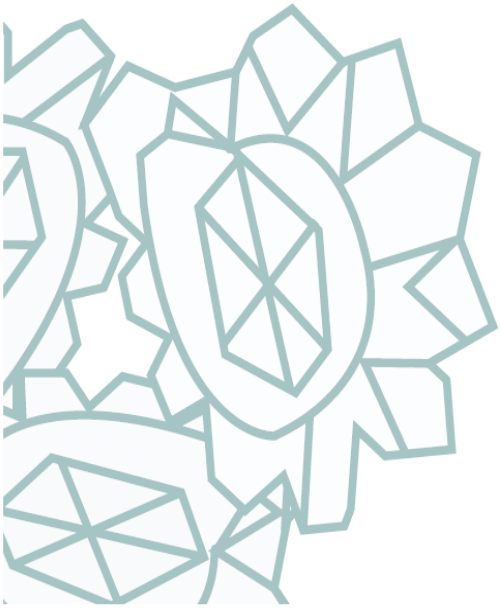
DRILLING ENVIRONMENTAL MANAGEMENT PLAN

EGS ENERGY LIMITED

EDEN GEOTHERMAL PROJECT

JUNE 2013



Moorhouse Petroleum Limited
Moor House
Bessingby Way
Bessingby Industrial Estate
Bridlington
East Yorkshire
YO16 4SJ

Tel: (01262) 608731
Fax: (01262) 608390

APPROVAL LIST

	Title	Name	Signature
Prepared By	Planning and HSE Engineer	Philip Silk	
Reviewed By	HSEQ Manager	John Bateman	
Approved By	Drilling Manager	Richard Sands	

REVISION RECORD

Version	Date	Description
Draft	24/06/13	Draft
Rev 0	27/06/13	Initial Release
Rev 1		
Rev 2		

CONTENTS

1 INTRODUCTION AND OVERVIEW

Moorhouse Drilling and Completions (Moorhouse) has been commissioned by EGS Energy to provide a drilling environmental management plan for the Eden geothermal borehole, specifically in relation to the drilling, stimulation and testing phases of the proposed operations.

This document provides information on the standards and measures required to effectively control and improve the environmental impact of the EGS Energy operations. EGS Energy currently has accreditation to BS EN ISO 9001:2008 Quality Management Standard and is committed to continuous improvement throughout its operations and procedures.

The Company also currently has accreditation to BS EN ISO 14001:2004 Environmental Management Standard and is committed to understanding, managing and reducing the environmental and ecological impacts of their activities through innovation, technology and cultural change.

1.1 EGS ENERGY LIMITED

EGS Energy is focused on extracting the geothermal energy located deep in the granite rocks that are found in many areas throughout Europe, delivering it in the form of electricity and heat. EGS Energy brings together the leading European experts in the field of engineered geothermal systems, with over 70 years experience between them.

Based in Penzance, Cornwall, and with an office in London, EGS Energy will deploy its team's extensive sectoral knowledge, gained over 30 years working with deep geothermal projects and in setting up of two geothermal plants in Germany, to develop this project in Cornwall.

1.2 THE DEVELOPMENT

EGS Energy has received planning permission from Cornwall County Council, to drill and test a geothermal borehole at the Eden Project, Cornwall. Outline permission has also been granted for a Geothermal Plant, which will be capable of providing heat and energy 24 hours a day.

The initial development will consist of four principle phases:

- Site Construction
- Drilling
- Stimulation
- Testing

The Eden Deep Geothermal Project will consist of two boreholes, drilled to around 4.5 km into the granite beneath Eden. It is expected that the rock at that depth is at 180-190°C. The boreholes will be stimulated, to allow communication between them. Water will then be injected down the first borehole and extracted by the second borehole back to surface at around 185°C. The heated water will be used to generate electricity and heat which will be

distributed offsite. This is a closed system, therefore the water is injected back into the first borehole.

On completion of the initial operations which allow for the boreholes to be drilled and a short period of testing, EGS Energy will look to produce geothermal heat and electricity with approval from Cornwall County Council.

1.3 SCOPE

This Drilling Environmental Management Plan will be applicable throughout the drilling, stimulation and testing phases of the operations as detailed in Section 4. All contractors and third parties will be required to ensure compliance with this plan. There are no exceptions to this Environmental Management Plan.

The EMP considers potential issues associated with:

- Air Quality
- Ground and Surface Water
- Noise
- Landscape
- Ecology
- Traffic and Transport
- Local Community

These are considered against the various operations which will occur onsite during the drilling, stimulation and testing phases. Where appropriate, mitigation has been proposed to reduce or remove any adverse environmental impacts.

At the time of writing this document, a number of elements need to be finalised, including rig selection and associated equipment, stimulation and well test equipment and details on drilling cuttings. A further review will be completed once this information is finalised.

2 MANAGEMENT POLICY

EGS Energy's Management Policy is detailed below:

It is the established policy of EGS Energy Ltd to provide to all its customer's, services related to the provision of project management activities that are delivered without deviation from the company's quality specification. The company has implemented an integrated management system (IMS) based on the requirements of ISO 9001 : 2008 and ISO 14001 : 2004.

This policy involves all aspects of company activities and its employees.

On-going management system review and evaluation, including formal internal audits and documented review by senior management ensures:

- that the integrated management system is complied with and continues to be effective
- the identification and implementation of management system improvement opportunities
- compliance with all statutory and regulatory requirements pertaining to the products and services of the company

All necessary action is taken following evaluation, and appropriate objectives and targets are set so as to maintain the standards associated with the EGS Energy name and ensure a policy of continual improvement.

Environmentally, the company is committed to best practicable environmental practice and best available techniques (BAT) in all aspects of its activities, and specifically to the prevention of pollution.

Continual improvement is central to the environmental philosophy of the Company as is compliance with legislative/regulatory environmental requirements at international, national and local levels.

A series of objectives and targets to reduce the environmental impact of those impacts evaluated as being significant have been documented. An appropriate management programme ensures that all practicable steps are taken to realise these objectives and targets.

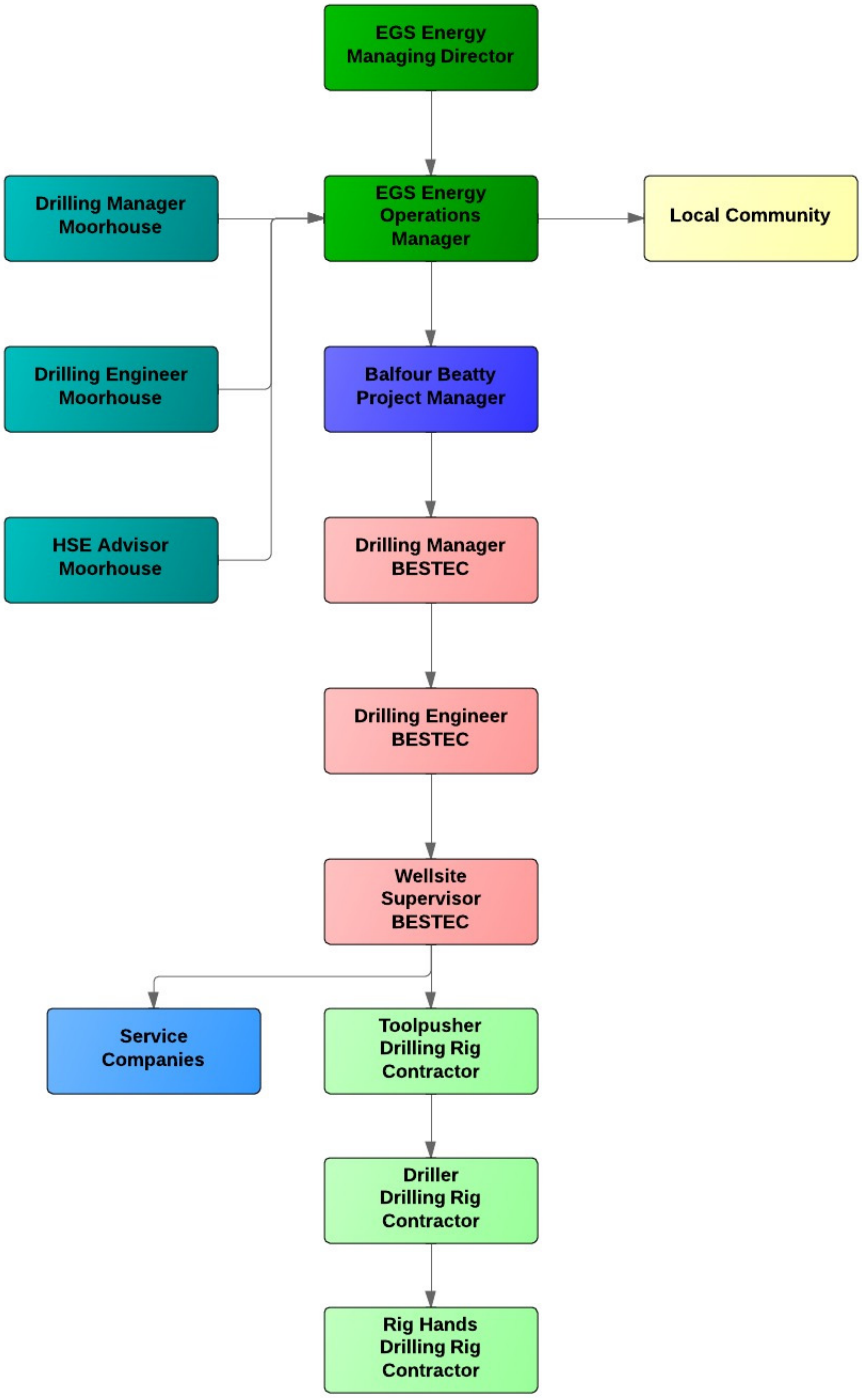
Environmental objectives and targets are monitored on an on-going basis (monitoring activities are recorded) and are formally reviewed at management review meetings.

The communication of information and education of suppliers and customers, where company knowledge and experience permits, forms a highly important element of the Company's commitment to this environmental policy.

Communication activities extend to making this policy statement and performance details with reference to objectives and targets, publicly available on request.

May 2011

3 ROLES AND RESPONSIBILITIES



3.1.1 Managing Director – EGS Energy

The Managing Director of EGS Energy is responsible for:

- Providing resources to achieve the objectives and targets of the EMP.
- Monitoring its ongoing success in accordance with the objectives and targets of EGS Energy.

- Ensuring the effective implementation of the EMP.
- Show commitment to the HSEQ policy and system in their attitude, behaviour and formal communications.
- Ensure that all decisions reflect the intention of the Management policy.

3.1.2 Operations Manager – EGS Energy

The Operations Manager of EGS Energy is responsible for:

- Ensuring the effective implementation of the EMP within the project operational specifics.
- Monitoring its ongoing success in accordance with the objectives and targets of EGS Energy.
- Providing resources to ensure its successful implementation.
- Providing a point of contact for local community and authorities.
- Liaising with the local community through the liaison committee.
- Acting as the Management Representative and informing senior management.
- Ensuring effective communication between head office and site.
- Act as the EGS Management contact during emergency response.

3.1.3 Project Manager – Balfour Beatty

The Project Manager is responsible for:

- Ensuring the effective implementation of the EMP.
- Monitoring its ongoing success in accordance with the objectives and targets of EGS Energy.
- Ensuring sufficient resources are provided to achieve the objectives and targets of the EMP.

3.1.4 HSE Advisor - Moorhouse

The HSE Advisor is responsible for:

- Monitoring the effective implementation of the EMP.
- Identifying additional environmental aspects.
- Auditing the operations in accordance with the EMP.
- Investigating any incidents / non-conformances.
- Informing the Operations Manager of results of investigations into incidents / non-conformances.

3.1.5 Drilling Manager - Moorhouse

The Drilling Manager is responsible for:

- Promoting the objectives and targets of the EMP.
- Ensuring that the operations conform to the requirements of the EMP.
- Informing the Project Manager of any incidents.

3.1.6 Drilling Engineer - Moorhouse

The Drilling Engineer is responsible for:

- Promoting the objectives of the EMP.
- Ensuring that the operations conform to the requirements of the EMP.

3.1.7 Logistics Manager - Moorhouse

The Logistics Manager is responsible for:

- Ensuring any suppliers are made aware of the EMP requirements.
- Ensuring any services procured are in accordance with the EMP.

3.1.8 Wellsite Supervisor - BESTEC

The Wellsite Supervisor is the principal authority onsite during the drilling operations and is responsible during the drilling phase for:

- Continually monitoring Contractors conformance to the approved EMP.
- Allocating sufficient time and resource to ensure that effective communication between all parties in the form of shift handovers, daily meetings, toolbox talks etc. is achieved throughout the project.
- Promoting the objectives and targets of EGS Energy and ensuring the project achieves these.
- Reporting any incidents / non-conformances to the HSE Advisor.
- Promoting high levels of environmental protection and stopping any work which is likely to cause damage to the environment.
- Acting as Incident Controller in the event of an emergency.

3.1.9 Sub Contractors / Project Personnel

Any personnel associated with the EGS Energy project are expected to comply with the requirements of the EMP.

- Provide safe plant and equipment which has been regularly maintained and inspected in accordance with relevant legislation and manufacturers recommendations.

- Increase awareness of the environment through regular participation in meetings at all levels.
- Ensure work is conducted in accordance with company procedures.
- Stop any work which is likely to cause damage to the environment and report it to the Supervisor onsite.

4 ACTIVITIES

The development is located on the edge of the Eden Project, near Trethurgy in Cornwall. The Eden Project is a local visitor attraction and the proposed development is situated at the entrance to this.

The site is currently an area of disused land. It is predominantly an area of scrub, which is understood to have been used for a number of years as a storage area for other local construction projects; it also contains an area of broadleaved woodland. Drainage ditches run along the perimeter of the site, leading to a small pond.

The site is approximately 500m west of Trethurgy. The nearest properties are between 170 and 450m from the site.

The Phase 1 development will consist of four discreet sub-sections, which have been approved by Cornwall County Council, under Planning Permission No. PA10/04671. Outline planning permission has also been granted for the development of a geothermal plant.

Phase 1

Construction

The initial phase of the operations is to construct a site, suitable for the drilling operations. This will include the careful removal of vegetation and topsoil in accordance with best practice and BAT (Best Available Techniques). The site will be levelled and a hardstanding and concrete pad constructed. Two cellars will be constructed on the site, from which the wells will be drilled.

Drilling

The drilling phase of the operations will commence with the mobilisation of the drilling rig. The drilling rig will be built up onsite and commissioned prior to commencing operations. EGS will then commence the drilling of two geothermal boreholes, through the granite to a total depth of ± 4,500m. The drilling operations are expected to take 10 months. Operations will take place 24 hours day, 7 days a week.

Stimulation

Once both wells have reached their required depth, a stimulation programme will follow. This will involve injecting a high volume of fluid into the granite to open the natural fractures in the formation. This will provide communication between the two wells, enabling fluid to be circulated through a closed loop system.

Well Test

Once the well has been successfully stimulated, the wells will be put on a short test. This will allow the formation characteristics to be ascertained and additional information to be gathered.

As the water is returned to surface at temperature from one borehole, it will pass through a heat exchanger before being re-injected down the second borehole.

Phase 2

Production

Once a successful test has been completed then the site will be used to generate electricity and heat for a number of years. Additional planning permission and approvals will be required. This element of the works is not considered within this EMP.

5 LEGISLATION AND CONSENTS

5.1 LEGISLATION

A register of applicable legislation has been developed as part of EGS Energy's ISO14001 environmental management system. IMS Document No. 5 provides a register of all applicable regulations associated with the ongoing EGS operations. This is regularly reviewed and updated to capture new legislation or revisions to existing legislation.

5.2 PLANNING PERMISSION

EGS Energy was awarded planning permission by Cornwall County Council, under permission No. PA10/04671.

The table below details those planning conditions which are relevant to this EMP and need to be taken into consideration.

Planning Condition	Element	Requirement
Condition 5	Surface Water Management Plan	Submit and obtain approval in writing from the LPA for the provision of a Surface Water Management Scheme, to include: • Ground investigation results to assess the suitability of infiltration drainage; • Details of the drainage during the construction phase; • A timetable of construction; • A construction quality control procedure; • Details of the final drainage scheme; • Provision for overland flow routes from surface water and the watercourse; • A plan for the future maintenance and management of the system.

Condition 6	Construction Traffic Management Plan	Submit and obtain approval in writing from the LPA a Construction Traffic Management Plan and programme of works.
Condition 7	Construction Environmental Management Plan	Submit and obtain approval in writing from the LPA a Construction Environment Management Plan, to include: • Statutory Waste Management Plan; • Construction Method Statement;
Condition 8	Liaison Group	Submit and obtain approval in writing from the LPA the details of regular local community liaison group meetings.
Condition 9	Contamination Remediation Strategy	If, during development, contamination not previously identified is found at the site, then no further development shall be carried out until the developer has submitted and obtained written approval from the LPA for, an amendment to the remediation strategy.
Condition 11	Trees, hedges and associated vegetation	All trees, hedges and associated vegetation not scheduled for removal during the development of the site shall be protected from damage or disturbance for the duration of the construction works on site.
Condition 12	Noise emissions during enabling works	The noise emissions from the enabling works shall not exceed 65dB LAeq, 1hr, measured 1m from any a noise-sensitive receptor during working hours.
Condition 13	Noise emissions during drilling	The noise emissions from drilling operations shall not exceed 45dB LAeq, 1 hr measured 1 m from any noise-sensitive receptor at any time.
Condition 16	Prevention of mud and debris being carried onto public highway	Ensure that vehicles leaving the site during construction and operational periods are in a condition such as not to emit dust or deposit mud, slurry or other debris on the public highway.
Condition 17	Lighting Plan	There shall be no lighting of the approved development areas except in accordance with details to be agreed in writing with the LPA.
Condition 18	Noise, dust, fumes, odour and vibrations	All reasonably practicable means shall be employed by the operators for preventing and minimising noise and the emission of dust, fumes, odour or the creation of vibration during the approved use of the site.
Condition 20	Japanese Knotweed and Ragwort	During the operation of the site, noxious weeds in particular Ragwort and Japanese Knotweed shall not be allowed to colonise the site. Recognised control measures shall be implemented.

5.3 WR11

Under the Water Resources Act 1991, there is a requirement to submit a summary of the drilling programme to the Environment Agency.

Once a drilling programme has been developed and approved internally, it will be submitted to the Environment Agency for review. On reviewing the proposed program, it may be necessary for the Environment Agency to issue a Conservation Notice. Any requirements of this notice will be captured in the Environmental Management Plan.

5.4 CONSENT TO DISCHARGE

An application has been submitted to permit the discharge of surface water, from the Eden wellsite.

Any water which has been collected will pass through an interceptor, which is to be selected based on the requirements of Pollution Prevention Guidance 3 'Use and Design of Oil Separators in Surface Water Drainage Systems.'

All surface water drainage will be captured onsite and directed through the interceptor to a soak away.

5.5 WASTE PERMITS

All waste contractors selected for this operation will have the necessary permits and licences.

In addition to the licences and permits provided by third parties, it will be necessary for EGS Energy to obtain a mining waste permit. An application is to be submitted to the Environment Agency prior to the drilling operations commencing.

6 ENVIRONMENTAL ASPECTS

As part of the environmental management process, EGS Energy has developed an environmental aspects list. This identifies all of the operations associated with the drilling, stimulation and testing phases and the environmental aspects associated with these works. The aspects register is specific to the operations at the Eden geothermal wellsite.

Identification of environmental aspects for the site is the responsibility of the HSE Advisor, in collaboration with other relevant personnel whose knowledge covers both legislative and process aspects. All site activities and processes are to be considered in terms of normal (day to day), abnormal (cleaning, maintenance etc) and emergency situations.

The environmental aspects list is to be continually reviewed throughout the ongoing operations. Where additional items are identified or there is a change to the original programme then the aspects register is to be updated.

A copy of the environmental aspects register is included in Appendix 3.

7 PROCEDURES AND STANDARDS

7.1 Environmental Actions

EGS Energy has developed a site specific list of all environmental actions that must be adhered to during the operations. These are listed in a table in Appendix 4. All actions will be defined in terms of:

- What should be done;
- How it should be done;
- Why it should be done;
- Who should do it; and
- A section to allow verification that the action was completed.

This table will be updated throughout the operations to ensure it captures all environmental actions.

7.2 Emergency Response

As part of the operational documentation, an emergency response plan has been developed, which is contained in the Borehole Sites and Operations Regulations 1995 (BSOR) site safety document. This details the roles and responsibilities onsite when responding to an incident. It also classifies the level of an emergency.

7.3 Ecology

Many of the ecological constraints will have been addressed during the initial construction of the wellsite. During the drilling, stimulation and well test phases the following measures will be implemented:

- The development will be fenced, to prevent contractors going outside of the development boundaries.
- All personnel will receive a toolbox talk (TBT) which is intended to provide information and training on flora and fauna to make them aware of protected species which may be present.

7.4 Noise

There is the potential for adverse effects during the drilling operations. Therefore a number of control measures are required to minimise these effects and reduce the potential for causing statutory nuisance to affected persons. A number of mitigation measures have been incorporated into the design, planning and selection process.

A range of mitigation is already incorporated into the proposals through the design of the wellsite and selection of equipment intended to minimise noise levels at source, along the pathway and at the receptor. This includes:

- Noise attenuation and screening provided by surrounding vegetation and topography.

- Equipment maintained in accordance with recommendations.
- Enclosed equipment.
- Acoustic cladding of equipment.
- Positioning of equipment to provide screening.
- Operational practices.

In the event that monitoring shows that noise limits are exceeded, then EGS Energy will implement an additional scheme of mitigation to achieve acceptable noise levels. The exact mitigation cannot be determined until the source and extent of any exceedance are understood to allow suitable mitigation to be proposed. However, it may include:

- Installation of boundary screening.
- Installation of container screening.
- Screening specific equipment.
- Changing equipment.

On commencement of operations, noise monitoring equipment will be installed to assess compliance with the approved noise levels. This will be in place for a minimum of two weeks from the commencement of drilling. In the event of any complaint being made about noise from the operations, a decision will be made on extending the remote monitoring survey to cover the whole drilling programme.

7.5 Waste

All waste produced from the operations will be disposed of in an environmentally friendly manner. Where possible and in accordance with the "Waste Hierarchy", waste will be reduced and recycled, however, this is not always possible. Waste will be segregated on site and stored in secure containers on site.

Five principal sources of waste require disposal from site:-

1) drilling mud located in the mud tanks and drill cuttings;
2) sanitary waste collected in the cess tank;
3) site drainage collected in the ditches;
4) general waste - paper, timber, scrap metal – collected in skips;
5) waste fluids processed during drilling or testing operations and collected in storage tanks.

All waste materials, including wastewater and fluids (subject to prior analysis if required) will be removed by licensed waste carriers in accordance with the requirement for specific waste transfer notes and disposed of at authorised locations. Foul sewage will be collected in a cess tank which will be emptied periodically, with disposal to an approved location.

Prior to the start of the operations, procedures will be documented and all personnel made aware of the measures in place for responding to an emergency situation, including fire and spills.

Waste management procedures will be captured within a site waste management plan. Once additional information is provided on the drilling cuttings, a review will take place of the content and specification of the solid waste and incorporated into the site waste management plan.

7.6 Traffic Management

A traffic management plan will be implemented, specifying the route vehicles are to follow when accessing the wellsite. All contractors working on behalf of EGS Energy will be required to follow this plan, non-compliance will result in action being taken against the driver.

During the drilling, stimulation and well test operations, an area has been designated on site for parking. This will provide sufficient facilities for all personnel. No vehicles will be permitted to park on the verge outside the site at any time. Visibility from the site access will be maintained at all times.

Signs directing vehicles to the wellsite are to be erected along the prescribed access route.

Holding areas will be identified in the local area and will be used during the drilling operations. At no time will vehicles be allowed to wait or queue along the designated access route.

7.7 Surface and Groundwater

Measures have been incorporated into the design process to prevent any impacts on surface and groundwater sources. Further mitigation is incorporated into practices and procedures onsite in line with relevant guidance and best practice and BAT.

Surface Construction

The surface of the site is to be constructed from concrete, which will fall to an onsite surface water collection point. The concrete will provide a barrier preventing any surface water draining into local water sources.

Drilling Cellar

The drilling cellar is to be constructed using pre cast concrete rings, which are sealed together using a Tokstick sealant. These cellars provide an additional containment facility from which the well will be drilled. On completion of construction operations, an integrity test will be performed to ensure it provides a sealed containment.

Surface Conductor

During the site construction, a smaller drilling rig may be mobilised to site in order to drill and set conductor casing. A conventional fluid circulating system used by the larger drilling rig would result in drilling fluid being lost to the formation. Once this first hole section has been

drilled, steel casing is run into the hole and cemented back to surface and tested to confirm its integrity.

Drilling and Casing

As each hole section is drilled, casing is run into the hole which is then cemented in place on the outside. This creates a number of barriers between the well and the formation. Pressure tests are conducted on the casing and when new formation is drilled beneath the casing to confirm the integrity of the casing and cement.

Once the well has been drilled and all the casing run, it is considered that there is sufficent protection from fluids from other deeper geological formations contaminating potential aquifers.

Stimulation

Prior to commencing the stimulation operations, all of the equipment will be function tested and inspected to confirm its suitability for the operations.

During the operations, the Site Supervisor will monitor the equipment and operations closely.

Disposal of Fluids

Any fluids requiring disposal will be collected by a licenced waste carrier and disposed of offsite at a licenced waste facility. In accordance with the Operators “Duty of Care”, they will ensure that all waste is collected and disposed of by licenced waste carriers at suitably licenced sites.

Welfare Facilities

All welfare facilities provided onsite will be provided in self contained cabins. The foul water from these will be removed on a regular basis by a licenced waste carrier and disposed of at a suitably licenced facilitie.

Effluent tanks will be reguarly monitored and inspected by onsite personnel.

Spillages

To prevent spills, a number of measures are taken to ensure that the likelihood of this occurring is minimised. All oils and chemicals are stored in bunded areas and double skinned tanks, in accordance with the requirements of the Control of Pollution (Oil Storage) (England) Regulations 2001. In addition, regular maintenance of equipment is performed that includes the inspection of pipework and connections to confirm its integrity and identify any issues prior to an incident occuring.

In the event of a spill, there are a number of measures in place to protect the environment and ensure it is dealt with promptly and effectively. As part of the operations procedures, site specific documents are developed on how to respond to a spill and regular drills are performed throughout the operations. Spill kits are provided on site in strategic locations. Any spills will be cleaned up and the resultant material disposed of via a licenced waste carrier.

7.8 Air Quality

During the drilling, stimulation and well test operations there is the potential for air quality to be affected.

To minimise any impacts associated with dust, the following mitigation will be applied:

- Vehicles to be inspected prior to leaving site.
- Wheel washing facilities onsite.
- Lorries to be sheeted when carrying dry waste away from site.
- Personnel to wear PPE at all times, including safety glasses and dust masks as appropriate.
- If required, areas will be sprayed onsite.

An assessment will be conducted on the potential air emission impacts from the selected drilling rig and a mitigation strategy developed.

7.9 Landscape

Many of the potential landscape issues have been addressed during the early design stages, with mitigation incorporated.

A 3m high fence will be installed around the perimeter of the wellsite, which will screen the site from passing vehicles, pedestrians and cyclists.

7.10 Lighting

The drilling, stimulation and well test operations may take place 24 hours a day, therefore lighting will be necessary. Lighting stands will be positioned around the site and directed towards the required areas. The drilling rig also has a number of intrinsically safe lights on the drill floor, derrick and dog house.

Consideration has been given to the potential impacts of lighting causing statutory nuisance to affected persons including, light spill into surrounding countryside, glare from lights onto public highway, sky glow from site and luminance visible from properties.

In order to minimise the effects, the following mitigation will be applied:

Site Layout

Lighting will be located in key areas around the site where it is required. Tower lights will be positioned around the perimeter of the site and raised high and face downwards to reduce overspill. No lighting will be focused directly onto the public highway.

Screening

Screening will be used on site to limit any impacts arising from light spill, sky glow and visibility from local residencies. This will be achieved through the positioning of equipment onsite. Where possible, equipment will be positioned so as to provide screening.

In addition to the careful positioning of equipment onsite, natural screening will also be provided by hedgerows, interspersed woodland and the local topography.

Positioning and Light Baffles

Any lighting will be directed to the areas required to ensure its efficient use. In addition, lighting will be downward facing to minimise any light spill. Typically this will be directed at an angle of approximately 70º, thereby reducing spill and glare.

Where appropriate, lighting baffles will be used to prevent light spilling outside of the site and glare onto the public highway. This will be reviewed during the set up of each phase. In particular, lighting which spills onto the public highway will be prevented to ensure that road users are not effected.

7.11 Community

EGS Energy is committed to maintaining good relationships with local residents and the neighbouring community.

A Liaison Committee has been formed, which is attended by residents from the local area. This allows for information to be distributed regarding the operations but also allows for any comments or concerns to be raised with members of the project team.

Once operations commence, the EGS Energy website will be regularly updated providing the community with information on the current status of operations.

A 24 hour telephone number will be provided to local residents. This number will be linked to a member of the project team who will be able to address any concerns.

8 TRAINING

It is essential that all personnel involved with the EGS Energy project are competent and have received sufficient training for their roles and responsibilities.

Training will include:

- Site specific induction
- Fire fighting
- Spill response
- Emergency drills

Additional training will be specific to the roles and responsibilities of contractors involved in the project.

Regular toolbox talks will be conducted during the operations by the Site Supervisor, to highlight and identify any environmental concerns associated with particular operations.

9 MONITORING AND REPORTING

Throughout the operations a number of reports and records will be produced. Some of those reports and monitoring and detailed below.

9.1 Daily Reports

During the drilling, stimulation and well test operations daily reports are completed by the site supervisor. These reports allow for any environmental incidents to be recorded. They are then forwarded to members of the project team.

9.2 Audit

Regular audits will be conducted during the operations to confirm compliance with the approved EMP. This will be conducted a minimum of every 4 weeks. Any non-conformances identified during the audit will be recorded and a course of action identified.

9.3 Incident Investigation

The Borehole Sites and Operations Site Safety document details the requirements for reporting incidents which occur on the wellsite and the applicable classifications. All incidents are to be reported to the Site Supervisor. They will then inform the HSE Advisor and EGS Energy representatives.

All incidents will be investigated in accordance with the EGS Energy procedure MP23.

This will document the findings and provide recommendations to prevent reoccurrence.

9.4 Management of Change

EGS Energy has a Management of Change (MOC) procedure in place. Any material changes to the site layout, equipment, programmes and documentation are to be captured in the by the MOC procedure MP25.

10 COMPLAINTS

EGS Energy is committed to developing a positive working relationship with the local community. The site is situated in a rural location, between a number of villages. Complaints will be handled in accordance with MP14, Corrective and Preventative Action.

Should a complaint be made during the EGS Energy operations, the following protocol will be undertaken:

- All complaints will be recorded on a register and details kept on the nature and date of the complaint.
- An informal discussion will be held with the complainant. Any steps including mitigation actions, found necessary to address the complaint will be noted on the register.

Prior to the commencement of operations, local residents and the Liaison Committee will be provided with the contact details of a project representative who will be able to respond to any complaints 24 hours a day. The contact details are:

APPENDIX 1 – WELL SITE CONTACTS

Name	Title	Company	Mobile	Landline
	Managing Director	EGS Energy		
	Operations Manager	EGS Energy		
	Drilling Manager			
	Drilling Engineer			
	HSE Advisor			
	Logistics Manager			
	Drilling Supervisor			
	Environment Agency Hotline			0800 807060
	Local Council Emergency Hotline			0300 1234 232

This page has been intentionally left blank

APPENDIX 2 – SITE PLAN

To be included once drilling rig has been selected and layout determined.

This page has been intentionally left blank

APPENDIX 3 – ASPECTS REGISTER

This page has been intentionally left blank

ASPECTS REGISTER

N - Normal Operations
A - Abnormal Operations
E - Emergency Operations

Phase	Process	Aspect	Air	Water	Land Contamination	Natural Resources	Energy	Noise and Vibration	Waste	Community	Controls and Mitigation
	Mobilisation	Vehicle Movements	N	E	E	N	N	N		A	Traffic Management Plan Liaison committee and information to residents. Enforced speed limit. Security bat entrance to wellsite. Signage.
		Unloading/ Loading	N			N	N	N		A	Banksman supervising. TBT prior to unloading. Equipment securely loaded. Spill response procedures in place.
	Rigging Up/Down	Rig Up/Rig Down	N	E	E	N	N	N		A	Drilling rig contractor procedures to be followed. Emergency response procedures. Daily meetings and TBT. Banksman/Slinger/ Signaller supervising. Equipment function tested prior to use.
		Fuel Delivery	N	E	E	N		A		A	Inspection of equipment before filling. Spill response equipment onsite. Spill response procedures. Personnel to remain with fuel tank at all times during filling. Site lined with concrete to capture any spills. Double skinned fuel tanks.

ASPECTS REGISTER

N - Normal Operations
A - Abnormal Operations
E - Emergency Operations

Phase	Process	Aspect	Air	Water	Land Contamination	Natural Resources	Energy	Noise and Vibration	Waste	Community	Controls and Mitigation
		Mix Drilling Fluids	N	E	E	N	N	N		A	Inspection of equipment before filling. Spill response equipment onsite. Spill response procedures. Site lined with concrete to capture any spills.
		Wash Down		E					N		All wash down fluids to be directed into cellar. Wash down water to be disposed of by licensed waste carrier.
		Drilling	N	N	A	N	N	N	N	A	Drill with water based fluids through any aquifers. Continuously monitor fluid levels. All equipment to be acoustically housed. Noise monitoring. Monitoring of air emissions. Best practice standards to be followed. Follow programme approved by Environment Agency. Lighting monitored by Site Supervisor.

ASPECTS REGISTER

N - Normal Operations
A - Abnormal Operations
E - Emergency Operations

Phase	Process	Aspect	Air	Water	Land Contamination	Natural Resources	Energy	Noise and Vibration	Waste	Community	Controls and Mitigation
Drilling Conductor	Drilling	Fuels		E	E						Fuel tanks double skinned in accordance with Control of Pollution (Oil Storage) Regulations 1999. Tanks positioned on concrete pad which drains to collection point. Regular inspection of storage tanks. Emergency response procedures.
		Drilling Fluids		E	E						Drilling with water based fluids. Monitoring of fluid levels whilst circulating. Tanks positioned on concrete pad which drains to a collection point. Response plan in the event of a spill. Regular inspection of pipework and tanks.
		Cuttings		E	E			N			Monitoring of cuttings tanks. Tanks positioned on concrete pad which drains to a collection point. Spill response plan. Regular inspection of equipment.

ASPECTS REGISTER

N - Normal Operations
A - Abnormal Operations
E - Emergency Operations

Phase	Process	Aspect	Air	Water	Land Contamination	Natural Resources	Energy	Noise and Vibration	Waste	Community	Controls and Mitigation
	Running Casing	Casing Handling					N	N		A	Noise minimised with good handling procedures.
		RIH with Casing					N	N		A	Good practices maintained whilst RIH. Fluid levels monitored throughout.
	Cementing	Rig Up/ Rig Down Cement Equipment	N					N		A	Equipment maintained regularly. Acoustic cladding around engines. Function test equipment.
		Pump Cement	N	E	E	N	N	N	N	A	Spill response plan. Cement skips available. Excess cement disposed of by licensed waste carrier.
	Waste Disposal	Cuttings Storage			E				N		All cuttings to be stored in secure containers. Disposed of by licensed waste carriers. Handling procedures in place.
		Water				N			N		Water to be recycled for use where possible. Use rain water in drilling fluids.
		Drilling Fluids		E	E				N		Storage tanks to be regularly inspected. Spill response procedures and equipment. Concrete working surface. Drainage collection point.

ASPECTS REGISTER

N - Normal Operations
A - Abnormal Operations
E - Emergency Operations

Phase	Process	Aspect	Air	Water	Land Contamination	Natural Resources	Energy	Noise and Vibration	Waste	Community	Controls and Mitigation
		Effluent	A	E	E				N		Effluent tanks to be regularly monitored. Waste to be disposed of by licensed waste contractor. Waste tanks to be situated in concrete pad area.
	Mobilisation	Vehicle Movements	N	E	E	N	N	N		A	Traffic Management Plan Liaison committee and information to residents. Enforced speed limit. Security bat entrance to wellsite. Signage.
		Unloading/ Loading	N			N	N	N		A	Banksman supervising. TBT prior to unloading. Equipment securely loaded. Spill response procedures in place.
		Rig Up/Rig Down	N	E	E	N	N	N		A	Drilling rig contractor procedures to be followed. Emergency response procedures. Daily meetings and TBT. Banksman/Slinger/ Signaller supervising. Equipment function tested prior to use.

ASPECTS REGISTER

N - Normal Operations
A - Abnormal Operations
E - Emergency Operations

Phase	Process	Aspect	Air	Water	Land Contamination	Natural Resources	Energy	Noise and Vibration	Waste	Community	Controls and Mitigation
	Rigging Up/Down	Fuel Delivery	N	E	E	N		A		A	Inspection of equipment before filling. Spill response equipment onsite. Spill response procedures. Personnel to remain with fuel tank at all times during filling. Site lined with concrete to capture any spills. Double skinned fuel tanks.
		Mix Drilling Fluids	N	E	E	N	N	N		A	Inspection of equipment before filling. Spill response equipment onsite. Spill response procedures. Site lined with concrete to capture any spills.
		Wash Down		E					N		All wash down fluids to be directed into cellar. Wash down water to be disposed of by licensed waste carrier.

ASPECTS REGISTER

N - Normal Operations
A - Abnormal Operations
E - Emergency Operations

Phase	Process	Aspect	Air	Water	Land Contamination	Natural Resources	Energy	Noise and Vibration	Waste	Community	Controls and Mitigation
Main Drilling	Drilling	Drilling	N	N	A	N	N	N	N	A	Drill with water based fluids through any aquifers. Continuously monitor fluid levels. All equipment to be acoustically housed. Noise monitoring. Monitoring of air emissions. Best practice standards to be followed. Follow programme approved by Environment Agency.
		Installation of BOPs				N	N				BOP's tested prior to installation. Operated by trained personnel.
		Fuels		E	E						Fuel tanks double skinned in accordance with Control of Pollution (Oil Storage) Regulations 1999. Tanks positioned on concrete pad which drains to collection point. Regular inspection of storage tanks. Emergency response procedures.

ASPECTS REGISTER

N - Normal Operations
A - Abnormal Operations
E - Emergency Operations

Phase	Process	Aspect	Air	Water	Land Contamination	Natural Resources	Energy	Noise and Vibration	Waste	Community	Controls and Mitigation
		Drilling Fluids		E	E						Drilling with water based fluids. Monitoring of fluid levels whilst circulating. Tanks positioned on concrete pad which drains to a collection point. Response plan in the event of a spill. Regular inspection of pipework and tanks.
		Cuttings		E	E			N			Monitoring of cuttings tanks. Tanks positioned on concrete pad which drains to a collection point. Spill response plan. Regular inspection of equipment.
	Wireline Logs	Make up running tool					N	N			Equipment maintained regularly. Acoustic cladding around engines. Function test equipment.
		RIH running tool					N	N			Good practices maintained whilst RIH. Fluid levels monitored throughout.
	Running Casing	Casing Handling					N	N		A	Noise minimised with good handling procedures.
		RIH with Casing					N	N		A	Good practices maintained whilst RIH. Fluid levels monitored throughout.

ASPECTS REGISTER

N - Normal Operations
A - Abnormal Operations
E - Emergency Operations

Phase	Process	Aspect	Air	Water	Land Contamination	Natural Resources	Energy	Noise and Vibration	Waste	Community	Controls and Mitigation
	Cementing	Rig Up/ Rig Down Cement Equipment	N					N		A	Equipment maintained regularly. Acoustic cladding around engines. Function test equipment.
		Pump Cement	N	E	E	N	N	N	N	A	Spill response plan. Cement skips available. Excess cement disposed of by licensed waste carrier.
	Waste Disposal	Cuttings Storage			E				N		All cuttings to be stored in secure containers. Disposed of by licensed waste carriers. Handling procedures in place.
		Water				N			N		Water to be recycled for use where possible. Use rain water in drilling fluids.
		Drilling Fluids		E	E				N		Storage tanks to be regularly inspected. Spill response procedures and equipment. Concrete working surface. Drainage collection point.
		Effluent	A	E	E				N		Effluent tanks to be regularly monitored. Waste to be disposed of by licensed waste contractor. Waste tanks to be situated in concrete pad area.

ASPECTS REGISTER

N - Normal Operations
A - Abnormal Operations
E - Emergency Operations

Phase	Process	Aspect	Air	Water	Land Contamination	Natural Resources	Energy	Noise and Vibration	Waste	Community	Controls and Mitigation
Stimulation	Mobilisation	Vehicle Movements	N	E	E	N	N	N		A	Traffic Management Plan Liaison committee and information to residents. Enforced speed limit. Security bat entrance to wellsite. Signage.
		Unloading/ Loading	N			N	N	N		A	Banksman supervising. TBT prior to unloading. Equipment securely loaded. Spill response procedures in place.
	Rigging Up/Down	Rig Up/Rig Down	N	E	E	N	N	N		A	Drilling rig contractor procedures to be followed. Emergency response procedures. Daily meetings and TBT. Banksman/Slinger/ Signaller supervising. Equipment function tested prior to use.
		Fuel Delivery	N	E	E	N		A		A	Inspection of equipment before filling. Spill response equipment onsite. Spill response procedures. Personnel to remain with fuel tank at all times during filling. Site lined with concrete to capture any spills. Double skinned fuel tanks.

ASPECTS REGISTER

N - Normal Operations
A - Abnormal Operations
E - Emergency Operations

Phase	Process	Aspect	Air	Water	Land Contamination	Natural Resources	Energy	Noise and Vibration	Waste	Community	Controls and Mitigation
	Stimulation	Pumping of fluid		E	E	N	N	N	N	A	All equipment commissioned prior to starting operations. Spill response procedures. TBT for all personnel involved. Equipment acoustically housed. Well parameters closely monitored.
		Flowback of fluid		E	E			N	N	A	Spill response plan. Fluid flowed back into concrete containment ditch. Fluid disposed of by licensed waste carrier. Flowback rates controlled. Spill equipment onsite. Competent personnel trained for operations used.
	Mobilisation	Vehicle Movements	N	E	E	N	N	N		A	Traffic Management Plan Liaison committee and information to residents. Enforced speed limit. Security bat entrance to wellsite. Signage.
		Unloading/ Loading	N			N	N	N		A	Banksman supervising. TBT prior to unloading. Equipment securely loaded. Spill response procedures in place.

ASPECTS REGISTER

N - Normal Operations
A - Abnormal Operations
E - Emergency Operations

Phase	Process	Aspect	Air	Water	Land Contamination	Natural Resources	Energy	Noise and Vibration	Waste	Community	Controls and Mitigation
Well Test	Rigging Up/Down	Rig Up/Rig Down	N	E	E	N	N	N		A	Drilling rig contractor procedures to be followed. Emergency response procedures. Daily meetings and TBT. Banksman/Slinger/ Signaller supervising. Equipment function tested prior to use.
		Fuel Delivery	N	E	E	N		A		A	Inspection of equipment before filling. Spill response equipment onsite. Spill response procedures. Personnel to remain with fuel tank at all times during filling. Site lined with concrete to capture any spills. Double skinned fuel tanks.
		Injection of water	N	E	E		N	N		A	Spill response plan. Fluid circulated in a closed loop system. Equipment commissioned prior to being operated. Spill equipment onsite and response procedures. Competent personnel trained for operations used.

ASPECTS REGISTER

N - Normal Operations
A - Abnormal Operations
E - Emergency Operations

Phase	Process	Aspect	Air	Water	Land Contamination	Natural Resources	Energy	Noise and Vibration	Waste	Community	Controls and Mitigation
	Well Test	Pumping of water	N	E	E		N	N		A	Spill response plan. Fluid circulated in a closed loop system. Equipment commissioned prior to being operated. Spill equipment onsite and response procedures. Competent personnel trained for operations used.
		Water flowed through surface equipment		E	E			N		A	Spill response plan. Fluid circulated in a closed loop system. Equipment commissioned prior to being operated. Spill equipment onsite and response procedures. Competent personnel trained for operations used.

APPENDIX 4 – ENVIRONMENTAL ACTIONS

No.	Phase	Objective	Action	Responsible Person	Timing/ Frequency	Consent and Mitigation Reference	Completed (Date)	Notes
1	Drilling	Monitor microseismic activity	Install microseismic monitoring network.	EGS Energy	Prior to stimulation operations - continuous	PA10/04671 – Condition 3		
2	All	Ensure protection of surface water	Ensure operations are conducted in accordance with Surface Water Management Scheme	Balfour Beatty	Daily inspections	PA10/04671 – Condition 5 Planning Application – Section 5.29		
3	All	Minimise impact of vehicles	Ensure operations are conducted in accordance with Construction Traffic Management Plan	Balfour Beatty	Daily	PA10/04671 – Condition 6		
4	All	Minimise impacts on the environment	Ensure all personnel are inducted and familiar with the EMP. Ensure compliance with EMP.	Balfour Beatty/ Moorhouse	Daily	PA10/04671 – Condition 7		
5	All	Maintain community consultation	Form liaison committee and inform residents of ongoing operations.	EGS Energy/ Balfour Beatty	Monthly	PA10/04671 – Condition 8		
6	Construction	Site contamination	Develop site remediation strategy	Balfour Beatty	If required	PA10/04671 – Condition 9		
7	All	Protection of vegetation	Ensure trees, hedgerows and vegetation are not unnecessarily removed	Balfour Beatty		PA10/04671 – Condition 11		
8	Construction	Noise	Ensure noise levels do not exceed 65dB Laeq during construction.	Balfour Beatty	Daily	PA10/04671 – Condition 12		
9	Drilling	Noise	Ensure noise levels do not exceed 45dB Laeq	Moorhouse	Daily	PA10/04671 – Condition 13		

			during drilling operations.					
10	Drilling	Vehicles	Ensure vehicles do not carry mud and debris onto road.	Moorhouse	Ongoing	PA10/04671 – Condition 16		
11	Drilling	Lighting	Minimise the impact of lighting.			PA10/04671 – Condition 17		
12	Drilling	Dust and Vibrations	Minimise impact of dust, fumes, odour and vibrations	Moorhouse	Ongoing	PA10/04671 – Condition 18 Planning Application – Section 5.38		
13	Drilling	Vegetation	Prevent any colonisation of invasive species	Balfour Beatty	Ongoing	PA10/04671 – Condition 20		
14	Drilling	Noise	Minimise impacts from noise through installation of acoustic barriers	Moorhouse	Ongoing	Planning Application – Section 5.4		
15	Drilling	Habitat enhancement	Development of new wet woodland and improvement of grassland.	Balfour Beatty	Prior to start of operations	Planning Application – Section 5.15		
16	Drilling	Air emissions	Minimise emissions during drilling operations	Balfour Beatty	Ongoing	Planning Application – Section 5.38		
17	Drilling	Groundwater	Submission of drilling program to HSE	Moorhouse	Prior to drilling operations	Borehole Sites and Operations Regulations 1995		
18	Drilling	Groundwater	Submission of drilling information to Environment Agency	Moorhouse	Prior to drilling operations	Water Resources Act 1991		
19	All	Surface Water	Consent to discharge surface water	Balfour Beatty	Prior to start of operations	Planning Application		