

Permitting decisions

Bespoke permit

We have decided to grant the permit for Holmwood Wellsite operated by Europa Oil & Gas Limited.

The permit number is EPR/YP3735YK.

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

Purpose of this document

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

- Highlights key issues in the determination
- Summarises the decision making process in the decision checklist to show how all relevant factors have been taken into account
- Summarises the engagement carried out because this is a site of high public interest
- Shows how we have considered the consultation responses

The decision document should be read in conjunction with the environmental permit. It explains how we have considered the Applicant's application, and why we have included the specific conditions in the permit we are proposing to issue 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.

In accordance with the Environment Agency's public participation statement we have consulted on the permit notice and provided an opportunity for the public and other interested parties to understanding our thinking and, if they wish, to make relevant representation. This decision document takes into account relevant matters raised in the responses we received.

Use of terms

Applicant

The Applicant is Europa Oil & Gas Limited. We refer to Europa Oil & Gas Limited as 'the Applicant' in this document. Where we are talking about what will happen after the permit is granted, we call Europa Oil & Gas Limited 'the Operator'.

Regulations

In this document the term 'Regulations' refers to the Environmental Permitting (England and Wales) Regulations 2016 No. 1154.

Summary of our proposed decision.

We have decided to issue the permit. This will allow the applicant to operate a mining waste activity under an Environmental Permitting Regulations (the Regulations) permit for the management of extractive wastes arising from prospecting for hydrocarbon resources in accordance with Schedule 20 to the Regulations and other relevant legislation and guidance. 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 Holmwood wellsite is proposed to be developed within the Surrey Hills Area of Outstanding Natural Beauty, 1.5km west of South Holmwood. Access to the wellsite will be from Coldharbour Lane pending the construction of a ~230m access track through land currently managed by the Forestry Commission. The authorised mining waste activity will be limited to the area contained within the wellsite and will include the management of extractive mining wastes not involving a waste facility. There will be no permanent storage of extractive wastes onsite and no treatment of extractive wastes before consignment offsite to an authorised facility. The permit will authorise as part of the mining waste activity the flaring of any waste gas arising from well testing. This will be undertaken within a shrouded ground flare over an aggregated fifteen day period with the total mass of gas to be flared not exceeding 10 tonnes per day. As such flaring activities will not fall within the capacity limits set out in the Regulations; Chapter 5, Part A (1), Section 5.1, Incineration and co-incineration of waste. A risk assessment has been submitted with the application which considers the proposed flaring activity, management practices and risks to sensitive receptors. This will be discussed in greater detail below.

The Holmwood wellsite will also operate under standard rules relating to a permit for oil storage (SR2015 No2). This permit authorises an installation operation for gasification, liquefaction and refining activities as described within Part A (1) of Schedule 1.2 to the Regulations. The standard rules permit will operate within the boundary of the mining waste permit. Management practices such as site surfacing and containment considered by the Environment Agency under this application will also apply to this activity.

The Holmwood operations will involve the circulating of surface fluids exposed to the formation during drilling and / or well testing. This material may contain NORM (naturally occurring radioactive materials) in concentrations exceeding those set out in Schedule 23, Part 3, Table 1 of the Regulations. A Radioactive Substances Regulation (RSR) permit will therefore be applied for separately to this application. This permit will describe the requirements for storage, testing, handling and disposal of the waste. This application has been considered separately to the mining waste permit application.

The applicant has not applied for a water discharge or groundwater activity as set out in Schedule 21 and 22 of the Regulations. A full justification for the use of drilling chemicals (water and oil based muds) has been included as part of this application and considered by the Environment Agency. Where relevant, groundwater activities that fall within the exclusions set out under paragraph 3.3(b) of Schedule 22 to the Regulations have been assessed and determined as *de minimis* by the Environment Agency and so will not require formal authorisation under a permit. A technical justification for this stance has been presented in this document.

The bespoke 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 Regulations, Mining Waste Directive (2006/21/EC) and other relevant legislation and guidance. This document does not include an explanation for these standard conditions. Where they are included in the permit notice, we have considered the application and accepted the details are sufficient and satisfactory to make the condition appropriate.

Key issues relevant to this determination have been described in greater detail below. These address the Environment Agency's legal obligations under the Regulations and other relevant legislation and guidance. The Key Issues section also address points raised during the public consultation which is described in further detail later in this document. Following the minded-to consultation an additional section has been included to take into consideration consultation responses received and, where relevant, outlines the assessment of any additional information that has informed the determination of this application.

Key issues of the decision

Gas management

Management of waste gas arising from well testing will be undertaken for an aggregated period of no more than fifteen days and will be performed using a PW Well Test Limited (PWWT) shrouded ground flare manufactured to an open pipe flare design of a single 78mm (3.070") open pipe flare within a 356mm (14.015") diameter steep pipe, with a pilot line and air assist line running up the outside.

The burning of waste gas within a shrouded ground flare may in certain circumstances be considered best available technique (BAT) in accordance with the Environment Agency's published guidance (<https://www.gov.uk/government/publications/onshore-oil-and-gas-exploration-and-extraction-environmental-permits>), however in determining the appropriateness of this proposal the Environment Agency has considered the technical justification put forward by the applicant and has concluded that appropriate measures will be put in place that will afford a level of protection to the Environment that is consistent with the general requirements of the Mining Waste Directive. The Environment Agency has considered the technical justification put forward by the applicant and concluded that the proposed flaring activity affords an equivalent level of protection to the environment and is therefore suitable. The PWWT technical flare document (EOG-EPRA-HW-FTD-008) sets out in detail the technical justification for gas management and has been assessed by the Environment Agency and found to be acceptable for the proposed activity.

An initial screening of proposed flaring activities taking into consideration proximity of the site to residential and ecological receptors was undertaken by the applicant and the Environment Agency, through an H1 assessment. As part of our screening we highlighted the proximity of flaring activities to Ancient Woodland (50m from site boundary) and as a result more detailed screening was undertaken by the Environment Agency's Air Quality Modelling Assessment unit.

This assessment considered varying distances from the flare and impacts from flaring activities on the Ancient Woodland. The assessment concluded that there is a potential exceedance of the 24 hour critical level for NO_x, however this is limited to 10m to 20m of the nearest part of the ancient woodland with the majority of the woodland remaining below the critical level for NO_x.

In addition, due to the conservative nature of the assessment tool and the uncertainties of making predictions within such small distances flaring activities can be screened out as insignificant. We have therefore not requested detailed dispersion modelling from the applicant.

Site surfacing and containment

Containment that meets the CIRIA C736 guidance has been proposed by the applicant and detailed within the waste management plan (WMP), site condition report (SCR) and supporting technical diagrams and drawings. These documents are listed in the permit under Schedule 1, Table S1.2. The operator is also required to provide a construction quality assurance plan (CQA) on site surfacing and containment for approval by the Environment Agency prior to the commencement of drilling operations. These pre-operational measures are detailed in the permit under Schedule 1, Table S1.3. The CQA plan will detail the finalised well site surface construction and the processes for installing secondary and tertiary containment. The CQA plan will ensure these are installed in accordance with the manufacturer's guidelines and will be protective of land, groundwater and surface water.

Briefly, the site will be constructed by the removal of 850m³ of topsoil and the levelling of the land to facilitate site activities. Surplus topsoil and subsoil material will be stored within a temporary screening bund on the northern boundary. This material will provide partial screening of the well site and will be reused during the restoration of the site in accordance with the restoration plan agreed under planning.

The wellsite compound will consist of a 118m by 55m sealed drilling pad with a perimeter drainage ditch, containment drain and infrastructure to collect any surface runoff water and potential contaminants. The compound surfacing will be constructed using a layer of Secutex 401 geotextile, which overlays the exposed subsoil. The Secutex 401 geotextile is designed to protect the underside of the Bentofix Geo-synthetic clay liner (GCL), which will form an impermeable layer. The geotextile and GCL will cover the site surface and perimeter drainage to create a sealed system.

As part of the determination of the permit application the Environment Agency raised questions regarding the integrity of the GCL liner proposed to be used across the site. The applicant contacted the manufacturer of the Bentofix GCL to consider the site-specific requirements and hydrogeological conditions. As a result the manufacturer has recommended the use of Bentofix NSP 4900 along with pre-hydration of the liner during installation. The revised waste management plan confirms the operator will adopt the manufacturer's recommendations and the CQA report on site surfacing will be assessed by the Environment Agency to ensure that the manufacturer's installation guidelines are followed and that the liner provides an effective environmental barrier.

We have taken the product details, the manufacturer's assurances and recommendations in to consideration when considering the risks posed to groundwater from the use of this type of lining system at this specific site. We have considered the proposed short-term duration of the activity at an exploration site compared with a longer-term proposal at a production site, elsewhere in the country, in making our decision.

The site will be finished using either a Type 3 stone (typically 300mm depth) or aluminium ground matting to create a working platform. If Type 3 aggregate is used to complete the surfacing a sand binding layer followed by 300mm of compacted Type 3 aggregate. If ground matting is used in lieu of 300mm Type 3 aggregate the Bentofix GCL will be overlaid with a layer of dense Secutex 201 geotextile and is designed to protect the upper layer of the impermeable membrane, prior to installing the ground matting.

The borehole will be drilled within a concrete chamber which will provide secondary containment for drilling activities in accordance with CIRIA C736. Subsoil will be excavated to a depth sufficient to construct at 2.74m deep well cellar with excavated material stored within the temporary bund to the North of the wellsite. A 300mm thick reinforced concrete base will be set in base of the excavation. A Precast Concrete (PCC) ring will be set into the concrete base, providing a slight overlap. A layer of Bentofix GCL is then laid on top of the concrete base and turned up against the inside walls of the cellar forming a containment barrier. Additional PCC rings are added to line the well cellar back to the surface with the final PCC ring 50mm below the site surface level. Each PCC ring is sealed together using Tockstrip concrete join sealant and all PCC lifting points will be suitably plugged and sealed. The PCC rings are then encased in a 200mm thick concrete jacket surrounded, set to a depth immediately below the surface construction. The Bentofix GCL and Secutex 1201 protective membranes will be folded upward along the external wall of the well cellar to ensure wellsite integrity.

Where the liner abuts other infrastructure, these aspects will be detailed by the applicant in the CQA plan for the liner and implemented to ensure that the manufacturer's installation guidelines are followed in order that the liner will provide an effective environmental barrier.

Once the well cellar has been constructed, an integrity test will be carried out to confirm that it provides suitable and effective containment. Testing will consist of filling the cellar with water and measuring the loss over a 24hr period. If containment loss is measured then further sealing (or repairs) will be made and the test repeated until it is demonstrated to be successful.

Secondary containment will be required around all waste storage tanks on site, including those authorised under the Oil Storage Permit (SR2010 No15) in line with CIRIA C736. All secondary bunding will provide at least 110% capacity of the total volume of each storage tank or aggregated grouping. Daily monitoring of containment capacity of the site including the site surfacing, drainage ditches and banded tanks will be undertaken to ensure that the site can cope with adverse weather conditions. All waste water accumulating within containment structures will be removed by a licenced waste carrier to a permitted waste facility.

The Environment Agency concluded that site surfacing and containment as described in the Site Condition Report and Waste Management Plan are sufficient to mitigate risks to surface and groundwater receptors for the proposed duration of the exploration activity.

Baseline assessment

The applicant has proposed in Section 5.7 of the Site Condition Report to excavate a number of shallow boreholes to identify any contamination prior to site activities being undertaken and support geotechnical assessment of the wellsite to ensure that the site surfacing meets its objectives. Soil samples are proposed to be taken to a depth of 300mm below the formation level. The baseline soil sample results will be used to update the initial Site Condition Report and assess the sites compliance with the permit when it comes to surrender to ensure that the land is returned to a satisfactory state.

Noise

The applicant has considered possible noise nuisance from site works including flaring activities within the Environmental Risk Assessment (EOG-EPRA-HW-ERA-007) and Flare Technical Document (EOG-EPRA-HW-FTD-008). With respect to flaring activities, the applicant has estimated sound power level from the flaring activities across a range of flow rates expressed as million standard cubic feet per day (mmscfd) which is reported to be <115.5dB(LWA). Condition 8 of the planning decision notice provides the following requirements, relating to noise emission from the development:

'The level of noise arising from any operation, plant or machinery on site, at a height of 1.2m above ground level and at least 3.5m from the façade of any residential property or other noise-sensitive building most exposed to noise from the site shall not exceed the limits in the table below. Such noise levels may be measured directly at the relevant location(s) or may be calculated according to a method previously agreed in writing with the County Planning Authority.'

To comply with the planning condition 8 the operator has proposed a noise monitoring plan for approval by Surrey County Council. Where noise limits set under planning cannot be met the operator has committed to reduce the flow rate at the choke manifold, which in turn will reduce the inlet flow rate of hydrocarbon gas to the flare, resulting in a reduction in sound power level and impact at receptors. The Environment Agency consider this approach to be satisfactory and have not imposed further monitoring conditions within the permit.

Groundwater protection - Well design

Prior to the permit application being made, during the planning application and planning appeal process, the applicant provided sufficient information to show that the risks to the groundwater environment from the proposed design and specification of the well had been considered and were acceptable. This included the production of a revised hydrogeological risk assessment including agreement to drill the conductor casing with only air or fresh water and to extend the conductor casing through the full length of the Lower Greensand (Hythe Beds and Atherfield Clay) principal aquifer and to seal the base of any rat hole / mouse hole developed prior to drilling, to protect the groundwater environment. In doing so they provided sufficient information to show that the risks from the proposed activity would be acceptable. Adequate information had been submitted to show how the groundwater immediately beneath the site, the groundwater that feeds to the local Pipp Brook and that provides water to local springs, private supplies and, indirectly, to public water supplies, would be protected. As a result of the hydrogeological risk assessment already submitted we were satisfied that the broader risks to groundwater had been addressed.

When the permit application was made there were two key issues regarding the well design that we felt needed further, more detailed, explanation and clarification at the permit application stage:

- In the permit application the trajectory (route) of the proposed well below ground and the proposed casing depths varied in comparison to those submitted at the planning application stage. The revised trajectory is referred to as "Path 8". The surface casing went to a much shallower depth and the angle of the drilling near the ground surface had changed. The applicant provided additional information, a detailed explanation of the changes and a justification. By changing the angle of the upper part of the well bore they suggested that they can get across the identified faults in the

geological sequence while they are still in the Weald Clay, and still reach the target formations that they wish to drill through and investigate. They suggested that this will enable them to provide a better natural seal as the clay prevents the migration of drilling fluid and better seals against the well casing. In order to get the angles right and to maintain safe drilling practices they have had to decrease the proposed depth of the surface casing, but it still keys in to an impermeable layer. This proposal for well design and trajectory, Path 8, was deemed acceptable given the information available at the time of the planning application and of the initial permit application.

- Within a few weeks of the permit application, based on existing geological maps of the adjacent area, we found information that lead us to query our original understanding of the depth of the Weald Clay present in the vicinity of the site. This query was based on the apparent discrepancy in information available on the anticipated depth of the Weald Clay formation available from the application and on the British Geological Survey 1:50 000 geological maps, on the Guildford Sheet 285 and the Reigate Sheet 286. As the Weald Clay is an important protective layer it was vital to clarify this uncertainty. The applicant carried out additional work to interpret seismic profiles of the geological layers at their site, linking it in with newly acquired data from the latest well results from Horse Hill 1. They were able to demonstrate to us that the latest information confirms that there should be over 400 metres depth of Weald Clay available to protect the Tunbridge Wells Sand Formation within the Hastings Beds. This additional work confirmed that the information submitted and assessed at the time of the planning application was accurate and that there were no further requirements from an environmental permitting perspective.

The revised proposal involved using the oil based muds (OBMs) below 177m True Vertical Depth Below Rotary Table (TVDBRT) in the Weald Clay, which was shallower than the 400 m below ground level figure in the guidance, based on the UK Technical Advisory Group on the Water Framework Directive figure. As the Weald Clay was considered as an impermeable layer and the amount of OBM to be used in the drilling process was of such quantity and concentration to obviate any present or future risk of deterioration in the quality of the receiving groundwater, it was considered that the use of OBM would be allowed and exempt from permitting process (de minimis).

During the minded-to consultation we received further local information that resulted in us re-visiting the initial assessments made on the well drilling, integrity and the protection of groundwater. The local information included specific information regarding the presence of sandstone and limestone bands within the Weald Clay formation in the immediate area of the proposed well site. This was based on local knowledge and on the British Geological Survey 1:10 000 sheets as well as reviewing the British Geological Survey 1:50 000 sheet 302 for Horsham. It has been ascertained that some of the limestone and sandstone bands that outcrop to the south of the proposed site are continuous in extent, range up to 10 metres thick and these limestone and sandstone bands provide enough fresh water to support local abstractions. This raised further questions, including whether:

- The proposal to use oil-based drilling muds (OBMs) at a depth of from a depth of 177m TVDBRT, shallower than 400 metres below ground level, is acceptable or whether it could lead to contamination of groundwater within limestone and sandstone layers within the Weald Clay;
- the limestone and sandstone layers that outcrop to the south of the site are present below the site itself.

In light of the points raised above and to ensure that the proposed well design and specification was adequate to protect the groundwater at this location we requested additional information from the applicant.

The applicant submitted a Technical Note (dated 03/07/2018) which reviewed:

- the geological sheets at 1:50 000 and at 1:10 000 scale;
- information available on the limestone and sandstone bands within the Weald Clay, in order to assess;
 - The likelihood of the limestone and sandstone bands being present and,
 - To enable the potential depth of the layers at the site to be calculated.

- information from off-set boreholes within the Weald;
- information from drilling records in order to assess the presence of sandstone and limestone bands as well as reports of mud losses (that would indicate the risk to the groundwater environment);
- the risks of using water based muds over oil based muds in the Weald Clay.

In addition, we assessed whether there are any licenced abstractions from the Weald Clay within the vicinity of the site. In conclusion there are 2 licences that abstract directly from the Weald Clay within 20km of the site. This supports the premise that limestone and sandstone layers within the Weald Clay can support abstractions for water supply. Both abstractions are small and are at a distance from the proposed exploration site, so will not be impacted by the proposal. Overall, while a theoretical risk exists to the groundwater in the Weald Clay, the applicant has provided site specific data to enable us to review the risks at the proposed Holmwood exploration site.

Having reviewed the information presented, we are satisfied that the operators will using safe drilling practices. In summary;

- it is safer, quicker and presents less risk to the groundwater environment if oil based muds are used in the Weald Clay than water based muds;
- the licenced abstractions from the Weald Clay are at a distance from the proposed exploration site;
- any sandstone and limestone bands that may be present within the Weald Clay are likely to be:
 - at considerable depth beneath the site and will not be in hydraulic continuity with the groundwater bearing units at the ground surface;
 - laterally discontinuous or lenticular in nature, and may or not be present beneath the site;
- the grain-size of the sandstone units are predominantly very fine grained, and well cemented, which suggests that they will not form a significant migration pathway for fluids and will only contain negligible amounts of groundwater;
- the quantity and concentration of oil based muds likely to be in contact with groundwater in the Weald Clay will be so small that it will obviate any present or future risk of deterioration in the quality of the receiving groundwater.

On this basis, we are satisfied that an exemption from Environmental Permitting (England and Wales) Regulations 2016 can be used for the proposal to use oil based muds below 177m TVDBRT at this location.

Groundwater protection - Well integrity

The trajectory of the well bore (Path 8) has been revised since the planning application and appeal. This has resulted in the proposed well being drilled at a steeper angle and the proposed depth of the secondary casing been shortened when compared with the original details, keying in the Weald Clay at a depth of 177m TVDBRT. The applicant has provided an explanation for this in the environmental permit application.

We have listened to and reviewed the concerns regarding the angle of the well, along with the case presented for using oil based muds rather than water based muds in the Weald Clay. We are satisfied that the applicant has considered the protection of the environment when making their proposals.

The Environment Agency have considered the revised well design as described in the WMP and the SCR and concluded that it meets the expected requirements. The wellbore is to be constructed in accordance with the requirements of the Health and Safety Executive and the Petroleum and Exploration Development Licence. It is also designed in accordance with industry best practice and in compliance with the Offshore Installation and Wells (Design and Construction) Regulations 1996 (DCR). DCR requires the design of the well to be such that no unplanned escape of fluids can occur. The Environment Agency have assessed the risk of drilling an exploratory well at this location and consider that the design meets the requirement to prevent any release of liquids into the water environment.

We have reviewed the method of construction of the exploratory well and we are satisfied that these methods are appropriate and will ensure that groundwater is protected. Finally the environmental permit described herein is for exploration drilling only and not to carry out production in future. In the event that an application is made for a variation of the environmental permit in the future we will review the proposed activity and the borehole integrity information available at that time.

Groundwater protection - Chemical additives

Chemical additives including water and oil based drilling muds, contingency chemicals, wellbore clean up solutions and chemicals to be used at the surface have been considered by the Environment Agency as part of the application and are listed fully within the Waste Management Plan, Appendix 6.

We have considered the Hydrogeological Risk Assessment provided by the applicant and have reviewed this against our information and conceptual understanding of the location. We have considered this in light of the additional hydrogeological information submitted by consultants acting on behalf of local groups at the time of the minded-to consultation.

We have evaluated whether an environmental permit for a groundwater activity is required. Based on the information presented, we have determined that an environmental permit for a groundwater activity is not required for the proposed activity, which is limited to drilling a wellbore for exploratory purposes, as set out below.

We consider that the use of the proposed water and oil based drilling muds does not amount to a groundwater activity and so will comply with the groundwater activity exclusion under the EPR 2016 (paragraph 3.3(b) of Schedule 22), in that any discharge to groundwater that may occur would be of a quantity and concentration so small as to obviate any present or future risk of deterioration in the quality of any receiving groundwater. Therefore no permit for a groundwater activity will be required at the site.

Groundwater protection - Acid wash and squeeze

The initial application for the hydrochloric acid (HCL) wash and for the HCL acid squeeze was assessed with respect to the potential impact on groundwater. The initial proposal suggested that the acid wash would be to clear any formation damage caused during the drilling and that the acid squeeze would travel further back into the target formation (possibly up to 14 metres) and may result in “stimulation” of flow. While the Environment Agency were satisfied that the acid wash would result in no impact on the groundwater environment in the target formations, we raised further questions around the risk to the groundwater environment from the proposed acid squeeze.

We asked the applicant to clarify the details of the proposed “acid squeeze” at this specific site. The applicant has explained that their only intention is to clear any damage in the target formations caused by drilling, that the pressures to be exerted will not be at a level to cause fracturing of the rocks, that their intention is to clear the drilling damage near the well bore and that all of the dilute acid solution will return to the surface once it has reacted, leaving no discernible trace of product in the groundwater. The applicant has reviewed their submission including confirming the maximum volume of acid to be used, decreased the expected distances that the acid may travel into the formation (which relates the amount of pressure they can apply when the acid is applied) and revised their Waste Management Plan accordingly.

The Waste Management Plan describes the applicants proposal to improve the flow of petroleum within the well and formation after drilling. The intention is to remove damage to the formation as a result of drilling activities, which will improve flow in the near wellbore formation. The applicant has proposed two products listed in the Chemical Inventory – Waste Management Plan, Appendix 6.

- Protekt-15 Plus HCl (15% HCl acid with inhibitors); and
- Protekt-7 Plus HCl (7% HCl acid with inhibitors).

The waste management plan (WMP) describes two procedures to clean out the wellbore contents (casing walls and tubing strings), perforations (tunnel mouths) and borehole rock-face (in open-hole) which have been potentially blocked as a result of the initial drilling operations. These are listed as acid wash and acid squeeze. Both procedures promote the dissolution of calcite (CaCO₃) within the formation through the following reaction shown below. Once the acid has fully reacted it is described as spent, with the products of the reaction escaping to the atmosphere as carbon dioxide gas (CO₂) or present in aqueous forms of calcium chloride (CaCl₂) within the solution which are returned to the surface and stored prior to offsite disposal.



An acid wash is defined as the application of acid under low pressure and will be used primarily to clean the near wellbore environment to remove damage from drilling activities. This activity will precede any further acid squeeze.

Acid squeeze is defined as the application of acid under pressure that does not exceed the fracture pressure of the formation. The pressure that the acid can be applied at, so that it does not exceed the fracture pressure of the formation will be established by pressure testing during drilling operations. The acid squeeze is designed to clean the natural pores and fractures of the near wellbore environment which may have been damaged by drilling operations. The intention is for the dilute acid to pass 1m from the borehole, depending on the extent of existing fractures within each formation and the extent of drilling damage, acid may pass beyond 1m radius of the borehole, but will be recovered as production water when pumped back to the surface.

It is anticipated that a total of 95m³ of HCl will be pumped into the formation for a maximum of three acid wash and squeeze operations in the following targeted formations; the Portland Sandstone, Kimmeridge Micrites and the Corallian Sandstone and possibly the limestone in the Great Oolite Group. The volume used for each acid treatment will vary and is dependent on the length of the perforated section of the wellbore in each of the targeted formations.

The Environment Agency have considered the volumes proposed and assessed the chemicals in the Protekt 15 and Protekt 7 Plus products, according to the materials safety data sheets (MSDS) within Appendix 6 of the WMP for the acid wash and squeeze activities. These are considered to be of a quantity and concentration so small as to obviate any present or future risk of deterioration in the quality of any receiving groundwater and, therefore that a permit will not be required.

The Environment Agency has considered the acid wash and squeeze activities as described in the waste management plan and concluded that they meet the groundwater activity exclusion set out in Paragraph 3.3(b) of Schedule 22 to the Regulations.

Hydraulic Fracturing

Permitted activities at the Holmwood wellsite do not include hydraulic fracturing or activities that require a permit under Schedule 22 to the Regulations. Where hydrochloric acid is used to improve the performance of the near wellbore environment this is done in accordance with the requirements for an exclusion from a groundwater activity, often referred to as meeting the requirements for 'de-minimis' as set out in our published guidance (<https://www.gov.uk/government/publications/groundwater-activity-exclusions-from-environmental-permits/groundwater-activity-exclusions-from-environmental-permits#de-minimis>).

Environmental Monitoring – Air Quality

Air Quality monitoring including parameters, frequency, limit values and testing methods is defined within Schedule 3 of the permit and includes monitoring for oxides of nitrogen, carbon monoxide, total volatile organic compounds, methane (inlet concentration), temperature and the flare gas feed flow rate. Section 9 of the Flare Technical Document (EOG-EPRA-HW-FTD-008) provides further technical detail on proposed air quality monitoring at the flare emission point. The Environment Agency has considered the proposed monitoring in line with our published guidance and consider it to be satisfactory to control air quality emissions.

Environmental Monitoring – Water Quality

Groundwater and Surface Water monitoring including locations, parameters, limit of detection values, monitoring frequency and testing methods are defined within Schedule 3 of the permit. This includes monitoring for water level, pH, temperature, electrical conductivity, sodium, potassium, calcium, chloride, bicarbonate, sulphate, total petroleum hydrocarbons and methane (dissolved). Proposed groundwater and surface monitoring is defined in more detail within Appendix 2 – Groundwater monitoring strategy of the applicants site condition report (EOG-EPRA-HW-SCR-006). This includes on-site monitoring boreholes, monitoring of the water course both up and down hydraulic gradient of the site, as well as offsite monitoring of private wells around the site. The Environment Agency has considered the proposed monitoring in line with our published guidance and consider it to be satisfactory to control the risk of site activities to groundwater and surface waters. We have also included Pre-Operational measures (PO-4) which requires the operator to submit a report that describes the baseline groundwater quality for the site. This report must be provided before operations start at the site and this information will be used to update the initial Site Condition Report submitted with the permit application.

Habitats

The Holmwood Wellsite is located near designated and non-designated sites which require consideration under the Wildlife and Countryside Act 1981 (Sites of Special Scientific Interest - SSSI) and the National Planning Policy Framework (Ancient Woodland). Specifically the Leith Hill SSSI is located approximately 600m south west of the proposed Holmwood Wellsite and there are Ancient Woodlands at a distance of <50m from the western site boundary. Ancient woodlands to the east of the site boundary are separated by Coldharbour Road which runs northwards towards the town of Dorking.

The Environment Agency undertook a risk assessment of the proposed activity in accordance with the requirements of Section 28I of the Wildlife and Countryside Act 1981 as amended by the Countryside and Rights of Way Act (CRoW) 2000. This document referred to as an Appendix 4 notice assessed the risk of activities likely to damage sites of special scientific interest (SSSI).

As part of this assessment the Environment Agency identified the following 'operations requiring consent' that may cause damage and were relevant to the proposed works. Operations requiring consent are listed on Natural England's 'designated site view' [website](#) and in the Environment Agency's judgment include the following.

- | | |
|-----------|--|
| 8 | Burning |
| 11 | The destruction, displacement, removal or cutting of any plant or plant remains including tree, shrub, herb, hedge, dead or decaying wood, moss, lichen, fungus, leaf-mould and turf |
| 22 | Storage of materials |
| 23 | Erection of permanent or temporary structures, or the undertaking of engineering works, including drilling |

The Appendix 4 notice sent to Natural England as part of the public consultation assessed each of these operations requiring consent and provided details on the management practices proposed by the operator to mitigate the risk to designated sites. The Appendix 4 concluded that the proposed permissions are not likely to damage any of the flora, fauna or geological or physiological features which are of special interest to the Leith Hill SSSI.

There was no formal response from Natural England to the Appendix 4 notice issued by the Environment Agency as part of the public consultation. However it should be noted that Natural England have been involved with the planning application which is dealt with by the local planning authority who were also a consultee to the application.

The applicant has submitted a H1 air emissions assessment with the application to estimate the impact of flaring activities undertaken on the site. This screening tool developed by the Environment Agency identifies a potential exceedance of the daily critical level of NO_x within ancient woodlands that are protected under the National Planning Policy Framework. As a result the Environment Agency's Air Quality Modelling Assessment unit undertook further screening of predicted emissions, including an assessment of critical level exceedances at varying distances from the flaring activity. The assessment concluded that although emissions from the proposed flaring activity exceeded the daily critical level of NO_x the exceedance was limited to 10-20m from the boundary of the site and that the majority of the Ancient woodland to the west of the site boundary would remain unaffected. As the proposed flaring activities will be undertaken for no more than an aggregate of fifteen days it was concluded that more detailed modelling was not necessary and that the activity could be considered low risk and not likely to damage the ancient woodland.

With respect to the Surrey Hills AONB the Environment Agency have considered their duty as set out in Section 85 of the Countryside and Rights of Way Act 2000 and other duties in Section 7(1) of the Environment Act 1995. The effect of site operations on the AONB has also been considered as part of planning and is detailed within the High Court re-determined appeal decision document which can be found [here](#).

Briefly, this decision notes that there would not be a viable alternative site for prospecting outside of the AONB and that based on the areal extent and the temporary nature of the proposed operation that development cannot be considered to have a significant effect on the enjoyment of the special qualities of the Surrey Hills. The restoration plan put forward by the applicant will return the site to its previous use and the overall visual disturbance will be reversed over time.

With respect to this permit application the operator would be obliged under any permit to return the site to its pre-existing state in accordance the Environment Agency's guidance on surrendering an environmental permit which can be viewed [here](#). At the point of permit surrender the Environment Agency will assess site compliance and evidence put forward by the operator and request if necessary further information including site investigations to demonstrate that the land has been returned to a satisfactory state. The Environment Agency therefore concur with the High Court decision that the proposed activity will not affect the overall integrity or enjoyment of the AONB and that any disturbance will be for a limited time only and mitigated by restoration of the site which is controlled through extant planning.

Non-regulated issues

The following issues have been raised as part of the statutory and minded to consultation but have not been considered as part of permit application EPR-YP3735YK due to the nature of the issues raised. Where relevant the reader should direct comments towards the local mineral planning authority, in this case Surrey County Council for;

- Land-use (and location)
- Traffic management
- Visual Amenity
- Ecological monitoring and aftercare

The lead authority in determining whether a particular land-use is acceptable at any particular location is the local mineral planning authority, in this case Surrey County Council. The Environment Agency is a consultee in this process. We comment on proposals received through the planning system with respect to the risk to the environment and to ensure alignment with the environmental permitting process. The location of the site in relation to Areas of Outstanding Natural Beauty, Sites of Special Scientific Interest, existing infrastructure, other land-use activities and residential properties *etc.* is covered by the planning application process rather than through environmental permitting.

With respect to traffic management, the Environment Agency cannot take into consideration the movement of vehicles and plant outside of the permitted boundary as part of this permit application. The applicant is

obliged under planning to seek approval from the local authority of a traffic management plan and all necessary planning conditions must be discharged before site activities can be undertaken.

With respect to ecological monitoring, management and aftercare the applicant has submitted details pursuant to Condition 9 of appeal ref: APP/B3600/A/11/2166561. Mole Valley District Council stated on the 16th August 2016 that they had no objection to the proposals set out by the applicant.

Other issues that fall outside of the regulatory scope of both the Environment Agency and local Mineral Planning Authority have not been considered further and the reader should direct comments towards either the Department of Environment, Food and Rural affairs (Defra) or Department of Business, Energy and Industrial Strategy (BEIS) as appropriate.

- Sustainability
- Climate change

In addition a response to the minded to consultation raised the issue as to whether an authorisation under planning and authorised permit could be considered to cause private nuisance. A claim of private nuisance is a private right of action that a person in possession of land can make against a third party where there has been unlawful interference with that person's enjoyment of land. The Environment Agency cannot comment on whether an action in private nuisance may or may not be open to nearby residents of the Holmwood Well site. We can however say our determination of the application was reached using our normal regulatory principles. In this case we are satisfied that no pollution will result from the Holmwood Well site.

During the minded-to consultation several comments were received related to planning applications and environmental permitting of other sites. Only comments relevant to this application, the activity proposed and this specific site have been addressed in determining this application.

Seismic Hazards

Concerns over increased seismicity were raised as part of the public consultation. The Oil and Gas Authority are the lead regulator for seismic hazards.

Radioactive substance regulations

A standard rules environmental permit (SR2014 No 4) will be applied for by the applicant to allow the operator to carry on the accumulation and disposal of radioactive waste containment natural occurring radioactive material (NORM) arising from the production of oil and gas.

The rules allow NORM wastes to be accumulated and disposed of, in the form of gaseous waste, aqueous waste and solid waste. The rules limit the amount of aqueous radioactive waste that can be held on site at any one time and require aqueous and solid wastes to be disposed of within 3 months. The rules authorise these wastes to be disposed of by transfer to operators who are themselves permitted to receive and dispose of these radioactive wastes. The rules allow direct disposal of gaseous wastes to the environment.

In addition, the rules authorise:

- The disposal of any residual well stimulation fluids, containing NORM, which have remained underground rather than returned to the surface after use;
- The disposal to the underground strata of NORM present in water brought to the surface from the production of oil and gas.

For clarity, this is NORM that was present in the underground rock before the industrial activity took place, and has either remained there throughout or has been returned underground after being brought to the surface in the oil or gas abstracted from the rock.

The Health and Safety Executive regulates activities involving work with ionising radiation under the Ionising Radiation Regulations 1999 for the protection of the workforce. Those regulations cover accidents and contingency arrangements in the event of accidents involving radioactive materials and waste, including any off-site effects and response.

Decision checklist

| Aspect considered | Decision |
|--------------------------------------|--|
| Receipt of application | |
| Confidential information | <p>A claim for commercial or industrial confidentiality has not been made.</p> <p>The decision was taken in accordance with our guidance on confidentiality.</p> |
| Identifying confidential information | <p>We have not identified information provided as part of the application that we consider to be confidential.</p> <p>The decision was taken in accordance with our guidance on confidentiality.</p> |
| Consultation | |
| Consultation | <p>The consultation requirements were identified in accordance with the Environmental Permitting Regulations and our public participation statement.</p> <p>The application was publicised on the GOV.UK website.</p> <p>We consider this application to be of high public interest and so the Kent and South London Area team have advertised with the following persons and groups during the planning process and through the determination of the permit application:</p> <ul style="list-style-type: none"> • Sir Paul Beresford MP • Leith Hill Action Group • Norwood Hill Action Group • Brockham Oil Watch • General enquires from members of the public • Surrey County Council • Public Health England • Sutton and East Surrey Water (now SES Water) • Locally elected members of Surrey County Council and Mole Valley District Council • Capel Parish Council • Coldharbour Parish Council <p>As part of the determination of the permit application the National Permitting Service consulted the following:</p> <ul style="list-style-type: none"> • The application was advertised in the Surrey Mirror. • Mole Valley District Council • Surrey County Council • Public Health England • Health and Safety Executive • Oil and Gas Authority • Forestry Commission • Sutton and East Surrey Water (now SES Water) |

| Aspect considered | Decision |
|--|--|
| | <ul style="list-style-type: none"> • Natural England • Leith Hill Action Group <p>The comments and our responses are summarised in the consultation section.</p> |
| Operator | |
| Control of the facility | 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 facility | |
| The regulated facility | <p>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 RGN 2 'Defining the scope of the installation', Appendix 1 of RGN 2 'Interpretation of Schedule 1', guidance on waste recovery plans and permits.</p> <p>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.</p> |
| The site | |
| Extent of the site of the facility | The operator has provided plans which we consider are satisfactory, showing the extent of the site of the facility. The plan is included in the permit. |
| Site condition report | <p>The operator has provided a description of the condition of the site based on a desktop assessment, which we consider is satisfactory. The decision was taken in accordance with our guidance on site condition reports. We have included a pre-operational condition which requires the operator to submit a report that describes the baseline groundwater quality for the site from three groundwater monitoring boreholes installed around the site. This report must be provided before operations start at the site and this information will be used to update the initial site condition report submitted with the permit application. Monitoring of the groundwater level and quality will verify the operator's site conceptual model.</p> <p>The operator will also be undertaking soil sampling during the site construction phase to confirm the baseline condition of soils underlying the site. This information will be used to update the initial Site condition report.</p> <p>The operator must keep accurate records throughout the lifetime of their permit to show their activities have not adversely impacted the site. These records will be used in conjunction with the baseline soil and groundwater data and the site condition report to support any application to surrender the permit.</p> |
| Waste management plan | The operator has provided a waste management plan which we consider is satisfactory. |
| Biodiversity, heritage, landscape and nature | The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat. |

| Aspect considered | Decision |
|--------------------------------------|---|
| conservation | <p>We have assessed the application and its potential to affect all known sites of nature conservation, landscape and heritage and/or protected species or habitats identified in the nature conservation screening report as part of the permitting process.</p> <p>We consider that the application will not affect any sites of nature conservation, landscape and heritage, and/or protected species or habitats identified.</p> <p>We have consulted Natural England on the application. The decision was taken in accordance with our guidance. No formal response was received, however it should be acknowledged that Natural England have been involved throughout the planning application.</p> |
| Environmental risk assessment | |
| Environmental impact assessment | <p>In determining the application we have considered the Environmental Statement.</p> <p>We have also considered the planning permission and the committee report approving it.</p> |
| Environmental risk | <p>We have reviewed the operator's assessment of the environmental risk from the facility.</p> <p>The operator's risk assessment is satisfactory.</p> <p>The assessment shows that, applying the conservative criteria in our guidance on environmental risk assessment, all emissions may be categorised as environmentally insignificant.</p> <p>Please see key issues section for further details on mitigation measures proposed for the site.</p> |
| Operating techniques | |
| General operating techniques | <p>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.</p> <p>The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.</p> |
| Odour management | <p>We have reviewed the odour management plan in accordance with our guidance on odour management.</p> <p>We consider that the odour management plan is satisfactory.</p> |
| Noise management | <p>We have reviewed the noise risk assessment and management practices outlined in the applicants Environmental Risk Assessment (EOG-EPRA-HW-ERA-007) and Section 8.3 – Environmental Performance of the Flare Technical Document (EOG-EPRA-HW-FTD-008) in accordance with our guidance on noise management.</p> <p>We consider that the management practices outlined in the aforementioned documents are satisfactory.</p> |

| Aspect considered | Decision |
|----------------------------|---|
| Permit conditions | |
| Pre-operational conditions | <p>Based on the information in the application, we consider that we need to impose pre-operational conditions.</p> <p>Further information on pre-operational conditions can be found in the key issues section. Briefly these cover:</p> <ul style="list-style-type: none"> • Requirement to submit a method for calculating air emissions of oxides of nitrogen, carbon monoxide and TVOCs as set out in Schedule 3, table 3.1 of the permit. • Requirement to submit a CQA plan on site surfacing, secondary and tertiary containment at the wellsite. • Requirement to submit a CQA validation report on site surfacing, secondary and tertiary containment at the wellsite. • Requirement to submit baseline groundwater monitoring results and a report proposing compliance limits. • Requirement to submit a report detailing proposals for monitoring key indicators of chemical additives, including proposed compliance limits. |
| Emission limits | <p>Emissions limits for point source emissions to air have not been set within the permit with the exception of limits on temperature and flare gas feed flow rate. Oxides of nitrogen, carbon monoxide and TVOC will be calculated by the operator based on measurements made at the well head. Screening of the flaring activities undertaken by the operator and assessed by the Environment Agency have concluded that the impact to sensitive receptors is considered to be insignificant and that detailed or specific limits are not required.</p> <p>Environmental limit values for groundwater monitoring parameters will be agreed in advance of drilling operations commencing on site. These values will be based on baseline groundwater monitoring and will be regulated within the permit by a pre-operational condition (PO-3) set in Schedule 1, Table 1.2 of the permit.</p> |
| Monitoring | <p>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.</p> <p>These monitoring requirements have been imposed in order to monitor the efficacy of the site containment systems and effect of drilling operations on surface and ground water quality.</p> <p>A baseline monitoring program is currently being undertaken by the operator which will inform environmental limit values. We are satisfied that the baseline monitoring period is sufficient to establish the current quality of groundwater surrounding the site. This program will be completed prior to drilling operations commencing at the site and will be regulated through the permit.</p> <p>We made these decisions in accordance with the following guidance.</p> <p>https://www.gov.uk/government/publications/onshore-oil-and-gas-exploration-and-extraction-environmental-permits</p> |

| Aspect considered | Decision |
|----------------------------|--|
| | Based on the information in the application we are satisfied that the operator's techniques, personnel and equipment have where available either MCERTS certification or MCERTS accreditation as appropriate. If MCERTS certification or accreditation is not available the operator must seek approval from the environment agency prior to undertaking monitoring. |
| Reporting | We have specified reporting in the permit. Reporting frequencies specified for emissions to air, process monitoring and groundwater and surface monitoring are appropriate for the duration of the proposed activities and restoration of the site prior to permit surrender. |
| Operator competence | |
| Management system | There is no known 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. |
| Relevant convictions | The Case Management System has been checked to ensure that all relevant convictions have been declared. No relevant convictions were found. The operator satisfies the criteria in our guidance on operator competence. |
| Financial competence | We have carried out the standard checks that we are required to undertake when assessing a permit application. These include a check of the details held on the applicant at Companies House. The application for a mining waste activity not classified as a Category A facility as described within the Mining Waste Directive and relevant guidance and therefore does not require financial provision to be in place to ensure that there are sufficient funds to complete restoration works or remedial works. There is no known reason to consider that the operator will not be financially able to comply with the permit conditions, assuming an environmental permit were to be granted. |

| Aspect considered | Decision |
|---|---|
| Growth Duty | |
| Section 108 Deregulation Act 2015 – Growth duty | <p>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.</p> <p>Paragraph 1.3 of the guidance says:</p> <p>“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.”</p> <p>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.</p> <p>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.</p> |

Consultation periods

We have held two public consultation periods during the determination process for this application. The first statutory consultation period was from 06/04/2017 to 16/05/2017. During the statutory consultation period people were given the opportunity to view the initial application for the environmental permit. Following review of the application and the responses to the statutory consultation we proceeded to a further consultation period, the minded-to consultation. During the minded-to consultation people were given the opportunity to see and comment on the revised application documents, proposed draft environmental permit, the proposed draft decision document and to raise any new information they had in support or against the proposal. The minded-to consultation period was from 15/02/2018 to 29/03/2018 and included a public drop-in event, held at Dorking Halls on 15/03/2018.

Statutory consultation period

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

Responses from organisations listed in the consultation section

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| Response received from |
| Surrey County Council |
| Brief summary of issues raised |
| <p>The County Planning Authority has no views to make on the technical detail submitted for the permit application. However they note the following:</p> <ol style="list-style-type: none">1. That no permit is being sought for the Incineration of Natural Gas as the applicant states that the incineration of natural gas will not exceed 10 tonnes per day.2. Paragraph 6.5.1 of the Non-Technical Summary, paragraph 5.3.1 of the WR11 Notification Document² and paragraph 5.3.4.1 of the Waste Management Plan³ all titled “Acid Wash and Squeeze” states that “to improve the flow of petroleum within the Permian formation, an acid,[...]”. However the CPA note that in paragraph 6.4.2 ‘Main Drilling Operation’ under section Hole Section 6” it states that drilling will be down to the Corallian sandstone which is within the Upper Jurassic. The CPA believes the reference to ‘Permian’ is a typo and clarification sought from the applicant.3. Paragraph 5.4 “Environmental Setting” of the Site Condition Report⁴ states “An Ecology assessment was undertaken in support of the Planning Application East Riding of Yorkshire Council, [...] being of relevance to the proposed Holmwood wellsite”. The application site is within the County of Surrey. The Environmental Setting does not mention the Plantation on Ancient Woodland Sites (PAWS) which immediately abuts the western boundary of the application site.4. Appendix 2 – Groundwater Monitoring Strategy by envireau water (July 2016) does not include the additional Technical Note (dated 23 September 2016) that was submitted to the County Planning Authority and forms part of the Scheme of Groundwater and Surface Water Baseline Quality and Monitoring pursuant to Condition 15 of appeal ref: APP/B3600/A/2166561 (planning application ref: MO/2016/1292 approved 21 October 2016)5. Paragraph 5.3 “Waste Generating Activities” in the Waste Management Plan⁵ outlines that for clarity the target formations would include the Portland Sandstone, Micritic Limestone within the Kimmeridge Clay, Corallian Sandstone; and Great Oolite Group. However on reviewing the application documents for planning permission MO/2014/1006 which was for the ‘Underground drilling corridor of an exploratory hydrocarbon borehole’, the drawings and information provided as |

part of that application state that the “The Holmwood Prospect has two main hydrocarbon objectives, the Portland Sandstone and the Corallian Sandstone, both Jurassic in age” (paragraph 1.25 page 7, Chapter 1 of the Environmental Statement November 2014). Paragraph 1.27 provides further information on this point as well. Figure 1.10 in Chapter 1 also shows the trajectory to the target as being to these formations and no lower i.e. to the Oolite Group.

6. Paragraph 8.5 ‘Dispersion’ of the Odour Management Plan⁶ refers to meteorological monitoring taking place to assist in local modelling for any air dispersion from the West Firsby wellsite. The CPA believes this reference is a typo and clarification sought from the applicant. Additionally it is unclear whether the metrological monitoring would take place on site or off site.
7. Figure 5a “Well Construction Concept” within the Scheme of Monitoring for Exploratory Hydrocarbon Borehole (envireau water, July 2016) is different to figure 5a “Well Construction Concept” within the Hydrogeological Risk Assessment (envireau water March 2015) in terms of the depth of:
 - the drilling - the 2016 5a drawing goes to the Oxford Clay and Kellaways Formations yet the 2015 drawing goes to the Corallian Group
 - the surface casing 13 3/8” goes between 0 – 171m TVD yet on the 2015 drawing it goes between 0 – 460m TVD
 - the 2016 drawing shows a casing to 7” production liner yet in the 2015 drawing it shows open hole at 8 ½”
 - the 2016 shows drilling to a deeper depth to 1688m TVD yet the 2015 drawing shows drilling to 1450m/.

Summary of actions taken or show how this has been covered

Inconsistencies in the application as identified in the public consultation response from Surrey County Council have been noted and addressed through a Schedule 5 notice served to the applicant on the 19/06/2017. The response to this notice which was completed in full on the 05/01/2018 and a complete list of these documents has been made available on the relevant citizen space page as part of the minded to consultation and available through the public register.

Representations from community and other organisations

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| Response received from |
| Leith Hill Action Group |
| Brief summary of issues raised |
| <p>Financial. In short, the financiers of the drilling are technically insolvent.</p> <ol style="list-style-type: none">1. An assessment of the companies' finances has been provided and concludes that there is a significant risk that the operator may not be able to fulfil the restoration or remediation of the site if the company goes bankrupt prior to an application surrender the permit.2. A concern has been raised over the standard rules application with respect to finances. <p>Water. There are a number of respects in which EOG's application appears deficient.</p> <ol style="list-style-type: none">3. Risk to Groundwater Is Greater Than We thought in 2015 The applicant has not made an application for permits concerning a Groundwater Activity. This means they have made neither an application for Groundwater Activity (point source) nor for Groundwater Activity (discharge onto land).4. EOG Has Not Applied For A Permit Regarding Water Discharge Activity The applicant has not made an application for permits concerning a Water Discharge Activity. Based on the application it is expected that an application should be made for this activity. <p>Nature of application. Not in spirit of what the planning permission was granted.</p> <ol style="list-style-type: none">5. Concern has been raised over the use of acid at 'higher levels than one would normally expect from any kind of 'conventional' drilling'. Specifically the response states that 'acid fracking' occur and that this is analogous to hydraulic fracking. This the response stated could lead to increased risks of seismic disturbance and pollution of groundwater and other water courses with toxic chemicals.6. Request that specific chemicals to be used, the percentages of these chemicals and whether they include hydrofluoric acid should be made available to the general public.7. Detailed information should be provided on the handling of chemicals on site, whether the waste is to be reinjected or removed from the site and if the latter where it is to be treated.8. Concern raised of potentially carcinogenic air pollution from flares.9. Long term risks from toxic waste in the abandoned well. <p>Radioactive Substances.</p> <ol style="list-style-type: none">10. Concern of local residents that operatives might be dispersing radioactive substances that have remained undisturbed for millions of years. Specifically concerns have been raised about harmful levels of radioactive uranium in the waste products of the 'flow back'. |
| Summary of actions taken or show how this has been covered |
| <p>Points raised by the Leith Hill Action Group have been considered on their own merit. Where concerns raised have been addressed in the key issues document the reader is directed to the relevant section.</p> <ol style="list-style-type: none">1. The application for a mining waste activity not classified as a Category A facility as described within the Mining Waste Directive and relevant guidance (https://www.gov.uk/government/publications/environmental-permitting-guidance-the-mining-waste-directive) does not require financial provision to be in place to ensure that there are sufficient funds to complete restoration works or remedial works. The applicant has completed the appropriate declaration in part F of the application which requires that the applicant state whether the operator is subject to any insolvency procedures. The Environment Agency have no reason to suspect that the operator is not a fit and proper person to operate a permit. |

2. There is no requirement for the standard rules permit to consider the financial solvency of the operator beyond what is considered in Part F of the application form. The Environment Agency has no reason to suspect that the operator is not a fit and proper person.
3. The proposed activities at the Holmwood Wellsite as described in the application and additional information received in response to the Schedule 5 notice have been considered with respect to Schedules 21 and 22 to the Regulations, which cover groundwater protection. Further discussion on exemptions have been included in the Key Issues section at the start of this document.
4. The proposed site activities do not include a water discharge activity. The site will be sealed from groundwater and surface water receptors through site surfacing that meets the CIRIA C736 guidance. A construction quality assurance (CQA) report undertaken by a third party independent assessor is required to be submitted prior to drilling operations commencing. This will be reviewed and assessed by the Environment Agency. All formation water and recirculated drilling fluids stored at the site surface will be removed off site to a licenced facility. Where testing shows that material stored on site exceeds the thresholds listed in Schedule 23 of the Regulations these will be handled in accordance with the RSR standard rules permit which has been applied for separately to the mining waste permit described herein.
5. Acid wash and squeeze activities as described in the applicants waste management plan have been assessed by the Environment Agency, have been amended to ensure that the activity is purely to clear damage caused by drilling, and are now considered low risk. A discussion on this point has been made in the Key issues section at the start of the document.
6. A complete list of chemicals and proposed volumes have been made available by the application in Appendix 6 of the waste management plan (Rev7). This document is available for viewing on the public register and will form part of the minded to consultation. Where appropriate MSDS that cover propriety chemicals have bene excluded from the public register for commercial reasons. The chemicals have been assessed by the Environment Agency and their use is considered to fall within the exclusions set out in Schedule 22, paragraph 3.3(b) to Regulations.
7. Information on containment on site is discussed in detail within the Key issues section of this document. The Environment Agency consider that the management practices put in place by the operator will ensure that the risk to ground water and surface water bodies is minimal. The applicant has also committed to consigning material off site to authorised facilities. There will be no treatment of waste material on site which will be stored for offsite disposal or where relevant recovery.
8. The risk from flaring activities has been considered by the applicant and screened out as insignificant. The Environment Agency have undertaken their own assessment of the risk from flaring activities and conclude with this approach. Further information can be found in the key issues section at the start of this document.
9. The operator is require to undertake the restoration of the site in accordance with planning. Prior to surrender of the permit the operator must demonstrate that the site has been returned to a satisfactory state and that it meets the legal test of surrender as set out in RGN9.
10. The control, handling and disposal of naturally occurring radioactive materials will be covered under a standard rules permit. This is a precautionary management practice to mitigate the risk to receptors which is considered low. There will be no injection of radioactive materials or tracers as part of this application.

Representations from individual members of the public.

Statutory consultation period

Start: 06/04/2017 **End: 16/05/2017**

Responses from members of the public received during the consultation period have been grouped into common classes to aid in assessment and response. It is not considered appropriate to respond in detail to each representation as a total of 183 responses were received, with a large proportion of the responses citing multiple reasons.

Public responses have been grouped into common classes as outlined in the tables below. Of the fifteen common classes identified these have been where relevant grouped together. The rationale for this grouping is that emissions and control measures are common for these class types and aid the response in the key issues of the decision document. The grouped classes are listed in the table below.

The Environment Agency have taken the points raised into account during the permit determination where their remit allows. Common grouped classes have been addressed individually within the relevant section of the key issues document. Where errors or emissions to the original submission have been noted as part of the public consultation these issues have been addressed through the determination of the permit.

Holmwood Public Responses – Common issues

| |
|--------------------------------------|
| Habitat Concerns |
| Support Proposal |
| Radioactivity |
| Not supportive |
| Hazardous Emissions |
| Groundwater |
| Surface Water |
| Drinking Water |
| Sustainability |
| Acid wash, acid squeeze and Oil Wash |
| Visual Amenity |
| Traffic |
| Liability |
| Seismic Hazards |
| Fracking |

Holmwood Public Responses - Grouped classes

| |
|--|
| Deterioration of habitat |
| Supportive |
| Emissions (Radioactivity and Well Stimulation) |
| Not supportive (no reason cited) |
| Groundwater and Surface Water |
| Concerns outside of permitting |
| Seismic Hazards and Fracking |

Minded-to consultation period

The minded-to consultation period, from 15/02/2018 to 29/03/2018, included a drop-in at Dorking Halls on 15/03/2018. In addition to the Environment Agency, the Health and Safety Executive and the Oil and Gas Authority were present. This drop-in was attended by approximately 200 people. There was a mixture of support and concerns brought to the attention of the Environment Agency. Some of the issues raised were outside of the Environment Agency's remit, but we have captured the key issues raised in the decision document. The key concerns that were flagged up included issues relating to the planning application process, technical issues that are related to the permit application, financial and liability issues and staffing (resourcing) issues.

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

Minded to consultation period

Start: 15/02/2018 **End: 29/03/2018**

A total of 1899 consultation responses were received during the minded to consultation period. These responses have, as during the statutory consultation period in 2017, been grouped into common classes to aid in assessment and response. It is not considered appropriate to respond in detail to each representation as responses generally cover common themes. The common themes were identical to those raised in the previous statutory consultation period.

In addition several detailed reports and responses were submitted were received during the minded to consultation period. These have been considered by the relevant technical teams within the Environment Agency to ensure that we have taken all relevant factors into consideration during the determination of the permit application.

Our responses to the questions raised and the information received during the minded-to consultation are detailed in the main body of the decision document text and form the basis of our final decision.

Responses from the public and organisations:

| |
|--|
| Response received from |
| Public petition, via 38 Degrees – representing over 103,427 signatures at the time of the drop-in |
| Brief summary of issues raised |
| <ol style="list-style-type: none">1. We call on the Environment Agency (EA) to reject the environmental permit applications for Leith Hill in Surrey related to oil drilling. We think the potential water contamination risks are unacceptable.2. We also call on the EA to substantially extend and strengthen the water monitoring to more locations and over a longer time period. Water is both a vital natural resource and a heritage, which must be protected defended and treated as such.3. Additional comments (n=664) were received as part of submission of the 38 degrees petition. These have been grouped into similar classes as the statutory and minded to consultation and addressed fully within the key issues section of this document. |

Summary of actions taken or show how this has been covered

1. The Environment Agency have considered the risks from the proposed activities and have set out our position within the Key Issues section of this document. This includes the mitigation measures adopted by the operator to protect water supplies from contamination. The Agency is satisfied that where the operator adopts these measures then the risk to groundwater will be low.
2. Groundwater monitoring proposed by the applicant has been included in the permit for compliance purposes. However it should be noted that the applicant has not proposed a specific groundwater activity as listed within the Schedules of the regulation. As such we would not normally require specific groundwater monitoring. The proposed monitoring program is considered acceptable to demonstrate that site surfacing is effective and that harm is not occurring to sensitive receptors outlined within the application documents and subsequent revisions.
3. All comments have been addressed as grouped classes within the key issues document.

Response received from

Foley Report – Tapajos (PR417), Environmental Geology and Geotechnical Consultants Limited, commissioned by local residents and funded through a 38 Degrees petition / campaign.

Brief summary of issues raised**Conventional and unconventional methods of hydrocarbon exploration**

1. Concern has been raised over the inclusion of the Kimmeridge Micrites within the Kimmeridge Clay as a target reservoir formation as these will require acidisation and the claim that the Kimmeridge Micrite is a conventional oil play.

Acid wash and acid squeeze

2. There is concern that the acid squeeze is matrix acidisation, the volume of acid used for the acid squeeze should be limited in volume and concentration and data has not been presented for the mechanical properties of the formations targeted for the acid squeeze

Summary of actions taken or show how this has been covered

These points have been considered on their own merit. Where concerns raised have been addressed in the key issues document the reader is directed to the relevant section.

1. The application is for a mining waste permit to allow management of waste produced from drilling and testing one exploratory well. We have assessed the proposals to drill an exploratory well, and undertake acid wash and acid squeeze treatments as described in the applicant's waste management plan in each of the target formations. We consider that the acid wash and squeeze at this site meet the groundwater activity exclusion set out in Paragraph 3.3(b) of Schedule 22 to the Regulations. Whether a site or resource is considered 'conventional' or 'unconventional' is not a critical part of the Environment Agency's decision process. We are satisfied that a permit for a groundwater activity is not required for the applicant's proposals. If we consider that hydraulic fracturing is proposed, we assess whether we can permit it, or not and whether any further assessments are required before a decision is made. The applicant has not applied to undertake hydraulic fracturing. The permit will not allow the operator to undertake any hydraulic fracturing.
2. The use of acid at the Holmwood wellsite is discussed in detail within the key issues section under Groundwater Protection – Acid wash. The intention of this activity is to remove drilling induced damage only. The Environment Agency have not authorised matrix acidisation or stimulation of the formation for the purposes of enhanced recovery.

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| Response received from |
| Public response PR375 received from Keith Taylor, MEP for South East England |
| Brief summary of issues raised |
| <ol style="list-style-type: none"> 1. Concerns raised over the lack of time made available to make representations during the minded to consultation. 2. Concerns raised about the possibility of harm to drinking water as a result of containment failure during drilling and testing. The responses states that the precautionary principle should be adopted until it can be demonstrated to the satisfaction of the public that there will be no harm. 3. Concerns over the performance of other oil and gas operators within the Weald Basin. 4. Concerns over ability of Environment Agency to regulate the site after the granting of a permit. 5. Concerns over a lack of 3D seismic survey work being carried out to justify the borehole track. 6. Concern over acidisation at the target formation and pollution to groundwater. 7. Concerns over emissions from flaring activities. 8. Concerns over the amount of baseline monitoring at the site. |
| Summary of actions taken or show how this has been covered |
| <ol style="list-style-type: none"> 1. The Environment Agency have consulted twice on the application for a mining waste permit at Holmwood. The initial statutory consultation began on the 6th April 2017 and concluded on the 16th May 2017. The application was advertised in the Surrey Gazette and the application documents were available on the GOV.UK website. A second minded to consultation was begun on the 15th February 2018 and ended on the 29th March 2018. Throughout this time the Environment Agency has accepted representation from the public and other interested parties and the communications and engagement team have produced public briefing notes to inform stakeholders of progress with the application. The Environment Agency feel that sufficient time has been granted to allow for fair representation to be made and for these responses to be considered. 2. The Environment Agency have considered the risk to drinking water supplies and concluded that the management practices set out by the applicant are sufficient to mitigate the risk. Site surfacing will be installed in such a way that no contamination of surface water will occur. Drilling through the Hythe beds which are considered a principal aquifer will use only water or air and the cement casing bonding logs will be audited by the HSE to ensure that they meet the required integrity. 3. Applications for Environmental Permits from independent operators are treated independent of other legal entities. The Holmwood Site application has been considered in its own right. 4. Compliance activities will be undertaken by the Environment Agency area enforcement teams after the issue of the permit. Enforcement actions include suspension of permit activities, fines for non-compliance and revocation of the permit. 5. The Environment Agency has not requested additional 2D seismic data or 3D seismic data. The purpose of the permitted activity is to manage waste arising from the drilling of an exploratory borehole without well stimulation and testing of the borehole to determine whether petroleum is present. We have reviewed the method of construction of the proposed exploratory borehole and are satisfied that groundwater will be protected. In addition we are satisfied that control measures as set out in the waste management plan are sufficient to mitigate the risk to groundwater and surface water receptors. 6. The use of acid at the Holmwood wellsite is discussed in detail within the key issues section under Groundwater Protection – Acid wash. The intention of this activity is to remove drilling induced damage only. The Environment Agency have not authorised matrix acidisation or stimulation of the formation for the purposes of enhanced recovery. 7. The Environment Agency have set out its position with respect to flaring in the key issues section of this document. 8. The principle behind the proposals for baseline monitoring have been agreed between the Environment Agency and the applicant. These will be submitted for assessment prior to the commencement of drilling operations and are enforced through the permit as part of a pre-operational measure (PO-4). |

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| Response received from: |
| A Voice for Leith Hill: Response to the Environment Agency in the context of relevant geology and hydrogeology by Professor David Smythe. Submitted to the Environment Agency on the 3 rd April 2018 as part of the minded to consultation. |
| Brief summary of issues raised |
| <ol style="list-style-type: none"> 1. Concerns over lack of seismic reflection information to define faulting and target structures and uncertainty of the geological interpretation. The response also states that the applicant should be required to acquire additional 2D seismic data or 3D seismic data and interpret this before pursuing the Holmwood prospect 2. Concern over poor understanding of the structure of the shallow geology of the Hythe Formation Principal Aquifer and misleading conclusions on the groundwater flow direction. 3. Concern over the wellbore design including the conductor casing is too short and will not penetrate into the Weald Clay and the deviation angle of the well through the Weald Clay 4. Concern over acidisation in the target formations including the acid squeeze constitutes matrix acidisation. 5. Concern regarding the inclusion of the Kimmeridge Micrites within the Kimmeridge Clay as a target reservoir and these should be considered as an unconventional resource because their permeability is too low to allow hydrocarbon flow without treatment of the rock |
| Summary of actions taken or show how this has been covered |
| <ol style="list-style-type: none"> 1. The Environment Agency has not requested additional 2D seismic data or 3D seismic data. The purpose of the permitted activity is to manage waste arising from the drilling of an exploratory borehole without well stimulation and testing of the borehole to determine whether petroleum is present. We have reviewed the method of construction of the proposed exploratory borehole and are satisfied that groundwater will be protected. In addition we are satisfied that control measures as set out in the waste management plan are sufficient to mitigate the risk to groundwater and surface water receptors. 2. The Environment Agency is satisfied that adequate information has been submitted in the Site Condition Report, the Hydrogeological Risk Assessment and the Technical Note to show how the groundwater immediately beneath the site, the groundwater that feeds to the local Pipp Brook and that provides water to local springs, private supplies and, indirectly, to public water supplies, would be protected. We have considered the risk to the Hythe Formation Principal Aquifer and concluded that the management practices set out by the applicant are sufficient to mitigate the risk. We have considered the risk to any sandstone and limestone layers, if present within the Weald Clay Formation beneath the site, and have concluded that the management practices set out by the applicant are sufficient to mitigate the risk. The principles behind the proposals for baseline groundwater and surface water monitoring have been agreed between the Environment Agency and the applicant. These will be submitted for assessment prior to the commencement of drilling operations and are enforced through the permit as part of a pre-operational measure (PO-4). Should the construction of the groundwater monitoring boreholes identify that the groundwater flow direction is different from the anticipated groundwater flow direction stated in the Hydrogeological Risk Assessment, a fourth groundwater monitoring borehole may need to be installed. 3. We have reviewed the method of construction of the proposed exploratory borehole and we are satisfied with the proposals to install the conductor casing into the top of the Weald Clay, at approximately 50m true vertical depth. The Environment Agency has set out its position on the well design with respect to groundwater protection in the key issue section of this document. 4. The use of acid at the Holmwood wellsite is discussed in detail within the key issues section under Groundwater Protection – Acid wash. The intention of this activity is to remove drilling induced damage only. The Environment Agency have not authorised matrix acidisation or |

stimulation of the formation for the purposes of enhanced recovery.

5. The application is for a mining waste permit to allow management of waste produced from drilling and testing one exploratory well. We have assessed the proposals to drill an exploratory well, and undertake acid wash and acid squeeze treatments as described in the applicant's waste management plan in each of the target formations. We consider that the acid wash and squeeze at this site meet the groundwater activity exclusion set out in Paragraph 3.3(b) of Schedule 22 to the Regulations. Whether a site or resource is considered 'conventional' or 'unconventional' is not a critical part of the Environment Agency's decision process. We are satisfied that a permit for a groundwater activity is not required for the applicant's proposals. If we consider that hydraulic fracturing is proposed, we assess whether we can permit it, or not and whether any further assessments are required before a decision is made. The applicant has not applied to undertake hydraulic fracturing. The permit will not allow the operator to undertake any hydraulic fracturing.

Response received from

Public response PR1888, received from the Campaign to Protect Rural England, Surrey Branch

Brief summary of issues raised

1. Comment on the whether the risks to groundwater have been properly assessed with respect to the proposed design and specification of the well.
2. Comment on whether the Weald clay can be considered to be an effective barrier due to sandstone and limestone inter beds; the latter forming locally import aquifers supporting domestic supplies and spring-flow to surface water courses.
3. Concern over the information made available to the regulator for the assessment of hazardous properties of chemicals. Specific concern made to proprietary titles.
4. Request for an explanation of acid wash and squeeze and why a more aggressive acid has not been used and why a maximum permissible pressure has not been stipulated in the permit.
5. Concern over the resources available to the Environment Agency to ensure compliance.
6. Request for independent monitoring as self-regulation is not deemed sufficient to protect environment.

Summary of actions taken or show how this has been covered

1. Risks to groundwater have been assessed by the environment agency for all activities authorised under the permit including the drilling of the H1 well. A detailed response to the design and specification of the well has been produced in the Key Issues section of the document under Groundwater protection – Well design and Well integrity.
2. As described in the Key issues section under Groundwater protection further information has been received from the applicant as a result of a request for information from the Environment Agency. This sets out in greater detail why the operator believes that the Weald Clay can act as an effective barrier. The Environment Agency are satisfied with this explanation and have agreed to permit the use of oil based muds within the Weald Clay.
3. All chemicals proposed on site have been submitted for formal assessment by the Environment Agency. Further information on assessments and the de-minimis assessment can be found in the key issues section of this document under Groundwater protection – Chemical additives.
4. A fully description of acid wash and squeeze has been provided in the key issues section of this document under Groundwater protection – Acid wash and squeeze. The applicant cannot at this stage know what pressures the acid wash and squeeze activities will take place at, but have made a commitment not to exceed the formation fracture pressure which will be derived during drilling.
5. Compliance activities will be undertaken by the Environment Agency area enforcement teams after the issue of the permit. Enforcement actions include suspension of permit activities, fines for non-compliance and revocation of the permit. Sufficient resources will be made available by the regulator to achieve these requirements.

6. The site operator is responsible for environmental monitoring as set out in the permit. The Environment Agency examine data and records to ensure that they are abiding by the permit conditions. In some cases, depending on the risks presented by the site, we may undertake extra monitoring ourselves. All monitoring must be conducted by companies accredited by the Environment Agency's Monitoring Certification Scheme (MCerts).

Response received from

Public response PR1884

Brief summary of issues raised

1. Comment that an appropriate hydrogeological understanding has not been demonstrated in the permit application or draft notice.
2. Submission of Tapajos Ltd report for consideration.
3. Concern raised over the pollution risks to the chalk aquifer which runs from Croydon, under Leatherhead and Dorking to Guildford and beyond.
4. Criticism raised over the length of time allowed for the minded too consultation period despite representation made to the Environment Agency. This extended time would have been used to commission further consultation on application documents.
5. Concern over possible emissions of hazardous chemicals to groundwater, air and surfacewater.
6. Concern over impact of noise and visual amenity.

Summary of actions taken or show how this has been covered

1. Concerns that an appropriate hydrogeological understanding has not been demonstrated have been addressed fully within the responses to the Tapajos Ltd report in this section and within the Key issues section of this document under the Groundwater protection sections.
2. The Tapajos Ltd report has been assessed by the Environment Agency and responses made in this document. Please see page 26 of this document for further information.
3. The Environment Agency has set out in detail the mitigation measures that the site proposes to adopt to protect groundwater. It should be noted that Environment Agency have only considered geology relevant to the site location. The White chalk sub group referenced in the public response outcrops to the North of the site and therefore hasn't been included in our consideration.
4. The Environment Agency have consulted twice on the application for a mining waste permit at Holmwood. The initial statutory consultation began on the 6th April 2017 and concluded on the 16th May 2017. The application was advertised in the Surrey Gazette and the application documents were available on the citizen space page. A second minded to consultation was begun on the 15th February 2018 and ended on the 29th March 2018. Throughout this time the Environment Agency has accepted representation from the public and other interested parties and the Customers and Engagement team have produced public briefing notes to inform stakeholders of progress with the application. The Environment Agency feel that sufficient time has been granted to allow for fair representation to be made and for these responses to be considered.
5. The Environment Agency have discussed the emissions of hazardous chemicals to groundwater, air and surfacewater and the mitigation measures adopted in the Key Issues section of this document. We consider the approach taken by the operator to be satisfactory.
6. The impact of noise has been considered under the Key issues section. Due to the limited time that the site intends to operate for the effect of site activities is likely to be short lived and has been considered acceptable. Further constraints on noise impacts have been put on the operator by the local authority and will be enforced accordingly.

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| Response received from |
| Public response PR78 |
| Brief summary of issues raised |
| <ol style="list-style-type: none"> 1. Comment raised about the reduction of the projected distances that the acid will penetrate into the formation during acid squeeze, whilst using more acid than stated in the original WMP (EOG-EPRA-HW-WMP-005 R1). 2. Comment that without information on the length and number of perforations at the target formations then it cannot be said with certainty how far the acid will travel from wellbore into the formation. 3. Query over whether the decision document which states to 1 metre of penetration of acid during acid squeeze should be amended to state the maximum formation invasion as stated in the revised WMP. 4. Query as to how the 1 metre radius from wellbore can be achieved during acid wash given the increased volume. Supporting information – ‘Discussion Calculated Acid Volume Threshold’ has been provided to support this query. 5. Comment as to whether Europa’s description of acid squeeze is more consistent with the EA’s description of matrix acidisation and should therefore be referred to as a stimulation method. 6. Comment on what information will be submitted to the Environment Agency and Health and Safety Executive, what is the frequency and what enforcement options are in place for non-compliance. |
| Summary of actions taken or show how this has been covered |
| <ol style="list-style-type: none"> 1. The Environment Agency have as described within the Key Issues section under Groundwater protection – Acid wash and squeeze the information that has been requested by the applicant to clarify the use of acid as both an acid wash and squeeze activity. The intention of the acid squeeze is to clear out pores and existing fractures in the near wellbore area which could potentially be damaged from the initial drilling operation. The intent is not to enlarge or create new fractures in the formations. The acid will be pushed a short way into the formations at a pressure greater than the formation pressure, but below the fracture pressure. The fracture pressure of the formation will be determined during the main drilling operation and the acid squeeze will be undertaken below this pressure. We have reviewed the volumes and chemicals proposed for the acid wash and acid squeeze treatments for the target formations and we are satisfied that these will not have a discernible impact on groundwater in the target formations and will be fully recovered. The Environment Agency are satisfied has considered the acid wash and squeeze activities as described in the waste management plan and concluded that they meet the groundwater activity exclusion set out in Paragraph 3.3(b) of Schedule 22 to the Regulations. 2. As above 3. The use of acid at the Holmwood wellsite is discussed in detail within the key issues section under Groundwater Protection – Acid wash. The intention of this activity is to remove drilling induced damage only. The Environment Agency have not authorised matrix acidisation or stimulation of the formation for the purposes of enhanced recovery. 4. Compliance activities will be undertaken by the Environment Agency area enforcement teams after the issue of the permit. Enforcement actions include suspension of permit activities, fines for non-compliance and revocation of the permit. Sufficient resources will be made available by the regulator to achieve these requirements. |

Response received from

Public response received from Leith Hill Action Group

Brief summary of issues raised

1. Comment on the site plan as shown on pp5-6 of site plants is substantially enlarged from the site that was given approval by HM Inspector in spring 2015 and does not have planning permission.
2. Comment that the application indicates a far greater risk to the environment and SES Water supply than was previously thought at the time of the Public Inquiry in Spring 2015;
 - The first general area of concern is **water**. There are a number of respects in which EOG's application appears deficient as compared with how it should be approaching such a vital natural resource.
 - The second general area of concern is the **nature of what is being applied for**. There are some elements of this that we do not believe are in the spirit of what planning permission was granted for.
3. We have to question whether the risks to the groundwater environment from the proposed design and spec of the well were acceptable, given the geophysical evidence presented. The conclusion is reached that by changing the drilling angle, the drill string will only pass through faults in the Weald Clay – implying that this formation is not subject to movement on the faults identified by Envireau Water in their March 2015 Risk Assessment (Fig. 5a) and is uniformly impermeable. LHAG believe that neither assumption can be correct.
4. Following on from the above, there is a reference to the Weald Clay as an “important protective layer” implying that it would be an impermeable barrier to the migration of hazardous fluids. In fact, the term “clay” is somewhat misleading here as the formation comprises a complex of indurated mudstones inter-bedded with extensive lenses of sandstone and limestone; the latter forming locally important aquifers supporting domestic supplies and spring-flow to surface water courses. For this reason, we would not agree that the revised design has met the expected requirements.
5. Comment on whether higher levels of acid are being used than in ‘conventional drilling’ and that this is being used to allow the operator to undertake acid fracking. Where the applicant has not provided a detail hazard assessment then the application should be refused on the basis of the precautionary principle.
6. Comment that information should be available to the Environment Agency and the general public, concerning the specific chemicals to be used, the percentages of these chemicals and whether they include hydrofluoric acid.
7. Comment of concern over the application for a standard rules radioactive substances regulation permit and the risk of emissions of hazardous radioactive substances.
8. Concern over the funds that the operator holds and whether they are able to comply with all the mitigation measures that they have committed to.

Summary of actions taken or show how this has been covered

1. The Environment Agency is satisfied that the mining waste and oil storage activities listed in the permit can be undertaken within the boundary as set out in Schedule 7 of the permit and there is no contradiction in planning. It is the operators' responsibility to comply in full with any planning requirements.
2. Risks to groundwater have been assessed by the environment agency for all activities authorised under the permit including the drilling of the H1 well. A detailed response to the design and specification of the well has been produced in the Key Issues section of the document under Groundwater protection – Well design and Well integrity.
3. As above [2]
4. As above [2]
5. A fully description of acid wash and squeeze has been provided in the key issues section of this document under Groundwater protection – Acid wash and squeeze. The applicant cannot know what pressures the acid wash and squeeze activities will take place until they have drilled the hole at but have made a commitment not to exceed the formation fracture pressure which will be derived during drilling.
6. All chemicals proposed on site have been submitted for formal assessment by the Environment Agency. Further information on assessments and the de-minimis assessment can be found in the key issues section of this document under Groundwater protection – Chemical additives. For clarity the permit does not authorise the use of hydrofluoric acid.
7. Radioactive substances regulation has been described in detail within the relevant section of the Key Issues Document. The standard rules permit allows for the control of low-level radioactive material that may be encountered within formation water. The SR set sets out the obligations that the operator has for the assessment and disposal of material where it occurs.
8. We have carried out the standard checks that we are required to undertake when assessing a permit application. These include a check of the details held on the applicant at Companies House. The application for a mining waste activity not classified as a Category A facility as described within the Mining Waste Directive and relevant guidance and therefore does not require financial provision to be in place to ensure that there are sufficient funds to complete restoration works or remedial works. There is no known reason to consider that the operator will not be financially able to comply with the permit conditions, assuming an environmental permit were to be granted.