Environment Agency permitting decisions

Bespoke permit

The Permit Number is: EPR/CB3300KR

The Applicant / Operator is: Hutton Energy UK Limited

The Site is located at: Harlequin 3 Wellsite, Land Adjacent to A52, Grantham Road, Radcliffe on Trent, Nottinghamshire, NG12 2AW

Consultation commenced on: 06/01/2015

Consultation ended on: 06/02/2015

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

Purpose of this document

This document explains how we have considered the Applicant's Application to permit a mining waste operation for the Harlequin 3 wellsite, and why we have included the specific conditions in the permit we are issuing to the Applicant. It is our record of our decision-making process, to show how we have taken into account all relevant factors in reaching our position. Unless the document explains otherwise, we have accepted the Applicant's proposals.

Preliminary information

We gave the Application the reference number EPR/CB3300KR/A001. We refer to the Application as "the **Application**" in this document in order to be consistent.

The number we have given to the permit is EPR/CB3300KR. We refer to the permit as "the **Permit**" in this document.

The Application was duly made on 15/12/2014.

The site for the proposed mining waste operation is located at: Land Adjacent to A52, Grantham Road, Radcliffe on Trent, Nottinghamshire, NG12 2AW.

Use of terms

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

Drilling muds

Drilling muds are used to lubricate the wellbore while drilling.

Drill cuttings

Drill cuttings are broken bits of solid material naturally occurring underground and removed from a borehole as part of the drilling process into underground formations.

Prospecting

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

Extractive waste

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

Cement

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

Regulated facility

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

This decision document:

- explains how the application has been determined
- provides a record of the decision-making process
- shows how all relevant factors have been taken into account
- justifies the specific conditions in the permit other than those in our generic permit template.

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

Structure of this document

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

Key issues of the decision

1. Brief outline of process

The operator intends to carry out the boring of up to 2 vertically inclined boreholes for the purposes of prospecting for hydrocarbon resources with well stimulation. The planned operations are assessed by the operator as an appraisal borehole for Mineral Exploration. This application is for a vertically inclined well drilled to a depth of approximately 950 metres.

The well construction will take place in stages. The drilling method and any additives are detailed in the Waste management Plan.

- The first stage will involve the use of a waterwell drilling rig to drill a 17½" hole to a depth of approximately 12m Target Vertical Depth Ground Level. A 14" conductor casing will then be run to the surface before the oilfield rig is moved onto location.
- Next a 12¼" vertical hole section will be drilled to a depth of approximately 265m TVD GL, within the Triassic formation. Once this hole section has been drilled a 9⅝" casing will be run and cemented back to the surface. The 9⅝" casing will provide isolation of the shallow aquifer located within the Triassic formation prior to drilling into the carboniferous formations. This will then be cemented back to the surface to ensure a high level of well integrity. A water and polymer mud system will be used to drill this section.
- From approximately 265m TVD GL to approximately 600m TVD GL a 8½" hole will be drilled and set just above the Wingfield Flags using a salt saturated inhibited water based mud system. A 7" casing will then be run and cemented back to surface, this will isolate any unconsolidated formations, potential loss zones, halite sections and provide integrity prior to the next section being drilled.
- The next stage will be the final drilling phase, a 6" hole will be drilled to the target depth of approximately 950m TVD GL, through the target formations. A 4½" slotted liner with swellable packers will be run and set across the petroleum reservoir(s) back to the 7" casing. The swellable packers will provide zonal isolation between the reservoirs and allow for subsequent selection of the reservoirs for petroleum production. Finally a 2⅞" completion and 2⅞" tubing will then be run into the well to provide conduit for petroleum to flow to the surface. During this drilling phase an inhibited and weighted water based mud system will be used.
- The composition of drilling muds for each section are detailed in the Waste Management Plan.

Once the drilling of the well is completed well testing will commence. During the drilling and well construction phases geological logging is undertaken to determine whether formations contain petroleum. This borehole log will help identify which zones justify subsequent testing. There is a suite of tests that could be used, depending on the results of the borehole logs and geological formations being encountered.

- Drill Stem Test (DST) is a short duration test to provide initial analysis of the petroleum composition and its flow characteristics within the formation. In order to establish communication between the formation and wellbore, perforation guns will be run into the wellbore and fired, providing a direct pathway from the formation to the wellbore, through which petroleum can flow. Temporary isolation packers will be run into the well on a completion string and set above and below the perforation providing isolation between the formation being tested and the remainder of the wellbore. The temporary completion is then connected at the surface to a testing tree through which petroleum is channelled into fluid separation equipment located on site.

- Any natural gas associated with the flowing of oil to the surface will be diverted via temporary pipework to an enclosed single-point flare (in line with BAT) located on the site for incineration. The flare is equipped with propane fuel which is always on pilot. This will ensure immediate ignition as soon as gas is present and reignition if there is a break in flow.

- Acid wash and Squeeze - Hydrochloric acid at 15% concentration with water is used during well clean up and flow testing operations. The acid is used to expand existing channels within the sandstone or carbonate formation to aid petroleum products to flow to surface. An acid squeeze will apply pressure to the formation not exceeding the fracture pressure to force the acid through the natural fractures to increase the near hole permeability. Hydrochloric acid used during well clean up and flow testing operations will be reverse circulated to surface where it is stored in tanks (1m3 IBC’s) for subsequent offsite disposal to a licenced waste facility.

- Formation water is water that occurs naturally within the pores of the rock. During the drilling and well testing operations, formation water may be encountered. Formation water during drilling will be mixed with the drilling mud and circulated to surface. Mud volumes are continually monitored and will identify if significant ingress of formation water occurs, although the hydrostatic weight of the drilling mud should prevent such an occurrence. If formation water is encountered, it will be separated at surface and transferred to storage tanks (60m3) for subsequent offsite disposal via a licenced facility.

- Samples of produced water will be sent to an accredited laboratory for radionuclide analysis to ascertain whether any Naturally Occurring Radioactive Material are present, and if so determine the concentration.

- To aid the flow in the wellbore nitrogen may be injected to displace wellbore fluids and reduce the hydrostatic weight. Nitrogen is classified as an inert waste and venting nitrogen extracted from the atmosphere back to the atmosphere is considered a closed loop system.

- The management of all extractive waste will be confined to the area of approximately 0.8 hectares, this includes the 230 metre access road.

The drilling and management of the extractive waste are regulated under different regimes. An Operator will need planning permission from the local Minerals Planning Authority, and a Petroleum Exploration and Development Licence (PEDL) from the Department of Energy and Climate Change (DECC).

This Application is only for a permit for the management of the non-hazardous and hazardous extractive waste and waste gas, should it arise, resulting from prospecting for oil.

If, following this stage, the Applicant decides it wishes to proceed either to further testing using well stimulation and/or to extraction (including pre-production development), a variation of the permit will be required.

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

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

The discarded drill cuttings, produced water, spent drilling muds, spent hydrochloric acid and cement are considered to be extractive waste and as such fall to be regulated under the Mining Waste Directive (MWD). Although not anticipated, there is a possibility the Operator will have to deal with natural gas in the event that formations are over-pressurised, which will be hazardous waste. The Applicant has considered this and provided monitoring and mitigation measures in the Waste Management Plan and Environmental Risk Assessment.

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

The permit will authorise the management of waste generated by well stimulation. As such, there is the potential to produce oil and gas from the well. This is the threshold requirement to classify the operation as a NORM Industrial Activity (NIA). A radioactive substances permit is therefore required, and has been applied for under a separate application.

2. Summary of our proposed decision

We have decided to grant the Permit to the Applicant. This will allow it to operate the mining waste operation for the management of extractive waste arising from prospecting for mineral resources limited to mineral resources with well stimulation.

We consider that, in reaching that 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 Permit contains conditions taken from our standard Environmental Permit template including the relevant Annexes. We have developed these conditions in consultation with industry having regard to the legal requirements of the Environmental Permitting Regulations, Mining Waste Directive and other relevant legislation. This document does not therefore include an explanation for these standard conditions. Where they are included in the permit, we have considered the Application and accepted the details are sufficient and satisfactory to make the standard condition appropriate.

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

3. How we took our decision

The Application was duly made on 15/12/2014. This means we considered it was in the correct form and contained sufficient information for us to begin our determination but not that it necessarily contained all the information we would need to complete that determination.

We carried out consultation on the Application taking into account the Environmental Permitting Regulations and our statutory Public Participation Statement.

We advertised the Application by a notice placed on our website, which contained all the information required by the regulations, including telling people where and when they could see a copy of the Application. Due to the Christmas holiday period the start of the consultation period was delayed until 06/01/2015. The delay did not, however, impinge on the consultation period but allowed for staff to be present to manage any issues should they arise. The consultation period concluded on 03/02/2015.

We placed a paper copy of the Application and all other documents relevant to our determination on our Public Register at The Environment Agency Trentside Office, Trentside North, West Bridgford, Nottingham, NG2 5FA. We also sent a copy to Nottinghamshire County Council for its own Public Register. Anyone wishing to see these documents could do so and arrange for copies to be made.

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

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

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

Further details along with a summary of consultation comments and our response to the representations we received can be found in Annex 1. We have taken all relevant representations into consideration in reaching our determination.

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

Following the submission of the permit application we requested further information on the documents submitted via a schedule 5 notice. Additional information was subsequently received on 28/01/15. The Non-technical Summary was amended to include descriptions detailing integrity tests for the well casing, casing and grouts in the annulus between the well casing and borehole wall. Annex A and J of the Environmental Risk Assessment was amended to reflect the geological strata associated with the application.

A second schedule 5 notice was issued on 20/02/15 requesting information on the proposed ground flare. The information was returned on 10/03/15 and consisted of a detailed schematic of the proposed ground flare to be used on site and a detailed table highlighting the criteria considered Best Available Technique by the Environment Agency for an enclosed ground flare. See section 5.3 Waste management activities; for further details. We provided the public with an opportunity to comment on the Application and describe in Annex 1 how we have addressed issues raised.

4. The legal framework

The Permit is granted under regulation 13 of the Environmental Permitting (England and Wales) Regulations 2010, which regulates facilities whose activities involve water discharges and groundwater activities, radioactive substances, waste, mining waste or which are listed in schedule 1 to the 2010 Regulations. The Environmental Permitting regime is the regulatory framework which requires the Environment Agency to deliver the obligations required by national policy and various EC Directives.

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

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

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

5. Description of the operation

Description of the site and related issues

5.1 Location

The site is called the Harlequin 3 Wellsite and is located at Land adjacent to the A52, Grantham Road, Radcliffe on Trent, Nottinghamshire.

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

- The nearest residential properties are Hill Farm located approximately 250 metres east of the site, Spellow Farm located 450 metres to the north west and a group of properties close to the junction of Saxondale Drive approximately 260 metres to the south west of the site.
- The nearest main watercourse, a culverted drain which feeds a tributary of the River Trent, is situated over 140 metres to the north of the site.
- The nearest protected species and habitats are over 1km from the site;
- The nearest local wildlife site Saxondale Railway and active railway cutting is approximately 140 metres north of the site.
- The nearest local nature reserve is located approximately 2.6km to the west of the site.
- There are no designated European sites within 10 km of the site.
- The site is not within a Groundwater Source Protection Zone;
- There are no Sites of Special Scientific Interest (SSSI) within 1 km of the site. The nearest SSSI is approximately 6.2 km distant.

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

5.2 What the regulated facility does

The permit will authorise the operation of a regulated facility, namely a mining waste operation for the management of extractive waste not including a waste facility. With the exception of any gas that may arise, all other wastes will be non-hazardous.

5.3 Waste management activities

The following text is a brief description of how the wastes arise and what will happen to them.

The proposal is to drill a vertically inclined pilot hole termed ‘Harlequin 3’. The drilling operation from start to installation of the completion is estimated to take around 10 weeks using a compact drilling unit. The drilling will utilise a closed loop drilling fluid (known as drilling “mud”) system to remove drill cuttings from the well bore and maintain hydrostatic pressure and control the temperature of the drill bit. Aquifers will be drilled through in the shortest possible time with water based drilling muds. The well bore will then be cased off and cemented to prevent any further aquifer impact. During the drilling programme a number of extractive wastes are produced, these principally include: drilling muds, drill cuttings, cement, produced water and spent hydrochloric acid. These wastes will be temporarily stored on site in suitable containment before being transferred to an appropriately permitted waste treatment facility. We have put a restriction in the permit requiring the Operator to obtain

written approval from the Environment Agency before any flaring takes place. We are satisfied that the operating procedures will minimise the emissions as far as practicable and that there is still a high level of protection for the environment as a whole. We have reviewed the information submitted and we are satisfied that the design of the flare is appropriate to achieve efficient combustion of the gas at various rates.

The Applicant proposes to use an enclosed ground flare, which we consider to be BAT for the disposal of waste gas. An enclosed flare provides abatement for noise and for visual impact and this technology is preferred over the use of an open flare or venting directly to air. The permit limits the flaring of gas to a maximum of 14,158 cubic metres per day as set out in the Waste Management Plan and on which the Air Quality Modelling was based.

On completion of the drilling phase, the drilling unit will be moved off location and (in the event that hydrocarbons are discovered) a separate well testing programme shall be conducted.

The wastes that will need to be managed on site are:
1. Drilling muds and Drill cuttings;

- Waste clays and sand (EWC code 01 04 09) non hazardous, estimated quantity 2.21m³. The waste will be minimised through the selection of a drill bit size that is comparable to the hole size required for each section of the well bore. The waste will be transported off site via a licensed haulier to a permitted composting facility for treatment.
- water based rock cuttings (EWC code 01 04 08) non hazardous, estimated quantity 23m³. The waste will be minimised through the selection of a drill bit size that is comparable to the hole size required for each section of the well bore. The rock cuttings tank is a fluid separator tank (perforated false floor) which allows drilling muds coated to the rock cuttings to percolate down through the false floor where it is collected and pumped back to the closed loop system. The waste will be transported off site via a licensed haulier to a permitted composting facility for treatment.
- Salt saturated rock cuttings (EWC code 01 05 08) non hazardous, estimated quantity 39m³. The waste will be minimised through the selection of a drill bit size that is comparable to the hole size required for each section of the well bore. The rock cuttings tank is a fluid separator tank (perforated false floor) which allows drilling muds coated to the rock cuttings to percolate down through the false floor where it is collected and pumped back to the closed loop system. The waste will be transported off site via a licenced haulier to a permitted composting facility for treatment.

- Fresh water drilling muds and waste (EWC code 01 05 04) non hazardous, estimated quantity 41m³. Drilling mud waste is minimised by continually reusing the mud in a closed loop system and sustained by way of filtering out rock cuttings and finer particles of rock. The rock cutting tank is a fluid separator tank (perforated false floor) which allows drilling muds coated to the rock cuttings to percolate down through the false floor where it is collected and pumped back to the closed loop system. When the drilling mud weight exceeds the prescribed mud weight, the drilling mud will be diluted. Dilution requires the removal of a prescribed volume of active mud and the dilution of the remaining volume with new drilling mud. Periodically the drilling mud system will be completely changed depending on the formation being drilled. Drilling muds become a waste when no longer required for use in the operation, at which point drilling mud will be transferred via a vacuum tanker to a permitted composting facility for treatment via a licensed haulier.
- Chloride containing drilling muds and waste (EWC code 01 05 08) non hazardous, estimated quantity 142m³. Drilling mud waste is minimised by continually reusing the mud in a closed loop system and sustained by way of filtering out rock cuttings and finer particles of rock. The rock cutting tank is a fluid separator tank (perforated false floor) which allows drilling muds coated to the rock cuttings to percolate down through the false floor where it is collected and pumped back to the closed loop system. When the drilling mud weight exceeds the prescribed mud weight, the drilling mud will be diluted. Dilution requires the removal of a prescribed volume of active mud and the dilution of the remaining volume with new drilling mud. Periodically the drilling mud system will be completely changed depending on the formation being drilled. Drilling muds become a waste when no longer required for use in the operation, at which point drilling mud will be transferred via a vacuum tanker to a permitted composting facility for treatment via a licensed haulier.

2. Cement:

- Concrete (EWC code 17 01 01) non hazardous, estimated quantity 25m³. the amount of cement required is carefully calculated by a competent contractor to reduce the amount of potential waste, precise volumes are batched mixed on site to allow control of quantities used. Excess returns are transferred to a builders skip for removal to a permitted waste treatment facility where it is recycled as building rubble for use in the building industry.

3. Produced water;

- Aqueous liquid wastes other than those mentioned in 16 10 01 (EWC code 16 01 02) non hazardous, estimated quantity 1503m³. The only process to minimise produce water is to re-inject back to the formation, which is not being conducted at the Harlequin 3 site. Following testing by radionuclides analysis, produced water will be transported via a licensed haulier to either a permitted waste

treatment facility for treatment and disposal, or to a bespoke RSR permitted waste treatment facility for treatment and disposal in accordance with BAT.

5. Spent hydrochloric acid:

- Aqueous liquid wastes other than those mentioned in 16 10 01 (EWC code 16 01 02) non hazardous, estimated quantity 11m³. The acid will be used in stages to ensure its use minimises the reaction of the hydrochloric acid with the calcite or dolomite producing calcium chloride. The calcium chloride will be reverse circulated out of the wellbore into a number of 1m³ IBC containers, stored on site prior to transfer off site via a licenced haulier to permitted waste treatment facility for processing.

6. Natural gas;

- Gases in pressure containers (including halons) containing dangerous substances (EWC code 16 05 04) hazardous, estimated quantity <14,158m³ per day. The ability to minimise natural gas is limited due to the requirement to allow the determination of the condition and state of the reservoir. The exploratory nature of the operation the capture of gas for sale and transportation for reuse as a fuel or other means of generating electricity is not considered to be Best Available Technique due to the unknown quantity of gas volumes, short flow testing period and long lead in times involved for infrastructure,. The gas is separated from the produced fluids at surface and diverted via temporary pipework to an enclosed ground flare located on site for incineration. The enclosed ground flare consists of multiple burners in a cylindrical enclosure which is refractory lined to ensure the combustion temperature of 1000°C is maintained throughout the combustion zone for a minimum residence time and to limit radiant heat. It is correctly sized for actual flow rate, has burners designed to deliver efficient air/fuel mix; and has control of the combustion airflow to optimise the air/fuel ratio.

6. General Issues

6.1 Administrative issues

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

6.2 Management

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

6.3 Financial competence and relevant convictions

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

The Operator does not have any relevant convictions.

6.4 External Emergency Plan

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

6.5 Site security

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

6.6 Accident management

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

6.7 Surrender of the permit

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

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

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

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

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

6.8 The site and its protection

6.8.1 Site setting, layout and history

The site is located at land to the east of Radcliffe on Trent, Nottingham, NG12 2AW, NGR SK 66798 39820.

6.8.2 Planning permission

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

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

The regulated facility does not involve a mining waste facility. Therefore the requirement in paragraph 13 of schedule 20 of EPR for planning permission to be in force before a permit is granted does not apply.

6.8.3 Site condition report

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

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

6.8.4 Pollution prevention measures

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

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

Surface water management

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

Rainfall onto the well site, as well as any potential contaminants such as fuel and oils used in operating the site preparation and drilling machinery, will be directed into the interceptor ditch. During drilling operations water in the perimeter ditches will be used to make up the drilling fluid. Oil contamination from the drilling equipment or site traffic will be retained in a Class 1 separator and tankered off site for disposal at an appropriately permitted waste management facility. There will be no discharge to local surface waters from the site.

Storage arrangements

The temporary storage of extractive waste is limited to such storage pending collection as part of the process of transporting the waste off site for recovery or disposal. It will take place on the impermeable HDPE geomembrane layer, which will also provide secondary containment for drilling muds and drilling cuttings.

The drill cuttings will be collected in an open top tank with a capacity of 31,000 litres;

The returning cement will be collected in a skip with a capacity of 6,000 litres.

The spent hydrochloric acid will be collected in an IBC container with a capacity of 1,000 litres;

Produced water will be collected in a horizontal cylindrical closed tank with a capacity of 60,000 litres.

Fugitive emissions

Fugitive emissions of natural gas are to be prevented by mud control so there should be no emissions.

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

Odour management

Odour is not considered to be a particular concern for this site considering its location, which is 250 metres from the nearest sensitive receptor and the use of water based drilling muds, which are not considered likely to be odour producing. The activity is expected to be of short duration. A risk assessment was submitted on 15/12/14 that provides consideration of odour. We are satisfied that adequate measures will be in place to manage odour.

Noise management

The Applicant provided a risk assessment on 15/12/14 that provides consideration of noise. Noise management measures include acoustic shielding via site fencing and soil bunds, equipment specifically selected for low acoustic performance. Silencers will also be fitted to equipment to reduce noise. Noise analysis will also be conducted during operations to ensure that planning permission conditions are adhered to. We are satisfied that adequate measures will be in place to manage noise.

7. Environmental Issues and their control

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

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

- Protection of groundwater

- Emissions to air

- Odour

- Noise

- Contamination of land

- Water quality

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

7.1 Assessment of environmental impact

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

7.2 Nature Conservation

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

The application site is not within the relevant distance criteria of a Protected site (SSSI, SAC, SPA, Ramsar) There is a Local Wildlife Site (LWS) within 150m of the

proposed wellsite. Saxondale Railway; air emissions will not have an impact due to the mitigation measures put in place by the Applicant – see section 7.6 Emissions to air, below.

7.3 Waste Management Plan

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

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

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

7.4 Setting permit conditions

We have set conditions in the permit in accordance with our Regulatory Guidance Series, No RGN 4 – *Setting standards for environmental protection (version 3.0).* This guidance note explains how we determine the requirements that should apply to a particular activity. Permit conditions specify certain key measures for that type of activity to protect the environment. Other measures may be required through outcome-based conditions. Outcome based conditions specify what we want the Operator to achieve, but do not tell them how to achieve it.

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

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

7.5 Protection of groundwater

In addition to information provided by the Applicant, we have carried out our own groundwater risk assessment.

We have evaluated whether a Groundwater Activity Permit is required. Based on the information presented, we have determined that a Groundwater Activity Permit is not required for the proposed activity which is limited to vertically inclined drilling for exploratory purposes, based on the following:

We consider that the use of the proposed drilling muds will comply with the groundwater activity exclusion under the EPR 2010 (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 danger of deterioration in the quality of any receiving groundwater and that a permit will not be required.

The only potential contamination source is the drilling muds. As stated above we believe this source is of a quantity and concentration so small as to obviate any present or future danger of deterioration of groundwater.

Given this, and that this application is for a straight forward stratigraphic investigation and then subsequent flow and drill stem test, it is considered that there need be no requirement for monitoring as a condition in the permit. It would be unreasonable to require the Operator to monitor groundwater and surface water for something they are unlikely to find.

Other considerations are:

- That the well bore is to be constructed in accordance with the requirements of the HSE and the Petroleum and Development Licence. It is also designed in accordance with industry best practise and in compliance with the 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 has assessed the risk of drilling a borehole at this location and we consider that the design of the proposed boreholes meets the requirement to prevent any release of liquids into the water environment. The borehole will be constructed in accordance with the agreed notification submitted under section 199 Water Resources Act 1991

- We have assessed the method of construction of the borehole and the proposed drilling additives and we are satisfied that the methods used are appropriate and will ensure that the groundwater is protected. The Operator can only use additives that have been assessed and approved by the Environment Agency or equivalent alternatives subsequently approved. Assessment and approval is also required prior to the use of any other additive during the activities if the Operator needs to use different additives for operational reasons.

Other potential hazards from the management of the waste are failure of containment of the solids and liquids. These will be stored in suitable containers awaiting removal off site.

Should a container or tank fail, the whole site has secondary bunding which will contain any spillages. During operations, any solid spills will be collected and removed off site and liquid spills will be directed to sealed drainage for containment prior to collection.

No spilled material will be able to leave the site and there will be no pathway for these wastes to affect land or water. The site is entirely contained and provides adequate containment for the activities. There will be no discharge to surface water. Well pad construction is detailed in section 6.8.4 above. We are satisfied with these pollution prevention measures.

Well integrity is assured through compliance with the well examination regime and regulation by the Health and Safety Executive, and further through conformance conformity to Oil & Gas UK and UK Onshore Operators' Group good practice guidelines for well design and construction.

- We have carefully considered the risk assessment provided by the Applicant and consider that it covers all the potential risks and sets out appropriate measures by way of mitigation.

7.6 Emissions to air

During initial flow testing operations, there is a likelihood of natural gas being produced from the target formations.
The ability to prevent or minimise the production of natural gas is extremely limited during the initial exploration. Given that the operation is exploratory, the infrastructure required and the temporary nature of the operations (14 days), it is not practicable during the initial flow test to capture the gas for sale and transportation for use as a fuel or other means of generating energy.

Natural gas is separated from flowback fluids at the surface and diverted via temporary pipe work to an enclosed ground flare where it will be incinerated.

We have included monitoring conditions in the permit requiring the Operator to monitor for temperature, volume of gas going into the flare from which the emissions of oxides of nitrogen, carbon monoxide, total Volatile Organic Compounds (VOCs) and methane can be calculated, and to provide reports of the results.

During the determination of this application, we carefully considered emissions to air that will arise from the flaring and the potential impact of these emissions on human

health and ecological receptors. The Applicant submitted an air quality assessment as part of their application which we then assessed.

A methodology for risk assessment of point source emissions to air, which we use to assess the risk of applications we receive for permits, is set out in our Horizontal Guidance Note H1 and has the following steps:

Describe emissions and receptors
Calculate process contributions
Screen out insignificant emissions that do not warrant further investigation
Decide if detailed air modelling is needed
Assess emissions against relevant standards
Summarise the effects of emissions

The H1 methodology uses a concept of “process contribution (PC)”, which is the estimated concentration of emitted substances after dispersion into the receiving environmental media at the point where the magnitude of the concentration is greatest. The guidance provides a simple method of calculating PC primarily for screening purposes and for estimating process contributions where environmental consequences are relatively low. It is based on using dispersion factors. These factors assume worst case dispersion conditions with no allowance made for thermal or momentum plume rise and so the process contributions calculated are likely to be an overestimate of the actual maximum concentrations. More accurate calculation of process contributions can be achieved by mathematical dispersion models, which take into account relevant parameters of the release and surrounding conditions, including local meteorology – these techniques are expensive but normally lead to a lower prediction of PC.

The Applicant has submitted air dispersion modelling as part of their application. Air dispersion modelling enables the Process Contribution to be predicted at any environmental receptor that might be impacted by the operation of the flare.

The dispersion model and assessment, the selection of input data, use of background data and the assumptions made have been reviewed by the Environment Agency’s air quality modelling specialists to establish the robustness of the Applicant’s air impact conclusions. The output from the model has then been used to inform further assessment of health impacts and impact on habitats and conservation sites.

Our review of the Applicant’s assessment leads us to agree with the Applicant’s conclusions. We are satisfied that the combustion of this natural gas will not result in pollution or harm to human health and that it is not necessary to set emission limits, as the operating controls will ensure effective and efficient combustion, maximising

the conversion of the methane to carbon dioxide and water vapour and minimising other emissions.

7.7. Monitoring

Air

Condition 3.5 of the permit will require the operator to monitor the input to the flare and assess by calculation the emissions to air. The condition contains separate requirements for groundwater and surface water monitoring.

Direct monitoring of emissions from a flare stack is not possible because the length of the flare stack is insufficient for the stack gases to cool sufficiently so as not to damage the sampling equipment. For this reason the Operator will use surrogate parameters to calculate the emissions. The stack emissions can be calculated from the combustion chemistry using the feed gas composition, feed gas flow rate and combustion efficiency.

The permit requires the Operator to submit their proposed method for calculating the emissions for written approval by the Environment Agency prior to flaring any gas. Determining the point source emissions involves continuous measurement of the gas flow through the flare, the combustion temperature, and the gas composition. From this data the emissions from the flare can be derived, i.e. oxides of nitrogen (NOx), carbon monoxide (CO), volatile organic compounds (VOCs).

The Operator is required to continuously monitor the feed gas flow rate and analyse periodic samples of the feed gas to determine its composition. The flare efficiency is known from technical specification provided by the flare supplier. It is not possible to directly monitor combustion efficiency, but combustion temperature will be used as a surrogate indicator and also as a control parameter to ensure that the efficiency is maintained at its design value.

Using the parameters above, the Operator is required to assess point source emissions which will be released into the air from incineration of gas, and will also undertake ambient air monitoring for comparison against a baseline. The Operator will keep records of the data collected, which must be submitted to the Environment Agency on a regular basis.

The Operator will undertake a baseline study of ambient air quality around the proposed site prior to operations commencing. Once operational the Operator will

continue to monitor air quality in the same locations that the baseline measurements were taken. The results of the monitoring will be made available by the Operator.

We are satisfied that assessing the emissions from the flare using the feed gas flow rate, the feed gas composition and the flare efficiency is appropriate considering that direct monitoring of the flare is not technically possible. This level of assessment will demonstrate whether the combustion is working at the correct level of efficiency to minimise harmful emissions.

Annex II of the Industrial Emissions Directive (IED) lists a number of air pollutants that emission limits could be set for. We have considered the relevant pollutants listed in the IED Annex II that would result from this activity and are satisfied that it is not necessary to set emission limits, as the operating controls will ensure effective and efficient combustion.

We will be reviewing the assessment of point source emissions as part of our compliance work and if we have reason to believe that emissions limits are required, we have the power to vary the permit to impose such limits. If appropriate monitoring methods/techniques are developed for monitoring point source emission from flares, we will review the activities and may vary the permit to change the monitoring requirements.

When in operation, the flare will be supervised 24 hours a day to ensure its effectiveness to incinerate the natural gas. Should a problem arise the flare can be shut off, on site or remotely.

The Operator's proposed flare will have to be approved prior to gas flaring operations commencing as required by the pre operational condition in the permit. This will ensure appropriate measures and processes for the management of the environmental aspects of the activity.

Groundwater and surface water

Incorporated into the design of the wellsite is an impermeable membrane constructed using HDPE. The membrane was laid across the entire site as a means of sealing the site and capturing any spills that may occur during the exploratory operations preventing any environmental contamination. The HDPE membrane was heat welded and tested to confirm its integrity. The perimeter ditch was also lined with an impermeable membrane. A layer of non-needle punch geotextile was placed both above and below the impermeable membrane to protect it from any damage.

The impermeable membrane prevents surface fluids penetrating the underlying

subsoils. Surface fluids migrate along the surface of the impermeable membrane to a perimeter ditch, where it is contain for subsequent ruse in the drilling operation.

Daily inspections of the drainage ditch are undertaken to ensure the level does not exceed the maximum containment of the ditch. If the level is close to reaching maximum containment of the ditch, the surface fluids will be removed by road tanker for subsequent disposal at a permitted waste treatment facility.

A daily inspection of all tanks and other waste storage containers shall be undertaken to ensure they remain fit for purpose. The inspections will aid early identification of any potential release to site from equipment that deteriorates over time.

7.8 Fugitive emissions

We carefully considered emissions to air during the determination of the application. Fugitive emissions of methane could potentially arise from the wellbore and mud circulation system. The Operator has provided an environmental risk assessment and consideration in the WMP for this scenario which includes monitoring and proposes abatement measures, including mud weight and a blow-out preventer. We are satisfied that these measures to minimise the risk of fugitive emissions, together with condition 3.1 provide acceptable controls.

7.9 Odour

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

We do not consider that the activity will give rise to significant levels of odour. However, we have included a pre operational condition in the permit. This condition requires the Operator to submit a specific odour management plan, at least 2 weeks before commencement of any drilling activities. The operator shall submit to the Environment Agency a written odour management plan for approval and the activities shall not commence until the operator has obtained the Environment Agency's written approval to it.

The odour management plan must identify potential sources of odour, potential odour release points, unit operations resulting in venting of gas to atmosphere, abnormal operations that could result in venting of gas to atmosphere, calculation of maximum quantities of gas that could be released to atmosphere from each unit operation and abnormal operation, measures for the prevention, containment and abatement of odour releases, procedures for odour monitoring, procedures for odour

complaint investigation. The plan must include an assessment of releases of nitrogen gas containing organics.

The odour management plan must comply with relevant Environment Agency guidance “H4 Odour Management: How to comply with your environmental permit”.

7.10 Noise and vibration

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

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

7.11 General considerations

Site stability

The management of waste is limited to waste generated from prospecting without well stimulation. Any waste stored on site will be limited to extractive waste temporarily stored in secure containment pending collection as part of the process of being transported off site.

8. Other legal requirements

8.1 Mining Waste Directive 2006/21/EC

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

Article 4 – General requirements

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

Article 5 – Waste management plan

This outlines the requirement for the Operator to provide a waste management plan and the information required within this. The waste management plan has been assessed in accordance with these requirements and is satisfactory. Condition 2.3.1

ensures that the operations are limited to those described in the WMP. It also ensures that the Operator follows the techniques set out and that any deviation will require our written approval.

Article 6 – Major accident prevention and information

The permit does not authorise a waste facility, and therefore a MAPP is not required.

Article 7 – Application for a permit

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

Article 8 – Public participation

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

Article 9 – Classification system for waste facilities

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

Article 10 – Excavation voids

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

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

Article 11 – Construction and management of facilities

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

Article 13 – Prevention of water status deterioration, air and soil pollution

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

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

Article 14 – Financial guarantee

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

8.2 Further legislation

Section 4 Environment Act 1995 (pursuit of sustainable development)

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

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

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

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

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

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

- To address both point source and diffuse pollution;

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

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

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

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

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

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

We do not feel that any additional conditions are required.

Section 7 Environment Act 1995 (pursuit of conservation interests)

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

We do not feel that any additional conditions are required.

Section 81 Environment Act 1995

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

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

Section 40 Natural Environment and Rural Communities Act 2006

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

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

Section 23 requires us where we consider it appropriate to take such steps as we consider appropriate to secure the involvement of interested persons in the exercise of our functions by providing them with information, consulting them or involving

them in any other way. Section 24 requires us to have regard to any Secretary of State guidance as to how we should do that.

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

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

Consideration has been given to whether any additional requirements should be imposed in terms of the Environment Agency's duty under regulation 3 to secure compliance with the requirements of the Water Framework Directive through (inter alia) environmental permits, but it is felt that existing conditions are sufficient in this regard and no other appropriate requirements have been identified.

Human Rights Act 1998

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

Countryside and Rights of Way Act 2000 (CROW 2000)

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

Wildlife and Countryside Act 1981

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

There is no SSSI which could be affected by the mining waste activity due to the distance – the site is 6.2 km distant from the nearest SSSI.

The Conservation of Habitats and Species Regulations 2010

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

Government Planning Policy Guidance 10: Planning and waste management 1999

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

Annex 1: Consultation and web publicising

Summary of responses to consultation and web publication and the way in which we have taken these into account in the determination process.

Response received from
Environmental Health
Brief summary of issues raised
No specific noise, amenity issues or enforcement actions regarding the site. The updated noise impact assessment put forward with the suggested mitigation measures in place should ensure that there will not be any noise issues at the sensitive receptors.
Summary of actions taken or show how this has been covered
None required

Response received from
Nottinghamshire County Council as Mineral Planning Authority
Brief summary of issues raised
Acknowledged that the development has the potential to generate noise and other amenity issues, however conditions have been attached to the planning permission to ensure that these are adequately controlled.
Summary of actions taken or show how this has been covered
None required.

Response received from
Health and Safety Executive (HSE)
Brief summary of issues raised
We have received the consultation documents relevant to this application and we would advise that from Well Operations we have no objections to the proposals. The well design is to be in compliance with the relevant legislation and suitable well construction (cemented casings) will protect the aquifer The Well Operator will submit a Well Notification, with specific details of the

well construction and operations to be conducted, to the Executive at a later date which will be inspected by a Specialist Well Operations Inspector.
Summary of actions taken or show how this has been covered
None required.

Response received from
Mineral Planning Authority
Brief summary of issues raised
See Nottinghamshire County Council above
Summary of actions taken or show how this has been covered
None required.

Response received from
Public Health England (PHE)
Brief summary of issues raised
Public Health England has no significant concerns regarding the risk to the health of the local population from this operation.
Summary of actions taken or show how this has been covered
None required.

Consultation Responses from Members of the Public and Community Organisations

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

455 responses were received through the consultation process, of which one was from the Bingham Town Council, one response was submitted by the Radcliffe on Trent Parish Council. Of the remaining responses 400 were individual comments from members of the public with the remaining 53 being duplicates of already submitted comments.

Response received from
Public responses relating to hydraulic fracturing
Brief summary of issues raised
• Contamination of groundwater, surface water and drinking water. • Risk of earthquakes. • Health impacts to local residents and wildlife. • Nature of chemicals used in frack fluid. • Object to government's energy policy. • Hydraulic fracturing contributes to climate change.
Summary of actions taken or show how this has been covered
The application is for a mining waste permit to allow the management of waste produced from the exploration of mineral resources, in this case, from the drilling of a borehole. The applicant has not applied to hydraulically fracture and as a result a permit will not allow the operator to conduct any hydraulic fracturing activities.

Brief summary of issues raised	Summary of actions taken or show how this has been covered
Human health impacts Concerns have been raised that the proposed activities conducted at the well site will have general impacts on human health.	We are satisfied that the activities we are permitting will not give rise to significant pollution or harm to human health.
Human health impacts – Asthma Concerns were raised that the proposed activities conducted at the well site will have an impact on local residents that suffer from asthma.	We are satisfied that the activities we are permitting will not give rise to significant pollution or harm to human health. We consulted Public Health England in relation to this application; they raised no concerns regarding health impacts resulting from the proposed operations.
Light pollution Concerns have been raised that the flare will create light pollution which may impact on both local residents and wildlife.	The flare is of an enclosed design and will minimise light emissions; we are satisfied that the use of the flare will not result in light pollution. The use of artificial lights on site is controlled by the planning permission and falls outside of the remit of this permit.
Lack of Risk Assessment Concerns were raised that a risk assessment had not been submitted as part of the permit application	The applicant submitted a risk assessment in line with the requirements of applying for a permit under the Environmental Permitting Regulations 2010, the risk assessment was made available to read through the public register and the GOV.UK website during the consultation phase of the permit determination.
Suitability of the Risk Assessment Concerns have been raised about the adequacy of the Applicant's Risk Assessment and whether it identified all the risks and categorised them correctly.	We have reviewed the assessment, and we are satisfied that it complies with our relevant guidance and that it identifies and covers all appropriate risks and that measures are in place to address them.
Emergency planning	This facility does not meet the criteria

A number of comments were made regarding the lack of emergency planning in case of a severe accident on site or health impacts on the local community.	for a Category A mining waste facility as detailed in the Mining Waste Directive; as such an emergency plan is not required. However the permit requires the Operator to have an appropriate management system, and we will be checking that they comply with their permit conditions as part of our compliance work. This management plan will include avoidance of accidents, the management of potential accidents and the minimisation of their consequences. The Health and Safety Executive and Public Health England have been consulted and have not raised any concerns relating to emergency planning.
Visual impact Comments were received stating that the proposed oil exploration operation would have a high visual impact on the beauty of the area with long lasting impacts. There were concerns that the proposed activities would result in the overall change of use from a grazing pasture to a highly industrialised site.	The structures with the most impact on visual amenity will be the drilling rig and the flare. These structures are temporary in nature and any visual impact will be limited. In addition, this issue was addressed through the planning process, where it was stipulated that no development shall take place until details of the exact siting and appearance of the temporary buildings proposed for the site have been submitted to and approved in writing by the Mineral Planning Authority.
Spillages Concerns were raised that the risk from potential spillages had not been adequately addressed by the Applicant in their risk assessment. Concerns were also raised about potential spillages off-site during transport of the waste waters.	The proposals include the lining of the site with an impermeable membrane to protect the underlying soils and groundwater. The risk assessment includes details of how spillages will be reduced or avoided and how the risks from potential spillages are going to be minimised. The extractive waste transfer and storage activities will take

	place on an impermeable surface with sealed drainage and containment. Spillages to surface water will be prevented by the site drainage arrangements. Spillages during transport outside the permitted site boundary are outside the scope of the permit, but are, for waste, subject to other regulatory controls (Duty of Care).
Inadequate consultation A large number of comments have raised concerns that the consultation has been inadequate due to lack of public awareness, and that the time frame given for consultation response was not sufficient.	We carried out an extended consultation on the Application taking into account the Environmental Permitting Regulations and our statutory Public Participation Statement and the requirements of Article 8 of the Mining Waste Directive (MWD). The website for the Environment Agency has been incorporated into the GOV.UK website as part of the UK Government's decision to have a single website for all statutory organisations. We advertised the Application by a notice placed on the GOV.UK website, which contained all the information required by the regulations, including telling people where and when they could see a copy of the Application. We placed a paper copy of the Application and all other documents relevant to our determination on our Public Register. Anyone wishing to see these documents could do so and arrange for copies to be made.
Impact of property value A large number of comments have been made that the proposed activities will have a negative impact on property values in the local area. Concerns were raised that no consideration had been made of residences that were in close	Any negative impact of property values in the local area is not relevant to the determination for environmental permit applications.

proximity to the site.	
Stress A number of comments have raised concerns that the activities will cause stress to the local community.	See above in relation to Public Health England comments. Public Health England have raised no objection and we are satisfied that the activities we are permitting will not give rise to any significant pollution or any emissions that will cause harm to human health. In the context of Environmental Law, pollution is defined as any emission as a result of human activity which may be harmful to human health or the quality of the environment, cause offence to a human sense, result in damage to material property, or impair or interfere with amenities or other legitimate uses of the environment. This definition does not extend to fear, anxiety or stress.
Monitoring surface water and groundwater Concerns were raised as to how the activities will be monitored and the long term monitoring of the site prior to the surrender of the permit.	The Waste Management Plan details the monitoring that the Operator will be carrying out before, during and after the permitted activities are taking place. We have also specified monitoring requirements in the permit. These monitoring requirements, both those specified in the permit and conditioned through incorporation of the waste management plan, are for an indefinite period of time and will continue unless the condition is varied or the permit is surrendered. We would not accept an application to vary the monitoring unless we considered that the proposed variation provided adequate environmental protection. We would not accept an application to surrender the permit unless we are satisfied that the relevant statutory test is met. The operator would need to demonstrate that the necessary measures have

	been taken to avoid a pollution risk from the operation of the regulated facility and to return the site to a satisfactory condition, having regard to the state of the site before the facility was put into operation.
Monitoring of the flare Comments were raised concerning the monitoring of the flare and the publishing of the monitoring results	We recognise that the flaring of gas needs to be controlled and we have required that the Operator assesses and reports the emissions from the flare using a calculation method based on the gas flow rate, combustion efficiency and gas composition, rather than monitoring emissions directly from the flare, due to the practical difficulties of performing representative measurements inside the combustion chamber of a flare, and the hazards associated with such measurement procedures. Combustion efficiency is determined primarily by maintaining the temperature above 800 °C; this parameter will be continually monitored. Using this method the Operator can determine the emissions of oxides of nitrogen, carbon monoxide and volatile organic compounds. These results will be submitted to the Environment Agency and will be published by the Operator and will be available on the public register.
Risk associated with well failure and Well integrity Concerns were raised that there was no certainty that the exploratory boreholes to be drilled were safe and structurally adequate to prevent leakages that could cause pollution.	Well integrity is assured through compliance with the well examination regime and regulation by the Health and Safety Executive (HSE), and further through conformance conformity to Oil & Gas UK and UK Onshore Operators' Group good practice guidelines for well design and construction. The well will be designed

	and constructed such that well integrity is appropriate to ensure that the environment is protected from fluid or gas releases, through both our requirements and those of the HSE. These standards of construction are detailed in section 5.4.1.2 of the approved Waste Management Plan. All boreholes (whether offshore or onshore) used for hydrocarbon extraction are subject to The Offshore Installations and Wells (Design and Construction) Regulations 1996 (DCR). These regulations, enforced by HSE, are primarily concerned with well integrity and require the Operator to carry out regular monitoring and reporting of the well integrity. This is usually done by monitoring well casing pressure, which would indicate possible failures of casings. The Environment Agency and HSE will work together to carry out inspections and assess well integrity during the lifetime of the well.
Location of the site and industrialisation of the countryside Concerns were raised that the site location and proposed activities were not appropriate for the Harlequin/Saxondale area.	Decisions over land use are matters for the planning system. Nottinghamshire County Council is responsible for determining whether or not the proposed development is appropriate in this location, having regard to relevant policies within the adopted local plan and the National Planning Policy Framework. The location of the site is a relevant consideration for Environmental Permitting, but only in so far as affects the potential for the site to have an adverse environmental impact on communities or sensitive environmental receptors. The environmental impact is assessed as part of the determination process and has been reported upon in Section 7 of

	the decision document above.
Climate change policy Concerns were raised regarding the impact on the climate from the proposed activities.	Policy is made by the Government and the policy on exploitation of oil is no different to that of any other fossil fuel. The policy states “We aim to maximise the economic recovery of oil and gas from the UK’s oil and gas reserves, taking full account of environmental, social and economic objectives”.
Vehicle access to the site and traffic movements Concerns were raised regarding the increase of traffic movements and HGVs accessing the site via the A52	These are relevant considerations for the grant of planning permission, but do not form part of the environmental permit decision making process except where there are established high background concentrations of pollutants contributing to poor air quality and the increased level of traffic might be significant in these limited circumstances. This is not the case for this location.
Well site at risk of flooding Concern were raised that the site could be flooded in periods of high precipitation.	The site has been assessed for flood risk and the site is not located in a flood risk zone.
Noise from drilling activities Concerns have been raised that the activities will cause noise pollution.	We are satisfied that the activities, if carried out in accordance with the Permit, will not cause noise pollution. Condition 3.4 of the Permit controls Noise and Vibration and requires that such emissions are minimised and, in the unlikely event that the activities give rise to pollution due to noise or vibration outside the site, a noise and vibration management plan can be requested and will have to be submitted to the Environment Agency for approval prior to being implemented. In schedules 13 to 20 inclusive of the planning permission it stipulates that

	the drilling rig is fitted with silencers, the site is fitted with a temporary noise barrier and the rig is orientated that the drill tower offers an acoustic shield to the dwellings of Saxondale.
Odour pollution Concerns have been raised that the activities will cause odour pollution.	We have carefully considered all the permitted activities and are satisfied that they are unlikely to give rise to any significant odour. In particular, the flaring of the gas is unlikely to give rise to odour due to the origin of the gas and its predicted composition. Condition 3.3 of the Permit controls Odour and requires that emissions are minimised and, in the unlikely event the activities give rise to pollution due to odour outside the site, an odour management plan can be requested and will have to be submitted to the Environment Agency for approval and, once approved, be implemented.
Potential impact of activity on surface water and groundwater Concerns were raised that surface water and groundwater may be contaminated by the proposed drilling activities. Concerns that the impermeable membrane cannot be guaranteed to not to leak	We have reviewed the Environmental Risk Assessment provided by the applicant against our information and conceptual understanding of the location. We are satisfied that the method of well construction, including drilling additives and testing activities, which are controlled by this permit, will not pose a risk to groundwater or surface water given the mitigation measures required. Drinking water supplies are not at risk. The Waste Management Plan (WMP) and the Environmental Risk Assessment specify the pollution prevention measures that will ensure that surface water and groundwater will be protected. The Waste Management Plan sets out the nature of the fluids to be used in each process of the

	proposal, their expected volumes and their treatment or disposal, where applicable. These measures are required through conditions in the permit. Site construction is detailed in section 5.3 of the approved Waste Management Plan. We are satisfied that the design of the site containment is appropriate. As part of the site construction, the impermeable membrane will be tested for integrity. During operations, the membrane will be protected via the aggregate work surface and will be visually inspected. Any spillage will be indentified and remediated.
Operator competence and lack of trust in the Operator A number of concerns have been raised about the Operator and their competence to run the operations on site. Concerns were also raised that the operator was not transparent in their dealings with the public. Concerns relating to the legality of the company applying for the Environmental Permit.	The Permit conditions require the Operator to have an appropriate management system in place that includes details of staff capability, roles and responsibilities, experience and training records to demonstrate technical competence. We will assess the Operator's activities and we will be checking they comply with their permit conditions as part of our compliance work. We have carefully considered Operator competence and we have no reason to think that they would not comply with Permit requirements and conditions. We have considered all relevant factors and have determined that there is no reason to consider that the Applicant will not operate in accordance with the permit. It is quite common for Operators to conduct their own outreach programmes. Although we offer

	guidance to Operators, we are not involved in directing how the Operators conduct their public relations exercises. We checked the Companies House Register where all companies operating in the UK have been registered, from conducting this check we are satisfied that the company applying for the Environmental Permit is a legal company.
Nature of chemicals used Concerns were raised that the proposals mention the use of chemicals within the drilling muds but no details of these chemicals have been provided.	The Applicant has provided a full list of all the additives and fluids that will be used for drilling. We have assessed the additives to be used and we are satisfied that they will not cause environmental harm at the rates and levels of use proposed. The fluids will be non-hazardous to groundwater and the Permit will limit the composition of the fluids to those disclosed in the Waste Management Plan and approved by the Environment Agency.
Air emissions gas/fugitive emissions: Concerns have been raised about how fugitive methane emissions and point source emissions from a flare would be controlled.	We recognise that the flaring of gas needs to be controlled and we have required that the Operator assesses and reports the emissions from the flare using a calculation method using the gas flow rate, flare efficiency and gas composition as surrogate parameters, rather than carrying monitoring of emissions directly from the flare, due to technical limitations. Using this method the Operator can determine the emissions of oxides of nitrogen, carbon monoxide and volatile organic compounds. These results will be submitted to the Environment Agency. Condition 3.2 of the Permit applies controls on fugitive emissions.

Flaring Concerns were raised on the proposed flaring of gas and that it was not the Best Available Practice – a better practice being methane capture.	The applicant has justified the use of the flare rather than using the gas to meet energy requirements on site, and we consider this to be satisfactory and in line with BAT requirements for this type of operation.
Financial provision Comments were made which raised concerns on the absence of monetary provision that could be set aside and which could be used for any remedial work required in the event of a pollution incident.	The requirement in the Mining Waste Directive for financial guarantee does not apply to all activities. It only applies to the waste facility for hazardous waste, see section 8.1 above for further details.
Earth tremors/Seismic activity Concerns were raised that the drilling activity could cause earthquakes. Some of the respondents pointed to previous coal mines being at risk of collapse from the drilling activities.	We have considered the risk of seismicity in relation to the potential impact on the permitted activities, including the integrity of the wells, and we are satisfied that appropriate measures will be in place to ensure that seismicity will not result in pollution or harm to human health from the permitted activities. There are no recorded incidents of seismic activity associated with the type of exploration such as that proposed at the Harlequin site.
Radioactive waste Several comments raised concerns on how the radioactive substances generated from the activity will be managed.	The Applicant has applied for a radioactive substances activity (RSR) permit that will deal with the management of naturally occurring radioactive materials arising from the proposed activities. Issues relating to the management of radioactive materials raised as part of the consultation have been shared with the relevant officers and will be considered under the RSR permit.
Well abandonment and site	We have considered the risk of the

restoration Concerns were raised that the well site will be left in state of disrepair.	company leaving the well site in a state of disrepair and we are satisfied that appropriate measures will be in place as detailed in the approved Waste Management Plan section 5.4.3 At the point when the Operator wishes to decommission the well they will have to carry out any necessary works to make the well safe and prevent any leakage that could cause environmental damage. The Health and Safety Executive have detailed legal requirements relating to this stage of the well life, which the Operator will have to comply with. The Environment Agency will be involved in this process to ensure that any groundwater is protected during the abandonment process and for the future. The Operator will have to provide sufficient evidence to satisfy the Environment Agency that the decommissioned well will not cause any on-going or future impact on the environment before surrender of the permit would be accepted. Monitoring at the site will continue into the post decommissioning period and will have to demonstrate that no impact has occurred and that there are no on-going environmental issues. Well site restoration will be the subject of a separate waste management plan submitted by the Operator as part of any permit application to surrender the Mining Waste permit.
Health and Safety Executive not involved in process. Concerns were raised that the Health and Safety Executive had not been	The Health and Safety Executive (HSE) are a statutory consultee for all mining waste permit applications submitted to the Environment Agency. See statutory consultees section above for further

consulted on the permit application	details.
Future plans if oil is discovered Concerns were raised that the company could continue straight to production if oil was discovered.	The Mining Waste permit application covers the exploration of the well site only, if the operator plans to develop the site further it will require additional permits from the Environment Agency, as well as planning permission from Nottinghamshire County Council. Further consultation processes are required for both applications should this eventuality arise.
Proximity to local conservation area and threat to wildlife Concerns were raised that no assessment of the operations impact on a conservation area and local wildlife. It was stated that protected species such as badgers and bats are found locally in the site area. Residents are concerned that small animals may drink the contaminated waste water and could also drown in it.	As detailed in section 5.1 above the potential for the proposed activities to impact on any designated sites is not significant. The nearest designated Local Wildlife Site is Saxondale Railway, the railway is still active therefore the proposed activities will not impact on it. There are no records of badger population in the area. The drainage ditch located on site will have banked sides to enable any animals that may fall in an escape route.
Proximity of railway to the well site Concerns were raised that the location of the proposed drilling activities will impact the railway line	Decisions over land use are matters for the planning system. Nottinghamshire County Council is responsible for determining whether or not the proposed development is appropriate in this location, having regard to relevant policies within the adopted local plan and the National Planning Policy Framework. The location of the site is a relevant consideration for Environmental Permitting, but only in so far as affects the potential for the site to have an adverse environmental impact on communities or sensitive environmental receptors. The environmental impact is assessed as part of the determination process and has been reported upon in Section 7 of

	the decision document above.
Proximity to historic coal mining Concerns were raised that the drilling of the well would intercept historic coal mines and/or coal seems causing leakages and pollution.	The Coal Authority compiled a report indicating that the Harlequin 3 Wellsite is not located within a zone that could be influenced by past underground workings or any present underground coal workings. Furthermore, the well will be designed and constructed such that well integrity is appropriate to ensure that the environment is protected from fluid or gas releases, through both our requirements and those of the HSE. These standards of construction are detailed in section 5.4.1.2 of the approved Waste Management Plan.