Environment Agency Permitting Decisions

Bespoke Permit

We have decided to grant a permit for Trafford Power Station operated by Wainstones Energy Limited.

The permit number is EPR/QP3630WH.

This was applied for and determined as a bespoke permit.

The application was duly made on 14/03/2016.

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.

Description of the Main Features of the Installation

The application is for a new gas fired power station. Trafford Power Station comprises a natural gas fired Combined Cycle Gas Turbine (CCGT) electricity generating station with a net electricity capacity of up to 1,931 megawatts (MW).

The plant is to be located at 132 Manchester Road, Carrington, Manchester and covers an area previously occupied by the former coal fired Carrington Power Station site. The site is located between the villages of Carrington and Partington approximately 14 kilometres south west of Manchester city centre.

The CCGT plant will comprise of three generating units each consisting of a gas turbine (GT), heat recovery steam generator (HRSG) and a steam turbine (ST) in a combined cycle configuration within a common turbine hall. Each CCGT has an electricity capacity of 644 MWe (thermal input of 1,044 MWth each).

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

The installation is expected to operate at an energy conversion efficiency of over 60% and be capable of generating 1,931 MWe which will be exported to the National Grid via an existing 400 kilovolt overhead transmission network to the north of the site. Natural gas will be drawn from the National Transmission System, approximately 1.6 kilometres away, through a new dedicated pipeline.

The installation will also include a water treatment plant, two 25.5 MWth gas fired auxiliary boilers to provide steam for start up of the HRSGs and three 3 MWth emergency diesel generators to enable safe shut down.

Spent steam is cooled and condensed for reuse in the HRSG. Water for the cooling system will use cooling water abstracted from the Manchester Ship

Canal (MSC) in three hybrid cooling towers. The cooling water will be discharged back into the MSC 9°C warmer than the abstraction temperature.

A detailed heat mapping exercise was undertaken to establish the potential for use of heat from the plant, however, no suitable heat customers were identified. The power station will be combined heat and power (CHP) ready. The installation will also be designed to be carbon capture ready to allow for potential retrofit in the future. Emissions of oxides of nitrogen (NO_x) will be minimised by the use of dry low NO_x burners installed in the gas turbines. Flue gases will be discharged to atmosphere through three 85 metre stacks.

Purpose of this Document

This decision document:

- explains how the application has been determined
- provides a record of the decision-making process
- shows how all relevant factors have been taken into account
- justifies the specific conditions in the permit other than those in our generic permit template.

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

Structure of this Document

- Key issues of the Decision
- Annex 1 the Decision Checklist
- Annex 2 the Consultation and Web Publicising Responses

Key Issues of the Decision

Contents:

GLOSSARY

Baseload	means: (i) as a mode of operation, operating for >4000hrs per annum; and (ii) as a load, the maximum load under ISO conditions that can be sustained continuously, i.e. maximum continuous rating
BAT	best available techniques
BREF	best available techniques reference document
CCGT	combined cycle gas turbine
ELV	emission limit value set out in either IED or LCPD
GT	gas turbine
IED	Industrial Emissions Directive 2010/75/EC
LCP	large combustion plant – combustion plant subject to Chapter III of IED
MSUL/MSDL	Minimum start up load/minimum shut-down load
SCR	selective catalytic reduction
SNCR	selective non catalytic reduction

1. Chapter III of the IED

Chapter III of the Industrial Emissions Directive (IED) applies to new and existing large combustion plants (LCPs) which have a total rated thermal input which is greater or equal to 50 MWth. Articles 28 and 29 explain exclusions to chapter III and aggregation rules respectively.

The aggregation rule is as follows:

- A LCP has a total rated thermal input ≥50 MWth.
- Where waste gases from two or more separate combustion plant discharge through a common windshield, the combination formed by the plants are considered as a single large combustion plant.
- The size of the LCP is calculated by adding the capacities of the plant discharging through the common windshield disregarding any units <15 MWth.

A “common windshield” is frequently referred to as a common structure or windshield and may contain one or more flues.

Combustion plant on the installation that do not form part of an LCP and so do not come under chapter III requirements, will still aggregate to be part of the Section 1.1 A(1)(a) activity listed in Schedule 1 of the Environmental Permitting regulations if they have a rated thermal input of 1 MWth or over.

Chapter III lays out special provisions for LCP and mandatory maximum emission limit values (ELVs) are defined in part 2 of Annex V for new plant, however it is worth noting that best available techniques (BAT) requirements may lead to the application of lower ELVs than these mandatory values. Mandatory ELVs cannot be exceeded even if a site specific assessment can be used to justify emission levels higher than BAT.

2. Large Combustion Plants Description and Numbers

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

LCP463
This LCP consists of a 1,044 MWth CCGT which vents via a single windshield at emission point A1. The unit burns natural gas only.

LCP464
This LCP consists of a 1,044 MWth CCGT which vents via a single windshield at emission point A1. The unit burns natural gas only.

LCP465
This LCP consists of a 1,044 MWth CCGT which vents via a single windshield at emission point A1. The unit burns natural gas only.

3. Compliance Route

The applicant has proposed to operate LCP463, LCP464 and LCP465 under the ELV compliance route, complying with the emission limits set out in part 2 of annex V of the IED.

4. Net Thermal Input

The applicant has stated that the net thermal input of each LCP463, LCP464 and LCP465 is 1,044 MWth.

The applicant has not provided sufficient information to demonstrate the net thermal input of the LCP as the plant has not been built yet. Consequently we have set improvement condition IC2, requiring them to provide this information within 12 months of the plant starting up.

5. 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 IC1, 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 too.

6. 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). All these factors 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.

6.1 Assessment Methodology

6.1.1 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.

6.1.2 Use of Air Dispersion Modelling

For LCP applications, 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 might 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 emissions of lead, the national EQS is more stringent than the EU EQS. In such cases, we use the national EQS standard 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 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 SSSIs, SACs or 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.

6.2 Assessment of Impact on Air Quality

The applicant's assessment of the impact of air quality is set out in Annex 8 (*Revised Air Quality Assessment*, dated 19/02/2016) 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; and
- a study of the impact of emissions 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 6.3.

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 installation's stack emissions using the ADMS 5 dispersion model, which is a commonly used computer model for dispersion modelling. The model used five years of meteorological data collected from the weather station at Manchester International Airport between 2003 and 2007. The airport is located approximately 13 kilometres southeast of the main GTs stack. 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_x), expressed as NO_2;
  - carbon monoxide (CO); and
  - sulphur dioxide (SO_2) (only short term impacts).
- Second, they assumed that the installation operates continuously at the relevant long term or short term emission limit values, i.e. the maximum permitted emission rate.

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

The applicant has carried out background air quality monitoring to augment the data available from local authority monitoring. They reviewed data from various automatic monitoring stations around Trafford Plant: Salford Eccles, Salford M60, Trafford, Trafford A56 and Glazebury. They finally selected the measurement of a diffusion tube in Irlam Locks in 2013, provided by Salford Council, located approximately 1 km northwest from the GTs stack. CO data was selected from UK-AIR web using the maximum value for 3x3 km area around the site and a period of 2001-2015. The SO_2 value was chosen from

the automatic monitoring station in Manchester Piccadilly measured in 2014, located at approximately 13 km from the source. This data is summarised in the application and has been used by the applicant to establish the background (or existing) air quality against which to measure the potential impact of the installation. We have reviewed and cross checked the values and compared with the DEFRA Pollution Climate Mapping (PCM) background maps, which have a resolution of 1x1 km. We found slightly higher background concentration for SO_2 and lower for CO. However, even with these differences in the background for these two pollutants, the conclusions do not change.

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.

6.2.1 Assessment of Air Dispersion Modelling Outputs

The applicant's modelling predictions are summarised in the tables below. The applicant's modelling predicted peak ground level exposure to pollutants in ambient air and at discreet receptors. The power station will operate at base load for the majority of the time and in comparison will only operate at minimum load for a few hours. Therefore, only the potential short term impacts for operation a minimum load were considered. The tables below show the ground level concentrations at the most impacted receptors.

Table 1 Atmospheric dispersion modelling results – maximum on modelled grid at base load

Pollutant	Averaging period	EQS / EAL µg/m³	Background µg/m³	PC µg/m³	PEC µg/m³	PC % of EQS / EAL	PEC % of EQS / EAL	Location of maximum	
								E	N
NO_2	Annual mean	40	21.1	0.7	21.8	1.7	54.4	373820	393515
	1 hour mean	200	42.2	27.3	69.5	13.7	34.8	373320	393415
CO	Maximum 8 hour running	10,000	346	193.1	538.8	1.9	5.4	373020	393665
	Maximum 1 hour mean	30,000	346	426.8	772.6	1.4	2.6	373020	393315

Table 2 Atmospheric dispersion modelling results – maximum at modelled sensitive receptors at base load

Pollutant	Averaging period	EQS / EAL µg/m³	Background µg/m³	PC µg/m³	PEC µg/m³	PC % of EQS / EAL	PEC % of EQS / EAL
NO_2	Annual mean	40	21.1	0.57	21.7	1.4	54.2
	1 hour mean	200	42.2	15	57.2	7.5	28.6
CO	Maximum 8 hour running	10,000	346	154	499.8	1.5	5
	Maximum 1 hour mean	30,000	346	193.2	538.9	0.6	1.8

Table 3 Atmospheric dispersion modelling results – maximum on modelled grid at minimum load

Pollutant	Averaging period	EQS / EAL µg/m³	Background µg/m³	PC µg/m³	PEC µg/m³	PC % of EQS / EAL	PEC % of EQS / EAL	Location of maximum	
								E	N
NO_2	1 hour mean	200	42.2	48.1	90.3	24	45.1	373120	393365
CO	Maximum 8 hour running	10,000	346	315.2	660.9	3.2	6.6	372920	393515
	Maximum 1 hour mean	30,000	346	432.3	778	1.4	2.6	372870	393415

Table 4 Atmospheric dispersion modelling results – maximum at modelled sensitive receptors at minimum load

Pollutant	Averaging period	EQS / EAL µg/m³	Background µg/m³	PC µg/m³	PEC µg/m³	PC % of EQS / EAL	PEC % of EQS / EAL
NO_2	1 hour mean	200	42.2	30.5	72.7	15.3	36.4
CO	Maximum 8 hour running	10,000	346	190.7	536.4	1.9	5.4
	Maximum 1 hour mean	30,000	346	258.2	603.9	0.9	2

(i) Screening out emissions which are insignificant

From the tables above the following emissions 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:

- oxides of nitrogen (short term at baseload – modelled at sensitive receptors); and
- carbon monoxide (short term at baseload and minimum load – modelled at maximum grid and sensitive receptors).

Therefore we consider the applicant's proposals for preventing and minimising the emissions of these substances to be best available techniques (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 (short term and long term at all operating scenarios, except short term baseload, and maximum on modelled grid and maximum at modelled sensitive receptors).

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 section 7 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.

6.2.2 Consideration of Key Pollutants

(i) Nitrogen Dioxide (NO_2)

The impact on air quality from NO_2 emissions has been assessed against the EU EQS of 40 $\mu g/m^3$ as a long term annual average and a short term hourly average of 200 $\mu g/m^3$. The model assumes a 70% NO_x to NO_2 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. The peak short term PC is marginally 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.

The applicant's modelling predictions also considered predicted peak ground level exposure to NO_2 at discreet receptors within the air quality management area (AQMA). The maximum predicted annual NO_2 PC for the AQMA receptors ranged from 0.36 to 0.57 $\mu g/m^3$ (0.9 – 1.4% of the EQS/EAL) when the plant operates in base load. As the predicted PC is greater than 1% it cannot be deemed insignificant. However, we have checked the background data at the AQMA receptors where PCs are predicted to be over 1% and found that there will be adequate headroom and therefore, the PCs are unlikely to be significant and are unlikely to exceed the EQS.

(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_2)

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 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.

6.3 Impact on Habitats Sites

i. Sites Considered

The following European habitat sites are located within 15 kilometres of the installation:

- Rixton Clay Pits (SAC)
- Manchester Mosses (SAC)
- Rostherne Mere (Ramsar)
- Midland Meres and Mosses Phase 1 (Ramsar)

There are no Sites of Special Scientific Interest (SSSI) within two kilometres of the proposed installation.

The following non statutory local wildlife and conservation sites are located within two kilometres of the installation:

- Old River Irwell (LWS)
- Jack Lane (LWS)
- Reedbed by Ship Canal Sidings (LWS)
- Wetland at Partington (LWS)
- Broadoak Wood (LWS)
- Carrington Power Station (LWS)
- River Mersey (LWS)
- Towns Gate Marsh (LWS)
- Flixton Sludge Beds (LWS)
- Wetland at Carrington Moss (LWS)

6.3.2 European Habitats Assessment

Alone 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.

Table 5 – Impacts on Rostherne Mere Ramsar (located 8.3 km 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[1]						
NO_x annual	30	28.4	0.06	0.2	28.5	95
NO_x daily mean	75	56.8	1.8	2.4	58.6	78
Deposition Impacts[1]						
Nitrogen deposition (kg N/ha/yr)	20	21.7	0.009	0.04	21.7	109
Acidification - nitrogen deposition (Keq/ha/yr)	0.928	1.55	0.0006	0.07	1.77	191

(1) Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

Table 6 – Impacts on Rixton Clay Pits SAC (located 4.6 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[1]						
NO_x annual	30	24.6	0.14	0.5	24.7	82
NO_x daily mean	75	49.2	5.7	7.6	54.9	73
Deposition Impacts[1]						
Nitrogen deposition (kg N/ha/yr)	10	21.1	0.02	0.2	21.16	212
Acidification - nitrogen deposition (Keq/ha/yr)	0.566	1.51	0.0014	0.25	1.73	306

(1) Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

Table 7 – Impacts on Manchester Mosses SAC (located 3.9 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[1]						
NO_x annual	30	22.4	0.4	1.3	22.8	76
NO_x daily mean	75	69.9	6.1	8.1	76	101
Deposition Impacts[1]						
Nitrogen deposition (kg N/ha/yr)	5	18.3	0.057	1.1	18.4	368
Acidification - nitrogen deposition (Keq/ha/yr)	0.571	1.31	0.0041	0.72	1.53	272

(1) Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

Table 8 – Impacts on Midland Meres and Mosses Phase 1 Ramsar (located 10.6 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[1]						
NO_x annual	30	20.4	0.05	0.2	20.5	68
NO_x daily mean	75	40.8	2	2.7	42.8	57
Deposition Impacts[1]						
Nitrogen deposition (kg N/ha/yr)	5	21.7	0.008	0.16	21.71	434
Acidification - nitrogen deposition (Keq/ha/yr)	0.56	1.55	0.0006	0.1	1.77	316

(1) Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

From the tables above all of the emissions, apart from long term emissions of nitrogen dioxide and nutrient deposition on the Manchester Mosses SAC, can be screened out as insignificant. Their impact can be considered to have no likely significant effect as their PC is <1% of the long term EQS/EAL and <10% of the short term EQS/EAL, critical level or critical load.

The long term PC at Manchester Mosses SAC is 0.4 µg/m^3 and the PEC is 22.8 which are 1.3% and 76% of the 30 µg/m^3 long term EQS/EAL respectively. Although, it cannot be screened out as insignificant there is still sufficient headroom, from the emissions from the site alone, to indicate that a breach of the EQS/EAL is unlikely.

The PC of nitrogen deposition at Manchester Mosses SAC is 0.057 kgN/ha/year and the PEC is 18.4 kgN/ha/year which are 1.1% and 368% of the 5 kgN/ha/year critical load respectively. As the predicted deposition equates to greater than 1% for PC and 70% for PEC it cannot be regarded as insignificant. However, as the PC is only marginally over the 1% threshold taking into account the worst case scenario i.e. meteorological conditions and the background being the main contributing factor. We do not believe the emissions from this installation will not have an adverse impact on the habitat site. Furthermore, the predicted worst case deposition only exceeds the 1% criteria at a relatively small proportion of the habitat site, approximately 10 - 20% of the SAC.

In Combination Assessment

As the long term emissions of oxides of nitrogen and nitrogen deposition could not be screened out as insignificant and an in combination assessment has been considered.

Carrington Power Station is a permitted installation immediately north (approximately 500 metres) of Trafford Power Station which has the potential to emit oxides of nitrogen and therefore we have considered this through an in combination assessment. We have considered Carrington Power Station as it was not operational before the background data was collected and therefore would not have been reflected through the PEC assessment. This was considered as it is the largest and closest installation to Trafford Power Station.

An assessment of the cumulative effects of Trafford Power Station and Carrington Power Station, both running at base load, were considered for the long term emissions of oxides of nitrogen and nitrogen deposition at Manchester Mosses SAC.

The long term PC of emissions of nitrogen dioxide for both Trafford and Carrington is 2.8% and the PEC is 78% of the 30 $\mu g/m^3$ long term environmental assessment level (EAL). Although the cumulative emissions from the two sites cannot be screened out as insignificant there is still adequate headroom to indicate there would be an unlikely breach of the EAL. The primary component of the PEC is constituted by the background rather than emissions from the two plants.

The predicted PC of nitrogen deposition is 2.38% and the PEC is 369% of the 5 kgN/ha/year critical load. We can draw the same conclusion as the alone impacts that background is the main contributing factor and therefore the installation will not have a likely significant effect on the site in combination.

The potential cumulative impacts at the habitat sites show only a small increase in PCs when Carrington Power Station is included. Therefore, there are no changes to the overall conclusion of the results for when Trafford Power Station is operating alone.

Conclusion

More comprehensive details of our assessment on the European habitat sites is recorded in the Appendix 11 assessment document. Our initial assessment concluded the long term and short term PCs of nitrogen dioxide, acid deposition and nitrogen deposition from Trafford Power station are considered to have no likely significant effect at any of the identified habitat sites either alone or in combination. This assessment was sent to Natural England for their consultation review and approval. Their response concluded that the emissions from the installation were unlikely to have a significant effect on any European habitat site, and could therefore be screened out from any requirement for further assessment under the Habitats Regulations. The relevant European sites had no habitat features sensitive to air pollution impacts or the modelling showed that areas of sensitive habitat within the sites would not be affected by the proposed development.

Taking into account the response from Natural England and the minor contribution of emissions from the process to existing background levels we conclude that the emissions from the proposed installation will not have any likely significant effect on the features of the European habitat sites.

We are therefore, satisfied that the applicants 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.

6.3.3 Assessment of Other Conservation Sites

Conservation sites are protected in law by legislation. The Habitats Directive provides the highest level of protection for SACs and SPAs, domestic legislation provides a lower but important level of protection for SSSIs. Finally the Environment Act provides more generalised protection for flora and fauna rather than for specifically named conservation designations. It is under the Environment Act that we assess other sites (such as local wildlife sites) which prevents us from permitting something that will result in significant pollution; and which offers levels of protection proportionate with other European and national legislation. However, it should not be assumed that because levels of protection are less stringent for these other sites that they are not of considerable importance. Local sites link and support EU and national nature conservation sites together and hence help to maintain the UK's biodiversity resilience.

For SACs, SPAs, Ramsars and SSSIs we consider the contribution PC and the background levels in making an assessment of impact. In assessing these other sites under the Environment Act we look at the impact from the installation alone in order to determine whether it would cause significant pollution. This is a proportionate approach, in line with the levels of protection offered by the conservation legislation to protect these other sites (which are generally more numerous than Natura 2000 or SSSIs) whilst ensuring that we do not restrict development.

Critical levels and loads are set to protect the most vulnerable habitat types. Thresholds change in accordance with the levels of protection afforded by the legislation. Therefore the thresholds for SAC, SPA, Ramsars and SSSI features are more stringent than those for other nature conservation sites.

Therefore, we would generally conclude that the installation is not causing significant pollution at these other sites if the PC is less than the relevant critical level or critical load, provided that the applicant is using BAT to control emissions.

There are nine Local Wildlife Sites (LWSs) within two kilometres of the installation (as detailed above in section 6.3 i). The table below represents the LWS with the likely 'worst case' impact. The table shows that the PCs are <100% and we can conclude that impacts are insignificant at this site. As this LWS has the highest ground level concentrations it can be concluded that the impacts on the other LWSs are unlikely to give rise to significant pollution or cause damage to the features of the site.

Table 9 – Impacts on Flixton Sludge Beds LWS

Pollutant	EQS / EAL (µg/m³)	Back-ground (µg/m³)	Process contribution (PC) (µg/m³)	PC as % of EQS / EAL
Direct Impacts[1]				
NO_x annual	30	28	2.53	8.4
NO_x daily mean	75	55.9	29.9	39.9
Deposition Impacts[1]				
Nitrogen deposition (kg N/ha/yr)	5	27.9	0.238	4.75
Acidification - nitrogen deposition (Keq/ha/yr)	0.570	1.22	0.0085	1.49

(1) Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

6.4 Emissions to Water

6.4.1 Discharge of Cooling Water to the Manchester Ship Canal

The applicant has assessed the potential impact of the cooling water discharge on the Manchester Ship Canal (MSC). The assessment predicts the potential effects on the receiving water from a thermal discharge consisting of 0.13 m^3 per second of returned abstracted cooling water (at +9°C above ambient temperature) from the installation's cooling water system. The applicant has used a CORMIX thermal discharge model for their impact assessment.

The applicant assumed an ambient water temperature of 26°C, for the summer high temperature assessment. This was based on the recorded

maximum water temperature at Latchford on the MSC which was 25°C (between 1991 and 1996) and takes into account potential increasing temperatures over the next 30 years, for a worst case assessment. The discharge is predicted to be 9°C warmer than the incoming cooling water and therefore the model assumed a maximum temperature, at the point of discharge, of 35°C (26°C + 9°C). The applicant assumed an ambient water temperature of 4°C, for the winter low temperature assessment.

For both the warm and cold water conditions the applicant's modelling predicted that the plume would mix rapidly and be less than 0.5°C above the ambient temperature within 14 metres of the discharge point. We have audited the applicant's modelling and agree with their conclusion that the elevated temperature of the discharge is unlikely to impact upon the water quality and ecology of the MSC.

The model was also used to assess the potential impact associated with the use of biocide (sodium hypochlorite) to limit biofouling within the cooling water system. The applicant's report states that emissions of residual free chlorine will be below 0.2 mg/l and we are satisfied that at this concentration, chlorine emissions should not give rise to significant pollution of the receiving water. However, as a precautionary measure, because the applicant did not fully explore the complex issue surrounding the fate of chlorination by-products (CBPs) in the discharge, we have included a pre-operational condition (PO3) on the permit requiring the applicant to further assess the environmental impact of chlorine in the cooling water discharge on the aquatic environment of the MSC. The applicant will be required to submit a written report on their assessment for approval by the Environment Agency prior to the commencement of commissioning of the installation.

6.6.2 Discharge of Trade Effluent to the Manchester Ship Canal

The discharge of trade effluent, at emission point W1, into the Manchester Ship Canal (MSC) consists predominantly of returned canal water used for cooling, boiler blow down and water treatment plant effluent. There will be a maximum discharge up to 11,249 m^3 per day of trade effluent.

The applicant undertook a H1 assessment for the discharge 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.

The H1 assessment indicated that further detailed assessment was required for biochemical oxygen demand (BOD), suspended solids, ammonia, phosphate, chlorine, chloride, manganese and nitrate.

We have assessed the impact of the proposed effluent 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 water body 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 'Mersey (Man.Ship Canal, Irlam to Howley Weir). The WFD Water body Identification Number (WBID) for this stretch is GB112069061010. The WFD status objective for the watercourse is to meet overall good ecological status by 2027.

The nearest WFD monitoring point (88002440) is named 'Manchester Ship Canal at Irlam Locks'. This monitoring point is located approximately 1.9 kilometres upstream of the proposed discharge point. Monitoring data for the compliance year 2012 shows that water quality is poor for ammonia and

phosphate. Data for the compliance year 2013 shows that water quality is moderate for BOD.

Flow Data for the Receiving Watercourse

Watercourse flow data was taken from the National River Flow Archive (1976 – 2015) at flow gauge 69007 Mersey at Ashton Weir. The upstream flow data used is taken from the River Mersey before it joins the MSC and therefore is conservative as there will be greater dilution at the point of discharge.

Water Quality Assessment

The primary criteria for acceptability is that discharges should not cause a greater than 10% deterioration in water quality. The secondary consideration is that the deterioration should not cause a breach of a WFD classification target. If the watercourse is already failing its target quality we can only allow a discharge if its overall impact would not prevent possible improvement measures from bringing the watercourse back into its target class.

As the receiving watercourse is currently failing to meet WFD targets and some environmental quality standards (EQS) the water quality modelling was undertaken using current background quality as the assumed upstream quality.

We undertook an assessment of the proposed discharge by calculating the likely impact in terms of the resultant downstream pollutant concentrations if a permit was granted. Following the outcome of the H1 screening assessment detailed modelling was undertaken to determine whether numeric permit emission limits would be required for those hazardous pollutants that were not screened out, in order to protect the receiving water quality. The programme 'Mass Balance Calc' (Monte Carlo) was used to determine emission limits for those substances.

Monte Carlo was also used to determine whether numeric permit emission limits would be required for the sanitary pollutants, BOD, ammonia and phosphate.

Effluent Quality Data

Data provided by the applicant's consultant was used to establish a mean and standard deviation for effluent quality.

Effluent Flow Data

As no data was provided for the variation in effluent quantity, we assumed a worst case scenario of a mean of 11,249 m^3 per day with no standard deviation.

Proposed Limits Determined by Modelling

Based on the Monte Carlo modelling, and in line with river considerations for sanitary substances to ensure deterioration of less than 10%, the discharge would have to contain no more than:

- BOD, 207.01 mg/l – no limit required as the discharge concentration will be approximately 20 mg/l
- Ammonia, 52.3 mg/l - no limit required as the discharge concentration will be approximately 15 mg/l. Furthermore, the CORMIX model for ammonia indicates that concentrations of ammonia in the discharge plume return to less than 10% above background within one third of the width of the MSC, under a worst case low flow situation.
- Phosphate, 18.29 mg/l - no limit required as the discharge concentration will be approximately 12 mg/l
- Manganese, 11.04 mg/l - no limit required as the discharge concentration will be approximately 1 mg/l
- Nitrate, 38.13 mg/l - no limit required as the discharge concentration will be approximately 15 mg/l

Therefore, from the outcome of Monte Carlo modelling, no numeric permit limits are required for the assessed substances.

Limits have been set for the following parameters:

- Flow - not to exceed 11,249 m^3/day
- pH - between 6 and 9
- Temperature – maximum temperature difference between cooling water inlet and outlet of 9°C and a maximum discharge temperature of 35°C
- Oil and grease – no visible emission
- Free chlorine - 0.2 mg/l

In addition to the above pollutants, cadmium and mercury may be contained in the discharge because they may be present as trace contaminants in the raw materials (e.g. sodium hydroxide) used in the water treatment plant. Cadmium and mercury are Priority Hazardous Substances under WFD. The applicant did not address this potential issue in their H1 risk assessment. Our view based on experience of regulating similar plants elsewhere is that the associated risk is low due to the types of raw material currently available which tends to of a 'low impurity' grade. We have included an Improvement Condition in the permit requiring the operator to monitor the discharge for 12 months to determine the levels of cadmium and mercury being discharged, and to use our H1 screening tool to assess the potential significance of any discharge on the receiving water (MSC).

Conclusion

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

Parameter	**Limit**
Total flow	11,249 m^3 per day
pH	6 – 9

Temperature	35°C
Temperature increase	+ 9°C
Free chlorine	0.2 mg/l
Manganese	0.9 mg/l
Nitrate	3.5 mg/l
Oil and grease	No visible emission

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

6.7 Noise Impacts

The installation 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 applicant proposed to use a combination of noise criteria for the specification of equipment, building design and attenuation measures to minimise noise emissions.

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. Measurements were taken of the prevailing ambient noise levels to produce a baseline noise survey and an assessment was carried out in accordance with BS 4142:2014 to compare the predicted plant rating noise levels with the established background levels.

Measurements were taken from various locations around the site to establish existing noise levels. BS 4142:2014 assesses the impact of industrial and commercial sound on residential receptors by subtracting the measured background from the rating level. BS 4142:2014 states: *"A difference of +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context."* and *"A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context."*

The lowest mean and mode measured background noise levels recorded during the assessment are 32 dB and 27 dB, respectively. The assessment predicts a noise level of 38 dB at the most sensitive residential receptor. This is based on the operation of Trafford Power Station under normal base load and during normal transient, start up and shut down conditions.

Making no rating corrections this would result in a different of +11 dB over the lowest measured background. This indicates a potential significant adverse impact. However, as the measured background is less than 30 dB BS 4142:2014 is not the most appropriate way to assess the impacts. In these instances we look at the World Health Organisation (WHO) guidance which recommends a night time noise value of 40 dB is considered to be acceptable. Therefore, 38 dB can be considered to be acceptable.

We have audited the assessment and ran sensitivity analysis and can agree with the consultant's conclusions that there is a potential for an adverse impact. However, we note, that providing there is a three metre noise barrier, as proposed, the rating levels at the worst affected receptors will be <40 dB, at night time, and therefore agree the impacts are likely to be acceptable.

7. Application of Best Available Techniques

7.1 Scope of Consideration

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

- 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.

7.2 Consideration of Combustion Plant

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

7.3 Consideration of Emission Control Measures

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

7.3.1 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 installation. 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 proposes 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 air quality objectives. However, our conclusion is that a breach is not likely and therefore the installation of SCR/SNCR, or any other 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 ELVs deliver compliance with BAT-AELs.

7.3.2 Emissions to Land and Water

There are no direct emissions to land.

Process waters, predominantly cooling water blow down, are discharged to the Manchester Ship Canal via discharge point W1. A H1 assessment has been included in the application assessing this discharge. Pollutants which did not screen out as insignificant were assessed further using Monte Carlo water quality modelling and limits applied (as detailed in section 6.6.2).

The onsite water treatment plant (WTP) will treat abstracted canal water from the MSC, using reverse osmosis and ion exchange, to produce demineralised water for the boiler. 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 there proposals are BAT.

7.4 Energy Efficiency

7.4.1 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 installation which are normal aspects of all EPR permit determinations. 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 MW 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 – see Annex II of the Energy Efficiency Directive for detail on how to calculate this.

7.4.2 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 installation.

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

7.4.3 Choice of Cooling System

The applicant has carried out qualitative assessment of cooling systems. Five types of cooling systems were considered in the BAT assessment, which were:

- once through cooling
- natural draught cooling
- mechanical draught cooling
- air cooled condensers
- hybrid cooling towers

There are advantages and disadvantages with each system which are detailed below.

Once Through Cooling

Once through cooling provides the greatest efficiency but requires the abstraction and discharge of water in substantial volumes. The applicant identifies two potential water sources, Manchester Ship Canal (MSC) and River Mersey, which could provide a source of water.

The flow required for a once through cooling system would be 26.4 m^3 per second. The average flow in the River Mersey is 14 m^3/s with low flows of 3.8 m^3/s and flows of 13 m^3/s within the MSC. The applicant concluded that there would not be sufficient flows in the River Mersey or MSC at the levels of abstraction required for once through cooling. Therefore, this method of cooling was deemed not to be appropriate.

Natural Draught Cooling

This method of cooling does not require the same levels of cooling water in comparison to once through cooling. However, as it uses evaporative cooling is less efficient as the re-cooled water is at higher temperatures in comparison to the once through cooling. Furthermore, the towers are very large, greater than 100 metres, and have large visible vapour plumes causing significant visual impacts. Therefore, this method of cooling was deemed not to be appropriate.

Mechanical Draught Cooling

Despite these towers being considerably smaller in size similar to the natural draught cooling they can result visual plumes. Therefore, this method of cooling was deemed not to be appropriate.

Air Cooled Condensers

Air cooled systems do not require the use of water, chemical treatment or water discharge but have higher energy consumption levels. Therefore, this method of cooling was deemed not to be appropriate.

Hybrid Cooling Towers

Hybrid cooling systems uses a combination of air cooled systems and evaporative cooling. The use of mounted fans to force air through allows for a smaller, 20 metre, tower. Furthermore, hybrid cooling towers have wet and dry sections to enable the towers to be plume free down to an ambient temperature of 5°C and a relative humidity of 95%. The calculated flow that would be required for this system at Trafford Power Station has been calculated to be 0.552 m^3/s and 0.35 m^3/s of that would be returned. As there are sufficient flows available within the MSC and no significant impact on

aquatic ecology from the heated effluent discharge, hybrid cooling towers have been selected as the proposed cooling technology for the installation.

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

7.4.5 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. However, two potential district heating routes were but the report concluded that they would not be commercially or economically viable 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.

7.3.4 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.

7.3.5 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.

8. Emission Limits

The operator has proposed limits in line with part 2 annex V of the IED and 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.

Parameter	Proposed mg/m^3	Reference Period	Annex V mg/m^3	Permit limit mg/m^3
Oxides of nitrogen (NO and NO_2 expressed as NO_2)	None	95%ile of hourly averages	100	100
	None	24 hourly averages	55	55
	50	Monthly averages	50	50
Carbon monoxide	None	95%ile of hourly averages	200	200
	None	24 hourly averages	110	110

	100	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.

9. 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.

Standards

Standards for assessment of the monitoring location and for measurement of oxygen, water vapour, temperature and pressure have been added to the permit template for clarity.

A row has been included in table S3.1 which requires the operator to confirm compliance with BS EN 15259 in respect of monitoring location and stack gas velocity profile in the event there is a significant operational change (such as a change of fuel type) to the LCP. For a new plant, such as this, in pre operational commissioning the same requirement applies.

Resource Efficiency Metrics

A more comprehensive suite of reporting metrics has been added to the permit template for Electrical Supply Industry (ESI) plant. Table S4.2 “Resource Efficiency Metrics” has been added requiring the reporting of various resource parameters, as this is an ESI power plant. This table is being used for all ESI plant.

10. Meeting the Requirements of the IED

The table below shows how each requirement of the IED has been addressed by the permit conditions.

IED Article Reference	IED requirement	Permit condition
30(6)	If there is an interruption in the supply of gas, an alternative fuel may be used and the permit emission limits deferred for a period of up to 10 days, except where there is an overriding need to maintain energy supplies. The EA shall be notified immediately.	n/a
37	Provisions for malfunction and breakdown of abatement equipment including notifying the EA.	n/a
38	Monitoring of air emissions in accordance with Ann V Pt 3	3.5, 3.6
40	Multi-fuel firing	n/a
41(a)	Determination of start-up and shut-down periods	2.3.4 Schedule 1 Table S1.5
Ann V Pt 1(1)	All emission limit values shall be calculated at a temperature of 273,15 K, a pressure of 101,3 kPa and after correction for the water vapour content of the waste gases and at a standardised O2 content of 6 % for solid fuels, 3 % for combustion plants, other than gas turbines and gas engines using liquid and gaseous fuels and 15 % for gas turbines and gas engines.	Schedule 6, Interpretation
Ann V Pt 1	Emission limit values	3.1.2 Schedule 3, Table S3.1
Ann V Pt 1	For plants operating less than 500 hours per year, record the used operating hours	n/a
Ann V Pt 1(6(1))	Definition of natural gas	Schedule 6, Interpretation
Ann V Pt 2	Emission limit values	n/a
AnnV Pt 3(1)	Continuous monitoring for >100 MWth for specified substances	3.5, 3.6 Schedule 3, Table S3.1
AnnV Pt 3(2, 3, 5)	Monitoring derogations	n/a
AnnV Pt3(4)	Measurement of total mercury	n/a
AnnV Pt3(6)	EA informed of significant changes in fuel type or in mode of operation so can check Pt3 (1-4) still apply	2.3.1 Schedule 1, Table S1.2
AnnV Pt3(7)	Monitoring requirements	3.5.1 Schedule 3, Table S3.1
AnnV Part 3(8,9,10)	Monitoring methods	3.5, 3.6
AnnV Pt 4	Monthly, daily, 95%ile hourly emission limit value compliance	3.5.1 Schedule 3, Table S3.1

IED Article Reference	IED requirement	Permit condition
AnnV Pt7	Refinery multi-fuel firing SO_2 derogation	n/a

Annex 1: Decision Checklist

This document should be read in conjunction with the Duly Making checklist, the application and supporting information and permit/ notice.

Aspect considered	Justification / Detail	Criteria met Yes
Receipt of submission		
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. The decision was taken in accordance with our guidance on commercial confidentiality.	✓
Consultation		
Scope of consultation	The consultation requirements were identified and implemented. The decision was taken in accordance with our guidance. For this application we consulted the following bodies: • Local Planning Authority – Salford City Council • Environmental Health – Salford City Council • Public Health England • Director of Public Health • Canal and River Trust • Food Standards Agency • Health and Safety Executive • National Grid	✓
Responses to consultation and web publicising	The web publicising and consultation responses (Annex 2) were taken into account in the decision. The decision was taken in accordance with our guidance.	✓
Operator		
Control of the facility	We are satisfied that the applicant (now the operator) is the person who will have control over the operation of the facility after the grant of the permit. The decision was taken in accordance with our guidance on what a legal operator is.	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
European Directives		
Applicable directives	All applicable European directives have been considered in the determination of the application. The requirements of the Industrial Emissions Directive have been taken into account in the permit.	✓
The site		
Extent of the site of the facility	The operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility. A plan is included in the permit and the operator is required to carry on the permitted activities within the site boundary.	✓
Site condition report	The operator has provided a description of the condition of the site. We consider this description is satisfactory. The decision was taken in accordance with our guidance on site condition reports and baseline reporting under IED– guidance and templates (H5).	✓
Biodiversity, Heritage, Landscape and Nature Conservation	The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat. A full assessment of the application and its potential to affect the sites has been carried out as part of the permitting process. We consider that the application will not affect the features of the sites. Formal consultation has been carried out with Natural England. The consultation responses (Annex 2) were taken into account in the permitting decision.	✓
Environmental Risk Assessment and operating techniques		
Environmental risk	We have reviewed the operator's assessment of the environmental risk from the facility.	✓

Aspect considered	Justification / Detail	Criteria met Yes
	The operator's risk assessment is satisfactory. The assessment shows that, applying the conservative criteria in our guidance on Environmental Risk Assessment, all emissions may be categorised as environmentally insignificant or unlikely to give rise to significant pollution. **See key issues section 6.0 for further information.**	
Operating techniques	We have reviewed the techniques used by the operator and compared these with the relevant guidance notes. Emissions of carbon monoxide have been previously screened out as insignificant and so the Environment Agency agrees that the applicant's proposed techniques are BAT for the installation. NO_2 emissions to air are not insignificant and have been discussed in further detail in the key issues sections 6 and 7. Low NOx burners are to be used at Trafford Power Station. The proposed techniques/emission levels for priorities for control are in line with the benchmark levels contained in the SGN and we consider them to represent appropriate techniques for the facility. The permit conditions ensure compliance with relevant BREFs and ELVs deliver compliance with BAT-AELs. **See key issues section 6.0 and 7.0 for further information.**	✓
The permit conditions		
Pre operational conditions	Based on the information in the application, we consider that we need to impose pre operational conditions. PO1 – To submit a report on the baseline conditions of soil and groundwater at the installation. PO2 – Confirm if timber will be used within the cooling towers and to provide a specification of the pre installation timber washing regime.	✓

Aspect considered	Justification / Detail	Criteria met Yes
	PO3 – To further assess the environmental impact of chlorine in the cooling water discharge on the aquatic environment of the Manchester Ship Canal. PO4 – To provide confirmation that a written Environment Management System is in place. PO5 – To confirm details of the final cooling water outlet design and location. PO6 – To confirm details of expected emissions during commissioning and actions taken to protect the environment.	
Improvement conditions	Based on the information in the application, we consider that we need to impose improvement conditions. We have imposed improvement conditions to ensure that: IC1 - The appropriate measures are in place for the start up and shut down of the plant. IC2 - The operator provides evidence to support the thermal input of the plant. IC3 - The operator is working towards certification of their Environment Management System. IC4 - 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. IC5 – To ensure impacts of cadmium and mercury in the discharge are being reduced.	✓
Incorporating the application	We have specified that the applicant must operate the permit in accordance with descriptions in the application, including all additional information received as part of the determination process.	✓

Aspect considered	Justification / Detail	Criteria met Yes
	These descriptions are specified in the Operating Techniques table in the permit.	
Emission limits	We have decided that emission limits should be set for the parameters listed in the permit. The following substances have been identified as being emitted in significant quantities and ELVs have been set for these substances: • Oxides of nitrogen (NO and NO_2 expressed as NO_2) • Carbon monoxide NO_2 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. **See key issues section 8.0 for further information.** 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. • pH • Free chlorine • Mercury • Cadmium **See key issues section 6.0 for further information.**	✓
Monitoring	We have decided that monitoring should be carried out for the parameters listed in the permit, using the methods detailed and to the frequencies specified. 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	✓

Aspect considered	Justification / Detail	Criteria met Yes
	methods are in accordance with the Monitoring of Stack Emissions to Air Technical Guidance Note (M2). Based on the information in the application we are satisfied that the operators techniques, personnel and equipment have either MCERTS certification or MCERTS accreditation as appropriate.	
Reporting	We have specified reporting in the permit. The reporting requirements in the permit have been specified in order to comply with the requirements of the Industrial Emissions Directive. We made these decisions in accordance with the *JEP Electricity Supply Industry – IED Compliance Protocol for Utility Boilers and Gas Turbines. February 2015.*	✓
Operator Competence		
Environment management system	There is no known reason to consider that the operator will not have the management systems to enable it to comply with the permit conditions. The decision was taken in accordance with our guidance on operator competence. An EMS has not been submitted with the application. Pre operational condition (PO4) requires the operator to produce a written EMS and confirms to the Environment Agency that this has been completed.	✓
Relevant convictions	The National Enforcement Database has been checked to ensure that all relevant convictions have been declared. No relevant convictions were found. The operator satisfies the criteria in RGN 5 on Operator Competence.	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
Financial provision	There is no known reason to consider that the operator will not be financially able to comply with the permit conditions. The decision was taken in accordance with our guidance on operator competence.	✓

Annex 2: Consultation and Web Publicising Responses

Summary of responses to web publicising and consultation and the way in which we have taken these into account in the determination process.

Response received from
Public Health England – received on 27/04/2016
Brief summary of issues raised
Based on the information contained in the application Public Health England have no significant concerns regarding the risk to health of the local population from this installation. This consultation response is based on the assumption that the permit holder shall take all appropriate measures to prevent or control pollution, in accordance with the relevant sector guidance and industry best practice.
Summary of actions taken or show how this has been covered
Conditions 3.1.1, 3.2.1 and 3.3.1 concerning odour and fugitive emissions are included in the permit.

Response received from
Public response (Pollution & Housing at Trafford Council) – received on 16/05/2016
Brief summary of issues raised
Had a number of concerns regarding the air impact assessment submitted with the application as outlined below. Further explanation of the Janssen method used in the air quality impact assessment. Potential cumulative impacts should be considered from the SAICA paper mill and the Barton Renewable Energy Plant. Local wildlife sites (LWSs) should be considered in the air quality impact assessment. Noted that the air quality impact assessment shows that 24 hour mean levels of oxides are forecast to be significant in relation to the air quality critical level (CLe) of 75 µg/m^3 at a number of European and nationally designated habitat sites. The report states that this is on the basis that that this CLe is only relevant on occasions when the ozone and sulphur dioxide are above the relevant CLe's. However, Pollution & Housing have concerns that these conditions will prevail for a significant proportion of the time and that the assessment of the 24 hour mean NO_x concentrations should be re-evaluated.
Summary of actions taken or show how this has been covered
Our internal air quality specialists (AQMAU) have audited the air quality impact assessment and carried out sensitivity analysis where the applicants

predicted PCs greater than 1% using the Janssen method. They found that there would still be adequate headroom at these locations and therefore the PCs are unlikely to be significant or exceed the EQS.

We considered the cumulative impacts with Carrington Power Station as it was not in operation before the background data was collected and therefore would not have been reflected through the PEC assessment. This was considered as it is the largest and closest installation to Trafford Power Station. The potential cumulative impacts show only a small increase in PCs when Carrington Power Station is included. Therefore, there are no changes to the overall conclusion to the results for when Trafford Power Station is operating alone.

We requested that the air impact assessment was amended to take into consideration other nature conservation sites located within two kilometres of the installation. The assessment showed that the impacts on the identified LWSs are unlikely to give rise to significant pollution or cause damage to the features of the site.

AQMAU carried out detailed check modelling and sensitivity analysis and indicated that although we do not agree with the applicant's absolute numerical predictions we agree with their overall conclusion.

See key issues section 6.2 for further information.

Response received from
Environmental Health (Salford Council) – received on 17/05/2016
Brief summary of issues raised
Noise impacts comments The noise impact assessment shows there to be a greater difference of +5 dBA at a few of the receptors which, in accordance with BS 4142, is likely to be an indication of an adverse impact. EH request that the operator reduce noise rating levels at these receptors to below 35 dBA to avoid adverse impacts using a site specific condition. Air quality comments Concerns of the original air impact assessment predicting higher NO_2 annual average and hourly increases than the current assessment which has a higher load output. In light of the Environment Agency H1 Guidance being withdrawn, in February 2016, what sections of the H1 have been used and the suitability under current guidance. Cumulative impacts with nearby installations not being accurately considered. The assessment should have considered Barton Renewable Energy Plant.

Justification for the significance tests used in the air quality assessment.

The carbon monoxide background levels used were from 2001 and scaled to 2015 concentrations. Requested information on how scaling took place and to provide a suitable rationale.

Concerns that the proximity of the nearby viaduct was not considered in the air impact assessment.

Concerns of the generic background levels for NO_2 used. Cumulative hourly NO_2 contributions should be assessed in conjunction with the latest modelled hourly mean levels to determine whether or not the total hourly contributions could result in additional areas exceeding NO_2 levels of 200 $\mu g/m^3$ more than 18 times per year.

Contaminated land comments

Commented on baseline data being collected during the development which will take place after the permit determination.

Summary of actions taken or show how this has been covered

Noise impacts comments

Our internal specialists, AQMAU, have completed check modelling and sensitivity analysis of the noise impact assessment submitted with the application. With the inclusion of a noise barrier as described in the noise impact assessment we are satisfied that the noise levels at the receptors will not cause unacceptable impacts and therefore do not need to mitigate further. Condition 3.4.1 concerning noise emissions is included in the permit.

See key issues section 6.7 for further information.

Air quality comments

AQMAU have completed check modelling and sensitivity analysis of the air impact assessment submitted with the application. Our specialists have agreed with the operators conclusions that the PCs are likely to be insignificant and for those PCs which are not considered insignificant the PECs are unlikely to exceed the relevant air quality standards.

We considered the cumulative impacts with Carrington Power Station as it was not in operation before the background data was collected and therefore would not have been reflected through the PEC assessment. This was considered as it is the largest and closest installation to Trafford Power Station. The potential cumulative impacts show only a small increase in PCs when Carrington Power Station is included. Therefore, there are no changes to the overall conclusion to the results for when Trafford Power Station is operating alone.

The air quality impact assessment shows that there is significant headroom

and therefore even taking other potential future operations into account there is little likelihood of exceedance of the relevant air quality standards. **See key issues section 6.2 for further information.** <u>Contaminated land comments</u> A pre operational condition (PO1) required the operator to submit a report on the baseline conditions of soil and groundwater at the installation.

Response received from
Natural England – received on 15/09/2016
Brief summary of issues raised
Agreed with our conclusion that there should be no likely significant effect at any European designated sites either alone or in combination.
Summary of actions taken or show how this has been covered
None required.