions, which follow the new Regional Assembly boundaries.



5.2 Data from the statutory authorities

5.2.1 Waste management sites in England & Wales

The waste management transfer stations accepting hazardous waste from trade are listed on the Environment Agency website,⁶ however not all of these will be licensed to accept oil.

Following implementation of the ban on co-disposal of hazardous with non-hazardous waste in landfill, a significant decrease in capacity has occurred. Initially, a total of 23 sites applied for permits to continue landfill hazardous waste after 2004, and 12 represented commercial operations, the rest being in-house facilities such as the cement industry. As of November 2005, England and Wales had 10 sites with valid permits to accept waste oil.

5.2.2 Hazardous and special waste management sites in Scotland

Mineral oil wastes arising in Scotland are consigned as Special Waste to authorised waste management facilities for consolidation and onward transport, treatment, recovery or disposal. Consequently, the main sources of information on the management of mineral oil wastes arising in Scotland were the special waste consignment note datasets held by SEPA. In 2003/2004, 35 waste management sites were licensed to treat special waste in Scotland. In addition, seven sites permitted under the IPC Regulations treated special waste⁷. Certain sites are licensed as both transfer stations and treatment plants. In some instances, it is not possible to identify whether waste entering the site was going to the transfer station or the treatment plant.

In any case, the value of such records are severely limited as the data set available comprises 2003 records and only offers a picture of the historical situation. Analysis of the SEPA special waste consignment note dataset for 2003 as part of the *National Best Practice Project: Mineral Oil Wastes Final Phase 1 Report*⁸ revealed that approximately 225,859 tonnes of mineral oil wastes were consigned as special waste to waste management facilities located in Scotland in 2003. Of this total:

- 207,291 tonnes (92%) comprised oily wastes;
- 15,930 tonnes (7%) comprised waste mineral oils; and
- 2,638 tonnes (1%) could not be classified as either category.

Of the total, 51,623 tonnes of mineral oil wastes were sent for recovery and 10,836 tonnes were disposed of to landfill. In addition, 59,586 tonnes were consigned to sites operating solely as transfer stations, 70,639 tonnes to sites operating solely as treatment plants and a further 33,165 tonnes went to facilities operating as both transfer and treatment facilities for which the data could not be disaggregated. Notably, the North East (Waste Strategy Area

⁶ www.environment-agency.gov.uk/commondata/acrobat/trade_993019.pdf

⁷ http://www.sepa.org.uk/nws/data/data_digest.htm

⁸ http://www.sepa.org.uk/pdf/nws/data/pws/finalreport_mineral.pdf

4) undertook the majority of the treatment of oily waste (over 45,000 tonnes) managed in Scotland. The treatment methods employed by waste management companies include thermal recovery, solvent extraction and physical/chemical stabilisation.

The SEPA report authors estimated that between 122,262 - 155,427 tonnes of mineral oil wastes consigned to waste management facilities in Scotland in 2003 were used in the production of RFO.

Upon request, the licensed oil treatment and storage facilities (63 individual Waste Management Licenses) within Scotland were provided by the Scottish Environment Protection Agency.

Review of the latest SEPA Waste Data Digest 6 dated December 2006 provides a variety of information concerning waste management within Scotland. However, a critical weakness of this data is the date attached to the numerous figures and tables. For example, Appendix VII refers to the licensed landfill sites in Scotland, some of which are able to take Special Waste. However, data used to prepare the table is dated 2004 and so the detail relating to the facilities that can receive Special Waste, is misleading. Detailed, up to date information concerning the current situation associated with hazard waste management sites, appears to be unavailable at this time.

5.2.3 Waste management sites in Northern Ireland

The Environment & Heritage Service, Northern Ireland publishes a list of all licensed waste management sites on the website and the latest update was 28th February 2007⁹. The stations specifically licensed to accept and transfer oil and the permitted quantities (8 individual Waste Management Licenses) within Northern Ireland were provided by the Environment & Heritage Service, Northern Ireland and are attached in **Appendix 2**. It should be noted that although licensed to accept oil and oily wastes, this does not necessarily mean that they do take in those types of wastes at present.

Northern Ireland has always had relatively few facilities for the treatment or disposal of hazardous waste. In October 2005, the EHSNI published a study entitled *Statement of Facility Needs for Hazardous Waste in Northern Ireland*¹⁰. In this it states that "the end of co-disposal landfill in July 2004, the extension of the definition of hazardous waste in July 2005 and the implementation of the WID in December 2005 could all make the situation worse".

The Statement of Facility Needs report presented the fact that the **4 existing oil separation and treatment facilities** provided adequate capacity but with the demand for recovered fuel oil (RFO) in the Republic of Ireland predicted a potential for Northern Ireland to serve the market there. In addition it noted that **two cement kilns** (*Lafarge Cement Cookstown, County Tyrone* and *Lagan Group, County Meath*) could potentially use

⁹http://www.ehsni.gov.uk/environment/wasteManage/public_reg.shtml and <http://www.ehsni.gov.uk/pubs/publications/WebsiteLicenses.pdf>

¹⁰www.ehsni.gov.uk/pubs/publications/StOfFacilityNeeds.pdf and www.ehsni.gov.uk/pubs/publications/StatementofFacilityNeedsReportwithblankbackingpages_V5.pdf

secondary liquid fuel (SLF or reprocessed fuel oil, RFO) but that additional storage facilities was a priority need.

5.3 The role of the private sector

Recent legislation, including the Landfill and Waste Incineration Directives, has led to a significant shortfall in available UK capacity to treat hazardous wastes. In this section we present the various avenues for waste oils in the private sector which primarily focus upon oily waste material being disposed of through incineration. Hazardous waste incinerators primarily treat dangerous wastes from industrial sources, including the chemical and pharmaceutical industries, paint, food factories and metal processing operations. The ESA estimated that hazardous waste incinerators treat approximately 100,000 tonnes each year.

Process such as pyrolysis and gasification are becoming increasingly significant, and represent two technologies that can be used for incineration and co-incineration of hydrocarbon-contaminated material. The private sector utilises use these technologies as a way of recovering energy from waste, and it may be a significant route for the disposal of partially contaminated oily waste.

The majority of gasification and pyrolysis processes have four separate stages:

1. Pre-treating the waste, which usually involves sterilising the content and separating out some of the recyclables, such as grit and metal fragments, all of which have no calorific value.
2. Heating the remaining waste which represents an oily sludge, to produce gas, oils and char (ash).
3. 'Scrubbing' (cleaning) the gas to remove some of the particulates, hydrocarbons and soluble matter in order to prevent damage to plant equipment and assist in meeting regulatory air emission targets.
4. Using the scrubbed gas as a source of heat within some other process, such as cement manufacture, etc.

There are significant technical issues associated with the adequate pre-treatment of waste within item (1) above for incineration units, and also gasification and pyrolysis plants. Oily waste resulting from a maritime spill will certainly contain a variety of "contamination" in the form of plastic gloves, sand and other matter. Such material must be removed to some extent, so that damage to plant does not occur, and air emission requirements are met. These technical barriers are discussed in greater detail within Section 5.3.7. of this report.

5.3.1 Hazardous Waste Incineration

DEFRA have provided a written response to the EC concerning the implementation of Directive 2000/76/EC on the incineration of waste to the UK. This document is dated December 2006 and covers the period up to mid-2006, which is less than 1 year after the Directive came into force. This document provides a useful, current source of information concerning the current situation within the UK relating to waste incineration. Data used

within the response has been derived from statutory authorities, and the key points are summarised below.

- A total of 85 incineration plants and 42 co-incineration plants are covered by the Directive;
- There is confusion concerning the interpretation of the Directive in relation to the fact that whilst gaseous waste (*per se*) does not fall within WID, the product of pyrolysis/gasification technologies within incineration plants is to produce gas to burn, and that this “product” should be treated as a “waste” material.
- There are currently no mobile incineration permits issued within the UK.
- Confirmation that the roadstone drying, cement, steel and oil and gas industry are all involved in the use of pyrolysis/gasification. However, details concerning the current UK capacity of such facilities to receive and dispose of oily waste are not stated.

5.3.2 Roadstone drying industry

Reprocessed Fuel Oil (RFO) is considered a waste when bought by the quarrying industry and, because burning it constitutes disposal, it must now comply with the WID¹¹. Without significant changes to plants, the quarrying industry cannot meet the WID criteria, and have had to cease its use from 27th December 2005.

The Quarry Products Association has voiced concern regarding the investment required to make each of the 150 asphalt sites compliant to the WID. In a press release¹² they are quoted as stating: “With the asphalt industry effectively barred from using Reprocessed Fuel Oil after 28 December 2005, and a total of eight million litres of used oil arising every week, Government will have to find an environmentally friendly way of disposing of a volume of used oil equivalent to the Exxon Valdez spillage every five weeks*.”

5.3.3 Cement industry

Cement kilns are effective at releasing the energy that is locked up in materials such as recycled liquid fuels (RLF, generally known as Cemfuel or secondary liquid fuel SLF). Rather than incinerating such materials, a cement kiln moves them up the waste hierarchy by recovering energy. With 15 strategically located works around the UK, the cement industry has significant potential capacity to tackle the problem. Compared with the needs of the steel industry, Roger Cresswell from ORA (Oil Recycling Association) confirmed that the cement industry can accept relatively low quality waste oil.

The British Cement Association (BCA) is the trade and research organisation that represents the interests of the United Kingdom’s cement industry. The cement industry as

¹¹ <http://www.defra.gov.uk/ENVIRONMENT/AIRQUALITY/lapc/aqnotes/pdf/aq04-06.pdf>

¹² <http://www.qpa.org/news/16feb05> Source *Figures provided by Exxon Valdez Oil Spill Trustee Council.

a whole expects the use of substitute fuels in cement kilns, including waste oils, to grow significantly over the next few years. The BCA has predicted a significant growth in the use of substitute fuels by 2007 and has estimated that between 90,000 - 345,000 tonnes of waste oil could be utilised by 2007¹³.

The members of the British Cement Association operate 15 works as follows:

Buxton Lime Industries Tunstead, Derbyshire.

Castle Cement Ketton, Rutland; Padeswood, Flintshire and Ribblesdale, Lancashire.

Lafarge Cement UK Dunbar, East Lothian; Hope, Derbyshire; Cauldon, Staffordshire; Aberthaw, Vale of Glamorgan; Westbury, Wiltshire; Northfleet, Kent; Barnstone, Nottinghamshire; and Cookstown, County Tyrone.

Rugby Cement South Ferriby, Humberside; Rugby, Warwickshire; and Barrington, Cambridge

There is also the Belfast-based **Lagan Group** that has a cement plant in County Meath; **Redland** plant in Thrislington, Co Durham; and **Blue Circle** operate at two sites - Great Blakenham, Suffolk, and Westbury, Wiltshire.

As fuel costs account for 35% of fixed costs, the cement industry has sought to make use of alternative fuels and this has included consideration of the use of waste oils¹⁴. Treated oils are now being accepted at kilns as a support fuel, although sludges and contaminated oils are not accepted without a minimum charge of up to £20 per tonne. Oakdene Hollins estimated that in 2000 around 15,000 tonnes of waste oils were being accepted for use in cement kilns in the UK with a increase expected in 2006.

Lafarge Cement UK also noted that in the event of an oil spill the cement industry “would have to be permitted to use [the resultant waste oil] as fuel unless the Government gave the OK not to invoke the Substitute Fuels Protocol (SFP)”. Introduced in the mid-1990s as a permitting procedure for cement and lime manufacturers, the SFP sets out the principles and practices for the use of substitute fuels. In February 2005 the Environment Agency published and implemented a revised SFP¹⁵.

5.3.4 Steel industry

The Hazardous Waste Forum meeting in November 2004 confirmed that “waste oil used as a reductant in the steel industry is not subject to the WID. There is a clear possibility that the steel industry could take large quantities of waste oil on this basis”¹⁶. From a survey of steel companies, Oakdene Hollins estimated that the UK steel industry used approximately 20,000 tonnes of waste oil and RFO in 2000. The steel industry does however require higher quality waste oil than for example the cement industry. The ORA confirmed that the

¹³ <http://www.endsreport.com/index.cfm?action=report.issue&IssueNo=353> shown in full at the following site: <http://www.cank.org.uk/index.cfmaction=report.htm>

¹⁴ British Cement Association

¹⁵ Substitute Fuels Protocol for Use on Cement and Lime Kilns, Environment Agency.

¹⁶ <http://www.defra.gov.uk/environment/waste/hazforum/meetings/index.htm>

steel industry will accept processed oil of a high specification. An unnamed steel producer in England is referenced in the SEPA¹⁷ report as stating that that they could utilise all the RFO produced in the UK in their process.

The location of main steel furnaces within the UK is provided in Figure 4.

¹⁷ http://www.sepa.org.uk/pdf/nws/data/pws/finalreport_mineral.pdf

Figure 4. Location of the main steel furnaces in the United Kingdom Taken from <http://www.uksteel.org.uk/wherfaq.htm> Note: a large number of smaller plants are not shown. Key: ■ Integrated plants: combined steelmaking and rolling mills. ■ Other rolling mills. ■ Coating plants. ■ Wire plants. ■ Tube mills.



5.3.5 Oil refinery locations

Waste oil can potentially be re-refined into a base lubricating oil or an ultra-low sulphur diesel fuel additive, or can be re-used as oil refinery feedstock. Waste oil that refineries can accept back needs to have a low salt content to avoid the risk of corrosion. Nevertheless, according to Oakdene Hollins¹⁸, there appears to be cost advantages to re-refining used oil at a full-scale refinery. These include the use of existing storage tanks, weighbridges, laboratory testing facilities, water treatment and emission monitoring resources, sources of heat and hydrogen as well as maintenance and technical staff. The marketing of the final product is also simplified. Nevertheless, the historical reluctance of oil refinery operators to exploit these advantages is understandable. Untreated used oil is thought to pose increased risk of catalyst poisoning, increased corrosion and contamination of wax products.

Figure 5. Location of oil refineries in the United Kingdom Source: The Energy Institute formerly the Institute of Petroleum

¹⁸ <http://www.oakdenehollins.co.uk/pdf/WasteOils2200309.pdf>



Only three refineries (Stanlow, Fawley and Coryton) manufacture base oils, the others manufacture fuel and other products. According to the National Best Practice Project, no waste oils are presently re-refined back to base oil for use as a lubricant in the UK. Although re-refining to a base stock did take place at two plants in England during the late 1990s, both refining plants have now closed.

Oakdene Hollins state that major oil companies have investigated the technical and commercial barriers to taking back used oil and how to solve them. They concluded however that in the absence of a clear signal from the most senior level of management in one or more of the major oil companies that the technical, commercial and legal barriers will continue to prevent the return of used oil to a refinery. It should be noted that during the *Sea Empress* disaster, arrangements were made with oil refineries¹⁹ to assist in the recovery of the waste oil following the spillage in south west Wales in 1996.

5.3.6 Transportation and storage capacity

The storage capacity of many of the small businesses that collect oil is limited to the capacity of a single 5,000-gallon road tanker supplemented by a small tank in a depot. Very few have significant storage capacity. From 2006, the number of local points of disposal will fall as the WID prevents them from burning waste oils as a fuel. Oakdene Hollins estimate that there were at least 350 different locations in the UK at which waste oil was disposed as a fuel, 125 of them at road stone quarries. From 2006, this number is expected to be less than 10 and certainly less than 15. With this alteration in the sector it was predicted that a least one major waste oil collection business would be integrated within a leading oil company, cement manufacturer or waste management business. At present the collectors are still mostly small businesses²⁰.

¹⁹ personal communication 17/03/06: Adrian Rees, Central coordinator recording movement and recovery of waste at Biffa during the *Sea Empress* oil spill

²⁰ Personal communication 25/04/06: David Fitzsimmons, Oakdene Hollins Ltd

5.3.7 Technical barriers associated with the use of waste oil

There are a number of technical barriers associated with the recovery of waste oil. **Table 3** below provides a summary of some common issues, and how measures can be made at various moments in the process chain, to try and solve some of the issues.

Table 3. Summary of barriers and potential solutions

Problem	Cause	Potential Solutions
Contamination of oily waste stream with other materials such as plastics, sand, etc.	Potential for damage to plant equipment and exceedance of air quality emission targets during incineration.	Careful segregation techniques along the shoreline edge to promote optimum waste segregation. Filtration techniques to remove specific types of contaminating materials.
Difficulty in transferring emulsified waste oil to plant facility	High viscosity waste oil.	Use of specialist steam-heating and pump equipment that is specifically designed to transfer emulsified oil.
Elevated concentration of chlorine within waste stream, leading to damage to incineration equipment, corrosion, reduction in exit-stream products (such as wax).	Chemical composition of oily waste following contact with seawater	Blend waste stream with low-chlorine waste stream to reduce average input concentrations.

The technical constraints identified above represent a major challenge to the private sector's involvement in dealing with large quantities of oily waste. In general, the private sector is used to dealing with low quantities of oily waste produced from very specific sources, such as used engine oil which is contaminated with (mainly iron-based) metal fragments.

5.3.8 Discussion

Communication²¹ from the Oil Recycling Association was published on the Chemical Recoveries website on March 2005 concerning the combustion as a fuel of processed used mineral oil commonly referred to as RFO. In this communication it states that "RFO can be used as a fuel and meet the legislative requirements of the WID in authorised cement kiln applications. RFO can assist in the steel making process, a non WID activity. However, cement kiln operators have a number of waste derived fuel options which would set a relative market valuation for RFO. Because of the choices open to the cement industry the future value of RFO to them is not expected to be high. Steel makers also have choices on sources of carbon (RFO) that is a precursor to making the chemical reducing agents that steel making requires. This industry has an extra benefit in that a complex hydrocarbon duty derogation rule applies. So, RFO would have to be competitive with such other materials and it is expected this would be at a relatively lower value."

Whilst cement and lime kilns will still be able to use RFO from 28th December 2005, their capacity to accept RFO may not be sufficient to handle the total quantities of waste oil being generated within the UK. RFO will also have to compete with other waste-derived

²¹ http://www.chemrec.co.uk/News/ORA_User_RFO_Advice_Note.htm

fuels and such competition is likely to make market-influences the main driver. Competition by other waste derived fuels could be strong in the cement industry where fuel costs are significant and growth in the use of a range of substitute fuels has been predicted. A recent claim by a steel manufacturer in England that it could use all the RFO produced in the UK as a carbon reductant in steel manufacture requires further investigation.

According to Oakdene Hollins, the UK sourced oil wastes are currently going to **Corus Redcar** with **Eco Oil** positioned to supply Corus directly²². Cement kilns are not currently receiving oil wastes and so have not looked at buying collectors and the big oil companies have not engaged with re-refining technology providers as was predicted.

The recommendations arising from the National Best Practice Project on Mineral Oil Wastes included the setting up of a **technical working group comprising key stakeholders and SEPA National Waste Strategy staff** to review the findings of Phase 1 and a technical working group to oversee the development of best practice guidance for the management of mineral oil wastes in Scotland and feed into the work of the Oil Care Campaign. It was also recommended that consideration be given to options for obtaining more detailed information on mineral oil wastes management, particularly in relation to cross-border movements of special wastes and waste handled at multi-activity sites.

The techniques that represent best available technologies for these installations will be outlined in their own sector specific guidance. Guidance produced by DEFRA, "Directive 2000/76/EC On The Incineration Of Waste²³", may be useful to Operators in understanding how the WID applies in such situations.

6 ANALYSIS & CONCLUSIONS

The results of Task 2 activities has identified a number of key points, which are:

1. In the event of a major spill, oil recovered from the coastline will be presumed by the statutory agencies to represent hazardous waste under existing classification criteria.
2. That up-to-date, accurate information concerning the current level of UK capacity to treat or dispose of oily waste, is not readily available within any of the three geographical regions, and that various reports still make references to previous (post-July 2005) capacities. The inclusion of such data within even recent reports, is misleading and significant data gaps currently exist. Consequently, it is not possible at this time to estimate the available capacity to within the UK regions.
3. Specifically, the private sector is currently not ready to assist in the event of a major oil spill. Various industry representatives consistently requested a tri-party meeting between BMT Cordah, MCA and themselves, to try and resolve how regulatory and technical issues can be agreed "in principal" so that they can be prepared, in the event of a major spill.

²² Personal communication 25/04/06: David Fitzsimmons, Oakdene Hollins Ltd

²³ <http://www.defra.gov.uk/corporate/consult/ppc-wid/guidance.pdf>

4. There are a number of significant technical barriers associated with the issue of private sector operations to treat/recover oily waste. Despite repeated, highly targeted requests by BMT Cordah to meet “on the ground” at an oil refinery which is currently engaged in recycling oil, a visit could not be organised due to a lack of willingness on the part of external companies and the wish to bring the industry together under a wider meeting.

5. The UK handling facilities are, in general, inadequate in being ready to handle significant quantities of oily waste within the UK. Large scale potential storage centres do not exist, Memorandum of Understanding (MOU) –type agreements are not in place between MCA and private sector organisations, and much work needs to be undertaken with the aim of bringing various parties together.

Appendix 1: Communication record

Date	Company/ Organisation	Name	Objectives	Follow up? Notes	Completed; date
17/01/2006	Viridor	Mark Tivey	Sample questions and answers	Call Martin Fennell, Depot Mgr	yes 18-01-06
18/01/2006	Viridor	Martin Fennel	Sample questions and answers	Offered to be point of contact for Viridor	AMG added details to MCA database
17/01/2006	ORA	Roger Cresswell	Membership details, background	Call Roger Mabbott@UKSpill	yes - wrote email to AG 20-02-06
17/01/2006	UKSpill	Roger Mabbott	Membership details, background	Chase by telephone (Owen also called)	yes 23-01-06 Membership list
17/01/2006	DEFRA	Daniel Barwick	Consultation coordinator	Call Liz Ambekar to chase for details	yes 26-01-06 Consultee list
18/01/2006	ESA	Barry Dennis	Membership details, background	Directed to website	yes CHB added to database
21/01/2006	SEPA	Julie Frew	Location & capacity of facilities		
24/01/2006	EHSNI	Allison Townley	Capacity in Northern Ireland	left messages to call me back	Lisa Holland responded 01-02-06
24/01/2006	Eagency	Alan Bell	Any updated HazWaste data?	only 2003 available at present	yes, 25-01-06, email with 2 contacts
25/01/2006	Eagency Oakdene	Susan Macleay	Location & capacity of oil waste facilities	Cost implications to be discussed w MCA	not necessary; info rec'd Feb but more specific info needed
20/02/2006	Hollins	David Fitzsimmons	Update from Waste Oil Sector report 2003	call again next week	not available
20/02/2006	EHSNI	Lisa Holland, Gary Tate	chasing up on NI existing capacity	awaiting further info in addition to licensed sites	yes rec'd 22-02-06
14/02/2006	CIA	enquiries	Chemical industries view on waste oil capacities		No response
15/02/2006	Steel: Website research		Chemical Recoveries, Quarry Products Association, British Cement Association, The Energy Institute, UK		Yes: incorporated into TASK2 report
15/02/2006	UKSteel	enquiries@uksteel.org.uk	position statement from UKSteel on use of waste oil in the steel industry		
15/02/2006	Corus	technical enquiries line	position statement from Corus on use of waste oil in the steel industry		
31/03/2006	SEPA	Julie Frew	Further information on capacity figures (voicemail)		suggested we call each registry department
31/03/2006	Eagency	Andrea Purdy	Further information on capacity figures and grid refs		information being collated

Date	Company/ Organisation	Name	Objectives requested	Follow up? Notes	Completed; date [update @ 20-04-06]
03/04/2006	SEPA	Stirling	contact names for Falkirk & Stirling SEPA offices	Call Carrie Stein (Stirling) & Eilee Jones (Falkirk) offices	
11/04/2006	SEPA	Stirling	Further Info on 'Permitted Capacity'	happy to provide info. bu email	
11/04/2006	SEPA	Glenrothes	Further Info on 'Permitted Capacity'	Fife - happy to provide info. by email	
11/04/2006	SEPA	Arbroath	Further Info on 'Permitted Capacity'	Angus Dundee -can't provide Info, advise to go back to registry	
11/04/2006	SEPA	Edinburgh	Further Info on 'Permitted Capacity'	Spoke with Duncan Hogg (Registry)- insufficient manpower to provide data, suggest visit to Edi office to obtain info.	
11/04/2006	SEPA	Perth	Further Info on 'Permitted Capacity'	happy to provide info. by email	
11/04/2006	SEPA	Aberdeen	Further Info on 'Permitted Capacity'	happy to provide info. by email	yes 13.04.06
11/04/2006	SEPA	Nicola McFarlane	Further Info on 'Permitted Capacity'	Nicola McFarlane emailed back with figures	yes 11.04.06
11/04/2006	SEPA	Morag Matheson	Further Info on 'Permitted Capacity'	awaiting email response for Northwest Sites (Abn)	
11/04/2006	SEPA	Mark Boyle	Further Info on 'Permitted Capacity'	awaiting email response for Southwest sites.	advised to obtain copies of individual icences from the Registry
11/04/2006	SEPA	Judith Moore	Further Info on 'Permitted Capacity'	awaiting email response for Southeast (Stirling)	will arrange for info to be returned
11/04/2006	SEPA	Avril Crombie	Further Info on 'Permitted Capacity'	awaiting email response for Southeast (Fife:Glenrothes)	yes 12.04.06
12/04/2006	SEPA	Fiona Arthur	Further Info on 'Permitted Capacity'	awaiting email response for Southeast (Fife:Glenrothes)	
13/04/2006	SEPA	Julie Frew	Further assistance on capacity figures	willing to coordinate internally	received WML in electronic format - to be collated
13/04/2006	ORA Oakdene	Roger Cresswell	Liase on their members' capacity estimates	Call to follow up on previous conversation	Email bounced back undeliverable 13-04-06
13/04/2006	Hollins	David Fitzsimmons	Update from Waste Oil Sector report 2003	Call next week +44 (0)1296 423915	send follow on email about conclusions to 2001 report
18/04/2006	ESA	Barry Dennis	Environmental Performance indicators	left message to speak to Marian Kelly	Marian sent email 19-04-06

Date	Company/ Organisation	Name	Objectives	Follow up? Notes	Completed; date
19/04/2006	ESA	Marian Kelly	Environmental Performance indicators	Will forward some information as discussed [50% of members submit data]	
19/04/2006	EIC	Adrian Wilkes	position statement from EIC on waste oil collection capacity		No response
19/04/2006	BCA	David Pocklington	position statement from BCA on use of waste oil in the cement industry		yes plus contact from Lefarge Cement 20-04-06

Appendix 2: Waste management stations in Northern Ireland licensed to handle oil (note variety of units)

EHS File number	Company Name	Address	Irish Grid Reference	Notes (including waste permitted)	Permitted quantities
WML 06/03	Thompson Recycled Oil	33 Greenogue Road, Dromore, Co Down. BT25 1RG	IJ189 562	"mixed waste mineral oils/hydrocarbons" further defined as "used or surplus lubricant/fuel oil from automotive, shipping, industrial and commercial producers"	The limit for storage on their site is 19,600 gallons
WML 07/15	Silver Lining Industries (Ireland) Ltd	Castleton Centre, 30 - 42 York Road, Belfast. BT15 3HE	IJ340761	"oil/grease" (1) "oil filters" (2)	1. maximum at any time 5 tonnes, maximum in the year 130 tonnes. 2. maximum at any time 5 tonnes, maximum in the year 100 tonnes
WML 01/02	McQuillan Envirocare Ltd.	Caulside Drive, Newpark Industrial Estate, Antrim. BT41 2DR	IJ179867	(1) Carcinogenic Waste (2) Special Waste Liquids & Solids	(1) Max stored at any given time is 33 Tonnes (2) maximum annual quantity permitted by licence is 2300 tonnes of liquids and sludges plus 1,150 tonnes of solids
WML 14/03	Atlas Environmental (NI) Ltd	The Old Mill, Drumanness, Ballynahinch, Co.Down. BT24 8LS	IJ396485	A wide range of oily wastes is permitted including oily washes from interceptors and general oil spillages	The quantity of waste delivered to the site for treatment shall not exceed the limits of operational storage capacity of 208 tonnes per week in total of oil, oil sludge and waste water.

EHS File number	Company Name	Address	Irish Grid Reference	Notes (including waste permitted)	Permitted quantities
WML 07/06	Irish Waste Services Ltd	116 - 120 Duncrue Street, Belfast	IJ346768	Licence permits (under 'Types of Waste') 'Industrial Waste (including special waste)'. Excludes 'Inactive' defined as 'e.g. soils' and 'General and Biodegradable Solid Wastes' defined as 'e.g. household, construction & road materials'.	Amounts permitted to be stored are: Liquids - 140T (Chemical plant), 110T (Transfer Station), 210T (De-watering Facility).
WML 14/07	Macwaste Ltd	Flying Horse Industrial Estate (Killough Road Industrial Estate) Downpatrick	IJ493429	Licence permits 'Oil fuel storage tank sludge, including leaded gasoline sludge' and operation of associated 'treatment plant'.	Max quantity permitted per day is 45 cubic metres
WML 07/10	Wilson Waste Management Ltd	110 Duncrue Street, Belfast. BT3 9AR	IJ347767	Permitted waste includes 'hazardous or toxic waste including special wastes (specifically: acids, alkalis, hexavalent chromium, cyanide, asbestos & other chemical wastes)	Max quantities of 'other chemical wastes' at any one time shall not exceed 20 tonnes each of liquids, sludges and solids.
WML 19/21	Safety - Kleen UK Ltd	Unit 1/2 Building 5, Lissue Industrial Estate, Moira Road, Lisburn. BT28 2RF	IJ244642	1. Kerosene (Mineral Spirits), 2. Oil Filters, 3. Mixed Fuel, 4. Waste Oil and Solvents, 5. Absorbent Materials	Maximum daily inputs / max storage / max annual throughput: (1) 1000litres / 8000litres / 250cubic meters (2) 15x205l drums / 140x205l drums / 800x205l drums (3) 2000l / 5000l / 50 cubic metres (4) 20x205l / 80x205l / 1800x205l (5) 5 drums / 10 drums / 500 drums