Permit

Waste Management Plan			
Management System:	HSE	**File Name:**	HSE-Permit-BAL-005
Accountable:	HSEP Manager	**Version No:**	Issue 3.0
Responsible:	Environmental Advisor	**Date of Issue:**	October 2017
Author:	PPE Manager		

Version	Section	Revision Information	Date	Reviser
1.0		Waste Management Plan	June 13	PPE Manager
2.0		Updated Waste Management Plan	February 17	PPE Manager
3.0		Schedule 5 response	October 17	HSEP Manager

Management Plans are reviewed at least annually, or sooner if a significant change to the operation has taken place, to ensure relevance to the systems and process that they define.

Table of Contents

1.0 Introduction

Cuadrilla Balcombe Limited (hereinafter "Cuadrilla") is prospecting for oil and intends to carry out exploratory well testing at the site to identify and quantify the presence of oil trapped in the reservoir rock in the ground below.

Cuadrilla is specifically prospecting for oil trapped in the Weald Basin, West Sussex. The planned operations do not include hydraulic fracturing and are assessed as a conventional oil well exploration activity.

Data gained from Balcombe 1, 1986 indicates little to no natural gas in the target formations. As such this is an oil exploratory operation and we do not expect to encounter gas (although the possibility cannot be ruled out entirely).

The 0.55 hectare site is situated at:

Lower Stumble Hydrocarbon Exploration Site

London Road

Balcombe

Haywards Heath

West Sussex

RH17 6JH

The process to well test and extract the trapped hydrocarbons will generate extractive waste which falls under the scope of Directive 2006/21/EC (the Mining Waste Directive) and, as a result, an environmental permit is required under the Environmental Permitting (England and Wales) Regulations 2010 (as amended).

Extractive waste is defined in accordance with Environment Agency Position Statement MWRP PS 015 version 1.0 August 2010.

This document encompasses Cuadrilla's Waste Management Plan in order to support its application for an environmental permit under Schedule 20 of the Environmental Permitting (England and Wales) Regulations 2010 (as amended).

The purpose of this Waste Management Plan is to ensure that Cuadrilla prevents or reduces waste production and its harmfulness, promotes recovery of waste and ensures the short and long term safe disposal of the extractive waste generated.

The plan will be updated at least every 5 years, or whenever a substantial change occurs, in accordance with Article 5 (4) of the Mining Waste Directive.

2.0 Facility Classification

The operations that will be conducted will mean that the site is a Mining Waste Operation for non-hazardous and hazardous waste as defined in the Mining Waste Directive, Environmental Permitting (England and Wales) Regulations and available guidance.

The extractive wastes which will be managed as a Mining Waste Operation are:

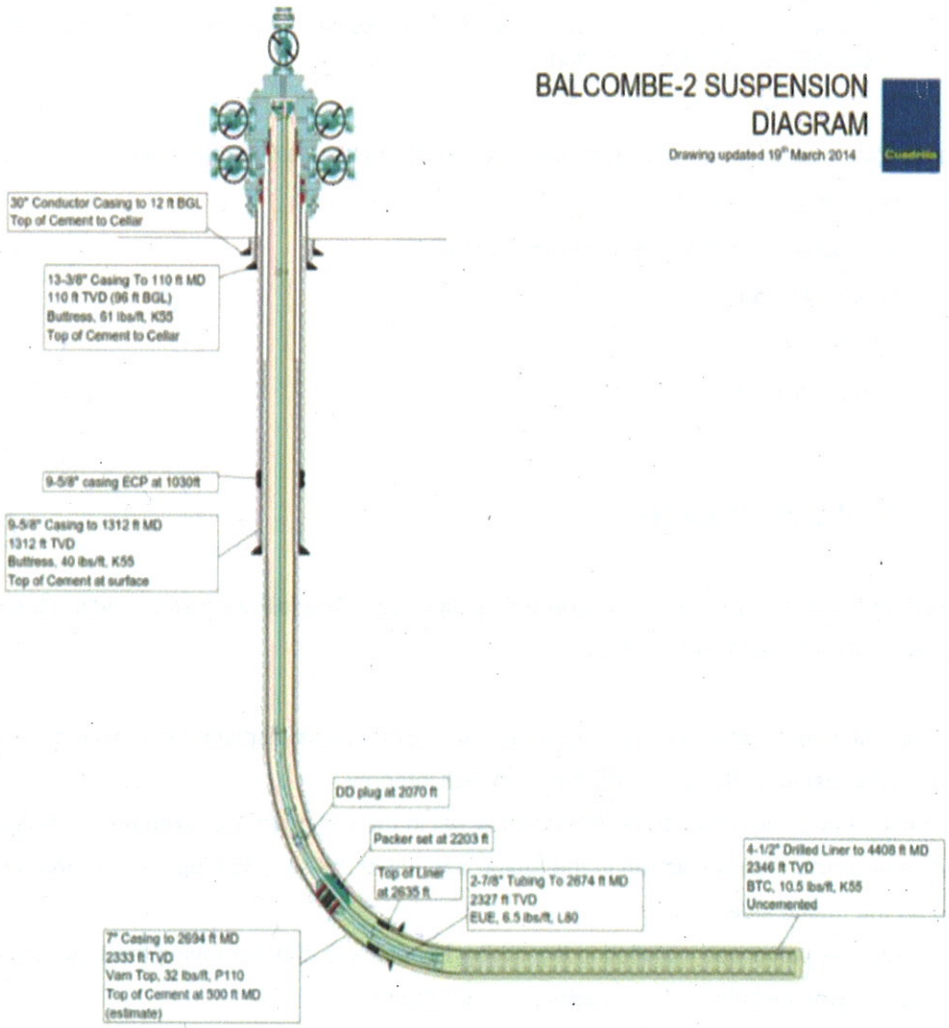
- Well suspension fluid
- Salty water (from the spent hydrochloric acid)
- Produced water
- Natural gas
- Vented nitrogen

2.1 Well Suspension

Post drilling Balcombe 2z, the well is currently suspended. The following steps outline the process for well suspension. See figure 1 for schematic.

The drilling fluid in the previously pressure tested 7" casing was displaced to inhibited calcium chloride brine. The pressure test identified no compromise of well integrity.
A production packer was run on 2-7/8" tubing at set in the casing at approximately 2200ft and pressure tested on the casing side. A plug was run in the tubing and set at the seating nipple above the packer and pressure tested on the tubing side.
A back-pressure valve was installed in the tubing hanger and after removing the blow-out preventer the tubing head adapter was installed with a master valve on top of it.
A needle valve and pressure gauge has been fitted to both the master valve above the tubing hanger and the tubing head valve to the 7" casing annulus to allow for monitoring of tubing and casing pressure during the period of suspension. Monitoring of pressures will take place after the first week, and then at intervals increasing by 1 week until it is every 4 weeks up to quarterly. If any pressure build-up is detected, it will be investigated further, which may involve draining the cellar.
A lockable cover will be installed over the cellar for security but still providing inspection access.

Figure 1: Balcombe schematic (Well Suspension)



2.2 Well Testing Programme

The well testing programme is broken down into a series of stages which produce extractive waste streams.

Stage 1: The well suspension fluid is displaced out of the wellbore to a holding tank at surface. There are 2 possible approaches to removing well suspension fluid which could be displaced from the wellbore depending on the technique utilised:

1) From the reservoir section (volume of 6" hole from below the packer to total depth of the well) plus volume of the 2-7/8" tubing down to the packer: this is for the case that the well is lifted from inside the production string, for instance using coiled tubing; and

2) Additional volume of the annulus between production tubing and 7" casing, down to the packer: this is for the case that the well is lifted with a rod pump, and so the entire annular volume is removed as well.

Once received at surface, the displaced fluid could be reused to the extent that it is not contaminated with formation fluids, i.e. crude oil. Any contaminated suspension fluid is sent to a permitted waste site as per other liquid drilling waste. When the testing is finished the well is re-suspended with a similar suspension fluid, so additional volume may need to be prepared to augment the recovered volume.

Stage 2 requires approx. 20m³ of diluted hydrochloric acid (10% dilution mix) to be circulated within the horizontal well via coil tubing. The coiled tubing which is inserted within the well provides a clean, accurate conduit for pumping the acid wash and water solution into the wellbore. The purpose of circulating diluted hydrochloric acid as a reagent is to remove any residual drilling mud debris from the horizontal wellbore and to clean the immediate wellbore area. The water and acid wash solution is circulated below fracturing pressures. No high pressure circulation will be used which could create fractures in the reservoir rock. Any penetration of diluted acid wash from the wellbore into the immediately adjacent reservoir rock is minimal and only due to the natural permeability of the reservoir rock surrounding the wellbore.

Stage 3 requires flushing of the wellbore using nitrogen gas, if natural gas is not present in the reservoir, to lift liquids from the well returning to surface any residual liquids or solids remaining in the wellbore. Nitrogen is an inert gas.

All fluids returned from the wellbore pass through the well test system for separation and storage, pending removal from site via an authorised waste contractor. The waste streams will be temporarily stored at site and subsequently sent to a permitted waste facility at the end of the 7 day well testing stage or sooner. There will be no waste stored at the site permanently.

Any waste gas which may be present in the formation is only classified as an extractive waste once it comes to the surface.

The spent diluted hydrochloric acid is intended to clean the wellbore as an engineering fluid. There is no intention to leave any fluid in the formation.

2.2.1 Well Suspension Fluid

Suspension fluids are waste in accordance with the revised Waste Framework Directive. Their composition has been assessed as hazardous due to the contamination with Crude Oil.

2.2.2 Surplus Natural Gas

Surplus gas is a waste in accordance with the revised Waste Framework Directive. The composition has been assessed as hazardous (Highly flammable).

2.2.3 Produced Water

Produced waters are waste in accordance with the revised Waste Framework Directive. Their composition has been assessed as non-hazardous.

2.2.4 Salty Water (Spent Diluted Hydrochloric Acid)

Spent diluted hydrochloric acid is a waste in accordance with the revised Waste Framework Directive. Their composition has been assessed as non-hazardous.

2.2.5 Nitrogen

Returning nitrogen is an inert gas and is a waste in accordance with revised Waste Framework Directive. Its composition has been assessed as inert.

3.0 Waste Prevention & Reduction

The activities will be conducted so as to prevent waste production wherever possible, and to reduce the quantities generated in all other cases applying the Waste Hierarchy.

However, the nature of the operations giving rise to the extractive waste that are the subject of this Plan means that it is practically impossible to de-couple waste creation from the originating process. It is also subject to a degree of variation, and whilst every effort will be made to conserve natural resources and therefore generate as little waste as possible, the precise characteristics encountered in the target reservoir will mean this is subject to change.

3.1 What we will do to reduce or minimise waste

3.1.1 Surplus natural gas

During prospecting for oil natural gas may be encountered. Data from the Balcombe 1 well drilled in 1986 on the same site, indicate low levels of natural gas within the underground formation. It is also not feasible to utilise any of gas on site. For these reasons, the gas is flared (as a cleaner and safer alternative to venting methane). The predicted quantity of any surplus natural gas has been estimated at a worse case of 35,000m^3 for the total duration of well testing.

3.1.2 Salty Water (Spent Hydrochloric Acid) & Produced Water

Minimum amount of water and acid solution wash shall be used to clean the horizontal section of the wellbore. Expected amount of returns are 82m^3 and this will be a combination of salty water and produced water.

3.1.3 Nitrogen

As nitrogen is extracted from the atmosphere and vented back into the atmosphere it is deemed a closed loop system.

3.2 What we will do to avoid disposal

3.2.1 Produced Water & Spent Diluted Hydrochloric Acid

Given the exploratory, small-scale and short-term nature of our prospecting activities, the best option will be to send the waste off site for treatment and subsequent disposal.

3.2.2 Nitrogen

As nitrogen is extracted from the atmosphere and vented back into the atmosphere it is deemed a closed loop system.

4.0 Waste Disposal

There are no disposal of waste at site. The waste management plan has been updated with a partial surrender of the mining waste facility.

5.0 Waste Characterisation

5.1 Produced Water & Salty Water (Spent Diluted Hydrochloric Acid)

Based on the data from Balcombe 1 well in 1986, the produced water and salty water returning from the diluted hydrochloric acid reaction have been assessed.

The waste does not display any of the hazardous properties listed in Annex III of the revised Waste Framework Directive at or above relevant limit values (as set out in Environment Agency Technical Guidance WM3). The waste has been assessed against the definition of "non-hazardous" provided in Article 3(3) of the Mining Waste Directive.

01 01 02	Waste from mineral non metalliferous excavation

5.2 Surplus Natural Gas

The gas composition has been assessed and displays one of the hazardous properties listed in Annex III of the revised Waste Framework Directive and is therefore defined as hazardous waste by H3A, fourth indent (Highly Flammable).

16 05 04	Gases in pressure containers

5.3 Venting Nitrogen

Nitrogen gas is classified as an inert gas. There is no corresponding entry in the European Waste Catalogue (EWC) that can be accurately used to describe this waste.

5.4 Well Suspension Fluid

The waste may display hazardous properties listed in Annex III of the revised Waste Framework Directive at or above relevant limit values (as set out in Environment Agency Technical Guidance WM3). The waste has been assessed against the definition of "hazardous" provided in Article 3(3) of the Mining Waste Directive.

01 05 06*	Drilling muds and other drilling waste containing hazardous substances

6.0 Site Operations and Waste Treatment

6.1 Produced Waters & Salty Water (Spent Diluted Hydrochloric Acid)

Produced water returns, including spent hydrochloric acid, will be temporarily deposited in dedicated steel Flowback tank each with a volume of 60m³. The duration of storage will be commensurate with the flowrate and quantity of fluid returning to the surface. Due to the short term nature of the flow test, 7 days, it is expected that the waste streams will be stored on site for a shortest period as possible forming part of the transportation and collection process. All waste will be removed from site once the flow test has been completed. There will be no waste stored at the site permanently.

The Flowback tanks are subject to annual thickness inspections and weekly visual integrity inspections. The waste produced water is removed by vacuum loading road tanker to an authorised waste facility. It should be noted that the exact size and configuration of tanks and vessels for the storage of this waste may change to suit operational needs, but will remain of the same high standard.

6.2 Surplus Natural Gas

After separation by the high volume 4 phase test separator, surplus natural gas becomes an extractive waste and is discarded by being diverted to a flare system and substantively destroyed at temperatures exceeding 800 degrees Celsius to ensure efficient combustion. A proprietary flare system has been developed for this purpose by the Operator.

The flare has been designed to meet the standards described in section 3.5.2.6 of the guidance (BAT Reference Document cww_bref_0203 "Best Available Techniques in Common Waste Water and Waste Gas Treatment / Management Systems in the Chemical Sector), to achieve greater than 98% of Methane being flared converted to CO_2, carbon monomers and water.

The flare stack starts with a 12 inch diameter x 15ft high stand pipe that vents all gas into an 8ft diameter x 30ft high burn chimney. The total height of the flare system is 45 feet from ground level. The chimney suppresses both the noise levels, and the light emissions. It also significantly reduces the heat given off by the flame. Additionally, it prevents a "flame fold-down" that can occur if a strong horizontal wind is present.

With this design of flare stack, all gas is trapped in the 30ft chimney and is subjected to a longer burn path, thus preventing any stray natural gas from escaping off to the sides before reaching the flame.

Additionally, air vents have been cut into the 30ft chimney (front side and back side) which enables air to be drawn into the system during flaring operations. This results in a more complete burn of the gas.

The flare is equipped with a continuous burning pilot flame (propane), and an auto-ignite system to light the pilot, should it go out. During a test operation there is always 24 hour manpower coverage with experienced well test crews.

In use, the performance of the flare will be monitored as defined in section 8 and, if the conversion standards stated above are not achieved, then in the short-term, the flow of gas from the separator will be isolated and the well will be temporarily shut-in to prevent the flow. Unabated releases of natural gas to atmosphere will be avoided.

Should the flare become temporarily unavailable, the flow of gas from the separator will be isolated and the well will be temporarily shut-in to prevent the flow of further natural gas. Unabated releases of natural gas to atmosphere will be avoided.

To manage the flow of natural gas below the 10t per day hazardous waste limit, a choke will be installed between the wellhead and flare lateral. The volume of gas will be monitored hourly post choke to record the quantity of gas flow by a well site engineer. If flow is calculated to exceed the 10t limit per day then the flow will be reduced. In the unlikely event that flow will potentially exceed the daily limit the well will be shut in temporarily to prevent the flow from exceeding the limit. The calculation of gas flow and records will be kept for inspection at site.

6.3 Venting Nitrogen

As nitrogen is extracted from the atmosphere and vented back into the atmosphere it is deemed a closed loop system. No treatment of the waste nitrogen is required.

6.4 Well Suspension Fluid

Calculations were made by Cuadrilla and a competent contractor accounting for borehole section and well design to estimate the amount of suspension required and the volumes will be measured to reduce the amount of waste generated by excess. Where possible returned suspension fluid can be reused on site e.g. for the plug and abandonment phase. Returned fluid which is classified as a waste will be temporarily stored in a secure containment area and then sent for disposal to a permitted waste management facility as soon as reasonably practicable forming part of the transportation and collection process. There will be no long term or permanent storage of waste at the site.

7.0 Environmental risk assessment

7.1 H1 Risk Assessment

An Environmental Risk Assessment (HSE-Permit-BAL-003) has been prepared for the activity in support of this Environmental Permit application. The assessment has been undertaken in accordance with the Environment Agency horizontal guidance H1 Environmental Risk Assessment for Permits, Version 2.1, December 2011 and EPR6.14 How to comply with your environmental permit. Additional guidance for: mining waste operations, Version 2, February 2011

This qualitative risk assessment has considered odour, noise, fugitive emissions, dust, air emissions, releases to water environment, waste, Global Warming potential, and potential for accidents and incidents as these relate directly to the activities.

The assessment concluded that with the implementation of appropriate risk management measures, potential hazards from the activities are unlikely to be significant.

7.2 Guide to how we score risk in the context of our Environmental Risk Assessment

The Environmental Risk Assessment (HSE-Permit-BAL-003) provides details of the activities and situations that could give rise to harm, and describes what this harm could be if no mitigation measures are in place – i.e. the worst-case scenario. It then goes on to score the risks with the existent risk control measures in place, where the Initial Risk Rating is calculated as:

Likelihood that harm will occur x the severity of the Consequence if it does = Risk

Consideration is then given to implementing additional mitigation measures, and the Residual Risk Rating is calculated – this is the remaining level of risk after all identified risk control measures have been implemented.

It should be noted that the aim is to reduce risks to an acceptably low level, but that it is not always possible to entirely eliminate risk altogether.

As with any risk assessment, the conclusions reached are subjective but based upon experience, technical understanding and sound professional judgment.

8.0 Risk mitigation

The Environmental Risk Assessment in (HSE-Permit-BAL-003) details the proposed risk control and mitigation measures that Cuadrilla will put in place at the Balcombe Prospecting Site.

9.0 Control and monitoring

The Environment Risk Assessment (HSE-Permit-BAL-003) coupled with the findings of the Site Condition Report (HSE-Permit-Bal-002), demonstrates that due to the nature of the waste to be generated and the proposed risk control and mitigation measures, there will be no significant risk from mud, odour, noise/vibration, waste, air quality and emissions with global warming potential, or accidents at the site.

Accordingly, only limited monitoring of these parameters is proposed during the well suspension phase and well testing.

A single groundwater monitoring borehole was drilled before the start of drilling operations in June 2013. A hydrogeological risk assessment accompanies the waste management plan outlining the risks from operations to groundwater. Subsequently this will determine the frequency and determinants to be monitored.

Figure 1: Surface Headworks Arrangements

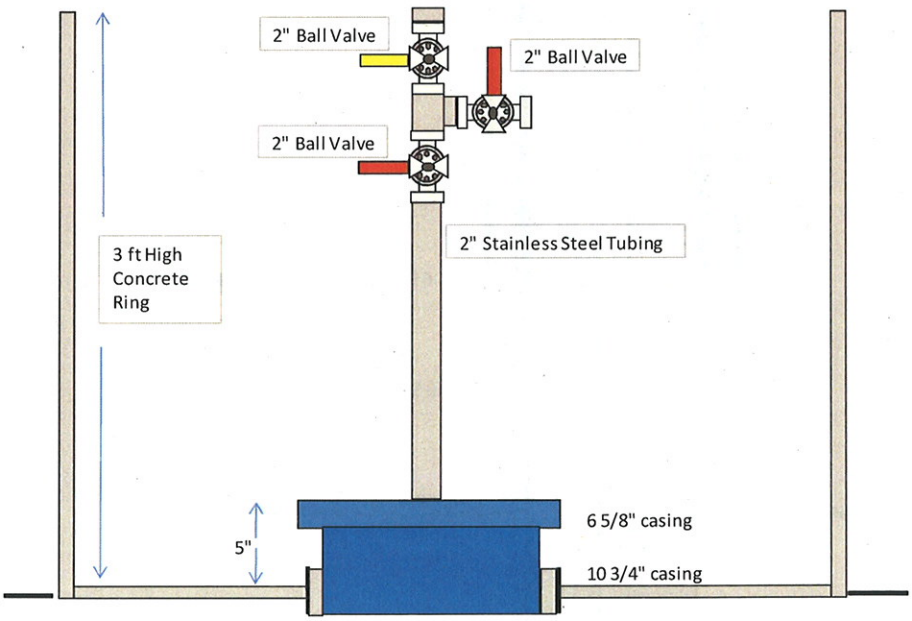


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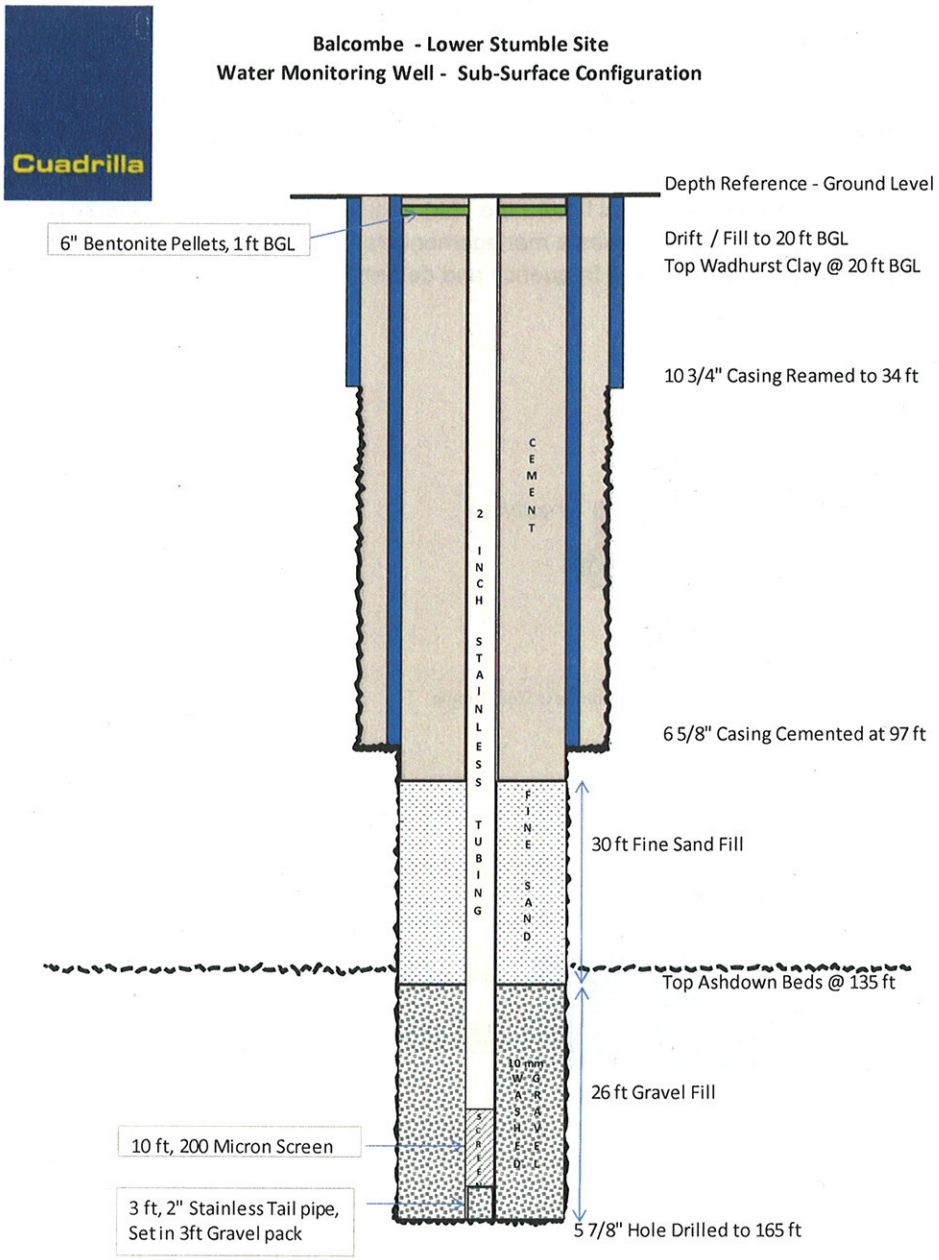
Figure 2: Subsurface Configuration



9.1 Well Suspension Monitoring

9.1.1 Groundwater

The environmental risk assessment has concluded a low risk from the limited activity being carried out at the surface and the hydrocarbon well suspended to HSE standards. The environmental risk assessment, provides a three dimensional approach to identifying risks to groundwater (Source, Pathway, Receptor) based on DEFRA Greenleaves III guidance. Subsequently reviewing the risks presented to groundwater only dissolved methane, dissolved carbon dioxide and dissolved oxygen will be monitored on site to maintain surveillance on groundwater quality. The sampling frequency will be quarterly (4 per calendar year) or more frequent if the results identify significant changes.

The sampling technique requires an inverted semi closed-system technique that involves the filling a vials while inverted in a bucket of purge water. The inverted method does not expose the sample directly to the atmosphere, the liquid in the bucket proceeds to equilibrate with atmospheric pressure.

As part of the water quality monitoring a number of parameters will be collected at site during purging. The parameters; pH, electrical conductivity, temperature and dissolved oxygen are collected for 3- 5 minute intervals until stablished. The stabilisation of these measures will indicate when a groundwater sample can be taken.

9.1.2 Fugitive methane emissions

The environmental risk assessment has concluded any quantities are expected to be very minor and deemed to pose a low environmental risk.

Laser methane monitoring equipment shall be deployed on site to monitor during the well suspension period on a quarterly basis. The laser methane monitoring equipment shall be deployed up wind and downwind of the wellhead to establish any changes to methane levels.

9.1.3 Surface Water

A series of surface water locations, surrounding the site and different flow directions will be monitored on a 6 monthly basis. Due to the limited activity of the site and the well in suspension the surface water will be monitored to maintain a surveillance of the site conditions.

9.2 Well Test Monitoring

9.2.1 Groundwater

The environmental risk assessment has concluded a low risk from the activity being carried out at the surface and the hydrocarbon wellbore being flow tested as low with appropriate mitigation measures in place. The environmental risk assessment, provides a three dimensional approach to identifying risks to groundwater (Source, Pathway, Receptor) based on DEFRA Greenleaves III guidance. Subsequently reviewing the risk presented to groundwater a suite of metals, hydrocarbons and dissolved methane, dissolved carbon dioxide and dissolved oxygen will be monitored on site to maintain surveillance on groundwater quality. These are listed within the existing permit EPR/AB3307XD Table S3.2 and will be complied with during the well testing phase. The sampling frequency will be a single sample at the start of the well test, a single sample in the middle of the well test and a single sample on the final day of the well test, up to 3 tests during the well testing phase.

For dissolved gases the sampling technique requires an inverted semi closed-system technique that involves the filling a vial while inverted in a bucket of purge water. The inverted method does not expose the sample directly to the atmosphere, the liquid in the bucket proceeds to equilibrate with atmospheric pressure.

As part of the water quality monitoring a number of parameters will be collected at site during purging. The parameters; pH, electrical conductivity, temperature and dissolved oxygen are collected for 3- 5 minute intervals until stablished. The stabilisation of these parameters will indicate when a groundwater sample can be taken.

Sampling for metals and hydrocarbons will be sampled directly from the sample train with no need for an inverted method.

9.2.2 Surface Water

The environmental risk assessment has concluded a low risk from the activity being carried out at the surface and the hydrocarbon wellbore being flow tested with appropriate mitigation measures in place. The risk assessment, provides a three dimensional approach to identifying risk to groundwater (Source, Pathway, Receptor) based on DEFRA Greenleaves III guidance. Subsequently reviewing the risk presented to surface water a suite of metals and hydrocarbons will be monitored on site to maintain surveillance of surface water quality. These are identified within the existing permit EPR/AB3307XD Table S3.2. The sampling frequency will be one at the start of the well test, in the middle of the well test and the final day of the well test, up to 3 tests during the week. The location of the sampling is located surrounding the site and different flow directions, see Appendix C.

9.2.3 Air Quality/Emissions

The extractive waste generated by the activity includes the potential to flare natural gas creating a point source emission. The environmental risk assessment (HSE-Permit-BAL-003) accompanied with an Air Quality Technical Report (Appendix B) has concluded that point source emissions of natural gas has a negligible impact to human health. As a result perimeter air quality monitoring is proposed for the duration of drilling and well testing programme. Air quality monitoring parameters include; nitrogen dioxide, sulphur dioxide, hydrogen sulphide, methane, VOC's and BTEX.

9.2.4 Mud

The site is located on a stone pad, with an established unmade access and egress track to the drilling location. A once daily inspection of the road immediately at the juncture of the site entrance will be performed (and the details recorded) to ensure that any potential mud deposits from road tankers visiting to collect extractive waste does not become a problem. In the unlikely event of any build-up of mud and debris, the area will be cleaned using a sub-contracted road sweeper service.

9.2.5 Odour

Based on prior experience, the extractive waste that will be generated is not malodorous and nor are any of the associated processes that will be performed.

9.2.6 Noise/Vibration

Road tankers visiting the site to collect extractive waste may be fitted with audible reversing alarms. Noise will be maintained within planning condition levels.

The operation of the flare is likely to be a source of noise emissions, although flaring will only take place for approximately 1 week and the site is not in close proximity to residential properties so this is not expected to be problematic. The exploration site is screened by natural features (established woodland) providing an additional sound attenuation.

Noise monitoring will be undertaken at pre-determined locations around the boundary of the site and close to sensitive receptors. If any complaint is received an investigation will be conducted into the causes of the complaint. The findings will as appropriate inform further monitoring and risk control arrangements and may lead to additional mitigation measures. Details of any such complaints and any remedial action taken or planned will be discussed with the Environment Agency.

9.2.7 Accidents

The environmental risk of an accident is predominantly associated with the potential for spillage of extractive wastes. Given that the site is constructed with a large impermeable membrane providing spillage containment; that pipework and the associated storage tanks will be inspected daily for leaks and damage. The site is not situated in a Source Protection Zone (with no potable water abstraction activities in the site boundary or immediately nearby) the environmental risk assessment has concluded the risk to be low. Nonetheless, it is proposed that nearby surface water features will be sampled prior to extractive waste being generated, and once every week during the drilling and well testing programme, and tested to identify the presence of extractive waste contaminants.

The results of this monitoring will be recorded and the relevant sections of the Site Condition Report (HSE-Permit-BAL-002) will be updated accordingly and will inform the future monitoring for the Site Closure Plan (HSE-Permit-Bal-006). Details of all accidents, and our response, will be shared with the Environment Agency and other regulators as appropriate.

9.2.8 Produced Waters & Salty Water (Spent Diluted Hydrochloric Acid)

The quantity of waste arising each day will be monitored and recorded, along with the quantities dispatched off site for disposal. Sampling of the returned produced waters and salty water will be taken at the first available opportunity for chemical analysis and any other additional waste acceptance criteria that are requested by the offsite authorised waste facility. An onsite pH test shall be undertaken at the first available opportunity to test the produced waters and salty water. The chemical composition shall be submitted to a UKAS accredited laboratory for wet-chemistry analysis. Following this initial sample, weekly samples will be taken.

However, it should be noted that the actual composition could vary dependent on the precise conditions encountered in the target reservoir.

In the unlikely event that our testing highlights levels of contaminants that would render the waste hazardous then more frequent testing will take place in an attempt to identify whether or not the waste remains hazardous. If, after conducting additional and detailed testing, it is evident that the composition of the waste has permanently altered and is likely to remain hazardous, its classification

will be amended, the Waste Management Plan will be updated and the environmental permit varied to reflect the change. The Environment Agency will be notified.

The quantity and frequency of sampling may be reduced with written agreement from the Environment Agency in the event that the results obtained are consistently within expected ranges and when the volume of waste generated declines at the end of the extended well testing period. The results of all testing will be shared with the Environment Agency in accordance with permit conditions.

9.2.9 Surplus Natural Gas

The temperature of the flare will be continuously monitored at the base and tip of the flame. Records of the temperature will be recorded daily.

9.2.10 Fugitive Air Emissions

The environmental risk assessment has concluded any quantities are expected to be very minor and deemed to pose a low environmental risk.

Laser methane monitoring equipment shall be deployed on site to monitor and establish background methane levels before drilling and well testing. The laser methane monitoring equipment shall be deployed on 2 separate occasions during well testing up to 8 hours per deployment. The laser methane monitoring will be positioned up wind and downwind of the site.

9.2.11 Complaints

If any complaints are received from stakeholders, including neighbours, they will be recorded, investigated and responded to without delay in accordance with the Company's existing complaints handling procedures. Complaints will additionally be reported to the Environment Agency, with whom actions to avoid a recurrence will be discussed and agreed.

9.3 Conclusion

The results of all monitoring will be used to update the Site Condition Report (HSE-Permit-BAL-002) for the permitted operation, to inform changes to the Waste Management Plan, and will be shared with the Environment Agency. The monitoring details shall be used to inform the Site Closure Plan (HSE-Permit-BAL-006).

10.0 Proposed plan for closure

The planning consent for the site sets out the requirements for closure and restoration of the site,

If a decision is taken to close the site, it shall be plugged and abandoned in accordance with established procedures and the following regulatory provisions:

- the Borehole Sites and Operations Regulations 1995 [BSOR];

- the land-based requirements of the Offshore Installations and Wells (Design & Construction etc) Regulations 1996 [DCR];

- Petroleum Exploration and Development Licence (PEDL) 244.

In addition, the guidance set out by the UK Onshore Operators Group (UKOOG) entitled "UK Onshore Shale Gas Well Guidance" will also be observed.

The process to plug and abandon the well will involve setting a series of mechanical and cement plugs to isolate permeable sections of the well, in addition to cement plugs higher up in the vertical well bore. The wellhead will be removed and the casings cut and sealed below ground level. This is to prevent, on a permanent basis, the escape or migration of fluids from the well. This process will follow the Oil & Gas UK and UK Onshore Operators Group guidelines, and is reviewed by an independent well examiner and the HSE.

No active pollution control requirements will be deployed.

When the site is closed, a closure plan (HSE-Permit-BAL-006) will be developed that covers all the required measures detailed in section 3.4 of the Environment Agency's guidance "How to comply with your environmental permit. Additional guidance for: mining waste operations" as part of any application to surrender the environmental permit. This will cross-reference the updated Site Condition Report (HSE-Permit-BAL-002) and take into account any changes in site conditions.

11.0 Measures for the Prevention of Environmental Pollution

The environmental risk assessment (HSE-Permit-BAL-003) discussed in Section 6 above has identified all the potential hazards and pollutant linkages at the site relating to the management of the extractive waste, the risks they pose, and the risk control measures that Cuadrilla will implement in order to mitigate those risks.

These risk control measures are considered to meet the requirements of the Mining Waste Directive, including the need to prevent water status deterioration and soil pollution.

11.1 Direct Discharges of Extractive Waste

There will be no leachate generated at the site. There will be no deliberate discharges of extractive liquid waste directly to the environment from the site.

Measures to prevent the pollution of soil and accidental releases of waste that could cause pollution of surface water and groundwater have been considered and mitigation measures within the environmental risk assessment implemented on site.

11.2 Indirect Discharges of Extractive Waste

Mitigation measures are in place to prevent indirect discharges of extractive waste arising from accidents, leaks or percolation into the environment. The mitigation measures are documented with the environmental risk assessment.

11.3 Point Source Emissions of Natural Gas

All extracted natural gas will be flared, where flaring is used as an abatement technique.

11.4 Fugitive Emissions of Natural Gas

The use of a 4 stage high pressure separator means that the risks of fugitive natural gas releases are very low. However, should the results of our monitoring indicate the need, additional abatement measures will be considered to ensure that any identified fugitive emissions of natural gas are eliminated or reduced to the lowest possible level. A review of abatement measures will be assessed once the scale of the problem has been established. A number of other variables, such as the precise equipment layout at each exploration site, also constrain our ability to determine what other engineered controls might be implemented. In circumstances where our monitoring determines it to be necessary, we will present our findings to the Environment Agency, along with details of our proposed abatement techniques, for review and subsequent approval.

11.5 Venting of Nitrogen

The venting of nitrogen as an inert gas is not considered an environmental risk.

12.0 Appendices

12.1 Appendix A – Site Boundary

See Schedule 7 of Permit EPR/AB3307XD

12.2 Appendix B - Atkins Air Quality Technical Report

12.3 Appendix C - Surface Water Monitoring Locations