Riverside Energy Park

Environmental Permit and Air Quality Note

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Contents

Tables

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1 Introduction

1.1.1 The application for the Riverside Energy Park (REP) Development Consent Order (DCO) was submitted to the Secretary of State on 16 November 2018. An application for an Environmental Permit (EP) to operate REP was submitted to the Environment Agency (EA) in December 2018.

1.1.2 Operations at REP cannot commence unless an EP is granted by the EA. An EP can also be referred to as a 'Permit to Operate'.

1.1.3 The EP application covers both the Anaerobic Digestion and Energy Recovery Facility (ERF) elements of the Proposed Development.

1.2 Purpose of this Report

1.2.1 The purpose of this report is as follows:

- to provide an update on the status of the EP application process;
- to explain why the EP determination process is being undertaken in parallel to the DCO application process;
- to provide an update on the abatement technology being proposed for the ERF element of REP within the EP application;
- to explain the Applicant's response to general sensitivities relating to wider air quality issues within Greater London through a commitment in the EP application to the use of low emission abatement technology. This investment will provide one of the 'lowest' emission limits within an EP application for any conventional ERF within London or the UK;
- to provide an update on the status of the R1 application process. If R1 status is granted by the EA, it demonstrates that the ERF is classified as a '*Recovery operation*', in accordance with the waste hierarchy; and
- to confirm the proposed processing capacity of REP and the types of wastes to be processed, and explain how these will be constrained within the EP.

2 EP Application Status

2.1.1 In England, the EA is the Competent Authority for permitting and regulating waste treatment facilities, such as that proposed for REP. Before the Applicant can commence operation of the ERF and anaerobic digestion facility, an EP will be required.

2.2 Interactions between the EP and DCO application

2.2.1 The EA has developed guidance, titled '*Guidance for developments requiring planning permission and environmental permits*', dated October 2012. The guidance sets out the relationship between planning and permitting, and the EA's roles and responsibilities in dealing with planning applications where an EP is needed.

2.2.2 The EA Guidance states "*the more complex the issues, the more likely that parallel tracking will be necessary*". The EA guidance explains that this will "… *help us* [the EA] *work with the developer and local planning authority to resolve complex permitting issues at the same time as decision making for the planning process*". The Applicant considers that the DCO and EP applications for REP contain a number of complex issues. Therefore, the Applicant took the decision, in agreement with the EA, to 'parallel track' the DCO and EP applications in line with good practice.

2.2.3 Paragraph 4.10.6 of the Overarching National Policy Statement for Energy (EN-1) states that "*Wherever possible, applicants are encouraged to submit applications for Environmental Permits and other necessary consents at the same time as applying to the [Secretary of State] for development consent*." This is what the Applicant has done in respect of its application for the EP.

2.2.4 The DCO application and the Environmental Statement (ES) within it, was developed and assessed on the basis of the likely worst case and the principle of the "Rochdale Envelope", which enabled the Applicant to assess the parameters for the Proposed Development rather than the precise final design. This provides flexibility within the DCO application for the purposes of obtaining development consent. However, the EP needs to consider and assess the most likely site and technology configuration, rather than likely worst case. This is why some EP applications are not submitted until post planning. Therefore, within the EP application, the Applicant has been more specific regarding the proposed building form, layout and technology choice through the assistance of its likely technology provider (refer to Section 3 of this report). The design of REP for the EP application falls within the parameters assessed for the purposes of the DCO application.

2.3 EP Application

2.3.1 During the development stage of the EP application, a pre-application meeting was held with the EA on 18 September 2018. Within the pre-application meeting, the proposed abatement technologies and timing of the submission of the EP application were discussed with the EA, as well as a number of key points regarding the permitting process. The development of the EP application was undertaken during 2018.

2.3.2 The EP application was acknowledged as received by the EA on 17 December 2018. The EP application was subsequently confirmed as being Duly Made[1] on 5 February 2019. However, the Duly Made date for the application was 17 December 2018, i.e. it was back-dated to the date that the application was received.

2.4 EP Determination Process

2.4.1 Following submission of the EP application, the EA determined that the application would be treated as a 'High Public Interest' (HPI) site. EA Guidance titled '*RGN 6: Determinations involving sites of high public interest*', dated March 2015, explains that HPI status allows the EA to extend the determination period for the EP application beyond the requirements of the Government's Penfold Review of non-planning development consents, which requires the EA's determination process to be completed within 13 weeks. For complex EP applications, including those for Energy Recovery Facilities (ERF's) such as the ERF at REP, the EA often apply the HPI criteria. It should be noted that, even though the EA has applied this criteria to REP, this does not imply that the EA expects to receive a high level of public objection to the scheme. Furthermore, the Applicant understands that following the Public Consultation, refer to paragraph 2.5.4, the EA has reclassified the EP application to a '*Potential High Public Interest*'.

2.4.2 Since the EP application was Duly Made, the EA National Permitting Team – the EA's centralised permitting team – has commenced the determination process for the EP application. This includes undertaking consultation with statutory consultees and the public. Detail on the EA consultation process is presented in **Section 2.5**.

2.4.3 As part of the determination process, the EA will issue the environmental assessments submitted in support of the EP application to the EA's relevant in-house technical teams to undertake detailed audits of the assessments. These assessments and the respective in-house technical teams can include:

a. Air Quality Assessment - Air Quality Management and Assessment Unit (AQMAU);

b. Human Health Risk Assessment – AQMAU;

c. Noise Assessment - AQMAU; and

[1] In accordance with EA Guidance titled '*RGN 3: Deciding applications are duly made and requests for further information*', dated February 2011, "*An application is duly made if it contains the required components and sufficient information for it to begin to be determined*".

d. Site Condition Report (ground conditions) - Groundwater and Contaminated Land Team.

2.4.4 The EA's technical specialists will undertake a detailed review of the relevant environmental assessments and feedback to the EA National Permitting Team that are responsible for the co-ordination of the EP application. An EP for REP will only be granted when the technical specialists are satisfied with the assessment method, that the proposed technology is demonstrated to represent Best Available Techniques (BAT), and predicted impacts are acceptable.

2.4.5 When the EA complete the determination process, an EP will be granted for REP. The EP will include emission limits which the Applicant will be required to design REP to achieve. Furthermore, the EP will require the Applicant to operate REP in accordance with the emission limits, refer to **Section 3.2**.

2.5 EA Consultation

2.5.1 The EA held a Consultation Period on the EP application from 13 February 2019 to 13 March 2019. During the Consultation Period, the EA requested comments from Statutory Consultees and the general public.

2.5.2 The Statutory Consultees which were consulted were:

- London Borough of Bexley (Planning Department);
- London Borough of Bexley (Director of Public Health);
- National Grid (ENGIE);
- Health and Safety Executive;
- Marine Health Organisation; and
- Public Health England.

2.5.3 It is understood by the Applicant that 'no significant concerns' have been raised by the Statutory Consultees on the information presented in the EP application.

2.5.4 In addition, during the Consultation Period, the EA provided the general public with the opportunity to provide comments on the EP application. The EA published Public Notices in two local newspapers (News Shopper - Bexley, Greenwich, Dartford & Swanley) and also had an online consultation page (https://consult.environment-agency.gov.uk/psc/da17-6jy-cory-environmental-holdings-limited/). At the time of submission of this report, the Applicant understands that the EA has not received any response to the public consultation from the general public.

3 Building Layout, Emission Limits and Abatement Technology

3.1 Building Layout

3.1.1 The 'Stepped Building Design layout' (which is confirmed as the proposed design in the **Design Principles** (**7.4; APP-105**) and which is secured via Requirement 2(2) of the **draft Development Consent Order** (**3.1; APP-014**)), has been taken forward as the design for air quality modelling purposes of the EP application.

3.1.2 In addition, following additional analysis of the building design and layout, a stack height of 90 m (at surrounding ground levels) has been proposed within the EP application. This has been demonstrated to be appropriate within the air quality assessment submitted with the EP application. The surrounding ground levels will be a minimum of 1m AOD and a maximum of 3m AOD (as secured in Requirement 3 of Schedule 2 to the draft Development Consent Order) (Rev 1).

3.2 Emission Limits

3.2.1 Within the EP application, the Applicant has proposed emission limits for all point source emissions to air – from both the ERF and the anaerobic digestion biogas engines. When granting the EP for REP, it is assumed that the EA will apply the proposed emission limits.

3.2.2 The Waste Incineration BAT Reference Document (here in referred to as the Waste Incineration BREF) contains 'emission levels associated with the best available techniques' (referred to as BAT-AELs) for waste incineration facilities such as the ERF. The requirements of the Waste Incineration BREF are currently being consulted on by the European Commission. The Draft Waste Incineration BREF proposes a range of BAT-AELs for different pollutants that will be regulated.

3.2.3 It is understood that the 'Final' Waste Incineration BREF is expected to be published in Q3/Q4 2019. Allowing for the typical determination period for a complex EP application, such as that of the REP EP application, this publication will likely occur during the determination period and the EP, if granted, could be granted after the publication date of the BREF. It is assumed that the BAT-AELs in the 'Final' Waste Incineration BREF when it is published will be the same as the Draft Waste Incineration BREF.

3.2.4 The Applicant anticipates that the 'Final' Waste Incineration BREF, when published, will require ERF's to apply the latest technology for the abatement of emissions. As previously described, the Draft Waste Incineration BREF proposes a range of BAT AELs for all regulated pollutants. As stated in '*UK Regulators Large Combustion Plant Best Available Techniques Interpretation Document*' (Working document V1.1) (https://consult.environment-agency.gov.uk/psc/permit-reviews-for-large-combustion-plant-lcp/supporting_documents/Interpretation%20document%20working%20docv1.1.pdf), dated 9 May 2018, DEFRA has issued 'Part A Guidance' to the EA that instructs inspectors [the EA] '*to take the top of the range as the permitting value, unless compliance with an Air Quality standard requires a lower value'.* It is assumed that the same requirements would also be applied to all other sectors including the Waste Incineration BREF.

3.2.5 Therefore, the proposed emission limits within the EP application are in accordance with the requirements of the upper range of the BAT-AELs published in the Draft Waste Incineration BREF for new plants. However, an exception is the proposed emission limit for oxides of nitrogen (NOx); which due to the Applicant's additional investment in abatement technology, is significantly lower than the upper range of the BAT-AELs. This is discussed in more detail in **Section 3.3**.

3.2.6 The table below summarises the proposed emission limits which the Applicant has applied for within the EP application, and compares these with the assumed emission concentrations within the air quality assessments submitted with the DCO application (**6.1; APP-044**). As can be seen from Table 3-1, the proposed emission limits within the EP application are either the same (or less) than those assumed in **Chapter 7 (Air Quality)** of the **Environmental Statement** (**6.1, Table 7.17, APP-044**). Therefore, the DCO provides a more conservative assessment than assumed within the EP application. The air quality assessment within **Chapter 7** of the **Environmental Statement** (**6.1; APP-044**) applies the BREF emission limits; which are referred to as the 'assumed concentrations' within the DCO application for environmental assessment purposes. Whereas the emission limits applied for within the EP application, are proposed as binding emission limits which will be applied by the EA when granting the EP; therefore, they have been referred to as the 'Proposed emission limits'.

Table 3-1: Emissions assumptions for air quality assessment purposes

Parameter	Units	EP application – Proposed Emission Limits			DCO application – Assumed Emission concentrations [2]	
		Half Hour Average	Daily Average	Periodic Limit	Half-hourly Mean Emission	Daily Mean Emissions
ERF						
Particulate matter	mg/Nm^3	30	5	-	30	5
VOCs as Total Organic Carbon (TOC)	mg/Nm^3	20	10	-	20	10

[2] It should be noted that the air quality assessment in the DCO application ((Table 7.2; 6.1; APP-044) identified the daily emission limits as being in a range. However, the modelling applied the upper end of the range. Therefore, this is what is presented in Table 3-1.

Parameter	Units	EP application – Proposed Emission Limits			DCO application – Assumed Emission concentrations [2]	
		Half Hour Average	Daily Average	Periodic Limit	Half-hourly Mean Emission	Daily Mean Emissions
Hydrogen chloride	mg/Nm³	60	6	-	60	6
Hydrogen fluoride	mg/Nm³	-	-	2	4	1
Carbon monoxide	mg/Nm³	100	50	-	150 (10-minute average)	50
Sulphur dioxide	mg/Nm³	200	30	-	200	30
Oxides of nitrogen (NO and NO_2 expressed as NO_2)	mg/Nm³	400	75	-	400	120
Ammonia	mg/Nm³	-	10	-		10
Cadmium & thallium and their compounds (total)	mg/Nm³	-	-	0.02		0.02
Mercury and its compounds	mg/Nm³	-	-	0.02	0.035	0.02
Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	mg/Nm³	-	-	0.3		0.3
Dioxins & furans ITEQ	ng/Nm³	-	-	0.06		0.06
All expressed at 11% oxygen in dry flue gas, 273.15K.						
Biogas Engine						
Oxides of nitrogen (as NO2)	mg/Nm³	-	-	190		190
Sulphur Dioxide	mg/Nm³	-	-	40		40
All expressed at 15% oxygen in dry flue gas, 273.15K.						

3.2.7 For comparison purposes, the reported contribution of emissions of NOx from the ERF, presented as a percentage of the relevant Air Quality Assessment Level (AQAL), have been compared in Table 3-2.

Table 3-2: Comparison of Reported Air Quality Impacts

Pollutant	Unit	ES – Rochdale Envelope	ES – Stepped Building Design	EP Application
Oxides of nitrogen – Point of max impact	%	9.62	2.64	1.7

3.2.8 The Air Quality Chapter of the ES submitted as part of the DCO application concluded '*that significant effects are not likely*' (**Para 7.13.2; APP-044**). However, as can be seen from the table above, the proposed emission limit in the EP application, and also the refining of the building dimensions and layout, will result in a significant reduction in air quality impacts from REP compared to those assessed as part of the ES for the DCO application.

3.2.9 Through the EP determination process, the EA will review the air quality modelling and reported impacts. In granting an EP for REP, the EA will impose emission limits which REP will be required to comply with. Failure to comply with the emission limits within the EP will result in the EA taking regulatory action against the Applicant. In a worst case scenario, this could include revoking the EP. However, this would only occur if there was ongoing non-compliance with the relevant emission limits.

3.3 Proposed Abatement Technologies

NOx Abatement

3.3.1 The EA has published guidance titled '*Incineration of waste (EPR5.01): additional guidance*'. The guidance identifies two secondary abatement measures available for the abatement of emissions of NOx:

- Selective Non-Catalytic Reduction (SNCR); and
- Selective Catalytic Reduction (SCR).

Selective Non-Catalytic Reduction

3.3.2 SNCR involves distributing a spray containing an aqueous ammonia or aqueous urea solution (the de-NOx reagent) into the flue gas flow path at an appropriate location (typically the secondary combustion chamber), at a gas temperature of 850 to 1,050°C. The reagent reacts with the NOx formed in the combustion process to produce a combination of nitrogen, water and carbon dioxide (when urea is used as the reagent).

3.3.3 Extensive dosing of reagent or low reaction temperatures can lead to ammonia slip, resulting in the formation of ammonia salts downstream in the flue gas path and discharge to atmosphere of unreacted ammonia. Ammonia may be controlled under the plant's permit and can lead to secondary problems, so should be kept to a minimum.

3.3.4 SNCR is widely deployed across waste, biomass and coal power plants in the UK and across Europe, including at Riverside Resource Recovery Facility. NOx emissions of 120 mg/Nm^3 can be achieved in waste fired facilities with SNCR abatement.

Selective Catalytic Reduction

3.3.5 SCR is a means of converting NOx, with the aid of a catalyst, into nitrogen, water and carbon dioxide. SCR is a leading technology in the abatement of NOx from combustion systems across Europe.

3.3.6 Aqueous ammonia or urea is injected into the flue gas stream and flows across a catalytic surface, typically titanium dioxide. The catalyst is installed downstream of the bag filter component of the flue gas cleaning system in order to extend the lifetime of the catalyst.

3.3.7 The reaction takes place at a lower temperature than SNCR, typically 250 to 300°C. However, since the flue gases should be cleaned in a bag filter before the catalyst, which is done at a lower temperature, the flue gas must be heated before entering the SCR system. This is proposed by means of steam extraction from the turbine (thereby reducing electrical generating capacity) and use of a gas-gas heat exchanger. This is subject to detailed design of the SCR system.

3.3.8 The additional components in the flue gas path require a larger induced draft fan to be installed, which also increases the electricity consumption and so marginally reduces the electricity exported from the ERF. Ammonia slip may also be a limiting factor of NOx abatement efficacy in SCR systems in terms of environmental compliance. However, it is accepted that overall SCR systems result in lower NOx emissions than SNCR systems.

3.3.9 An SCR system is considerably more complicated and is more capital intensive than a SNCR system. Whereas the SNCR system consists of a number of injection nozzles, along with pipework, tanks and pumps, the SCR system includes a large catalyst bed, gas-gas heat exchanger, and steam-flue gas heat exchanger. Despite lower reagent consumption (due to better stoichiometry), the operational costs of an SCR system are higher due in large part to regeneration and replacement of the catalyst (and additional parasitic electrical load).

3.3.10 NOx emissions of 75 mg/Nm^3 have been demonstrated at a number of ERF facilities within continental Europe utilising SCR technology to abate emissions of NOx.

3.3.11 The Edmonton EfW was granted an EP by the EA for an SCR system. In the EP for the Edmonton EfW, the EA has imposed an emission limit for NOx of 80mgNm^3. It is understood that this is currently the lowest emission limit for any conventional ERF in the UK.

Selective Non-Catalytic Reduction vs Selective Catalytic Reduction

3.3.12 SCR technology is extensively deployed throughout Europe. However, within the UK, SNCR has historically been the preferred approach to the abatement of emissions of NOx from ERF's. This is because the EA has accepted that the additional costs and reduced energy efficiency of SCR systems outweigh the benefits of reduced NOx emissions.

3.3.13 Whilst SCR systems are considerably more complicated and capital intensive than SNCR systems, the Applicant considers SCR to be a ‘cutting-edge’ technology in the abatement of emissions of NOx from ERF’s.

3.3.14 The Applicant acknowledges that all areas within Greater London have been designated as AQMA’s, largely due to transport related air quality impacts. Therefore, the Applicant understands the general sensitivity of air quality impacts on Greater London, in Bexley and neighbouring authorities. Taking this into consideration, within the EP application (refer to Table 3-1) the Applicant has proposed what is understood to be the ‘lowest’ NOx emission limit within the EP application for any large-scale conventional ERF within London or indeed the UK, being 75 mg/Nm^3. This is a lower emissions limit than that assumed in the ES for the DCO application, being 120 mg/Nm^3. As reported in the DCO application (**6.1, APP-044**), emissions of NOx, with an emission limit of 120 mg/Nm^3, will have a ‘negligible’ impact at sensitive receptors. Therefore, in applying for an emission limit of 75 mg/Nm^3 within the EP application, the impact will be less than predicted in the DCO application.

3.3.15 The proposed emission limit for ammonia will be the same for both the SCR and SNCR system (10 mg/Nm^3). Therefore, the environmental impact will be the same. As reported in the DCO application (**6.1, APP-044**), emissions of ammonia will have a ‘negligible’ impact at the point of maximum impact and at sensitive receptors.

3.3.16 As the proposed emission limit cannot be achieved with the use of SNCR, the Applicant is proposing the use of SCR even though it is considerably more complicated and capital intensive than the alternative (SNCR). A BAT assessment has been developed in support of the EP application, which justifies the proposed SCR system as representing BAT, i.e. it is the Best Available Technique for the abatement of NOx from the ERF.

3.3.17 The technology provider has confirmed that an SCR system can be installed within the design constraints of the DCO application.

4 R1 Application

4.1 Recovery or Disposal

4.1.1 In accordance with the waste hierarchy requirements of the Waste Framework Directive, dated 2008, a facility for the incineration of municipal (or similar) waste, such as the ERF, is classified as a '*Disposal activity*' unless R1 status has been granted. Where R1 status is granted it will be re-classified as a '*Recovery operation*' which is higher than 'disposal' in the waste hierarchy. The Waste Framework Directive (WFD) Article 3 makes the following definitions:

- 'recovery' means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II sets out a non-exhaustive list of recovery operations, [Article 3(15)]; and
- 'disposal' means any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy, [Article 3(19)]. In accordance with EA Guidance, titled '*Waste incinerator plant: apply for R1 status*', dated May 2017 (referred to as the R1 Guidance), to qualify as an R1 recovery operation the waste incinerator must:
  - have or will have an environmental permit for a waste incineration installation;
  - be capable of incinerating mixed municipal solid waste, including refuse derived fuel or solid recovered fuel - if the fuel has been made from mixed municipal solid waste; and
  - not be a co-incinerator.

4.1.2 In accordance with the R1 Guidance, there are three stages of R1 status:

- Preliminary Stage;
- Commissioning Stage; and
- Operational Stage.

4.1.3 At the current development stage for the ERF, the Applicant is only able to apply for a Preliminary Stage approval.

4.1.4 To achieve R1 status, the Applicant is required to demonstrate that the ERF achieves the relevant energy efficiency factor – this is referred to as the R1 value. The R1 value must be calculated using the method which is set out in the European Commission's Guidance, titled '*Guidelines on the R1 energy* *efficiency formula in Annex II of Directive 2008/98/EC*' (June 2011). The Environment Agency has developed a spreadsheet to calculate the R1 value for the ERF. For a Design Stage approval, the R1 Application is based on design data.

4.1.5 To be granted R1 status, an R1 Application is required to be submitted to the Competent Authority, detailing that the ERF is eligible for R1 status. The EA is the Competent Authority for granting R1 status in England. The EA has developed an R1 application process and supporting guidance. In accordance with the R1 Guidance, the minimum R1 value for the ERF is 0.65.

4.2 R1 Application

4.2.1 An application for 'Preliminary' R1 status was submitted to the EA on 7 February 2019, and subsequently acknowledged as received by the EA on 8 February 2019. The EA issued formal confirmation that REP has been granted 'Preliminary' R1 status by the EA on 9 April 2019, refer to Appendix A .

4.2.2 The complete R1 Application is presented in Appendix B . As demonstrated in the R1 Application, the design of the ERF will achieve an R1 value of 0.87, which demonstrates a significant margin above the relevant threshold.

4.3 Maintaining R1 Status

4.3.1 The Applicant intends on maintaining R1 status throughout the operational life of the ERF.

4.3.2 To maintain R1 status, the EA will require the Applicant to submit operational data on an annual basis which confirms that the R1 threshold has been achieved. The EA will review and assess the data provided. If the EA is satisfied that the relevant threshold has been achieved written confirmation will be provided to the Applicant to confirm that the ERF is maintaining R1 status. The Applicant understands that R1 status will be withdrawn by the EA if the ERF is not able to demonstrate compliance with the R1 threshold for more than two consecutive years.

4.3.3 The Applicant has maintained R1 status for RRRF since the commencement of operations.

5 Processing Capacity and Waste Types

5.1 Processing Throughput

5.1.1 The EP for REP will include a constraint on the ‘maximum quantity’ of waste feedstocks which can be received for processing at REP on an annual basis. The EP will prohibit the Applicant from processing more waste than the maximum quantity stated. Within the EP application, the Applicant has stated the maximum capacity of the two proposed waste processing facilities, as follows:

- ERF – 805,920 tonnes per annum; and
- Anaerobic Digestion facility – 40,000 tonnes per annum.

5.1.2 During the EP determination process, the EA will review the capacities which are proposed within the EP application. The EA will only grant an EP for a facility which the EA considers is representative of the constraints set out within the EP application.

5.2 Waste Types

5.2.1 The EA is the competent authority for waste management within England. The EA applies a Europe wide system for the categorisation of wastes, which is referred to as the EWC (European Waste Catalogue) code. The EWC code system provides for the identification of the source of the waste; the hazardous status/nature of the waste; and a description of the waste type. The EP will constrain the types of wastes which can be accepted for processing at the individual waste treatment facilities by limiting the waste types to a specific list of EWC codes. The EA will prohibit the waste treatment facilities from processing wastes other than those stated in the EP.

5.2.2 Within the EP application, the Applicant has proposed a number of different types of non-hazardous waste which are proposed to be processed within the waste treatment facilities. For the Anaerobic Digestion facility, these are represented by EWC codes which are considered to be representative of non-hazardous ‘organic wastes’; and for the ERF, these are represented by EWC codes which are considered to be representative of non-hazardous ‘residual wastes’, i.e. the wastes which will remain after waste has been separated for recycling.

5.2.3 Source segregated waste will only be accepted at REP, if it is contaminated due to how it has been collected, stored or treated prior to being delivered to REP. Therefore, it would be unsuitable for recycling.

5.2.4 During the EP determination process, the EA will review the EWC codes which are presented in the EP application. If the EA considers that these wastes are not suitable for incineration, or could otherwise be transferred for recovery/recycling, i.e. they are not residual waste, the EA will not permit these wastes to be received and processed at REP.

5.2.5 Prior to commencement of commissioning, the EA will require the Applicant to develop procedures to verify that any wastes which are received at REP are within the constraints which are set out within the EP. These are referred to as waste pre-acceptance and waste acceptance procedures. The Applicant will be required to implement these procedures through the lifetime of the EP, to ensure that wastes are not delivered to the REP which the Applicant is not permitted to receive.

5.2.6 The duty of care in relation to the appropriate application of EWC codes to wastes is the responsibility of waste producers. In implementing the waste pre-acceptance and waste acceptance procedures the Applicant will undertake its own duty of care investigation into whether the Applicant believes that the appropriate EWC codes has been applied to the waste; and whether it is an acceptable waste stream for REP. If the Applicant believes the waste to be either incorrectly coded and/or unsuitable for processing at REP, the Applicant would not accept the waste.

5.2.7 In the unlikely event that wastes are received at REP which are not allowed for within the EP, referred to as non-compliant wastes, the non-compliant wastes will be stored in a designated area within the Tipping Hall within the main REP building, prior to transfer off-site to a suitably licensed waste management facility.

5.2.8 It should be noted that the Overarching National Policy Statement for Energy (NPS EN-1) recognises that the Environmental Permitting regime will incorporate operational waste management requirements in any permit issued under that regime (paragraph 4.10.5). As paragraph 4.10.3 states, the Secretary of State should not duplicate relevant pollution control and other environmental regulatory regimes. Accordingly, given it is the EA that will monitor the operational waste side of the ERF and the Anaerobic Digestion facility, it should be the EP that imposes any restrictions on waste type and quantity. This is logical, given it is not the waste throughput that gives rise to the operational effects of the ERF, instead specific requirements should be imposed on those areas that would give rise to adverse effects - for example, the draft Development Consent Order at Deadline 2 includes a transport restriction on waste being delivered to the ERF.

6 Conclusions

6.1.1 The EA is the Competent Authority for permitting and regulating waste treatment facilities, such as that proposed for REP. Before the Applicant can commence operation of REP, an EP will be required.

6.1.2 Within this paper, it is explained that an EP application for REP was submitted to the EA on 17 December 2018. The EP application was subsequently Duly Made by the EA on 5 February 2019, with a Duly Made date of 17 December 2018.

6.1.3 As part of the EP application determination process, the EA has undertaken consultation with statutory consultees and the public between the dates of 13 February 2019 to 13 March 2019. The Applicant understands that during this period that the EA has not received any response to the public consultation from the general public

6.1.4 The EA's in-house relevant technical specialist teams will undertake detailed audits of the air quality, human health, noise and ground condition assessments submitted with the EP application.

6.1.5 When the EA determination process is complete, assuming that the EA's National Permitting Team is satisfied that the predicted impacts are acceptable and the proposed technology and operating techniques are demonstrated to represent BAT, the EA will grant an EP for REP. The EP will include emission limits which REP will be required to comply with.

6.1.6 Within the EP application submitted to the EA, the Applicant has proposed the NOx abatement technology of Selective Catalytic Reduction (SCR). The proposed SCR will result in significantly lower NOx emissions than were applied within the air quality assessment submitted within the ES.

6.1.7 The Applicant considers SCR to be a 'cutting-edge' technology in the abatement of emissions of NOx from ERF's.

6.1.8 The Applicant understands the general sensitivity of air quality impacts within Greater London. Taking this into consideration, within the EP application the Applicant has proposed to commit and invest in the 'lowest' emission limit within the EP application for any conventional ERF within London or the UK. This will be secured in the EP.

6.1.9 The Applicant submitted an R1 Application to the EA for the ERF on 7 February 2019. The EA issued formal confirmation that REP has been granted 'Preliminary' R1 status by the EA on 9 April 2019.

6.1.10 Within the R1 Application the Applicant has demonstrated that the design of the ERF will comfortably exceed the relevant R1 threshold, thereby achieving R1 status. The Applicant intends on maintaining R1 status throughout the lifetime of the ERF.

6.1.11 The EP will include constraints on the quantities and types of waste which can be accepted and processed at REP. Within the application for the EP, the Applicant has applied for the capability to process wastes which are either organic or residual, i.e. the wastes which will remain after waste has been separated for recycling.

6.1.12 The EP will require that the Applicant develops and implements procedures to ensure that the wastes received within the REP are in accordance with those permitted within the EP. The procedures will be required to be in place prior to commencement of commissioning of REP. The duty of care in relation to the appropriate application of EWC codes to wastes is the responsibility of waste producers. In implementing the procedures the Applicant will undertake its own duty of care investigation into whether the Applicant believes that the appropriate EWC codes has been applied to the waste; and whether it is an acceptable waste stream for REP.

6.1.13 In the event that non-compliant wastes are received at REP, they will be stored in a designated quarantine area, prior to transfer off-site to a suitably licensed waste management facility.

Appendix A Preliminary R1 Approval

James Sturman
Senior Environmental Consultant
Fichtner Consulting Engineers Limited
Kingsgate (Floor 3)
Wellington Road North
Stockport
Cheshire
SK4 1LW

Our ref: EPR/GP3535QS/R1

Date: 09 April 2019

Dear Mr Sturman

Classification as a recovery operation using the R1 Energy Efficiency Formula

Application reference: EPR/GP3535QS/R1
Operator: Cory Environmental Holdings Limited
Facility: Riverside Energy Park

Thank you for your application, received 31/01/2019, concerning the Riverside Energy Park incinerator at Norman Road North, Belvedere, London. Based on the information that you provided and presented in the attached spreadsheet, we have concluded it is capable of having an R1 energy efficiency factor equal to or above 0.65. This letter therefore preliminarily certifies that it is an R1 recovery operation under Annex II of Directive 2008/98/EC on Waste based on design data. We will indicate this status on our website. It will need to be validated when plant acceptance data is available.

We remind you:

- to contact us if the data used in the assessment changes which may reduce it below 0.65, eg as a result of plant modifications or arrangements to take the energy.
- to confirm the design data when plant acceptance data is available
- operational plants will need to submit an updated version of the spreadsheet by end of January each year, covering performance over the last calendar year, so we can revalidate the R1 certification.

If you have any questions please phone Simon Paterson on 02030252888 or email simon.paterson@environment-agency.gov.uk.

Yours sincerely

Phil Kelkin.

Team Leader
National Permitting Centre
Environment Agency

Encl: Final version of the spreadsheet

Permitting Support Centre EP team, Quadrant 2, 99 Parkway Avenue, Sheffield, S9 4WF
Customer services line: 03708 506506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

Appendix B R1 Application

	A	B	C	D	E	F	G	H	I
1	**PROFORMA FOR DETERMINING ENERGY EFFICIENCY USING R1**								
2	**Site name, address and grid reference**	Riverside Energy Park	**EPR Permit reference** **(if known)**						
3	**Operator name**	Cory Environmental Holdings Ltd	**Application fee (£)**		2000				
4	**Details of who to contact if we have any queries regarding this form**	James Sturman jamessturman@fichtner.co.uk [redacted]							
5	**What data has been used in the application? →**		Design data						
6	Indicative R1 factor (subject to confirmation)	0.87	Quantity in reporting year	Units	U_c	Properties (Average over reporting year)	Units	Note which parameters that have been estimated	Reference to Supporting information
7	Climate change correction factor (optional)								
8	R1 after CCF adjustment								
9	1. Gross electricity meter (Electricity produced at turbine)		540800	MWh					See Application Suppor
10	2. Electricity exported - Net input/output meter		492000	MWh					See Application Suppor
11	3. Electricity imported - Net input/output meter		927.2	MWh					See Application Suppor
12	4. Other fuel inputs								
13		4.1 Light fuel oil	567742	litres		0.93	kg/l		
14						42700	kJ/kg		See Application Suppor
15		4.2 Natural gas		Nm^3		34200	kJ/Nm^3		
16									
17		4.3 LPG		Nm^3			kg/Nm^3		
18							kJ/kg		
19		4.4 Other fuels similar to light fuel oil		litres			kg/l		
20							kJ/kg		
21	5. Primary combustion air (as supplied to furnace)		1656976000	m^3		0.814	kg/Nm^3		
22						160	°C		
23						136.35	kJ/kg		See Application Suppor
24	6. Secondary combustion air (as supplied to furnace)		424192000	m^3		0.896	kg/Nm^3		
25						120.88	°C		
26						96.8388	kJ/kg		See Application Suppor
27	7. Recycled flue gas (as supplied to furnace)		383440000	m^3		0.83	kg/Nm^3		
28						150	°C		
29						126.25	kJ/kg		See Application Suppor
30	8. Heat exported outside R1 boundary								
31		8.1 steam exported		tonnes			°C		
32							kPa		
33							kJ/kg		
34		condensate returned		tonnes			°C		
35							kPa		
36							kJ/kg		
37		8.2 hot water exported		tonnes			°C		
38							kPa		
39							kJ/kg		
40		hot water returned		tonnes			°C		
41							kPa		
42							kJ/kg		
43									
44	9. Internal steam use								
45		9.1 for soot blowing (no backflow)	6864	tonnes			°C		
46							kPa		
47						2827.7	kJ/kg		See Application Suppor
48		9.2 for steam driven devices		tonnes			°C		
49							kPa		
50							kJ/kg		
51		backflow as steam		tonnes			°C		
52							kPa		
53							kJ/kg		
54		9.3 for trace heating		tonnes			°C		
55							kPa		
56							kJ/kg		
57		backflow as condensate		tonnes			°C		
58							kPa		
59							kJ/kg		
60		9.4 for re-heating flue gas		tonnes			°C		
61							kPa		
62							kJ/kg		
63		backflow as condensate		tonnes			°C		
64							kPa		
65							kJ/kg		
66		9.5 for concentration processes		tonnes			°C		
67							kPa		
68							kJ/kg		
69		backflow as condensate		tonnes			°C		
70							kPa		
71							kJ/kg		
72		9.6 for building, equipment, tank heating		tonnes			°C		
73							kPa		
74							kJ/kg		
75		backflow as condensate		tonnes			°C		
76							kPa		
77							kJ/kg		
78		9.7 for deaeration and demineralisation		tonnes			°C		
79							kPa		
80							kJ/kg		

	A	B	C	D	E	F	G	H	I
81		backflow as condensate		tonnes			°C		
82							kPa		
83							kJ/kg		
84		9.8 other internal applications, in line with commission guidance, to be specified		tonnes			°C		
85							kPa		
86							kJ/kg		
87		backflow as condensate		tonnes			°C		
88							kPa		
89							kJ/kg		
90		9.9 other internal applications, in line with commission guidance, to be specified		tonnes			°C		
91							kPa		
92							kJ/kg		
93		backflow as condensate		tonnes			°C		
94							kPa		
95							kJ/kg		
96	10. Use of condensing energy from steam in flue gas			GJ					
97	11. Superheated steam at boiler outlet		2067200	tonnes			°C		
98							kPa		
99						3255.173	kJ/kg		See Application Suppor
100	12. Boiler feedwater		2073600	tonnes			°C		
101							kPa		
102						553.189	kJ/kg		See Application Suppor
103	13. Boiler Efficiency (Design)		89%	±	1.5%				See Application Suppor
104	**Instructions for completing this spreadsheet**								
105	1.	Ensure that you have completed the first three rows of the application form							
106	2.	This form should be accompanied by supporting information for the figures quoted. Where this information is in the permit application, reference to the relevant sections of the application can be made.							
107		A Sankey diagram (or equivalent) reflecting the boundaries of the installation used as well as any references to physical properties is the absolute minimum that should be provided for an application based on design information							
108	3.	We have colour coded the cells in this spreadsheet to assist you in completing this form, an explanation of the colour codes is provided below. The colour will disappear when data has been entered.							
109		Blue cells require data that is essential for the R1 calculation, where information on uncertainty of the data is available it would be useful (but not mandatory) for this to be included for these parameters.							
110		Beige Cells indicate that any data entered will be used in the R1 calculation. They have been used where there is a choice of inputs but not all plants will have data for all the input options.							
111		Where you are entering data into beige cells you need to make sure that you enter data into all the beige cells associated with the input as they are all needed for carrying out the calculation.							
112		Yellow cells have been used to provide flexibility to include fuels or energy uses not identified elsewhere. Supporting information to explain why the standard fields were not appropriate or adequate will need to be provided where these cells are used.							
113		Data entered in uncoloured cells are not used when calculating the R1 energy efficiency factor but can be completed to provide a more complete data set.							
114		Data in the purple cell for the CCF factor is optional. If used the way it was calculated must be explained in supporting information							
115	4.	Ensure the temperatures entered into cells F19 and F22 (and F25) are the actual temperatures of the heated air in ^{o}C.							
116		The spreadsheet uses these values to calculate the specific enthalpy associated with heating the air from ambient 25 ^{o}C in cells F20 and F23 (and F26).							
117	5.	Densities used in cells F18 and F21 (and F24) should be at the temperatures at which the flows quoted in C18 and C21 (and C24) are reported.							
118		The spreadsheet multiplies these pairs of entries to generate a mass of air.							
119	6.	If you believe that any of the information that you have submitted in this application form is commercially confidential please identify the confidential information and the grounds on which you believe it to be confidential in your covering letter							
120	LIT 5753								
121	EAD/0812/xls/v3								

FICHTNER
Consulting Engineers Limited

CORY RIVERSIDE ENERGY

Riverside Energy Park

R1 Application Supporting Information

1 Design Data

The following data on the Riverside Energy Park (REP) Energy Recovery Facility (ERF) has been used for the purposes of the R1 calculation.

Description	Value	Units
Lines	2	lines
Operational hours	8,000	hours/year
Non-operational Hours	760	hours/year
Waste consumption (nominal design capacity)	40,889	kg/hour per line
Waste LHV	9,000	kJ/kg
Gross power generation	67.6	MW_e
Parasitic load	6.1	MW_e
Fuel oil consumed on start up	23,000	kg
Fuel oil consumed on shut down	10,000	kg
Auxiliary fuel LHV	42,700	kJ/kg
Auxiliary fuel density	0.93	kg/l
Primary air flow	103,561	Nm^3/hr per line
Primary air temperature	160	^oC
Primary air density	0.814	kg/m^3
Primary air enthalpy	161.6	kJ/kg
Secondary air flow	26,512	Nm^3/hr per line
Secondary air temperature	120.9	^oC
Secondary air density	0.896	kg/m^3
Secondary air enthalpy	121.8	kJ/kg
Recirculated flue gas flowrate	23,965	Nm^3/hour per line
Recirculated flue gas density	0.83	kg/Nm^3

Description	Value	Units
Recirculated flue temperature	150.0	^{o}C
Soot blowing steam flowrate	0.429	tonnes/hour per line
Soot blowing steam enthalpy	2,827.7	kJ/kg
Main steam produced by boiler at 100% MCR	129.2	tonnes/hour per line
Main steam temperature	440.0	^{o}C
Main steam enthalpy	3,255.2	kJ/kg
Boiler feedwater flowrate	129.6	tonnes/hour per line
Boiler feedwater enthalpy	553.2	kJ/kg
Boiler design efficiency	89.3	%

2 Assumptions

The following assumptions on the design and performance of the REP ERF have been used for the purposes of the R1 calculation. These assumptions are based on developed design data and performance guarantees provided by the EPC contractor. Where applicable, conservative assumptions on operational parameters based on our experience of similar facilities have been made.

- The availability of the ERF will be 8,000 hours/year.
- The auxiliary fuel will be fuel oil. No other auxiliary fuels will be combusted in the ERF.
- Building services demand comprises 20% of the parasitic load.
- There will be 8 start ups / shutdowns per line per year.
- The Anaerobic Digestion facility is assumed to be operational and therefore contributing to the parasitic load.
- Despite aspirations from the applicant, there is assumed to be no heat export from the ERF since no formal heat supply agreements are currently in place with heat users. The ERF is therefore assumed to be operating in fully condensing mode. This approach represents a conservative position with regards to energy efficiency, which will improve when heat export is realised.
- Internal heat use within the ERF will comprise condensate / feedwater and combustion air pre-heating, in addition to soot blowing of the economiser section of the boilers.

3 Calculations

3.1 Gross Electricity

The gross electrical generation of the ERF was calculated as follows:

Gross electrical generation = Gross power generation (MW_e) x Operating hours
= 67.6 (MW_e) x 8,000 (hours)
= 540,800 MWh

3.2 Electricity Exported

The electricity exported – net output of the ERF was calculated as follows:

Electricity exported = (Gross power generation – Parasitic power) (MW_e) x Operating time (hours)

= (67.6 (MW_e) – 6.1 (MW_e)) x 8,000 (hours)

= 492,000 MWh

3.3 Electricity Imported – Net Input / Output Meter

The electricity imported – net input to the ERF was calculated as follows:

Electricity imported = Parasitic power (MW_e) x Building services x Non-operating time (hours)

= 6.1 (MW_e) x 0.2 x 760 (hours)

= 927.2 MWh

3.4 Other Fuel Inputs

The annual auxiliary fuel input was calculated as follows:

$$\text{Other fuel input} = \frac{\text{(Start up fuel (kg/line) + Shut down fuel (kg/line))}}{\text{Fuel density (kg/litre)}} \times \text{start ups per year} \times \text{lines}$$

$$= \frac{\text{(23,000 + 10,000) (kg/line)}}{\text{0.93 (kg/litre) (start up)}} \times \text{8 (start ups)} \times \text{2 (lines)}$$

= 567,742 litres

3.5 Primary Combustion Air (Heated)

The annual heated primary combustion air flow was calculated as follows:

Primary combustion air = Primary combustion air (Nm^3/hour) x Operating time (hours)

= 103,561 (Nm^3/hour per line) x 2 (lines) x 8,000 (hours)

= 1,656,976,000 Nm^3

3.6 Secondary Combustion Air (Heated)

The annual heated secondary combustion air flow was calculated as follows:

Secondary combustion air = Secondary combustion air (Nm^3/hour) x Operating time (hours)

= 26,512 (Nm^3/hour per line) x 2 (lines) x 8,000 (hours)

= 424,192,000 Nm^3

3.7 Recirculated Flue Gas

The annual recirculated flue gas flow was calculated as follows:

Recirculated flue gas = Recirculated flue gas (Nm^3/hour) x Operating time (hours)

= 23,965 (Nm^3/hour per line) x 2 (lines) x 8,000 (hours)

= 383,440,000 Nm^3

3.8 Soot Blowing

The annual steam used for soot blowing was calculated as follows:

Steam for soot blowing = Soot blowing steam (tonnes/hour) x Operating time (hours)

= 0.429 (tonnes/hour per line) x 2 (lines) x 8,000 (hours)

= 6,864 tonnes

3.9 Superheated Steam at Boiler Outlet

The annual superheated steam at the boiler outlet for the ERF was calculated as follows:

Superheated steam from boilers = Main steam flow rate (tonnes/hour) x Operating time (hours)

= 129.2 (tonnes/hour per line) x 2 lines x 8,000 (hours)

= 2,067,200 tonnes

3.10 Boiler Feedwater

The annual boiler feedwater used by the ERF was calculated as follows:

Boiler feedwater = Boiler feedwater flow rate (kg/hour) x Operating time (hours)

= 129.6 (tonnes/hour per line) x 2 (lines) x 8,000 (hours)

= 2,073,600 tonnes

4 Sankey Diagram

An indicative Sankey Diagram for the Riverside Energy Park ERF (exporting power only) is presented below.