Coastal Oil and Gas Limited

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St Nicholas Exploration Borehole

Pollution Incident Plan

December 2014

Pollution Incident Plan for the drilling of the St Nicholas Borehole

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1. Introduction

1.1 Background

Coastal Oil and Gas Limited have an approved planning application 2013/00333/FUL:-

- **Drill a single vertical exploration borehole at Site located in field 400m along an unnamed road between the A4266 and Duffryn (grid ref 308215 : 171623)**

The purpose of this document is to provide a Pollution Incident Plan for the site.

The proposed drilling activities fall under the scope of the Mining Waste Directive (2006/21/EC) and as such the proposed operations will be regulated under the Environmental Permitting (England and Wales) Regulations (EPR) 2010 (as amended). Under these regulations, any extractive wastes generated as part of the site operations need to be managed in accordance with an approved Waste Management Plan (WMP).

Additional detail is from DIRECTIVE 2006/21/EC on the management of waste from extractive industries and amending Directive 2004/35/EC.

1.2 Site Location

The site is located near Duffryn, South West of Cowbridge in the St Nicholas and Bonvilston community council's areas of the Vale of Glamorgan Borough Council. The national grid co-ordinates for the site are:-

Eastings 308215 Northings 171623

Figure 1: Location of site

2. Description of Facility

2.1 Site Operations

In accordance with the local authority planning permission ref: **2013/00333/FUL – DRILL A SINGLE VERTICAL EXPLORATION BOREHOLE AT SITE LOCATION IN FIELD 400M ALONG AN UNNAMED ROAD BETWEEN THE A4266 AND DUFFRYN.** Drilling an exploration borehole to a depth of approximately 1200m.

Drilling operations include:-

- Site Set up
- Drilling to set casing
- Drilling to collect samples
- Geophysical logging
- Well Testing
- Site Welfare Arrangements

2.2 On Site Activities

2.2.1 Site Establishment.

The site compound will be constructed and fenced in accordance with the planning permission.

Under the drilling rig and tanks drip trays will be constructed with bunds in non-permeable material.

2.2.2 Drilling Activities

The drilling activity involves open hole drilling at varying diameters which decrease with increasing depth after each well casing is set.

- Construct Well Cellar
- Drill 12" dia to 50m and grout 9 5/8" to cellar floor
- Drill 8.5" dia to 550m and grout 7" casing to cellar floor
- Drill 6" dia to 1200m

Steel pipe casing is grouted in position to ensure the stability of the near surface superficial deposits.

2.3 Objectives of the Pollution Incident Plan

Objectives: To set out the controls required to protect the environment and reduce the risk of a pollution incident. To allow planning for the dealing with any incident should one occur.

3. Pollution Control

3.1 Prior to Site Works

Prior to any works commencing on site a full survey will be carried out to look at the site to establish any existing pollution.

A photo survey of the site will be taken including the site entrance and the road leading to the main highway. This will establish a baseline prior to starting site works.

3.2 Environmental Manager

A member of the site staff will be appointed Environmental Manager to oversee all aspects of the site and ensure good site practices are maintained at all times.

On site toolbox talks and site induction will be used to ensure site staff are trained and understand the procedures in event of a pollution incident.

The Environmental Manager will be responsible for updating the pollution incident plan if there are any changes to the site conditions.

3.3 Site Induction and Training

Before the commencement of site works all site staff will be inducted on to the site and made aware of the chemicals and the incident procedures for the site. As part of the site induction:

- Will clearly define roles and responsibilities of the staff
- Names of staff and contractors trained in incident response
- The types and location of emergency response equipment available and appropriate personal protective equipment (PPE) to be worn
- Procedures for alerting key staff
- A system of response coordination
- A list of contacts to call in response to any incident
- Awareness of the potential for harm to people and the environment from the materials held on-site;

- Information on the sensitivity of the environment surrounding the site;
- Reporting procedures if there's a risk of surface water, groundwater or land contamination;
- Safe and correct use of all spill clean-up equipment or pollution prevention structures and/or devices on site;
- Safe handling and legal disposal of contaminated materials and wastes resulting from an incident, including arrangements for using specialist contractors and services;
- Appropriate and safe decontamination.

Regular tool box talks with site staff will take place to update the staff with any changes to the pollution incident plan.

3.4 Site Perimeter

In order to prevent the discharge of surface water from the site a cut off ditch / bund and a submerged sealed interceptor tank will be constructed on a boundary across the lowest point.

A 10,000 gallon bowser will be kept onsite to allow the interceptor to be regularly emptied in the event of rain / surface run off. The bowser that the tank is pumped into will be sent off site to a licensed facility when it has been filled.

3.5 Oil and Fuel Storage

The storage of all oils and Fuels will be within a bunded fuel tank where the volume of the bund is 1.5 times the capacity of the tank. During fuel transfer absorbent matting will be placed below the fuel fill point to catch any drips. Drip trays lined with absorbent matting will be placed under the drilling rig at all times. Spill kits will be provided. Detailed specific risk and COSHH Assessments will be prepared for the emergency procedures to be adopted in the event of any spillage.

A list of all oils and fuels and chemicals and the product COSHH / MSDS sheets will be stored in the site office.

3.6 Drilling Fluids

The storage of drilling fluids, prior to mixing the drilling fluids are in powder form in bags. These will be stored in the drilling store shown on the site layout plan. The drilling fluids will comprise of a viscosifer to increase the viscosity of the fluid to increase the ability to lift the cuttings to the surface.

The water / fluids used for drilling are contained in a closed loop system; the volume of fluid required will depend on the depth of the well. The drilling fluid will be held in tanks on the surface so that they can be checked for levels and leaks.

- Shaker screen – the drilling fluid is passed over a fine vibrating sieve of various sizes to allow the drill cuttings to pass into a covered skip for disposal and the drilling fluid to drop through and return to the closed loop system. This separates the solid drill cuttings from the fluid so that it can be re-circulated back down the wellbore.

- Cyclone – The drilling fluid is spun in a hydro cyclone, "closed system" to remove the finer grained material from the system. The fine drilling cuttings drop out into a covered skip for disposal at a licensed facility.

At the end of the drilling operation all excess drilling fluid will be tankered off site to a licensed disposal facility.

As all drilling fluids are maintained in a closed loop system this can easily be monitored for leaks. In the event of a loss of fluid to the system the source of that loss will be investigated. If there is a leak to a tank / pipe then this will be repaired immmediately. The tanks will be placed so that they can be observed by the drilling crew and site staff. In the event that there is an increase in drilling fluid that may allow a spillage from the tanks, drilling will cease until additional tanks can allow for the increase in fluid or the additional fluid is tankered off site to and appropriate facility.

The volume of the borehole at 1200m will be less than 25m^2 the total volume of fluid in the closed loop system will be approximately 30m^2 (6,600 gallons). The drilling fluids will be constantly monitored by the drilling crew.

Water based drilling muds can contain soil and stones which, after appropriate treatment, may be suitable for use in recovery operations. Water based drilling muds will be used for the entire length of the borehole, with Purebore added to clean water in the form of a powder.

The water based drilling muds are a non hazardous substance at the concentrations used in the drilling. The quality of drilling fluids in the closed loop system is monitored and controlled. No oil based muds will be used.

Pure-Bore has recently been granted approval under regulation 31(4)a of the Water Supply (Water Quality) Regulations 2000 and the Water Supply (Water Quality) Regulations 2010 and therefore approved for use in public water supplies and included in the "List of Approved Products for use in Public Water Supply in the

United Kingdom". Pure-Bore was developed and is manufactured by the Clear Solutions Group of Companies.

Pure-Bore is PLONOR (pose little or no risk) to the environment, and the CEFAS registration for Pure-Bore was granted in March 2012, with Pure-Bore achieving the best possible environmental rating under this registration scheme (Gold rating).

Under the terms of the European directive 75/442/EEC on waste and Article 1(4) of Directive 91/689/EEC on hazardous waste the code for freshwater drilling muds and wastes is 01 05 04.

Under the terms of Directive 1991/689/EEC of the Council of the European Communities of 12 December 1991 on hazardous waste the drilling fluids are not hazardous.

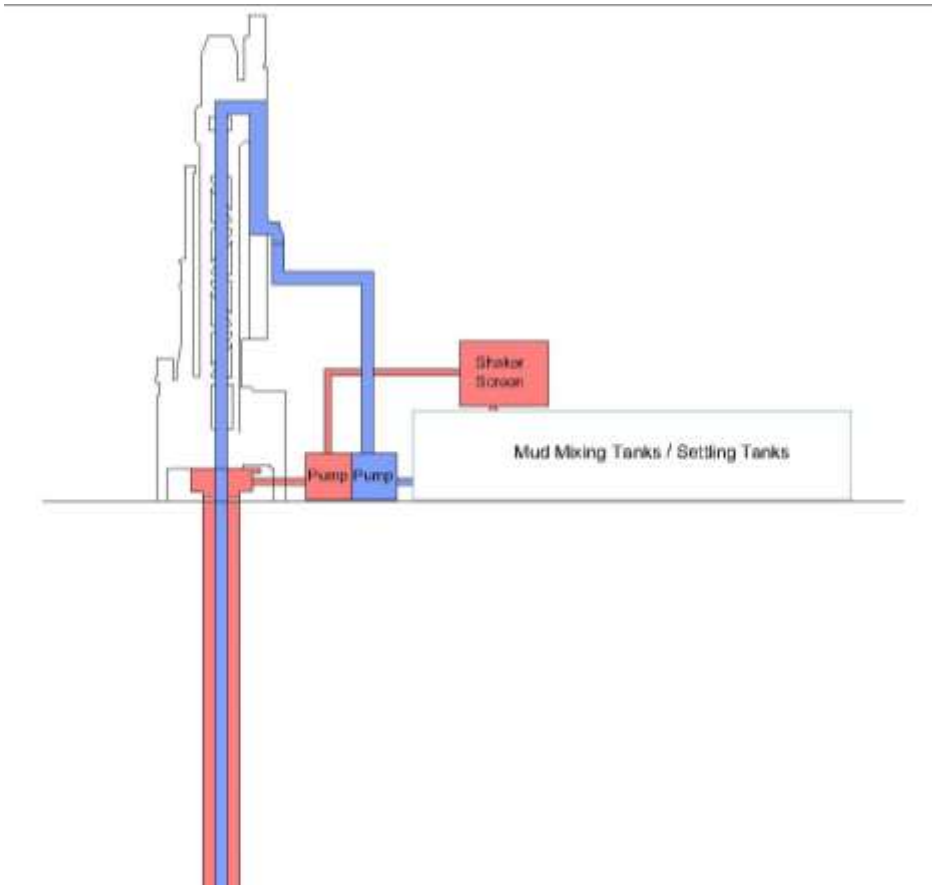

Figure 2: Close Loop System for the drilling fluids

3.7 Review and Maintenance

During the site works the pollution incident plan will be reviewed and updated where required. Any feedback from the toolbox talks will be utilised to improve the plan.

4. Procedures in the Event of Spillage

4.1 Spillage of Drilling Fluids

The closed loop system of tanks, pumps and pipework are located on site in such a way as they can be observed by the site staff. In the event of a spillage of drilling fluids from the tanks or pumps this will be observed and drilling can cease until the leak can be corrected or repaired.

The tanks are utilised at 3/4 capacity to reduce the risk of over spillage.

In the unlikely event of that there is a spillage of drilling fluids this will be contained on site.

Any spillage can be picked up and if possible returned to the closed loop system for re-use.

4.2 Spillage of Fuels / Oils

In the event of any spillage of fuel or oil this will be contained within the drip trays under the operating plant. An emergency spill kit with absorbent material will be kept on site and the site operatives will be responsible to clean up any spills immediately.

5. Site Completion Closure

In the event of site closure and/or the completion of the borehole, then the borehole will be formally plugged and abandoned in accordance with established procedures and the following 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];

- the guidelines presented by the Environment Agency publication 'Good practice for decommissioning redundant boreholes and wells October 2012.'
- the guidance from UKOOG - UK Onshore Shale Gas Well Guidance

Once the site has been fully abandoned and restored then no active pollution controls will be deployed on the site.

6. Reporting of Pollution Incidents

Any pollution incidents will be reported by the site staff to the on site Environmental Manager. A pollution report will be generated and noted on site and reported back to head office.

In the event of a major incident the **emergency services** should be contacted by dialling 999.

In the event of a pollution incident then this will be reported to **Natural Resources Wales** via the **Incident hotline** Telephone: 0800 80 70 60

In the case reporting an incident for of a RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013) the Health and Safety Executive will be contacted on line http://www.hse.gov.uk/riddor/report.htm

The Local Water Authority is **Dwy Cymru** and can be contacted on 0800 052 0130 - www.dwrcymru.com/en/Contact-Us/Water-Supply-Enquiry.aspx

7. Pollution from incidents beyond site control

As with all projects there may be accidents and equipment failures from time to time. Causes of environmental incidents on your site include:

- Overfilling containment vessels;
- Plant or equipment failure;
- Containment failure;
- Fires, explosions or failure to contain fire fighting water;
- Incompatible materials coming in contact;
- Uncontrolled reactions;
- Vandalism;
- Flooding of part or all of the site.

Any of these incidents could affect:

- Drainage systems, surface waters, aquatic ecosystems, groundwater and soil;
- Air quality by producing toxic fumes and airborne pollutants which may damage human health, wild and domestic animals and ecosystems;
- Thermal radiation which can harm people and the environment

These incidents will be dealt with by the site personnel using the stated practices. Fire fighting materials will be maintained on site, with training provide via toolbox talks for site use. There will be regular inspections of equipment by the site staff and the Environmental Manager. Planned maintenance of equipment will reduce the potential for equipment failures and records will be kept on site of all work carried out.

There are South Wales based companies that have 24hr responses to liquid spills that can be contacted in case of environmental incidents:-

- Natural Solutions - 01656 741799 - http://www.naturalsols.co.uk/
- Spilsolv UK - 08700 420966 - http://www.spilsolv.co.uk/
- Paulex Environmental - 07793 587075 - http://www.paulex.co.uk/

8. Environment Agency Guidelines

This plan has been put together with the aid of the Environment Agency Guidelines: Pollution Prevention Guidelines - Incident Response Planning: PPG 21 March 2009.