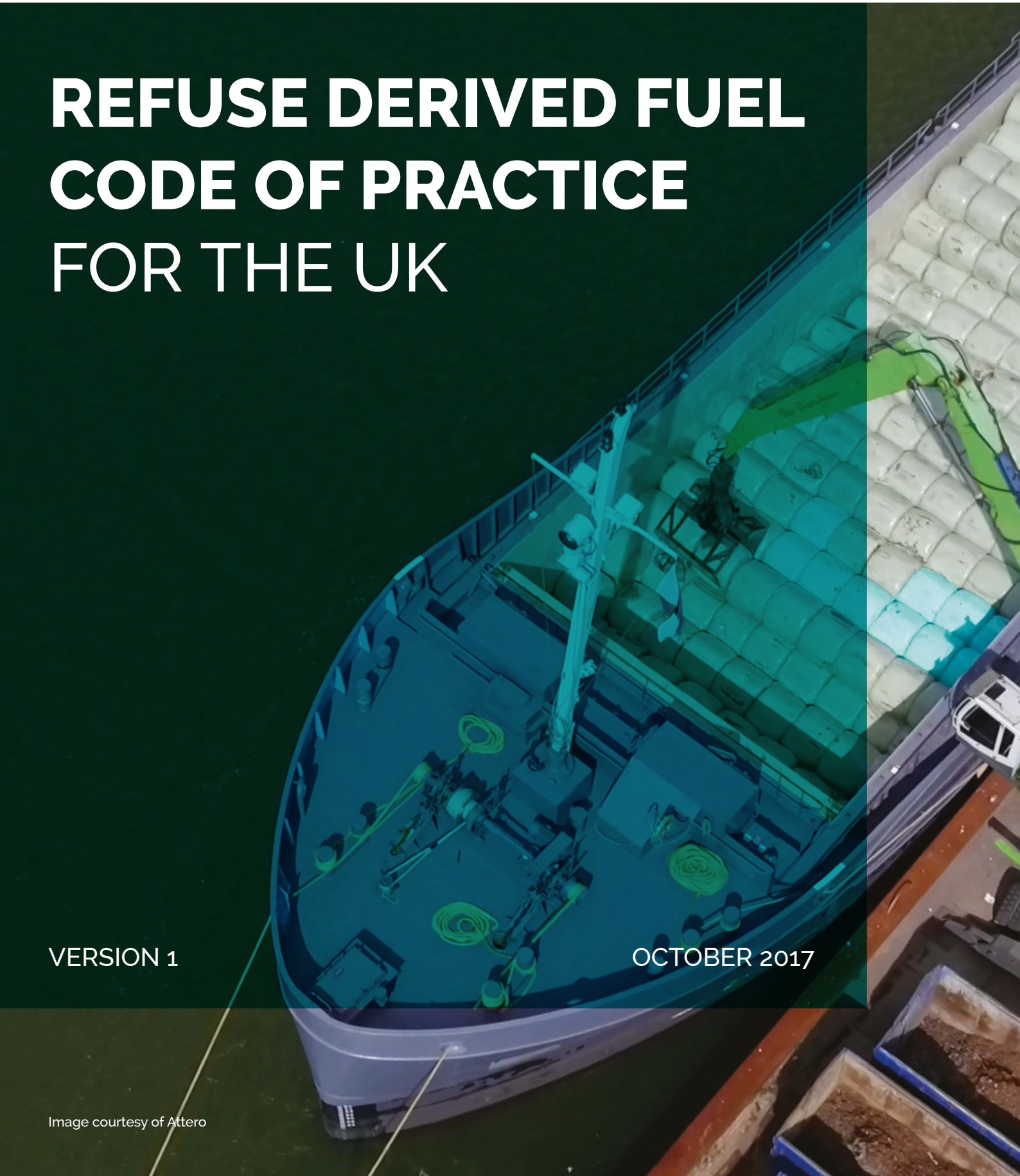
RDF INDUSTRY GROUP

REFUSE DERIVED FUEL CODE OF PRACTICE FOR THE UK



VERSION 1

OCTOBER 2017

Image courtesy of Attero

FOREWORD

The RDF Industry Group was formed to provide a coordinated approach to opportunities and challenges within the sector. The Group is pleased to provide this Refuse Derived Fuel - Code of Practice (CoP) to share good practice across the industry and increase the confidence of both RDF customers and regulators in processes and products.

The CoP brings together regulatory requirements across the RDF supply chain, and through the good practice recommendations it further defines what is expected of not only a compliant but a respected operator.

The CoP will play an important role in achieving good working practices at sites, and encourage a co-ordinated approach in which good practice is shared for everyone to benefit. It provides a reference document for businesses and will give reassurance to regulators and customers.

The Group is grateful to the Environment Agency (EA), Department for Environment, Food and Rural Affairs (Defra), Natural Resources Wales (NRW), Scottish Environment Protection Agency (SEPA), the Food Standards Agency (FSA) and the Advisory Committee on Animal Feedingstuffs (ACAF) for the input they have provided to the CoP, and we look forward to continuing to work closely with the regulators.

Gavin Graveson
RDF Industry Group Chair

Prepared by Eunomia Research & Consulting Ltd, as RDF Industry Group Secretariat

RDF
INDUSTRY GROUP

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INTRODUCTION

1

The Refuse Derived Fuel (RDF) Code of Practice (CoP) has been developed by Members of the RDF Industry Group ('the Group'). The Group was established in January 2015 to:

A. explore and address issues surrounding RDF Export from the UK;

B. develop evidenced-based information on the legal, environmental and economic issues related to RDF Export; and

C. communicate its work to third parties including the government and other key stakeholders in the form of reports, presentations and other communications material.

The Group has developed this CoP in order to share and promote good practice within the industry.

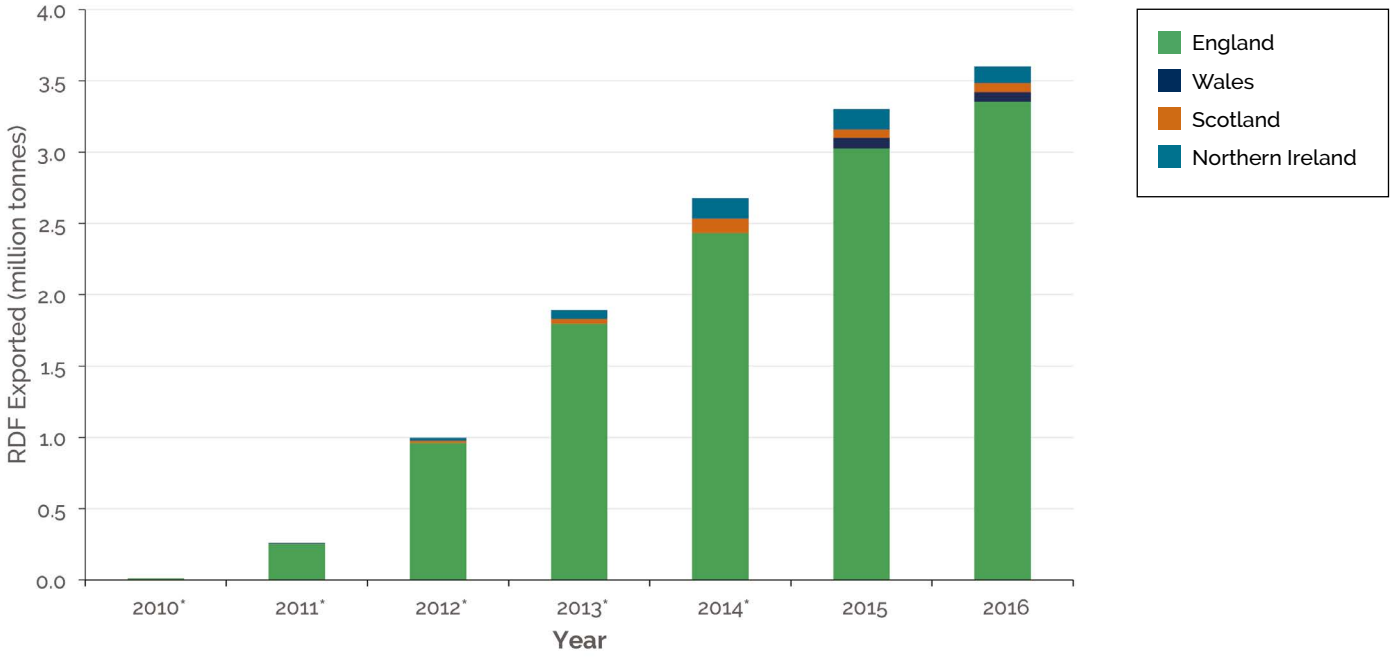
1.1. Applying the Code of Practice

As a condition of Membership of the Group, all Members commit to complying with the sections of the CoP relevant to the scope of their operations in relation to RDF Export. The Group supports the use of the CoP by the wider industry, and encourages adherence to the good practice set out in the CoP to raise standards across the industry.

1.2. The Need for a Code of Practice

Since the RDF market first emerged as an industry in 2010, there has been a significant increase in the amount of waste Exported from the UK (England, Wales, Scotland and Northern Ireland) to mainland Europe as RDF. RDF Exports from the UK have increased from just 0.01 million tonnes in 2010 to over 3.6 million tonnes in 2016, as shown in Figure 1.1.

Figure 1.1: RDF Exports from the UK 2010-2016



* English and Welsh data were reported together until 2015.

Source: Environment Agency, Natural Resources Wales, Scottish Environment Protection Agency and Northern Ireland Environment Agency.

The growth of the RDF market in the UK has presented challenges for government, which needs to ensure that this market:

- delivers environmental benefits in alignment with the waste hierarchy;
- operates within the environmental permitting system;
- operates safely; and
- adheres to relevant trade agreements.

It is the responsibility of the relevant government department and regulator to design, implement and regulate policies which apply to the RDF market. There is therefore potential for divergence in the policies that apply in different parts of the UK. The UK government departments and regulators are:

- Department for Environment, Food and Rural Affairs and the Environment Agency (EA) for England;
- Department for Natural Resources and Natural Resources Wales (NRW) for Wales;
- Scottish Government and the Scottish Environment Protection Agency (SEPA) for Scotland; and
- Department of Agriculture, Environment and Rural Affairs and the Northern Ireland Environment Agency (NIEA) for Northern Ireland (NI).

In recent years, many of these organisations have sought to achieve greater clarity and consistency across the RDF market. This has been undertaken through a waste crime consultation (England and Wales), the introduction of treatment standards (NI), and the trialling of an RDF definition (England).

Image courtesy of Rekom

1.3. Definitions

The following definitions apply to terms included in this CoP[1]:

Export	The process of Shipment of RDF to another country.[2]
Compliant Operator/ Off-taker	An Operator/Off-taker whose operations conform to legal and regulatory requirements.
Management System	A written statement along with plans, drawings and specifications detailing how a permitted site is to be operated and monitored.
Operator	An organisation involved in one or more activities relating to the RDF Supply Chain.
Off-taker	An organisation which is the Operator of the R1 facility which recovers the RDF.
Producer	An organisation which produces RDF from residual waste.
R1	A standard for energy-from-waste facilities where waste is used principally as a fuel to generate energy and a specified energy efficiency is achieved, as defined in the Revised Waste Framework Directive - Directive 2008/98/EC.
RDF	RDF is a generic term used to describe residual waste that has undergone an element of processing, from minimal sorting to more complex mechanical and / or biological treatment. RDF is typically at the lower end of the calorific value spectrum, as compared to Solid Recovered Fuel (SRF) at the higher end.
RDF Supply Chain	Includes one or more of the following activities relating to RDF: Transport, production, pre-treatment, storage, loading, Export, unloading, and Recovery.
Recovery	Incineration of RDF where R1 standards have been met.
Residual Materials Recovery Facility (MRF)	A facility which sorts and separates residual waste into its components.
Shipment	The movement of waste to another country for Recovery[3], not necessarily via a ship or ocean-going vessel.
Transport	The movement of waste by road, rail, air, sea or inland waterways.
Vehicle	A mode of Transport e.g. train, lorry or ship.
Waste Transfer Station	A Waste Transfer Station may be a pre-treatment facility, a Residual Materials Recovery Facility (MRF) or simply a site at which waste is bulked before onward Transportation to one of the former.

[1] Note these may differ to the definitions used in the Waste Shipment Regulations - Regulation (EC) No 1013/2006.

[2] This excludes movements between countries of the UK.

[3] This excludes movements between countries of the UK.

1.4. Purpose and Benefits

This CoP sets out a framework of recommended good practice that Operators should achieve on a day-to-day basis at each stage of the RDF Supply Chain.

This CoP:

- Provides a guide for organisations involved in the RDF Supply Chain to assist them in complying with applicable regulations.
- Helps those who adhere to it to demonstrate that they are Compliant Operators.
- Provides advice to ensure RDF produced in line with the CoP is being received by a Compliant Off-taker, and is accounted for throughout the RDF Supply Chain.
- Identifies and encourages good practice throughout the RDF Supply Chain.

The expected benefits[4] of the CoP are:

- Identifying and disseminating good practice processes across the industry and beyond.
- Increased customer and regulator confidence that a company operating in line with the CoP is a Compliant Operator.
- Increased Supply Chain confidence in the ability of RDF Producers to deliver the desired product and service, consistently meeting the needs and expectations of their customers.
- Ensuring land-owners, port Operators and hauliers have increased confidence in the quality of the RDF they are handling and the Operators they are working with.
- Helping to prevent organisations that act illegally from entering the RDF Supply Chain, and distinguishing Compliant RDF operations from non-Compliant criminal behaviour.

Image courtesy of Attero

[4] This CoP is not expected to have any effect on competition in the market. It does not deal with price setting or involve any element of market sharing or customer sharing. It will not have an appreciable adverse effect on competition, as outlined in Chapter I of the Competition Act 1998.

1.5. Scope and Audience

The RDF CoP covers the RDF Supply Chain (as shown in Figure 2.1) including:

- production of RDF, including pre-treatment;
- preparation for Transport, including baling and wrapping or containerisation;
- Transportation, Shipment and handling from production or storage site to the receiving facility;
- storage after production, in transit and at the receiving facility;
- Recovery; and
- record keeping, reporting, and necessary permits and Transfrontier Shipment (TFS) documents throughout the entire process.

The CoP does not include initial waste production or waste collection activities.

1.6. Code of Practice Updates

Over time this CoP will be updated to reflect the development of new technologies and working practices, as well as to reflect new and updated relevant UK legislation. The version number of the CoP can be found on the front page.

1.7. Legislative Background

The Shipment of waste between EU Member States is controlled by:

- Regulation (EC) No. 1013/2006 on Shipments of Waste (the Waste Shipment Regulation (WSR)); and
- Directive 2008/98/EC on Waste (the Waste Framework Directive).

The requirements of the Directive and Regulation have been transposed into UK law through a variety of regulations, including:

- the Transfrontier Shipment of Waste Regulations 2007/1711 (as amended) ('the TFS Regulations');
- the Waste (England and Wales) Regulations 2011 (as amended);
- the Waste (Scotland) Regulations 2012; and
- the Waste and Contaminated Land (Northern Ireland) Order 1997 (as amended).

The legislation referred to in this document is correct at the time of publication but is subject to change.

1.8. Structure of the Code of Practice Document

Section 2.0 of this document presents the key stages within the RDF Supply Chain. Section 3.0 describes the prescribed practices at each process stage. Within each stage of the CoP:

- "must" indicates a legal requirement; and
- "should" indicates a recommendation / good practice.

There are differing legislative requirements or regulatory controls in the devolved nations, and as such these are highlighted in breakout text boxes as shown below:

Legislative / Regulatory references for **ENGLAND** are shown in green text boxes as presented in this example.

Legislative / Regulatory references for **WALES** are shown in dark blue text boxes as presented in this example.

Legislative / Regulatory references for **NORTHERN IRELAND** are shown in blue text boxes as presented in this example.

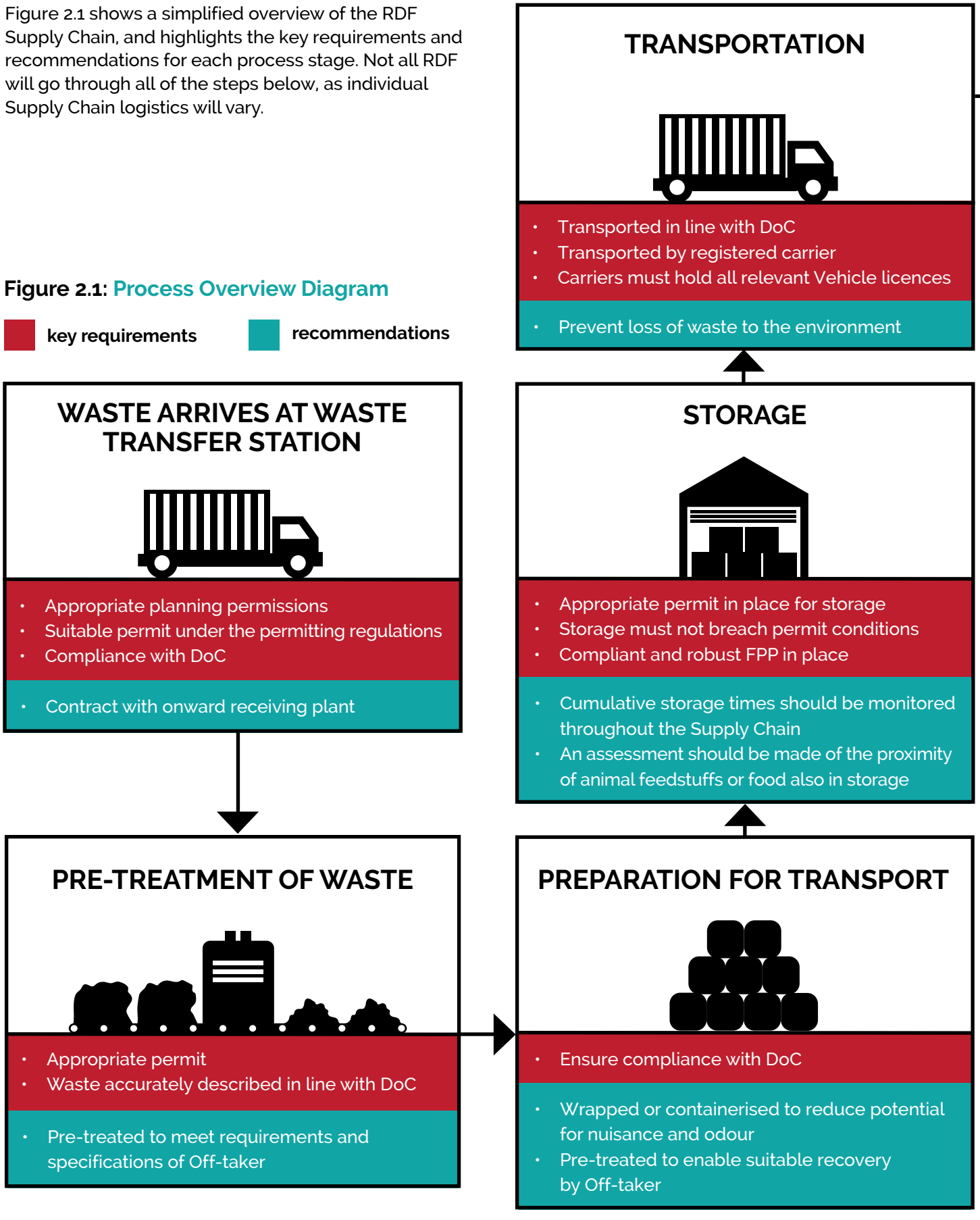
Legislative / Regulatory references for **SCOTLAND** are shown in orange text boxes as presented in this example.

PROCESS OVERVIEW

2

Figure 2.1 shows a simplified overview of the RDF Supply Chain, and highlights the key requirements and recommendations for each process stage. Not all RDF will go through all of the steps below, as individual Supply Chain logistics will vary.

Figure 2.1: Process Overview Diagram



LOADING

- Waste acceptance procedure carried out
- Care should be taken when loading to prevent loss of waste to the enviroment
- Comprehensive risk assessment
- Contingency arrangement in place

EXPORT

- Undertaken in line with TFS Regulations, UN Basel Convention, OECD Decision and EU Waste Shipment Regulations
- Due diligence should be undertaken on hauliers

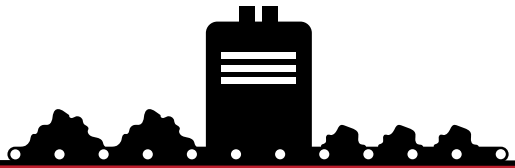
UNLOADING

- Conducted in accordance with requirements of receiving country
- Care should be taken when unloading to prevent loss of waste to the environment
- Comprehensive risk assessment

TRANSPORTATION

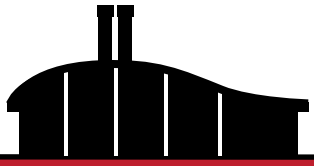
- Transported in line with legislation of receiving country
- Prevent loss of waste to the environment

FURTHER PRE-TREATMENT



- If desired for an interim operation, the Exporter must provide details on the notification document
- An Exporter must complete an interim movement form before the waste may be moved

RECEIVED AT RECOVERY FACILITY



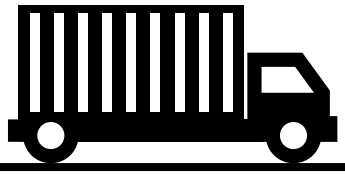
- Movement document sent within three working days of receipt of RDF
- Recovered within one year, or sooner if stipulated by relevant regulator
- Recovery certification must be issued once treated

PROCESS STAGES

3

This section of the CoP details the requirements and recommendations for each process stage.

STAGE 1 WASTE ARRIVES AT WASTE TRANSFER STATION



The first stage of the process covered in this CoP is the arrival of mixed residual waste (which can be sourced from households or commercial and industrial sources) at a Waste Transfer Station (WTS). A WTS may be a pre-treatment facility, a Residual Materials Recovery Facility (MRF) or simply a site at which waste is bulked before onward Transportation to one of the former. The CoP sets out requirements and recommendations for accepting waste at a WTS, and for operating a WTS.

Requirements

PERMITTING AND LICENSING

The WTS Operator must have in place appropriate planning permission and a permit/licence for the acceptance, storage and transfer operations that are applicable to RDF production.

Under the environmental permitting regulations, a WTS must have in place the following:

- a suitable Management System (a written set of procedures that identifies and minimises the risk of pollution);
- a risk assessment for the acceptance, storage and transfer of waste that identifies the potential risks and ensures they are managed effectively;
- a system to meet the legal Operator and competency requirements (including environmental, technical and financial competency); and
- measures to control and monitor emissions.

Under no circumstances must waste be held on site outside of the permitted areas, in excess of permitted capacity, or for periods exceeding those allowed by the permit.

WASTE ARRIVES AT WASTE TRANSFER STATION | PRE-TREATMENT OF WASTE | PREPARATION FOR TRANSPORT | STORAGE | TRANSPORTATION | LOADING | EXPORT | UNLOADING | TRANSPORTATION | FURTHER PRE-TREATMENT | RECEIVED AT RECOVERY FACILITY

ENGLAND

The WTS must have either:

- a 'standard rules permit' – a set of fixed rules for common activities; or
- a 'bespoke permit' – tailored to its business activities.

The environmental permitting regime in England is governed by the Environmental Permitting (England and Wales) Regulations 2016.

WALES

The WTS must have either:

- a 'standard rules permit' – a set of fixed rules for common activities; or
- a 'bespoke permit' – tailored to its business activities.

The environmental permitting regime in Wales is governed by the Environmental Permitting (England and Wales) Regulations 2016.

SCOTLAND

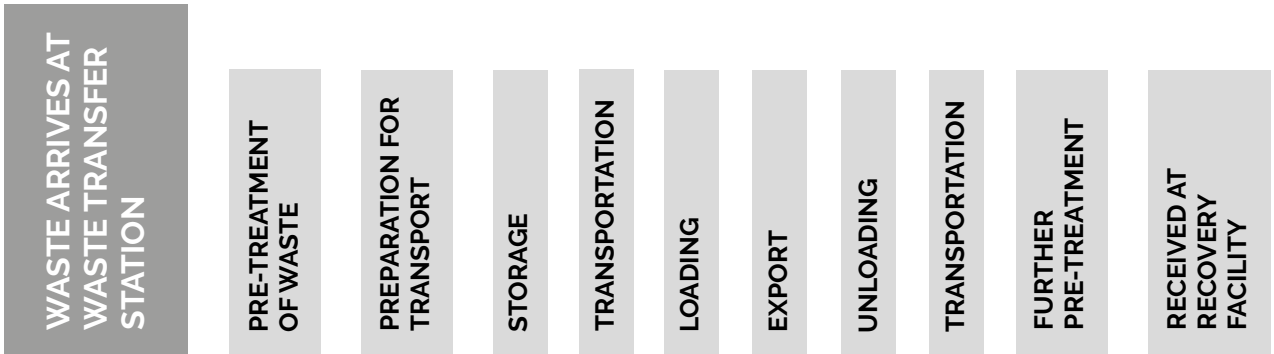
The environmental permitting regime in Scotland is governed by the Waste Management Licensing (Scotland) Regulations 2011 and the Pollution Prevention and Control (Scotland) Regulations 2012.

RDF/SRF manufacturing sites with a capacity of less than 75 tonnes per day will require a waste management licence. Sites with a capacity greater than 75 tonnes per day require a Pollution Prevention and Control (PPC) permit instead.

NORTHERN IRELAND

The environmental permitting regime in Northern Ireland is governed by the Waste Management Licensing (Northern Ireland) Regulations 2003.

The WTS must have a waste management licence and may also require a Pollution Prevention and Control Permit.



FIRE PREVENTION

As part of the environmental permitting system, the WTS site Operator is required to have a fire prevention plan in place in the following parts of the UK.

NORTHERN IRELAND

There is no requirement for a separate fire prevention plan to be in place over and above permit/licencing rules.

SCOTLAND

There is no requirement for a separate fire prevention plan to be in place over and above permit/licencing rules.

WALES

The WTS must have an appropriate Fire Prevention and Mitigation Plan (FPMP) in place, with similar rules and requirements as for England. Best industry practice on storage, mitigation and response measures are detailed in 'Fire prevention and mitigation plan guidance – Waste'.

For standard rules permits, the FPMP needs to be in place but does not need to be submitted to and approved by NRW. For bespoke permits a FPMP must be submitted and approved by NRW.

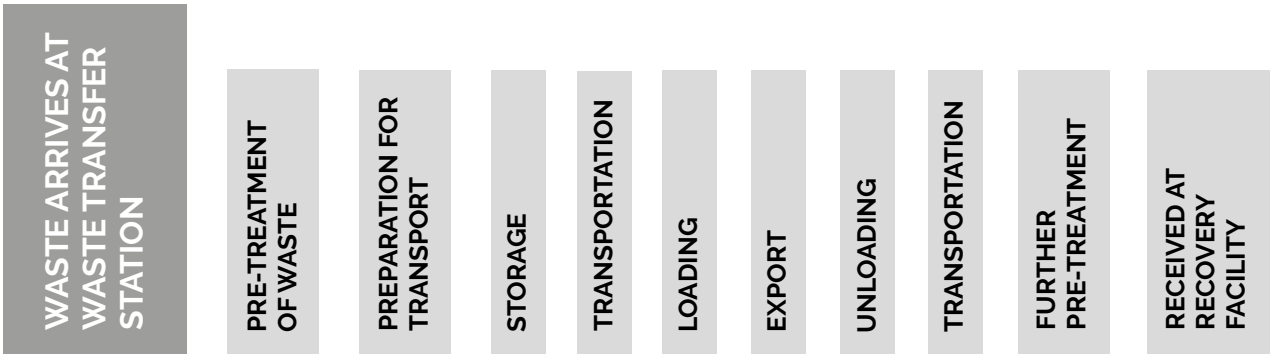
ENGLAND

The WTS must have an appropriate fire prevention plan (FPP) in place, as a standalone document as part of the Management System that can be easily referred to by site staff. The FPP must set out the fire prevention measures and procedures in place and in use on the site. Best industry practice on storage, mitigation and response measures are set out in Environment Agency requirements as detailed in 'Fire Prevention Plans: Environmental Permits'.

The plan must identify all the possible causes of a fire and set out the measures put in place to address them.

Operators must have in place stock rotation for all stored materials with a clear method to record and manage the storage of all waste on site. Under the FPP requirements waste must not be stored for more than six months.

An FPP is an application requirement for all new standard rules and bespoke permits. A phased approach is being applied to WTSs that already have permits in place, but site Operators will be required to provide an FPP if requested by the regulator, or (in the event of a fire) within a period specified by the regulator. The FPP must be assessed and approved by the EA.



DUTY OF CARE

WTS site Operators, like all Operators in the waste Supply Chain, must comply with Duty of Care (DoC) requirements. Operators have a legal responsibility to ensure that waste is produced, stored, Transported and treated/disposed of without harming human health or the environment. Under DoC, only waste carried by a registered waste carrier can be accepted into the WTS site, and Operators must ensure that the waste accepted is described accurately so that it can be handled in an appropriate manner.

All movements of waste must be covered by a written description of the waste, such as a Waste Transfer Note (WTN), which can be a paper copy or an electronic DoC certificate. Operators must retain copies of this written description for a minimum of two years. DoC Codes of Practice vary for England and Wales, Scotland and Northern Ireland. RDF Operators must abide by the DoC for the country in which any particular operation takes place.

SCOTLAND

DoC is based on Section 34 of the EPA.

DoC is regulated by SEPA.

NORTHERN IRELAND

DoC is based on Section 34 of the EPA.
Only parts of the EPA apply to Northern Ireland, and Northern Ireland has special provision with regards to the movement of waste into and out of the Republic of Ireland. DoC is based on Article 5 of the Waste and Contaminated Land (Northern Ireland) Order 1997.

DoC is regulated by the NIEA.

ENGLAND

DoC is based on Section 34 of the Environmental Protection Act (EPA) 1990.

DoC is regulated by the EA and local authorities.

WALES

DoC is based on Section 34 of the EPA.

DoC is regulated by NRW and local authorities.

Recommendations

PERMITTING AND LICENSING

If the capacity of the site is not specified within the site permit, the capacity limits should be specified in the site's environmental Management System.

DESCRIPTION OF WASTE

The WTS should have an operational weighbridge to allow Operators to keep an accurate record of the waste inputs and outputs of the site. Weighbridges should be calibrated at least once a year to ensure waste input and output tonnages are being recorded accurately.

When inspecting waste under the waste acceptance procedure, consideration should be given to the Off-taker's required specification.

FIRE PREVENTION

Each WTS should operate according to a robust fire prevention plan, regardless of whether this is an existing permit condition or requirement by the relevant regulator. Fire prevention plan guidance is a rapidly changing area, and there is considerable subjectivity surrounding what is considered a 'robust' plan. Operators should stay up-to-date with developments in this area.

WASTE CONTRACT

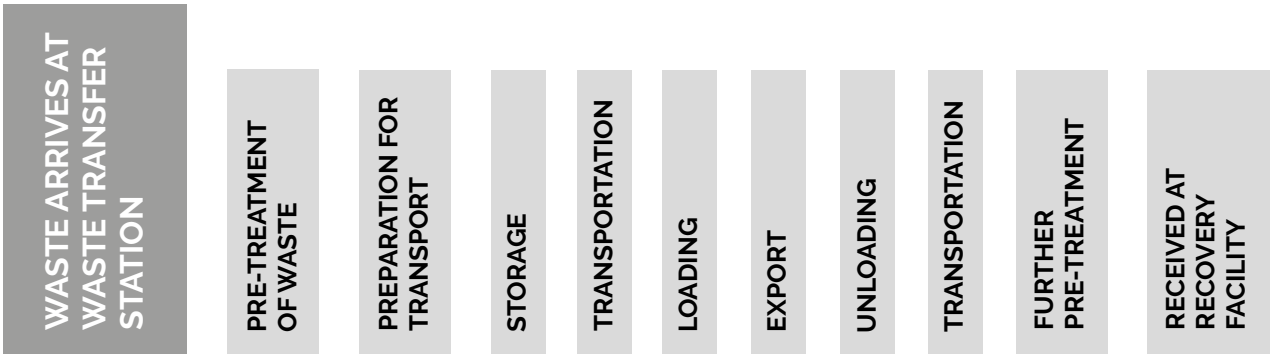
A WTS Operator should have in place a binding contract with the onward receiving plant for the Recovery of RDF, prior to the intention to manufacture the material. The contract should include as a minimum:

- a clear specification and requirement to comply regarding the quality of the RDF required by the importer;
- a clear mechanism for dealing with material that is found to be outside of its specification once it has entered the receiving country which is legally Compliant and offers the most practical solution;
- an obligation on the RDF Exporter to take the waste back if the Shipment or Recovery does not go ahead as intended, or if the Shipment is illegal;
- an obligation on the RDF importer to recover the waste if it is made illegal as a result of the importer's action;
- an obligation on the receiving facility to provide a completed movement document confirming they have legally recovered the waste; and
- a process for dispute resolution and mediation if required. The contract should include these measures to prevent risk of potential stockpiling of waste at production or bulking facilities.

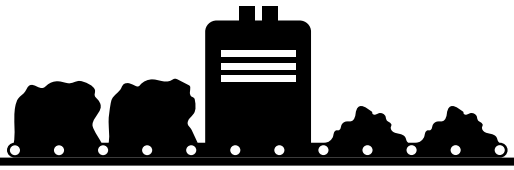
FINANCIAL PROVISION

WTS Operators should have sufficient financial provision in place to ensure that:

- obligations arising from a permit can be fulfilled;
- if the Operator stops operating, there is sufficient financial provision set aside to carry out the actions needed before surrendering the permit; and
- there is a contingency element.



STAGE 2 PRE-TREATMENT OF WASTE



WTS Operators undertake 'pre-treatment' of mixed residual waste to produce RDF. There are a range of pre-treatment processes currently being undertaken in the industry, which may include:

- physical;
- thermal;
- chemical; and/or
- biological processes.

Pre-treatment changes the characteristics of the waste, and can:

- reduce the waste's volume and/or weight;
- reduce its hazardous nature;
- reduce any biological activity;
- facilitate its handling; and/or
- enhance its Recovery.

Requirements

Operators must have an appropriate permit/licence in place (see Stage 1) allowing for the pre-treatment or preparation of waste to RDF, and must conduct all operations in accordance with such conditions.

Once waste has been pre-treated to transform it into RDF, DoC requires waste to be described accurately. Operators must ensure that all RDF is appropriately described and coded.

In relation to the Export of treated residual waste from the UK, one of the following List of Wastes (LoW) codes must be used:

- 19 12 10 (Combustible waste - Refuse Derived Fuel); or

- 19 12 12 (other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11 (hazardous)).

Further guidance on LoW codes is available in 'Guidance on the classification and assessment of waste: Technical Guidance WM3'.

There is no clear basis in UK legislation for the regulators to impose prescribed treatment requirements that waste must meet in order to be classified as LoW code 19 12 10 or 19 12 12 for Export as RDF, although regulatory guidance can be issued.

ENGLAND

Defra and the EA have not sought to introduce a treatment requirement, but have instead introduced a definition for RDF:

"Refuse derived fuel (RDF) consists of residual waste that complies with the specifications in a written contract between the producer of the RDF and a permitted end-user for the thermal treatment of the waste in an energy from waste facility or a facility undertaking co-incineration such as cement and lime kilns. The written contract must include the end-user's technical specifications relating as a minimum to the calorific value, the moisture content, the form and quantity of the RDF."

The definition is used in the EA's day to day work with the RDF sector.

Waste classification is governed by the Hazardous Waste (Miscellaneous Amendments) Regulations 2015.

WALES

NRW to date has not published any pre-treatment requirements or a definition for RDF.

Waste classification is governed by the Hazardous Waste (Miscellaneous Amendments) (Wales) Regulations 2015.

SCOTLAND

SEPA to date has not published any pre-treatment requirements or a definition for RDF.

Waste classification is governed by the Waste (Meaning of Hazardous Waste and European Waste Catalogue) (Miscellaneous Amendments) (Scotland) Regulations 2015.

NORTHERN IRELAND

In November 2013, the NIEA published a Regulatory Position Statement (RPS), which was updated in March 2014. This prescribed some examples of the type of treatment that waste must undergo before the NIEA considers that the mechanical treatment of mixed municipal waste has resulted in waste which can be classified under LoW codes 19 12 10 or 19 12 12.

Waste classification is governed by The Hazardous Waste (Amendment) Regulations (Northern Ireland) 2015.

Recommendations

Operators should pre-treat waste to create RDF that meets the requirements and specifications of the contracted Off-taker.

It is good practice for pre-treatment of malodourous waste to occur as soon as possible after receipt. Waste should be processed on a first-in first-out basis, with a robust system in place to demonstrate this.

Waste to be Transported or Exported as LoW code 19 12 10 should be subject to a defined sampling and testing regime to demonstrate compliance to the receiving facility's R1 specification.

STAGE 3 PREPARATION FOR TRANSPORT

Once pre-treated, RDF is prepared for onward Transportation either through bulking up, baling and/or containerisation in a manner that is acceptable to the haulier, Off-taker and regulators.

Image courtesy of Countrystyle

Requirements

Preparation of RDF for Transport must enable RDF Transport to comply with the requirements for DoC set out in Stage 1.

Recommendations

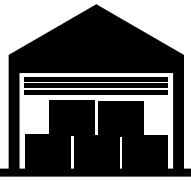
To reduce the potential for nuisance and smell, and enable suitable Recovery of RDF, Operators should ensure that RDF is wrapped or containerised:

- sufficiently to prevent the loss of waste materials and littering during storage and Transportation;
- sufficiently to prevent the leaking of leachate;
- sufficiently to prevent fly infestation and access by vermin;
- in a way that meets any conditions and specifications set out in the contract with the Off-taker; and
- in a way which makes it easy to handle and store.


Image courtesy of Countrystyle

The number of layers of plastic wrapping required to meet these recommendations will vary depending on the quality of the wrapping process, the thickness of the plastic film and the amount of handling that the bales will be subjected to. A minimum of six layers should be used for non-containerised RDF that is being handled multiple times through the Supply Chain, however, the precise number of layers is ultimately determined by the requirements of the hauliers and Off-takers involved.

STAGE 4 STORAGE



RDF may be stored prior to onward Transportation, or at any (or multiple) stage(s) along the Supply Chain.[5] Storage may be required in order to accumulate sufficient quantities of RDF before a Shipment can occur.

Requirements

Operators must have an appropriate environmental permit in place permitting the storage of RDF. RDF must be stored in accordance with the permit conditions, and RDF must not be stored outside of permitted areas, in excess of permitted capacity, or for periods in excess of those set out in the permit.

Operators must have a suitable fire prevention plan in place where this is required as part of the permit (see Stage 1 for further details).

Solid waste and waste water from the storage area must be disposed of in line with permit conditions and DoC requirements.

Recommendations

RDF should generally be stored for a total cumulative period – from initial production to final treatment[6] – of no longer than 3 months, and only for between 3 and 6 months where additional preventative measures are put in place to reduce any adverse impacts of longer storage. Storage should only exceed 6 months from the date of production where a specific agreement is in place with the appropriate regulator. RDF may be stored at multiple points through the RDF Supply Chain and therefore cumulative storage times should be monitored. This could be achieved through date marking of RDF bales, or through adherence to a site Management System which includes a stock rotation procedure.

These measures should prevent degradation of RDF, seeping of leachate and fly or pest/vermin infestation. Bales should be inspected regularly and storage times should be reduced if the RDF begins to show signs of degradation.

Where RDF is being stored an assessment should be made of the proximity of animal feedstuffs or food also in storage, and any risks that the RDF may present. Action should be taken to minimise those risks, and landowners (such as port Operators) and RDF Operators should consider additional biosecurity measures if necessary. These may include:

- storage away from animal feedstuffs or food as far as is practicable;
- storage for as short a time as possible where animal feedstuffs or food are stored in close proximity;
- regular monitoring and maintenance of the RDF and its wrapping to prevent cross contamination; and
- liason with owners of animal foodstuffs or food if spraying of insecticides is to be carried out.

RDF should be stored on an impermeable surface with sealable drainage to minimise the risk of leachate seeping into the ground and leading to water contamination or contamination of other storage areas.

Operators should have a robust fire prevention plan in place, regardless of whether this is an existing permit condition or required by the relevant regulator.

[5] This does not include 'in transit' storage when the RDF is being Exported. See Stage 6 for more information on 'in transit' storage.

[6] This cumulative period excludes storage that is considered part of the infrastructure of the receiving R1 facility, see Stage 11 for further details.

STAGE 5 TRANSPORTATION

RDF may be Transported to a UK-based treatment facility (which is outside of the scope of this CoP), or, as is more common, to an R1 Recovery facility overseas. Transportation is typically between WTSs, ports and/or the Recovery facility via one or more of the following Transport methods:

- road;
- rail; and/or
- sea.

Requirements

The Transportation of RDF within the UK via any means must be undertaken in compliance with DoC, which includes specific requirements for waste carriers. The key elements of DoC with relation to the Transportation of RDF are:

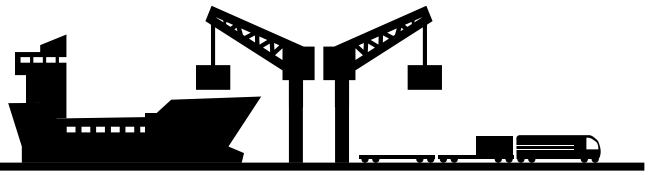
- preventing the escape of waste – particularly in relation to careful Transportation of wrapped bales of RDF to prevent damage to the wrapping; and

- describing the waste accurately to ensure it is handled in an appropriate manner.

RDF must only be Transported by registered waste carriers, and carriers must hold all relevant Vehicle licences.

Image courtesy of AEB

STAGE 6 LOADING



Loading of RDF onto a Vehicle can occur at different points in the Supply Chain depending on the exact logistics of the Export process. This section refers specifically to the loading of RDF onto the Vehicle that is being used for Export, and specifies requirements and recommendations for loading of ships separately from other Vehicles. It should be clear where the responsibility for loading lies, as this can vary according to Supply Chain logistics.

Requirements

SHIPPING

The majority of RDF Exported from the UK travels via ship. A variety of different methods can be used, such as lift-on lift-off ships, roll-on roll-off ships and containers. Curtainsider lorries are often used to deliver RDF bales to the dockside, while flatbed lorries are used for loose RDF in containers.

ENGLAND

RDF may be stored for a period of time at the port before being loaded onto the ship, in which case it must be stored in line with permit controls as outlined in Stage 4. If the RDF is being loaded straight onto the ship (i.e. incidental to Transport) then a permit may not be required.

SCOTLAND

RDF that is in transit at the immediate dockside for up to 5 days pending loading for Export does not require a waste management licence, if:

- the dockside is cleared of all waste within 5 days of the initial RDF deposit;
- storage at any one time does not exceed 4,000 tonnes;
- RDF is stored in a secure place;
- RDF bales are wrapped sufficiently to prevent access by water or pests, and release of odour or waste material; and
- bales are inspected regularly to identify any damage, which must be repaired within 24 hours.

Storage of RDF for longer than 5 days at the dockside must follow waste management licence rules set out in Stage 4.

WALES

RDF may be stored for a period of time at the port before being loaded onto the ship, in which case it must be stored in line with permit controls as outlined in Stage 4. If the RDF is being loaded straight onto the ship (i.e. incidental to Transport) then a permit may not be required.

NORTHERN IRELAND

RDF that is in transit at the immediate dockside for up to 5 days pending loading for Export does not require waste authorisation, if:

- the dockside is cleared of all waste within 5 days of the initial RDF deposit;
- storage at any one time does not exceed 4,000 tonnes;
- RDF is stored in a secure place;
- there is clear segregation of RDF by site of production;
- a written system and site layout is in place to prevent, contain and mitigate fires;
- RDF bales are wrapped sufficiently to prevent access by water or pests, and prevent release of odour, and are on an impermeable surface or indoors with appropriate infrastructure;
- damaged bales are removed off-site immediately; and
- bales must be clearly identified with designated details.

Storage of RDF for longer than 5 days at the dockside must follow waste management licence rules set out in Stage 4.

Recommendations

Care should be taken when loading RDF onto the Vehicle, especially if the RDF is wrapped. Loading equipment such as forklifts, telehandlers and cranes should be regularly inspected to ensure correct handling of the bales, and loading staff should be trained in the importance of careful handling and depositing of bales.

A waste acceptance procedure should be carried out before loading begins. Each bale should be inspected for damage or abnormalities, and damaged bales should be removed to a quarantine area. Any damaged bales should be sent for additional wrapping or patching to be applied if the on-site equipment is available, or for Transport back to the WTS. The structural integrity of the bale and the layers of plastic wrapping should be maintained throughout the loading process and bale handling should be optimised where possible to maintain wrap integrity. Containerised RDF should be checked for any breaches in containerisation.

Bales should be kept as dry as possible to reduce microbiological activity and prevent leaching, unless wrapping is sufficient to prevent water penetration.

SHIPPING

Each Operator should put in place a comprehensive risk assessment, including contingency arrangements for events such as bad weather preventing ships from docking or departing. Contingency arrangements should include additional inspections to those outlined above to identify any further RDF deterioration.

STAGE 7 EXPORT

Shipment of RDF for Export can take place via road, rail or ship. The processes for Export of RDF via ship are significantly different from via road and rail and therefore are included separately in this section. The Shipment method selected for RDF Export must be safe, legal and suitable for the material and destination.

Requirements

The TFS Regulations govern the movement of RDF into and out of the UK. They apply from the point at which RDF is loaded onto the Vehicle being used for Export, and continue to apply until the RDF has been fully recovered.

Export of RDF must be undertaken in accordance with the UN Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal (the Basel Convention) and the OECD Decision Concerning the Control of Transfrontier Movements of Waste Destined for Recovery. All import and Export of waste to and from EU countries must be undertaken in accordance with EU Waste Shipments Regulations. Waste that is Exported from an EU country to a non-EU country must also follow these regulations, along with any others laid down by the receiving country. Exports must also abide by the regulations of any third countries through which the RDF passes.

If ownership of RDF is being transferred at the point of Export, then DoC must be followed to ensure this only occurs between two authorised persons subject to a robust contract, and sufficient DoC checks must be made between both parties. This includes the transfer of all relevant documentation: WTNs, TFS documentation and weighbridge information.

NOTIFICATION CONTROLS

RDF is a waste type that is subject to 'notification controls' before Shipment can occur. RDF Exporters must obtain prior notification and consent from the relevant UK regulator and the regulator in the receiving country (as well as the regulator in any country(ies) through which the RDF will also pass).

Notification must be undertaken through the completion of the TFS forms, which outline the origin, destination and contents of the Shipment. All companies involved in the RDF Export must be named on the TFS forms.

The form includes specific information on:

- the waste licence/permit number of the receiving R1 facility; and

- the corresponding waste code for:
  - Basel annex IX;
  - OECD (if applicable);
  - LoW; and
  - national codes (the UK does not use these but other countries do).

In order for consent to be granted by all of the relevant regulators, Exporters must provide evidence that they have the following arrangements in place:

1. A financial guarantee to ensure enough money is available to the regulator to deal with the waste if things go wrong. The financial guarantee must be sufficient to cover:

   - Shipment of the RDF back to the UK;
   - storage of the RDF for up to 90 days; and
   - Recovery/disposal of the RDF.

2. A valid contract with another business for the Recovery of the waste, which includes details of:

    - an obligation on the receiving business to provide a completed movement document confirming they have legally recovered the waste;
    - an obligation on the RDF Exporter to take the waste back if the Shipment or Recovery does not go ahead as intended, or if the Shipment is illegal; and
    - an obligation on the RDF importer to recover the waste if it is found to be illegal as a result of the importer's action.

3. Insurance against liability for damage to third parties.

A 'general' notification can be used to cover several Export batches if:

- the waste has essentially similar physical and chemical characteristics;
- the waste is Exported to the same business and R1 facility; and
- the route of each Export batch is the same.

Once consent has been granted to Export the RDF, the Exporter must make the relevant regulators aware of the intended movement of the RDF by sending them the movement document at least three days before movement occurs. The RDF must be moved in line with the information in the notification package and must be accompanied by the movement documentation.

Image courtesy of Rekom

SHIPPING
Shipping of RDF must be undertaken in compliance with all international maritime rules and regulations, including the International Convention for the Prevention of Pollution from Ships (MARPOL).

Recommendations

When Exporters are contracting hauliers to Export RDF, sufficient due diligence should be undertaken to check the competency of the haulier. This includes checking that the haulier:

- is registered with the relevant regulators and holds the required waste carrier and Export permits and licences;
- operates within national and international law; and
- is financially secure and has sufficient third party liability for environmental damage.

This should also be undertaken for any subcontractors or agents being used in the process.

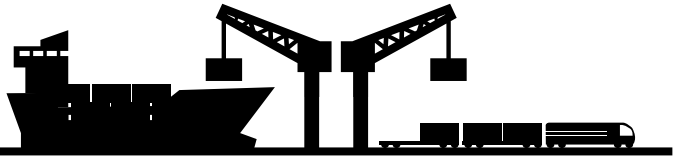
Hauliers should put in place comprehensive risk assessments for Export of RDF.

SHIPPING
There is no guidance from the International Maritime Organisation on the safe shipping of RDF, and hauliers should therefore undertake their own comprehensive risk assessments for this procedure.

Risk assessments should take into account issues such as the possible change in hold atmospheric composition if microbiological activity occurs within the RDF. This can result in reduced oxygen levels within the hold and can also increase fire risk. Mitigation of these risks by hauliers should be in place and should include:

- specific crew safety protocols;
- keeping RDF bales dry;
- continuous monitoring of gas levels and temperatures within the hold;
- a procedure for ventilation control; and
- communication with receiving port authorities if the fire risk increases.

STAGE 8 UNLOADING



It should be clear where the responsibility for unloading lies, as this can vary according to Supply Chain logistics. Unloading occurs at different points in the Supply Chain depending on the exact logistics of the Export process. This section refers specifically to the unloading of RDF from the Vehicle that is being used for Export, and specifies separate recommendations for the unloading of ships.

Requirements

If RDF is stored in the receiving country after unloading, then this must be done in compliance with the permit regulations applicable to that country.

If ownership of RDF is being transferred at the point when unloading occurs, then this must be undertaken in line with receiving country regulations with all relevant documents provided.

Recommendations

Care should be taken when unloading RDF from the Vehicle, especially where the RDF is baled and wrapped. Unloading equipment such as forklifts, telehandlers and cranes should be regularly inspected to ensure correct handling of bales, and hauliers should ensure that port staff are trained in the importance of careful handling and depositing of bales.

A waste acceptance procedure should be used to prevent damaged wrapping from resulting in the distribution of litter around the receiving site.

Each bale should be inspected for damage or abnormalities, and damaged bales should be removed to a quarantine area. Any damaged bales that will be stored before Recovery should be sent for additional wrapping or patching to be applied, if the on-site equipment is available. Alternatively, the damaged bales should be suitably contained. The structural integrity of the bale and the layers of plastic wrapping should be maintained throughout the unloading process and bale handling should be optimised where possible to maintain wrap integrity.

Bales should be kept as dry as possible to reduce microbiological activity and prevent leaching, unless wrapping is sufficient to prevent water penetration.

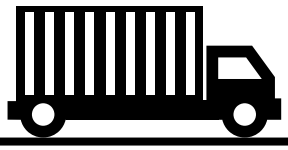
Each haulier should put in place a comprehensive risk assessment.

SHIPPING

If the RDF leaves a liquid residue in the hold, this should be handled and disposed of in line with restrictions set out in MARPOL to avoid contamination of the port environment.

A comprehensive risk assessment should be put in place by the haulier, including contingency arrangements for events such as bad weather preventing ships from docking or departing. Contingency arrangements should include additional inspections to identify further RDF deterioration.

STAGE 9 TRANSPORTATION



Transportation in the receiving country may include the Transport of RDF from the receiving port to the receiving facility via road or rail.

Transportation in the receiving country must be undertaken in compliance with waste Transport regulations in the receiving country, and should take account of the recommendations set out in Stage 5 as well.

STAGE 10 FURTHER PRE-TREATMENT

Requirements

RDF may undergo further pre-treatment in the receiving country prior to final Recovery at an R1 facility. Pre-processing or storing waste at a site overseas before moving it to a place of final Recovery is called an 'interim operation'. The WSR specifies five interim operations using the following codes:

- R12 - exchange of wastes
- R13 - accumulation of wastes
- D13 - blending or mixing of wastes
- D14 - repackaging of wastes
- D15 - storage of wastes

Those coded 'R' relate to Recovery and those coded 'D' relate to disposal. If RDF is destined for an interim operation, the Exporter must provide details of the nature and location of the waste treatment operation on the notification document.

An Exporter must complete an interim movement form before the waste may be moved.

Recommendations

Waste Exported under LoW code 19 12 10 should only require minimal further pre-treatment, such as blending of the waste.

STAGE 11 RECEIVED AT RECOVERY FACILITY

Requirements

Upon receipt of the RDF, the receiving R1 facility must send signed copies of the movement document back to the RDF Exporter and the regulators involved within thirty working days.

RDF must be recovered within one year, or sooner if stipulated by the relevant regulator. Recovery certificates must be issued once the RDF has been treated at the R1 facility.

Recovery facilities must be operated in accordance with all relevant legislative requirements of the receiving country.


Image courtesy of AEB

Recommendations

RDF should be recovered within the maximum cumulative storage period (as set out in Stage 4). Only where such additional storage is part of the infrastructure of the receiving R1 facility should the cumulative storage period be exceeded.

WASTE ARRIVES AT WASTE TRANSFER STATION
PRE-TREATMENT OF WASTE
PREPARATION FOR TRANSPORT
STORAGE
TRANSPORTATION
LOADING
EXPORT
UNLOADING
TRANSPORTATION
FURTHER PRE-TREATMENT
RECEIVED AT RECOVERY FACILITY

Prepared by Eunomia Research & Consulting Ltd on behalf of the RDF Industry Group

For more information about the RDF Industry Group or Code of Practice, please contact:

+44 (0)117 917 2250

rdfindustrygroup@eunomia.co.uk

www.rdfindustrygroup.org.uk

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INDUSTRY GROUP

www.rdfindustrygroup.org.uk

RDF FUEL SAMPLING

Background:

The heterogenous nature of both Refuse Derived Fuels (RDF) and Solid Recovered Fuels (SRF) (e.g., variable particle size, moisture content) creates the potential for wide ranging fuels that may not all be suitable for a given energy-from-waste (EfW) plant. Therefore, for accurate analysis to inform decisions regarding RDF and SRF handling and use, the fuels require precise and representative sampling.

This document provides an overview of key standards and procedures for fuel suppliers necessary to ensure representative samples of RDF, informed by RDF Industry Group members involved in waste fuel sampling. It should be noted that these steps are a recommendation, not a requirement, in recognition that national sampling standards across Europe differ.

Standards:

The sampling protocol below is informed by the two main standards for robust sampling methods:

1. **EN ISO 21645:2021 Solid recovered fuels. Methods for sampling**[1]

   Provides standards for obtaining a representative sample for a range of typical fuel production processes, transportation and storage. The processes outlined are also widely applicable in the sampling of RDF.

2. **EN 15443:2011 Solid recovered fuels – Methods for the preparation of the laboratory sample**[2]

   Provides standards for preparing a representative sample prior to accredited laboratory testing.

EN 15442:2011 will be replaced later this year by EN ISO 21646, providing it with international recognition. The content of the standard is not expected to change significantly.

[1] British Standards Institute (2021) *Solid recovered fuels - Methods for sampling*, 2021

[2] British Standards Institute (2011) *BS EN 15443 2011 Solid recovered fuels - Methods for the preparation of the laboratory sample*, 2011

Sampling Protocol:

The following steps are necessary to ensure representative sample of RDF and SRF are obtained:

1. **Implementation of sampling access points**

   To ensure a representative fuel sample, suitable access points should be planned and implemented prior to sampling.

2. **Use of UKAS accredited laboratories**

   Where possible, UKAS accredited laboratories (or European equivalent) should be utilised to carry out the below steps. It should be noted that this is not an EN requirement. Alternatively, site staff carrying out the sampling should obtain appropriate training.

3. **Determination of lot for analysis**

   The sample taken should be representative of the defined quantity of fuel (the lot) which requires analysis. The maximum weight of any one lot for one sample is 1,500 tonnes.

4. **Determination of nominal top size**

   The nominal top size of the lot should be determined to enable the particle size of materials to be calculated. The nominal top size is quantified as the size of the aperture through which at least 95% of the fuel (by mass) within a sample can pass.

5. **Calculation of sample mass**

   The sample mass is based on the nominal top size – the larger the top size, the larger the sample. To calculate the sample mass, see Annex E of ISO 21645. The sample size should also be:

   - At least as large as the minimum sample mass (the increment mass multiplied by the number of increments (see point ¤(a)(i)66 and Annex E of ISO 21645)).
   - Large enough for laboratory analysis.

6. **Calculation of the number and size of increments**

   All particles within a lot should have equal probability of being included within a sample. This can be achieved by collecting increments – a portion of fuel extracted in a single operation of the sampling device. Therefore:

   - A minimum of 24 increments should be distributed evenly across the lot before being combined to form a sample.
   - Each increment should meet a defined minimum mass (by either volume or weight).

   Both the number and minimum mass of increments should be based on the sample mass and the sample procedure. To calculate the number and minimum mass of increments, see Annex E/F of EN ISO 21645.

7. Incremental sample procedure

A variety of methods exist for taking incremental samples - ranked below in order of representativeness and preference. It should be noted that less representative methods should only be utilised in circumstances whereby a more representative method is not possible.

Rank	Sample procedure	Type of sampling
1	Drop flow	Moving / mechanical (see Annexes H4 and H5 of EN ISO 21645)
2	Moving conveyor belt	
3	Stationary conveyor belt	Static / manual (see Annexes G, H5, H6 and I on EN ISO 21645)
4	Drop flow	
5	Vehicle	
6	Store	

On obtaining the sample, the following requirements must also be met:

- The sampling equipment should not contaminate or affect the sample taken.
- The minimum dimensions of the sampling equipment should be at least three times the nominal top size of the lot.
- The increments should be taken over the production of the lot – this can be spread over a number of days.

8. Sub-sampling preparation

Samples may need to be sub-sampled to ensure they are small enough for lab testing. This is a critical stage in ensuring the representativeness of the sample. Sub-sampling:

- Should ideally be carried out by a UKAS accredited laboratory.
- Must remain representative, achieved through methodologies in EN 15443.
- Must reduce the sample's particle size in stages to determine sample characteristics and enable certain test parameters to be met (see Table 3 in EN 15443).
- Should reduce particles to a final size of <1mm for testing.
- Can reduce particle size on site - through use of apparatus including a small shredder or cutting mill - or in the laboratory.

9. Storage of samples

All samples should be placed in a tightly sealed and labelled container – large enough to include all material – to prevent moisture loss and contamination. The containers should be stored in a cold and dry environment (maximum 5˚C) for up to one week. If a longer storage

period is required, sample treatment is necessary to prevent decomposition.

Testing of the samples should occur in a UKAS accredited laboratory whose schedule of accreditation cover the preparation and analysis of SRF/RDF. Laboratory accreditation can be verified on the UKAS website.[3]

[3] https://www.ukas.com/