Cyfoeth Naturiol Cymru
Natural Resources Wales

Natural Resources Wales permitting decisions

Hydrogen production: Electrolysis of water

Protium Green Hydrogen Supply Ltd (Baglan Hydrogen Production Facility)

Contents

Natural Resources Wales permitting decisions

Hydrogen production permit using electrolysis of water

This is a new low impact hydrogen production permit. The permit regulates the production of hydrogen by electrolysis of water using a polymer electrolyte membrane

We have decided to grant the permit for Baglan Hydrogen Production Facility operated by Protium Green Hydrogen Supply Ltd.

The permit number is: Not yet allocated

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.

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 web publicising responses

Key issues of the decision

Meeting the low impact hydrogen production criteria

The application is for a new low impact hydrogen production permit. In issuing the permit we have confirmed the operator can meet the low impact criteria specified below and in the application form.

1) Hydrogen will be produced via Polymer Electrolyte Membrane (PEM)
2) The electricity will be supplied from the National Grid and will be supplied pursuant to a Green Power Purchase Agreement.

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3) The operator will not abstract any surface water for use in the process. It is anticipated that ~15m3 of water per day, sourced from a mains water connection will be utilised in the process.
4) All wastewater produced as part of the process is discharged to foul sewer on Central Avenue, to the southeast of the Site.
5) The Operator will not produce more than 1 tonne of non-hazardous or 10 kg of hazardous waste a day.
6) The Operator will not store more than 1 tonne of hydrogen at any one time.

In meeting the low impact criteria, we consider the regulated facility has minimal risk to the environment.

The low impact criteria have been developed based on our low impact hydrogen production criteria risk assessment which is available on our website here.

Consultation

The quick permitting process was consulted on during the design phase. Each minded to decision and draft permit will be consulted on by posting the decision document and permit on our website.

Site condition report

The production of Hydrogen through electrolysis will not result in the release of any polluting substances. However, the operator has indicated that small quantities of hazardous substances will be stored on site, in the form of:

- refrigerant– up to 500 litres, stored in tanks as appropriate.
- Ethylene glycol – up to 1,250 litres, stored within a closed loop system.
- R-407C (Difluoromethane, Pentafluoroethane, 1,1,1,2- Tetrafluoroethane) up to 7.1kg stored in a storage tank as appropriate.

The Operator has stated that storage tanks with pallet bunds or other appropriate storage arrangements will be utilised to prevent any chemical spillage. Also, that spill response kits will be provided where appropriate. We are satisfied that permit condition 3.2.3 will be sufficiently protective. The Operator has also submitted a desk-based site condition report which provides a statement of the condition of the site at the time of the Environmental Permit Application and will form the site baseline going forward.

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Biodiversity, Heritage, Landscape and Nature Conservation

This type of installation is not considered to present a risk of pollution to biodiversity, landscape or nature conservation.

The proposed installation itself will not be constructed within the boundaries of any protected site and any potential for physical impact as a result of this, has been eliminated. We also consider that the proposed installation will not affect the features or conservation management of any nearby sites, species or habitats as the only emissions to air associated with the PEM electrolysis process are oxygen and hydrogen and wastewater from the process will be discharged to foul sewer.

In conclusion we have ruled out the possibility of this type of installation having a significant effect on any Special Areas of Conservation, Special Protection Areas and Ramsar Sites. We are also satisfied that the installation is not likely to damage the features of any Sites of Special Scientific Interest and also that significant pollution will not be caused at non-statutory sites (National Nature Reserves, Local Nature Reserves, Local Wildlife Sites and Ancient Woodland).

Environmental Risk Assessment of low impact hydrogen production criteria

Air

The only emissions to air from this type of installation are oxygen and hydrogen. Hydrogen is vented during shutdown and maintenance periods, which will occur on a biannual basis, for a limited period of time (approximately 1 hour). The process equipment is designed so that hydrogen is vented at an appropriate height and location to ensure that the process is conducted safely. It is considered that the volume of hydrogen emitted is so small (44kg/hr) that it will not have any significant effect on local air quality. In order to mitigate against unplanned emissions of hydrogen, the installation will be fitted with suitable operating systems, instrumentation and control systems as well as hydrogen detection sensors. Production of hydrogen will cease in the event that a particular concentration of hydrogen is detected as per an agreed shutdown cause and effect chart. If necessary, the Operator will be able to isolate the affected component (e.g., valve). As well as this, intrinsically safe electrical equipment

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will be utilised to reduce the probability of spark ignition, should an unplanned release of hydrogen occur.

Oxygen is not considered a pollution risk. The use of the Oxygen produced is beneficial but cannot be guaranteed at the smaller scale. We have included permit condition 4.2.2 to ensure this is reviewed periodically.

Emission limits

There are no significant emissions from the installation, therefore we have decided that no emission limits should be set in the permit.

Water & Sewer

The only emission of water permissible by this type of permit is to public sewer or offsite treatment. All wastewater from the reverse osmosis process associated with the installation will be collected and removed from the Site via a licenced commercial carrier, pending permission from the sewerage undertaker to discharge to the public sewer on Central Avenue, to the southwest of the Site. The wastewater composition will be similar to that derived from a mains water supply; however, it will have a higher concentration of impurities (e.g. soluble carbonate salts of magnesium and calcium). The water demineralisation process will not introduce any further chemical species to the process.

The only emission to surface water from the installation is uncontaminated rainwater run-off. The operator has committed to installing a surface water drainage system to comply with the requirement to receive approval from the Neath Port Talbot Sustainable Drainage Approval Body (SAB). This will consist of appropriately engineered infiltration soakaways.

Emission limits

As there are no significant emissions to water or sewer from the installation, we have decided that no emission limits should be set in the permit.

Soil and Groundwater

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There will be no point source emissions to soil or groundwater from the installation and its associated operations. We consider that permit condition 3.1.1 will be sufficiently protective.

Odour

We do not consider this type of installation presents a risk of odour. We have included permit conditions 3.3.1 and 3.3.2 to ensure that should odours arise then regulatory control can be applied.

Noise and vibration

We agree with the Operator's conclusion that the installation is not anticipated to cause detriment to the amenity of the locality given its location adjacent to an existing industrial estate and in an area characterised by existing industrial operations, as well as significant levels of road traffic associated with the A4241, A48 and M4 motorway. The nearest residential receptors are located over 250m distant from the installation. The loudest piece of equipment associated with the installation has been identified as the compressor unit.

The compressor unit is containerised, and noise levels are expected to be around 85db (measured at 1m from the unit). Based on BS 5228-1:2009+A1:2014 (Code of Practice for Noise and Vibration Control on Construction and Open Sites), at around 250m from the Site, the sound level of the compressor will decrease from 85db to around 23db. This is based on the assumption that the intervening ground is soft in nature and no mitigation is proposed e.g. acoustic fencing. A firewall will be installed between the compressor units and the Site boundary which will afford some noise attenuation, especially in the direction of the nearest residential receptors. Based on this basic screening calculation, the HPF is unlikely to be audible at the nearest residential receptor.

We do not expect site operation to give rise to noise pollution, we have included permit conditions 3.4.1 and 3.4.2 to maintain regulatory control should issues arise.

Fugitive emissions

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Based upon the permit conditions we have imposed to minimise the risk of pollution and the control measures described by the operator, we are satisfied that the appropriate measures will be in place to prevent or where that is not practicable to minimise fugitive emissions and to prevent pollution from fugitive emissions.

Monitoring

We have decided that monitoring is not required due to the minimal risk of pollution.

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Annex 1: Decision checklist

Aspect	Justification / Detail	Criteria met Yes
Receipt of submission		
Low impact hydrogen production criteria met	The application meets the criteria for the low impact hydrogen production permit identified in the application form.	✓
Advertising		
Responses to web publicising	The responses to web publicising (Annex 2) were taken into account in the decision. The decision was taken in accordance with our guidance.	✓
Sustainable Management of Natural Resources (SMNR)		
Considerations of SMNR - Compliance with our General Purpose	We are satisfied that this decision is compatible with our general purpose of pursuing the sustainable management of natural resources in relation to Wales and applying the principles of sustainable management of natural resources.	✓
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.	✓
Environmental Management System (EMS)	The operator has provided a summary of their EMS which we consider is satisfactory.	✓
Operator competence		
Relevant Convictions	Our Enforcement Database has been checked to ensure that all relevant convictions have been declared. No relevant convictions were found for either the company or its officers. The operator satisfies the criteria in RGN 5 on Operator Competence.	✓
Financial competence	There is no known reason to consider that the operator will not be financially able to comply with the permit. The decision was taken in accordance with RGN 5 on Operator Competence.	✓

ANNEX 2: Consultation Reponses

A) Advertising and Consultation on the Application

The Application has been advertised and consulted upon in accordance with Natural Resources Wales Public Participation Statement. The way in which this has been carried out along with the results of our consultation and how we have taken consultation responses into account in reaching our draft decision is summarised in this Annex. Copies of all consultation responses have been placed on Natural Resources Wales public register.

1) Consultation Responses from Statutory and Non-Statutory Bodies

Response Received from	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**

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

a) Representations from Local MP, Assembly Member (AM), Councillors and Parish / Town / Community Councils

Response Received from	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**

b) Representations from Community and Other Organisations

Response Received from	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**

c) Representations from Individual Members of the Public

Response Received from	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**

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