Permitting Decisions - Bespoke Permit

We have decided to grant the permit for Northfleet Hydrogen Production Facility operated by Green Hydrogen 3 Limited.

The permit number is EPR/MP3624ST.

The permit was granted on 07/02/2025.

The application is for the production of hydrogen using electrolysis, which is a Section 4.2 Part A(1) (a)(i) scheduled activity, as part of a multi operator installation.

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

Purpose of this document

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

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

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

Read the permitting decisions in conjunction with the environmental permit.

Key issues of the decision

This application is for a hydrogen production facility comprising six 2.5 MWe proton exchange membrane electrolysers (15 MWe in total), which will together produce approximately 280 kg of hydrogen gas per hour. The hydrogen will enter a purification and drying system before being transported via a dedicated pipeline to the other operator of this multi operator installation (Kimberly-Clark Limited) for combustion in their boiler plant or temporarily stored until needed in dedicated storage tanks with a maximum storage capacity of 1800 kg.

The feedwater to the electrolysers will be ordinary towns water provided by agreement with Southern Water. The feedwater will be demineralised prior to use, with the resulting effluent discharged to sewer under a trade effluent discharge consent.

We expect the operator to follow our 'Hydrogen production by electrolysis of water: emerging techniques' guidance (available at www.gov.uk) or propose an alternative approach that provides the same or greater level of protection for the environment. The application was prepared and submitted before the publication of this guidance, however we have reviewed the proposed operating techniques against the requirements of the guidance below and we agree that they meet the requirements.

Assessment against 'Hydrogen production by electrolysis of water: emerging techniques' guidance (available at www.gov.uk)		
Guidance reference	**Summary of requirements**	**Application evidence**
2 Technique selection	When designing a hydrogen production plant and its associated activities, you should consider its overall environmental performance. You should justify your choice of technology at each stage using the principles of 'best available techniques' throughout your permit application including: • Energy demand and efficiency.	The operator has chosen proton exchange membrane (PEM) electrolysers because they can: • Operate at a high efficiency across a wide range of electrical loads. • Continue production at low loads, minimising production outages. • Adapt to changing loads placed on the system. The operator considers that these reasons make them particularly suitable for the potentially intermittent or variable renewable energy sources (wind and solar) that will be used.

Assessment against 'Hydrogen production by electrolysis of water: emerging techniques' guidance (available at www.gov.uk)		
Guidance reference	**Summary of requirements**	**Application evidence**
	• Water demand, efficiency and evaluation for re-use. • Emissions to the environment.	An evidence review carried out for UK environmental regulators on the emerging techniques for electrolysis of water technologies ('Review of emerging techniques for hydrogen production from electrolysis of water', available at www.gov.uk) also identified PEM technology as a good candidate for use with renewable power sources such as wind and power, due to its high turndown capability, rapid start-up and response to load changes. We therefore agree with the operator's justification for their choice of technology in terms of its environmental performance.
3.1 Operation	You must consider whether your hydrogen production plant may need to operate on a flexible basis and whether this will affect the design, operation and maintenance of the plant.	The operator has considered the hydrogen plant energy sources and the hydrogen fuel demand profile of the sole user and does not identify a need to operate on a flexible basis.
	You should identify all operating scenarios and describe measures to minimise the environmental impact of these scenarios.	The operator has stated that there is a wide envelope of normal operating conditions since PEM electrolysers can operate under a wide range of electrical loads. Commissioning and other than normal operating conditions (OTNOC) have been considered of: • Start-up and shutdown events. • Testing and maintenance. • Emergency inventory loss.
3.2	You will need to identify the equipment and systems, and their	The operator has confirmed that piping, vessels, pipelines and equipment will be designed to

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Reliability and availability	associated operating and maintenance techniques, that are critical in avoiding emissions or minimising environmental impact. You will need to design, operate and maintain these to make sure they are reliable and available. You should implement a risk-based OTNOC management plan. This should identify potential scenarios, mitigation measures, monitoring and periodic assessment of the OTNOC management plan. This should be part of your environmental management system.	minimise the probability for accidental release of hydrogen through consideration of maximum operating pressures and temperatures, suitable material selection and minimising potential leak sources. Storage tank pressure will be continuously monitored with pressure drops triggering an alarm. Gas sensors will be installed in the vicinity of the storage tanks and around upstream pipework connections. Pipe runs will be welded where possible to minimise the number of flanges. The operator has stated that the environmental management system is being developed as the project progresses and will include OTNOC procedures and the implementation of appropriate maintenance programmes. We have included a pre-operational condition in the permit (POC1) for the operator to provide a summary of their final environmental management system.
3.3 Energy efficiency, process efficiency, cooling	You should design, operate and maintain your hydrogen production plant to maximise energy efficiency and process efficiency. You should consider the use or recovery of oxygen by-product when this is commercially and technically viable. You must explain how you have balanced achieving	The operator has chosen PEM electrolysers because of their efficiency over a wide range of operating load, with electricity imported from renewable energy sources. Each electrolyser will be rated at 2.5 MWe with a nominal design production capacity of 46.7 kg of hydrogen. This gives an electrical consumption value of approximately 54 kWh/kg H_2 which is within the benchmark range of

Assessment against 'Hydrogen production by electrolysis of water: emerging techniques' guidance (available at www.gov.uk)		
Guidance reference	**Summary of requirements**	**Application evidence**
	these efficiencies to optimise environmental and economic requirements and what your considerations were. You should consider: • Electrical power needs and whether you will import or generate on site. • High pressure steam need and availability (SOEC). • Maximising any residual waste heat recovery. • Cooling needs. • Cooling type and medium. • Energy recovery devices on high pressure fluids. You should also consider heat integration optimisation.	45 – 66 kWh/kg H_2 for PEM electrolysers identified in the evidence review ('Review of emerging techniques for hydrogen production from electrolysis of water', available at www.gov.uk). Energy efficiency will also be considered when purchasing balance of plant items and control techniques will be employed to improve the energy efficiency of the plant. The DC rectifier for the electrolysers will be specified to achieve the maximum possible power factor. Demand for oxygen on-site has been considered but there is none, and the use or recovery of oxygen will not be further considered due to space constraints. Heat recovery is used within the purification system by pre-heating the input hydrogen with the output stream, thus minimising electrical heating requirements.
3.4 Water supply and use	You should: • Minimise the quantity of water you use. • Segregate, treat and re-use water where possible. • Identify how much contaminant needs to be removed to maintain the water quality necessary for effective operation. • Determine the quantity of water to be purged,	The application states that approximately 4.2 m^3/hr of demineralised water will be required to produce 280 kg/hr of hydrogen. We requested a justification that the amount of demineralised water is minimised and represents efficient use of water, since this represents a ratio of 15 kg of pure water per 1 kg of hydrogen, which is higher than the minimum 9:1 ratio required for electrolysis. The operator's response, based on the manufacturer's data, states that

Assessment against 'Hydrogen production by electrolysis of water: emerging techniques' guidance (available at www.gov.uk)		
Guidance reference	**Summary of requirements**	**Application evidence**
	the characteristics of that purged water, and design the treatment process accordingly. • Eliminate, minimise or treat any emissions to air or wastes that may result from the water treatment process. • Choose a cooling method that takes account of the impact of temperature on process performance, energy efficiency and environmental impact on the receiving medium.	the input water flow rate is 3456 l/hr with 864 l/hr of this removed via the water purification system. We have interpreted this as meaning that there is a pure water input of 2592 l/hr and hence pure water is expected to be consumed in a ratio of approximately 9.1 kg of pure water per 1 kg of hydrogen, which is in line with the minimum ratio required. In terms of minimising water use, the operator has stated that: • Closed loop water cooling and blast air cooling will be used to minimise water consumption for cooling. • Periodic corrosion assessments will be performed to mitigate leaks from the cooling water system. • Cleaning of electrolysers will be kept to the minimum recommended by the Original Equipment Manufacturers (OEM). The operator has identified that the feedwater requires treatment to achieve a concentration of dissolved salts equivalent to a conductivity of less than 1 microSiemens per centimetre. Re-use of the demineralisation process effluent has been considered but there are no viable options on-site and it would quickly degrade plant and pipework. The effluent will be discharged to sewer

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		via a trade effluent discharge consent. Drain water from the gas purification and drying system is being considered for use as feedwater, but this will depend on the amount and its specification, alongside design constraints. The electrolysers will be containerised units that include the water treatment, purification, drying and cooling systems with continuous monitoring of process parameters such as temperature.
3.5 Electricity supply	You should take account of power supply issues when you design and operate the hydrogen plant, to eliminate or mitigate any environmental impact.	The operator has stated that ring-fenced amounts of energy will be sourced from onshore wind and solar projects via a long-term Power Purchase Agreement and delivered via a firm grid feed. Since these sources have complementary seasonal behaviours, no significant seasonality in power supply is expected. The operator has chosen to use PEM electrolysers because they can operate efficiently with a variable energy supply.
3.6 Hydrogen purification	You should describe and justify your choice of purification techniques and the relevant aspects which will affect environmental criteria.	The operator will use a packaged purification and drying system to remove trace oxygen and reduce water content. Small quantities of wastewater will be produced which will be routed to the wastewater stream, and the operator does not expect this to contain any potential pollutants under normal operation. We have included a pre-operational condition in the permit

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Guidance reference	**Summary of requirements**	**Application evidence**
		(POC2) for the operator to confirm the catalyst and adsorbent that will be used within this system, which are not expected to carry over into the wastewater under normal operation.
4 Emissions to air	You should identify, eliminate, minimise or reduce any emissions to air that could cause pollution. You should carry out a risk assessment, including detailed air quality modelling where appropriate, to assess the impact of these emissions.	The operator has identified emissions to air under normal conditions of hydrogen, oxygen and nitrogen as follows: • Total plant commissioning volumes of 35,737 kg of hydrogen. • Process venting of hydrogen which cannot be recovered at approximately 1 kg/hr. • Venting of oxygen at approximately 2,200 kg/h. • Venting of nitrogen from routine purging at 135 kg/hr. The operator has also considered emissions under OTNOC as follows: • Emergency purging of hydrogen at 155 kg/min for a maximum of 15 minutes during an emergency event. • Start-up and shutdown events will have a minimal release of hydrogen. • Some oxides of nitrogen (NO_x) formation in the emergency scenario of the flare being used. • Venting of approximately 230 kg of hydrogen per year due to testing, inspection and maintenance of valves and vessels.

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Guidance reference	**Summary of requirements**	**Application evidence**
		Venting of hydrogen may also be required due to purging of equipment for safety reasons, testing of safety critical equipment and calibration of metering systems.
4.1 Emissions of hydrogen	You should design and operate your plant to achieve the following, which are listed in priority order. (Where technically and economically viable, and ensuring safety is not compromised.) 1. Prevent or avoid emissions of hydrogen. 2. Recover or recycle hydrogen. 3. Avoid or minimise continuous or intermittent flaring of hydrogen. 4. Avoid or minimise continuous or intermittent venting of hydrogen, whether for operational or safety reasons. You should consider using these techniques to achieve this: • Designing and operating your plant to maximise equipment availability and reliability. • Designing and operating your plant to	Continuous process venting of hydrogen is included in the application within continuous nitrogen purging of vents and safety valves. This will be confirmed in a later stage of the project and we have included a pre-operational condition in the permit (POC2) for the operator to confirm and justify any continuous venting of hydrogen that forms part of the final design. Plant will be designed to minimise the probability for accidental release of hydrogen. Start-up and shutdown events will be infrequent with a small release of hydrogen that is necessary as part of the nitrogen line purges required for these events. A flare will be used during emergency events to manage inventory loss. The use of the flare during commissioning was considered but it is designed for the quick combustion of a large and relatively pure hydrogen emission as opposed to the type of release expected during commissioning.

Assessment against 'Hydrogen production by electrolysis of water: emerging techniques' guidance (available at www.gov.uk)		
Guidance reference	**Summary of requirements**	**Application evidence**
	minimise the frequency of and amount of hydrogen purged, including during change of production rate, start-up and shutdown, abnormal operations and preparation for maintenance. • Use of buffer storage of out of specification hydrogen or hydrogen product during start-up and shutdown to minimise intermittent operation. • Recovery of hydrogen. • Treatment of hydrogen, for example, by recombination with oxygen or storage and purification of purged hydrogen. • Flaring rather than venting of hydrogen, where emissions cannot be eliminated and where practicable. • Designing flaring devices to ensure efficient combustion of hydrogen. • Venting hydrogen safely, where the above techniques are not practicable. You should explain your design and operational considerations behind your proposed techniques, including how you have	

Assessment against 'Hydrogen production by electrolysis of water: emerging techniques' guidance (available at www.gov.uk)		
Guidance reference	**Summary of requirements**	**Application evidence**
	considered overall environmental impact of their use.	
4.2 Other emissions from venting or purging	You should quantify and assess other venting and purging requirements, identifying any pollutants that are expected to be present.	The operator has identified other emissions to air of oxygen and nitrogen, but these are not considered to pose any environmental risk.
4.3 Other pollutants	You should identify, quantify and assess other pollutants.	The operator has considered the potential for NO_x emissions from the use of the flare. These are considered low risk given the emergency only use of the flare.
5 Emissions to water	You must identify and eliminate, minimise, recycle or treat any emissions to water that could cause pollution. You should carry out a risk assessment, including detailed modelling where appropriate, to assess the impact of these emissions.	Effluent from the raw water demineralisation process, containing the same dissolved species as the raw water input but at higher concentrations, will be discharged to sewer under a trade effluent discharge consent with Southern Water. The operator has carried out a surface water risk assessment based on the expected amount and composition of this effluent and identified chloride as a potential pollutant. We note however that the final discharge point of the effluent is into the tidal Thames at a point where the river is a marine environment. There is no environmental quality standard for chloride as a specific pollutant or priority hazardous pollutant in estuaries and coastal waters, so we therefore consider that chloride is not a potential pollutant in this case. We do however note that magnesium is identified in the

Assessment against 'Hydrogen production by electrolysis of water: emerging techniques' guidance (available at www.gov.uk)		
Guidance reference	**Summary of requirements**	**Application evidence**
		effluent, and magnesium has a marine water predicted no-effect concentration of 26.5 mg/l. The expected concentration in the effluent is only 3.24 mg/l, so we consider that the risk to the environment from magnesium in the effluent discharge is insignificant. We have included an improvement condition in the permit (IC1) for the operator to provide sampling data that validates the expected composition of the effluent discharge. The application states that process effluent produced by the hydrogen gas purification and drying processes will also form part of the discharge to sewer. This is expected to be a small amount of less than 100 litres per day that will not contain any potential pollutants.
5.1 Wastewater treatment	You should identify continuous and periodic effluent streams from the process and determine whether effluent treatment is required. You should decide how much water to treat and how to treat it before it is: • Re-used. • Discharged to surface water or sewage undertaker. • Disposed of. You should identify how much contaminant can be	No effluent treatment will be carried out on site. The process effluent will be discharged to sewer in line with a trade effluent discharge consent.

Assessment against 'Hydrogen production by electrolysis of water: emerging techniques' guidance (available at www.gov.uk)		
Guidance reference	**Summary of requirements**	**Application evidence**
	removed to comply with discharge requirements and design the treatment process accordingly. You should identify any unavoidable emissions to air or wastes that may result from the water treatment process. You should treat water for re-use, where practicable. You should refer to the appropriate BREF, BATC and guidance.	
6 Emissions to ground and groundwater	You must design your process to avoid emissions to ground and groundwater.	There are no emissions to ground or groundwater. The operator has considered the risk of a leakage of lubricant oil (used within the maintenance of rotating equipment). We agree with the operator's assessment of this risk as low, due to the storage of a small amount only (25 litres) within a pallet bund on the impermeable site surface. Spill kits will be available. Effluent from the water treatment goes to an underground pit from where it is pumped to the wastewater buffer tank. This is equipped with level monitoring and overflow protection, as well as being vented to atmosphere to mitigate against the risk of overpressure and loss of containment. Given the nature of the effluent and the measures in place to reduce the risk of overflow and loss of containment, we

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Guidance reference	**Summary of requirements**	**Application evidence**
		accept the operator's decision that secondary containment for the buffer tank is not required.
7 Waste	Before considering waste disposal, as far as practicable you must follow the waste hierarchy and: • Prevent. • Minimise. • Re-use. • Recycle. • Recover. • Treat. You should consider how to deal with liquid and solid wastes that may be generated and justify your choice following this waste hierarchy.	The operator has considered the limited wastes that will be produced on site (arising from, for example, maintenance and packaging) within the scope of the waste hierarchy.
8 Monitoring and reporting	Your permit application should include a monitoring plan for: • Routine operation. • Commissioning, where appropriate.	The operator has proposed monitoring of hydrogen emissions during both commissioning and routine operation.
8.1 Monitoring point source emissions to air	You should eliminate or minimise emissions of hydrogen due to their global warming potential. You should provide a monitoring plan for monitoring emissions to air, based on expected pollutants such as hydrogen.	The operator proposes to monitor hydrogen emissions from venting using calculations based on OEM data. We have included an improvement condition in the permit (IC2) for the operator to submit their methodology for quantifying and reporting emissions of hydrogen from venting. The operator states that they will develop fugitive emissions testing

Assessment against 'Hydrogen production by electrolysis of water: emerging techniques' guidance (available at www.gov.uk)		
Guidance reference	**Summary of requirements**	**Application evidence**
	You should do this using appropriate methods and measuring techniques. Your monitoring should consider, for example, any other sources of hydrogen emissions, such as venting and fugitive emissions, including vented oxygen.	plans in line with the requirements of the UK Low Carbon Hydrogen Standard. We have included an improvement condition in the permit (IC3) for the operator to provide details of the monitoring techniques proposed to detect and quantify fugitive emissions of hydrogen. We have also included reporting requirements in the permit for vented and fugitive emissions of hydrogen.
8.2 Monitoring emissions to water	You must monitor emissions to water based on expected impurities using appropriate methods and measuring techniques. You should use monitoring standards for discharges to water following the relevant BATC.	There are no emissions to water requiring monitoring. The process effluent will be discharged in line with a trade effluent discharge consent which we consider is sufficiently protective of environment in this case.
8.3 Monitoring emissions to ground and groundwater	You must provide a site condition report that assesses any relevant hazardous substances and includes baseline monitoring if necessary.	The operator has identified a relevant hazardous substance of lubricant oil, however due to the small quantity stored on site and the secondary containment measures in place, we agree that the risk of contamination to soil or groundwater is insignificant.
8.4 Monitoring standards	MCERTS sets the monitoring standards you should meet. You can use another certified monitoring standard, but you must provide evidence that it is equivalent to the MCERTS standards.	The application confirms that the rate of discharge to sewer will be monitored in line with MCERTS for flow monitoring.

Assessment against 'Hydrogen production by electrolysis of water: emerging techniques' guidance (available at www.gov.uk)		
Guidance reference	**Summary of requirements**	**Application evidence**
8.5 Monitoring process performance	You should identify the main requirements for monitoring process operations where these ultimately impact on environmental performance. You should monitor energy efficiency in the hydrogen production by measuring energy consumption per kg of hydrogen produced to calculate overall energy consumption. You should monitor overall water use by quality of water and purpose of use by carrying out a water balance across the installation.	The operator will monitor energy usage and efficiency and water usage and efficiency in line with reporting requirements that we have included in the permit.
9 Unplanned emissions and accidents	You should design your plant to: • Inherently avoid leaks by good design practice. • Ensure the plant is operated and maintained to appropriate industry standards. You should propose a risk-based leak detection and repair (LDAR) programme that is appropriate for the fluids and their composition. You should include how you will use the principles of LDAR to eliminate or	The operator will use networked and alarmed hydrogen detection for fugitive emissions and minimise potential leak sources at the design stage, as part of accident prevention measures. We have included an improvement condition in the permit (IC3) for the operator to submit a report describing their LDAR programme for fugitive hydrogen emissions. HAZOP workshops have been undertaken as part of the Front End Engineering Design. The balance of plant design includes bursting discs installed upstream of the pressure safety valves and before the pressure relief valves, to prevent seepage to the throat/nozzle of the safety

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Guidance reference	**Summary of requirements**	**Application evidence**
	reduce fugitive emissions of hydrogen due to its global warming potential. Your hazard assessment and mitigation for the plant must consider the risks of accidental releases to the environment.	valves. The electrolyser package system does not however identify a requirement for these bursting discs, so the operator is reviewing the need for these to be part of the final design. We have included a pre-operational condition in the permit (POC2) for the operator to confirm and justify whether bursting discs form part of the final design.
10 Noise	You should consider sources that have potential for noise and vibration.	The operator has considered noise sources within an acoustic impact assessment. There will be no compressors as part of the hydrogen production facility. Given the location of the facility in terms of factors such as the distance to receptors and other noise sources, we consider that the risk of noise impact is low and a noise impact assessment in line with 'BS 4142: Methods for rating and assessing industrial and commercial sound' is not required.

Decision considerations

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.

Consultation

The consultation requirements were identified in accordance with the Environmental Permitting (England and Wales) Regulations (2016) and our public participation statement.

The application was publicised on the GOV.UK website.

We consulted the following organisations:

- Environmental Protection Department, Gravesham Borough Council
- Health and Safety Executive
- Southern Water

The comments and our responses are summarised in the consultation responses section.

Operator

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 legal operator for environmental permits.

The regulated facility

We considered the extent and nature of the facility at the site in accordance with RGN2 ‘Understanding the meaning of regulated facility’, Appendix 2 of RGN2 ‘Defining the scope of the installation’ and Appendix 1 of RGN 2 ‘Interpretation of Schedule 1’.

The extent of the facility is defined in the site plan and in the permit. The activities are defined in table S1.1 of the permit.

This permit applies to only one part of the installation – the hydrogen production activity and its directly associated activities. The name and permit number of the operator of other parts of the installation are detailed in the permit's introductory note.

The site

The operator has provided a plan which we consider to be satisfactory.

This shows the extent of the site of the facility.

The plan shows the location of the part of the installation to which this permit applies on that site.

The plan is included in the permit.

The plan shows an area that overlaps with the boundary of the permitted area of the other operator of this multi-operator installation. At surrender of either operator's permit, responsibility for this area of land will be attributed to both permit holders, unless evidence is provided to support otherwise. Furthermore, the application includes confirmation that liability for remediation due to any future pollution incidents on this shared land will be agreed and documented by both operators.

Site condition report

The operator has provided a description of the condition of the site, which we consider is satisfactory. The decision was taken in accordance with our guidance on site condition reports.

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 have assessed the application and its potential to affect sites of nature conservation, landscape, heritage and protected species and habitat designations identified in the nature conservation screening report as part of the permitting process.

We consider that the application will not affect any site of nature conservation, landscape and heritage, and/or protected species or habitats identified.

The Thames Estuary & Marshes SPA/Ramsar and the Swanscombe Peninsula SSSI are within the relevant screening distances, however the only source that could impact these are oxides of nitrogen produced when flaring hydrogen. Given that flaring will take place for a short amount of time in emergency events only and not as part of normal operating conditions, we consider that any impact on these habitats would be insignificant.

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. Whilst the operator has not considered magnesium in the effluent discharge as a potential pollutant, the expected concentration is well below the predicted no-effect concentration. Refer to the ‘Key issues of the decision’ section above for further information.

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.

Our key reference has been our ‘Hydrogen production by electrolysis of water: emerging techniques’ guidance (available on www.gov.uk).

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

Operating techniques for emissions that screen out as insignificant

Emissions of magnesium to water have been screened out as insignificant, and so we agree that the applicant’s proposed techniques are Best Available Techniques (BAT) for the installation.

We consider that the emission limits included in the installation permit reflect the BAT for the sector.

Pre-operational conditions

Based on the information in the application, we consider that we need to include pre-operational conditions.

We have included:

- POC1 for the operator to provide a summary of their environmental management system prior to commissioning, since this will continue to be developed as the project design progresses.
- POC2 for the operator to confirm final design elements relating to continuous hydrogen venting, the inclusion of bursting discs and the purification system catalyst and adsorbent.

Improvement programme

Based on the information on the application, we consider that we need to include an improvement programme.

We have included an improvement programme to ensure that:

- The effluent composition once operational is within the risk envelope of that assessed in the application (IC1).
- Emissions of hydrogen from venting will be measured (IC2).
- Fugitive emissions of hydrogen will be measured and a leak detection and repair plan implemented (IC3).

Emission Limits

We have decided that emission limits for the substances expected in emissions to air and discharges to water are not required in the permit. Under normal operating conditions, there are no emissions to air of pollutants with environmental standards or discharges to water of pollutants that are expected to exceed an environmental standard or predicted no effect concentration.

We have included a limit on the volume of the discharge to sewer (emission point S1). This is based on the maximum rate of discharge used in the application's risk assessment and has been included to ensure protection of the receiving water body of the effluent discharge.

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.

This is in relation to the discharge to sewer (emission point S1) and the parameters are:

- Flow rate

These monitoring requirements have been included to ensure protection of the receiving water body of the effluent discharge.

We made these decisions in accordance with our ‘Surface water pollution risk assessment for your environmental permit’ guidance (available at www.gov.uk).

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.

Reporting

We have specified reporting in the permit.

Reporting requirements have been set for parameters for which monitoring requirements have been set, in relation to the discharge to sewer (emission point S1).

We made these decisions in accordance with our ‘Surface water pollution risk assessment for your environmental permit’ guidance (available at www.gov.uk).

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.

See the ‘Pre-operational conditions’ section above for further information.

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

Financial competence

There is no known reason to consider that the operator will not be financially able to comply with the permit conditions.

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.

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.

Consultation Responses

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

Responses from organisations listed in the consultation section:

Response received from:

Environmental Protection Department, Gravesham Borough Council.

Brief summary of issues raised:

The consultee concluded that there should be no risk to local air quality since the production of hydrogen should not involve its combustion and hence had no objections to the application based on potential emissions to air from the site. They recommended consultation with the Health and Safety Executive, due to potential risk of explosion.

Summary of actions taken:

No action required, since the Health and Safety Executive was included as a consultee. We consider hydrogen fires and explosions at electrolysis plants process safety hazards that, due to the nature of the process and inventory of substances, are unlikely to cause significant pollution in the case of an accident. We consider the safety risks to workers and members of the public, associated with hydrogen fires and explosions, fall beyond our regulatory remit under the Environmental Permitting Regulations. We have consulted the Health and Safety Executive on this application, but we have not received any response from them.