

Permitting Decisions- Variation

We have decided to grant the variation for Marchwood Power Station operated by Marchwood Power Limited.

The variation number is EPR/BL6217IM/V011

The variation was issued on 30/05/2024

The variation introduces controls on the maximum discharge temperature and through-plant temperature rise for discharge point WW1 in Table S3.2 of the Environmental Permit. This replaces condition 2.3.6, which restricted the number of days the installation could discharge warmed water to the River Test when the ambient abstracted water temperature was 21.5°C or greater.

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

Purpose of this document

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

- highlights [key issues](#) in the determination
- summarises the decision making process in the [decision considerations](#) section to show how the main relevant factors have been taken into account

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

Read the permitting decisions in conjunction with the environmental permit and the variation notice.

Key issues of the decision

Background

Marchwood CCGT Power Station is a once through cooled power station. It abstracts from the River Test estuary through an intake served by a channel dredged across the intertidal. It returns the warmed cooling water to the River Test through a shoreline outfall approximately 800m seaward of the intake.

Most power station discharge temperatures are controlled by an uplift limit and an absolute limit. This allows the site to modify their operations to control the temperature of the water they are discharging. Marchwood Power Station discharge temperature is currently controlled by a condition based on the temperature of the river water they abstract. This creates significant issues for the operation of the site due to the unpredictability of the temperature changes and doesn't give the site options to mitigate the effect by changing operations.

The previous permit condition resulted in problems controlling discharge temperatures:

- The current condition limits the site to operating for only 16 days when the river temperature is at 21.5°C. Below this temperature and during those 16 days, the site can discharge any temperature of water. This had led to times where discharges have reached 35°C on hot summer days.
- With the gradual typical increase in summer estuary water temperature in recent years, and with continuing increase expected in summers to come, the operational impact of this condition has increased.
- A day is only counted towards the 16-day limit when the temperature has been measured at 21.5°C for the full 24 hours. This allows the site to discharge on days when the river temperature could be over 21.5°C for significant periods, but not the full 24 hours.
- The rapid fluctuations in the river temperature make the establishment of a set point when it is appropriate for the site to restart after a high river temperature episode extremely difficult.

Marchwood Power Station is part of the critical infrastructure for the National Grid, there is a significant impact when they are unable to run. We therefore consider that the condition should be amended to address the points above and align the permit with the standard approach of setting an uplift limit and an absolute limit.

New limits

The variation replaces condition 2.3.6 by introducing controls on the maximum discharge temperature and 'through-plant temperature rise' (uplift) for discharge

point WW1 in Table S3.2 of the Environmental Permit. We have set a maximum limit of 30°C with an additional seasonal uplift limit, which takes summer and winter conditions into account.

The use of different permitted flows and uplift limits in the 'summer' and 'winter' is a refinement recognising site-specific circumstances for this power station. The introduction of a maximum discharge temperature limit is a standard form of condition used in permitting of once through cooled power plant. This combined approach is designed to recognise the thermal sensitivity of potentially affected receptors in summer water temperatures.

In the winter half year (1 November - 30 April), intake temperatures will be such that operation is more likely to be restricted by the maximum uplift rather than the maximum discharge temperature. In the summer half year (1 May - 30 October) operation will generally be restricted by the uplift limit. But for ambient water temperature at 22°C and above, operation will be restricted by the maximum discharge temperature condition.

Together the new limits will restrict Marchwood Power Station's thermal discharge and allow the necessary environmental protection to be maintained. It provides the capability for the site to reduce, but not necessarily cease, its operation during hot ambient conditions. Cooling water flow will continue at the summer permitted rate and generation will be reduced progressively as intake water temperature increases to maintain compliance with the maximum temperature condition. Reduction in generation will lead to a proportional reduction in uplift. Similarly, this condition will also allow for a progressive increase in generation when intake water temperature falls. Resulting in smoother operational control rather than the on/off control required under the current permit condition.

The new limits will allow Marchwood further capacity to adapt its operations and plant to ensure ongoing operations while maintaining environmental compliance in a warming climate.

Based on an average uplift of 8.5°C the current permit condition allows the site to discharge up to 29.99°C (based on a water temperature of 21.49 degrees). This is only 0.01 of a degree different from the new proposed limit therefore the overall effect is considered to be the same. In addition, the new limit introduces further controls by preventing the 16 days of additional unrestricted running when river temperatures are above 21.5°C. It also allows control of the discharge regardless of daily temperature fluctuations.

We are satisfied that the change to the permit condition will not cause any backsliding on the controls the power station is subject to. It will reduce the heat loading of the river especially in the early stages of high river temperatures. We consider that it is in-line with current guidelines as verified by the modelling. Further information is given below.

Modelling

The site has undertaken modelling of the discharge, which considers all states of the tide and at different discharge volumes. This has been used to establish that the discharge falls within the parameters set by the draft paper titled “Proposed Temperature Targets for the Assessment of Mixing Zones in Transitional and Coastal Waters”, dated February 2018 that has been used for guidelines in new industrial developments predominantly in the nuclear industry.

The key parameters highlighted in the paper are that a thermal plume should not cover more than 25% of the cross-section of the river and that outside the mixing zone, a temperature uplift relative to background of +3°C is allowable, except for waters of high ecological status where a 2°C uplift limit is proposed. The modelling demonstrates that the Marchwood plume is within these parameters at all states of the tide.

The relevant hazard, receptors, pathways and measures all remain unchanged since the original assessment was undertaken in 2001. Although the risk aspect is unchanged, the information base regarding the risk has greatly expanded since 2001, giving greater confidence in approaches to the management of this risk.

Decision considerations

Confidential information

A claim for commercial or industrial confidentiality has not been made.

The decision was taken in accordance with our guidance on confidentiality.

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 confidentiality.

Nature conservation, landscape, heritage and protected species and habitat designations

We have checked the location of the application to assess if it is within the screening distances we consider relevant for impacts on nature conservation, landscape, heritage and protected species and habitat designations. The application is within our screening distances for these designations.

We consider that the application will not affect any site of nature conservation, landscape and heritage, and/or protected species or habitats identified. The proposed variation will not cause any backsliding on the environmental controls that are already permitted. The controls introduced by this variation will in fact reduce the heat loading of the river, especially in the early stages of high river temperatures. The emission is already permitted, and no additional emissions are being added as part of this variation. The emission forms part of the “prevailing environmental conditions” that may contribute to the existing condition of the designated sites. The existing permitted emissions constitute the lawful baseline in regulatory terms and the proposed variation would not change that baseline. Therefore, as the competent authority, the Environment Agency concludes that there is no potential for likelihood of damage to any nearby SSSI and no likely significant effect on any nearby SAC/SPA/Ramsar sites.

We have not consulted Natural England.

The decision was taken in accordance with our guidance.

Environmental risk

We have reviewed the operator's assessment of the environmental risk from the facility.

The operator's risk assessment is satisfactory.

General operating techniques

We have reviewed the techniques used by the operator and compared these with the relevant guidance notes and we consider them to represent appropriate techniques for the facility.

The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.

As part of this variation, we have removed '2.3.6 Abstracted Water Temperature' from the Operating Techniques Table. This is because it is superseded by the updated limits specified in Table S3.2 of the permit.

Emission limits

Emissions limits have been added as a result of this variation. We are satisfied that the limits will not cause any backsliding on the controls the power station is subject to and therefore the risk is not increasing.

Emission point WW1: We have set a maximum discharge temperature limit of 30°C with an additional seasonal uplift limit. The uplift limits take the summer and winter conditions into account. We have also set additional limits on the flow:

Parameter	Limit (incl. unit)	Reference Period
Flow (Summer)	54,041 m ³ /hr (<i>of which 54,000 m³/hr is cooling water</i>)	Hourly average
	1,297,000 m ³ /day	Daily maximum
Flow (Winter)	45,041 m ³ /hr (<i>of which 45,000 m³/hr is cooling water</i>)	Hourly average
	1,081,000 m ³ /day	Daily maximum
Maximum discharge temperature	30°C	Instantaneous
Maximum plant uplift (Summer)	+8°C	Hourly average
Maximum plant uplift (Winter)	+9.5°C	Hourly average

The Operator also originally proposed hourly average reference periods for the maximum discharge temperature. However, as 30°C is an absolute maximum, we consider that an hourly average cannot apply to this parameter. Setting 30°C as an absolute maximum ensures that the permit condition will not cause any backsliding on the controls the power station is subject to.

Monitoring

We have decided that monitoring should be added for the following parameters, using the methods detailed and to the frequencies specified:

- Maximum discharge temperature – continuous monitoring
- Maximum plant uplift – continuous monitoring

Based on the information in the application we are satisfied that the operator's techniques, personnel and equipment have either MCERTS certification or MCERTS accreditation as appropriate.

The monitoring point will be the existing WW1 monitoring unit within the station car park, which directly accesses the cooling water flow after any influence from site activities.

Management system

We are not aware of any reason to consider that the operator will not have the management system to enable it to comply with the permit conditions.

The decision was taken in accordance with the guidance on operator competence and how to develop a management system for environmental permits.

Growth duty

We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit variation.

Paragraph 1.3 of the guidance says:

“The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation.”

We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections.

We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards.