

# Permitting decisions

## Variation

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We have decided to grant the variation for Damhead Creek Power Station operated by ScottishPower Generation Limited.

The variation number is EPR/DP3933DN/V002.

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

### Purpose of this document

This decision document provides a record of the decision making process. It summarises the decision making process in the decision checklist to show how all relevant factors have been taken in to account.

This decision document provides a record of the decision making process. It:

- highlights key issues in the determination
- summarises the decision making process in the decision checklist to show how all relevant factors have been taken into account
- shows how we have considered the consultation responses

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

Read the permitting decisions in conjunction with the environmental permit and the variation notice. The introductory note summarises what the variation covers.

## Key issues of the decision

### Description of the Variation Changes

The variation application is for an additional 1,800 megawatt electrical (MWe) combined cycle gas turbine (CCGT) power plant fired on natural gas.

The plant is to be located adjacent to the existing Damhead Creek Power Station at Kingsnorth, Hoo St Werburgh, Rochester. The site is located 8 kilometres north east of Rochester and 6 kilometres north of Gillingham.

The additional CCGT power plant will comprise of three generating units each consisting of a gas turbine, heat recovery steam generator (HRSG) and a steam turbine in a single shaft configuration. Each CCGT has an electricity capacity of 600 MWe (thermal input of 1,093 MWth each).

In the new CCGT plant natural gas is burnt in a combustion chamber of the gas turbine and the expanding exhaust gases are used to turn a turbine from which electricity is generated. The hot gases then pass to the HRSG which produces steam, which is fed to a steam turbine to generate additional electricity.

The new power plant, Damhead Creek 2 Power Station (DHC2), is expected to operate at an energy conversion efficiency of over 60%. DHC2 will be capable of generating 1,800 MWe which will be exported to the National Grid via a new underground cable to the existing Kingsnorth substation to the south of DHC2.

DHC2 will also include a 23.1 MWth gas fired auxiliary boiler to provide steam for start up of the HRSGs and a 2.8 MWth emergency diesel generator to enable safe shut down.

The cooling system consists of air cooled condensers in a closed looped system. As DHC2 does not have a cooling tower there will be no visible plume.

A combined heat and power ready (CHP-ready) assessment identified that at present there are no suitable heat customers and no suitable future developments are currently proposed. However, the layout of DHC2 has been arranged to allow space to be available for heat extraction to be undertaken in the future.

The variation is also for an increase to the existing DHC1 discharge at emission point W1 from 30 m<sup>3</sup> per hour to 60 m<sup>3</sup> per hour to allow for effective management of storm water accumulation.

### **Large Combustion Plants Description and Numbers**

The permit uses the DEFRA LCP reference numbers to identify each new LCP. The new LCPs at DHC2 are permitted as follows:

#### **LCP467**

This LCP consists of a 1,093 MWth CCGT which vents via a single windshield at emission point A9. The unit burns natural gas only.

#### **LCP468**

This LCP consists of a 1,093 MWth CCGT which vents via a single windshield at emission point A10. The unit burns natural gas only.

#### **LCP469**

This LCP consists of a 1,093 MWth CCGT which vents via a single windshield at emission point A11. The unit burns natural gas only.

### **Compliance Route**

The applicant has proposed to operated LCP467, LCP468 and LCP469 under the ELV compliance route, complying with the emission limits set out in part 2 of annex V of the IED.

### **Net Thermal Input**

The applicant has stated that the net thermal input of each LCP467, LCP468 and LCP469 is 1,093 MWth.

The applicant has not provided sufficient information to demonstrate the net thermal input of the LCP as the new plant has not been built yet. Consequently we have set improvement condition IC12, requiring them to provide this information within 12 months of the plant starting up.

### **Minimum Start Up Load and Minimum Shut Down Load (MSUL/MSDL)**

The applicant has not provided sufficient information to set the MSUL/MSDL as the plant has not been built yet. Consequently we have set improvement condition IC11, requiring them to provide this information within 12 months of the plant starting up. Table S1.5 in the permit has been completed to reflect this requirement.

## The Installation's Environmental Impact

Regulated activities can present different types of risk to the environment, these include odour, noise and vibration, accidents, fugitive emissions to air and water, point source releases to air, discharges to ground or groundwater, global warming potential and generation of waste and other environmental impacts. Consideration may also have to be given to the effect of emissions being subsequently deposited onto land (where there are ecological receptors). The key factors for this permit variation application are discussed in this and other sections of this document.

For an installation of this kind, the principal emissions are those to air and water, although we also consider those to land.

The next sections of this document explain how we have approached the critical issue of assessing the likely impact of the emissions to air from the installation on human health and the environment.

## Application of Environment Agency Web Guide for Air Emissions Risk Assessment

A methodology for risk assessment of point source emissions to air, which we use to assess the risk of applications we receive for permits, is set out in our Web Guide and has the following steps:

- describe emissions and receptors;
- calculate process contributions;
- screen out insignificant emissions that do not warrant further investigation;
- decide if detailed air modelling is needed;
- assess emissions against relevant standards; and
- summarise the effects of emissions.

The methodology uses a concept of "process contribution (PC)", which is the estimated concentration of emitted substances after dispersion into the receiving environmental media at the point where the magnitude of the concentration is greatest. The guidance provides a simple method of calculating PC primarily for screening purposes and for estimating PCs where environmental consequences are relatively low. It is based on using dispersion factors. These factors assume worst case dispersion conditions with no allowance made for thermal or momentum plume rise and so the PCs calculated are likely to be an overestimate of the actual maximum concentrations. More accurate calculation of PCs can be achieved by mathematical dispersion models, which take into account relevant parameters of the release and surrounding conditions, including local meteorology – these techniques are expensive but normally lead to a lower prediction of PC.

## Use of Air Dispersion Modelling

For any LCP application, we normally require the applicant to submit a full air dispersion model as part of their application, for the key pollutants. Air dispersion modelling enables the PC to be predicted at any environmental receptor that has the potential to be impacted by the plant.

Once short term and long term PCs have been calculated in this way, they are compared with environmental quality standards (EQS).

Where an EU EQS exists, the relevant standard is the EU EQS. Where an EU EQS does not exist, our guidance sets out a national EQS (also referred to as environmental assessment level (EAL)) which has been derived to provide a similar level of protection to human health and the environment as the EU EQS levels. In a very small number of cases, e.g. for emission of lead, the national EQS is more stringent than the EU EQS. In such cases, we use the national EQS for our assessment.

National EQSs do not have the same legal status as EU EQSs, and there is no explicit requirement to impose stricter conditions than best available techniques (BAT) in order to comply with a national EQS. However, national EQSs are a standard for harm and any significant contribution to a breach is likely to be unacceptable.

PCs are considered **insignificant** if:

- the **long term** process contribution is less than 1% of the relevant EQS; and

- the **short term** process contribution is less than 10% of the relevant EQS.

The **long term** 1% PC insignificance threshold is based on the judgements that:

- it is unlikely that an emission at this level will make a significant contribution to air quality; and
- the threshold provides a substantial safety margin to protect health and the environment.

The **short term** 10% PC insignificance threshold is based on the judgements that:

- spatial and temporal conditions mean that short term PCs are transient and limited in comparison with long term PCs; and
- the threshold provides a substantial safety margin to protect health and the environment.

Where an emission is screened out in this way, we would normally consider that the applicant's proposals for the prevention and control of the emission to be BAT. That is because if the impact of the emission is already insignificant, it follows that any further reduction in this emission will also be insignificant.

However, where an emission cannot be screened out as insignificant, it does not mean it will necessarily be significant.

For those pollutants which do not screen out as insignificant, we determine whether exceedances of the relevant EQS are likely. This is done through detailed audit and review of the applicant's air dispersion modelling taking background concentrations and modelling uncertainties into account. Where an exceedance of an EU EQS is identified, we may require the applicant to go beyond what would normally be considered BAT for the installation or we may refuse the application if the applicant is unable to provide suitable proposals. Whether or not exceedances are considered likely, the application is subject to the requirement to operate in accordance with BAT.

This is not the end of the risk assessment, because we also take into account local factors (for example, particularly sensitive receptors nearby such as a Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs) or Special Protection Areas (SPAs). These additional factors may also lead us to include more stringent conditions than BAT.

If, as a result of reviewing of the risk assessment and taking account of any additional techniques that could be applied to limit emissions, we consider that emissions would cause significant pollution, we would refuse the application.

### **Assessment of Impact on Air Quality**

The applicant's assessment of the impact on air quality is set out in Annex D (Air Quality Impact Assessment – Damhead Creek 2 Power Station 60471441/LORP004, dated 6<sup>th</sup> July 2016) of the application. The assessment comprises:

- a screening assessment of emissions to air from the operation of the CCGTs;
- dispersion modelling of emissions to air from the operation of the installation, including in combination with Damhead Creek 1 Power Station;
- a study of the impact of emission on nearby sensitive habitat and conservation sites.

This section of the decision document deals primarily with the dispersion modelling of emissions to air from the installation and its impact on local air quality. The impact on conservation sites is considered in section '*Impact on Habitats Sites*'.

The applicant has assessed the installation's potential emissions to air against the relevant air quality standards (AQSs), and the potential impact upon local conservation sites, habitat sites and human health. These assessments predict the potential effects on local air quality from the installations stack emissions using the Breeze AERMOD (version 8.89) dispersion model, which is commonly used computer model for dispersion modelling. The model used five years of meteorological data collected from the weather station at Southend Airport between 2008 and 2012. The airport is located approximately 17 kilometres north of the installation. The impact of the terrain surrounding the site upon plume dispersion was considered in the dispersion modelling.

The air impact assessments, and the dispersion modelling upon which they were based, employed the following assumptions:

- First, they assumed that the ELVs in the permit would be the maximum permitted by Annex V of the IED. These substances are:
  - oxides of nitrogen (NO<sub>x</sub>), expressed as NO<sub>2</sub>;
  - carbon monoxide (CO); and
  - sulphur dioxide (SO<sub>2</sub>) (only short term impacts).
- Second, they assumed that the installation (DHC1 and DHC2) operated continuously at the relevant short term emission limit values, i.e. the maximum permitted emission rate; and
- Thirdly, they assumed that for the long term impacts that the plant will run at 100% for a reduced proportion of the year and therefore load factors of 65% for DHC1 and 85% for DHC2 were applied.

We are in agreement with this approach. The assumptions underpinning the model have been checked and are reasonable precautionary.

The applicant has carried out background air quality monitoring to augment the data available from local authority monitoring. They reviewed data from various sources including Department for Environment, Food and Rural Affairs (Defra's) background maps for 2015 and Medway Council Monitoring stations between 2009 and 2014. The background data evidence indicates that the NO<sub>2</sub> values used by the consultant is a reasonable assumption.

As well as calculating the peak ground level concentration, the applicant has modelled the concentration of key pollutants at a number of specified locations within the surrounding area.

The way in which the applicant used dispersion models, its selection of input data, use of background data and the assumptions it made have been reviewed by the Environment Agency's modelling specialists to establish the robustness of the applicant's air impact assessment. The output from the model has then been used to inform further assessment of health impacts and impact on habitats and conservation sites.

Our review of the applicant's assessment leads us to agree with the applicant's conclusions.

The applicant's modelling predictions are summarised in the following sections.

### **Assessment of Air Dispersion Modelling Outputs**

The applicant's modelling predictions are summarised in the tables below. The applicant's modelling predicted ground level exposure to pollutants in ambient air at discreet receptors. Damhead Creek 1 Power Station and Damhead Creek 2 Power Station operating together represents the worst case scenario for impacts from the installation. Therefore, the tables below show both the maximum grid concentration and the ground level concentrations at the most impacted receptors from the operation of DHC1 and DHC2.

**Table 1 Atmospheric dispersion modelling results – maximum on modelled grid**

Pollutant	Averaging period	EQS / EAL µg/m <sup>3</sup>	Background µg/m <sup>3</sup>	PC µg/m <sup>3</sup>	PEC µg/m <sup>3</sup>	PC % of EQS / EAL	PEC % of EQS / EAL
NO <sub>2</sub>	Annual mean	40	16.2	2.01	18.25	5	45.6
	1 hour mean	200	32.5	53.7	86.2	26.9	43.1
CO <sup>1</sup>	Maximum 8 hour running	10,000	---	270.51	---	2.7	---
	Maximum 1 hour mean	30,000	---	486.49	---	1.6	---

Note 1: As the CO emissions screened out as insignificant, the PC is < 10% of the EQS/EAL, at the maximum on modelled grid it can be considered that there will be no impacts at any human receptor. Therefore, no assessment was required for CO impacts on human health receptors.

**Table 2 Atmospheric dispersion modelling results – maximum at modelled human health receptor**

Pollutant	Averaging period	EQS / EAL µg/m <sup>3</sup>	Background µg/m <sup>3</sup>	PC µg/m <sup>3</sup>	PEC µg/m <sup>3</sup>	PC % of EQS / EAL	PEC % of EQS / EAL
NO <sub>2</sub>	Annual mean	40	16.2	0.6	16.8	1.6	42
	1 hour mean	200	32.5	32.9	65.4	16.5	32.7

(i) Screening out emissions which are insignificant

From the tables above the following emission can be screened out as insignificant in that the PC is < 1% of the long term EQS/EAL and < 10% of the short term EQS/EAL. These are:

- carbon monoxide (short term - 8 hour rolling average and 1 hour mean at modelled at maximum grid)

Therefore, we consider the applicant's proposals for preventing and minimising the emissions of carbon monoxide to be BAT for the installation subject to the detailed audit referred to below.

(ii) Emissions unlikely to give rise to significant pollution

Also from the tables above the following emissions (which were not screened out as insignificant) have been assessed as being unlikely to give rise to significant pollution in that there is adequate headroom between the PEC and the EQS/EAL to indicate that an exceedance of the EQS/EAL is unlikely (taking expected modelling uncertainties into account) of both the long term and short term EQS/EAL. These are:

- oxides of nitrogen

For these emissions, we have carefully scrutinised the applicant's proposals to ensure that they are applying BAT to prevent and minimise emissions of these substances. This is reported in 'Application of Best Available Techniques' section of this document.

All emissions either screen out as insignificant or where they do not screen out as insignificant are considered unlikely to give rise to significant pollution.

## Consideration of Key Pollutants

(i) Nitrogen dioxide (NO<sub>2</sub>)

The impact on air quality from NO<sub>2</sub> emissions has been assessed against the EU EQS of 40 µg/m<sup>3</sup> as a long term annual average and a short term hourly average of 200 µg/m<sup>3</sup>. The model assumes a 70% NO<sub>x</sub> to NO<sub>2</sub> conversion for the long term and 35% for the short term assessment in line with Environment Agency guidance on the use of air dispersion modelling.

The above tables show that the peak long term PC is greater than 1% of the EU EQS and therefore cannot be screened out as insignificant. Even so, from the table above, the emission is not expected to result in the EU EQS being exceeded due to the headroom present between the PEC and EU EQS. The peak short term PC is also above the level that would screen out as insignificant (> 10% of the EU EQS). However, it is not expected to result in the EU EQS being exceeded due to the headroom present between the PEC and EU EQS.

The applicant's modelling predictions also considered predicted peak level ground level exposure to NO<sub>2</sub> within the air quality management area (AQMA). The predicted worst case annual NO<sub>2</sub> PC for the AQMA is 0.32 µg/m<sup>3</sup> (0.8% of the EQS/EAL). As the predicted PC is <1% it can be screened out as insignificant.

(ii) Dust

Natural gas is an ash free fuel and high efficiency combustion in the gas turbine does not generate additional particulate matter. The fuel gas is always filtered and, in the case of gas turbines, the inlet air is also filtered resulting in a lower dust concentration in the flue than in the surrounding air. Thus, for natural gas fired turbines dust emissions are not an issue.

(iii) Sulphur dioxide (SO<sub>2</sub>)

Natural gas, that meets the standard for acceptance into the National Transmission System, is considered to be sulphur free fuel. Hence, sulphur dioxide emissions from burning natural gas, were not considered to be significant and were not modelled by the applicant. We agree with this approach.

(iv) Carbon monoxide (CO)

The above tables show that for CO emissions, the peak short term PC is less than 10% of the EAL/EQS and so can be screened out as insignificant. Therefore, we consider the applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the installation.

### Impact on Habitat Sites

(i) Sites Considered

The following European habitat sites are located within 10 kilometres of the installation:

- Thames Estuary & Marshes (Ramsar and SPA)
- Medway Estuary & Marshes (Ramsar and SPA)
- Queendown Warren (SAC)
- The Swale (Ramsar and SPA)
- Benfleet & Southend Marshes (Ramsar and SPA)

The following Site of Special Scientific Interest (SSSI) is within two kilometres of the installation:

- Medway Estuary & Marshes

There are no non statutory local wildlife and conservation sites located within two kilometres of the installation.

### European Habitats Assessment

The applicant's European habitats assessment was reviewed by the Environment Agency's technical specialists for modelling, air quality, conservation and ecology technical services, who agreed with the assessment's conclusions, that there would be no likely significant effect on the interest features of the protected sites.

### Thames Estuary Ramsar and SPA

**Table 3 – Impacts on Thames Estuary Ramsar and SPA (located 3.4 kilometres from the installation)**

Pollutant	EQS / EAL (µg/m <sup>3</sup> )	Back-ground (µg/m <sup>3</sup> )	Process contribution (PC) (µg/m <sup>3</sup> )	PC as % of EQS / EAL	Predicted environmental concentration (PEC) (µg/m <sup>3</sup> )	PEC as % EQS / EAL
Direct Impacts <sup>1</sup>						
NO <sub>x</sub> annual	30	24.63	1.06	3.5	25.69	85.6
NO <sub>x</sub> daily mean	75	36.95	14.41	19.2	51.36	68.5
Deposition Impacts <sup>1</sup>						
Nitrogen deposition (kg N/ha/yr)	20 - 30	12.27	0.15	0.75	12.4	62.85

Pollutant	EQS / EAL (µg/m <sup>3</sup> )	Back-ground (µg/m <sup>3</sup> )	Process contribution (PC) (µg/m <sup>3</sup> )	PC as % of EQS / EAL	Predicted environmental concentration (PEC) (µg/m <sup>3</sup> )	PEC as % EQS / EAL
Acidification - nitrogen deposition (Keq/ha/yr)	0.743	0.88	0.011	1.5	0.891	120
Note 1: Direct impact units are µg/m <sup>3</sup> and deposition impact units are kg N/ha/yr or Keq/ha/yr.						

### Emissions of nitrogen dioxide (NO<sub>x</sub>)

#### *Long term:*

The PC is 1.06 µg/m<sup>3</sup> and the PEC is 25.69 µg/m<sup>3</sup> which are 3.5% and 85.6% of the 30 µg/m<sup>3</sup> long term critical level respectively. Although, it cannot be screened out as insignificant there is still sufficient headroom between the PEC and critical level, from the emissions from DCH2 alone, to indicate that a breach of the EAL is unlikely. See below for an in-combination impact assessment.

#### *Short term:*

The PC is 14.41 µg/m<sup>3</sup> and the PEC is 51.36 µg/m<sup>3</sup> which are 19.2% and 68.5% of the 75 µg/m<sup>3</sup> short term CLe respectively. Although, it cannot be screened out as insignificant there is still sufficient headroom between the PEC and the critical level, from the emissions from DCH2 alone, to indicate that an exceedence of the CLe is unlikely. See below for an in-combination impact assessment.

### Nitrogen deposition

The PC of nitrogen deposition is 0.15 kg N/ha/year and the PEC is 12.42 kg N/ha/year which are 1.9% and 155% of the lower range of 8 kg N/ha/year for critical load. However, a survey was carried out at the pre-application stage to determine the predominant type of vegetation present within the Thames Estuary & Marshes Ramsar and SPA. It was confirmed that there is no sand dune, saltmarsh or heath present in or near this receptor and therefore a CLo of 20-30 kgN/hr/yr is the appropriate critical range to use i.e. the CLo for neutral grassland. Taking this CLo into account the PC and PEC would be 0.75% and 62.85% respectively. This indicates that the nitrogen deposition can be considered insignificant when compared to this CLo.

### Acid deposition

The PC of acid deposition is 0.011 keq/ha/year and the PEC is 0.891 keq/ha/year which are 1.3% and 162.9% of the 0.743 keq N/ha/year critical load respectively. As the predicted deposition equates to greater than 1% for PC it cannot be regarded as insignificant.

In this instance the background acid deposition already exceeds the CLo. The PC from the DHC power stations is only marginally over the insignificance threshold at 1.3% and therefore we do not consider that this will have a likely significant effect on the habitat.

## Medway Estuary & Marshes Ramsar and SPA

**Table 4 – Impacts on Medway Estuary & Marshes Ramsar and SPA (located 37 metres from the installation)**

Pollutant	EQS / EAL (µg/m <sup>3</sup> )	Back-ground (µg/m <sup>3</sup> )	Process contribution (PC) (µg/m <sup>3</sup> )	PC as % of EQS / EAL	Predicted environmental concentration (PEC) (µg/m <sup>3</sup> )	PEC as % EQS / EAL
Direct Impacts <sup>1</sup>						
NO <sub>x</sub> annual	30	23.04	2.86	9.5	25.9	86.3
NO <sub>x</sub> daily mean	75	34.56	29.58	39.4	67.9	85.5
Deposition Impacts <sup>1</sup>						
Nitrogen deposition (kg N/ha/yr)	20 - 30	13.17	0.41	2.05	13.6	67.9
Acidification - nitrogen deposition (Keq/ha/yr)	1.113	0.94	0.029	2.6	0.97	87.1
Note 1: Direct impact units are µg/m <sup>3</sup> and deposition impact units are kg N/ha/yr or Keq/ha/yr.						

### Emissions of nitrogen dioxide (NO<sub>x</sub>)

#### *Long term:*

The PC is 2.86 µg/m<sup>3</sup> and the PEC is 25.9 µg/m<sup>3</sup> which are 9.5% and 86.3% of the 30 µg/m<sup>3</sup> long term environmental assessment level (EAL) respectively. Although, it cannot be screened out as insignificant there is still sufficient headroom, from the emissions from DCH2 alone, to indicate that a breach of the EAL is unlikely.

#### *Short term:*

The PC is 29.58 µg/m<sup>3</sup> and the PEC is 64.14 µg/m<sup>3</sup> which are 39.4% and 85.5% of the 75 µg/m<sup>3</sup> short term environmental assessment level (EAL) respectively. Although, it cannot be screened out as insignificant there is still sufficient headroom, from the emissions from DCH2 alone, to indicate that a breach of the EAL is unlikely.

### Nitrogen deposition

The PC of nitrogen deposition is 0.41 kg N/ha/year and the PEC is 13.58 kg N/ha/year which are 5.1% and 170% of the lower range of 8 kg N/ha/year for critical load. However, a survey was carried out at the pre-application stage to determine the predominant type of vegetation present within the Medway Estuary & Marshes Ramsar and SPA. It was confirmed that there is no sand dune present in or near this receptor and therefore a CLo of 20-30 kgN/hr/yr is the appropriate critical range to use i.e. the CLo for saltmarsh. Taking

this CLo into account the PC and PEC would be 2.05% and 67.9% respectively. This indicates that although the nitrogen deposition cannot be considered insignificant, that there is adequate headroom between the PEC and the CLo to indicate no likely significant effect.

The nearest sandune that was located was 6-7km to the north of the survey area.

Acid deposition

The PC of acid deposition is 0.029 keq/ha/year and the PEC is 0.969 keq/ha/year which are 2.7% and 111.4% of the 1.113 keq/ha/year critical load respectively. As the predicted deposition equates to greater than 1% for PC it cannot be regarded as insignificant.

The PC for the site is relatively low and the majority of the acid deposition is background. These figures represent worst case scenario in terms of operating regime and meteorological data. We can conclude that the predicted increase in acid deposition PC will have no likely significant effect.

**Queendown Warren SAC**

**Table 5 – Impacts on Queendown Warren SAC (located 9.8 kilometres from the installation)**

Pollutant	EQS / EAL (µg/m³)	Back-ground (µg/m³)	Process contribution (PC) (µg/m³)	PC as % of EQS / EAL	Predicted environmental concentration (PEC) (µg/m³)	PEC as % EQS / EAL
Direct Impacts <sup>1</sup>						
NO <sub>x</sub> annual	30	---	0.2	0.7	---	---
NO <sub>x</sub> daily mean	75	---	4.82	6.4	---	---
Deposition Impacts <sup>1</sup>						
Nitrogen deposition (kg N/ha/yr)	15	---	0.03	0.02	---	---
Acidification - nitrogen deposition (Keq/ha/yr)	4.856	---	0.002	0.04	---	---
Note 1: Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.						

Emissions of nitrogen dioxide (NO<sub>x</sub>)

*Long term:*

The PC is 0.20 µg/m³ which is 0.7% of the 30 µg/m³ CLe and therefore as the PC is <1% of the CLe, it is considered insignificant.

*Short term:*

The PC is 4.82 µg/m³ which is 6.4% of the 75 µg/m³ CLe and thus as the PC is <10% of the EAL, it is considered insignificant.

### Nitrogen deposition

The predicted PC of nitrogen deposition is 0.03 kg N/ha/year which is 0.2% of the 15 kg N/ha/year minimum CLo and thus as the PC is <1% of the CLo, it is considered insignificant.

### Acid deposition

The predicted PC of acid deposition is 0.002 keq/ha/year which is 0% of the 4.856 keq N/ha/year CLo and thus as the PC is <1% of the CLo, it is considered insignificant.

As the long term and short term emissions of nitrogen dioxide and nitrogen deposition/acid deposition at Queendown Warren SAC are insignificant, we can conclude that there will be no likely significant effect and no further assessment is required.

### **The Swale Ramsar and SPA**

**Table 6 – Impacts on The Swale Ramsar and SPA (located 9.9 kilometres from the installation)**

<b>Pollutant</b>	<b>EQS / EAL (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Back-ground (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Process contribution (PC) (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>PC as % of EQS / EAL</b>	<b>Predicted environmental concentration (PEC) (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>PEC as % EQS / EAL</b>
Direct Impacts <sup>1</sup>						
NO <sub>x</sub> annual	30	---	0.061	0.2	---	---
NO <sub>x</sub> daily mean	75	---	1.09	1.5	---	---
Deposition Impacts <sup>1</sup>						
Nitrogen deposition (kg N/ha/yr)	8	---	0.03	0.4	---	---
Acidification - nitrogen deposition (Keq/ha/yr)	0.743	---	0.002	0.3	---	---
Note 1: Direct impact units are $\mu\text{g}/\text{m}^3$ and deposition impact units are kg N/ha/yr or Keq/ha/yr.						

### Emissions of nitrogen dioxide (NO<sub>x</sub>)

#### *Long term:*

The PC is 0.23  $\mu\text{g}/\text{m}^3$  which is 0.8% of the 30  $\mu\text{g}/\text{m}^3$  CLe and therefore as the PC is <1% of the CLe, it is considered insignificant.

#### *Short term:*

The PC is 3.41  $\mu\text{g}/\text{m}^3$  which is 4.5% of the 75  $\mu\text{g}/\text{m}^3$  CLe and therefore as the PC is <10% of the EAL, it is considered insignificant.

### Nitrogen deposition

The predicted PC of nitrogen deposition is 0.03 kg N/ha/year which is 0.4% of the 8 kg N/ha/year minimum critical load and thus as the PC is <1% of the CLo, it is considered insignificant.

### Acid deposition

The predicted PC of acid deposition is 0.002 keq/ha/year which is 0% of the 0.743 keq N/ha/year critical load and thus as the PC is <1% of the critical load, it is considered insignificant.

As the long term and short term emissions of nitrogen dioxide and nitrogen deposition/acid deposition at The Swale Ramsar and SPA are insignificant, we can conclude that there will be no likely significant effect and no further assessment is required.

## **Benfleet and Southend Marshes Ramsar and SPA**

This habitats site is approximately 9.3 km from the installation. Although the Applicant did not consider this European site specifically we have used the data from Queendown Warren as the sites are within 0.5 km of each other.

### Emissions of nitrogen dioxide (NO<sub>x</sub>)

The PC for both long and short term NO<sub>x</sub> at Queendown Warren screen out as insignificant and as the CLe are the same for Benfleet and Southend these can also be presumed to screen out as insignificant.

### Nitrogen deposition

The lower CLo for the site is 8 N/ha/year. If this is compared to the 0.03 kg N/ha/year predicted for deposition at Queendown Warren, it is 0.4% of the CLo and therefore would screen out as insignificant.

### Acid deposition

The predicted PC of acid deposition at Queendown Warren is 0.002 keq/ha/year which is 0.11% of the 1.830 keq N/ha/year CLo and thus as the PC is <1% of the CLo, it is considered insignificant.

## **Potential impacts on habits - Conclusion**

The process contributions to the following European sites screen out as insignificant and therefore we can conclude no likely significant effect from the proposal on these sites:

### **The Swale Ramsar and SPA**

### **Queendown Warren SAC**

### **Benfleet and Southend Marshes Ramsar and SPA**

The process contributions to the following European sites for long term and short term NO<sub>x</sub> and nitrogen deposition are not considered insignificant but there is adequate headroom between the process contributions and the critical levels or loads to indicate that an exceedence is unlikely. We can therefore conclude no likely significant effect from the proposal for these pollutants at these sites:

### **Medway Estuary & Marshes Ramsar and SPA**

### **Thames Estuary & Marshes Ramsar and SPA**

Acid deposition however does not fall into this category as for both the Medway and Thames, the background levels of acid deposition are already exceeding the background. The PC for each site is 2.7% for Medway and 1.3% for Thames. The PCs are relatively low and the majority of the acid deposition is background. These figures represent worst case scenario in terms of operating regime and meteorological data. We can therefore unlikely that emissions from these sites will result in likely significant effect in combination.

However, as outlined above, where there is a potential for incombination impacts there is either adequate headroom to indicate that an incombination impact is unlikely or in the case of acid deposition, although the background is already exceeded, the individual process contributions from the other installations are relatively low and unlikely to have a significant effect.

### Potential in-combination impacts

The key operation to consider in combination with the new Damhead Powerstation is the existing DHC 1 powerstation. The impact assessment that the operator has carried out takes into account emissions from both sites in combination.

Kingsnorth Powerstation was in operation approximately 700 m to the south with a significant potential for in combination impact, however, Kingsnorth is no longer in operation. In addition to the removal of the potential for the powerstation to act in combination with Damhead Creek, this has resulted in a removal of a NO<sub>x</sub> PC of approximately 1.9% of the CL<sub>e</sub>. The following extract from the Joint Environment Protocol outlined the PC from the powerstation.

Site	Critical level (µgm <sup>-3</sup> )	Max PS contribution (µgm <sup>-3</sup> )	Max PS contribution as % of critical level	Background concentration (µgm <sup>-3</sup> )	Background concentration as % of critical level	Total concentration (µgm <sup>-3</sup> )	Total concentration as % of critical level
Benfleet & Southend Marshes Ramsar and SPA			Features not sensitive				
Thames Estuary & Marshes SPA	30	0.58	1.9	25.24	84.1	25.82	86.1
Thames Estuary & Marshes Ramsar	30	0.58	1.9	25.24	84.1	25.82	86.1
Medway Estuary & Marshes Ramsar and SPA	30	0.68	2.3	25.88	86.3	26.56	88.5
The Swale Ramsar and SPA	30	0.33	1.1	29.20	97.3	29.53	98.4
Queendown Warren SAC	30	0.22	0.7	33.29	111.0	33.51	111.7
North Downs Woodlands SAC	30	0.22	0.7	30.69	102.3	30.91	103.0
Peter's Pit SAC	30		Features not sensitive				

**Table 4.12.2: Contribution to critical level for annual average NO<sub>x</sub> concentrations at Natura 2000 sites within 15km of Kingsnorth**

The emissions that cannot be considered insignificant and therefore have the potential to act in combination with other permissions, plans or projects are as follows:

#### Medway Estuary & Marshes Ramsar and SPA

- Long term NO<sub>x</sub>
- Short term NO<sub>x</sub>
- Nitrogen deposition
- Acid deposition

#### Thames Estuary & Marshes Ramsar and SPA

- Long term NO<sub>x</sub>
- Short term NO<sub>x</sub>
- Nitrogen deposition
- Acid deposition

There are several power stations over 5km to the east of the installation – Medway powerstation (5.5km) and Grain powerstation (7.1km). Existing contributions from Medway and Grain Powerstations are incorporated into the background values to some extent. The isopleths provided in conjunction to the modelling below show that the highest predicted output from the modelling is localised and reduces significantly above 5km from the installation. With the level of headroom available for both long term NO<sub>x</sub>, short term NO<sub>x</sub> and nitrogen deposition, it is possible to conclude that it is unlikely that emissions from these sites will result in likely significant effect in combination.

We are therefore, satisfied that the applicant's assessment of impact on the relevant habitat sites is satisfactory and consider that the operation of the proposed installation will not have an adverse effect on the

features of these habitat sites. We consulted Natural England on this decision on 03/05/2017 and they confirmed that they agree with the conclusions of our assessment.

## **Impact on SSSIs**

### Sites of Special Scientific Interest Assessment

The applicant's assessment of Medway Estuary and Marshes SSSI is consistent with the habitats assessment, for Medway Estuary and Marshes Ramsar and SPA, detailed above. The assessment of the SSSI was reviewed by the Environment Agency's technical specialists for modelling, air quality, conservation and ecology technical services, who agreed with the assessment's conclusions, that the proposal does not damage the special features of the SSSI.

## **Emissions to Water**

There will be a new discharge of trade effluent, at emission point W2, into Damhead Creek which leads to River Medway. The discharge consists of boiler blowdown, water treatment plant effluent, treated sewage effluent and uncontaminated surface run off. There will be a maximum discharge of 90 cubic metres per hour of trade effluent.

In addition, the variation authorises the increase in the existing discharge at emission point W1. The new maximum discharge volume is 60 cubic metres per hour of trade effluent. The increase in discharge volume is to allow for effective management of storm water accumulation.

The applicant undertook a H1 assessment, for the new discharge and the increased discharge flow at W1, in order to screen out pollutants which could be considered insignificant and for which detailed modelling is not necessary in line with risk assessment guidance.

We have assessed the impact of the proposed effluent discharge and increase in the existing discharge in accordance with our operational instruction, OI 50\_12 Water Quality Planning: No deterioration and Water Framework Directive. The Water Framework Directive (WFD) requires member states to "*implement the necessary measures to prevent deterioration of the status of all water bodies...*" (Article 4.1). All practicable actions must be taken to prevent the deterioration in the status of all water bodies in England and Wales. While the permitting of a discharge into a waterbody will cause some localised deterioration, under WFD the deterioration from one status class to a lower one is not permitted. We use two tests to decide if discharges to surface waters are acceptable. A discharge is generally acceptable if:

1. it does not cause deterioration in quality of the water body receiving the discharge. We will assess discharges using the 'no deterioration' test if applying to increase currently permitted discharges, and
2. the receiving water body meets its target quality standards.

### *No deterioration*

Our aim is to issue permits that prevent or minimise any deterioration in the quality of the water bodies that could otherwise occur as a result of the discharge. We must also be sure the proposed discharges do not make it impossible to achieve any target standards not currently being met (such as the WFD Status Objective).

We refer to this as 'no deterioration' and our ideal is for no increase in the planned pollutant load discharged to the water body. Where this is not possible, we will limit any within class deterioration as far as possible.

We must maintain the WFD status of water bodies as reported in the February 2016 River Basin Management Plans. This may exceptionally require action beyond the requirement for no increase in the permitted pollutant load to the water body.

If the control measures necessary to achieve 'no deterioration' are not practical or cost effective, we may either refuse the permit or request the operator to use technically feasible and cost effective measures.

### *Target Standards*

When we are seeking improvement in water quality, our objective is to make sure the permits we issue meet the uses, water quality objectives, environmental quality standards and design standards applicable to the receiving water. These include the Water Framework Status Objectives.

The receiving watercourse is designated under the WFD and the water body name is the Medway via Damhead Creek. The WFD Water body Identification Number (WBID) for this stretch is GB530604002300. The Medway is classified as a Transitional and Coastal (TRaC) water body.

#### *Water Quality Assessment*

We have audited the H1 Water Impact Assessment for discharges from existing emission point W1 in combination with proposed emission point W2 to establish whether they are liable to cause pollution of the receiving water. Based on the H1 submitted we do not consider that the emissions to water from the installation are liable to cause pollution if emissions limit values are set in line with those already applied to the existing emission point on site.

#### *Conclusion*

We have included the following limits for this proposed discharge to the River Medway as follows:

<b>Parameter</b>	<b>Limit</b>
Total flow	90 m <sup>3</sup> /hour
Temperature	30°C
pH	6 - 9
Total suspended solids	60mg/l
Mercury and its compounds	0.005mg/l
Cadmium	0.01mg/l
BOD	40mg/l
Total ammonia	8 mg/l
Oil and grease	No visible emission

We are satisfied that the proposed emission limits will prevent significant pollution of the River Medway and are consistent with the application of best available techniques (BAT) at the installation.

#### **Noise Impacts**

The additional power station has the potential to create noise nuisance and disturbance through the operation of the plant and equipment, in particular the gas turbines but also the steam turbines and generators.

The application contained a noise impact assessment which identified local noise sensitive receptors, potential sources of noise at the proposed plant and noise attenuation measures. The applicant did not conduct the assessment in with BS4142:2014 but based the assessment on noise limit values which the council approved for planning. However, a BS4142 noise assessment was undertaken for the original Section 36 application which was carried out in 2007 and provided as part of a Schedule 5 request.

The site location is bounded by agricultural land to the south, by Damhead Creek to the east, by the Kingsnorth Industrial Estate to the north and west. The closest potentially sensitive residential noise receptors were identified 400m to the north, east and west of the DHC1 air cooled condenser.

A Noise Management and Monitoring Plan (NMMP) for the site has been put into place in relation to the planning application and approved by Medway Council. The NMMP contains maximum noise level limits for DHC1 and DHC2.

Noise modelling was carried out to predict likely potential impact on the sensitive receptors from the operational noise, however because the BS4142 assessment that considered noise was carried out in 2007, we consider it appropriate to set a pre-operational condition in the permit requiring the operator to redo the assessment using the updated standard and taking into account changes which have taken place, such as the closure of the Kingsnorth Power Station. The pre-operational condition (PO2) is as follows:

*'Prior to the commencement of commissioning of Damhead Creek 2 Power Station, the Operator shall prepare and submit a comprehensive noise assessment report undertaken by an experienced and suitably qualified person in accordance with the procedures given in BS4142:2014 (Methods for rating and assessing industrial and commercial sound). The assessment shall include the assessment of the predicted impact of noise emissions upon surrounding sensitive receptors arising from the operation of the powerstation against the relevant benchmarks for assessment set out in BS4142:2014.*

*If the report does not demonstrate that there will be no adverse effect, the noise management and mitigation proposals must be amended accordingly and the noise assessment updated to reflect the changes'.*

The applicant concluded within the Application that the new power station, as restricted by the noise limits specified in the planning permission is not likely to lead to an adverse impact and the predicted impact at the residential receptors will be minimal. The response to this pre-operational condition is required to validate the assessment included in the Application.

The Applicant also concluded that the results of the noise modelling indicate that predicted noise levels at all noise sensitive receptors around the site will be below the agreed noise limits for DHC2 set out in the Noise Monitoring and Management Plan (NMMP) specific to the planning permission granted by Medway Council. We agree with this conclusion.

Consideration of the potential impact of noise on habitats was also considered. Noise levels from the operation of DHC2 at habitats sites around the installation (including Medway Estuary & Marshes) were predicted to be below 55 dB, a level below which no effect on birds is expected. The majority of conservation sites (>95% of assessed areas) will be exposed to levels below 35 dB. Natural England were consulted in the form of an Appendix 11, the final version sent to them 03/05/2017. Natural England agreed with our conclusions that no likely significant effect is anticipated as a result of emissions of noise from the proposed powerstation.

The applicant has proposed the following measures to prevent or minimise noise from the installation:

- The gas turbines will be situated inside acoustic enclosures.
- Gas turbine filter and ventilation apertures fitted with high performance silencers.
- Low noise air cooled condensers.
- Unit transformers and generator transformers housed in an appropriate enclosure.
- Routine maintenance of plant and equipment will be undertaken as part of a formal preventative maintenance procedures.

We consider that these measures are BAT for the installation and in line with the relevant guidance for combustion activities.

## **Application of Best Available Techniques**

### Scope of Consideration

In this section, we explain how we have determined whether the applicant's proposals are the best available techniques.

- we consider the control measures for the emissions which were not screened out as insignificant in the previous section on minimising the installations environmental impact;
- we consider energy efficiency, and options for Combined Heat and Power, and the compliance with the Energy Efficiency Directive; and
- we consider the cooling system proposed.

Chapter III of the IED specifies a set of maximum emission limit values. Although these limits are designed to be stringent, and to provide a high level of environmental protection, they do not necessarily reflect what can

be achieved by new plant. Article 14(3) of the IED says that BAT Conclusions shall be the reference for setting the permit conditions, so it may be possible and desirable to achieve emissions below the limits referenced in Chapter III. However, BAT Conclusions and a revised BREF for LCP have not yet been drafted or published, so the existing BREF and Chapter III of the IED remain relevant.

Even if the Chapter III limits are appropriate, operational controls complement the emission limits and should generally result in emissions below the maximum allowed; whilst the limits themselves provide headroom to allow for unavoidable process fluctuations. Actual emissions are therefore almost certain to be below emission limits in practice, because any operator who sought to operate its installation continually at the maximum permitted level would almost inevitably breach those limits regularly, simply by virtue of normal fluctuations in plant performance, resulting in enforcement action (including potentially prosecution) being taken. Assessments based on, say, Chapter III limits are therefore “worst-case” scenarios.

We are satisfied that emissions at the permitted limits would ensure a high level of protection for human health and the environment in any event.

#### Consideration of Combustion Plant

The applicant has chosen to operate a CCGT plant which we consider to be BAT.

#### Consideration of Emission Control Measures

We have reviewed the techniques used by the operator and compared these with the relevant guidance notes.

#### Emissions to Air

It is anticipated that emission limits will be met without the need for further abatement.

Emissions of carbon monoxide, sulphur dioxide and particulates have been previously screened out as insignificant, and so the Environment Agency agrees that the applicant’s proposed techniques is BAT for the proposed plant. We consider that the emission limits included in the installation permit reflect the BAT for the sector.

Emissions of oxides of nitrogen cannot be screened out as insignificant. The Environment Agency has therefore assessed whether the proposed techniques are BAT.

The applicant proposed to use dry low NOx burners on the CCGTs. The use of dry low NOx burners in combination with CCGT is considered BAT in the Environment Agency Sector Guidance Note (SGN) Combustion Activities (EPR 1.01) and BREF Note.

The SGN and BREF Note describes selective catalytic reduction (SCR) and selective non catalytic reduction (SNCR) as beyond BAT measures which could be applied where there could be a likelihood of a breach of the AQS. As detailed above this is not likely and therefore the installation of SCR/SNCR, or any further abatement, is not necessary.

The proposed techniques and emission levels for priorities for control are in line with the benchmark levels contained in the SGN Combustion Activities (EPR 1.01) and we consider them to represent appropriate techniques for the facility. The permit conditions ensure compliance with relevant BREFs and benchmark ELVs.

#### Emissions to Land and Water

There are no direct emissions to land.

DHC2 process waters, consist predominantly of boiler blowdown and water treatment plant effluent, are discharged to Damhead Creek via new emission point W2. A H1 assessment has been included in the application assessing this discharge.

The effluent from the WTP will be treated in an automatic effluent neutralising system where the pH will be treated to within acceptable levels prior to discharge. The Environment Agency is satisfied that the proposals are BAT.

#### Consideration of Energy Efficiency

We have considered the issue of energy efficiency in the following ways:

1. The use of energy within, and generated by, the proposed plant. This issue is dealt with in this section.
2. The extent to which the installation meets the requirement of Article 14(5) of the Energy Efficiency Directive which requires new thermal electricity generation installations with a total thermal input exceeding 20 MWth to carry out a cost benefit assessment to “*assess the cost and benefits of providing for the operation of the installation as a high efficiency cogeneration installation*”.

**Cogeneration** means the simultaneous generation in one process of thermal energy and electrical or mechanical energy and is also known as combined heat and power (CHP)

**High-efficiency co-generation** is cogeneration which achieves at least 10% savings in primary energy usage compared to the separate generation of heat and power – Annex II of the Energy Efficiency Directive details how to calculate this.

#### Use of Energy within the Installation

Having considered the information submitted in the application, we are satisfied that appropriate measures will be in place to ensure that energy is used efficiently within the proposed plant.

The application details a number of measures that will be implemented at the proposed plant in order to increase its energy efficiency.

#### Choice of Cooling System

The applicant has chosen to operate using air cooled condensers as they do not require the use of water or chemical treatment. Furthermore, the use of air cooled condensers means that cooling towers are not required and no water discharge, therefore, minimising environmental impacts such as visible plumes and thermal discharges to watercourse which can be associated with other cooling systems.

The Environment Agency agrees that based on the above reasoning the proposed air cooled system is considered to be BAT for this installation.

#### Combined Heat and Power

Our CHP Ready Guidance - February 2013 considers that BAT for energy efficiency for new combustion power plant is the use of CHP in circumstances where there are technically and economically viable opportunities for the supply of heat from the outset.

The term CHP in this context represents a plant which also provides a supply of heat from the electrical power generation process to either a district heating network or to an industrial/commercial building or process. However, it is recognised that opportunities for the supply of heat do not always exist from the outset (i.e. when a plant is first consented, constructed and commissioned).

In cases where there are no immediate opportunities for the supply of heat from the outset, the Environment Agency considers that BAT is to build the plant to be CHP Ready (CHP-R) to a degree which is dictated by the likely future opportunities which are technically viable and which may, in time, also become economically viable.

The installation will generate electricity only and has been specified to maximise electrical output with little or no use of waste heat.

The applicant has provided a CHP- Ready assessment which identifies further potential heat supply opportunities and explains how the plant will be ready to supply them in the future.

The assessment included a detailed heat mapping exercise, review of local government strategic development documents and stakeholder consultation to establish potential industrial, residential and commercial heat customers within 15 kilometres of the installation. Suitable heat customers were not identified at this time.

The CCGT plant layout will be arranged to allow space to be available for potential heat extraction to serve a commercially viable district heating route in the future. In accordance, with BAT guidance a review of existing

and future heat users, heat loads and economic viability to serve these will be undertaken periodically taken into consideration.

The Environment Agency has reviewed the application CHP-R report and considers it adequately addresses all options for CHP within the vicinity of the plant. Permit condition 1.2.2 has been set within the permit to review CHP viability every four years.

We consider that, within the constraints of the location of the installation explained above, the installation will recover heat as far as practicable, and therefore that the requirements of Article 6(6) are met.

Compliance with Article 14(5) of the Energy Efficiency Directive

The applicant has carried out an assessment of the potential for operating the installation as a high efficiency cogeneration installation and has concluded that this will not be possible because there are no opportunities identified in the Comprehensive Assessment within 15 km of the installation and we agree with the applicant’s assessment. Therefore, no cost benefit assessment is required.

Permit Conditions Concerning Energy Efficiency

Condition 1.2.2 has been included in the permit, which requires the operator to review the viability of CHP at least every 4 years, or in response to changes that might make CHP viable.

The operator is required to report energy usage and energy generated under condition 4.2 and table S4.2 in Schedule 4. This will enable the Environment Agency to monitor energy efficiency at the installation and take action if at any stage the energy efficiency is less than proposed.

There are no site specific considerations that require the imposition of standards beyond indicative BAT, and so the Environment Agency accepts that the applicant’s proposals represent BAT for this installation.

**Emission Limits**

The operator has proposed limits in line with part 2 annex V of the IED emission benchmarks (BAT) given in SGN Combustion Activities (EPR 1.01). As discussed in section 6 above, emissions at these limits will not cause significant pollution. Consequently we have accepted the proposed limits and incorporated them into table S3.1 of the permit.

<b>Parameter</b>	<b>Proposed mg/m<sup>3</sup></b>	<b>Reference Period</b>	<b>Annex V mg/m<sup>3</sup></b>	<b>Permit limit mg/m<sup>3</sup></b>
Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	100	95%ile of hourly averages	100	100
	55	24 hourly averages	55	55
	50	Monthly averages	50	50
Carbon monoxide	200	95%ile of hourly averages	200	200
	None	24 hourly averages	110	110
	None	Monthly averages	100	100

For oxides of nitrogen and carbon monoxide the limits proposed by the applicant are the same as those set out in Annex V of IED. Therefore, the limits proposed by the applicant have been included in the permit.

## **Monitoring and Reporting Requirements**

### Gas Fired Plant

Sulphur dioxide emissions from natural gas firing of gas turbines and boilers will be reported as six monthly concentrations on the basis of the fuel sulphur content without continuous or periodic monitoring since only trace quantities of sulphur are present in UK natural gas. Dust emissions for natural gas fired boilers will, likewise, be reported on the basis of emission factors without continuous or periodic monitoring. For gas turbines we have not required any reporting as the dust emissions will always be reported as zero. This is because natural gas is an ash free fuel and high efficiency combustion in the gas turbine does not generate additional particulate matter. The fuel gas is always filtered and, in the case of gas turbines, the inlet air is also filtered resulting in a lower dust concentration in the flue than in the surrounding air.

The IED Annex V ELVs for oxides of nitrogen and carbon monoxide apply to OCGTs, CCGTs and mechanical drive gas turbines when the load is >70%. This has been interpreted as 70% of the rated output load. The rated output load used here is the same as that used for calculating the percentage load when specifying the end of start up and beginning of shut down.

## Decision checklist

Aspect considered	Decision
<b>Receipt of application</b>	
Confidential information	A claim for commercial or industrial confidentiality has not been made.
Identifying confidential information	We have not identified information provided as part of the application that we consider to be confidential.
<b>Consultation/Engagement</b>	
Consultation	<p>The consultation requirements were identified in accordance with the Environmental Permitting Regulations and our public participation statement.</p> <p>The application was publicised on the GOV.UK website.</p> <p>We consulted the following organisations:</p> <ul style="list-style-type: none"> <li>• Local Planning Authority</li> <li>• Environmental Health</li> <li>• Public Health England</li> <li>• Director of Public Health</li> <li>• Food Standards Agency</li> <li>• Health and Safety Executive</li> <li>• National Grid</li> </ul> <p>No responses were received.</p>
<b>The site</b>	
Extent of the site of the facility	The operator has provided a plans which we consider are satisfactory, showing the extent of the site of the facility. The plan is included in the permit.
Site condition report	The operator has provided a description of the condition of the site, which we consider is satisfactory. The decision was taken in accordance with our guidance on site condition reports and baseline reporting under the Industrial Emissions Directive.
Biodiversity, heritage, landscape and nature conservation	<p>The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat.</p> <p>We have assessed the application and its potential to affect all known sites of nature conservation, landscape and heritage and/or protected species or habitats identified in the nature conservation screening report as part of the permitting process.</p> <p>We consider that the application will not affect any sites of nature conservation, landscape and heritage, and/or protected species or habitats identified.</p> <p>We have consulted Natural England on our Habitats Regulations and SSSI assessments, and taken their comments into account in the permitting decision.</p>

Aspect considered	Decision
<b>Environmental risk assessment</b>	
Environmental impact assessment	<p>In determining the application we have considered the Environmental Statement.</p> <p>We have also considered the planning permission and the committee report approving it.</p>
Environmental risk	<p>We have reviewed the operator's assessment of the environmental risk from the facility.</p> <p>The operator's risk assessment is satisfactory.</p> <p>The assessment shows that, applying the conservative criteria in our guidance on environmental risk assessment, all emissions may be categorised as environmentally insignificant.</p>
<b>Operating techniques</b>	
General operating techniques	<p>We have reviewed the techniques used by the operator and compared these with the relevant guidance notes and we consider them to represent appropriate techniques for the facility.</p> <p>The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.</p>
Operating techniques for emissions that do not screen out as insignificant	<p>Emissions of oxides of nitrogen cannot be screened out as insignificant. We have assessed whether the proposed techniques are BAT.</p> <p>The proposed techniques/ emission levels for emissions that do not screen out as insignificant are in line with the techniques and benchmark levels contained in the technical guidance and we consider them to represent appropriate techniques for the facility. The permit conditions ensure compliance with relevant BREFs and BAT Conclusions, and ELVs deliver compliance with BAT-AELs.</p> <p>See key issues sections 'The Installation's Environmental Impact' and 'Application of Best Available Techniques' for further information.</p>
Operating techniques for emissions that screen out as insignificant	<p>Emissions of carbon monoxide have been screened out as insignificant, and so we agree that the applicant's proposed techniques are BAT for the installation.</p> <p>We consider that the emission limits included in the installation permit reflect the BAT for the sector.</p>
<b>Permit conditions</b>	
Updating permit conditions during consolidation	<p>We have updated permit conditions to those in the current generic permit template as part of permit consolidation. The conditions will provide the same level of protection as those in the previous permit.</p>
Pre-operational conditions	<p>Based on the information in the application, we consider that we need to impose pre-operational conditions.</p>

Aspect considered	Decision
	PO1 – To confirm details of expected emissions during commissioning and actions taken to protect the environment.
Improvement programme	<p>Based on the information on the application, we consider that we need to impose an improvement programme.</p> <p>We have imposed an improvement programme to ensure that:</p> <p>IC11 - The appropriate measures are in place for the start up and shut down of the plant.</p> <p>IC12 - The operator provides evidence to support the thermal input of the plant.</p> <p>IC13 - The appropriate measures are in place for the compliance with the permit conditions once environmental performance data has been obtained subsequent to the commissioning of the plant.</p>
Emission limits	<p>ELVs have been added for the following substances.</p> <ul style="list-style-type: none"> <li>• oxides of nitrogen (NO and NO<sub>2</sub> expressed as NO<sub>2</sub>)</li> <li>• carbon monoxide</li> </ul> <p>NO<sub>2</sub> emissions to air are only significant with regards to emissions from the HRSG stacks. Emissions from the auxiliary boilers, dew point heaters and diesel generators are insignificant therefore no emission limits have been set for these points within the permit.</p> <p>It is considered that the numeric limits for the pollutants described below will prevent significant deterioration of receiving waters. We have imposed numeric limits because either a relevant environmental quality or operational standard requires this.</p> <ul style="list-style-type: none"> <li>• Temperature</li> <li>• pH</li> <li>• Total suspended solids</li> <li>• Mercury</li> <li>• Cadmium</li> <li>• BOD</li> <li>• Total ammonia</li> <li>• Oil or grease</li> </ul>
Monitoring	<p>We have decided that monitoring should be added for the following parameters, using the methods detailed and to the frequencies specified:</p> <ul style="list-style-type: none"> <li>• continuous emissions monitoring for LCP467, LCP468 and LCP469 – oxides of nitrogen and carbon monoxide; and</li> <li>• 6 monthly for LCP467, LCP468 and LCP469 – sulphur dioxide</li> </ul> <p>These monitoring requirements have been imposed in order to meet requirements of Annex V of the IED. We made these decisions in accordance with the SGN Combustion Activities (EPR1.01) and the monitoring methods are in accordance with the Monitoring of Stack Emissions to Air Technical Guidance Note (M2).</p> <p>Based on the information in the application we are satisfied that the operator's techniques, personnel and equipment have either MCERTS certification or MCERTS accreditation as appropriate.</p>

Aspect considered	Decision
Reporting	<p>We have added reporting in the permit for the following parameters:</p> <ul style="list-style-type: none"> <li>• every 3 months for LCP467, LCP468 and LCP469 – oxides of nitrogen and carbon monoxide; and</li> <li>• every 6 months for LCP467, LCP468 and LCP469 – sulphur dioxide</li> <li>• every 3 months – emissions to water</li> </ul> <p>The reporting requirements in the permit have been specified in order to comply with the requirements of the Industrial Emissions Directive.</p> <p>We made these decisions in accordance with the <i>JEP Electricity Supply Industry – IED Compliance Protocol for Utility Boilers and Gas Turbines. February 2015.</i></p>
<b>Operator competence</b>	
Management system	There is no known reason to consider that the operator will not have the management system to enable it to comply with the permit conditions.
<b>Growth Duty</b>	
Section 108 Deregulation Act 2015 – Growth duty	<p>We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to vary this permit.</p> <p>Paragraph 1.3 of the guidance says:</p> <p>“The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation.”</p> <p>We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections.</p> <p>We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards.</p>

## Consultation

The following summarises the responses to consultation with other organisations, our notice on GOV.UK for the public and the way in which we have considered these in the determination process.

### Responses from organisations listed in the consultation section

<b>Response received on 13/12/16 from</b>
Public Health England (PHE)
<b>Brief summary of issues raised</b>
<p>Recommendation that the Environmental Permit should contain conditions to ensure that emissions to air do not impact upon public health.</p> <p>Based solely on the information contained in the application provided, PHE has no significant concerns regarding risk to health of the local population from the proposed activity, providing the applicant takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice.</p> <p>Recommendation that the Environment Agency also consults the local authority, the Food Standards Agency and the Director of Public Health.</p>
<b>Summary of actions taken or show how this has been covered</b>
<p>The decision document outlines how we carried out our assessment of the potential impact on human health. Conditions within the application require the operator to operate the site in line with those parameters specified in the permit variation application and best available techniques. Conditions relating to noise, odour, fugitive emissions and monitoring and reporting of emissions to air are all included in the permit.</p> <p>The local authority, the Food Standards Agency and the Director of Public Health were consulted on the application.</p>

<b>Response received on 22/11/16 from</b>
Medway Council – Environmental Protection Team
<b>Brief summary of issues raised</b>
Confirmation that the Environmental Protection Team are not aware of any noise or amenity issues at the site.
<b>Summary of actions taken or show how this has been covered</b>
No further action required

<b>Response received from</b>
Director of Public Health
<b>Brief summary of issues raised</b>
No response received
<b>Summary of actions taken or show how this has been covered</b>
No further action required

<b>Response received from</b>
Food Standards Agency
<b>Brief summary of issues raised</b>
No response received

<b>Summary of actions taken or show how this has been covered</b>
No further action required

<b>Response received from</b>
Health and Safety Executive
<b>Brief summary of issues raised</b>
No response received
<b>Summary of actions taken or show how this has been covered</b>
No further action required

The Application was also advertised on our website for 20 working days and no responses were received.