

Natural Resources Wales permitting decisions

Enfinium Parc Adfer Operations Limited

(Parc Adfer Energy Recovery Facility)

Decision Document

Executive Summary

The application is for a Variation to the existing installation permit. This means that the operator wishes to change what they do. They have a permit for a municipal waste incineration process with energy recovery by electricity generation. They have applied to increase the capacity of the site from a maximum of 200, 000 tonnes per annum (tpa) of waste input, to a maximum of 232, 000 tpa. This equates to a capacity increase from 25 tonnes to 29 tonnes per hour.

The application describes how this change affects the installation. The operator is able to achieve a higher throughput using the existing, unmodified plant and infrastructure, so there are very few changes to the operation or environmental impact of the site as a result of the change. There is no new infrastructure or processing, just higher throughput in the existing unit. The main change is to the mass emission rates of certain pollutants emitted via the emission stack to the air. These changes have been fully assessed as described below. The modelled resultant impacts at potential receptors are small, and are considered either insignificant, or unlikely to cause any significant pollution.

The increase in capacity will result in an associated increase in site operations e.g. generation of ash/residue, use of raw materials, mobile plant and vehicle movements, but these are not considered significant to overall site impact. Other impacts (such as noise, emissions to water, energy recovery and efficiency) and controls (environmental management system, accident management plans) are not materially affected by the variation.

The application number is: PAN-18868

The Variation number is: AB3092CV/V007

The applicant is: Enfinium Parc Adfer Operations Limited

The Installation is located at: Parc Adfer Energy Recovery Facility, Deeside Industrial Park, Flintshire, CH5 2LL

Our Decision

We have decided to issue the variation for Parc Adfer Energy Recovery Facility operated by Enfinium Parc Adfer Operations Limited.

As the regulator, we are required to determine any duly made permit application. This means that we must decide either to grant, or to refuse the application based upon an objective assessment of the proposals against the detailed legal requirements of relevant legislation and regulation. We cannot base our decision on any other factors.

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:

- 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.

Contents

Executive Summary	2
Contents.....	4
1. Application and Determination – overview	5
What the installation does.....	5
What the variation is for	5
Key permitting considerations.....	6
2. Application and Determination –details	7
The Application	7
The Facility.....	7
The site	7
Applicable legislation and associated issues	8
Best Available Techniques	9
3. Key Issues: Environmental Risk Assessment and Controls	11
Operating Techniques and environmental controls	11
Description of installation activities and assessment of BAT.....	13
Assessment of Air emissions and potential human health impact.....	17
Assessment of potential impact on designated ecological sites.....	24
4. General determination matters.....	27
ANNEX 1: Consultation Reponses.....	30
A) Advertising and Consultation on the Application	30
1) Consultation Responses from Statutory and Non-Statutory Bodies.....	30
2) Consultation Responses from Members of the Public and Community Organisations.....	31

1. Application and Determination – overview

What the installation does

The installation is a non-hazardous waste incinerator which is permitted to burn mixed municipal, commercial and industrial waste. Energy is recovered via a steam-generating boiler and turbine for the generation of electricity. There is a single processing line with an air-cooled moving grate. Further detail is provided in the environmental permit.

What the variation is for

The application is for a variation to increase the incineration capacity of the installation by 32, 000 tonnes per annum (tpa), from 200, 000 tpa to 232,000 tpa. This equates to a capacity increase from 25 to 29 tonnes per hour (based on 8000 operational hours per year).

The operator has explained that while the capacity of the facility was set at 200, 000 tpa when the site was first permitted, the plant design is capable of a capacity of 232, 000 tpa. This difference is the result of a change of equipment and supplier between the original (V001) permit being granted and construction commencing. The permitted capacity has not previously been increased to reflect the added technical capacity although the equipment changes were authorised by variation V002 (20/04/2018). Therefore the change of capacity now authorised will be entirely within existing plant / infrastructure. There are no changes to the equipment or significant changes to operation, other than the proportional increase in throughput, and associated increases such as in waste generation (ash/residues) and material use (e.g. consumption of air pollution control residues).

The variation application contained a detailed assessment of all possible changes to environmental risk / impact resulting from the proposed capacity increase. The applicant recognises that the increased capacity has the *potential* to increase environmental risks (e.g. odour), from site operations. For all impacts other than emissions of combustion gases to air (see below), they have clearly explained that existing arrangements are unaltered, and are sufficient for the additional incineration capacity, thus resulting in no material change to environmental risk.

Emissions to air of combustion products from incineration occur via the main chimney stack (referred to in the permit as emission point A1). As a result of the variation application, it has been identified that the mass flow of combustion gases will increase from that originally permitted (from 37.6 Nm³/s to 48.7 Nm³/s, approximately 30%). There is a commensurate increase in mass release rate of pollutants such as NO_x, SO₂, HCl etc. Therefore the potential impact of air emissions on human and ecological receptors is fully assessed and described in the application, and summarised below.

The Installation's environmental permit has recently been updated by Natural Resources Wales (V006, 19/12/22) to implement changes required as a result of publication of the 2019 Best Available Techniques (BAT) Conclusions for waste incineration. For existing plant such as this, the changes must be implemented by 3rd December 2023. A result of this variation application is that the "compliance date" is brought forward, and the BAT conclusions must be fully implemented by the variation determination date. The application therefore includes a BAT assessment for current compliance.

Further detail on the Applicant's proposals is given in the application and summarised throughout this decision document.

Key permitting considerations

The key considerations in reaching our decision were:

- Detailed review of the air emissions risk assessment (dispersion modelling and impact assessment) – the main focus of this decision document
- Ensure that full compliance with the 2019 BAT conclusions for waste incineration could be achieved by the variation determination date
- Confirm that, as summarised in the application, all other potential environmental impacts from the operation were not significantly affected by the proposed variation.

Our assessment of these is discussed below.

2. Application and Determination – details

The Application

The application for Substantial Variation was received on 05 08 2022.

In order for us to be able to consider the Application duly made, we needed more information. We requested further information relating to the air emissions risk assessment (AERA) as detailed below. Upon receipt of this information we were able to consider the application Duly Made on 13/02/2023.

All parts of the application, and all relevant parts of our determination correspondence were placed on the public register. These can be accessed on our [on-line public register](#). This document summarises relevant parts of the application; further detailed information is in the full application documentation.

The main application documents relevant our determination were:

- Non-technical summary
- Environmental Risk assessment
- Best Available Techniques and Operating Techniques (BATOT) document, updated for the variation
- Air Emissions Risk Assessment (AERA) detailing dispersion modelling and impact assessment undertaken (V3, following updates before the application was duly made)

The Facility

The regulated facility is an installation for the incineration of non-hazardous waste. Treatment of slags and ashes is also permitted. There are no changes to the permitted activities as a result of the variation, only in the capacity of the incineration process, as described. Activities are detailed in full in Table S1.1 of the permit and the revised maximum waste quantity is specified in Table S2.2.

The site

There are no changes to the site or site plan. The installation is located within Deeside Industrial Estate, and immediate surroundings are commercial/industrial. The site setting is further detailed in the application. The nearest residential properties are over 500m away, to the north east (Puddington). The site itself is not within any

environmentally sensitive designations. The setting includes a number of designated ecological sites, both sites of special scientific interest (SSSI) and National Site Network (SAC, SPA, Ramsar). The nearest is the Dee Estuary, being 150m to the north at the closest point. Assessment of potential impact of the variation on these receptors is described below.

Applicable legislation and associated issues

In order to operate, the activity requires a permit from Natural Resources Wales because it is a Part (A)(1) activity listed in Schedule 1 Part 2 of the Environmental Permitting (England and Wales) Regulations 2016 (EPR). It is also an *installation* as defined in the Industrial Emissions Directive 2010 (IED). It is an incinerator subject to Chapter IV of IED. It is subject to aspects of the Well-Being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016. The operator requires a variation to change its process (incineration capacity in this instance), but the legislative framework for the facility is otherwise unaltered.

As the EPR regulator in Wales, NRW are required to determine any duly made permit applications. This means that we must decide either to grant, or to refuse the variation based upon an objective assessment of the proposals against the detailed legal requirements of EPR. We cannot base our decision on any other factors; it would be unlawful to do so. Our [public participation statement](#) gives more information on what can, and cannot, be taken into account when making our permitting decision.

NRW is satisfied that this decision has taken into account all relevant legislation and is compatible with its general purpose of pursuing the sustainable management of natural resources in relation to Wales and applying the principles of sustainable management of natural resources. In particular, NRW acknowledges that it is a principle of sustainable management to take action to prevent significant damage to ecosystems. We consider that, in granting the Permit variation a high level of protection will be delivered for the environment and human health through the operation of the Installation in accordance with the permit conditions.

The application was submitted and determined as a substantial variation under the Regulations. The normal definition of substantial change, for which substantial variation is needed, is the following:

“a change in the nature or functioning, or an extension, of an installation or combustion plant, waste incineration plant or waste co-incineration plant which may have significant negative effects on human health or the environment”.

The legislation (Schedule 7 Paragraph 5 of the Environmental Permitting (England and Wales) Regulations, implementing the IED Article 17) also defines that:

“Any change in the nature or functioning or an extension of an installation shall be deemed to be substantial if the change or extension in itself reaches the capacity thresholds set out in Annex I”.

For incineration, the capacity threshold referred to is:

“The incineration of non-hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 3 tonnes per hour”.

As the proposed annual capacity increase of 32, 000 tonnes per annum is equivalent to 4 tonnes per hour, this threshold is met, and Natural Resources Wales must treat the application as a substantial variation. In this specific instance, based on the information in the application we are satisfied that the variation is unlikely to have significant negative effects on human health or the environment as described in the first definition.

Best Available Techniques

The legislation requires that Best Available Techniques (BAT) are implemented at the installation. These prevent and minimise environmental risk, impacts and emissions in normal and other than normal operation, taking into account cost and benefit. BAT includes the equipment selected and the way an installation is built, operated, maintained and decommissioned. This plant is in scope of the [2019 BAT conclusions for waste incineration](#). The Parc Adfer Energy Recovery Facility permit was already varied by Natural Resources Wales (V006, 19/12/22) to implement the updated BAT

conclusions. Implementation was required by 3rd December 2023, the standard date for existing plant of 4 years after publication of the update.

A consequence of this substantial permit variation is that our guidance requires the varied activity to meet the relevant BAT conclusions immediately upon permit issue (Paragraph 33 of [UK cross-cutting interpretation guidance and permitting advice on the Best Available Techniques \(BAT\) Conclusions](#)). So this variation brings forwards the 2019 BAT conclusion implementation date for Parc Adfer incinerator to the date of issue of variation V007.

3. Key Issues: Environmental Risk Assessment and Controls

The applicant has provided a detailed environmental risk assessment and BAT assessment (BATOT – Best available techniques and operating techniques) for their proposals. For each topic, the applicant is required to demonstrate that sufficient controls are in place to manage risk. These were supplemented by the following topic-specific information where screening assessment indicated that further information was needed:

- Atmospheric Dispersion Modelling – Air Emissions Risk Assessment (410.V11035.00011 Rev 3, dated February 2023).

Note that this document was updated during the permit variation application process at the request of Natural Resources Wales. Therefore reference should be made to this final version, not earlier submitted ones, or to the summary of impacts in the other general application documentation which may have been superseded.

Operating Techniques and environmental controls

As explained above, the application recognises that the proposed capacity increase has the *potential* to change a range of environmental impacts from the incineration operation (e.g. noise, odour, air emissions, raw material usage) and to require changes to the plant operating techniques (e.g. accident management plan, waste arising and handling). The application systematically identifies these factors in the non-technical summary (NTS), and includes in their review:

- Operating techniques and process description:
 - Processing capacity
 - Facility and process descriptions
 - Accident management
- Environmental risks, controls & procedures:
 - Raw material inventory (including quantities and fire prevention)
 - Waste handling, recovery and disposal (including quantities)
 - Noise

- Odour
- Point source emissions to air
- Fugitive and diffuse emissions (dust)
- Emissions to groundwater, surface water and sewer (including containment and prevention of accidental discharge)
- Greenhouse Gas emissions and Global warming potential.

The applicant has reviewed all relevant documentation and controls, and confirmed whether they remain valid for the plant operating at increased capacity. The BATOT provided with the application is an updated version of that already supplied and accepted at original permit determination, with revisions to reflect the plant capacity increase as summarised in the NTS. Generally these changes are minor in nature.

As an example, assessment has been made of whether the control of noise from the site changes with the increased plant capacity. Noise and vibration were assessed as part of the original permit application, and a noise assessment conducted to BS4142. The applicant has reviewed this and concluded that the only material change as a result of the variation is to the number of deliveries [by lorry] of waste to the process – which is itself unaltered. They conclude that the original assessment and proposed controls remain valid and we agree with this conclusion. The same principle applies to all direct, off-site impacts including those listed above: the original assessments are sufficient to include the additional processing capacity.

For some impacts the increased incineration capacity results in a directly related increase in quantity – e.g. amount of raw materials used (lime, urea, activated carbon), amount of residues (bottom ash and air pollution control residues) and greenhouse gas emission with global warming potential (primarily carbon dioxide). The BATOT document has been updated to reflect this. There is inevitably a potential global environmental impact from these increases. We do not however consider that there is any local impact relevant to environmental permitting, provided that the materials, their use, and disposal/emission routes remain the same and have sufficient capacity. We are satisfied that this is the case. Any wider impacts outside of the direct site operation, of increased resource use or waste generation, are beyond the scope of

the EPR permit determination. The quantities of waste stored on site are not increased with the existing bunker capacity remaining unchanged at 4,491 m³..

For all the above matters we accept the applicant's conclusion that the plant capacity increase to 232, 000 tpa will have an insignificant environmental impact. Noting that the increase is entirely within existing plant and infrastructure, which has the necessary capacity (without alteration) to handle the additional tonnage. The changes are minor as described in the application, and do not require further discussion.

For emissions of residual pollutants to air it has been identified that the flow of exhaust gases, and associated mass release rate for certain substances has increased. This aspect is therefore considered in detail below and for individual pollutants, based on air dispersion modelling undertaken by the applicant.

The operating techniques that the operator must use are specified in table S1.2 in the permit. To reflect the variation and associated updates, relevant parts of the application (BATOT, ERA, AERA) have been added to this table.

Description of installation activities and assessment of BAT

Implementation of BAT represents a key environmental control, by ensuring that operations are conducted in a way which minimises environmental impacts. The operator has described the equipment and operating techniques and provided a comprehensive BAT assessment of their proposals against the individual BAT conclusions relevant to the increased capacity process, noting the point that the variation brings forward the BAT compliance date from December 2023 to the date of variation.

As already described, the permit has previously been varied (V006, 19/12/2022) to implement the 2019 Waste Incineration BAT Conclusions. At this time we undertook a BAT assessment and were satisfied that for all applicable BAT conclusions, the plant was either already compliant, or would be compliant by the implementation date of 03 December 2023. There is no need to repeat this assessment for the variation or to reproduce it here, with information provided by the operator in each case being largely similar. Unless stated otherwise we regard that the operator was already **currently**

compliant with each applicable BAT conclusion prior to variation V007 and remains so. Therefore the reassessment below is only of matters which could be materially affected by the proposed variation:

- Where the capacity increase within existing equipment, infrastructure and techniques could conceivably significantly affect compliance with the BAT conclusion.
- Where the variation application, or our BAT assessment for the BREF review (V006) indicated that the operation was not yet fully compliant with the BAT conclusion, and taking into account any subsequent updates from the operator.

Assessment against the 2019 BAT Conclusions for Waste Incineration – where compliance may have changed or may need updating

BATc number	Summary of BAT Conclusion requirement	Status/comment
4 (31)	Monitoring of channelled emissions to air as detailed in the BATc for numerous determinands. Also BAT 31 for mercury.	<p>Currently Compliant.</p> <p>We had already confirmed the operator was compliant with BAT 4 for all parameters other than mercury (Hg) at the Bref review (V006 19/12/22). At this point we accepted the justifications for approach to HF and brominated dioxins also contained in the variation application.</p> <p>For mercury, either continuous monitoring or periodic measurements are required, with continuous being required unless mercury can be shown to be low and stable. The UK mercury Monitoring Protocol is an approach accepted by UK regulators to determining whether this is the case. If the Operator satisfies the protocol they can remain on periodic monitoring, if they cannot, long-term sampling is required.</p> <p>At the time of submission of the variation application, the operator had insufficient suitable monitoring data to satisfy the protocol, so indicated they were “not compliant” with the BATc in their application. Correspondingly at the BREF review, we assessed they would be “compliant in the future” once data was obtained and assessed, and a conclusion reached on the type of monitoring needed in future. We set Improvement Condition (IC) 9 at the BREF review to require this work.</p>

BATc number	Summary of BAT Conclusion requirement	Status/comment
		<p>Since then, and during permit determination, the operator has completed and submitted the necessary amount of Hg monitoring data to satisfy the protocol and allow a conclusion of “low and stable” mercury (8 triplicate tests with all results <10µg/m3). IC 9 is also therefore completed, with assessment of completion forming part of this permit determination and being notified to the operator.</p> <p>Following this assessment we now consider that the plant is currently compliant and will remain on periodic monitoring of mercury. However the requirement to satisfy the protocol is an ongoing requirement therefore both long-term sampling and periodic monitoring will be set in the permit. Although not anticipated, if in the future emissions were no longer low/stable and they could no longer satisfy the requirements for periodic monitoring, then they would revert to needing continuous mercury monitoring. A letter is sent at permit variation issue reflecting this.</p>
5, 18	Monitoring during “other than normal operating conditions” (OTNOC) (BAT 4) and OTNOC management plan (BAT 18)	<p>Currently compliant</p> <p>Similarly to BAT4 above, the operator indicated in their BREF response and variation application that they were not compliant/compliant in the future. At the BREF review we set IC 7 requiring formal review and submission of an OTNOC management plan to satisfy the requirements of BAT1 (xxiv) BAT 5 and BAT 18.</p> <p>Although this IC7 has not yet been assessed as completed, we are satisfied that the fundamental requirements of the BATc are already met by the plant. The existing EMS and operating techniques includes the core requirements of OTNOC management, such as definitions, and minimisation of occurrence through identification, design and maintenance of critical equipment. As indicated in the variation application, CEMS monitor CO, TOC and dust during OTNOC as far as practicable. Periodic monitoring of dioxins during OTNOC is planned for future start-up/shut-down events, and is subject to IC 7. Requirements for UK plant are clearly outlined in the UK BAT interpretation document (every 3 year frequency) and we are confident that monitoring will be done and reported within this timeframe.</p>

BATc number	Summary of BAT Conclusion requirement	Status/comment
20	<p>Energy efficiency – appropriate techniques and BAT-AEEL (associated energy efficiency level):</p> <p>20-35% gross electrical efficiency (GEE) for municipal solid waste incineration with electricity production using a condensing turbine.</p>	<p>Currently Compliant.</p> <p>The application indicated that the BAT-AEEL range would be achieved, but it was not immediately obvious whether the efficiency of energy recovery would be affected at all by the increased plant capacity. We would not expect an increase in waste throughput to reduce energy efficiency/recovery.</p> <p>The applicant provided confirmation (31/03/23) that the energy efficiency (<i>stated in the application as 29.37% and 28.9% in different parts depending on data used</i>) would not be systematically affected by the capacity increase. Any fluctuations are primarily as a result of changes to waste stream calorific value. We expect plant energy recovery efficiency to remain approx. 29% or better.</p> <p>The BAT2 / Permit Table S3.3 requirement to re-assess plant GEE does not apply as result of the variation, although NRW will continue to monitor any new efficiency data generated.</p>
25, 27-31	BAT-associated emission levels for emissions to air for various pollutants	<p>Currently compliant</p> <p>It is confirmed within the application that all BAT-AELs are achieved by the plant. The planned capacity increase is not expected to have any significant impact on emissions concentrations.</p>
All applicable BATc	Implementation date	In the V006 BREF review permit, a compliance date of 3 rd December 2023 was indicated, even when we assessed “compliant now”. As a result of the substantial variation, all post-dated permit requirements are updated to be effective immediately upon issue of V007.

Conclusion – Best Available Technique

We have already determined that the proposed equipment, operating techniques and restrictions (as described in the original application and BREF review, summarised here, and conditioned in the permit) are in line with BAT for the installation as defined in the Waste Incineration BAT conclusions. BAT performance is not significantly affected by the plant capacity increase. Where the BAT compliance date is brought forward by the variation, and we previously assessed that the plant would be “compliant in the future”, we are satisfied that the plant will be compliant by the date

of permit variation issue. We are therefore satisfied that the plant is BAT with the additional capacity of 232, 000 tpa.

Assessment of Air emissions and potential human health impact

Summary of air quality modelling undertaken

This section concerns results from dispersion modelling of emissions to air from the identified emission points A1 and the resultant impact on local air quality. The modelling provided by the applicant is summarised in the application dispersion modelling report (V3) referenced above.

The decision and modelling covers all relevant pollutants identified in the BATc, the environmental permit, and/or Chapter IV of IED for waste incineration, and are detailed below. Modelling was undertaken using Lakes Aermid, an air dispersion modelling package widely accepted for permit determinations. Typical precautionary modelling approaches were adopted, such as the use of 5 years meteorological data, assumption of continuous operation throughout the year, inclusion of terrain in the model, and consideration of building downwash for structures in the vicinity of the emission point. These are all detailed further in the application. Results are presented, for human health impact assessment, as maximum predicted ground level concentration at any point on the modelled grid (worst case scenario), irrespective of receptor locations.

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 Natural Resources Wales modelling specialists to establish the robustness of the Applicant's air impact assessment. We are satisfied that the results presented within the Applicant's air quality assessment report can be used in evaluating air quality environmental impact for permit determination. Key results, issues and conclusions are summarised below, and further detail is provided in the application report.

Dispersion modelling for incinerators involves a large number of pollutants, and a number of specific approaches. For example

- regarding total particulate emissions as being 100% PM₁₀ and PM_{2.5} for assessment purposes,
- screening of Volatile Organic Compound (VOC) emissions on a precautionary assumption that they are present as benzene although this is not itself expected to be present in significant concentration,
- apportioning amount of “group 3” metals that are regulated under a common emission limit value in a manner recommended by regulatory guidance).

All such approaches are considered standard in the sector and are accepted in our determination. They are described in the application, and are not detailed further here.

The application dispersion modelling describes 3 scenarios – referred to as “*original permitted scenario (200ktpa)*”, “*Existing operational scenario (200ktpa)*” and “*Permit Variation scenario (232 ktpa)*”. When the current application was submitted, it primarily compared impacts of the expanded incinerator with the existing operational scenario. As part of our current determination, we identified that air dispersion modelling had not previously been provided for that “*existing operational scenario*” when the permit was varied to allow for a change in equipment provider (boiler, turbine, V002, 2018). The V002 variation application stated that “*The emissions parameters (flue gas flow, temperature and velocity) remain in line with permit application ... there is no impact on existing dispersion modelling*”. It is evident that there has at some point in the life of the regulated facility been a change to the air emission fundamental parameters that does have an effect on mass emissions and dispersion – with stack diameter changing from 2.3 to 1.9m, waste gas flow increasing from 37.6 to 48.7 Nm³/s, and exit velocity increasing from 15 to 23 m/s.

We therefore required the applicant to update their modelling (to V3 as referenced above), making assessment of future emissions as process contribution (PC) from the entire 232 ktpa facility as anticipated, and with any comparison of change in impact being to the original permitted scenario @ 200ktpa. This ensures that the assessment is robust, and that this variation also therefore incorporates assessment and full permit authorisation of the historic changes to emissions parameters from now onwards.

The primary focus in this section is on potential impact to human health on local receptors; impact on protected ecological sites is considered separately below, and is on the basis of the same underlying dispersion modelling.

Overview of impact results for all pollutants

When assessing impact of air emissions, the applicant has quantified both the absolute impact of future emissions, and considered the change from previously consented operations. In very simple terms, the flow of waste gas is increasing by approx. 30%, so the “base” mass emission rate of pollutant and maximum environmental impact could increase by 30%, accordingly. However, in parallel to the capacity increase, emission limits for the process have in several instances been reduced by the BREF review and BAT-AELs, partially offsetting this increase, or even resulting in an overall reduction in emissions compared to the consented baseline scenario.

Where future emissions from the expanded capacity are now lower than those that have previously been consented, the applicant has concluded that they are insignificant, and not made further assessment. We agree with this approach. We consider it reasonable to take into account the reduction in impact associated with the BREF review as the absolute future impact of the facility is reducing compared to previously consented emissions, particularly given that the lower ELVs will be implemented immediately as a result of the variation rather than from 3rd December 2023.

Where emissions have increased, in line with standard permitting approach, we consider these to be insignificant if the total Process Contribution (PC) from the facility, *and not just the increase* is less than 1% of any applicable long-term (LT) environmental standard, or less than 10% of any applicable short-term (ST) environmental standard (ES), including Environmental Quality Standard (EQS) or Environmental Assessment Level (EAL). In making this assessment, we have taken a precautionary approach in line with guidance, which prevents the possibility of a number of incremental changes being authorised which, while not individually significant, could become significant cumulatively. If PC cannot be considered insignificant, this does not necessarily mean that impact is significant, and we assess

impact with reference to the Predicted Environmental Concentration (PEC), and with consideration of whether the relevant environmental standard is likely to be breached.

For all pollutants the Applicant has satisfactorily demonstrated that impacts of operation would be insignificant against human health assessment criteria, and that consideration of PEC is not required. Either PC is insignificant, and/or the pollution impact is reducing from the originally permitted scenario, taking into account both increased volume flow rate and any reduction in emission limit value. This data is summarised in table 1 and table 2 below.

We have not required the applicant to update impacts due to “abnormal operation” as the change to these is minimal. As stated in the original decision document *“Given that these abnormal operations are limited to no more than a period of 4 hours continuous operation and no more than 60 hour aggregated operation in any calendar year. This is less than 1% of total operating hours and so abnormal operating conditions are not expected to have any significant long term environmental impact.”* This conclusion remains. The short-term abnormal operation emission limits are unaltered. Given the very small changes to normal operation limits and impacts (max +0.2% for ST NO_x), recalculating abnormal operation to take account of these is unnecessary as it will not give a significantly different result.

Table 1 – Modelled pollutant emissions for the permit variation (other than metals)

Pollutant	EQS / EAL	Process Contribution (PC) - 232 Ktpa (variation)		Process Contribution - change from baseline - 200 Ktpa		Conclusion - Significance
	µg/m³	µg/m³	% of EAL	µg/m³	% of EAL	
NO ₂	40	0.36	0.90	+0.04	+0.11	Insignificant - PC <1% of LT ES
	200	3.35	1.7	+0.42	+0.21	Insignificant - PC <10% of ST ES
PM ₁₀	40	0.016	0.04	-0.01	-0.02	Insignificant - PC reducing and <1% of LT ES
	50	0.05	0.10	-0.03	-0.06	Insignificant - PC reducing and <10% of ST ES
PM _{2.5}	25	0.016	0.06	-0.01	-0.03	Insignificant - PC reducing and <1% of LT ES
SO ₂	266	3.06	1.2	+0.04	+0.02	Insignificant - PC <10% of ST ES
	350	2.07	0.59	+0.03	+0.01	Insignificant - PC <10% of ST ES
	125	0.92	0.7	+0.01	+<0.01	Insignificant - PC <10% of ST ES
HCl	750	1.42	0.19	+0.03	+<0.01	Insignificant, PC <10% of ST ES
HF	16	0	0.02	+<0.01	+<0.01	Insignificant, PC <1% of LT (monthly) ES
	160	0.18	0.11	+0.04	+0.02	Insignificant, PC <10% of ST ES
CO	10000	2.5	0.02	+0.53	+0.01	Insignificant, PC <10% of ST ES (8h)
	30000	3.6	0.01	+0.76	+<0.01	<i>Insignificant, PC <10% of ST ES (1h) - approximate values calculated by NRW permitting on basis of 8h results from applicant as 1h not provided. Clearly insignificant</i>
TOC	5	0.03	0.57	+0.01	+0.12	Insignificant - PC <1% of LT ES. Assessed "as benzene" against Benzene EAL - precautionary approach
PAH	0.0002 5	2.86E -06	1.14	+<0.01	0.24	Insignificant - See below
NH ₃	180	0.03	0.02	+0.01	+<0.01	Insignificant, PC <1% of LT ES
	2500	1.77	0.07	+0.38	+0.02	Insignificant, PC <10% of ST ES
PCBs	0.2	1.43E -05	0.01	+<0.01	+<0.01	Insignificant, PC <1% of LT ES
	6	0.001	0.01	+<0.01	+<0.01	Insignificant, PC <10% of ST ES
Dioxins		1.72E -10		-5.50E- 11		Insignificant, PC reducing, see below

Note, for both tables: Performance against both long term (annual, monthly) and short term (24-h, 1-h and 15m) environmental standards are reported as applicable. The conclusion indicates whether a short-term or long-term ES. See [Air emissions risk assessment for your environmental permit - GOV.UK \(www.gov.uk\)](#) for further detail on averaging period for individual ES.

Poly(cyclic) aromatic hydrocarbons (PAH) are a group of persistent organic chemicals. Their impact was assessed in a standard manner on the basis of one individual PAH (benzo[a]pyrene, BaP) which is the only one to have ES specified. The applicant assessed PAH using an ES of $0.001\mu\text{g}/\text{m}^3$ ($1\text{ng}/\text{m}^3$), which is the target value. There is also an objective ES of $0.00025\mu\text{g}/\text{m}^3$ ($0.25\text{ng}/\text{m}^3$). Therefore the applicant concluded the PC was simply $<1\%$ and insignificant. As shown, against the objective value, the calculated PC is just over 1% (1.14%). Given the large number of precautionary assumptions and inherent uncertainty in the modelling, we are satisfied that the true process contribution is $<1\%$ and insignificant. In addition to standard modelling precautionary approaches as summarised above and stated in the application, it is also noted that modelling is based not on an emission limit value (there is none), but instead on BaP emission levels given in the waste incineration BREF. The applicant used the highest emission level of the range stated in the BREF, hence our confidence that actual emissions and impacts would be lower for this modern, well performing plant.

For Dioxins (and furans) there is no ES, but normally dioxin emitters complete an additional model known as the human health risk assessment (HHRA) which considers possible human exposure resulting from emissions to air. For Parc Adfer, an HHRA was completed for the original permit application. As emissions for the varied facility are reducing (as a result of implementation of lower BAT-AEL emission limit), there is no need for further or updated assessment.

Table 2 – Modelled pollutant emissions for the permit variation (metals)

Pollutant	EQS / EAL	Process Contribution (PC) - 232 Ktpa (variation)		Process Contribution - change from baseline - 200 Ktpa		Conclusion - Significance
	µg/m ³	µg/m ³	% of EAL	µg/m ³	% of EAL	
Cd	0.005	2.86E-05	0.57	+0.01	+0.12	Insignificant - PC <1% of LT ES
Tl		2.86E-05		+0.01		Insignificant - no ES, and change very small
Hg	0.25	5.73E-05	0.02	<-0.01	-0.02	Insignificant - PC reducing and <1% of LT ES
	7.5	0.004	0.05	<-0.01	-0.05	Insignificant - PC reducing and <10% of ST ES
Sb	5	1.98E-05	<0.01	<-0.01	<-0.01	Insignificant - PC reducing and <1% of LT ES
	150	0.001	<0.01	<-0.01	<-0.01	Insignificant - PC reducing and <10% of ST ES
Pb	0.25	8.68E-05	0.03	<-0.01	<-0.01	Insignificant - PC reducing and <1% of LT ES
Co		NA		NA	NA	As no ES, applicant does not report figures, but considered insignificant. From other data, PC will be <0.00008 µg/m ³
Cu	10	4.98E-05	<0.01	<-0.01	<-0.01	Insignificant - PC reducing and <1% of LT ES
	200	<0.02	<0.01	<-0.01	<-0.01	<i>Insignificant - PC reducing and <10% of ST ES - worst case values calculated by NRW permitting on anomaly in applicant data (listed Co not Cu) . Clearly insignificant</i>
Mn	0.15	1.03E-04	0.05	<-0.01	-0.02	Insignificant - PC reducing and <1% of LT ES
	1500	<0.01	<0.01	<-0.01	<-0.01	Insignificant - PC reducing and <10% of ST ES
V	5	1.03E-05	<0.01	<-0.01	<-0.01	Insignificant - PC reducing and <1% of LT ES
	1	<0.01	0.06	<-0.01	-0.02	Insignificant - PC reducing and <10% of ST ES - <i>Clearly insignificant -note applicant reports this 24-h mean as being a 1-h mean. Unclear if 1-h or 24-h reported but if mis-reported, actual impact will be even lower</i>
As	0.003	4.30E-05	1.43	<-0.01	-0.46	Insignificant - PC reducing considerably over existing consented emission owing to reduced BAT-AEL
Cr (II)(III)	5	1.58E-04	<0.01	<-0.01	<-0.01	Insignificant - PC reducing and <1% of LT ES
	150	0.01	0.01	<-0.01	<-0.01	Insignificant - PC reducing and <10% of ST ES
Cr (VI)	0.0002	3.72E-07	0.19	+<0.01	+<0.01	Insignificant - PC <1% of LT ES
Ni	0.02	3.78E-04	1.89	<-0.01	-0.61	Insignificant - PC reducing considerably over existing consented emission owing to reduced BAT-AEL

We accept the applicant's conclusion, that on the basis of individual pollutants detailed above, all future emissions are insignificant when considered against environmental standards implemented for the protection of human health.

Emission limits and monitoring

There are no changes to Emission Limit Values as a result of this variation, other than that the earlier implementation of BAT-AELs from the date of permit issue as already described. Schedule 3 and 4 of the permit are amended accordingly.

There are no changes to monitoring as a result of this variation, although we have confirmed via completion of IC9 that the requirements of the mercury protocol have been met, and the permit continues with periodic mercury monitoring (subject to ongoing review).

Assessment of potential impact on designated ecological sites

National Site Network (SAC, SPA, Ramsar)

The application is within the relevant distance criteria (10km) of the following National Site Network designated sites which are protected under the Conservation of Habitats and Species Regulations 2017:

Reference code used in the application	Name of designated site and official reference number(s)	Type of designation -SAC, SPA or Ramsar	Approx. distance between installation and protected site (km, at nearest point)
ER1	Dee Estuary / Aber Dyfrdwy (England / Wales) (UK0030131, 9013011, 11082)	SAC / SPA / Ramsar.	The Estuary lies to the west and north of the installation – at closest point the protected site boundary is ~150m to the north of the installation boundary.
ER2	River Dee and Bala Lake (UK0030252)	SAC	The river lies broadly to the south of the installation and the protected site extends for a considerable distance along the river course. At its closest point, the river is ~1500m south of the installation
ER3	Deeside and Buckley sites (UK0030132)	SAC	This SAC comprises a number of separate areas of land to the south-west of the installation. The

			closest is ~2.8km from the installation
ER4	Halkyn Mountain / Mynydd Helygain (UK0030163)	SAC	~9.5km west-south-west of the installation

Note that for ER1 the SPA includes inner marsh farm SSSI, whereas the SAC does not. ER1 describes the higher magnitude air quality potential impact of all designations - to demonstrate this the applicant also gave separate data for ER5 (inner marsh farm).

A full assessment of the application and its potential to affect the interest features of the designated site has been carried out as part of the permitting process. Assessment has included potential effects of the installation alongside the background pollutant levels for air quality where applicable, using the same insignificance criteria (1% of a LT ES, 10% of a ST ES) as described above. As the sites within screening distance include sites designated both in Wales and England, the statutory nature conservation body for each country has been consulted.

Appropriate assessment:

In light of the conclusions of an appropriate assessment, and taking account of the advice received from protected sites advisors [Natural England], it has been established that the project will not adversely affect the integrity of any National Site Network site, taking into account any conditions or restrictions as applicable, either alone or in-combination with other plans and projects. (As documented in section 4 and 5 of OGN 200 form 1 and available on the [public register](#)). The statutory nature conservation body for Wales was consulted and provided comments in pre-consultation discussion and on the initial Appropriate Assessment, which was revised and resubmitted. They have not provided an official response on the final version. As we indicated we would in our consultation with them, we have decided to proceed with our decision, assuming no objection.

The assessment focuses on air quality impacts, as all other impacts can be screened out as no likely significant effect as already described. Detailed air impact assessment is on the basis of air dispersion modelling already described. The assessment is available in full in the Form 1.

SSSI Assessment

The application is within the relevant distance criteria (2km) of the following site of special scientific interest (SSSI):

- ER1 DEE ESTUARY / ABER AFON DYFRDWY – 31WHJ (Wales) (0.3 km to the north and west of the installation – see above for further detail)
- ER1 Dee Estuary – 1000595 (England) (1.5km to the north and west of the installation)
- ER2 River Dee and Bala Lake – 31WDW (1.5km -broadly south of the installation – see above for further detail)
- ER6 Inner Marsh farm (31 WTC) (1.1km to the north of the installation))
- ER7 Shotton Lagoons and Reedbeds (31 WBU) (1km to west of installation)

The potential impact on the SSSIs of the proposed variation to the installation has been assessed, according to the requirements of Section 28I of the Wildlife & Countryside Act 1981 as amended by the Countryside and Rights of Way Act (CRoW) 2000. The assessment is documented on the Appendix 4 form which is on the [public register](#). It concludes that the new installation is not likely to damage features of the SSSI.

Non-statutory Sites Assessment.

No additional habitats sites have been identified by the applicant within 2 km of the installation. It is noted by the applicant that the Dee Estuary (SAC, SPA, Ramsar, SSSI) is also an RSPB reserve, but we do not consider that additional assessment or consultation is necessary, given the scrutiny already applied owing to the sites designated status.

4. General determination matters

Other determination matters are summarised in the sections below. Our approach to these is considered routine for the application type.

Confidential information

No claim for commercial or industrial confidentiality has been made. We have not identified information within the application that we consider to be confidential.

Consultation

The consultation requirements were identified and implemented. For this substantial variation application, we consulted initially on the duly made application, and on our draft decision. The consultation decision was taken in accordance with statutory requirements, RGN 6 High Profile Sites, our Public Participation Statement and our Working Together Agreements. The consultation adverts were placed on our website.

A copy of the Application and all other documents relevant to our determination (see below) are available for the public to view. Anyone wishing to see these documents could arrange for copies to be made.

We sent copies of the Application to the following bodies, which includes those with whom we have “Working Together Agreements”:

- Environmental Public Health Service Wales
- Flintshire County Council – planning & environmental health departments
- The Health and Safety Executive (HSE)

These are bodies whose expertise, democratic accountability and/or local knowledge make it appropriate for us to seek their views directly.

The consultation on the duly made application started on **03/02/2023** and ended on **03/03/2023**.

The consultation on the draft decision started on **22/06/23** and ended on **28/07/23**. The consultation was extended by one week from 20th to 28th July as owing to an IT glitch, the advertising of the consultation on our website was offline from 12th 19th. Although the consultation was still open during this period, we decided to extend the

deadline to ensure our statutory obligation to consult on the draft decision for 20 working days was fully fulfilled.

Further details along with a summary of consultation comments and our response to the representations we received can be found in Annex 1. We have taken all relevant representations into consideration in reaching our determination.

Permit Conditions

The permit contains many conditions taken from our standard Environmental Permit template including the relevant Annex for waste incineration. We developed these conditions in consultation with industry, having regard to the legal requirements of the Environmental Permitting Regulations and other relevant legislation. This document does not therefore include an explanation for these standard conditions. Where they are included in the permit, we have considered the Application and accepted the details are sufficient and satisfactory to make the standard conditions appropriate. No non-standard or non-template conditions are used in this permit and no permit conditions have been altered as a result of this variation.

Other permit updates

The permit has been updated to reflect the new incineration capacity of 232, 000 tonnes per annum, principally in Table S2.2, also in the non-technical summary. The capacity for the permitted but not constructed Incinerator Bottom Ash treatment activity is left unaltered in Table S2.3. It is however recognised as anomalous, as the site bottom ash production is stated in the variation application as 70, 000 tonnes per annum. The pre-operational condition PO7 is therefore amended to require that prior to operation of the bottom ash processing activity, the BAT assessment shall demonstrate BAT “*for the processing capacity which is proposed*”.

As the BAT implementation date is brought forward from 3rd December 2023 to date of issue of permit variation V007, Schedule 3a and 4a (Emissions and monitoring, reporting until 3rd December) are no longer required. Former Schedule 3b and 4b are re-named simply Schedule 3 and 4 and apply from permit issue. Other permit requirements, such as improvement conditions are unaltered by the variation.

OPRA

The OPRA permit application score at permit issue is 199. The subsistence OPRA score is 179, reflecting the charge scheme guidance for the location attribute (statutory nature conservation sites) once determination has been completed and when no adverse effect on the site has been established.

ANNEX 1: Consultation Responses

A) Advertising and Consultation on the Application

The Application has been advertised and consulted upon as detailed above. The consultation responses and a summary of how we have taken these into account in reaching our decision is given in this Annex. Copies of all consultation responses have been placed on Natural Resources Wales public register. ~~mean~~

1) Consultation Responses from Statutory and Non-Statutory Bodies

Response Received from The Health and Safety Executive (22/02/23 – consultation on duly made application)	
Brief summary of issues raised:	Summary of action taken / how this has been covered
None – the consultee responded but indicated they would not be making detailed comments.	N/A

Response Received from Flintshire County Council (24/02/23 – consultation on duly made application)	
Brief summary of issues raised:	Summary of action taken / how this has been covered
None – the consultee responded but indicated they had no specific concerns	N/A

Response Received from Environmental Public Health Service Wales [formerly Public Health Wales] (09/03/23 – consultation on duly made application)	
Brief summary of issues raised:	Summary of action taken / how this has been covered
Impacts of Arsenic (As) and Nickel (Ni) where PC exceeds insignificance threshold of 1%	See section on air dispersion modelling and impact assessment. Although the emissions cannot be considered insignificant (PC 1.43% and 1.89% of ES, respectively), this does not mean that they are necessarily significant. As modelled PC's are going down from those modelled for the originally consented facility (PC 1.89% and 2.50%, respectively based on application modelling), it is considered that the future impact is insignificant, and detailed

	<p>assessment of background metal concentrations to determine Predicted Environmental Concentration is considered unnecessary. Furthermore, it is understood that were background air pollutant levels for As and Ni in the area considered, exceedance of the ES is highly unlikely. Hence it is not considered that any further corrective action is necessary.</p> <p>Finally, the stated impact is at the most impacted point on the modelled grid. The impact at sensitive receptors is almost certainly insignificant, although this is not explicit in the submitted assessment.</p>
Concern that some monitoring arrangements do not meet BAT (Hg, during OTNOC ,	<p>See BAT assessment (section 3 of this document) which details this issue. When the application was submitted, the site sector BREF review had not been completed, monitoring applicability had not been confirmed, and data was not fully available to justify monitoring selection. To ensure full disclosure, the operator therefore highlighted that they were “non-compliant” even though these points were being developed, subject to our decision and additional data.</p> <p>We are satisfied that additional information has been provided and that appropriate monitoring is in place at the date of variation V007 issue for Hg, during OTNOC, and also for dioxins/furans, HF and brominated dioxins.</p>
Site condition report (SCR) and land condition at permit surrender	<p>No SCR was provided or required for permit variation, as there were no changes to process or permit boundary. The permit surrender process will look at the SCR history and any potential for pollution during the life of the permit.</p>

There were no consultation responses on our draft decision

2) Consultation Responses from Members of the Public and Community Organisations

- None received -

Published by:
Natural Resources Wales
Cambria House
29 Newport Road
Cardiff
CF24 0TP

0300 065 3000 (Mon-Fri, 8am - 6pm)

enquiries@naturalresourceswales.gov.uk
www.naturalresourceswales.gov.uk

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Issued 08 August 2023

Page 32 of 32