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Thameside Energy Recovery Facility EP Variation



Thameside Energy Recover Facility Limited

Fire Prevention Plan

Document approval

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Contents

1	Introduction.....	6
1.1	Site location and description	7
2	Types of combustible materials	8
2.1	Combustible waste.....	8
2.2	Other combustible materials	14
3	Using this fire prevention plan	15
3.1	Where the plan is kept and how staff know how to use it	15
3.2	Testing the plan and staff training	15
3.3	Roles and responsibilities.....	16
4	Fire prevention plan contents	17
4.1	Activities at the site.....	17
4.2	Site plans and drawings	18
4.3	Plan of sensitive receptors near the site.....	18
5	Managing common causes of fire	19
5.1	Arson or Vandalism	19
5.2	Plant and equipment.....	19
5.3	Electrical faults including damaged or exposed electrical cables.....	19
5.4	Discarded smoking materials	20
5.5	Hot works safe working practices	20
5.6	Industrial heaters	20
5.7	Hot exhausts and engine parts	20
5.8	Ignition sources.....	20
5.9	Leaks and spillages of oils and fuels.....	21
5.10	Build-up of loose combustible waste, dust and fluff	21
5.11	Reactions between wastes	21
5.12	Deposited hot loads	21
5.13	Hot and dry weather	22
6	Preventing self-combustion	23
6.1	General self-combustion measures	23
6.2	Managing storage time	23
6.2.1	Methods used to record and manage the storage of all waste on site.....	23
6.2.2	Stock rotation policy.....	23
6.3	Monitoring and control temperature	24
6.3.1	Monitoring and controlling temperature	24
6.3.1.1	Bunker.....	24
6.3.1.2	IBA storage.....	25
6.3.1.3	APCr Storage.....	25
6.3.2	Reducing exposed metal content and proportion of fines.....	25
7	Manage waste piles.....	26
7.1	Maximum pile sizes.....	26
7.2	Storing waste materials in their largest form	26

7.3	Waste stored in containers	26
8	Prevent fire spreading	27
8.1	Separation distances	27
8.2	Fire walls construction standards	27
8.3	Storing waste in bays	28
9	Quarantine area	29
9.1	Quarantine area location and size	29
9.2	How to use the quarantine area if there is a fire	29
9.3	Procedure to remove material stored temporarily in the event of a fire.....	29
10	Detecting fires	31
10.1	Detection systems in use	31
10.2	Certification for the systems.....	33
11	Suppressing fires	34
11.1	Suppression systems in use.....	34
11.1.1	Bunker cannons	34
11.1.2	Fire hose reel system.....	34
11.1.3	Fire hydrants and mains	35
11.1.4	Fire extinguishers.....	35
11.2	Certification for the systems.....	35
12	Firefighting techniques.....	36
12.1	Active firefighting.....	36
12.2	Alternative fire detection and suppression measures	36
13	Water supplies.....	37
13.1	Available water supply	37
14	Managing fire water	38
14.1	The containment of fire water	38
15	During and after an incident	40
15.1	Dealing with issues during a fire	40
15.2	Notifying residents and businesses.....	40
15.3	Clearing and decontamination after a fire.....	41
15.4	Making the site operational after a fire	41
Appendices	42
A	Plans and drawings.....	43
A.1	Site location plan.....	43
A.2	Site layout plan.....	43
A.3	Waste storage areas plan.....	43
A.4	Access points around the perimeter to assist fire-fighting.....	43
A.5	Indicative locations of fire hydrants.....	43
A.6	Indicative locations of fire walls.....	43
A.7	Indicative location of quarantine area.....	43
A.8	Materials storage areas.....	43
A.9	Indicative firewater storage and containment	43

A.10	Indicative location of cylinders	43
A.11	Fire Receptor Plan.....	43
A.12	Areas of natural or unmade ground	43
B	Wind roses.....	44

1 Introduction

Thameside Energy Recovery Facility Ltd (TERFL) is applying to the Environment Agency (EA) under the Environmental Permitting Regulations (EPRs) to vary the Environmental Permit (EP) for the Thameside Energy Recovery Facility (the 'Facility'). The Facility will be located adjacent to the site of the existing Tilbury Green Power waste biomass incineration facility (TGP) at Tilbury Docks in Essex.

The Facility will be located at in the western part of the Port of Tilbury on the north side of the Thames Estuary, approximately 1km to the south east of the town of Grays in Essex, England.

The objective of this report is to provide a preliminary Fire Prevention Plan (FPP) for the Facility, identifying the provisions which have been taken into account during the development phase of the Facility. In addition, provisional operational measures have been identified where these are available. The report will be subject to review following completion of detailed design of the Facility.

This report 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 the Facility to ensure that they are consistent and compatible with other management systems associated with the operation of the Facility. It is intended to share the FPP with the local fire and rescue service.

This document and the measures to mitigate the risk and impact of fires within the Facility have been (and will continue to be) developed in accordance with the requirements of the following:

- Environment Agency guidance - '*Fire Prevention Plans: Environmental Permits*' (11 January 2021);
- Building Regulations – '*Approved Document B (Fire Safety)*';
- Chubb Guidance Document – Energy from Waste - Fire Systems Issue 5.0 14 December 2017 (formerly ACE Technical Risks, Engineering Information Bulletin, Guidance document '*Energy from Waste (EfW) – Fire Systems, Issue 1.0*');
- Chubb Guidance Document – Waste Processing Plant – Fire Systems Issue 4.0 14 December 2018 (formerly ACE Technical Risks, Engineering Information Bulletin, '*Guidance Document Waste Processing Plants – Fire Systems Issue 1.0*');
- 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.

The Facility 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 5, 6 and 10.
2. Active firefighting measures will be implemented should a fire break out – refer to section 11. Utilising these measures, the Facility aims to extinguish a fire within 4 hours.
3. Fire walls will minimise the spread of fire within the site and to neighbouring sites – refer to section 8.

Utilising these measures, the Facility aims to extinguish a fire within 4 hours.

1.1 Site location and description

The Facility will be located at in the western part of the Port of Tilbury on the north side of the Thames Estuary, approximately 1km to the south-east of the town of Grays in Essex, England. The Facility will be located at an approximate national grid reference of TQ 62074 77172.

The site is bounded by the River Thames (River) to the south-west; by an open watercourse named Botney Channel and beyond, the riverside park (Grays Beach) to the North West; and by the main Grays-Tilbury railway line to the north east.

The land within the Installation Boundary covers an area of approximately 5 hectares, with the site area within the Installation Boundary currently covered by hardstanding, with the exception of a small open area of amenity grassland with ornamental tree and shrubs.

A site location plan and installation boundary drawing are presented in Appendix A.1

2 Types of combustible materials

2.1 Combustible waste

The non-hazardous waste types to be treated at the Facility, which may comprise municipal or commercial and industrial waste, are presented in Table 1:

Table 1: Wastes to be processed in the Facility

EWC code	Description of waste
02	WASTE 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 02	animal tissue waste (Catering Wastes & Former Foodstuffs Only)
02 01 04	Waste plastics (except packaging)
02 01 06	animal faeces, urine and manure (including spoiled straw), effluent, collected separately and treated off-site (Spoiled Straw Only)
02 01 07	Wastes from forestry
02 01 09	agrochemical wastes other than those mentioned in 02 01 08
02 02	wastes from the preparation and processing of meat, fish and other foods of animal origin
02 02 02	animal-tissue waste (Catering Wastes & Former Foodstuffs Only)
02 02 03	materials unsuitable for consumption or processing (Catering Wastes & Former Foodstuffs Only)
02 02 04	sludges from on-site effluent treatment
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 02	waste preserving agents
02 03 04	materials unsuitable for consumption or processing
02 03 05	sludges from on-site effluent treatment
02 04	wastes from sugar processing
02 04 03	sludges from on-site effluent treatment
02 05	materials unsuitable for consumption or processing
02 05 01	materials unsuitable for consumption or processing
02 05 02	sludges from on-site effluent treatment
02 06	wastes from the baking and confectionary industry
02 06 01	materials unsuitable for consumption or processing
02 06 02	wastes from preserving agents
02 06 03	sludges from on-site effluent treatment (dried sludge only)
02 07	wastes from the production of alcoholic and non alcoholic beverages (except coffee tea and cocoa)

EWC code	Description of waste
02 07 04	materials unsuitable for consumption or processing
02 07 05	sludges from on-site effluent treatment
03	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 07	mechanically separated rejects from pulping of waste paper and cardboard
03 03 08	wastes from sorting of paper and cardboard destined for recycling
03 03 10	fibre rejects, fibre, filler and coating-sludges from mechanical separation
03 03 11	sludges from on-site effluent treatment other than those mentioned in 03 03 10
04	WASTES FROM THE LEATHER, FUR AND TEXTILE INDUSTRY
04 02	wastes from the textile industry
04 02 09	wastes from composite materials (impregnated textile, elastomer, plastomer)
04 02 10	organic matter from natural products (for example grease, wax)
04 02 15	Wastes from finishing other than those mentioned in 04 02 14
04 02 20	sludges from on-site effluent treatment other than those mentioned in 04 02 19
04 02 21	wastes from unprocessed textile fibres
04 02 22	wastes from processed textile fibres
07	WASTES FROM ORGANIC CHEMICAL PROCESSES
07 02	wastes from the MFSU of plastics, synthetic rubber and man-made fibres
07 02 12	sludges from on-site effluent treatment other than those mentioned in 07 02 11
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 03	wastes from the MFSU of organic dyes and pigments (except 06 11)
07 03 12	sludges from on-site effluent treatment other than those mentioned in 07 03 11
07 04	wastes from the MFSU of organic pesticides (except 02 01 05)
07 04 12	sludges from on-site effluent treatment other than those mentioned in 07 04 11
07 05	wastes from the MFSU of pharmaceuticals
07 05 12	sludges from on-site effluent treatment other than those mentioned in 07 05 11
07 05 14	solid wastes other than those mentioned in 07 05 13
07 06	wastes from the MFSU of fats, grease, soaps, detergents, disinfectants and cosmetics
07 06 12	sludges from on-site effluent treatment other than those mentioned in 07 06 11

EWC code	Description of waste
07 07	wastes from the MFSU of fine chemicals and chemical products not otherwise specified
07 07 12	sludges from on-site effluent treatment other than those mentioned in 07 07 11
08	WASTES FROM MFSU OF COATINGS, ADHESIVES, SEALANTS & PRINTING INKS
08 01	wastes from MFSU and removal of paint and varnish
08 01 12	waste paint and varnish other than those mentioned in 08 01 11 (Solidified or Dried only)
08 01 14	sludges from paint or varnish other than those mentioned in 08 01 13
08 01 16	aqueous sludges containing paint or varnish other than those mentioned in 08 01 15
08 01 18	wastes from paint or varnish removal other than those mentioned in 08 01 17
08 03	wastes from MFSU of printing inks
08 03 07	aqueous sludges containing ink
08 03 13	waste ink other than those mentioned in 08 03 12 (Solidified or Dried)
08 03 15	ink sludges other than those mentioned in 08 03 14
08 04	wastes from MFSU of adhesives and sealants (including waterproofing products)
08 04 10	waste adhesives and sealants other than those mentioned in 08 04 09 (Solidified or Dried only)
08 04 12	adhesive and sealant sludges other than those mentioned in 08 04 11
08 04 14	aqueous sludges containing adhesives or sealants other than those mentioned in 08 04 13
09	WASTES FROM THE PHOTOGRAPHIC INDUSTRY
09 01	wastes from the Photographic industry
09 01 07	photographic film and paper containing silver or silver compounds
09 01 08	photographic film and paper free of silver or silver compounds
09 01 10	single-use cameras without batteries
12	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
12 01 15	machining sludges other than those mentioned in 12 01 14
12 01 17	waste blasting material other than those mentioned in 12 01 16
12 01 21	spent grinding bodies and grinding materials other than those mentioned in 12 01 20
15	WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED
15 01	packaging (including separately collected municipal packaging waste)

EWC code	Description of waste
15 01 01	paper and cardboard packaging (contaminated or otherwise unsuitable for recycling)
15 01 02	plastic packaging
15 01 03	wooden 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
16	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
16 03	off-specification batches and unused products
16 03 04	inorganic wastes other than those mentioned in 16 03 03
16 03 06	organic wastes other than those mentioned in 16 03 05
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)
17 02	wood, glass and plastic
17 02 01	waste wood
17 02 03	plastic
17 03	asphalt, tar and tarred products
17 03 02	bituminous mixtures other than those mentioned in 17 03 01
17 06	insulation materials and asbestos-containing construction materials
17 06 04	insulation materials other than those mentioned in 17 06 01 and 17 06 03
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
18	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)
18 01 07	chemicals other than those mentioned in 18 01 06

EWC code	Description of waste
18 01 09	medicines other than those mentioned in 18 01 08
18 02	wastes from research, diagnosis, treatment or prevention of disease involving animals
18 02 03	wastes whose collection and disposal is not subject to special requirements in order to prevent infection
18 02 06	chemicals other than those mentioned in 18 02 05
18 02 08	medicines other than those mentioned in 18 02 07
19	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 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05
19 02 10	combustible wastes other than those mentioned in 19 02 08 and 19 02 09
19 03	stabilised/solidified wastes
19 03 05	stabilised wastes other than those mentioned in 19 03 04
19 03 07	solidified wastes other than those mentioned in 19 03 06
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 05 99	wastes not otherwise specified
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 08 05	sludges from treatment of urban waste water
19 08 09	grease and oil mixture from oil/water separation containing edible oil and fats
19 08 12	sludges from biological treatment of industrial waste water other than those mentioned in 19 08 11
19 08 14	sludges from other treatment of industrial waste water other than those mentioned in 19 08 13
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 09 04	spent activated carbon

EWC code	Description of waste
19 10	wastes from shredding of metal-containing wastes
19 10 04	fluff-light fraction and dust other than those mentioned in 19 10 03
19 10 06	other fractions other than those mentioned in 19 10 05
19 11	wastes from oil regeneration
19 11 06	sludges from on-site effluent treatment other than those mentioned in 19 11 05
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
19 12 01	paper and cardboard (contaminated or otherwise unsuitable for recycling)
19 12 02	ferrous metal
19 12 03	non-ferrous metal
19 12 04	plastic and rubber
19 12 05	glass
19 12 07	wood other than that mentioned in 19 12 06
19 12 08	textiles
19 12 09	minerals (for example sand, stones)
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
19 13	wastes from soil and groundwater remediation
19 13 02	solid wastes from soil remediation other than those mentioned in 19 13 01
19 13 04	sludges from soil remediation other than those mentioned in 19 13 03
20	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 (contaminated or otherwise unsuitable for recycling)
20 01 02	glass
20 01 08	biodegradable kitchen and canteen waste
20 01 10	clothes
20 01 11	textiles
20 01 25	edible oil and fat
20 01 28	paint, inks, adhesives and resins other than those mentioned in 20 01 27
20 01 30	detergents other than those mentioned in 20 01 29
20 01 32	medicines other than those mentioned in 20 01 31
20 01 38	wood other than that mentioned in 20 01 37 (contaminated or otherwise unsuitable for recycling)
20 01 39	plastics
20 01 40	metals

EWC code	Description of waste
20 01 99	other fractions not otherwise specified
20 02	garden and park wastes (including cemetery waste)
20 02 01	biodegradable waste
20 02 02	soil and stones
20 03	other municipal wastes
20 03 01	mixed municipal waste
20 03 02	waste from markets
20 03 03	street-cleaning residues
20 03 04	septic tank sludge
20 03 06	waste from sewage cleaning
20 03 07	bulky waste
20 03 99	municipal wastes not otherwise specified

2.2 Other combustible materials

In addition to the combustible wastes listed in Table 1, there will be a limited number of other materials on site which are potentially combustible, including maintenance materials (such as oils and greases present in small quantities at various locations) and gas cylinders.

Gas cylinders will be stored within purpose-built dedicated storage facilities. All facilities for the storage of gas cylinders will be kept locked/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 storage facilities and maintenance materials will be developed upon completion of detailed design.

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 is presented within Appendix A.8.

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 integrated management systems (IMS) for the Facility. The FPP will be linked with the site Fire Risk Assessment (FRA) within IMS. 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 IMS (including Environmental Management Systems or EMS) awareness training 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 the Facility 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 box or similar 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, hydrants, controls etc.

3.2 Testing the plan and staff training

All site staff (and contractors) will be trained in emergency response procedures and in the use of firefighting equipment such as fire extinguishers. Training records will be maintained in accordance with the documented management systems for the Facility, 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 the Facility. The first review is expected to be during the commissioning of the site prior to full operation, to incorporate any further detailed design information or mitigation measures installed at the Facility. The FPP will be updated where necessary to ensure that the stated control techniques remain appropriate, for example:

- immediately following any major fire incidents;
- following a near miss of a fire;
- if there are any significant technical or managerial changes at the Facility;
- 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 FRA as part of TERFL's IMS.

Fire prevention messages will be reinforced around the site using signs. Furthermore, visitors to the Facility 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. Where appropriate the procedures will be updated, and staff trained in the updated procedures.

3.3 Roles and responsibilities

In addition to all staff having an awareness of fire safety and emergency response procedures, 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 any fire risk assessments at the site and ensuring that findings are addressed, or mitigation measures are implemented. Risk assessments will be reviewed on an annual basis. The assigned FSM will also be responsible for ensuring 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. The fire wardens 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. The fire wardens will liaise with the FSM if they are not already present on the site.

All other employees at the Facility 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

Activities covered by this EP application include:

1. a single waste incineration plant processing incoming waste which is delivered to the Facility from off-site via road;
2. generation of power for export to the local electricity grid, and the potential to export heat;
3. production of inert bottom ash material that will be transferred off-site to a suitably licensed waste treatment facility for recovery; and
4. generation of an air pollution control residue that will be transferred to a suitably licensed hazardous waste facility for disposal or recovery.

Table 2 lists the Schedule 1 activities, from the Environmental Permitting Regulations, and the Directly Associated Activities (DAA's).

Table 2: Scheduled and directly associated activities

Type of Activity	Schedule 1 Activity	Description of Activity
Installation	Section 5.1 Part A(1) (b)	The incineration of non-hazardous waste in a waste incineration plant with a nominal design capacity of 43.3 tonnes per line per hour
Directly Associated Activities		
Directly Associated Activities		Waste reception, storage and handling facilities
Directly Associated Activities		Combustion and energy recovery processes including the export of electricity to the national grid and the potential to export heat
Directly Associated Activities		Flue gas treatment
Directly Associated Activities		Residue storage and handling facilities
Directly Associated Activities		Standby electrical generation to provide electrical power to the plant in the event of an interruption in the supply

The Facility will include the following key components: waste reception; waste storage; water, fuel oil and air supply systems; furnaces; boilers; steam turbine/generator set; facilities for the treatment of exhaust or flue gases; on-site facilities for storage of residues and waste water; flues with associated stacks; and devices and systems for controlling combustion operations and recording and monitoring conditions.

The Facility will process approximately 350,000 tonnes per annum (at the design capacity of 43.8 tph per line with a design NCV of 10.5 MJ/kg and an availability of approximately 8,000 hours).

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);
- access points (Appendix A.2);
- indicative locations of fire hydrants (Appendix A.5);
- indicative locations of fire walls (Appendix A.6);
- indicative location of quarantine area (Appendix A.7);
- materials storage areas (Appendix A.8);
- indicative firewater storage and containment (Appendix A.9); and
- fire receptor plan (Appendix A.10).

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 the Facility 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 valves and firewater containment systems;
- site drainage plan;
- the location of gas cylinders; and
- the location of plant, protective clothing and pollution control equipment and materials.

Wind roses indicating the direction of prevailing winds for the Facility from 2015 to 2019, taken from London City Airport, are presented in Appendix B.

4.3 Plan of sensitive receptors near the site

In the unlikely event of a fire, the site personnel, other industrial units and businesses within Tilbury Dock are most at risk. A fire at the Facility may have a temporary localised impact on the operation of the Tilbury Dock depending on meteorological conditions at the time of any incident.

A plan showing the location of receptors in the event of a fire is presented within Appendix A.10 which sets out sensitive receptors within 1km of the site. In addition, a wind roses drawing is presented within Appendix B which shows the prevailing wind direction for the Facility.

5 Managing common causes of fire

5.1 Arson or Vandalism

Security measures will prevent access by members of the public and thereby prevent the risk of arson attacks or vandalism. The Facility will be surrounded by security fencing. A barrier will be present at the entrance and exit of the site to restrict vehicular access. Only authorised visitors will be able to enter the site.

The Facility 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. The shift team leaders will be responsible for security on the site, including delivery vehicles as they travel around the site.

Emergency response procedures will be developed for the Facility, prior to the commencement of operations, as part of the detailed Environmental Management System (EMS). The procedures will detail the response to a number of different emergency situations on site, including unauthorised personnel accessing the Facility.

In accordance with the waste acceptance procedures to be developed for the Facility, unloading of all waste deliveries will be supervised by operational staff. CCTV will be installed in all areas where waste delivery vehicles discharge waste into the bunker. The design and location of the CCTV systems and security alarms will be undertaken during detailed design of the Facility and labelled on a site plan accordingly.

5.2 Plant and equipment

An operating and maintenance manual (O&M manual) will be developed and completed through the commissioning phase of the installation. 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 the Facility. As part of such work instruction development, the risk of fire will be considered, and appropriate activities included within the work instruction 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.

5.3 Electrical faults including damaged or exposed electrical cables

The risk of electrical faults on site 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.

Testing will be carried out on electrical equipment by fully and appropriately qualified electricians, when required. The inspection of electrical cabling at the Facility 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.

5.4 Discarded smoking materials

Smoking will be prohibited in operational areas. External areas designated for smoking within the Installation Boundary will be identified, with suitable facilities 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. A fire watch will be carried out for a suitable period after hot works have ended, and at the end of a working day.

5.6 Industrial heaters

It is currently expected that industrial heaters will not be installed at the Facility, however, this will be confirmed during detailed design of the Facility. 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 to detect signs of fires from dusts settling on hot exhausts. 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. 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 the Facility, with any risk areas identified on DSEAR zonal drawings.

Vehicles and electrical items necessary for the operation of the Facility will be regularly inspected for electrical faults. All mobile plants serving the Facility 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 the Facility. 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. Where feasible, 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 system. This will include ensuring that the location of stored mobile plants, which is subject to detailed design of the Facility, 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, 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. The fire detection and protection measures will minimise the risk of a fire spreading from waste storage areas.

5.9 Leaks and spillages of oils and fuels

Emergency response procedures will be developed as part of the emergency procedures for the Facility. 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 from roadways prior to discharge via the infiltration pond.

The location of spill kits will be marked up on a site plan following detailed design of the Facility.

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

The Facility 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 the Facility, the control of dust and fluff has been considered. This includes:

- the use of an enclosed fuel reception/unloading building; and
- mechanical ventilation of the waste reception and storage areas, during normal operation, 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 regular basis, inspections will be undertaken 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 will be undertaken to clean this material from the surfaces. Good housekeeping practices will be employed at the Facility 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 the Facility.

In the unlikely event that waste identified as 'unacceptable' is received, a quarantine area 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 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. These do not include any hazardous wastes including those with oxidising or flammable risk phases.

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.

Any rejected wastes will be stored within a dedicated quarantine area – refer to section 9. Should a ‘hot load’ be delivered to the Facility, a ‘hot load procedure’ will be followed (this will be incorporated into the waste acceptance procedures for the site). Fire suppression (e.g. by the use of fire extinguishers) will be implemented to deal with the hot load if necessary.

5.13 Hot and dry weather

Incoming loose waste, stored within the main building, will be provided with protection from direct sunlight as the waste bunker will not have external windows. Periods of hot weather have the potential to increase the risk of fires. However, all loose waste will be stored within the main building which will reduce the risk of overheating. Furthermore, during periods of very hot weather, additional site inspections and monitoring will take place.

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.

Baled waste will not be received at the Facility. Therefore, the FPP guidance requirements relevant to waste bale storage do not apply to the Facility.

6.2 Managing storage time

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

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 10,000 m³ (equivalent to approximately 6 days fuel supply). During normal operation, it is expected that the maximum period which waste will remain within the waste bunker is approximately 7 days.

Prior to any planned shutdowns of the Facility, waste deliveries will be stopped and/or diverted to alternative waste management facilities, and 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, and typically will not extend beyond four weeks.

In the event that the 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 bunker 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 the bunker will depend on the status of operation and expected commencement of operations at the 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 bunker.

6.2.2 Stock rotation policy

Following the commencement of waste deliveries after a period of shutdown, deliveries of 'new' waste will be mixed with residual quantities of waste within the bunker in accordance with the bunker management procedures for the Facility – 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 the Facility, the fire system design will be designed and installed by an experienced fire engineering company, which employs appropriately qualified persons. 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 local fire officer, the fire risk insurers and any relevant standards and codes of practice.

Operational staff will be briefed on the need for monitoring for the early signs of fires. The waste bunker and all main process areas will have CCTV to allow remote monitoring from the control rooms on a continuous basis. All waste delivered to the Facility will be supervised by operational staff, who will be responsible for the inspection and monitoring of waste deliveries. 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.

6.3.1.1 Bunker

Thermal imaging cameras or IR flame detectors will be fixed around the perimeter of the 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 Facility. 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. 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.

In extreme cases, firewater cannons (refer to section 11.1.1) may be used to extinguish any smouldering or burning waste. The thermal imaging cameras or IR flame detectors will be set with two trigger alarms at different temperatures within the bunker as discussed in Section 10.1. The fire water cannons will be activated if the high-high temperature alarm is reached.

6.3.1.2 IBA storage

Due to the high thermal temperatures in which the IBA has been combusted, it will not be expected to contain any combustible materials which are able to self-combust from the elevated temperatures within the IBA. This will be confirmed by regular sampling and analysis of the IBA to demonstrate that TOC levels are less than 3% as required by the EP. In addition, the quenching of the ash will ensure it has been suitably cooled prior to storage and the moisture within the IBA from quenching of the ash will ensure that the IBA will not combust.

6.3.1.3 APCr Storage

The APCr is not expected to contain any combustible materials which could self-combust from elevated temperatures within the APCr.

6.3.2 Reducing exposed metal content and proportion of fines

The waste received at the Facility will be residual waste; therefore, it is not expected that there will be large quantities of metals within the waste. Furthermore, it is not expected that a large amount of fines will be present within the waste. Therefore, the FPP guidance requirement to reduce exposed metal content and proportions of fines does not apply to the Facility.

7 Manage waste piles

7.1 Maximum pile sizes

It is understood that the EA's maximum waste pile sizes are not applicable to waste stored within a waste bunker.

In addition, bottom ash is not expected to contain any combustible materials which would pose a fire risk. Therefore, it is understood that the pile sizes do not apply to bottom ash stored within the IBA storage area.

7.2 Storing waste materials in their largest form

Incoming loose waste will not be treated (such as shredding) prior to processing and combustion. Therefore, incoming loose waste will be stored in its largest form.

As stated in section 7.1, it is understood that the EA's requirements for waste piles do not apply to waste stored within a bunker.

7.3 Waste stored in containers

The only waste which will be stored in 'containers' is Air Pollution Control residues (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 340 m³. The APCr silos will have sufficient capacity for the storage of approximately 7 days of APCr, assuming that the Facility operates continuously at the nominal capacity. As stated in section 6.3.1, 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

TERFL understands that the storage requirements stated in the EA guidance, 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. All wastes which are delivered to the Facility will be unloaded and stored within enclosed waste reception areas with all incoming waste being stored within 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 of the Facility, and dependent on the layout to be further developed by the EPC Contractor. The indicative locations of the fire walls are presented in Appendix A.6.

Subject to the location of the process equipment, operational areas will be segregated into fire zones (the "Fire Zones"). In accordance with NFPA 850, certain specific Fire Zones 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 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 TERFL and the fire risk insurers.

The dividing wall between the waste bunker hall and boiler hall 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 this 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. These walls and the base of the bunker will be resistant to crane grab impact and the impingement of water cannon jets. The structure of the waste bunker itself therefore will have adequate fire resistance.

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 will be 2-hour fire rated, and hence resistant to fire. Therefore, the crane operators will be able to continue operating the crane for a limited amount of time in the event of a fire, depending its severity.

8.3 Storing waste in bays

Waste which is delivered to the Facility will not be stored in bays, and incoming waste will be stored within the waste bunker. Therefore, the requirements of the FPP Guidance will not apply to the Facility.

9 Quarantine area

9.1 Quarantine area location and size

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.

Where appropriate, 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), around the quarantined waste.

The quarantine area will be kept clear at all times when it is not being used for the storage of unacceptable waste.

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 is presented in Appendix A.7.

9.2 How to use the quarantine area 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 fuel supply agreements which have been agreed with waste suppliers for the Facility, or other waste which is unsuitable for incineration and/or not compliant with the EWC codes stated in the EP. In the event that a hot load was of unacceptable waste, this would be extinguished and stored in the quarantine area.

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.

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 Procedure to remove material stored temporarily in the event of a fire

Hot loads stored within the quarantine area 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 area. Therefore, if a fire was to occur within the quarantine area, it will be extinguished prior to the waste being transferred

off-site. If required, the emergency services would be called for assistance. The final design of the quarantine area will be subject to detailed design and agreed with the fire risk insurers.

The 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.

10 Detecting fires

Procedures will be in place at the Facility to detect a fire in its early stages, in order to reduce the impact of the fire.

The choice of fire detection system (smoke/heat/flame detectors) to be installed within the Facility will be subject to detailed design. However, it can be confirmed that the fire detection systems will be covered by a UKAS-accredited third-party certification scheme or equivalent. This will be confirmed prior to the commencement of commissioning at the Facility.

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

10.1 Detection systems in use

There will be a fire detection and alarm system which will cover all of the waste processing areas within the Facility. 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 room.

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. In low fire risk areas, such as the Boiler Hall, the requirements for a P1 detection system may be relaxed.

In areas which are identified as having a low fire risk, the proposed 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.

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

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 Facility.
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 Facility 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. For the Facility, this is subject to detailed design, and will be set in consultation with the Fire Service. However, it is estimated that the trigger temperatures will be approximately 90°C and 120°C for the high temperature and high-high temperature alarms respectively. 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 burner skids will be protected with a sprinkler system or other suitable 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 suitable fire detection systems and suppression systems (such as a gaseous extinguishing system) if appropriate.
 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.

8. 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.
9. All automatic fire detection and alarm systems will be designed and maintained by a suitably qualified, experienced and registered fire protection engineer.
10. 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.
11. It will be the responsibility of the operators and shift managers to monitor fire alarms.

10.2 Certification for the systems

Where appropriate, the Facility will be designed and operated in accordance with the relevant fire prevention and detection standards, or alternative recognised international standards where they are available. This may include, but not be limited to, the following:

- EN 671: Fixed fire-fighting systems – Hose systems;
- EN 12845: Fixed firefighting systems – Automatic sprinkler systems – Design, installation and maintenance;
- EN 14384: Pillar fire hydrants (if applicable);
- EN 15004: Fixed Firefighting systems – Gas extinguishing systems;
- BS 750: Specification for underground fire hydrants and surface box frames and covers (if applicable);
- BS 5041: Fire hydrant systems equipment;
- BS 5266: Emergency Lighting;
- BS 5306: Fire extinguishing installations and equipment on premises;
- BS 5588: Fire precautions in the design construction and use of buildings;
- BS 5839: Fire Detection and Alarm systems for buildings;
- BS 9990: Non-automatic fire-fighting systems in buildings – Code of practice;
- BS 9999: Code of Practice for Fire Safety in the design, management and use of Buildings;
- Building Regulations, in particular Approved Document B, Volume 2 – Buildings other than dwelling houses, Section B5, Access and facilities for the fire service;
- NFPA 13: Standard for the Installation of Sprinkler Systems;
- NFPA 850: Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations; and
- 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 the Facility.

11 Suppressing fires

The suppression systems for the Facility will be subject to detailed design. The main features of the fire suppression systems are provided in sections 11.1 and 11.2.

11.1 Suppression systems in use

There will be a fire suppression system installed in the locations considered by the fire strategy and NFPA 850 to be at risk of fire. It is anticipated that the fire suppression systems will include the following (in appropriate locations at the Facility):

- 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.

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 the Facility.

11.1.1 Bunker cannons

Thermal cameras will be installed over the waste reception bunker to detect any hot spots in the waste. If the temperature of any hot spot exceeds a defined set-point (for the Facility, this is subject to detailed design, and will be set in consultation with the Fire Service. 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.

Subject to agreement with the fire risk insurers trigger temperatures for the cannons will be set as per the temperatures stated in section 10.1.

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.

11.1.2 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 the Facility for firefighting in fire risk areas.

For firefighting purposes, hose reels and extinguishers where appropriate will be provided within the buildings.

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 the Facility, a plan identifying the location of the fire hose reels will be developed.

11.1.3 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 10.2) and will be connected to a ring main at strategic positions around the Facility 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 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.

11.1.4 Fire extinguishers

Fire extinguishers will be strategically located throughout the operational areas 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 the Facility. Following completion of detailed design, a plan identifying the location of the fire extinguishers will be developed.

11.2 Certification for the systems

The relevant standards for the fire prevention and suppression systems are described in section 10.2.

It is anticipated that the automatic fixed fire suppression systems for the Facility will be designed in accordance with the requirements of Chubb Guidance Document – Energy from Waste - Fire Systems, Chubb Guidance Document – Waste Processing Plant – Fire Systems, NFPA 850 and other NFPA or BS equivalent standards where appropriate.

12 Firefighting techniques

12.1 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 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.

12.2 Alternative fire detection and suppression measures

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

In addition, in the event of a significant fire within the waste bunker, 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 Facility.

13 Water supplies

13.1 Available water supply

The Facility will have a firewater storage tank designed in accordance with the requirements of BS 5306 (or equivalent standard). The firewater storage tank 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 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). The firewater tank will be designed to ensure the required firewater capacity is always available for fire protection.

It is estimated that the size of the firewater storage tank will be approximately 1,500 m³. 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 available for fire protection at all times. When specifying the 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 m³ 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 10,000 m³, the guidance implies the need for a 12,000 m³ fire water tank, which is excessive. It should be noted that 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.

It is acknowledged that the provisions for the supply of firewater at the Facility are not in strict accordance with the EA's FPP guidance. However, the proposed management systems; the design considerations of the Facility; 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 Facility.

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, foam may be used as an additive in the firewater system which will reduce the quantity of water required for firefighting – this is subject to detailed design of the Facility. 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 on previous projects (similar to the Facility) and it was agreed that they would not be applied.

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

14 Managing fire water

14.1 The containment of fire water

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 will be accomplished through the installation of one or a combination of:

- waste bunker;
- process water tank/pit;
- surface water drainage system (including attenuation storage);
- floor drains/floor trenches;
- 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 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 operating for a minimum of 10 minutes; and
- the maximum design discharge of fixed fire suppression systems operating for a minimum of 10 minutes.

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

1. Firewater resulting from treating fires in the bunker and tipping hall area. This 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 10,000 m³, however, it is acknowledged that this will be reduced by the quantity of waste present.
2. Firewater from inside any other process building or from the IBA storage area. Such firewater is expected to be extremely rare and small in quantity so only small amounts of firewater will arise. This drainage will be contained, to prevent contaminated water discharging off-site. It is anticipated that the sedimentation tank (process water tank) will have a capacity of approximately 250 m³.
3. Firewater from outside any building. Such firewater will be contained in the site drainage systems. The underground attenuation systems will have a combined capacity of approximately 1,800 m³, subject to detailed design of the drainage systems. It is acknowledged that the storage capacity of the attenuation systems will be reduced by the quantity of water already present within the system. 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. The drainage system will be installed with a penstock valve or similar isolation system which will prohibit the discharge of contaminated surface water off-site in the event of a fire or other emergency.

Additional storage for used firewater will also be available from site raised kerbing and areas of hardstanding. It is expected that hardstanding and kerbing will provide approximately 925 m³ of additional containment capacity. Therefore, the full volume of the firewater tank can be contained within the site in the surface water drainage systems and site kerbing (of 100mm depth).

Regarding firewater into the foul drainage system, an isolation valve will be installed in the foul manhole upstream of the SUDS pond, to prevent contaminated firewater infiltration into the ground. These are identified in Appendix A.9 (Indicative Firewater Storage and Containment). The water used for firefighting will be sampled and analysed to identify whether it is suitable to be used as process water, 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 the Facility) is presented in Appendix A.12.

15 During and after an incident

15.1 Dealing with issues during a fire

Emergency procedures will be developed during the construction and commissioning phase. 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.

All staff and contractors will be trained in the site-wide emergency response procedures. 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 as part of the documented management systems.

The effectiveness of the emergency response procedures will be reviewed following any emergency incidents on-site. Where appropriate the procedures will be updated, 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 the Facility not being capable to receive waste, waste deliveries to the Facility will be stopped or diverted to a suitably licensed alternative waste management facility.

Deliveries of waste to the Facility will not be recommenced until it has been deemed safe for the Facility to be restarted following the incident. During a complete shutdown of the Facility, the fire detection systems will remain operational.

15.2 Notifying residents and businesses

The site 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 Fire Emergency Response Procedure 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 the Facility, and

as part of the development of the documented management systems associated with the operation of the Facility, 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.

15.3 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 the Facility, an assessment will be undertaken by the management team for the Facility, 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 will be backloaded from the bunker 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.

15.4 Making the site operational after a fire

If there was a significant fire requiring a full shutdown of the Facility, the Facility 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.

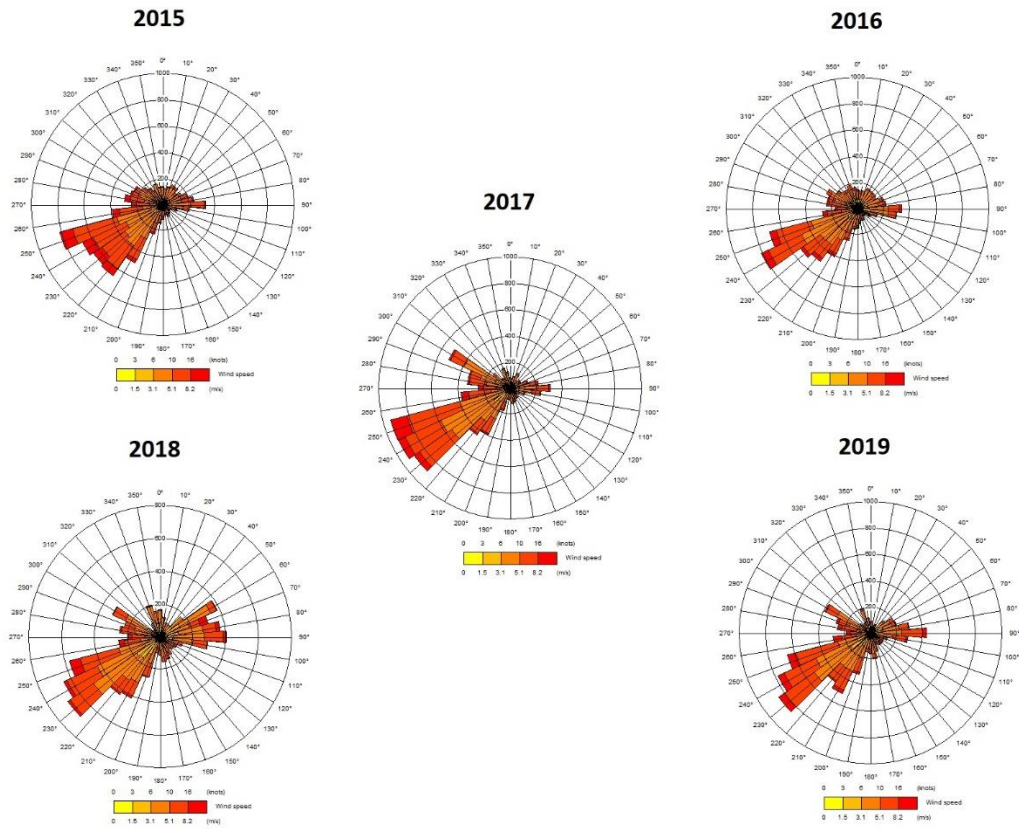
Records will be maintained in accordance with the requirements of the EP and any documented management systems.

Appendices

A Plans and drawings

- A.1 Site location plan
- A.2 Site layout plan
- A.3 Waste storage areas plan
- A.4 Access points around the perimeter to assist fire-fighting
- A.5 Indicative locations of fire hydrants
- A.6 Indicative locations of fire walls
- A.7 Indicative location of quarantine area
- A.8 Materials storage areas
- A.9 Indicative firewater storage and containment
- A.10 Indicative location of cylinders
- A.11 Fire Receptor Plan
- A.12 Areas of natural or unmade ground

B Wind roses



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