Riverside Energy Park

Environmental Permit Appendices

APPENDIX:

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FIRE PREVENTION PLAN

December 2018 | Revision 0 |

CORY
RIVERSIDE ENERGY

Contents

1 Introduction

1.1.1 Cory Environmental Holdings Limited (trading as Cory Riverside Energy) (Cory or the Applicant) is applying to the Environment Agency (EA) under The Environmental Permitting (England and Wales) Regulations 2016 (Environmental Permitting Regulations) for an Environmental Permit (EP) to operate an integrated Energy Park, to be known as Riverside Energy Park (REP or the Proposed Development). REP would comprise waste treatment facilities together with an associated Electrical Connection.

1.2 Project Description

1.2.1 A detailed description of REP is presented in sections1.4 to 1.6 of the Supporting Information. REP would be constructed on land immediately adjacent to Cory's existing Riverside Resource Recovery Facility (RRRF), within the London Borough of Bexley and would complement the operation of the existing facility.

1.2.2 The main elements of REP would be as follows:

- Energy Recovery Facility (ERF): to provide thermal treatment of Commercial and Industrial (C&I) residual (non-recyclable) waste with the potential for treatment of (non-recyclable) Municipal Solid Waste (MSW);
- Anaerobic Digestion facility: to process food and green waste. Outputs from the Anaerobic Digestion facility would be transferred off-site for use in the agricultural sector as fertiliser or as an alternative, where appropriate, used as a fuel in the ERF to generate electricity;
- Solar Photovoltaic Installation: to generate electricity. Installed across a wide extent of the roof of the Main REP Building;
- Battery Storage: to store and supply additional power to the local distribution network at times of peak electrical demand. This facility would be integrated into the Main REP building; and
- On Site Combined Heat and Power (CHP) Infrastructure: to provide an opportunity for local district heating for nearby residential developments and businesses. REP would be CHP Enabled with necessary on site infrastructure included within the REP site.

1.3 The Objective

1.3.1 The objective of this report is to provide a preliminary Fire Prevention Plan (FPP) for REP. The report would be subject to review following completion of detailed process design, which has not yet been undertaken. Detailed process design would be programmed following final contract negotiations with the Engineering Procurement and Construction (EPC) contractor who would be undertaking the construction works. The development is expected to take approximately three years to design, build, commission and switch to operational status.

1.3.2 This report has been developed in accordance with Environment Agency guidance note: Fire prevention plans v3, as published on the UK government website. The requirements of the FPP would be integrated within the emergency plans and procedures for REP to ensure that they are consistent and compatible with other management systems associated with the operation of REP.

1.3.3 A suite of emergency procedures for REP would be written and included in the training package for all staff and contractors. Training of site operatives will commence approximately

6 months prior to commencement of commissioning of REP, and all operational personnel would be tested on the fire prevention and emergency procedures.

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

- Environment Agency guidance '*Fire prevention plans*', November 2016;
- 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*', 2015 Edition; and
- the insurer's requirements where structures or equipment fall outside published guidance or recommended practice.

2 Site Location and Description

2.1 The Site

2.1.1 The REP site is located in Belvedere, in the London Borough of Bexley (LBB), in an area bounded to the north by the River Thames and the adjacent Thames Path long distance trail. It is bounded to the east by a boundary fence onto a public footpath linking Norman Road with the Thames Path, and to the west by a boundary fence onto the adjacent undeveloped Crossness Nature Reserve, between the REP site and Thames Water's Crossness Sewage Treatment Works (STW) site, approximately 200 m away. Within this area a public footpath links the Crossness Local Nature Reserve (LNR) with the Thames Path.

2.1.2 The REP site includes the existing jetty extending out into the River Thames but excludes the existing Riverside Resource Recovery Facility (RRRF) main building itself. The majority of the REP site is used for private vehicle circulation areas, the jetty access ramp, staff and visitor parking, open container storage, contractor maintenance, an electrical substation and associated landscape/habitat areas.

2.1.3 The REP site is accessed by river via the existing jetty and by pedestrians and vehicles from Norman Road, a single carriageway road linking to the dual carriageway A2016 Picardy Manor Way.

The Activities

2.1.4 Activities covered by this application include:

i. Twin line waste combustion ERF, processing incoming waste which would predominantly be delivered to REP by river. The ERF would:

- generate power and export electricity to the local electricity distribution network and have the potential to export heat from the ERF;
- produce an inert bottom ash material (referred to as Incinerator Bottom Ash (IBA)) that would be transferred off-site to a suitably licensed waste treatment facility for recovery/disposal; and
- generate an Air Pollution Control Residue (APCR) that would be transferred to a suitably licensed hazardous waste facility for disposal or recovery.

ii. The anaerobic digestion of organic waste to produce a biogas which will be subsequently upgraded to Compressed Natural Gas (CNG) and a digestate which will be suitable to be applied to land as a soil conditioner.

2.1.5 Table 2-1 lists the Schedule 1 activities, from the Environmental Permitting Regulations, and the directly associated activities.

Table 2-1 - Permitted Activities

Type of Activity	Schedule 1 Activity	Description of Activity
Installation	Section 5.1 Part A1 (b)	The combustion of non-hazardous waste in a waste incineration with a nominal design capacity of greater than 3 tonnes per hour. (Line 1)

Installation	Section 5.1 Part A1 (b)	The combustion of non-hazardous waste incineration with a nominal design capacity of greater than 3 tonnes per hour. (Line 2)
Installation	Section 5.4 Part A1 (b)	Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 100 tonnes per day, as the waste treatment activity is anaerobic digestion, involving biological treatment.
Directly Associated Activities		The receipt and storage of municipal and commercial and industrial waste prior to incineration.
Directly Associated Activities		The receipt and storage of organic waste prior to anaerobic digestion.
Directly Associated Activities		The handling, storage and transfer of residues for transfer off-site.
Directly Associated Activities		The export of electricity and potential export of heat from the Installation.

2.1.6 The ERF would include two energy recovery lines, waste reception, waste storage, water, auxiliary fuel and air supply systems, boilers, facilities for the treatment of exhaust gases, on-site facilities for treatment or storage of residues and waste water, flues, stack, devices and systems for controlling operation of the waste incineration plant, including recording and monitoring flue gas conditions.

2.1.7 The anaerobic digestion plant includes a single treatment line, waste reception, shredder, waste handling systems, digester, digestate storage, biogas storage, gas engines and [potentially] gas upgrade facilities.

2.2 Site plans & drawings

2.2.1 Included in Appendix A are the:

- site location plan (Appendix A.1);
- site layout plan (Appendix A.2);
- waste storage areas plan (Appendix A.3);
- access points around the perimeter to assist fire-fighting (Appendix A.4); and
- indicative locations of fire hydrants and water supplies (Appendix A.5).

2.2.2 As stated in paragraph 1.3.1, detailed process design would be undertaken following final contract negotiations with the EPC contractor. Following completion of detailed design, the following drawings would be included within the 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.

2.2.3 Wind roses showing the direction of the prevailing winds for the Facility for 2013 to 2017, as taken from London City airport, are presented in Appendix B.

3 Fire Prevention

3.1 Waste storage

ERF bunker

3.1.1 Incoming waste for processing in the ERF would be transferred to the ERF bunker. Allowing for stacking within the ERF bunker, the waste storage capacity of the ERF bunker would be approximately 35,000 – 40,000 m3. Following consultation with the EA on the minimum height above ground level for the key components of REP including flood sensitive components, the finished floor level will be set to at least 2.97 m AOD, within the Main REP Building. Allowing for this, the maximum capacity of the bunker would be approximately 12,000 tonnes, which would be equivalent to 6 days of waste processing capacity. If there is an extended unforeseen shutdown of the ERF occurs, a facility is included into the design which will allow for waste to be back loaded from the ERF bunker and transferred off-site to a suitably licenced waste management facility.

3.1.2 With respect to the potential volume of firewater required, this would be considerably less than the total potential (or 'airspace') volume of the bunker i.e. reduced by the volume taken up by waste at the time of a potential fire.

3.1.3 The ERF bunker is designed as a fire compartment. Water cannons would be installed over the waste bunker, refer to paragraph 4.8.20 to 4.8.22. The roof steelwork above the bunker would be protected with water sprinklers in the event of a fire within the bunker. These measures are in in accordance with the requirement of NFPA and insurers for plants which combust waste derived fuels, including the adjacent RRRF.

3.1.4 Bunker management procedures would be adopted to ensure that there is a constant turnover of waste within the bunker preventing hot spots or anaerobic conditions within the waste bunker. The crane would be sized to allow for mixing and rotating the waste within the waste bunker whilst providing appropriate quantities of waste within the feed hopper to maintain operation of the waste combustion process.

3.1.5 Thermal imaging cameras would be fixed around the perimeter of the bunker to provide the crane driver with a continuous thermal 'map' of the bunker. The crane driver would, therefore, be able to identify and react to hot areas in the bunker and undertake mixing or feeding of waste as appropriate, or in extreme cases use the firewater cannons to extinguish any smouldering/burning waste. In addition, there would be flame detectors located above the waste fed hoppers, with an associated deluge system.

3.1.6 The non-hazardous waste types, which may comprise municipal or commercial and industrial waste, which would be treated within the ERF are presented in Table 3-1:

Table 3-1: Waste to Be Processed in the ERF

EWC Code	Description of Waste
02	**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
02 02	**wastes from the preparation and processing of meat, fish and other foods of animal origin**
02 02 03	materials unsuitable for consumption or processing
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
02 07	**wastes from the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa)**
02 07 04	materials unsuitable for consumption or processing
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 08	wastes from sorting of paper and cardboard destined for recycling
04	**WASTES FROM THE LEATHER, FUR AND TEXTILE INDUSTRIES**
04 02	**wastes from the textile industry**
04 02 21	wastes from unprocessed textile fibres
04 02 22	wastes from processed textile fibres
15	**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 05	composite packaging
15 01 06	mixed 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 02	**wastes from electrical and electronic equipment**
16 02 16	components removed from discarded equipment other than those mentioned in 16 02 15
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	Wood
17 02 03	Plastic
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 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
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 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
19 12 04	plastic and rubber
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
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
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 32	medicines other than those mentioned in 20 01 31
20 01 36	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35
20 01 38	wood other than that mentioned in 20 01 37
20 01 39	Plastics
20 01 41	wastes from chimney sweeping
20 02	**garden and park wastes (including cemetery waste)**
20 02 01	biodegradable waste
20 02 03	other non-biodegradable wastes
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 07	bulky waste

Quarantine area for unacceptable waste

3.1.7 A suitable area for the quarantine of unacceptable waste will be identified as part of the detailed design stage. A single quarantine area will provide storage for all incoming waste, i.e. waste to be processed in the ERF and the anaerobic digestion plant.

3.1.8 Appropriate fire detection and protection measures (e.g. smoke / flame detectors, hose reel, sprinklers, or water cannon) will be installed in the quarantine area. The final design of the quarantine area will be subject to detailed design and agreed with fire risk insurers.

Incinerator Bottom Ash (IBA)

3.1.9 Bottom ash from the waste incineration process will be transferred to the IBA storage area. The IBA storage area will be an enclosed concrete bunker, located adjacent to the boiler hall. The size of the IBA storage area will be subject to detailed design, but it is estimated that it will have a capacity to store approximately 1,900 m^3 of IBA.

Air Pollution Control Residues

3.1.10 Air Pollution Control Residues (APCR) will be stored within APCR silo(s). The design of the silo(s) is subject to detailed design, but it is expected that the capacity of the silo(s) will be approximately 600 m^3 in total. The silo(s) will be elevated above-ground level so that APCR can be discharged into road tankers from above. Removal of the APCR will be by sealed tankers which will drive alongside the silo, from which telescopic chutes will be used to discharge the APCR into the road tankers.

Anaerobic Digestion bunker

3.1.11 Incoming organic waste for processing in REP will be transferred to the anaerobic digestion bunker. The maximum waste storage capacity of the anaerobic digestion bunker would be approximately 1,000 m^3. The anaerobic digestion bunker will be a subsurface structure of concrete construction and located within the Main REP Building.

3.1.12 The anaerobic digestion bunker is designed as a fire compartment. Water cannons will be installed over the anaerobic digestion bunker, refer to paragraphs 4.8.20 to 4.8.22. The roof steelwork above the anaerobic digestion bunker will be protected with water sprinklers to activate in the event of a fire within the anaerobic digestion bunker. These measures are in accordance with the requirement of NFPA and insurers for waste combustion plants in the UK.

3.1.13 The waste types to be treated within the anaerobic digestion plant are presented in Table 3-2:

Table 3-2 – EWC codes to be treated in the anaerobic digestion plant

EWC Code	Description
02	**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 02	animal-tissue waste
02 01 03	plant-tissue waste
02 01 06	animal faeces, urine and manure (including spoiled straw), effluent, collected separately and treated off-site

EWC Code	Description
02 02	**wastes from the preparation and processing of meat, fish and other foods of animal origin**
02 02 02	animal tissue waste − Category 3 ABP including blood, animal flesh, fish processing waste, fish carcasses, poultry 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	biodegradable materials unsuitable for consumption or processing (other than those containing dangerous substances)
02 05	**wastes from the dairy products industry**
02 05 01	biodegradable materials unsuitable for consumption or processing (other than those containing dangerous substances) − solid and liquid dairy products, milk, food processing wastes, yoghurt, whey
02 07	**wastes from the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa)**
02 07 99	spent grains, hops and whisky filter sheets/ cloths.
03	**WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER AND CARDBOARD**
03 03	**wastes from pulp, paper and cardboard production and processing**
03 03 08	wastes from sorting of paper and cardboard destined for recycling
04	**WASTES FROM THE LEATHER, FUR AND TEXTILE INDUSTRIES**
04 02	**waste from the textile industry**
04 02 01	organic matter from natural products, e.g. grease, wax
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 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 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 wastewater treatment works**
19 08 09	grease and oil mixture containing only edible oils and fats
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

EWC Code	Description
20 01 08	biodegradable kitchen and canteen waste
20 01 25	edible oil and fat
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 − separately collected biowastes
20 03 02	wastes from markets

Solid Digestate Storage

3.1.14 Solid digestate would be collected from the digestate dryer and transferred via wheel loader to the compost maturation area prior to transfer off-site. The storage bays would have a capacity for the storage of approximately 500 tonnes of digestate.

3.2 Storage duration

Waste bunker

3.2.1 Allowing for the design capacity of the ERF, it is estimated that the maximum period which waste would remain in the waste bunker during normal operation is approximately 6 days, or additional days if a shut-down of the Facility occurs. However, the quantity of waste stored within the bunker would be significantly reduced prior to the planned shut-down.

Quarantine area for unacceptable waste

3.2.2 The quarantine area would be used for the inspection and storage of unacceptable waste. Waste would only be retained in this area for a few hours whilst it is inspected. After inspection and verification of the waste it would either be:

- transferred to the waste bunker;
- transferred off-site to the adjacent landfill; or
- transferred off-site to suitably licensed waste management facility.

IBA

3.2.3 The IBA storage area would have sufficient capacity for the storage of approximately 5 days of IBA, assuming that the Facility operates continuously at the nominal design capacity.

APCR

3.2.4 APCR would be stored within APCR silos which have been sized to be equivalent to approximately 4 or 5 days of storage at the nominal design capacity of the Facility.

Anaerobic Digestion bunker

3.2.5 The anaerobic digestion bunker would have storage capacity to maintain the operation of the Anaerobic Digestion plant for an extended weekend period – assumed to be up to 4 days.

Solid Digestate Storage

3.2.6 The compost maturation area will have a storage capacity to 7 days of operating capacity of the anaerobic digestion process. Therefore, the dried digestate would be stored in this area for up to 7 days.

3.3 Monitoring of stores for waste and recovered materials

3.3.1 In accordance with the waste acceptance procedures for the installation, unloading of all waste deliveries would be supervised by operational staff.

3.3.2 CCTV would be installed in all areas where vehicles discharge waste into waste reception facilities, and areas where wastes and recovered materials are discharged from the processes. The design of the CCTV systems would be undertaken during detailed design of the Facility.

3.3.3 Within the Facility, the waste bunker would be continuously monitored by the fully automatic thermal imaging system linked to the water cannons. During daytime operation, the bunker would be visually monitored by control personnel. At night time the control personnel will visually monitor the bunker as part of their responsibilities for operating the Facility.

3.4 Actions to limit self-heating

ERF Bunker

3.4.1 There would be thermal imaging cameras fixed around the perimeter of the ERF bunker to provide the control personnel with a continuous thermal ‘map’ of the surface of the waste pile within the bunker. The control personnel would, therefore, be able to identify and react to hot areas in the bunker and undertake mixing or feeding of waste as appropriate.

3.4.2 The turning of waste within the bunker is standard practice at UK plants that combust waste derived fuels. 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 helps to release heat that has built up in the waste. By taking grabs of waste and then spreading over a wider area, turning dissipates entrained heat and removes thermal inertia within the waste. It also increases the evaporation of water, a heat absorbing process. These factors help to minimise the risk of self-heating and ignition.

3.4.3 In extreme cases, if the heat does not dissipate as expected, the firewater cannons or sprinkler system would be used to extinguish any smouldering/burning waste, with the cannons providing the principal method of extinguishing the smouldering/burning waste.

IBA storage

3.4.4 Due to the high thermal temperatures in which the IBA has been combusted, it would not be expected for the IBA to contain any combustible materials which could self-combust from elevated temperatures within the IBA.

APCR

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

Anaerobic Digestion bunker

3.4.6 There would be thermal imaging cameras fixed around the perimeter of the anaerobic digestion bunker to provide the control personnel with a continuous thermal 'map' of the surface of the waste pile within the bunker. The control personnel would, therefore, be able to identify and react to hot areas in the bunker and undertake mixing or feeding of waste as appropriate.

3.4.7 The turning of waste within the bunker is standard practice at waste treatment plants. As well as helping to mix the waste (to produce a more homogenous feedstock to the anaerobic digestion process), it helps to prevent the formation of hotspots. Turning helps to release heat that has built up in the waste. By taking grabs of waste and then spreading over a wider area, turning dissipates entrained heat and removes thermal inertia within the waste. It also increases the evaporation of water, a heat absorbing process. These factors help to minimise the risk of self-heating and ignition.

3.4.8 In extreme cases, if the heat does not dissipate as expected, the firewater cannons or sprinkler system will be used to extinguish any smouldering/burning waste, with the cannons providing the principal method of extinguishing the smouldering/burning waste.

Solid Digestate Storage

3.4.9 The solid digestate will have a high moisture content (approximately 55%), so the action of self-heating is not considered to be a concern.

3.5 Contingency

3.5.1 In the event that REP is not able to receive waste due to an unplanned incident forcing a full shut-down of the Facility, waste deliveries would be diverted to the adjacent RRRF.

3.5.2 If there was a significant fire requiring a full shut-down of the Facility, the Facility would not re-start operations until the relevant regulatory authorities (Fire Service, Health and Safety Executive, Environment Agency, etc) as well as the fire insurers, advised that it was safe to do so.

3.5.3 If REP was not available due to a period of extended unplanned maintenance, facilities would be provided for the waste within the ERF bunker to be back-loaded from the bunker for transfer to the adjacent RRRF.

3.5.4 For periods of planned maintenance, the waste levels within the bunker would be maintained to ensure that the quantities of waste within the bunker can be combusted.

3.5.5 The temperature of waste in the waste bunker will continue to be monitored by the thermal imaging system during plant shut-down. Therefore, the crane operators or the control room would be able to continue to mix waste to prevent excessive temperatures in the bunker or use the fire-fighting cannons as necessary.

3.6 Seasonality

3.6.1 The operation of REP is not expected to follow any seasonal variations in the demand for the incoming wastes to be treated or the resultant residues generated. However, it is note that there may be some seasonal variation in the proportions of food and green waste within the organic waste treated within the anaerobic digestion plant.

3.7 Arson or vandalism

3.7.1 Security measures will prevent access by members of the public and thereby prevent the risk of arson attacks or vandalism. REP would be bounded by security fencing and monitored using CCTV. A barrier would be present at the entrance and exit to site to control vehicular access. Only authorised visitors will able to enter the Site.

3.7.2 REP would be operational and manned 24 hours, 7 days a week, with the CCTV system monitored in the control room by the operators.

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

3.8 Plant and equipment

3.8.1 An operating and maintenance manual (O&M manual) would 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 the plant and equipment which requires maintenance.

3.8.2 Maintenance procedures would be developed to cover all plant and equipment within REP. As part of such work instruction development the risk of fire would be considered, and appropriate activities included within the work instruction to reduce the risk of fire in all plant and equipment.

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

3.9 Infrastructure and site inspections

3.9.1 Regular site inspections would be undertaken which will cover all operational areas as part of the normal operating procedures. Records of site inspections would be retained on-site. Inspections would be carried out on a continuous basis, but as a minimum an inspection of the main operational areas would be carried out during every operating shift with maintenance work instructions raised for any items identified.

3.10 Electrical faults

3.10.1 The risk of electrical faults on site would 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.

3.10.2 Electrical equipment would be checked and maintained as part of the planned maintenance regime as required in the detailed operating manuals for each piece of equipment.

3.11 Ignition sources

3.11.1 Vehicles and electrical items necessary for the operation of REP would be regularly inspected for electrical faults. All mobile plant serving REP would be fitted with fire extinguishers and dust filters.

3.11.2 Naked sources of ignition would be controlled through a hot work management system. This system will cover both staff and contractors working at REP. 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.

3.11.3 As part of the hot work management system, the potential for sources of ignition to cause fires would 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 would be followed as part of this management system. This will include ensuring that the location of stored mobile plant, which is subject to detailed design of the Facility, would be stored at least 6 metres away from combustible wastes.

3.11.4 All visitors would be informed about the fire safety precautions as part of the induction procedures.

3.12 Industrial heaters

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

3.13 Leaks and spillages of oils and fuels

3.13.1 Emergency response procedures would be developed as part of the emergency procedures for REP. 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.

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

3.14.1 REP would be designed to prevent the accumulation of dusts by designing conveying systems, waste and ash bunkers, workshop, electrical rooms, reagent / residue area to minimise the areas where dust can settle.

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

- the use of an enclosed fuel reception/unloading building with air extraction and filtration system; and
- mechanical ventilation of waste storage areas to prevent fugitive emissions from the building facade.

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

3.14.4 On a regular basis, inspections would be undertaken to identify the build-up of loose combustible waste, dust and fluff. Where inspections identify that there has been a build-up of loose combustible waste, dust and fluff, appropriate cleaning would be undertaken to clean this material from hot surfaces.

3.15 Hot exhausts

3.15.1 A fire watch system would be implemented to detect signs of fires from dusts settling on hot exhausts. This would be developed as part of the operating procedures. This will include daily visual checks of dusts settling on hot exhausts as part of the operational checks by operational staff for each shift.

3.16 No smoking policy

3.16.1 A no smoking policy would be adopted and implemented at REP. Smoking would be prohibited in operational areas. External areas designated for smoking within the Installation Boundary would be identified, with suitable facilities provided for staff.

3.17 Heat and spark prevention

3.17.1 A review under the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) would be completed during the detailed design of REP, with any risk areas identified on zoning drawings.

3.18 Gas bottle and other flammable items

3.18.1 Gas cylinders would be stored within purpose-built dedicated storage facilities. All facilities for the storage of gas cylinders would be kept locked/secured. The location of gas cylinder storage and other flammable items would be subject to detailed design. A plan showing the location of gas storage facilities would be included in Appendix A upon completion of detailed design.

3.18.2 A system for the regular inspection of gas storage facilities would be developed as part of the operating and maintenance procedures and the site inspection regime.

3.19 Fire watch

3.19.1 Operational staff would be briefed on the need for monitoring for the early signs of fires. The waste bunker and all main process areas would have CCTV to allow remote monitoring from the control rooms on a continuous basis.

3.19.2 All waste delivered to REP would be supervised by operational staff, who would be responsible for the inspection and monitoring of waste deliveries.

3.20 Smoke/heat/flame detectors

3.20.1 The choice of fire detection system (smoke/heat/flame and carbon dioxide detectors) to be installed within the Facility is subject to detailed design. The fire detection systems would be covered by a UKAS-accredited third party certification scheme.

3.20.2 A plan showing the chosen fire detection systems for the different areas of REP, depending on the suitability of each detection type for each process area, would be presented in Appendix A upon completion of detailed design.

4 Management and Storage of Waste

4.1 Incompatible/hot loads

4.1.1 Waste acceptance procedures would be developed for REP. These will include considerations for incompatible wastes and hot loads.

4.1.2 Non-permitted wastes or incompatible waste would be identified by the delivery driver or by the operator through examination of the waste as it is being unloaded within the waste reception areas. Furthermore, if unacceptable waste is identified within the bunker it would be able to be removed from the bunker using the crane grab.

4.1.3 Unacceptable wastes, including incompatible wastes and hot loads would be transferred to a dedicated quarantine area.

4.2 Waste acceptance - permitted waste

4.2.1 Prior to commencement of operations, waste acceptance procedures would be developed and implemented. This fire prevention plan would be updated following development of the procedures. The procedures will include arrangements for the management of wastes which are permitted to be treated.

4.3 Waste storage – separation distance

4.3.1 It is understood that the storage requirements relating to pile separation distances only applies to external storage of wastes. As detailed in section 3.1, all wastes which are delivered or stored within the Site would be within buildings. Taking this into consideration, the pile separation distances would be adopted as good practice where feasible.

4.4 Fire walls

4.4.1 Fire walls would be installed within the buildings as required. The location and specification for fire walls would be subject to detailed design.

4.4.2 Subject to the location of the process equipment, operational areas would be segregated into fire zones (the "Fire Zones"). In accordance with NFPA 850, certain specific Fire Zones such as the ERF waste bunker and boiler hall would 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 would be subject to agreement with the fire risk insurers.

4.4.3 As part of the detailed design process, a fire risk assessment would 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.

4.4.4 The fire zoning would be subject to the approval of the fire risk insurers.

4.4.5 The dividing wall between the ERF bunker hall and boiler hall would be suitably constructed in concrete, block work or suitably rated cladding system up to roof level to form a continuous fire rated barrier for the full width and height of the building structure. Any doors within this wall would be fire rated. 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. This dividing wall would be resistant to crane grab impact and the impingement of water cannon jets.

4.4.6 Any exposed steel columns located at the front of the waste bunker would be protected against structural damage caused by fire or mechanical damage. This protection would be provided by concrete encasement or other acceptable means and would extend from the base of the column to the roof of the refuse pit enclosure.

4.4.7 All openings in fire barriers would be provided with fire doors, including if feasible airlock systems, 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.) would 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 would be fitted with fire stops.

4.4.8 In addition, the glass partition in the control room / crane cabin, would be fire rated.

4.5 Quarantine areas for unacceptable waste

4.5.1 The Facility is subject to detailed design, but it can be confirmed that, where appropriate, the quarantine areas would be in accordance with the requirements of the fire prevention plan (FPP) guidance, i.e. it will:

- hold at least 50% of the volume of the largest pile, row or block of containers at the Facility; and
- where practicable have a separation distance of at least 6 metres around the quarantined waste.

4.5.2 Following completion of detailed design, plans showing the location of all quarantine areas would be developed. The plans will show the size of the quarantine area, clearance areas around the perimeter, and infrastructure associated with the quarantine areas.

4.5.3 Fire detection and protection measures (e.g. smoke / flame detectors, hose reel, sprinklers, or water cannon) would be installed in this area, the final design being subject to the recommendations of the final fire strategy completed during the detailed design phase of the project and agreed with insurers.

4.6 Storage within buildings

4.6.1 The detailed arrangements for waste storage are explained within section 3.1, but it can be confirmed that all incoming wastes and residues following processing would be stored within buildings.

4.6.2 As part of the detailed design and construction of REP, the fire system design would be designed and installed by a suitably qualified and experienced fire engineering company, which employs appropriately qualified persons. The system would be developed in accordance with NFPA 850, which is an industry standard for fire protection systems for power generating facilities, the local fire officer, the fire risk insurers and any relevant standards and codes of practice. Where appropriate, waste storage areas would be designed with automatic

fixed fire detection and suppression systems to enable a fire to be supressed in less than 2 hours.

4.7 Shut-down

4.7.1 The duration of planned shut-downs will vary significantly, dependent on the nature of the work required, and typically will not extend beyond two weeks. The likelihood of a full shutdown of REP is considered to be low, due to the two separate waste combustion streams and the anaerobic digestion plant. Planned shutdowns will typically be phased, so that only one line of the ERF would be shutdown at a time. During periods of shutdown of a single line, the waste would be maintained at suitable levels to provide sufficient waste to maintain operation of a single line, and all other incoming waste being diverted to the adjacent RRRF.

4.7.2 When any of the waste treatment processes are shut-down, whether it is planned or unplanned, both engineered fire detection controls and procedures would be implemented to minimise the risk of a fire within waste storage areas.

4.7.3 The frequency of inspection of waste storage areas would be increased during a full shut-down. The operation of all thermal monitoring equipment would be maintained during all periods of shut-down where there is waste within the bunkers.

4.8 Active fire fighting

4.8.1 The fire fighting system on site would be subject to detailed design. The main features of the fire system are described in the following sections.

Fire prevention standards

4.8.2 Where appropriate, REP would be designed and operated in accordance with the following fire prevention and detection standards, or alternative recognised international standards where they are available:

- BS EN 671: Fixed fire-fighting systems;
- BS 5266: Emergency Lighting;
- BS 5839: Fire Detection and Alarm systems for buildings;
- BS EN 15004: Fixed Firefighting systems – Gas extinguishing systems;
- BS EN 12845: Fixed fire fighting systems – Automatic sprinkler systems – Design, installation and maintenance;
- BS 5306: Fire extinguishing installations and equipment on premises;
- 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; and
- Building Regulations, in particular Approved Document B, Volume 2 – Buildings other than dwelling houses, Section B5, Access and facilities for the fire service.

Fire detection systems

4.8.3 There would be a fire detection and alarm system which will cover all of the waste processing areas within REP. 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) would be in the control room.

4.8.4 The fire detection system will, in general, be designed to categories P1 & M as defined in BS 5839. In low fire risk areas, e.g. the Boiler house, the requirements for a P1 detection system may be relaxed. In areas which are identified as having a low fire risk, proposed detection method(s) would 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.

4.8.5 The following fire detection systems would be incorporated into the design of the Facility.

iii. Tipping hall -fire detection would be provided by flame detectors in accordance with an appropriate risk assessment study.

iv. Waste bunker fire detection would be provided by thermal imaging cameras and flame detectors which would 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. This will allow the operator 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 as the primary means of fighting a bunker fire.
- To proactively prevent fires the system would be configured to alarm based on certain conditions. The thermal imaging cameras would be set with two triggers/alarms at different temperatures. As indicated in insurer guidelines, high temperature sprinkler heads would be utilised, and temperature set-points would be determined during detailed design and in consultation with the fire service.
- 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.
- Following activation of the high-high temperature alarm in an area within the bunker, the area with an elevated temperature would be targeted and the firewater cannons would be activated to reduce the temperature in the area where self-heating has occurred.

- The system can be designed so that the trigger temperature for the fire detection systems can be amended if required from operational experience.

v. Feed hopper area fire detection would be provided by the waste feed hopper supervision camera and a deluge system to flood the feed hoppers if required.

vi. In the boiler house the boiler auxiliary burner fuel supply valve train will have a wire and fusible link system or heat detector and solenoid valve such that in the event of an external fire the local fuel supply isolation valve (fuel oil) is automatically closed.

vii. Electrical rooms with significant concentrations of electrical equipment such as switchgear rooms, low voltage rooms, control system rack room, Uninterruptible Power Supply (UPS), crane control cabinet rooms etc. would be fitted with fire detection systems.

- The fire detection would be by means of a 'double knock' system composing of ionisation (or heat and smoke) detectors to minimise the risk of false activation. In addition, Manual Call Points would be installed in all areas. The detection system would be designed for ease of regular testing to demonstrate correct operation. Suitable automatic fire protection systems would be located within the rooms. The electrical equipment would be installed within e-housing rooms which are of a steel construction with dedicated fire detection and suppression systems.

viii. Transformer protection would provide complete water spray impingement on all exposed exterior surfaces. In accordance with fire insurers requirements, the water would be applied at a net rate not less than 10.2 mm/m^2 of projected area of rectangular prism envelope for the transformer and its appurtenances, and not less than 6.1 mm/m^2 on the expected non-absorbent ground surface area of exposure. Water spray application shall include the conservator tanks, pumps, etc.

- Dry-type transformers would be used for indoor transformer installations. If appropriate, enclosures for dry-type transformers would be provided with suitably designed fire detection systems.

ix. The turbine-generator and ancillaries would be protected by a dedicated fire detection and automatic sprinkler fire protection system. The main areas of control would be associated with the turbine, generator and lubricating oil skid. The fire detection and protection system would be installed such that detectors cover all the areas of risk.

- Automatic actuation of the fire protection systems via a double knock system with manual operation from the control room shall be provided

- The fire detection systems would be installed in accordance with NFPA 850. In addition, in accordance with NFP850 all areas beneath the turbine-generator operating floor that are subject to oil flow, oil spray, or oil accumulation would be protected by an automatic sprinkler or foam-water sprinkler system.

- Whilst it is subject to detailed design, if the turbine generator is housed in an enclosure, then an automatic total flooding water mist system, or inert gas fire suppression system would be installed.

- A 'double knock' system would be used with a dry glass bulb for 1st knock and dedicated heat detectors as the 2nd knock. Break glass units would be installed at each entrance to the turbine hall. These detection and protection systems would be segregated from the main fire detection and protection system. Locations of pipes and equipment would be designed to minimise the risk of oil

fires spreading. Passive fire protection to the generator and the cooling system would be designed in accordance with the requirements of the fire insurer.

- Procedures would be developed in the operation of the fire detection systems. Training would be provided to the relevant staff in the different fire detection systems. Training records in the operation of the fire detection systems would be retained on-site.
- All automatic fire detection and alarm systems would 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 would be produced during detailed design.
- It would be the responsibility of the shift managers to monitor fire alarms.

Fire suppression systems

4.8.6 There would be a fire suppression system installed in the locations considered by the fire strategy and NFPA 850 to be at risk of fire. The fire suppression systems would include:

- automatic sprinkler/water deluge systems for the fuel reception areas, waste bunker, waste feed hopper, step-up transformer area, 33 kV series circuit reactor, fire pump container and the emergency diesel generator;
- automatic foam systems for the turbine generator and lube oil systems, auxiliary burners;
- inert gas suppression for the electrical rooms and CEMS container; and
- carbon dioxide gas suppression system for the bag filters in the flue gas treatment system.

4.8.7 The automatic fire suppression systems would be designed and maintained by a suitably qualified, experienced and registered fire protection engineer. The fire suppression systems would be covered by a recognised (typically UKAS) third party certification scheme.

4.8.8 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 would be produced following detailed design.

Alternative fire detection and suppression measures

4.8.9 In addition to the fire detection and suppression systems identified in sections 0 and 0, the design of the Facility would include a number of 'additional measures' to prevent the spread of fire, such as fire walls (section 4.4), fire hose reels and wet riser system (section 0), and fire extinguishers (section 0).

4.8.10 The overall design of the Facility, including the fire detection and fire suppressions systems where applicable have been designed to achieve the requirements of the guidance, such as:

- 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.

4.8.11 In addition, in the event of a significant fire within the waste bunker, the plant would initiate a shut-down which will include the shut-down of the induced draft 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.

Provision of firewater

4.8.12 The Facility would have a firewater storage tank designed in accordance with the requirements of BS 5306.

4.8.13 The firewater storage tank would be connected to the local water supply and would be installed with a suitable system to prevent freezing. The tank would 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).

4.8.14 The automatic fixed fire suppression systems for the Facility would be designed in accordance with the requirements of ACE (ACE Technical Risks - Engineering Information Bulletin Guidance Document) and NFPA850. The water storage capacity for the fire protection systems would be based on providing a 2-hour supply based on the flow rate requirements for the sum of items (1) and (2) as:

a. the greater of items (i) or (ii) below:

   i. the largest fixed fire suppression system demand; or

   ii. any fixed fire suppression system demands that could reasonably be expected to operate simultaneously during a single event, e.g. turbine under floor protection in conjunction with other fire protection system(s) in the turbine area; and

b. a reasonable assessment of anticipated hose stream demand at not less than 1,890 l/min for 10 minutes.

4.8.15 The firewater tank would be designed to ensure the required firewater capacity is available for fire protection at all times.

4.8.16 It is estimated that the size of the firewater tank would be approximately 1,000 to 1,200 m^3. The exact size of the firewater tank would be confirmed following detailed design. When specifying the sizing for the firewater tank, it would 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.

4.8.17 The FPP Guidance requires a supply of firewater of 2,000 litres/minute 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 storage capacity of 40,000 m^3, the guidance implies the need for a 48,000 m^3 fire water tank, which is excessive. The waste bunker is a contained concrete structure, with rated fire walls (refer to section 4.4). The provisions for fire-fighting in this area would be in accordance with NFPA 850 and as required by the fire risk insurers.

4.8.18 It is noted that the Facility is located adjacent to the River Thames. In the event that there was a significant fire at the Facility, water could be pumped from the River Thames to be used for fire fighting purposes by the emergency services.

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

Bunker cannons

4.8.20 Thermal cameras would 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 (assumed to be 90°C, however subject to agreement with the fire risk insurers) water cannons installed around the bunker will automatically operate to prevent the potential for fire spreading within the bunker. The water cannons within the waste bunker will operate automatically, although they can also be operated remotely from the control room.

4.8.21 The cannons would be located in positions to optimise the horizontal and vertical coverage of the water spray(s) for total firefighting suppression across the entire area of the bunker.

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

Fire hose reel system and wet riser system

4.8.23 Hose stations would be designed in accordance with BS 5041 - Specification. Fire hydrant systems equipment would be provided at strategic positions within the Facility for firefighting in fire risk areas.

4.8.24 For firefighting purposes hose reels and extinguishers where appropriate would be provided within the buildings based on a minimum 65 mm diameter 30m length collapsible type rubber hose reels

4.8.25 The positioning of hose points would take into account the following:

- location and physical protection so 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.

4.8.26 Following detailed design of the Facility, a plan identifying the location of the fire hose reels would be developed.

Fire hydrant and mains

4.8.27 Fire hydrants would be designed in accordance with NFPA 14, Standard for the Installation of Standpipe, Private Hydrants, and Hose Systems, or BS equivalent and would be connected to a ring main at strategic positions around the Facility to provide firewater supplies to external fire risk areas. The fire hydrants would be designed in accordance with the requirements of the Building Regulations and the fire service; and spaced at no greater than 90 metres apart and within 12 metres of the building.

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

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

- protection from freezing.

4.8.29 The fire hydrants would be fed from the fire water storage tank and maintain the required pressure in accordance with the requirements of the fire service.

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

Fire extinguishers

4.8.31 Fire extinguishers would be strategically located throughout the operational areas in accordance with the requirements of BS 5306: Part 3.

4.8.32 The location of the fire extinguishers would 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 would be developed and presented in Appendix A.

Containment of firewater

4.8.33 The containment systems for firewater would be subject to the appointment of an EPC contractor who would be responsible for the design and construction of the Facility. However, it can be confirmed that drainage and prevention of flooding of equipment and the fire retention would be accomplished by installation of one or a combination of:

- floor drains;
- floor trenches;
- open doorways or other wall openings;
- kerbs for containing or directing drainage;
- equipment pedestals; and
- pits, sumps, and sump pumps.

4.8.34 The provisions for drainage and any associated drainage facilities, and in particular drainage for the turbine hall deluge system would be sized to accommodate the concurrent flow due to operation of the following components:

- 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.

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

- Firewater resulting from treating fires in the bunker and tipping hall area. This firewater is routed to the bunker which is watertight and hence can contain large amounts of firewater

(the volume of the bunker from the base to the tipping apron is between 19,000 - 20,000 m^3, subject to detailed design of the bunker).

- 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 water would be contained in the process drainage system within the main building.

- Firewater from outside any building. Such firewater would be contained in the site drainage systems. The drainage system would be installed with a penstock valve which will prohibit the discharge of contaminated surface water from being discharged off-site. If the firewater is contaminated, it would be pumped out, and transferred off-site to a suitably licensed waste management facility. If it is not contaminated it would be discharged off-site into the appropriate surface water drainage systems.

Contingency during the incident

4.8.36 Emergency procedures would 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; and
- requirements for diverting incoming waste.

4.8.37 All staff and contractors would be trained in the emergency response procedures for the waste combustion process as well as the site-wide emergency procedures. Where specific responsibilities are given to specific staff, training would be provided to those employees. Training records in the emergency response procedures for all staff and contractors would be retained on-site.

4.8.38 The effectiveness of the emergency response procedures would be reviewed following any emergency incidents on-site. Where appropriate the procedures would be updated and staff trained in the updated procedures.

4.8.39 A copy of the emergency procedures would be maintained at the gate house, or other suitable location, and will 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.

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

4.8.41 In the event of an incident resulting in REP not being capable to receive waste, waste deliveries to the ERF would be diverted to RRRF; and organic waste would be diverted off-site.

4.8.42 Deliveries of waste to REP will not be recommenced until it has been deemed safe for the ERF and/or anaerobic digestion plant to be restarted following the incident.

Appendix 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 and water supplies.

Appendix B Windrose - London City Airport