

## Permitting Decisions- Bespoke Permit

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We have decided to grant the permit for The Sky Mining Company operated by The Sky Mining Company Limited.

The permit number is EPR/QP3001BP.

The application is to permit Schedule 1 activities of hydrogen and methane production associated with the production of synthetic diamonds (see key issues section for further details).

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

#### Site processes

At the installation, synthetic diamonds are produced on a seed crystal using microwave plasma Chemical Vapour Deposition (CVD) diamond synthesis technology. The CVD process uses high purity speciality gases; most of which are manufactured on site (including methane and hydrogen) with some exceptions such as argon and helium which will be purchased from manufacturers and delivered to site. The process gases are introduced into a reaction chamber in a pre-determined mix and converted into a gas plasma.

Carbon is deposited atomic layer by atomic layer onto a seed crystal. Helium gas will be used as an inert substance that can be used for flushing and leak testing.

The plant has three main emissions in normal operation: hydrogen, oxygen and wastewater. Wastewater is created by the water purification system.

There are eight emission points to air, A1 – A6 from the CVD exhausts. Each CVD machine has an individual exhaust system which predominantly releases hydrogen to air via a stainless-steel pipe. The main components in the exhaust are hydrogen and methane. There is the potential for reactions to take place in the gas to create a range of carbon-based species which can include the formation of benzene. Emission point A7 from the hydrogen electrolyser can vent hydrogen and oxygen and emission point A8 venting from the methanogenesis plant which mainly vents methane with small quantities of hydrogen, carbon dioxide, hydrogen sulphide, ammonia and water.

In the future the operator may apply for a discharge consent for emissions from the water treatment plant to go to sewer. At permit issue no effluent related to the process goes to sewer. Due to the low risk nature of the discharge, the emission point to sewer has been included in the permit.

Water and residual bulk chemicals and trace elements produced by the methanogenesis process are discharged to an intermediate bulk container (IBC) and will be removed by a registered waste carrier.

The site is largely laid to concrete, tarmac or paving. All activities occur within the building on-site. Secondary refrigerant antifreeze is stored on site in 25 litre containers on a bund.

## **Activities**

The Schedule 1 activities undertaken at the installation are as follows:

- Section 4.1 A(1)(a)(i) – Producing organic chemicals such as – hydrocarbons (methane)
- Section 4.2 Part A(1)(a)(i) – producing inorganic chemicals such as – gases (hydrogen)

The operator initially demonstrated that the hydrogen production activities meet the low impact installation criteria in isolation (Hydrogen generators low impact assessment, received 03/03/2021).

The original permit application did not identify methane production as a listed activity. Although the production of methane was identified at duly making, it was determined that it did not meet the low impact installation criteria during determination and is therefore a bespoke listed activity. We have therefore listed both activities as making up one bespoke installation.

## **Environmental impacts**

The key factors considered for this permit application include emissions to air, odour impacts and noise impacts.

### **Air Quality Assessment**

Key pollutants which will be emitted to air from the installation activities include a range of carbon-based species from the CVD exhausts which have the potential to form benzene and small quantities of hydrogen sulphide and ammonia from the methanogenesis plant.

The Application states that the levels of oxygen present in the CVD systems means that it is very unlikely that SO<sub>2</sub> or NO<sub>x</sub> would be generated and therefore these have not been considered in the air quality impact assessment.

The applicant submitted an H1 assessment through which emissions to air of benzene were screened out as insignificant as the process contribution (PC) is less than 1% of the air quality limit.

We agree with the overall conclusions that there will not be a significant impact on local air quality. Figures from the Operator's assessment are used in the assessment summary below.

Small quantities of hydrogen sulphide and ammonia can be released from the methanogenesis plant but these are <0.001% of the total emissions from a process operated 24 hours per week and we agree with the operator that produced emissions levels are likely to be insignificant. There are passive absorbent carbon filters which are disposed of off-site as waste when replaced. We have set an improvement condition for the operator to carry out a monitoring exercise to validate that the emissions of H<sub>2</sub>S associated with the process are insignificant prior to use of the carbon filters based on monitoring data and H<sub>2</sub>S removal rates.

### **Human health assessment**

For human health risk:

- Annual emissions of benzene screen out as insignificant (PC <1% of ambient air directive limits).

Having assessed the application we conclude that there will be no significant harm to human health from the operations.

There is no air quality standard for assessment of potential impacts on habitats and therefore this has not been considered further.

## **Odour**

The operator submitted a review of odour risk on the site. The potential for odour to arise as a result of the installation activities is limited. All storage and use of raw materials are well controlled and does not produce perceivable external odours. Should odour become an issue in the future, permit condition 3.3.2 enables the Environment Agency to request an odour management plan to identify and minimise the risk of pollution from odour.

## **Noise**

The operator submitted a review of noise and vibration risk on the site. The potential for noise to arise as a result of the installation activities is limited due to the limited scale and indoor location of the majority of the equipment. An acoustic barrier was installed onsite to further reduce the potential for impact.

A noise impact assessment was submitted and demonstrated that the predicted rated noise levels for the proposed plant units, following mitigation, were below or similar to typical day or night-time background noise levels in the area. The report concludes that the predicted levels correspond to a low impact as set out in the BS4142 standard.

Should noise and vibration become an issue in the future, permit condition 3.4.2 enables the Environment Agency to request a noise and vibration management plan to identify and minimise the risk of pollution from noise and vibration.

## **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.

We consulted the following organisations:

UK Health Security Agency

Director of Public Health

Environmental Health

Health and Safety Executive

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', 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.

## **The site**

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

These show the extent of the site of the facility.

## **Site condition Report**

The Operator has not submitted a Site Condition Report and is therefore required to accept 'zero contamination' beneath the site. This means that when the Operator applies to surrender the Permit, any contamination by substances used at, produced or released from the facility would be considered to have resulted from the operation of the installation and are the liability of the Operator. [This is in accordance with the Environment Agency Guidance H5 – Site Condition Report].

The site is not located within or near a Groundwater Source Protection Zone. A surface water feature is located approximately adjacent to the site, but the relevant hazardous substances are always used within buildings in small quantities and banded when stored.

No historical site investigations have been undertaken as no evidence of the likelihood of contamination has been identified and it is not proposed to take any soil and groundwater reference data.

The relevant hazardous substances are always used within buildings in small quantities and banded when stored.

## **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.

See key issues section for further information.

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 assessment shows that, applying the conservative criteria in our guidance on environmental risk assessment or similar methodology supplied by the operator and reviewed by ourselves, all emissions may be screened out as environmentally insignificant.

## **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.

## **Operating techniques for emissions that screen out as insignificant**

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

The applicant should keep the plans under constant review and revise them annually or if necessary sooner if there have been complaints arising from operations on site or if circumstances change. This is in accordance with our guidance 'Control and monitor emissions for your environmental permit'.

## **Improvement programme**

We have decided to set an improvement condition requiring the operator to submit additional information associated with the production of methane on the site to demonstrate the Low Impact Installation Criteria are met. The original application covered only the hydrogen production as an activity falling under the Environmental Permitting Regulations.

## **Emission Limits**

We do not consider we need to set any emission limit values (ELVs) or monitoring for this permit.

## **Reporting**

We have specified reporting in the permit for the following parameters:

- Energy usage

## **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.

## **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

## Responses from organisations listed in the consultation section:

Response received from Director of Public Health

Brief summary of issues raised:

The potential for noise from the installation should be taken into account.

Summary of actions taken:

See the 'noise' section of the key issues for further information on our assessment of the noise impact assessment.

Response received from UK Health Security Agency

Brief summary of issues raised:

No significant concerns regarding the risk to the health of the local population from the installation.

Response received from Environmental Health, Stroud District Council

Brief summary of issues raised:

The potential for noise from the installation should be taken into account. Confirmation that there are noise restrictions related to the planning permission for the site.

Summary of actions taken:

See the 'noise' section of the key issues for further information on our assessment of the noise impact assessment.