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Consulting Engineers Limited

Redcar Energy Centre

Redcar Holdings Limited

Fire Prevention Plan

ERF and fuel preparation facility

ENGINEERING CONSULTING

Document approval

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1 Introduction

Redcar Holdings Limited (Redcar Ltd) is applying to the Environment Agency (EA) under the Environmental Permitting Regulations (EPRs) for an Environmental Permit (EP) to operate the Redcar Energy Centre (REC), to be located at the Redcar Bulk Terminal, approximately 4.5 km west of Redcar town centre and 8.5km northeast of Middlesbrough city centre. REC will comprise a fuel preparation facility, Energy Recovery Facility (ERF) to incinerate incoming non-hazardous waste, and an IBA treatment/processing facility (IBA facility). A detailed description of REC is presented within section 1.4 of the Supporting Information.

As both the fuel preparation facility and ERF will accept and store potentially combustible wastes, a Fire Prevention Plan (FPP) must be developed for the operation of these two facilities. Due to the nature of the waste that is handled at the IBA facility (i.e. non-combustible wastes), the FPP is not required to include fire prevention and mitigation measures associated with the IBA facility.

For the purposes of this report, 'REC' refers to both the fuel preparation facility and ERF; therefore, references made to fire measures implemented at REC are applicable to both the fuel preparation facility and ERF. Measures which are specific to the fuel preparation facility or ERF respectively are split out in further detail and referenced as applicable.

The objective of this report is to provide a preliminary Fire Prevention Plan (FPP) for REC and identify the provisions considered during the development phase of REC to prevent, detect, and mitigate against fire. In addition, provisional operational measures in relation to fire have been identified where these are available. This FPP will be subject to review following completion of detailed design of REC.

This FPP has been developed in accordance with Environment Agency guidance note: *Fire Prevention Plans: Environmental Permits* and the associated report template, as published on the UK government website. The requirements of the FPP will be integrated within the emergency plans and procedures for REC, to ensure that they are consistent and compatible with other management systems associated with the operation of REC.

This document and the measures to mitigate the risk and impact of fires within REC have been (and will continue to be) developed in accordance with the requirements of the following. It is also intended to share the FPP with the local fire and rescue service.

- Environment Agency guidance - *'Fire Prevention Plans: Environmental Permits'* (updated 11 January 2021);
- Building Regulations – '*Approved Document B (Fire Safety)'*;
- National Fire Protection Association *'NFPA 850: Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations'*; and
- The insurer's requirements where structures or equipment fall outside published guidance or recommended practice.

The EA's Fire Prevention Plan guidance has been designed with 3 objectives in mind:

1. minimise the likelihood of a fire happening;
2. aim for a fire to be extinguished within 4 hours; and
3. minimise the spread of fire within the site and to neighbouring sites.

REC will meet these objectives as follows:

1. The use of suitable management procedures and fire detection systems will minimise the likelihood of a fire happening – refer to sections 4.4, 6, 7 and 10.

2. Active firefighting measures will be implemented should a fire break out – refer to section 11, 13 and 14. Utilising these measures, REC aims to extinguish a fire within 4 hours.
3. Fire walls and other prevention methods will minimise the spread of fire within the site and to neighbouring sites – refer to section 8 and 9.

Utilising these measures, REC has been designed with the aim of extinguishing a fire within 4 hours.

1.1 Site location and description

REC will be located on approximately 10 hectares of land at the Redcar Bulk Terminal, approximately 4.5 km west of Redcar town centre and 8.5km northeast of Middlesbrough city centre. REC will be located at a national grid reference of NZ 55890 26032. The site was previously heavily industrialised as it formed part of the former Teesside Steel Works (the Steel Works). The Redcar Bulk Terminal was a port used for the shipment of coal, coke and other bulk goods, and for importing iron ore.

The eastern boundary of the site is formed by coke ovens associated with the Steel Works, with a further area of the Steel Works located to the southeast of the site. The north and northeastern boundaries of the site are formed of a high earth bund, beyond which lies an area of sand dunes which are part of the Bran Sands. The western boundary of the site is not enclosed or marked but a further storage area of the Redcar Bulk Terminal and the Tees Estuary lies beyond it.

Access to REC will be via a series of internal access roads which serve the industrial area, with a link to the A1085 which provides a strategic access to Middlesbrough and beyond via the A19.

A site location plan and Installation Boundary drawing are presented in Appendix A.1 and A.2 respectively.

2 Types of combustible materials

2.1 Combustible waste

2.1.1 Fuel preparation facility

The non-hazardous waste types to be treated at the fuel preparation facility are presented in Table 1. For consistency with the EP, the full list of EWC codes has been presented, although it is acknowledged that metals, glass and minerals (for example sand, stones) are not combustible wastes.

Table 1: Wastes to be processed in the fuel preparation facility

EWC Code	Description of Waste
WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING	
02 01	**wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing**
02 01 03	plant-tissue waste
02 01 04	waste plastics (except packaging)
02 01 07	wastes from forestry
WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER AND CARDBOARD	
03 01	**wastes from wood processing and the production of panels and furniture**
03 01 01	waste bark and cork
03 01 05	sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04
03 03	**wastes from pulp, paper and cardboard production and processing**
03 03 01	waste bark and wood
03 03 08	wastes from sorting of paper and cardboard destined for recycling
WASTES FROM THE LEATHER, FUR AND TEXTILE INDUSTRIES	
04 02	**wastes from the textile industry**
04 02 09	wastes from composite materials (impregnated textile, elastomer, plastomer)
04 02 15	wastes from finishing other than those mentioned in 04 02 14
04 02 21	wastes from unprocessed textile fibres
04 02 22	wastes from processed textile fibres
WASTES FROM ORGANIC CHEMICAL PROCESSES	

EWC Code	Description of Waste
07 02	**wastes from the MFSU of plastics, synthetic rubber and man-made fibres**
07 02 13	waste plastic
07 02 15	wastes from additives other than those mentioned in 07 02 14
07 02 17	wastes containing silicones other than those mentioned in 07 02 16
07 05	**wastes from the MFSU of pharmaceuticals**
07 05 14	solid wastes other than those mentioned in 07 05 13
WASTES FROM SHAPING AND PHYSICAL AND MECHANICAL SURFACE TREATMENT OF METALS AND PLASTICS	
12 01	**wastes from shaping and physical and mechanical surface treatment of metals and plastics**
12 01 05	plastics shavings and turnings
WASTE PACKAGING, ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED	
15 01	**packaging (including separately collected municipal packaging waste)**
15 01 01	paper and cardboard packaging
15 01 02	plastic packaging
15 01 03	wooden packaging
15 01 04	metallic packaging
15 01 05	composite packaging
15 01 06	mixed packaging
15 01 07	glass packaging
15 01 09	textile packaging
15 02	**absorbents, filter materials, wiping cloths and protective clothing**
15 02 03	absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02
WASTES NOT OTHERWISE SPECIFIED IN THE LIST	
16 01	**end-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance (except 13, 14, 16 06 and 16 08)**
16 01 19	plastic

EWC Code	Description of Waste
16 03	**off-specification batches and unused products**
16 03 04	inorganic wastes other than those mentioned in 16 03 03
17 02	**wood, glass and plastic**
17 02 01	wood
17 02 03	plastic
17 03	**bituminous mixtures, coal tar and tarred products**
17 03 02	bituminous mixtures other than those mentioned in 17 03 01
17 09	**other construction and demolition wastes**
17 09 04	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03
WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE	
19 02	**wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**
19 02 03	premixed wastes composed only of non-hazardous wastes
19 02 10	combustible wastes other than those mentioned in 19 02 08 and 19 02 09
19 05	**wastes from aerobic treatment of solid wastes**
19 05 01	non-composted fraction of municipal and similar wastes
19 05 02	non-composted fraction of animal and vegetable waste
19 09	**wastes from the preparation of water intended for human consumption or water for industrial use**
19 09 01	solid waste from primary filtration and screenings
19 12	**wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 01	paper and cardboard
19 12 04	plastic and rubber

EWC Code	Description of Waste
19 12 07	wood other than that mentioned in 19 12 06
19 12 08	textiles
19 12 10	combustible waste (refuse derived fuel)
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11
MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 01	**separately collected fractions (except 15 01)**
20 01 01	paper and cardboard
20 01 10	clothes
20 01 11	textiles
20 01 38	wood other than that mentioned in 20 01 37
20 01 39	plastics
20 03	**other municipal wastes**
20 03 01	mixed municipal waste
20 03 02	waste from markets
20 03 07	bulky waste

2.1.2 ERF

The non-hazardous waste types to be treated at the ERF are presented in Table 2.

Table 2: Waste to be processed in the ERF

EWC Code	Description of Waste
WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING	
02 01	**wastes from agriculture, horticulture, aquaculture,forestry, hunting and fishing**
02 01 03	Plant-tissue waste
02 03	**wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing, conserve production, yeast and yeast extract production, molasses preparation and fermentation**
02 03 04	materials unsuitable for consumption or processing
02 05	**wastes from the dairy products industry**
02 05 01	materials unsuitable for consumption or processing
02 06	**Wastes from the baking and confectionery industry**
02 06 01	Materials unsuitable for consumption or processing
WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER AND CARDBOARD	
03 01	**wastes from wood processing and the production of panels and furniture**
03 01 01	Waste bark and cork

EWC Code	Description of Waste
03 01 05	sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04
03 03	**Wastes from pulp, paper and cardboard production and processing**
03 03 01	waste bark and wood
03 03 07	mechanically separated rejects from pulping of waste paper andcardboard
03 03 08	wastes from sorting of paper and cardboard destined for recycling
03 03 10	fibre rejects, fibre-, filler- and coating-sludges from mechanicalseparation
03 03 07	Mechanically separated rejects from pulping of wastepaper and cardboard
WASTES FROM THE LEATHER, FUR AND TEXTILE INDUSTRIES	
04 02	**wastes from the textile industry**
04 02 10	Organic matter from natural products for example grease, wax
04 02 21	Wastes from unprocessed textile fibres
04 02 22	Wastes from processed textile fibres
WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED	
15 01	**Packaging (including separately collected municipal packaging waste)**
15 01 01	Paper and cardboard packaging which is contaminated and would otherwise be destined for landfill
15 01 02	plastic packaging
15 01 03	Wooden packaging which is contaminated and would otherwise be destined for landfill
15 01 05	Composite packaging
15 01 06	Mixed packaging which is contaminated and would otherwise be destined for landfill
15 01 09	Textile packaging
15 02	**Absorbents, filter materials, wiping cloths and protective clothing**
15 02 03	absorbents, filter materials, wiping cloths and protective clothingother than those mentioned in 15 02 02
CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	
17 02	**Wood, glass, and plastic**
17 02 01	Wood which is contaminated and would otherwise be destined for landfill
WASTES FROM HUMAN OR ANIMAL HEALTH CARE AND/OR RELATED RESEARCH (except kitchen and restaurant wastes not arising from immediate health care)	
18 01	**wastes from natal care, diagnosis, treatment or prevention of disease in humans**
18 01 04	wastes whose collection and disposal is not subject to special requirements in order to prevent infection(for example dressings, plaster casts, linen, disposable clothing, diapers)

EWC Code	Description of Waste
WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE	
19 02	**Wastes from physical/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**
19 02 03	Premixed wastes composed only of non-hazardous wastes
19 02 10	combustible wastes other than those mentioned in 19 02 08 and 19 02 09
19 05	**Wastes from aerobic treatment of solid wastes**
19 05 01	Non-composted fraction of municipal and similar wastes
19 05 02	Non-composted fraction of animal and vegetable waste
19 05 03	Off-specification compost
19 06	**wastes from anaerobic treatment of waste**
19 06 04	digestate from anaerobic treatment of municipal waste
19 06 06	digestate from anaerobic treatment of animal and vegetable waste
19 08	**wastes from waste water treatment plants not otherwise specified**
19 08 01	Screenings
19 12	**Wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 01	Paper and cardboard which is contaminated and would otherwise be destined for landfill
19 12 07	Wood other than that mentioned in 19 12 06
19 12 08	Textiles
19 12 10	Combustible waste (refuse derived fuel)
19 12 12	Other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11
MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 01	**Separately collected fractions (except 15 01)**
20 01 01	Paper and cardboard (rejects from materials recovery plants only)
20 01 10	Clothes
20 01 11	Textiles
20 01 38	Wood other than that mentioned in 20 01 37 (rejects from materials recovery plants only)
20 01 39	Plastics (rejects from materials recovery plants only)
20 02	**Garden and park wastes (including cemetery waste)**
20 02 01	Biodegradable waste
20 03	**Other municipal wastes**
20 03 01	Mixed municipal waste
20 03 02	Waste from markets

EWC Code	Description of Waste
20 03 99	Municipal Waste not otherwise specified

2.2 Other combustible materials

In addition to the wastes listed in section 2.1, there will be a limited number of other materials stored and used at REC which are potentially combustible. These include maintenance materials, such as oils and greases present in small quantities at various locations, and gas cylinders.

At the ERF, low sulphur fuel oil will be used for auxiliary firing and will be stored in a dedicated storage tank on-site. A plan showing the location of the primary raw materials and residues at REC is presented within Appendix A.3 of this report. The plan will be updated following completion of detailed design to include for storage locations of combustible maintenance materials.

Gas cylinders will be stored within purpose-built dedicated storage facilities. All facilities for the storage of gas cylinders will be kept locked and secured. A system for the regular inspection of gas storage facilities will be developed as part of the operating and maintenance procedures and the site inspection regime. The location of gas cylinder storage and maintenance materials will be subject to detailed design; a plan showing the location of gas cylinders will be incorporated into Appendix A upon completion of detailed design.

It can be confirmed that all construction materials will be non-combustible or of limited combustibility, including all building thermal insulation.

3 Using this fire prevention plan

3.1 Where the plan is kept and how staff know how to use it

This FPP will form part of the documented management systems for REC. The FPP will be available in both electronic and hard copies at easily accessible locations. Staff induction programmes will be location and job role specific; however, they will include awareness training on the documented management systems at the site as a minimum. All staff will be able to easily access the documented management systems, including this FPP.

Visitors and contractors will be informed about fire prevention measures adopted at REC as part of site induction procedures and will be able to access the FPP if required. The FPP will also be made available to local Fire Officers. A Premises Information Box or similar at the gatehouse will be made available to the fire and rescue service which will contain a copy of the FPP, contact numbers and also information on control features such as shut-off valves, hydrant controls etc.

3.2 Testing the plan and staff training

All site staff (and contractors) will be trained in emergency response procedures. Operational staff will be trained in a range of firefighting equipment. Training records will be maintained in accordance with the documented management systems for REC, with fire response procedures incorporated within the site's management systems. It is expected that fire drills (including procedures for emergency evacuation of the site) will be exercised at least twice per year.

This FPP will be subject to regular review and updating by senior management following the commencement of operation of REC. The first review is expected to be undertaken during the commissioning phase of the waste processing activities prior to full operation, to incorporate any mitigation measures proposed during detailed design and construction of REC. The FPP will be periodically reviewed and updated where necessary to ensure that the stated control techniques remain appropriate. Scenarios for when the FPP will be periodically reviewed and updated, will include the following:

- immediately following any major fire incidents;
- following a near miss of a fire;
- if there are any significant technical or managerial changes at REC;
- the local environment changes, e.g. a school or residential development is built nearby; or
- if the EA asks for the FPP to be revised.

Regular reviews will be captured through both the FPP and any fire risk assessments as part of Redcar Ltd's documented management systems.

Fire prevention messages will be reinforced around the site using signs. Furthermore, visitors to REC will be informed of the correct safety and fire prevention procedures – information will be provided at the site entrance and by appropriate located signage on-site.

On a periodic basis, testing of the emergency procedures will be undertaken. The intention of the testing is to verify that all staff and contractors are aware of the emergency procedures. Following all tests, the implementation of the procedures will be reviewed. If appropriate, the procedures will be amended, or additional training provided to all staff and contractors.

The effectiveness of the emergency response procedures will be reviewed following any emergency incidents on-site. The procedures will be updated if required, and staff trained in the updated procedures.

3.3 Roles and responsibilities

A Fire Safety Manager (FSM) will be assigned. The FSM will take overall responsibility for establishing and maintaining a safe working environment in which fires are prevented from starting, or if they do, from developing beyond a minor event. The FSM will be responsible with overseeing the production of fire risk assessments at the site and ensuring that any recommendations for improvements/mitigation measures from the assessments are addressed/implemented. Risk assessments will be reviewed on an annual basis. The FSM will also be responsible to ensure that the FPP is reviewed regularly and remains appropriate to the site.

In addition to the FSM, a sufficient number of fire wardens will be assigned to ensure a safe and timely evacuation in the event of a fire. The fire wardens will be suitably trained and competent to carry out the role, with any training recorded as part of the documented management systems. The fire wardens will undertake fire watch site inspections and raise alarm/activate call points if smoke, odour or flame indicates a potential fire source. They will be responsible for investigating the location of the fire (if safe to do so, i.e. if determined using an automatic detection system) and utilising fire suppression equipment such as fire extinguishers if deemed safe to do so. They will liaise with the FSM if they are not already present on the site.

All employees (and contractors) will have a number of additional responsibilities in relation to fire safety, which are set out as follows:

- never leave obstructions in corridors, stairways, stair landings or other escape routes;
- never block fire exits or place objects in front of fire doors;
- never leave open fire doors which are required to be kept shut to prevent fire spreading, and ensure these doors are closed behind them;
- never interfere with fire detection or suppression equipment unless authorised to do so;
- report any damages identified to fire detection or suppression equipment;
- maintain safe working practices with electrical equipment;
- do not smoke on site unless in an approved area;
- familiarise themselves with fire emergency procedures; and
- book in and out of the site using the correct systems in place.

4 Fire prevention plan contents

4.1 Activities at the site

The activities to be undertaken at the site include the following:

1. a fuel preparation facility to process incoming waste to produce a residual waste-derived fuel for treatment at the ERF or transfer off-site;
2. a twin-line Energy Recovery Facility (ERF) to recover energy from waste;
   a. generation of power for export to the National Grid and the potential to export heat;
   b. production of an inert bottom ash material that will be transferred to the on-site IBA facility (see below), or an off-site IBA processing facility;
3. generation of an air pollution control residue that will be transferred off-site to a suitably licensed hazardous waste facility for disposal or recovery; and an Incinerator Bottom Ash (IBA) Recycling facility (the IBA facility) which will process bottom ash from the ERF and imported IBA from other waste incineration facilities in the local area, as well as blending with other imported inert wastes delivered directly to the IBA facility to create a secondary aggregate, referred to as Incinerator Bottom Ash Aggregate (IBAA).

Table 3 lists the Schedule 1 activities (as defined in the Environmental Permitting Regulations), and the Directly Associated Activities (DAA's) to be undertaken at REC. The table includes for the activities undertaken at the IBA facility (for consistency with the rest of the EP application), although as justified in section 1, this FPP does not cover the operation of the IBA facility.

Table 3: Scheduled and directly associated activities

Type of Activity	Schedule 1 Activity	Description of Activity
Installation	Section 5.1 Part A(1) (b)	Line 1 – The incineration of non-hazardous waste in a waste incineration plant with a capacity of 3 tonnes per hour or more
Installation	Section 5.1 Part A(1) (b)	Line 2 – The incineration of non-hazardous waste in a waste incineration plant with a capacity of 3 tonnes per hour or more
Installation	Section 5.4 Part A(1) (b) (ii)	**D13:** Blending or mixing prior to submission to any of the operations numbered D1 to D12 **R1:** Use principally as a fuel or other means to generate energy **R3**: Recycling/reclamation of organic substances which are not used as solvents **R4**: Recycling/reclamation of metals and metal compounds **R5**: Recycling/reclamation of other inorganic materials
Installation	Section 5.4 Part A(1) (b) (iii)	**D13:** Blending or mixing prior to submission to any of the operations numbered D1 to D12 **R5**: Recycling/reclamation of other inorganic materials **R4**: Recycling/reclamation of metals and metal compounds

Type of Activity	Schedule 1 Activity	Description of Activity
Directly associated activities		
Directly Associated Activities		Energy generation
Directly Associated Activities		A medium combustion plant comprising a diesel generator
Directly Associated Activities		Surface water management
Directly Associated Activities		**R13**: Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced) **D15:** Storage pending any of the operations numbered D1 to D14 (excluding temporary storage, pending collection, on the site where it is produced)
Directly Associated Activities		**R13**: Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced) **D15:** Storage pending any of the operations numbered D1 to D14 (excluding temporary storage, pending collection, on the site where it is produced)

4.1.1 Fuel preparation facility

The fuel preparation facility will include the following key components: main building including storage bays and storage bunkers, process equipment (including moving floor feeder, conveyors, de-baler, shredder). Baled waste will be stored in concrete bays. There will also be a tipping area within the building for reject material from the ERF.

The fuel preparation facility will be capable of processing up to approximately 200,000 tonnes per annum of non-hazardous waste, expected to be a mixture of municipal solid waste (MSW) and commercial and industrial (C&I) waste that has been pre-treated to remove recyclates prior to arriving at the fuel preparation facility in a baled form. Bulky waste will also be accepted for shredding. The purpose of the fuel preparation facility will be to process the incoming waste into a waste-derived fuel or Refuse Derived Fuel (RDF), which would be transferred for processing either within the adjacent ERF or an ERF off-site.

4.1.2 ERF

The ERF will include the following key components/infrastructure:

- waste reception and storage areas;
- reagent and raw material tanks and silos;
- residue silos and storage areas (including wastewater storage facilities);
- water, fuel oil and air supply systems;

- two incineration lines;
- boilers;
- steam turbine/generator set;
- facilities for the treatment of exhaust or flue gases;
- flues with associated stack; and
- devices and systems for controlling combustion operations and recording and monitoring conditions.

The ERF will be capable of approximately 450,000 tonnes per annum of waste, which is based on a processing capacity of 28.1 tonnes per hour per line with a design NCV of 10.5 MJ/kg and an availability of 8,000 hours. However, the ERF will be capable of processing wastes with a range of NCVs, typically between 7.5 – 11 MJ/kg. It is expected that the maximum capacity of the ERF will be approximately 500,000 tonnes per annum of waste.

The main activities associated with the operation of the ERF will be the combustion of waste to raise steam and the generation of electricity in a steam turbine/generator, with the potential to export heat subject to commercial and economic viability.

4.2 Site plans and drawings

The following plans and drawings are included within Appendix A of this report:

- site location plan (Appendix A.1);
- site layout plan (Appendix A.2);
- waste and materials storage areas plan (Appendix A.3)
- access points (Appendix A.4);
- indicative locations of fire hydrants (Appendix A.5);
- indicative locations of fire walls (Appendix A.6);
- indicative location of quarantine area (Appendix A.7);
- indicative firewater storage and containment (Appendix A.8);
- fire receptor plan (Appendix A.9); and
- areas of natural and unmade ground (Appendix A.9).

Detailed design will be undertaken following appointment of a technology provider. Therefore, the information in relation to some of the drawings identified above must be considered to be indicative until detailed design of REC has been completed. Following completion of detailed design, the following drawings will be included within the updated FPP:

- the location of drain covers, and any pollution control features such as drain closure values and firewater containment systems;
- a detailed site drainage plan;
- the location of gas cylinders and mobile plant;
- a plan showing permanent ignition sources at the site; and
- the location of plant (including mobile plant), protective clothing and pollution control equipment and materials (such as spill kits).

Wind roses indicating the direction of prevailing winds for REC from 2015 to 2019, taken from Teesside International Airport (previously named Durham Tees Valley Airport), are presented in Appendix B of this report.

4.3 Plan of sensitive receptors near the site

The following section details the local sensitive receptors which are considered to be sensitive to the effects of a fire event at REC. In the unlikely event of a fire, the site personnel, and the infrastructure and equipment at REC itself, will be most at risk. A fire at REC will potentially have a temporary localised impact on the operation of REC, or a wider impact on surrounding receptors, depending on meteorological conditions at the time of any incident. Meteorological conditions are discussed further in section 4.4.

According to the EA's FPP guidance, examples of sensitive receptors include:

- schools, hospitals, nursing and care homes, residential areas, workplaces;
- protected habitats, watercourses, groundwater, boreholes, wells and springs supplying water for human consumption; and
- roads, railways, bus stations, pylons (on or immediately adjacent to the site only), utilities, airports.

According to the guidance, receptors up to 1km from the site should be included, as these are considered to be most at risk of impacts from a fire. However, for REC, there are few receptors within 1km of the site boundary, due to the location of the site. Therefore, a number of additional receptors up to around 3km from the site have been considered.

The key receptors which could be impacted by a fire at REC are presented in Table 4. A more detailed plan showing the location of receptors surrounding the site (a Fire Receptor Plan), as required by the EA's FPP guidance, is presented within Appendix A.9.

Table 4: Sensitive receptors

ID	Name	Location		Approx. distance from the site (m)
		X	y	
R1	Tesco DC	455521	524198	1.8
R2	Intertek	454076	524732	2.2
R3	Hartlepool Power Station	452988	526955	3.0
R4	Frutarom UK	453507	527302	2.7
R5	Birkbrow Motors	457837	523976	2.8
R6	Broadway West	458050	523878	3.0
R7	York Road	458903	525055	3.2
R8	Northumbrian Water	456751	524385	1.8
R9	Redcar Bulk Terminal	454849	525945	1.0
R10	Paddy's Hole	455616	527344	1.3
R11	Broadway East	458776	524150	3.4
R12	Tod Point Road	457942	525050	2.3
E1	Teesmouth and Cleveland Coast (Ramsar/SPA /SSSI)	455734	526280	0.1
E2	Teesmouth (NNR)	454390	526915	1.7

4.4 Meteorological conditions

As can be seen from the wind roses presented in Appendix B, the prevailing wind direction for the site is from the southwest, with an average wind speed between 4.5 – 5 m/s. Therefore, receptors to the northeast of the site (such as the Teesmouth and Cleveland Coast habitats site) are most likely to be affected by the effects of a fire event at REC. The wind rose has been obtained from Teesside International Airport (previously named Durham Tees Valley Airport), which is located approximately 22 km to the southwest of the site. The topography at the airport is relatively flat, which is similar to the site where the IBA facility will be located. Therefore, this data is considered to be representative of the conditions at the site where the IBA facility will be located.

5 Managing common causes of fire

5.1 Arson or Vandalism

Robust security measures will prevent access to REC by members of the public, thereby reducing the risk of arson attacks or vandalism. REC will be surrounded by security fencing, and a barrier will be present at the entrance and exit of the site to restrict vehicular access. It is expected that the gatehouse at the entrance to REC will always be manned, and security personnel will be present on-site. As such, only authorised visitors will be able to enter the site.

Emergency response procedures will be developed for REC prior to the commencement of operations, as part of the documented management systems. The procedures will detail the response to a number of different emergency situations on site, including unauthorised personnel accessing REC.

The design and location of the CCTV systems and security alarms will be undertaken during detailed design of REC and labelled on a site plan accordingly.

The specific measures to mitigate against arson and vandalism associated with the fuel preparation facility and ERF are presented in sections **Error! Reference source not found.** and 5.1.2.

5.1.1 Fuel preparation facility

It is expected that the fuel preparation facility would operate 24 hours a day, 7 days a week throughout the year except during shutdown periods for maintenance or repair. Security personnel will be present at the site and will monitor the CCTV system. Shift workers will be responsible for overseeing delivery vehicles as they travel round the site.

In accordance with the waste acceptance procedures to be developed for the fuel preparation facility, unloading of all waste deliveries will be supervised by operational staff. CCTV will be installed in all areas where waste delivery vehicles unload waste at the site.

5.1.2 ERF

The ERF will be operational and manned 24 hours a day, 7 days a week, with the CCTV system monitored in the control room by trained and competent operators. CCTV will cover areas where waste is unloaded, with waste deliveries supervised by operational staff. The shift team leaders will be responsible for security on the site, including delivery vehicles as they travel around the site.

5.2 Plant and equipment

An operating and maintenance manual (O&M manual) will be developed and completed through the commissioning phase of REC. The O&M Manual will set out detailed operating and maintenance instructions for all plant and equipment which requires maintenance.

Maintenance procedures and work instructions will be developed to cover all plant and equipment within REC. As part of these, the risk of fire will be considered, and appropriate activities included within the maintenance procedures and work instructions to reduce the risk of fire in all plant and equipment.

As part of the maintenance system, responsibilities for retaining records of all maintenance undertaken and any actions taken following a problem will be defined.

5.2.1 Fuel preparation facility

At the fuel preparation facility, any shredding equipment will employ an anti-jam system to prevent blockages from damaging the equipment. Furthermore, it is expected that any shredders would have an integrated fire suppression system. This may include, but not be limited to, foam/powder injection, battery isolation and machine shutdown in the event of a fire. Frequent visual checks of the waste processing equipment including any shredders will be undertaken to allow prompt identification of any 'unsuitable' or 'unacceptable' wastes which includes hot loads. The waste processing equipment including shredders will also be subject to regular preventative maintenance in accordance with the documented management systems in place.

5.2.2 ERF

There will be frequent visual checks of waste processing equipment, including the crane and bunker arrangement, to allow the prompt identification of any 'unsuitable' or 'unacceptable' wastes which includes hot loads. Waste processing equipment will be subject to regular preventative maintenance in accordance with the documented management systems in place, and will be fitted with suitable fire suppression systems, further details of which are provided within section 11.

5.3 Electrical faults including damaged or exposed electrical cables

The risk of electrical faults at REC will be minimised by the use of qualified electricians and will comply with the relevant British Standards for the design and installation of electrical equipment and supplementary bonding/earthing. The site will be constructed and operated in accordance with recognised standards for fire prevention, detection and control within electrical control systems.

Testing will be carried out on electrical equipment by fully and appropriately qualified electricians, when required. The inspection of electrical cabling at REC will be included in the documented maintenance programmes. Electrical circuits on both mobile plant and static equipment will be checked in accordance with the manufacturer's recommendations.

All portable electrical appliances will be PAT tested annually, with a label attached to the plug (or the cable) to confirm the item has been tested.

5.3.1 Fuel preparation facility

For the fuel preparation facility, it is expected that the following measures would be implemented in accordance with current best practice for this type of facility:

- Electrical cables will be installed and maintained by a competent person.
- Power cables will be located at high points above-ground and will be secured to the building framework.
- Electrical equipment will be kept away from waste where feasible. Where electrical equipment is used which may generate static electricity, a physical barrier will be installed around the equipment.
- Temporary/mobile electrical equipment would be situated away from waste storage areas where feasible. If this is not possible, then the area would be continually monitored whilst the equipment is in use.

5.3.2 ERF

The exact types of fire detection and suppression systems for electrical control systems will be subject to detailed design. However, for the ERF, it is expected that the following measures will be implemented in accordance with current best practice for this type of facility:

- All rooms with concentrations of electrical equipment such as switchgear rooms, low voltage rooms, distributed control system (DCS) rack room, uninterruptible power supply (UPS) / battery rooms, crane control cabinet rooms will be fitted with suitable fire detection systems. Fire detection will be by means of a 'double knock' system, composing of ionisation (or heat and smoke) detectors to minimise the risk of false activation. Furthermore, Manual Call Points will be installed in all areas. The detection systems will be designed for ease of regular testing to demonstrate correct operation.
- Electrical equipment will be installed within e-housing rooms which are of a steel construction with dedicated fire detection and suppression systems.
- Suitable automatic fire protection systems will be located within the rooms. For electrical rooms, it is expected that inert gas suppression systems will be used. These will be installed and operated in accordance with a recognised standard, such as EN 15004. Gaseous supply bottles and local control/isolation panels for the systems will be located outside the enclosed area (i.e. the electrical e-housing room) being protected by the system.
- All cable trays or piping systems passing through fire barriers will be fitted with fire stops. Cable spreading rooms and cable tunnels which are long, or otherwise difficult to access for firefighting, will be protected with appropriate automatic fire suppression systems (such as automatic gaseous extinguishing systems, or sprinklers or water spray systems).

5.4 Discarded smoking materials

Smoking will be prohibited in operational areas at REC. External areas within the site boundary that are designated for smoking will be identified, and suitable facilities will be provided for staff.

5.5 Hot works safe working practices

Staff and contractors will follow safe working practices which may include a permit to work system when carrying out hot works such as welding or cutting at REC. A fire watch will be carried out for a suitable period after hot works have ended, and at the end of a working day (i.e. after each shift).

5.6 Industrial heaters

It is currently expected that industrial heaters will not be installed at REC, however, this will be confirmed during detailed design of REC. If applicable, the hot work management system will be extended to include the use of industrial heaters and the necessary safeguards required in each instance will be assessed and implemented to ensure their use is safe.

5.7 Hot exhausts and engine parts

A fire watch system will be implemented at REC to detect signs of fires from dusts settling on hot exhausts (including those associated with mobile plant). This will be developed as part of the operating procedures. This will include regular visual checks of dusts settling on hot exhausts as part of operational checks by staff – it is expected that these checks will be undertaken at the end

of each shift and so will be daily. Maintenance work instructions will be raised for any items identified as requiring maintenance.

5.8 Ignition sources

A review under the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) will be completed during the detailed design of REC, with any risk areas identified on DSEAR zonal drawings. This is required for installations which use dangerous substances, including pressurised gases.

Vehicles and electrical items necessary for the operation of REC will be regularly inspected for electrical faults. Mobile plant serving REC will be fitted with fire extinguishers and dust filters where appropriate.

Naked sources of ignition will be controlled through a hot work management system. This system will cover both staff and contractors working at REC. The hot work management system will also include requirements to train and authorise 'hot work risk assessors' for the purposes of eliminating, reducing and managing the risks associated with hot work. The hot work system will include for a period of fire watch following the hot works being undertaken.

As part of the hot work management system, the potential for sources of ignition to cause fires will be managed on a case-by-case basis. The guidance of keeping all sources of ignition at least 6 metres away from any combustible or flammable waste will be followed as part of this management where possible (i.e., this separation distance may not be possible when using or transporting mobile plant or when driving site vehicles). The management system will include ensuring that the location of stored mobile plants, which is subject to detailed design of REC, will be stored at least 6 metres away from combustible wastes. In the unlikely event that this separation distance cannot be maintained, there will be suitable fire detection and protection measures installed in this area to minimise the risk of a fire spreading, the design of which is subject to the recommendations of the final fire strategy which will be completed during the detailed design phase of the project and agreed with the fire insurers.

5.9 Leaks and spillages of oils and fuels

Emergency response procedures will be developed for REC. The procedures will include actions to be undertaken to respond to spills and leaks of chemicals. This will include actions to be undertaken to prevent liquids leaking or trailing from site vehicles. In addition, oil interceptors will treat surface water runoff prior to discharge from the site, further reducing the potential for off-site contamination.

Mobile plant and vehicle operators will be provided with suitable training for the equipment they are operating. Supervision of mobile plant operation and regular site inspections will ensure that any leaks or trailing from vehicles are quickly identified and suitably maintained to prevent leaks. Where specific responsibilities are given to specific staff, training will be provided to those employees. Training records in the emergency response procedures for all staff and contractors will be retained on-site.

Should a spill occur at the site, contained drainage systems in process areas will ensure that any contaminated effluent is not released to the aquatic environment. Storage of liquid chemicals (for example ammonia and fuel oil at the ERF) will be within bunded areas with the secondary containment having sufficient capacity to contain a spill. Regular inspections will be undertaken of storage vessels as part of regular preventative maintenance procedures.

Spill kits will be made easily available at different locations throughout the site. The location of spill kits will be marked up on a site plan following detailed design of REC. The documented management procedures for REC will include for accident management measures and will set out procedures to be followed in a spill event. All staff and contractors would be trained in site-wide emergency response procedures.

5.10 Build-up of loose combustible waste, dust and fluff

REC will be designed to prevent the accumulation of dusts by designing structural steelwork such that their shape or method of installation minimizes the surface area where dust can settle.

As part of the design of REC, the control of dust and fluff has been considered. This includes:

- the use of an enclosed fuel reception/unloading building at both the fuel preparation facility and ERF; and
- mechanical ventilation of the waste reception and storage areas at the ERF to prevent fugitive emissions from the building façade.

These systems will be checked as part of the planned maintenance regime as required in the detailed operating manuals for each piece of equipment.

On a daily basis, inspections will be undertaken at both the fuel preparation facility and ERF to identify the build-up of loose combustible materials, such as waste, dust and fluff. Where inspections identify that there has been a build-up of loose combustible materials, appropriate cleaning (such as washdown using hoses) will be undertaken to clean this material from the surfaces. Good housekeeping practices will be employed at REC to ensure that dusts and litter do not build up and pose a fire risk.

5.11 Reactions between wastes

Waste acceptance procedures will be in place which will minimise the risk of incompatible wastes coming into contact with each other, or unstable wastes being accepted at either the fuel preparation facility or ERF.

In the unlikely event that waste identified as ‘unacceptable’ is received, quarantine areas at both the fuel preparation facility and ERF will enable segregation of the waste prior to transfer off-site or extinguishing of a hot load (refer to section 9).

5.12 Deposited hot loads

Documented waste pre-acceptance and waste acceptance procedures will be in place at REC, which will enable the identification of any ‘unacceptable’ wastes – this could include the presence of hot loads. Waste acceptance and pre-acceptance procedures will meet the requirements of EA Guidance S5.06, to ensure that only the permitted waste codes are accepted.

Further details on the dedicated quarantine areas are presented in section 9. Should a ‘hot load’ be delivered to either the fuel preparation facility or the ERF, a ‘hot load procedure’ will be followed. The requirements of the hot load procedure will be incorporated into the waste acceptance procedures.

The specific measures to minimise/mitigate against the delivery of hot loads associated with the fuel preparation facility and ERF are presented in sections **Error! Reference source not found.** and 5.12.2.

5.12.1 Fuel preparation facility

At the fuel preparation facility, hot loads identified prior to processing (if not immediately rejected) will be tipped into the quarantine area (if identified during unloading) and extinguished, or moved from the main waste storage area (if already unloaded) to the quarantine area and extinguished using a suitable fire suppression system.

5.12.2 ERF

At the ERF, hot loads identified prior to transfer to the bunker (if not immediately rejected) will be tipped onto the tipping hall in the quarantine area and extinguished. Appropriate fire detection and protection measures will be installed in the quarantine area, with any hot loads extinguished using hoses, sprinklers or an equivalent fire suppression method. Hot loads identified within the waste bunker would be extinguished by water cannon/hoses before being transferred to the waste feed hopper or removed from the bunker using the crane maintenance arrangement if the waste is deemed unsuitable for incineration.

5.13 Hot and dry weather

Incoming loose waste, stored within the main buildings at both the fuel preparation facility and the bunker at the ERF, will be provided with protection from direct sunlight as the main waste storage areas will not be fitted with external windows. Periods of hot weather have the potential to increase the risk of fires; however, as waste will be stored within the main buildings, this will reduce the risk of overheating.

6 Preventing self-combustion

6.1 General self-combustion measures

It is acknowledged that some wastes can self-combust under certain conditions. Self-combustion can be managed through preventative measures, carefully managing storage times, pile volumes and height, and the temperature of the wastes. These are described further within the following sections.

6.2 Managing storage time

6.2.1 Methods used to record and manage the storage of all waste on site

In the event that either facility is not able to receive waste due to an unplanned incident, forcing a full shutdown of the facility, waste deliveries will be stopped and/or diverted to a suitably licenced waste management facility. Typically, in the event that an unplanned shutdown lasts for more than 14 days, waste within the fuel preparation facility building or bunker at the ERF respectively may be backloaded into lorries for transport to a suitably licensed waste management facility, unless operations are expected to recommence imminently. The rate at which waste will be removed from each facility will depend on the status of operation and expected recommencement of operations at each facility. In addition, environmental factors such as weather (e.g. hot weather posing odour risks) may contribute to the urgency to remove waste from the facility.

6.2.1.1 Fuel preparation facility

At the fuel preparation facility, the capacities of waste storage bays will be clearly established and not exceeded. Waste storage bays will have sufficient holding capacity to allow effective buffering between waste deliveries and processing rates. It is proposed to provide the EA with a full summary of the storage arrangements (including capacities) at the fuel preparation facility via a pre-operational condition. Notwithstanding this, it is expected that 6 concrete bays of 450m^3 capacity will be provided. Assuming a density of 1,100 kg/m^3 for baled waste, this equates to approximately ~3,000 tonnes of baled material storage. Furthermore, the 'tipping area' for rejected material from the ERF will have a capacity of up to 450 m^3. Assuming a density of 350kg/m^3, this equates to approximately 157 tonnes of storage capacity.

Prior to any planned shutdowns of the fuel preparation facility, waste deliveries will be stopped and/or diverted to alternative waste management facilities. At the fuel preparation facility, the length of shutdowns is not expected to be longer than a couple of weeks.

6.2.1.2 ERF

At the ERF, the capacity of the waste bunker will be clearly stated and not exceeded. It is anticipated that the waste storage capacity of the bunker will be approximately 6,300 tonnes (or 18,000 m^3), equivalent to approximately 5 days fuel supply. However, allowing for extended periods of shutdown, the maximum amount of time that waste will be stored in the bunker is expected to be up to 4 weeks.

Prior to any planned shutdowns of the ERF, waste deliveries will be stopped and/or diverted to alternative waste management facilities. At the ERF, the waste within the bunker will be combusted to minimize the quantity of waste remaining in the bunker prior to the shutdown commencing. This

will ensure that there is only a small residue in the bunker during the period of shutdown. The duration of planned shutdowns will vary significantly, dependent on the nature of the work required. At the ERF, they will typically will not extend beyond four weeks.

6.2.2 Stock rotation policy

6.2.2.1 Fuel preparation facility

At the fuel preparation facility, 'older' waste will be prioritised for processing, to ensure that it does not remain on site for extended periods of time. It is not expected that there will be seasonal variations in the demand or supply of waste.

6.2.2.2 ERF

Following the recommencement of waste deliveries after a period of shutdown, at the ERF, deliveries of 'new' waste will be mixed with residual quantities of waste within the bunker in accordance with the bunker management procedures for the ERF – refer to section 6.3.1. This will ensure that older waste is not 'buried' within the bunker. It is not expected that there will be seasonal variations in the demand or supply of waste.

6.3 Monitoring and control temperature

6.3.1 Monitoring and controlling temperature

As part of the detailed design and construction of REC, the fire system design will be designed and installed by an experienced fire engineering company, which employs appropriately qualified persons. Both the ERF and fuel preparation facility will develop systems in collaboration with the local fire officer, the fire risk insurers and any relevant standards and codes of practice.

All waste delivered to REC will be supervised by operational staff, who will be responsible for the inspection and monitoring of waste deliveries. Operational staff will be briefed on the need for monitoring for the early signs of fires.

The frequency of inspection of waste storage areas (and other parts of the site) will be increased during a full shutdown, and a checklist utilised to ensure a complete record of issues and comments that may require further action, such as assessing the presence of hotspots within waste storage areas.

6.3.1.1 Fuel preparation facility

Smoke or flame detectors will be fitted within the main fuel preparation facility building above waste storage areas, to allow for quick detection and mitigation of fires. Daily inspections and visual monitoring of waste storage areas will be undertaken, with CCTV fitted in the main process building which covers the main waste storage areas.

Currently, additional waste temperature monitoring is not proposed at the fuel preparation facility due to the short maximum residence time of the waste which will be stored at the site. Typically, the residence time of the majority of waste types at the fuel preparation facility will be up to around 2 weeks, although most baled waste would be processed in 4 – 6 days. It is understood from EA guidance that temperature monitoring is required if waste is stored on site for longer than 3 months, which is not the case for the fuel preparation facility.

6.3.1.2 ERF

At the ERF, the system will be developed in accordance with NFPA 850 (an industry standard for fire protection systems for power generating facilities) or equivalent standard. The waste bunker and all main process areas will have CCTV to allow remote monitoring from the control rooms on a continuous basis.

Thermal imaging cameras or infrared (IR) flame detectors will be fixed around the perimeter of the ERF bunker to provide the crane driver with a continuous thermal 'map' of the bunker. This is standard practice in UK waste incineration plants. The temperature of waste in the bunker will continue to be monitored even during periods of shutdown.

During daytime operations, the bunker will be visually monitored by control personnel, such as the crane operator. At night-time, the control personnel will visually monitor the thermal imaging system as part of their responsibilities for operating the ERF. Therefore, they will be able to identify and react to hot areas in the bunker and undertake the mixing or feeding of waste as appropriate.

Bunker management procedures will be adopted to ensure that there is a regular turnover of waste within the bunker, preventing hotspots or anaerobic conditions developing within the bunker. The turning of waste within the bunker is standard practice at waste incineration plants in the UK. As well as helping to mix the waste (to produce a more homogenous fuel which is better for control of the combustion process), it helps to prevent the formation of hotspots. Turning of the waste within the bunker helps to release heat that has built up in the waste. By taking grabs of waste and then spreading it over a wider area, it dissipates the entrained heat and removes thermal inertia within the waste. It also increases the evaporation of water, which is a heat absorbing process. These factors help to minimise the risk of self-heating and ignition. In addition, mixing the waste with the crane enables waste from the base of the bunker to be brought to the surface, reducing the risk of anaerobic conditions developing and ensuring older waste does not remain 'buried' at the base of the bunker. The crane will be sized to allow for mixing and rotating the waste within the bunker, whilst providing appropriate quantities of waste within the feed hopper to maintain operation of the waste combustion process. The size of the crane will ensure that the mixing of waste is feasible in relation to the amount of waste present in the bunker. The crane operator will be trained in careful waste handling and crane operation as to maintain the integrity of the bunker structure itself.

In extreme cases, firewater cannons (refer to section 11.1.4.2) may be used to extinguish any smouldering or burning waste that is identified within the bunker. The thermal imaging cameras and/or IR flame detectors will be set with two trigger alarms at different temperatures within the bunker. The fire water cannons will be activated if the 'high-high' temperature alarm is reached.

IBA will be transferred from the ERF, via conveyor, to the adjacent IBA processing facility. As described within section 1, the wastes handled at the IBA facility are considered to be non-combustible wastes. Due to the high thermal temperatures in which the IBA has been combusted, it is not expected to contain any combustible materials which are able to self-combust from the elevated temperatures within the IBA. In addition, the quenching of the ash will ensure it has been suitably cooled prior to processing/storage, and the moisture within the IBA from quenching of the ash will ensure that the IBA will not combust.

APCr is not expected to contain any combustible materials which could self-combust from elevated temperatures associated with the handling and storage of APCr.

6.3.2 Reducing exposed metal content and proportion of fines

It is not expected that a large quantity of fines will be present within the waste accepted at the fuel preparation facility. Therefore, the FPP guidance requirement to reduce the proportions of fines does not apply.

6.4 Waste bale storage

Baled waste will be stored internal to the building within concrete bays at the fuel preparation facility. The EA's FPP guidance requires a sampling and testing protocol to be developed for baled waste stored at sites for longer than 3 months. Baled waste is not expected to be stored at the fuel preparation facility for periods of 3 months or longer – therefore, it is understood that these requirements do not apply.

7 Manage waste piles

7.1 Maximum pile sizes

7.1.1 Fuel preparation facility

The layout of the fuel preparation facility will allow for a number of dedicated waste storage bays. The bays will be segregated by fire walls and will be fitted with appropriate fire detection and prevention measures. The design of the waste storage bays will be undertaken in accordance with the FPP guidance, and final designs will be confirmed with the EA via a pre-operational condition or similar. Notwithstanding this, at this stage, 6 bays of 450m^3 capacity each are expected. This is understood to be in accordance with the maximum pile sizes allowed by the EA's FPP guidance.

7.1.2 ERF

It is understood that the EA's maximum waste pile sizes are not applicable to waste stored within a waste bunker. Therefore, the pile sizes in the FPP Guidance do not apply to waste stored at the ERF.

7.2 Storing waste materials in their largest form

7.2.1 Fuel preparation facility

Incoming bulky waste will not be shredded prior to initial storage at the fuel preparation facility. The waste will only be shredded once loaded into the process. Once processed, the resulting RDF will only be stored for short period of time prior to transfer to the adjacent ERF for recovery.

7.2.2 ERF

Incoming waste will not undergo any further 'treatment' upon receipt at the ERF prior to incineration.

7.3 Waste stored in containers

7.3.1 Fuel preparation facility

Containers may be provided within the quarantine area or tipping area at the fuel preparation facility, subject to detailed design. Any skips/containers would be open at the 'top' (i.e. they would not be covered and would be accessible from at least one side) so that any fires can be easily extinguished and contained. In the event of a fire event, procedures would be in place for the movement of the containers using mobile plant if it is safe to move them. Procedures will form part of the emergency systems for the fuel preparation facility.

7.3.2 ERF

At the ERF, the only waste which will be stored in 'containers' is APCr which will be stored within silos. The design of the silos is subject to detailed design; however, it is expected that the total storage capacity for APCr will be approximately 700 m^3. The APCr silos will have sufficient capacity

for the storage of approximately 5 days of APCr, assuming that the ERF operates continuously at the nominal capacity. As stated in section 6.3.1.2, the APCr is not expected to contain any combustible materials which could self-combust from elevated temperatures within the APCr.

8 Prevent fire spreading

8.1 Separation distances

Following previous consultation with the EA, it is understood that the storage requirements relating to pile separation distances (i.e. storing combustible waste piles with a separation distance of at least 6 metres) only applies to the external storage of wastes.

8.1.1 Fuel preparation facility

Most of the waste delivered to, and processed by, the fuel preparation facility will be stored within the main fuel preparation facility building in dedicated storage bays. Storage bays will be separated by fire walls and will be fitted with appropriate fire detection and prevention measures. Therefore, it is understood that pile separation distances do not apply to the storage of wastes inside the main fuel preparation facility building in the segregated waste storage bays.

8.1.2 ERF

All wastes delivered to the ERF will be stored within buildings and will primarily be stored within the waste bunker. It is understood that pile separation distances do not apply to the waste bunker.

8.2 Fire walls construction standards

Fire walls will be installed within the buildings as required by the fire insurers and in accordance with Buildings Regulations. The location and specification for fire walls will be subject to detailed design, and will be dependent on the ‘final’ layout developed by the EPC Contractor. Indicative locations for the fire walls are presented in Appendix A.6. The drawing will be updated following detailed design of the fuel preparation facility to reflect the locations of the concrete storage bays.

8.2.1.1 Fuel preparation facility

As stated within section 8.1, the waste storage bays at the fuel preparation facility will be separated by fire walls. The fire walls will be constructed to resist a fire for a period of at least 120 minutes. The waste storage bays at the fuel preparation facility will be constructed of reinforced concrete with the structure providing some level of firewater retention, in addition to the wider contained process drainage system at the fuel preparation facility.

8.2.1.2 ERF

Subject to the location of the process equipment, operational areas at the ERF will be segregated into fire zones (the "Fire Zones"). In accordance with NFPA 850, certain specific Fire Zones at the ERF such as the waste bunker and boiler hall will be separated from each other by fire barriers with a minimum of 2-hour fire resistance rating, spatial separation, or by other approved means. The specific Fire Zones to which this applies, and the means of separation, will be subject to agreement with the fire risk insurers.

As part of the detailed design process, a fire risk assessment will be undertaken for each Fire Zone within the ERF to identify the appropriate fire detection and protection systems in association with appropriate civil work design principles to control:

- the risk of fire propagation;

- the spread of fumes and smoke;
- firewater flooding; and
- to maintain the integrity of dedicated fire partition walls in the event of fire.

The fire zoning will be subject to the approval of Redcar Ltd and the fire risk insurers.

The dividing wall between the waste bunker hall and boiler hall at the ERF and all other walls within the bunker will be suitably constructed in concrete, block work or a suitably rated cladding system up to roof level to form a continuous 2-hour fire rated barrier for the full width and height of the building structure. In addition, the base of the bunker will be constructed of reinforced concrete, and the whole structure will be designed as a water retaining structure. The structural design and construction of the dividing wall shall be such that the integrity of the fire barrier is maintained in the event of the collapse of the bunker hall roof due to a fire in the bunker. The walls and the base of the bunker will be resistant to crane grab impact and the impingement of water cannon jets. Therefore, the structure of the waste bunker will provide adequate fire resistance/containment.

All openings in fire barriers will be provided with fire doors, including fire dampers, penetration seals (fire stops), or other approved means having a fire protection rating consistent with the designated fire resistance rating of the barrier. Windows in fire barriers (e.g. control rooms, observation windows, computer rooms, etc.) will be provided with appropriate fire protection to maintain the integrity of the fire barrier, e.g. by means of a fire shutter, automatic water curtain, window sprinkler system, etc. All cable trays or piping systems passing through fire barriers will be fitted with fire stops. In addition, the glass partition in the control room/crane cabin at the ERF will be 2-hour fire rated, and hence resistant to fire. Therefore, the operational staff will be able to continue operating the crane for a limited amount of time in the event of a fire, depending on severity.

8.3 Storing waste in bays

8.3.1 Fuel preparation facility

Waste will be stored within dedicated waste storage bays. In accordance with the requirements of the EA's FPP guidance, the following factors have been taken into consideration / will be taken into consideration during the detailed design of the fuel preparation facility:

- The waste storage bays will be constructed of reinforced concrete, with dedicated fire walls in-between. The bays will have a fire resistance period of at least 120 minutes, to allow waste to be isolated and a fire to be extinguished within 4 hours. When designing the height of fire walls etc, calculations of flame height and radiation (in addition to consideration of brands and lighted material moving outside bay walls) will be undertaken to demonstrate that the spread of fire between piles will be prevented. It is expected that waste piles will be a minimum of 1m below the top/sides of walls, to prevent fire spreading over and around walls. The maximum pile height will be clearly marked within the waste storage bay/walls and will not be exceeded.
- The design of waste storage bays will allow for quick and effective removal of wastes to the quarantine area if required.
- Frequent stock rotation of waste stored at the fuel preparation facility will be undertaken (refer to section 6.2.2). A 'first-in, first-out' policy will be applied to incoming waste at the fuel preparation facility. Waste storage areas will be subject to regular visual inspections, with operational staff responsible for ensuring that 'older' waste gets prioritised for processing.
- As justified within section 6.3.1, additional temperature monitoring of waste piles at the fuel preparation facility is currently not proposed.

- The specification, construction and dimension of fire walls will be confirmed during the detailed design of the fuel preparation facility.

8.3.2 ERF

Waste which is delivered to the ERF will not be stored in bays, with incoming waste stored within the waste bunker. Therefore, the requirements for the storage of waste within bays will not apply to the ERF.

9 Quarantine areas

9.1 Quarantine areas – location and size

When depositing waste in the quarantine areas at REC, the site operative will attempt to place the waste so that a reasonable separation distance is maintained around the waste, and does not lie directly adjacent to any walls. Suitable fire detection and suppression systems will be installed in the quarantine area to reduce fire risk within this area. When it is not being used for the storage of unacceptable waste, the quarantine area will be kept clear.

Following completion of detailed design, plans showing the location of all quarantine areas will be developed. The plans will show the size of the quarantine area, clearance areas around the perimeter, and infrastructure associated with the quarantine area. A drawing which shows the indicative location of the quarantine area at the ERF is presented in Appendix A.7 of this report. The quarantine area at the fuel preparation facility is subject to detailed design and as such, details of its location and size cannot be provided at this stage. However, the design of the quarantine area will be subject to agreement with the EA prior to the commencement of operations at the site.

9.1.1 Fuel preparation facility

A dedicated quarantine area will be reserved for the storage of 'unacceptable' waste that has been identified once it has already been unloaded at the site, prior to transfer off-site. The quarantine area will be situated on impermeable hardstanding and will have contained drainage. It is expected that the quarantine area will be a discrete bay located in the 'tipping area' within the building for reject material from the ERF. The size and location of the quarantine area/bay will be confirmed following the detailed design of the fuel preparation facility.

The quarantine area will be designed in accordance with the requirements of the FPP guidance and will be subject to approval by the EA. Similar to the proposed arrangements at the ERF (see below), it will be confirmed that the quarantine area will have sufficient capacity to hold at least one waste delivery vehicle load. This will allow the segregation of the whole waste delivery should a hot load be identified upon arrival. Skips may also be provided in the quarantine area to allow appropriate segregation between waste, in the unlikely event that more than one waste load requires quarantining.

9.1.2 ERF

A suitable area for the quarantine of unacceptable waste will be designated as part of the detailed design stage; however, it is anticipated that this will be a designated area within the tipping hall. The quarantine area will be designed in accordance with the requirements of the FPP Guidance, i.e. it will:

- hold at least 50% of the waste delivery load; and
- where practicable, have a separation distance of at least 6 metres, or alternative equivalent measure (such as a thick concrete wall between the bunker and the quarantine bay, or provision of containers or skips in the quarantine area), around the quarantined waste.

With regards the first requirement, this is stated in the FPP guidance as holding "*at least 50% of the volume of the largest pile, row or block of containers*" at the ERF. As pile size requirements and separation distances do not apply to the waste bunker, the waste stored within the bunker is not considered to fall under the definition of a waste 'pile' as per the FPP guidance. The largest pile or

container of waste will be waste contained within delivery vehicles. The quarantine area will have sufficient capacity to hold at least one waste delivery vehicle load. This will allow the segregation of the whole waste delivery should a hot load be identified upon arrival at the ERF.

With regards the second requirement, depending on the size of the waste pile requiring quarantine, it may not be possible to maintain a separation distance of 6m around the quarantined waste. However, in the unlikely event that there is more than one pile of waste (for example, two loads requiring storage in the quarantine area), skips will be used within the quarantine area to maintain appropriate separation between the wastes. The use of skips will also provide contingency in the event that the quarantine area is required for the storage of a hot load whilst it is being used for the storage of another unacceptable load. The skips will prevent contact between the hot load and the unacceptable load, with the hot load extinguished immediately upon placing into the skip.

9.2 How to use the quarantine areas if there is a fire

The quarantine area will be used to temporarily store, if needed, any unacceptable waste prior to removal from site. Unacceptable waste is broadly defined as waste which does not meet the requirements set out in the waste supply agreements which have been agreed with waste suppliers for both the ERF and fuel preparation facility, or other waste which is otherwise unsuitable processing at the fuel preparation facility (e.g hot loads) or incineration at the ERF, and/or is not compliant with the EWC codes stated in the EP.

In the event that the unacceptable waste is a hot load, this would be extinguished and stored in the quarantine area for a short period of time before being transferred off-site. At the ERF, where unacceptable waste is identified inside the bunker, it will be back-loaded from the bunker into the back-loading bay/quarantine area using the waste crane, for examination and/or removal from the site to a suitably licensed waste treatment facility.

Any waste placed within the quarantine area will be removed in a timely manner (i.e. typically within 24 hours), so it is highly unlikely for a situation to arise whereby the quarantine area is already ‘full’ and another load needs to be placed within the quarantine area. Any hot loads would be placed in a location within the quarantine area which is away from any loads which have already been transferred to this area. If the waste is burning when it is transferred to the quarantine area, it will be extinguished immediately upon placing in the quarantine area to prevent the spread of fire to any loads already within the quarantine area. Containers will be provided in the quarantine area to allow loads to be segregated.

Depending on the location of the fire, there may be a requirement for an alternative quarantine area, particularly when it has been identified as unsafe or not practical for hot loads to be transferred to the dedicated quarantine area. In this situation, the FSM or deputy FSM will undertake a dynamic risk assessment should additional quarantine areas be required. The dynamic risk assessment will take into account the potential for contaminated firewater runoff resulting from water suppression; the location of fire suppression systems; and the potential for the spread of fire.

9.3 Procedures to remove material stored within the quarantine areas

Hot loads stored within the quarantine areas will be removed as soon as possible (i.e. within 1 hour of a fire starting). Appropriate fire detection and protection measures (e.g. smoke/flame detectors, hose reel, sprinklers, fire extinguishers) will be installed in the quarantine areas. Therefore, if a fire was to occur within the quarantine areas, it will be extinguished prior to the waste being transferred off-site. If required, the emergency services would be called for assistance.

Unacceptable waste will be segregated from all other incoming waste, allowing it to be collected and loaded into appropriate road vehicles for removal off-site, once deemed safe to do so.

Unacceptable waste will typically not be stored within the quarantine areas for more than 24 hours. The waste supplier would be contacted immediately upon identification of an unacceptable load, and provisions will be made for the waste to be collected and removed from the site. However, to allow for extended periods where waste deliveries are not occurring (such as bank holidays), the maximum time that waste could remain in the quarantine area will be up to 7 days. Redcar Ltd will co-ordinate with the waste supplier to ensure that unacceptable waste is removed from the site as soon as possible. This will reduce the risk of two separate loads requiring storage in the quarantine area. Notwithstanding this, contingency measures are in place in the event that more than one load requires storage in the quarantine area, through the use of skips located in the quarantine area – refer to section 9.1.2.

Typically, unacceptable loads would be identified immediately upon tipping into the bunker at the ERF or the main waste storage bays at the fuel preparation facility. In this case, the waste delivery driver would be asked to remain at the site, the load would be rejected and the waste backloaded into the delivery vehicle for transfer off-site. Should the delivery driver have left the site, waste would be removed from the bunker using the crane at the ERF, or removed from the waste storage bays using bucket loaders at the fuel preparation facility, and deposited within the respective quarantine area.

10 Detecting fires

Procedures will be in place at REC to detect a fire in its early stages, in order to reduce the impact of the fire. The choice of fire detection systems (smoke/heat/flame detectors) to be installed within REC will be subject to detailed design. The fire detection systems will be covered by a UKAS-accredited third-party certification scheme or equivalent. The details of the sire detection systems will be confirmed prior to the commencement of commissioning.

During detailed design, appropriate fire detection systems will be proposed for the different areas of REC. The chosen fire detection systems will be appropriate to the waste treatment activities undertaken. Following completion of detailed design, a plan showing the fire detection systems in each area will be included in this FPP.

10.1 Detection systems in use

Fire detection and alarm systems will cover all of the waste processing areas. The fire alarm systems will include the following:

- local detectors/transducers and call points;
- sounders/high intensity flashing beacons;
- cabling and containment systems;
- local control and indication panels; and
- remote control and indication panel (incorporating integral printers) will be in the control rooms.

All fire detection systems will be installed in accordance with BS 5839, Part 1 (2002) and subsequent amendments to give level P1 + M coverage in accordance with the requirements of the Loss Prevention Council ("LPC") guidance, or equivalent standard. A category P1 system relates to the protection of property and involves installing detectors in all areas of the building. A category M system is a manual-operation only system which has call points on all exits, as well as corridors where call points are spaced a minimum of 45m apart for access. In low fire risk areas, such as the Boiler Hall at the ERF, the requirements for a P1 detection system may be relaxed.

All automatic fire detection and alarm systems will be designed and maintained by a suitably qualified, experienced and registered fire protection engineer. Detailed design calculations, risk assessments and system drawings to demonstrate compliance with the requirements of the building control officer, fire officer and the insurer’s requirements will be produced during detailed design.

In areas which are identified as having a low fire risk, the fire detection method(s) will be agreed with the requirements of the fire service and fire risk insurer. The fire detection, protection and alarm systems will comply with the requirements of the fire service and fire risk insurer. All fire detection systems will be design, installed and maintained in accordance with an appropriate UKAS-accredited third-party certification scheme or equivalent.

Procedures will be developed in the operation of the fire detection systems. Training will be provided to the relevant staff in the different fire detection systems. Training records in the operation of the fire detection systems will be retained on-site. It will be the responsibility of the operators and shift managers to monitor fire alarms.

10.1.1 Fuel preparation facility

It is anticipated that the following fire detection systems will be incorporated into the design of the fuel preparation facility:

1. Automatic smoke and/or flame detectors placed at strategic locations (such as above waste storage areas), and the installation of thermal imaging cameras (subject to detailed design of the fuel preparation facility). Manual call points would also be installed around the fuel preparation facility.
2. Fire detection systems will be linked to an alarm fire panel system. This will have an automatic connection to a remote monitoring station which operates 24/7, in the case of a fire starting when there are no operational staff at the site. The remote station would contact the local fire brigade and alert relevant employees (such as managers) who can attend the site and take appropriate action.
3. Testing of the fire detection systems is expected to be carried out on a weekly basis, or at a frequency in line with the manufacturers recommendations. Testing and inspections would be recorded in a logbook.

10.1.2 ERF

It is anticipated that the following fire detection systems will be incorporated into the design of the ERF:

1. Tipping hall fire detection will be provided by flame or temperature detectors in accordance with an appropriate risk study. Fire suppression in the tipping hall will likely be provided by an automatic sprinkler system or similar, to protect roofing and steelwork, with fire hose reels used manually in the case of vehicle fires or similar ground-level fires. The tipping hall fire detection and suppression systems will be subject to detailed design of the ERF.
2. Waste bunker fire detection will be provided by thermal imaging cameras and/or flame detectors which will be fixed around the perimeter of the bunker with automatic scanning of the entire fire zone. The thermal imaging cameras will provide a continuous thermal ‘map’ of the surface of the waste within the bunker. The thermal mapping will be displayed in the control room and will be used by the crane operator to manage temperatures within the bunker. The staff within the control room, as well as the crane operator, will be trained in the identification and implementation of corrective measures in the event of elevated temperatures within the bunker. The thermal imaging cameras will enable the crane operator and/or the control room staff to identify and react to hot areas in the bunker and undertake mixing or feeding of waste as appropriate. In extreme cases, the use of firewater cannons which covers the entire extent of the waste bunker to extinguish any smouldering/burning waste may be required.
    - Water cannons and manual fire hoses are considered to be the primary means of fighting a bunker fire.
    - To proactively prevent fires, it is anticipated that the fire detection systems will be configured to sound an alarm based on certain conditions. This would involve the thermal imaging cameras being set with two alarms at two different ‘trigger’ temperatures. These are described below.
        - Temperature set-points would be determined during detailed design of the ERF and in consultation with the fire service. It is understood that the system will be designed so that trigger temperatures can be amended if required.
        - High temperature alarms in other UK waste incineration plants operate with a trigger temperature of approximately 90°C, with high-high temperature alarms operating with a trigger temperature of approximately 120°C. The trigger temperatures for the fire

detection systems will be subject to detailed design and will be set in consultation with the Fire Service – it is assumed that they will be similar to other UK waste incineration plants. The system can be designed so that the trigger temperatures for the fire detection systems can be amended if required from operational experience.

- Following activation of the high temperature alarm in an area within the bunker, the area with an elevated temperature can be readily identified and, if possible, extinguished based on operator action through mixing within the bunker or fed into the hopper to be incinerated.
- Following activation of the high-high temperature alarm in an area within the bunker, the area with an elevated temperature will be targeted and the firewater cannons will be activated to reduce the temperature in the area where self-heating has occurred.
- Furthermore, the crane will be sized appropriately so that the time for waste mixing, feeding and management is within an acceptable time range for feeding waste to the feed hopper.

3. Feed hopper area fire detection will be provided by the waste feed hopper supervision camera or other suitable detection system, and a deluge system or firefighting nozzles to flood the feed hoppers if required.
4. In the boiler house the main cable trays and other fire sensitive areas will be protected with a sprinkler system or other suitable/equivalent fire suppression system. There will be suitable fire detection measures in place (e.g. a wire and fusible link system or heat detector and solenoid valve) so that in the event of an external or internal fire, the local fuel supply isolation valve (fuel oil) is automatically closed.
5. Electrical rooms with significant concentrations of electrical equipment will be fitted with appropriate suitable fire detection systems and suppression systems (such as a gaseous extinguishing system).
6. All oil-filled transformers shall be located outdoors wherever possible. Dry type transformers are preferred for indoor installations. Oil type transformer protection will comply with the requirements of NFPA 850 or have an equivalent level of fire protection. If appropriate, enclosures for dry-type transformers will be provided with suitably designed fire detection systems.
7. The fire sensitive areas of turbine-generator and ancillaries will be protected by a dedicated fire detection and automatic sprinkler fire protection system or equivalent.

11 Suppressing fires

The suppression systems for REC will be subject to detailed design. The main features of the fire suppression systems are described in section 11.1. Active firefighting techniques are detailed in section 13, with further details on the water supplies for the fire suppression systems provided in section 14.

11.1 Suppression systems in use

There will be a fire suppression system installed in the locations considered by the fire strategy to be at risk of fire. The automatic fire suppression systems will be designed and maintained by a suitably qualified, experienced and registered fire protection engineer. The fire suppression systems will be covered by a recognised (typically UKAS) third party certification scheme.

Detailed design calculations, risk assessments and system drawings to demonstrate compliance with the requirements of the building control officer, fire officer and the insurer's requirements will be retained on site throughout the lifetime of REC.

11.1.1 Fire hose reel system

Hose stations will be designed in accordance with NFPA 14, Standard for the Installation of Standpipe, Private Hydrants and Hose Systems, or BS equivalent (e.g. EN 671). Fire hydrant systems equipment will be provided at strategic positions within REC for firefighting in fire risk areas.

For firefighting purposes, hose reels and extinguishers will be provided within the main buildings at REC.

The positioning of hose points will take into account the following:

- location and physical protection as to avoid potential damage by vehicles;
- size and number to be determined for the specific works layout (e.g. push wall positions);
- ease of use, maintenance, and storage, such as through the use of continuous-flow, non-collapsible hose reels; and
- protection from freezing in unheated areas.

Following detailed design of REC, a plan identifying the location of the fire hose reels will be developed.

11.1.2 Fire hydrants and mains

Fire hydrants will be designed in accordance with NFPA 14 Standard for the Installation of Standpipe, Private Hydrants, and Hose Systems (or BS equivalent – refer to section 12) and will be connected to a ring main at strategic positions around REC to provide firewater supplies to external fire risk areas. The fire hydrants will be designed in accordance with the requirements of the Building Regulations and the fire service. Fire hydrants shall be positioned such that all hydrants are no more than 90m from a building entrance (in accordance with BS 9990) and within 12 m of the building.

The location of hose reels and hydrants will be subject to detailed design and will be agreed with the fire risk insurers and the fire officer. The positioning of fire hydrants will take into account:

- location and physical protection as to avoid potential damage by vehicles;
- size and number to be determined for the specific layout; and

- protection from freezing.

The fire hydrants will be fed from the fire water storage tank(s) and maintain the required pressure in accordance with the requirements of the fire service.

Following completion of detailed design, a plan identifying the location of the fire hose reels and hydrants will be developed. An indicative drawing showing the possible locations of fire hydrants is presented in Appendix A.5 of this report.

11.1.3 Fire extinguishers

Fire extinguishers will be strategically located throughout the operational areas of REC in accordance with the requirements of BS 5306 (or NFPA equivalent).

The location of the fire extinguishers will be subject to implementation of the recommendations of the fire officer for REC. Following completion of detailed design, a plan identifying the location of the fire extinguishers will be developed.

11.1.4 Additional suppression systems

11.1.4.1 Fuel preparation facility

In addition to the fire suppression systems outlined within sections 11.1.1 to 11.1.3, the fuel preparation facility is expected to have a Helios A.T.F.S automated detection and turret extinguishing system installed inside the main building. This provides a constant monitoring system with instantaneous reactive and targeted retardant spray cannon. The system would be fully integrated to the fire detection systems. The location of spray cannon(s) would be strategic, for example above waste storage and processing areas.

The system will be maintained and serviced in accordance with the manufacturers requirements. The system is expected to be connected to the mains water supply for continuous flow. Firefighting using the system will be supplemented by the additional firefighting measures outlined above.

11.1.4.2 ERF

As described within section 10.1, thermal imaging cameras will be installed over the waste bunker to detect any hot spots in the waste. If the temperature of any hot spot exceeds a defined set-point, water cannons installed around the bunker can be used to prevent the potential for fire spreading within the bunker. The water cannons will be located in positions to optimise the horizontal and vertical coverage of spray for total firefighting suppression across the entire area of the bunker.

Through detailed design of the waste bunker, the number and position of the fire monitors and cannons will be established, alongside the manual and/or automatic remote-control systems. Thermal imaging screens will be installed within the control room.

In addition to the fire suppression systems outlined within sections 11.1.1 to 11.1.3, and the bunker cannons as described above, it is anticipated that the fire suppression systems at the ERF will also include the following:

- automatic sprinkler/water deluge systems for the fuel reception areas, waste bunker, waste feed hopper, fire pump container and the emergency diesel generator;
- automatic systems for the turbine generator and lube oil systems, auxiliary burners; and
- inert gas suppression and carbon dioxide gas suppression for the electrical rooms and CEMS container.

12 Certification for the systems

REC will be designed and operated in accordance with relevant standards and guidelines, or alternative recognised international standards where they are available. This may include, but not be limited to, the following:

- BS EN 54: Fire detection & alarm systems
- EN 671: Fixed firefighting systems. Hose systems.
- BS 750: Specification for underground fire hydrants and surface box frames and covers.
- EN 1028: Fire-fighting pumps. Fire-fighting centrifugal pumps with primer.
- BS 5041: Fire hydrant systems equipment.
- BS 5266: Emergency lighting
- BS 5306: Fire extinguishing installations
- BS 5839: Fire detection & alarm systems for buildings
- BS 7273: Operation of fire protection measures
- BS 7974: Application of fire safety engineering principles to the design of buildings.
- BS 9990: Non automatic fire-fighting systems in buildings.
- BS 9997: Fire risk management systems.
- BS 9999: Code of Practice for Fire Safety in the design, management and use of Buildings.
- EN 12101-2: Smoke and heat control systems. Natural smoke and heat exhaust ventilators.
- EN 12259: Fixed firefighting systems. Components for sprinkler and water spray systems.
- EN 12845: Fixed Firefighting systems. Automatic sprinkler systems. Design, installation and maintenance.
- EN 13565: Fixed firefighting systems. Foam systems.
- EN 14384: Pillar fire hydrants.
- EN 14710: Fire-fighting pumps. Fire-fighting centrifugal pumps without primer.
- EN 14972: Fixed firefighting systems. Water mist systems.
- EN 15004: Fixed firefighting systems. Gas extinguishing systems.
- NFPA 850: Recommended practice for fire protection for electric generating plants and high voltage (for the ERF), in addition to other relevant NFPA standards as applicable.
- Requirements/guidance from the Insurer.

Records associated with the certification of the fire prevention and suppression systems will be retained on site throughout the lifetime of REC.

13 Firefighting techniques

13.1 Active firefighting

An immediate firefighting response will be allowed to be made by staff if the following criteria have been met:

- the fire alarm has been raised;
- the fire is identified to be 'small' and it has been deemed safe by the individual to attempt fire suppression; and
- such firefighting action (e.g. use of a single fire extinguisher) is deemed safe and likely to have a direct and immediate effect on the fire.

Team firefighting (i.e. more than one member of staff operating firefighting equipment at once) will be permitted in the event of a larger fire by the use of multiple fire extinguishers and the fire hose reels if the following criteria are met.

- the fire alarm has been raised;
- the FSM (or deputy FSM) is in attendance;
- a sufficient number of trained staff are available;
- an escape route is always available;
- staff are not deemed to be at risk of smoke inhalation, significant heat exposure or other relevant fire risks; and
- such firefighting action is deemed safe and likely to have a direct and immediate effect on the fire.

13.2 Alternative fire detection and suppression measures

In addition to the fire detection and suppression systems identified in sections 10 and 11, the design of REC will include 'additional measures' to prevent the spread of fire, such as fire walls (Section 8.2).

It is acknowledged that REC is not designed strictly in accordance with all of the requirements of the FPP guidance (specifically, the provision of water for firefighting, refer to section 14). However, the overall design of REC, including the fire detection and fire suppressions systems, where applicable, have been designed to achieve the requirements of the guidance, namely:

- minimising the likelihood of a fire happening;
- aim for a fire to be extinguished within 4 hours; and
- minimise the spread of fire within the site and to neighbouring sites.

In addition, in the event of a significant fire within the waste bunker at the ERF, the plant can be shut-down which will include the shut-down of the induced draft (ID) fan and the extraction of combustion air from within the bunker. The plant shut-down will reduce the risk of fire spread between the 'fire compartments' within the ERF.

14 Water supplies

14.1 Available water supply

REC will have firewater storage tank(s) designed in accordance with the requirements of BS 5306 (or equivalent standard). It is expected that there will be more than one firewater storage tank to serve both the fuel preparation facility and the ERF. The firewater storage tank(s) will be connected to the local water supply and will be installed with a suitable system to prevent freezing. It is anticipated that the firewater storage tank(s) will be fitted with a local external water level indicator as well as with remote water level control and level alarm indication to the distributed control system (DCS).

It is proposed that the design of the systems for the provision and containment of firewater at REC are confirmed via a pre-operational condition or similar.

14.1.1 Fuel preparation facility

The exact quantities of waste to be stored at the fuel preparation facility are subject to detailed design. Therefore, the size of the fuel preparation facility firewater tank needed to meet the requirements of the FPP guidance cannot be calculated at this stage. However, the water supplies and fire suppression systems at the fuel preparation facility will be designed in accordance with the relevant standards and the requirements of the EA's FPP guidance. As described within section 6.2.1, it is proposed to provide a detailed summary of storage arrangements at the fuel preparation facility via a pre-operational condition.

14.1.2 ERF

It is estimated that the size of the firewater storage tank at the ERF will be approximately 1,400 m^3. The exact size of the firewater tank will be confirmed following detailed design. The firewater tank will be designed to ensure the required fire water capacity is always available for fire protection. When specifying the exact sizing for the firewater tank, it will be based on early fire detection and automatic fire suppression systems in the waste reception and storage areas such that any fire can be rapidly contained and extinguished.

The FPP Guidance requires a supply of firewater of 2,000 l/min for 3 hours for a 300 m^3 pile of waste, but this is based on an open pile of waste with free run off, rather than storage in a bunker which contains the water. For a waste bunker with a waste storage capacity of 18,000 m^3, the guidance implies the need for a 21,600 m^3 fire water tank, which is larger than the capacity of the bunker. The potential volume of firewater required to extinguish a fire in the bunker will be considerably less than the total 'airspace' volume of the bunker, as the waste present in the bunker will reduce the available volume.

The provisions for the supply of firewater for the ERF are not in accordance with the EA's FPP guidance; however, the proposed management systems; the design considerations of the ERF; and the provision of the fire prevention and fire-fighting measures detailed within this FPP are considered to be in excess of the requirements of the FPP guidance. Therefore, the requirements of the EA's FPP guidance should not apply to the ERF.

The waste bunker will be a contained concrete structure, with thick fire-resistant concrete walls. The provisions for firefighting in this area will be in accordance with NFPA 850 and as required by the fire risk insurers. In addition, subject to detailed design, foam may be used as an additive in the firewater system which will reduce the quantity of water required for firefighting. Early fire

detection methods and fast suppression will mean that the full contents of the firewater tank are unlikely to be required. The requirements for firewater provision in the FPP guidance have been discussed with the EA previously and it has been acknowledged that they would not apply.

15 Managing fire water

Firewater resulting from external areas at REC would be collected in the site surface water drainage systems. An attenuation pond will be provided at the site, which will have a capacity of approximately 4,500 m^3. The surface water drainage system will be installed with a penstock valve or similar isolation system (e.g. at the exit of the attenuation pond) which will prohibit the discharge of contaminated surface water off-site in the event of a fire or other emergency.

1. It is acknowledged that the capacity of the surface water attenuation pond will be reduced by the quantity of water already present within the system; however, it is not anticipated that the attenuation systems will regularly store large amounts of water, as the required attenuation capacity was calculated assuming a 'worst case flow' (i.e. allowing for SUDS and climate change requirements). Therefore, there should be sufficient capacity available to hold excess firewater in the event of a fire. Furthermore, additional capacity from site raised kerbing (of 100mm depth) and hardstanding will ensure that there is sufficient capacity to store used firewater resulting from external areas, following a full discharge of the contents of the firewater tank (with specific capacities to be confirmed following detailed design of the drainage systems). Taking this into consideration, the full volume of the firewater tank(s) will be able to be contained within the site surface water drainage systems and site kerbing.
2. As the maximum depth of site kerbing will be 100mm, the firewater itself will be a maximum of 100mm in depth (although it is highly unlikely that the full containment capacity of kerbing/hardstanding will be used). This is the maximum depth that a typical passenger vehicle can travel through. The depth that a fire engine or special purpose fire vehicle can travel through will be greater than this. Therefore, hardstanding areas will remain accessible to firefighting vehicles despite small quantities of firewater being present at the site.
3. The surface water attenuation pond is expected to be lined and will be designed as a water retaining structure, thereby preventing the release of any contamination should the surface water attenuation pond be required to retain used firewater.

Measures to prevent the discharge of contaminated firewater off-site are presented in Appendix A.8 (Indicative Firewater Storage and Containment). An isolation valve will prohibit the discharge of contaminated firewater from the site surface drainage systems. The water used for firefighting will be sampled and analysed to identify whether it is suitable to be used as process water or suitable for discharge offsite, or if treatment/disposal is required. If the firewater is considered to be contaminated, it will be transferred off-site, via tanker, to a suitably licensed waste management facility.

A plan showing the proposed landscaping to surround the site (which shows the locations of natural and unmade ground surrounding REC) is presented in Appendix A.10 of this report.

15.1 Fuel preparation facility

There are three different types of firewater flows which will be required to be contained if there was a fire at the fuel preparation facility:

1. Firewater resulting from treating fires in waste storage bays. Waste storage bays will be constructed of reinforced concrete (in accordance with the BS EN 1992-3 and Eurocode 2 standards) and would provide some level of firewater containment. Excess firewater will be collected in the process drainage system – see point 2.
2. Firewater from elsewhere within the main process building. This firewater will pass through grated drains and will collect in the process effluent drainage system. The process drainage

system would have an overflow into the ERF wastewater pit – see section 15.2 for further details on capacity and containment in the wastewater pit.

3. Firewater from outside any building – refer to the section below on external firewater containment.

15.2 ERF

The waste bunker will be design and constructed as a water retaining structure in accordance with BS EN 1992-3. This will protect against the leak of contaminated firewater from the bunker and minimise the risk of contamination of groundwater in the event of a fire within the bunker.

Drainage systems will be designed for the prevention of flooding of equipment. Fire water retention at the ERF will be accomplished through the installation of one or a combination of:

- waste bunker;
- process water tank/pit;
- floor drains/floor trenches;
- surface water drainage system (including attenuation storage);
- areas of hardstanding and kerbs for containing or directing drainage; and/or
- pits, sumps, and sump pumps.

It is anticipated that the provisions for drainage and any associated drainage facilities at the ERF will be sized to accommodate the concurrent flow due to operation of the following components (in accordance with NFPA 820):

- the spill of the largest single container of any flammable or combustible liquids in the area, where the bund around oil tanks should be large enough to contain the oil and the water from suppression systems;
- the maximum expected number of fire hose lines (31.5 L/sec (500 gal/min) minimum) operating for a minimum of 10 minutes (i.e. firewater resulting from all hoses operating at once for at least 10 minutes); and
- the maximum design discharge of (maximum amount of firewater resulting from) fixed fire suppression systems operating for a minimum of 10 minutes (fixed fire suppression systems include sprinklers and water cannons).

There are three different types of firewater flows which will be required to be contained in the event of a fire at the ERF:

1. Firewater resulting from treating fires in the bunker and tipping hall area. Firewater will be routed to the bunker which is watertight and hence can contain large amounts of firewater. The total below-ground volume of the bunker will be approximately 14,700 m^3, however, it is acknowledged that the containment capacity will be reduced by the waste stored within the bunker.
2. Firewater from inside any other process building. This is expected to be a rare event, and the quantities of firewater will be small. This drainage will be contained, to prevent contaminated water discharging off-site. It is anticipated that the wastewater pit (process water pit) will have a capacity of approximately 310 m^3.
   – Under normal operation, process effluents will be re-used in the process and only temporarily stored within the wastewater pit prior to reuse. Therefore, at any one time, there will only be a small amount of process effluent being stored within the wastewater pit. In the unlikely event that excess process effluents are generated (e.g. resulting from emptying the boilers), these will either be discharged to sewer in accordance with a Trade

Effluent Consent or tankered offsite. Therefore, large quantities of process effluent are not likely to be stored within the wastewater pit at any one time. Emptying of any excess process effluents offsite will be co-ordinated with periods of planned maintenance, as part of the documented management systems in place at the site. This will ensure that when excess process effluents are generated (e.g. during maintenance activities), they are not stored for significant periods of time, and they are removed in a timely manner. Taking the above into consideration, it is considered that the process drainage system (including the wastewater pit) will have sufficient capacity to store the small quantities of firewater that would be generated as a result of fires in process areas at the site. This capacity will be maintained through regular emptying of the wastewater pit as part of planned maintenance procedures at the site.

3. Firewater from outside any building – refer to section 15 above on external firewater containment.

16 During and after an incident

16.1 Dealing with issues during a fire

Documented emergency response procedures will be developed during the construction and commissioning phase of REC. The emergency procedures will include, but not be limited to:

- fire identification and reporting procedures;
- an evacuation plan;
- emergency communication procedures;
- responding to chemical spillages;
- containment of firewater;
- requirements for diverting incoming waste; and
- Notification of any adjacent residential properties and businesses which may be impacted by the incident.

The effectiveness of the emergency response procedures will be reviewed following any emergency incidents on-site. Following an emergency incident, the procedures will be updated if required, and staff trained in the updated procedures.

A copy of the emergency procedures will be maintained at the gate house, or other suitable location, and may include the fire system mimic panel to allow co-ordination of the emergency response to a fire in the event that the main offices are unavailable.

On a periodic basis, testing of the emergency procedures will be undertaken. The intention of the testing is to verify that all staff and contractors are aware of the emergency procedures. Following all tests, the implementation of the procedures will be reviewed. If appropriate, the procedures will be amended, or additional training provided to all staff and contractors.

In the event of an incident resulting in REC not being capable to receive waste, waste deliveries will be stopped or diverted to a suitably licensed alternative waste management facility. Deliveries of waste will not be recommenced until it has been deemed safe for waste processing activities to be restarted following the incident. During a complete shutdown, the fire detection systems will remain operational.

16.2 Notifying residents and businesses

REC will be operated in accordance with an Environmental Management System (EMS) certified to the ISO 14001 standard. The EMS will include procedures for the response to and documentation of emergency situations. A documented emergency response procedures will be developed which will detail specific actions which must be carried out in the event of a fire.

Depending on the nature and scale of any incidents, it may be necessary to notify local residents and adjacent businesses of the incident. Prior to commencement of operation of REC, and as part of the development of the documented management systems associated with the operation of REC, suitable external communication procedures will be developed and implemented.

In the event of a significant fire, the EA will be notified as soon as practically possible. Following any fire incidents, the FSM will advise the EA what remedial measures or actions have been taken to prevent any further incidents.

16.3 Clearing and decontamination after a fire

Following a fire which requires the presence of the emergency services; materials, building structures, furnishings, vehicles, equipment and raw materials could be damaged. Once the fire has been fully extinguished and the emergency services given approval to enter REC, an assessment will be undertaken by the management team for REC, insurance assessors, structural engineers and fire damage/salvage specialists to assess the extent of the damage.

Once a full inventory of the damage and equipment has been completed under the strict supervision of specialist structural engineers, any building or structure will be made safe. Severely damaged equipment or building materials will be removed from site by a licenced waste/scrap company. Building structures that are deemed safe will be cleaned, as necessary.

Waste within the bunker which is not suitable to be incinerated, or waste stored at the fuel preparation facility which is not suitable to be processed, will be backloaded into HGV's and removed from site by a licenced waste carrier. Affected areas will be cleaned and washed before equipment and structural repairs will take place.

16.4 Making the site operational after a fire

If there was a significant fire requiring a full shutdown of REC, REC would not restart operations until the relevant regulatory authorities (Fire Service, Health and Safety Executive, Environment Agency, etc.), as well as the fire risk insurers, advised that it was safe to do so.

Records will be maintained of the following:

- fire incidents including post-incident investigation;
- feedstock management;
- training of site operatives;
- site inspections and monitoring;
- maintenance activities;
- testing of firefighting equipment; and
- complaints.

Records will be maintained in accordance with the requirements of the EP and any documented management systems.

Appendices

A Plans and drawings

A.1 Site location plan

A.2 Installation Boundary drawing

A.3 Materials and waste storage areas plan

A.4 Access points around the perimeter to assist firefighting

A.5 Indicative locations of fire hydrants

A.6 Indicative locations of fire walls

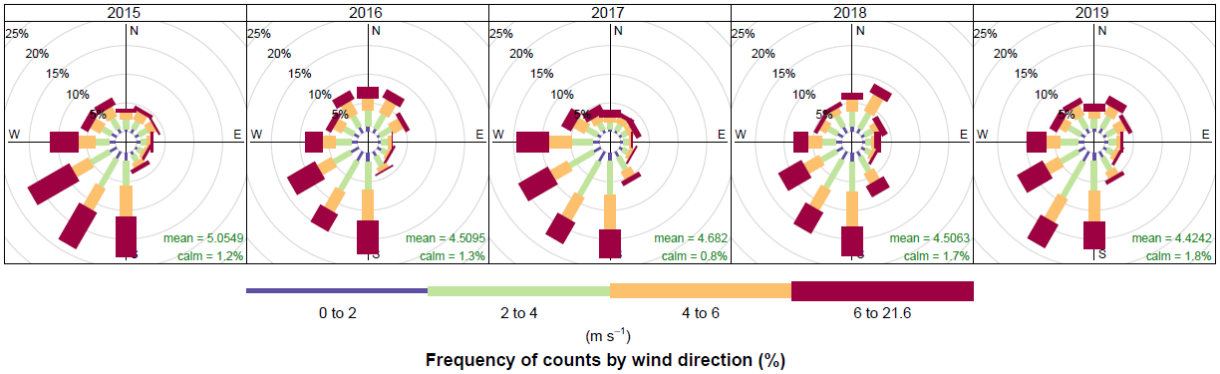
A.7 Indicative location of quarantine area

A.8 Indicative firewater storage and containment

A.9 Fire Receptor Plan

A.10 Areas of natural or unmade ground

B Wind roses


2015
2016
2017
2018
2019
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20%
15%
10%
5%
mean = 5.0549
calm = 1.2%
mean = 4.5095
calm = 1.3%
mean = 4.682
calm = 0.8%
mean = 4.5063
calm = 1.7%
mean = 4.4242
calm = 1.8%
0 to 2
2 to 4
4 to 6
6 to 21.6
(m s⁻¹)
Frequency of counts by wind direction (%)

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