Environment Agency permitting decisions

Variation

The Permit Number is: EPR/BB3300XG

The Applicant / Operator is: Horse Hill Developments Limited

The Site is located at: Horse Hill 1 Well Site, Hookwood, Horley, Surrey, RH6 0HN

We have decided to issue the variation for Horse Hill operated by Horse Hill Developments Limited

The variation number is EPR/BB3300XG/V003

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 document explains how we have considered the Applicant's Application, and why we have included the specific conditions in the variation we are issuing to the Applicant. It is our record of our decision-making process, to show how we have taken into account all relevant factors in reaching our position. Unless the document explains otherwise, we have accepted the Applicant's proposals.

Preliminary information

We gave the Application the reference number EPR/BB3300XG/V003. We refer to the Application as "the **Application**" in this document in order to be consistent.

The number we have given to the permit is EPR/BB3300XG. We refer to the permit as "the **Permit**" in this document.

The Application was duly made on 19/05/2015.

The site for the proposed mining waste operation is located at: Horse Hill 1 Well Site, Hookwood, Horley, Surrey, RH6 0HN.

Use of terms

The Applicant is Horse Hill Developments Limited. We refer to Horse Hill Developments Limited as "the **Applicant**" in this document. Where we are talking about what would happen after the Permit is granted, we call Horse Hill Developments Limited "the **Operator**".

Prospecting

Is defined by Article 3(21) of Directive 2006/21/EC (Mining Waste Directive) as 'the search for mineral deposits of economic value, including sampling, bulk sampling, drilling and trenching, but excluding any works required for the development of such deposits, and any activities directly associated with an existing extractive operation'.

Extractive waste

Extractive waste is waste directly resulting from the prospecting, extraction, treatment and storage of mineral resources and the working of quarries.

Cement

Cement is pumped to seal off the formations when installing casing. During the drilling process, steel casing is installed within the wellbore in stages, then cemented in place.

Regulated facility

This is the term used in the Environmental Permitting (England and Wales) Regulations. Those regulations provide that any regulated facility must be operated only under and in accordance with an environmental permit. The regulations define this term as to include a "mining operation". A "mining operation" is further defined so as to include the management of extractive waste whether or not it involves a waste facility. The term "regulated facility" is therefore a broader concept than "waste facility" which is defined in the Mining Waste Directive.

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.

Structure of this document

- **Key issues**
  1. Brief outline of process
  2. Summary of our proposed decision
  3. How we took our decision
  4. The legal framework
  5. Description of the facility
  6. General issues
  7. Environmental issues: and their control
  8. Other legal requirements

- **Annex 1 the consultation and web publicising responses**

Key issues of the decision

1. Brief outline of process

The original permit was for the management of extractive mining waste resulting from the drilling of an exploratory borehole at the Horse Hill 1 well site. Processes followed for the borehole drilling phase have been outlined in the original decision document that explained how the original permit was issued.

Following the drilling process, the Operator now wishes to carry out well tests which are aimed at assessing the potential of the borehole to produce oil.

The Operator wishes to assess the potential of flow of oil from the Portland Sandstone and Upper Kimmeridge Limestone and Lower Kimmeridge Limestone reservoirs. To begin well testing operations on site the Operator will be required to remove the suspension cap and to mill out the suspension plugs in the existing wellbore and clean out the casing. This will then allow the Operator to carry out the first perforation within the Lower Kimmeridge Limestone interval. After perforation the Operator will observe for any indication of flow. If there is weak or no flow the Operator will carry out an acid wash to clean out the wellbore to encourage flow. The acid wash will remove materials after perforation of the wellbore which may be inhibiting flow. The Operator proposes to use diesel in the wellbore, which will be drawn back up the wellbore in order to promote the flow of crude oil from the rock formation. If there is a weak flow or no flow the Operator will then carry out swabbing. Swabbing is a technique used to reduce the pressure in the well bore to encourage fluids in the reservoir to flow up the wellbore for extraction at the surface. It uses a swabbing rig to create an artificial lift force to extract the fluids present in the wellbore.

The processes described above will initially lead to the following fluids being extracted from the wellbore: unspent hydrochloric acid, brine, diesel and any produced water (drawn into wellbore along with any crude oil from the target formations). This mixture of unspent acid, diesel and produced water will flow through the separator and any crude oil present will be separated off to the oil storage tanks. As the flow of crude oil proceeds, the mixture will change to a mix of produced water (if present) and crude oil which will go through the separator. Any crude oil collected in the oil tanks will be sent to a refinery for processing and will not be waste. Produced water and other well test fluids (spent and unspent acid, brine and diesel) will be collected in the water tanks and sent off site for treatment/disposal at an appropriately permitted facility.

The Operator will carry out the second perforation on the Upper Kimmeridge Limestone interval. After perforation the Operator will observe for any indication of flow. If there is weak or no flow the Operator will carry out an acid wash to clean out the wellbore to encourage flow. If there is still weak or no flow the Operator will then carry out swabbing.

The Operator will carry out the final perforation on the Portland Sandstone interval. After perforation the Operator will observe for any indication of flow. If there is weak or no flow the Operator will carry out an acid wash to clean out the wellbore to encourage flow. If there is still weak or no flow the Operator will then carry out swabbing.

After the flow testing is completed the Operator will suspend the well for potential use in either appraisal or development of the site.

Section 2.2.2 Detailed description in the Waste Management Plan (Document Ref: HSE-HH1-PD-04 Rev A6); provides greater detail to the sequence of operations on site.

This Application involves a variation to the permit for the management of the non-hazardous and hazardous extractive waste, should it arise, which may result from the prospecting for oil.

If, following this stage, the Applicant decides it wishes to proceed either to further testing using methods not approved in this permit a variation of the permit will be required.

Any such application would be determined on its merits and be subject to our normal consultation process. Any application to vary the permit will require an amended waste management plan to be submitted and considered by us.

Unless otherwise agreed in writing by the Environment Agency, the Permit requires the Operator to comply with the techniques used in the waste management plan and limits the activities to those stated. We will only authorise minor amendments to the waste management plan without the need to vary the Permit.

The discarded cuttings (milling of the installed well plugs from when the well was suspended) and any cement returns are considered to be extractive waste and as such will fall under the Mining Waste Directive. Although not anticipated, there is a possibility the Operator will have to deal with natural gas which is highly unlikely (please see section 7.6 for further detail), which will be hazardous waste; and also produced water (saline groundwater in the target formation) from groundwater bearing strata/rocks. The Applicant has considered these scenarios and has provided monitoring and mitigation measures within the Waste Management Plan

and Environmental Risk Assessment. We are satisfied that the suggested measures are appropriate.

The activity of managing these extractive wastes under the permit variation is classified as the management of extractive waste. Mining waste operations, with or without a mining waste facility are regulated by the Environment Agency by means of a permit subject to the Environmental Permitting (England and Wales) Regulations 2010 (the 2010 Regulations). The Applicant has applied for a permit variation involving the management of waste that does not include a waste facility. We have carefully considered the proposed activity and have concluded that there will be no waste facility as defined in the Mining Waste Directive.

As the activity on site is to flow test for oil from the well, it meets the threshold requirement to classify the operation as a NORM Industrial Activity (NIA). A radioactive substances permit will therefore be required and will be applied for as a separate environmental permit application.

2. Summary of our proposed decision

We have decided to issue the variation to the Applicant. This will allow the Applicant to operate the mining waste operation for the management of extractive waste arising from prospecting for mineral resources limited to mineral resources.

We consider that, in reaching this decision, we have taken into account all relevant considerations and legal requirements and that the Permit will ensure that a high level of protection is provided for the environment and human health.

The variation notice authorises the operation of a mining waste operation at Horse Hill 1, namely the management of extractive waste from prospecting for mineral resources. The prospecting activities are targeting rock layers that lie below ground, to a maximum of approximately 2600 metres depth. The Operator has applied to vary the permit and wishes to carry out flow testing of the Portland Sandstone Upper Kimmeridge Limestone and Lower Kimmerdige Limestone reservoirs. This variation approves the revisions that have been made to the original waste management plan so as to allow the operator to carry out flow testing.

There will be no flaring on-site. No free gas is expected in the reservoir. If free gas is discovered operations will stop immediately and the well will be suspended to ensure no gas is released. If oil flows from the well any subsequent gas that arises off this oil will be vented. A risk assessment has been submitted which considers this emission point and it was determined that no additional abatement or limits are required for this emission point.

The variation notice contains conditions taken from our bespoke Environmental Permit template including the relevant Annexes. We developed these conditions in consultation with industry, having regard to the legal requirements of the 2010 Regulations, Mining Waste Directive and other relevant legislation and guidance. 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 condition appropriate.

We try to explain our decisions as accurately, comprehensively and as plainly as possible.

3. How we took our decision

The Application was duly made on 19/05/2015. This means we considered it was in the correct form and contained sufficient information for us to begin our determination but not that it necessarily contained all the information we would need to complete that determination: see the Key Issues section.

We carried out consultation on the Application taking into account the 2010 Regulations and our statutory Public Participation Statement.
We advertised the Application by a notice placed on our website, which contained all the information required by the 2010 Regulations, including telling people where and when they could see a copy of the Application.

We placed a paper copy of the Application and all other documents relevant to our determination on our Public Register at The Environment Agency Orchard House, Endeavour Park, London Road, Addington, West Malling, ME19 5SH. We also sent a copy to Surrey County Council for its own Public Register. Anyone wishing to see these documents could do so and arrange for copies to be made. The Applicant also made all the Application documents available on their website.

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

- Local Planning Authority
- Mineral Planning Authority
- Health and Safety Executive
- Public Health England
- Environmental Health
- Director of Public Health

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

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.

Although we were able to consider the Application duly made, additional information in support of the Application was also received as follows:

Following the submission of the permit application we requested further information on the documents submitted.

- A Schedule 5 Notice was issued on 12th June 2015 requesting for further detail and clarification for activities on site. We received an updated Waste Management Plan. (Doc Ref: HSE-HH1-PD-04 Rev A3)
- A Schedule 5 Notice was issued on 31st July 2015 requesting for further detail and clarification for activities on site. We received an updated Waste Management Plan. (Doc Ref: HSE-HH1-PD-04 Rev A4), H1 Risk Assessment – Air Releases and HSES HAZID Report (Doc Ref: HSE-HH1-PD-06 Rev A2)
- Questions on Process diagrams in the Waste Management Plan. We received an updated Waste Management Plan (Doc Ref: HSE-HH1-PD-04 Rev A5)
- A Schedule 5 Notice was issued on 4th November 2015 requesting for updated Rig Layout Diagram. We received an updated Waste Management Plan. (Doc Ref: HSE-HH1-PD-04 Rev A6)

We provided the public with an opportunity to comment on the Application and describe in Annex 1 how we have addressed issues raised as a result of that process.

4. The legal framework

The permit variation is granted under regulation 20 of the Environmental Permitting (England & Wales) Regulations 2010, which regulates facilities whose activities involve water discharges and groundwater activities, radioactive substances, waste, mining waste or which are listed in schedule 1 to the 2010 Regulations. The Environmental Permitting regime is the regulatory framework which requires the Environment Agency to deliver the obligations required by national policy and various EC Directives.

The regulated facility in question falls within the scope of the Mining Waste Directive, because it involves the management of extractive waste.

We consider that the permit will ensure that the operation complies with all relevant legal requirements and that a high level of protection will be delivered for the environment and human health.

We explain how we have addressed specific statutory requirements more fully in the rest of this document.

5. Description of the operation

Description of the site and related issues

5.1 Location

The site is called the Horse Hill 1 Well Site and is located on land to the south-west of Horse Hill, near Hookwood, Surrey.

The current use of the site is agricultural. The following receptors are located nearby:

- The nearest residential property is located approximately 300 metres east of the site, with the access road being approximately 50 metres at the junction with the main road.
- The nearest main watercourse, a tributary of Spencer's Gill is situated over 400 metres to the south of the site.
- The nearest protected species is approximately 1.4 km north east of the site;
- The nearest local wildlife site (Wrays Wood SNCI is 415 metres to the north of the site.
- The site sits in between two woodland areas, one 40 metres to the west and one to the east which the access road travels along the boundary, both have a level of protection.
- There are no designated European sites within 5 km of the site.
- The site is not within a Groundwater Source Protection Zone;
- There are no Sites of Special Scientific Interest (SSSI) within 1 km of the site. The nearest SSSI is approximately 3 km distant.

The Applicant submitted a plan showing the extent of the site. We are satisfied with this plan. The plan is included in the permit.

5.2 What the regulated facility does

The variation notice will authorise the operation of a regulated facility, namely a mining waste operation for the management of extractive waste not including a waste facility.

See section 5.3 Waste Management Activities for further details of the types of waste to be managed.

5.3 Waste management activities

The wastes that will need to be managed on site are:

1. Well Test Fluids; EWC: 01 05 05* (Hazardous)

Fluids from the wellbore will pass through the well test separator where diesel and oil from the target formation will be transferred to the oil tanks situated on site. Conversely, acid, brine, trace amounts of hydrocarbons (i.e. diesel and oil) not separated by the well test separator and potentially produced water (i.e. saline groundwater in the target formation) will be stored in the water tank situated on site.

When operations have been completed the well test fluids from water tanks will be removed by vacuum loading road tanker to an appropriately permitted waste treatment facility.

The waste fluids from the water tanks will be deemed hazardous as when they are removed off site since, as stated previously, they will contain trace amounts hydrocarbons (i.e. diesel and oil) which is classed as a hazardous waste.

Hydrocarbons from the oil tanks (i.e. diesel and oil) will be removed by transportation by road tanker to a processing facility. This is not deemed as waste.

The hazardous waste will not be stored for a prolonged period on site. The site does not therefore constitute a hazardous waste facility. The waste will be subject to immediate collection and transportation off site and therefore does not meet the criteria for a hazardous waste facility in accordance with Article 3(15) of the Mining Waste Directive.

To minimise waste the volumes of acid are calculated in advance of the well test operation and the well test process is monitored by the well test engineer, enabling monitoring of volumes of fluids pumped and returned.

The quantity of waste arising each day will be monitored and recorded, along with the quantities dispatched off-site for appropriate disposal. This data will be used to

inform waste prevention and reduction strategies. Fluids are sampled at the first available opportunity when the well test commences, for chemical analysis and any other additional waste acceptance criteria that is requested by the off-site permitted waste treatment facility.

2. Cuttings; EWC: 17 01 01 (Non Hazardous)

These wastes are generated from the cuttings from plug removal which will only be cement. Cuttings only arise from the milling of the installed well plugs from when the well was suspended.

Cuttings are sampled at the first available opportunity when the well test commences, for chemical analysis and any other additional waste acceptance criteria that is requested by the off-site permitted waste treatment facility.

The waste will be placed in skips of $4m^3$ capacity for collection and removal.

3. Cement EWC: 17 01 01 (Non Hazardous)

Pumped volumes are controlled to minimise returns at surface. Returning cement cannot be reused on site. The solidified cement will be sent for recycling to an offsite permitted waste treatment facility. The waste will be placed in skips of $4m^3$ capacity for collection and removal.

The quantity of waste arising each day will be monitored and recorded, along with the quantities dispatched off-site to a permitted waste treatment facility.

4. Waste Gas

During the drilling of the well, there was no sign of gas and therefore fugitive emissions are not expected during well testing. The Operator, will however, put in safety systems and continuous monitoring instrumentation during the well testing activity.

Should free gas be detected in the reservoir the Operator will shut the well in and suspend operations.

The potential gas fraction from oil that may be extracted during operations has been considered and calculated. A three phase crude oil separator will be in place, separating the oil, gas and water fractions of the crude oil. From this a vent with a 9.1m high stack will be installed to provide natural venting for air emissions.

Further detail can be found in Section 7.7 Fugitive Emissions.

Detail of the management of these wastes can be found in Sections 3.1, 3.2, 3.3 and 3.4 f the Waste Management Plan (Doc Ref: HSE-HH1-PD-04 Rev A6)

The original permit was restricted to the management of extractive waste arising from drilling an exploratory borehole. The Permit is being varied to include management of wastes arising from well testing. The waste management plan has been amended accordingly to include plans for incorporating this activity.

6. General Issues

6.1 Administrative issues

We are satisfied that the Applicant is the person who will have control over the operation of the facility after we grant the permit in line with our Regulatory Guidance Note RGN 1: *Understanding the meaning of Operator (version 4.0)*; and that the Applicant will be able to operate the regulated facility in compliance with the conditions included in the permit.

6.2 Management

Having considered the information submitted in the application, we are satisfied that appropriate management systems and management structures will be in place.

6.3 Financial competence and relevant convictions

We are satisfied that sufficient financial resources are available to the Operator to ensure compliance with the permit conditions.

The Operator does not have any relevant convictions.

6.4 External Emergency Plan

As the activity does not involve a waste facility, there is no requirement for an External Emergency Plan.

6.5 Site security

This is required as part of the written management system of the permit in condition 1.1.1 (a). and will be assessed as part of enforcement inspections.

6.6 Accident management

Having considered the information submitted in the application, we are satisfied that appropriate measures will be in place to ensure that environmental accidents that may cause pollution are prevented but that, if they should occur, their consequences are minimised. This is part of the written management system of the permit, required by condition 1.1.1 (a).

6.7 Surrender of the permit

When the Operator wants to surrender their permit, they have to satisfy us that the necessary measures have been taken to:

- Avoid any on-going pollution risk resulting from the operation of the facility; and

- To return the site to a satisfactory state, having regard to the state of the site before the activity was put into operation.

We will not grant an application for surrender unless and until we are satisfied that these requirements have been complied with.

The Operator's waste management plan contains information on the steps that they will take to remediate the site.

6.8 The site and its protection

6.8.1 Site setting, layout and history

The site is located at land to the south-west of Horse Hill, Hookwood, Horley, Surrey, RH6 0HN, NGR TQ 25258 43591.

6.8.2 Planning permission

Our decision on whether to grant a variation notice is separate from the planning application process. An Environmental Permit allows the site to operate and to be regulated by the Environment Agency exercising its pollution control functions. The Planning Authority, in this case the Surrey County Council, decides whether or not to grant planning permission.

The planning authority determines whether the activity is an acceptable use of the land. It considers matters such as visual impact, traffic and access issues, which do not form part of our Environmental Permit decision making process. The planning authority must also consider and respond to any objections they may receive on a particular planning application.

The regulated facility does not involve a mining waste facility.

6.8.3 Site condition report

The Operator submitted a site condition report detailing the condition of the site as part of their application. We use the information on a site condition report to establish a baseline for the condition of the site prior to the permitted activity starting. This baseline will be used as a comparison, to establish whether there has been any

deterioration of the land as a result of the permitted activities, when the Operator applies to surrender their permit.

The Operator must keep accurate records throughout the lifetime of their permit to clearly demonstrate that their activity has not adversely affected the site. This record will be used, in conjunction with the baseline data described above, to support any surrender application.

6.8.4 Pollution prevention measures

We have considered the location of the site, actual and potential emissions, the sensitivity of receptors and the nature of the activity to decide what appropriate pollution prevention measures need to be in place.

As part of our assessment of the application we have carefully considered the risk assessment provided by the Applicant. We consider that the risk assessment covers all the potential risks and sets out appropriate measures by way of mitigation.

Surface water management

The site is underlain by an impermeable HDPE geomembrane layer which feeds into an interceptor ditch and protects groundwater from any site leakages or spills. The interceptor ditch encircles the well site, which collects all surface drainage from the lined well site footprint, all collected water will be tankered off site for disposal at an appropriately permitted waste treatment facility.

Rainfall onto the well site, as well as any potential contaminants such as fuel and oils used in operating the site preparation and drilling machinery, will be directed into the interceptor ditch. During drilling or flow testing operations water in the perimeter ditches will be used to make up the drilling fluid. Any potential oil contamination from the drilling equipment or site traffic will be retained in a Class 1 separator and tankered off site for disposal at an appropriately permitted waste management facility.

The Operator also has a water discharge activity permit at this site (EPR/BB3691NN). This permit relates to the discharge of site drainage (rainfall related runoff) from the site when the rig and all associated drilling related equipment are not on site. During periods when there is no rig or drilling related equipment on the site the site drainage will pass through a Class 1 SPEL Oil bypass separator before being discharged to a tributary of Spencer's Gill via a submerged pipe. During periods when the rig or associated drilling related equipment (including the duration of the flow testing period) are on site no discharge shall take place..

Storage arrangements

The temporary storage of extractive waste is limited to such storage pending collection as part of the process of transporting the waste off site for recovery or

disposal. It will take place on the impermeable HDPE geomembrane layer, which will also provide secondary containment for drilling cuttings from milling out the suspension plugs. These cuttings will be collected in a skip with a capacity of 4m^3;

Fluids from the wellbore will pass through the 3-phase separator where oil and diesel will be stored in the oil tanks and the well test fluids which include acid and brine will be stored in the water tank. These waste fluids will then be removed by vacuum loading road tanker to an approriately permitted waste treatment facility.

The returning cement will be collected in a skip with a capacity of 4m^3.

Air quality management

Fugitive emissions of methane could potentially arise from the wellbore. The Operator has provided a specific risk assessment for this scenario which includes monitoring and proposes abatement and emergency control measures. We are satisfied that these measures to minimise the risk of fugitive emissions, together with condition 3.1, provide acceptable controls.

The potential gas fraction from oil that may be extracted during operations has been considered and calculated. A three phase crude oil separator will be in place, separating the oil, gas and water fractions of the crude oil. From this a vent with a 9.1m high stack will be installed to provide natural venting for air emission from the crude oil and water tanks.

Please see Section 7.7 Fugitive Emissions for more detail.

Odour management

Odour is not considered to be a particular concern for this site considering its location, which is 300 metres from the nearest sensitive receptor. The activity is expected to be of short duration.

The Operator will have an ambient Hydrogen Sulphide (H_2S) detector on site which will be in operation throughout the well testing activity with an audible alarm. If H_2S is detected the site will carry out shut down operations as stated in Section 6.10.3 of the Health, Safety, Environmental & Security (HSE) Management Plan (Doc No: HSE-HH1-OP-04).

Furthermore should H_2S be present in air emissions from the oil gas fraction this will be detected via monitoring from the storage tank vent A1. A monthly reporting frequency was determined suitable for this parameter, taking into consideration the additional ambient H_2S monitoring and short time scales for operations on site.

A risk assessment was submitted on within the Waste Management Plan that provides consideration of odour. We are satisfied that adequate measures will be in place to manage odour.

Noise management

The applicant has submitted a Health, Safety, Environmental & Security (HSE) Management Plan (Doc No: HSE-HH1-OP-04). Appendix K in this Plan outlines noise control arrangements, noise monitoring, community involvement and non-compliance.

In the original application the operator provided a revised risk assessment on 16/06/14 that provides consideration of noise. Noise management measures include acoustic shielding via site fencing and soil bunds, equipment specifically selected for low acoustic performance. Silencers will also be fitted to equipment to reduce noise. Noise analysis will also be conducted during operations to ensure that planning permission conditions are adhered to.

We are satisfied that adequate measures will be in place to manage noise emanating from the site.

7. Environmental Issues and their control

This section of the document explains how we have approached the critical issue of assessing the likely impact of the facility on human health and the environment. It also details the measures we require to ensure a high level of protection. The principal potential emissions are those to air, water and land.

The key issues arising in relation to human health and the environment during this determination were:

- Protection of groundwater

- Emissions to air

- Odour

- Noise

- Contamination of land

- Water quality

The detail in this section relates to how we determined these issues.

7.1 Assessment of environmental impact

We are satisfied that the Applicant has properly assessed the risk posed by the proposed activity. The risks identified are detailed in the Operator's risk assessment. This covers an assessment of the risk to surface, ground and air. We have reviewed the Operator's assessment of the environmental risk from the operations. The Operator's risk assessment is satisfactory.

7.2 Scope of consideration

Biodiversity, Heritage, Landscape and Nature Conservation

We have considered the location of the site, the activity taking place and the materials likely to be present within the extractive waste in order to set suitable conditions and limits in the permit.

The application is not within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat.

7.3 Waste Management Plan

Under the Mining Waste Directive (Article 5) an Operator of a mining waste operation must draw up a waste management plan (WMP) for the minimisation, treatment, recovery and disposal of extractive waste. We have assessed the Applicant's waste management plan in line with the requirements of Article 5. We have approved the plan subject to conditions in the permit. We are satisfied the permit requirements, including the WMP will protect the environment and that Article 4 and 5 of the MWD are met.

The WMP provides that the material inputs have been selected to minimise risk and will be restricted to the minimum amount necessary, thereby minimising the amount of waste generated. It provides an estimate of the amount of each waste that will be managed. Wastes arising from the activities will be recovered where possible. It also characterises each waste type.

The WMP is incorporated into the permit by means of condition 2.3.1 and table S1.2. The WMP needs to be reviewed every 5 years but in the unlikely event that the activities give rise to pollution, condition 2.3.1 enables us to require a revision of the plan to be submitted to us for approval and thereafter implemented. Condition 2.3.2 is a standard condition and refers to an extended time period. Although the condition is used in the permit, we do not expect the mining waste operation to extend beyond two months.

7.4 Setting permit conditions

We have set conditions in the permit in accordance with our Regulatory Guidance Series, No RGN 4 – *Setting standards for environmental protection (version 3.0).* This guidance note explains how we determine the requirements that should apply to a particular activity. Some permit conditions specify certain key measures for that type of activity to protect the environment. Other measures may be required through

outcome-based conditions. Outcome based conditions specify what we want the Operator to achieve, but do not tell them how to achieve it.

We have used the relevant generic conditions from our bespoke permit template along with other, activity-specific conditions to ensure that the permit provides the appropriate standards of environmental protection.

Our generic conditions allow us to deal with common regulatory issues in a consistent way and help us to be consistent across the different types of regulated facility. We have included our generic conditions on fugitive emissions, odour and noise/ vibration to control emissions from the facility.

7.5 Protection of groundwater

We have reviewed the application and supporting documents (including Waste Management Plan and Hydrogeological Risk Assessment) in relation to the risks to groundwater from the proposed variation of activity on site. The review was also to assess if the Operator required a Groundwater Activity Permit due to the proposed change in activity on site.

Groundwater is defined in the Environmental Permitting Regulations 2010 as all water that is below the surface of the ground in the saturation zone and in contact with the ground or subsoil (Regulation 2(1)). There are no restrictions on the quality of the groundwater or the depth of the geological formation that contains that groundwater.

We assessed the Hydrogeological Risk Assessment and Waste Management Plan HSE-HH1-PD-04 Rev A6 to make sure the activity complies with the Water Framework Directive (2000/60/EC) and the Groundwater Daughter Directive (2006/118/EC). More specifically, that hazardous substances must be prevented from entering groundwater and the input of non-hazardous pollutants must be limited to ensure that groundwater does not become polluted.

As part of our assessment to ensure the protection of the groundwater environment, we reviewed the following:
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- The integrity of the installed wellbore (Please see section 7.5.1)
- The chemicals the operator proposed to use to carry out flow testing on site (Please see section 7.5.2)
- The method on how the chemicals are to be used and whether the risk to groundwater is acceptable (Please see section 7.5.2)

7.5.1 Well integrity

The boreholes were constructed in accordance with the requirements of the Health and Safety Executive. They were designed in accordance with industry best practice and in compliance with the Installation and Wells (Design and Construction) Regulations 1996. This requires the design of the well to be such that no unplanned escape of fluids can occur.

We requested the Operator to provide clarification for the following:

- The borehole was constructed with the requirements of the Health and Safety Executive
- Cement bond logging had been carried out and that the assessments of the completed integrity had not shown any issues.

The Operator confirmed that Cement Bond Logs are available for both casing strings and no issues have been flagged by the Operator or in the geological report submitted as part of the variation application.

Well integrity is regulated by the Health and Safety Executive and they have not raised any issues with regards to the integrity of the well.

We have concluded that the integrity of the completed well is satisfactory for the new flow testing activity on site.

7.5.2 Use of chemicals

The new chemicals proposed included

- Hydrochloric Acid (including Butyl Glycol, demulsifier, corrosion inhibitor)
- Diesel
- Soda Ash (Sodium carbonate)
- Sodium Chloride Brine

The Soda Ash (sodium carbonate), the Sodium Chloride Brine, the Hydrochloric Acid and the Butyl Glycol, an additional component of the Hydrochloric Acid mix, are all classified as non-hazardous substances.

The quantities of the non-hazardous substances that will be used will be not have an impact on the groundwater environment.

- Sodium chloride brine (salty water) is used to control the flow of any hydrocarbons from the rock formation and will be equivalent in composition to any water found naturally in the rock formations at that depth.

- Soda ash (sodium carbonate) is used to alter the pH of the water in the well, making it more alkaline. Soda ash is a naturally occurring substance.

- Hydrochloric acid is also used to alter the pH of the water in the well, making it more acidic. Using these substances to regulate acidity in the well allows the clean-up of the well, by dissolving small fragments of rock, lime-scale, cement etc. In their dissolved form these are also naturally occurring substances in groundwater environments.

- Butyl-glycol forms only a small percentage (less than 2%) of the Hydrochloric Acid mix. It will be used and then recovered from the well, along with all the other substances used for the cleaning of the well.

We have assessed the Operators use of these non-hazardous chemicals and are satisfied they will not impact on the groundwater environment. As a result a groundwater activity permit is not required for this use of these chemicals.

Diesel

Diesel is classified as a hazardous substance. We asked the Operator under Schedule 5 Notices to provide further detail about the proposed use of diesel and we have carefully reviewed this additional information provided in relation to whether there will be a potential impact on the groundwater environment.

The Operator proposes to use diesel down the wellbore and then to draw it back up the wellbore in order to promote the flow of crude oil from the rock formation. This process may be repeated a few times until the crude oil starts to flow.

Diesel is lighter than water, saline groundwater in the target formation (connate water) or brine. When diesel is introduced in to the well to prime the flow of crude oil from a target formation, the diesel will float on the top of any water present. If crude oil is present there is a possibility that the crude oil will mix with the diesel at the interface of the rock for formation. However, the relative pressures will mean that it will not readily pass in to the rock formation.

As the diesel is lighter than water, this activity will not result in a discharge of a hazardous substance to the groundwater environment within the target formation.

As a result we do not consider that the use of diesel in the wellbore, for priming the flow of crude oil from a target rock formation, to be a groundwater activity within the meaning of Schedule 22 of the 2010 Regulations.

We have concluded that the Mining Waste Permit variation does not require an additional Groundwater Activity Permit.

7.6 Gas Presence

In addition to the direct work on the risk to groundwater, we also reviewed the information presented on the geological formations, with respect to whether there was likely to be gas present. This was to enable decisions to be made as to whether gas flares were required or not.

The information provided in the Waste Management Plan HSE-HH1-PD-04 Rev A6 (pages 20 to 22) assesses the results of drilling and logging at the Horse Hill site, surrounding sites and sites within that geological sequence across the South East of England. The information in Section 3.4 Gas Presence in the Waste Management Plan HSE-HH1-PD-04 Rev A6 has concentrated on gathering relevant information

for the Portland Sandstone and the Upper and Lower Kimmeridge Limestone formations. This information showed that it was very clear to see whether gas was likely to be present or not from the logs produced for different wells. It showed that the logging of the Horse Hill well showed no signs of gas being present. The conclusion was that there is little chance of free-gas being found, with the only likely source being the small amount of gas produced from the oil itself.

Given the information provided we agreed with the assessment that gas is unlikely to be present.

7.7 Fugitive emissions

The Operator has stated that they will operate under the expectation that the reservoir will not be gas bearing. A geological assessment has been carried out to demonstrate the companies understanding regarding the likelihood for the presence of gas. We have reviewed this assessment and are satisfied with the Operator's findings. Further detail can found in section 7.6

The Operator will only be permitted to operate as per Waste Management Plan HSE-HH1-PD-04 Rev A6. Continuous monitoring instrumentation will indicate the presence of any gas in the well. Should gas be detected in the reservoir the company will shut the well in and suspend operations. As soon as gas is detected in the well the hydrostatic fluids will be increased to immediately prevent any gas release. There will be additional controls to ensure the well is shut in at the surface including the use of the Blow Out Preventer (BOP) (for which a standard operating procedure is available).
The BOP will close the well in within 30 seconds. This can be activated remotely following an alarm sounded in the control room and a specialist work force on site will respond ensuring the BOP and choke manifold (used to safely manage pressure and flow rates at the well head) are closed.
Should operations be suspended in this manner revised assessments must be carried out and new applications will be submitted to the Environment Agency for the progression of the well as required as stated in the waste management plan.

The potential gas fraction from oil that may be extracted during operations has been considered and calculated. A three phase crude oil separator will be in place, separating the oil, gas and water fractions of the crude oil. From this a vent with a 9.1m high stack will be installed to provide natural venting for air emission from the crude oil and water tanks.

An H1 Environmental Risk Assessment for air emissions using the EA H1 Tool was submitted as part of this application. This assessment considers the maximum potential emissions that could arise from the oil, should oil flow from the wellbore. These emissions were conservatively assessed as 100% butane in the absence of an Environmental Assessment Level (EAL) for methane. This assessment demonstrates that the process contribution (emissions from the vent) is considered insignificant over the short and long term. Therefore this is screened out and no further air dispersion modelling, assessment or limits are required regarding air emissions from this emission point.

As stated above, although the operator does not expect any free gas, there will be continuous instrumentation to detect gas during the well test as well as ambient H_2S detector that will be in operation throughout the operations on site. If H_2S is detected the site will carry out shut down operations as stated in Section 6.10.3 of the Health, Safety, Environmental & Security (HSE) Management Plan (Doc No: HSE-HH1-OP-04).

Further to this as an additional precaution considering the potential presence of H_2S in the gas fraction from the oil will be monitored for from the air emissions stack vent A1. A monthly reporting frequency was determined suitable for this parameter, taking into consideration the additional ambient H_2S monitoring and short time scales for operations on site.

The Operator has stated in their Waste Management Plan that zoned drawings will be completed for the site layout to comply with DSEAR and EI15 and will form part of the Health and Safety Executive submission.

7.8 Odour

We carefully considered potential odour emissions from the activity during our determination. Condition 3.2.1 in the permit requires that emissions from the activities shall be free from odour at levels likely to cause pollution outside the site.

We do not consider that the activity will give rise to significant levels of odour. However, we have included condition 3.2.2 in the permit. This condition enables us to require the Operator to submit a specific odour management plan, should odour become a problem. Should a plan be required in the future, once we have assessed this plan as suitable, it will form part of the permit and the Operator must carry out the activity in accordance with the approved techniques.

7.9 Noise and vibration

We carefully considered emissions from noise and vibration during our determination. Condition 3.3 in the permit requires that emissions from the activities shall be free of noise and vibration at levels likely to cause pollution outside the site.

We have included condition 3.3.2 in the permit. This condition enables us to require the Operator to submit a specific noise and vibration management plan, should noise and vibration become a problem. Should a plan be required in the future, once we have assessed this plan as suitable, it will form part of the permit and the Operator must carry out the activity in accordance with the approved techniques.

7.10 General considerations

Site stability

The management of waste is limited to waste generated from prospecting without well stimulation. Any waste stored on site will be limited to extractive waste

temporarily stored in secure containment pending collection as part of the process of being transported off site.

8. Other legal requirements

8.1 Mining Waste Directive 2006/21/EC

In this section we explain how we have addressed other relevant legal requirements, to the extent that we have not addressed them elsewhere in this document.

Article 4 – General requirements

Article 4 sets out requirements for the protection of the environment and human health which apply to the management of extractive waste. Under the 2010 Regulations an environmental permit is required for a mining waste operation which is defined as the management of waste whether or not it involves a waste facility. It is through the permit and the conditions imposed that we are satisfied that the provisions of Article 4 will be met.

Article 5 Waste management plan

This outlines the requirement for the Operator to provide a waste management plan and the information required within this. The waste management plan has been assessed in accordance with these requirements and is satisfactory. Condition 2.3.1 ensures that the operations are limited to those described in the WMP. It also ensures that the Operator follows the techniques set out and that any deviation will require our written approval.

Article 6 – major accident prevention.

The permit does not authorise a waste facility.

Article 7 – Application for a permit

The permit covers the management of extractive waste that does not involve a waste facility.

Article 8 – public participation

The permit covers the management of extractive waste that does not involve a waste facility. However, we have provided the public with the ability to express comments and opinions to us before a decision has been taken and we have taken the results of consultation into account in making the decision to grant this permit.

Article 9 – classification system for waste facilities

The permit covers the management of extractive waste that does not involve a waste facility.

Article 10 excavation voids

There is a requirement under this article of the Mining Waste Directive for the Operator to take appropriate measures in order to secure the stability of the extractive waste, prevent the pollution of soil, surface water and groundwater and ensure the monitoring of the extractive waste and the excavation void when placing extractive waste into excavation voids.

We are satisfied that the Operator will comply with these requirements based on the information provided and the conditions in the permit.

Article 11 construction and management of facilities

The permit covers the management of extractive waste that does not involve a waste facility.

Article 13 prevention of water status deterioration, air and soil pollution

We are required, as the competent authority, to be satisfied that the Operator has taken the necessary measures in order to meet environmental standards, particularly to prevent deterioration of current water status.

We are satisfied that the Operator will comply with these requirements based on the information provided and the conditions contained within the permit.

Article 14 financial guarantee

The permit covers the management of extractive waste that does not involve a waste facility and therefore there is no requirement for financial provision.

8.2 Further legislation

Section 4 Environment Act 1995 (pursuit of sustainable development)

Consideration has been given as to whether the granting of an environmental permit meets our principal aim of contributing to attaining the objective of sustainable development under section 4 of the Environment Act 1995. It is felt that the proposed conditions are appropriate in providing effective protection of the environment and in turn sustainable development, in accordance with Section 4 of the Environment Act 1995 and the Department of Environment, Food and Rural Affairs statutory guidance.

That guidance is 'The Environment Agency's Objectives and Contribution to Sustainable Development: Statutory Guidance (December 2002)'. That document:

"provides guidance to the Environment Agency on such matters as the formulation of approaches that the Environment Agency should take to its work, decisions about priorities for the Environment Agency and the allocation of our resources. It is not directly applicable to individual regulatory decisions of the Environment Agency."

The guidance contains objectives in relation to the Environment Agency's operational functions and corporate strategy. Some of these objectives relate to the Environment Agency's wider role in waste management and strategy. In respect of the management of extractive waste, the guidance notes state that the Environment Agency should pursue the following objective:

"to prevent or reduce as far as possible any adverse effects on the environment as well as any resultant risk to human health from the management of waste from the quarrying and mineral extraction industries."

In respect of water quality, the Environment Agency is required to: *'protect, enhance and restore the environmental quality of inland and coastal surface water and groundwater, and in particular:*

- *To address both point source and diffuse pollution;*

- *To implement the EC Water Framework Directive; and to ensure that all relevant quality standards are met.'*

The Environment Agency has had regard to these objectives. We are satisfied that the imposition of conditions on the permit will mean it is operated in a way which protects the environment and human health.

Section 5 Environment Act 1995 (preventing or minimising effects of pollution to the environment)

We are satisfied that our pollution control powers have been exercised for the purpose of preventing or minimising, or remedying or mitigating the effects of pollution of the environment in accordance with section 5 of the Environment Act 1995.

Section 6 Environment Act 1995 (conservation duties with regard to water)

Consideration has been given to our duty to promote the conservation and enhancement of the natural beauty and amenity of inland waters and the land associated with such waters, and the conservation of flora and fauna which are dependent on an aquatic environment.

We do not feel that any additional conditions are required.

Section 7 Environment Act 1995 (pursuit of conservation interests)

Section 7(1)(c) of the Environment Act 1995 places a duty on us, when considering any proposal relating to our functions, to have regard amongst others to any effect which the proposals would have on the beauty and amenity of any urban or rural area.

We do not feel that any additional conditions are required.

Section 81 Environment Act 1995

The site is not within a designated Air Quality Management Area.

We consider that we have taken our decision in compliance with the National Air Quality Strategy and that there are no additional or different conditions that should be included in this permit.

Section 40 Natural Environment and Rural Communities Act 2006

Section 40 places a duty on us to have regard, so far as it is consistent with the proper exercise of its functions, to conserving biodiversity. 'Conserving biodiversity' includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat. We have done so and consider that no additional or different conditions are required.

Section 23 of the Local Democracy, Economic Development and Construction Act 2009

Section 23 requires us where we consider it appropriate to take such steps as we consider appropriate to secure the involvement of interested persons in the exercise of our functions by providing them with information, consulting them or involving them in any other way. Section 24 requires us to have regard to any Secretary of State guidance as to how we should do that.

The way in which the Environment Agency has consulted with the public and other interested parties is set out in this document. The way in which we have taken account of the representations we have received is set out in the Environmental Permitting (England and Wales) Regulations 2010, and our statutory Public Participation Statement, which implement the requirements of the Public Participation Directive. In addition to meeting our consultation responsibilities, we have also taken account of our guidance in Environment Agency Guidance Note RGN6 and the Environment Agency's Building Trust with Communities toolkit.

Water Environment (Water Framework Directive) (England and Wales) Regulations 2003

Consideration has been given to whether any additional requirements should be imposed in terms of the Environment Agency's duty under regulation 3 to secure

compliance with the requirements of the Water Framework Directive through (inter alia) environmental permits, but it is felt that existing conditions are sufficient in this regard and no other appropriate requirements have been identified.

Human Rights Act 1998

We have considered potential interference with rights addressed by the European Convention on Human Rights in reaching our decision and consider that our decision is compatible with our duties under the Human Rights Act 1998. In particular, we have considered the right to life (Article 2), the right to a fair trial (Article 6), the right to respect for private and family life (Article 8) and the right to protection of property (Article 1, First Protocol). We do not believe that Convention rights are engaged in relation to this determination.

Countryside and Rights of Way Act 2000 (CROW 2000)

Section 85 of this Act imposes a duty on Environment Agency to have regard to the purpose of conserving and enhancing the natural beauty of the area of outstanding natural beauty (AONB). There is no AONB which could be affected by the mining waste activity.

Wildlife and Countryside Act 1981

Under section 28G of the Wildlife and Countryside Act 1981 the Environment Agency has a duty to take reasonable steps to further the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which a site is of special scientific interest. Under section 28I the Environment Agency has a duty to consult Natural England in relation to any permit that is likely to damage SSSIs.

There is no SSSI which could be affected by the mining waste activity due to the distance – the site is 3km distant from the nearest SSSI.

The Conservation of Habitats and Species Regulations 2010

We have assessed the Application in accordance with guidance agreed jointly with Natural England and concluded that there will be no likely significant effect on any European Site.

Government Planning Policy Guidance 10: Planning and waste management 1999

Under section A28 in Appendix 1 of the Government Planning Policy Guidance 10 the Environment Agency has a duty to consult the Civil Aviation Authority for any New bespoke landfill or waste facility which is within 13km of an aerodrome. This directly relates to the number and movement of some species of birds that may be influenced by the distributions of landfill sites. We have considered the potential for activities being conducted at the site to attract birds as being insignificant, therefore consultation with the Civil Aviation Authority has not been conducted in this instance.

Annex 1: Consultation and web publicising

Summary of responses to consultation and web publication and the way in which we have taken these into account in the determination process. (Newspaper advertising is only carried out for certain application types, in line with our guidance.) Response received from

Response received from
Environmental Health
Brief summary of issues raised
No comments received
Summary of actions taken or show how this has been covered
None required

Response received from
Director of Public Health
Brief summary of issues raised
Take into consideration of Public Health England's comments
Summary of actions taken or show how this has been covered
None required.

Response received from
Surrey County Council Planning Authority
Brief summary of issues raised
Submitted copy of planning permission
Summary of actions taken or show how this has been covered
None required.

Response received from
Health and Safety Executive (HSE)
Brief summary of issues raised
No objections.
Summary of actions taken or show how this has been covered
None required.

Response received from
Mineral Planning Authority
Brief summary of issues raised
No objections.
Summary of actions taken or show how this has been covered
None required.

Response received from
Public Health England (PHE)
Brief summary of issues raised
Recommend permit should contain conditions to ensure potential emissions do not impact on public health. Recommend baseline monitoring for groundwater, surface waters and local air quality. Dust, noise, light and odour should be considered. The operator should consider a comprehensive accident management plan.
Summary of actions taken or show how this has been covered
Conditions have been included in the permit to ensure that potential emissions do not impact on human health see section 6.8.4 Pollution Prevention Measures and 7.4 Setting Permit Conditions in main document above.

During the determination of the permit application the Environment Agency has considered the need for baseline monitoring, however, this requirement has been screened out, please see section 6.8.4 Pollution Prevention Measures above for further details.

Under the Mining Waste Directive an accident management plan is required when a mining waste operation is considered a facility and Category A, in this instance the site is considered a Mining Waste Operation and as such a comprehensive accident management plan is not required. See section 6.6 Accident Management and 8.1 Mining Waste Directive 2006/21/EC in main document above.

Consultation Responses from Members of the Public and Community Organisations

The application was publicised on the Environment Agency website in line with; Operation Instruction 203_08 Environmental Permitting: how we duly make and consult on applications for water discharges, groundwater activities, waste, mining waste and installations.

Response received from
Public responses 1-5
Brief summary of issues raised
• Nature of chemicals used in frack fluid. • noise pollution and increase in traffic as a result of the operations on site • Subsidence from activities and compensation or protection schemes if subsidence occurs • Consultation process on future developments • Climate Change
Summary of actions taken or show how this has been covered
• The applicant has not applied to hydraulically fracture and as a result a permit will not allow the operator to conduct any hydraulic fracturing activities. • The additional activities being applied for in this variation to the Environmental Permit does not permit well stimulation and we have assessed the information provided in the application and agree with the Operators assessment that there is low risk to subsidence. • Compensation or protection schemes are not relevant to the mining waste permit • Increase in traffic is an issue overseen by the local planning authority and not relevant to the mining waste permit see section 6.8.2 Planning permission above for further details. • If the Operator wishes to vary or make a new environmental permit application for an Oil and Gas related activity we would consult with the public and relevant organisations on the application received. • The Government's climate change policy on exploitation of Shale Gas is no different to that of any other fossil fuel. The policy states "We aim to maximise the economic recovery of oil and gas from the UK's oil and gas reserves, taking full account of environmental, social and economic objectives".