Cloughton 2 Wellsite

Air Quality Monitoring Plan

Environmental Permitting (England and Wales) Regulations 2016

- **Application for a Bespoke Mining Waste Operation**
- **Application for a Bespoke Installation**
- **Application for a Bespoke Groundwater Activity**

Issue Number:	Details:	Prepared By:	Reviewed By:	Authorised By:
250207	Draft for Client Review	Tony Fildes (Zetland Group)	Jamie McGill (Europa)	Alastair Stuart (Europa)
250424	Initial issue for an Application for a Mining Waste Operation with Flare, a Mining Waste Facility and a Groundwater Activity	Tony Fildes (Zetland Group)	Jamie McGill (Europa)	Alastair Stuart (Europa)

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1 PURPOSE AND CONTEXT

This Air Quality Monitoring Plan forms part of an application to the Environment Agency to authorise the undertaking of specific 'permitted activities' at the Cloughton 2 Wellsite (herein referred to as the 'Wellsite'). With regards to onshore oil and gas operations, a number of activities are considered applicable to the environmental permitting regime.

The wellsite within which the 'permitted activities' are undertaken is considered a 'regulated facility' under The Environmental Permitting (England and Wales) Regulations 2016, as amended (EPR2016) [Ref.1]. Throughout the life of the wellsite, this Air Quality Monitoring Plan shall be considered a live 'operating technique' and must be complied with as it forms part of the environmental permit.

The purpose of the Air Quality Monitoring Plan is to outline the air quality monitoring arrangements to be implemented at the Cloughton 2 Wellsite (the 'Site') during the proposed drilling and testing operations, which for clarity includes drilling of the Cloughton-2 Well, workover and testing operations.

Europa Oil & Gas Limited is the 'Operator' as defined under EPR2016 and shall herein be referred to as the Operator within this Surface Water Management Plan.

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2 SCOPE

This Air Quality Monitoring Plan is applicable to the Cloughton 2 Wellsite and all operations conducted therein in accordance with environmental permits and planning consent.

It is applicable to the 'Operator', its contractors and subcontractors and can be used to support an application to the Environment Agency for an environmental permit under EPR2016, where there is a requirement to provide an Air Quality Monitoring Plan.

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3 Abbreviations and Definitions

µg m-3:	Micrograms (one-millionth of a gram) per cubic meter
%V/V:	Volume per Volume
BTEX:	Benzene, Toluene, Ethylbenzene and Xylene.
EMMP:	Environmental Management and Monitoring Plan
GC-FID:	Gas Chromatography – Flame Ionisation Detector
GC/IR:	Gas Chromatography - Infrared Spectroscopy
GC/MS:	Gas Chromatography - Mass Spectrometry
GPS:	Global Positioning System
H_2S:	Hydrogen Sulphide
NOx:	Nitrogen Oxides
PEDL:	Petroleum Exploration and Development License
Ppm:	Parts Per Million
Ppmv:	Parts Per Million by Volume
U.K.A.S:	United Kingdom Accreditation Service
UV:	Ultraviolet
VOC:	Volatile Organic Compounds

Table 1: Abbreviations and Definitions

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4 SITE DETAILS

The proposed wellsite is located in the countryside in the county of North Yorkshire. It is centred on grid reference TA 02081 92802 and located at the following address:

Cloughton 2 Wellsite

Land east of The Mill Yard

Burniston Mill

Coastal Road

Burniston

Scarborough

YO13 0DB

Figure 1: Cloughton 2 Wellsite – Proposed (Source: Google Earth 28/08/2024)

4.1 Site Location Plan and Site Layout Plan

A number of site plans have been provided within the Site Plans document (04 – Site Plans) and detail the extent of the wellsite, including its location, site layouts and point source emissions.

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5 ROLES AND RESPONSIBILITIES

Role	Key Responsibilities
Chief Operations Officer	The Chief Operations Officer is responsible for: • Ensure suitable and sufficient systems, processes and resources are provided to adhere to legislative and other requirements; • Apply HSE Management standards and procedures throughout the project. • Stipulate project requirements and conditions, e.g. budget, time constraints, milestones and feedback; and • Ensure that a proactive and robust system is in place for the management of air quality monitoring during operations.
Executive Director	The Executive Director is responsible for: • The communication and implementation of the Air Quality Monitoring Plan; • The communication of the HSE Management System structure and responsibilities to the Wellsite Supervisor / Site Supervisor; • Providing assistance and guidance in the update and approval of the Air Quality Monitoring Plan; • Ensuring that legislative compliance is maintained through the provision of adequate competent resources; • Ensuring that competent personnel are available to implement, monitor and assess requirements of the Air Quality Monitoring Plan; • Ensuring that roles and responsibilities are identified and the assessment of individuals is recorded; • Appointing contractors who can meet internal HSE standards through a robust tendering and/or selection process and the monitoring of contractors to ensure that these standards are being met; • Assessing the competence of contractors so that they are competent and capable of carrying out their work to the required standards; • The development and training of staff or assessing the competence of contractors so that they are competent and capable of carrying out their work to the required standards; • Ensuring that emergency response procedures are developed, maintained, communicated and tested for effectiveness; and • Conducting periodic audits of compliance and communicating environmental performance, significant findings and non-conformances.

Role	Key Responsibilities
Wellsite Supervisor / Site Supervisor	The Wellsite Supervisor / Site Supervisor is responsible for: • Ensuring that leadership is clearly established and promoting a high degree of HSE awareness through communication of HSE Policies and responsibilities; • Ensuring that defined practices and processes are communicated; • Ensuring that, where required, monitoring and reporting relating to regulatory compliance is carried out; • Ensuring that emissions to air are reported and investigated in accordance with internal HSE policies; • Ensuring that where required, emissions to air are sampled to determine source and composition of the emission; • Ensuring that all incidents, involving, or having the potential to cause, injury or harm to personnel, damage to infrastructure or the environment are thoroughly investigated; • Ensuring that emergency response plans are tested on a regular basis, recording the results, identifying, implementing and communicating corrective actions; and • Ensuring that complaints are reported to the Operator and thoroughly investigated.
All Personnel	All personnel are to follow the requirements of this Air Quality Monitoring Plan and cooperate fully with senior management. All personnel must take reasonable care to ensure that their actions do not have an adverse impact on the environment. Personnel must not intentionally or recklessly interfere with, or misuse anything that is provided in the interest of health, safety and the environment.

Table 2: Roles and Responsibilities

6 AMBIENT AIR QUALITY MONITORING

The proposed wellsite has yet to be constructed and does not currently hold an environmental permit. The Operator has taken a proactive approach by considering ambient air quality monitoring within both its planning and environmental permitting applications.

Any additional parameters to be monitored may be requested by the Environment Agency upon issue of the permit as a Pre-Operational condition.

6.1 Baseline Monitoring

Baseline monitoring will be undertaken prior to the commencement of exploratory operations and will consist of three (3) rounds of sampling to obtain a representative baseline sample on current ambient air quality.

6.1.1 Sampling Locations

Two (2) ambient air quality monitoring locations will be installed prior to the commencement of construction activities to obtain a representative baseline sample.

The ambient air quality monitoring locations will be advised by the engineer installing the ambient air quality monitoring equipment.

The engineer will attend the Wellsite installing a total of two (2) tripod stands which shall be placed around the area that the proposed wellsite will be constructed.

The location for each stand will be determined by the Air Quality Monitoring Consultant, with the grid references once identified provided within Table 3.

	Easting	Northing
Location 1	TBC	TBC
Location 2	TBC	TBC

Table 3: Baseline Ambient Air Quality Locations

For clarity, the location of the monitoring stands will be determined by the Operator's Air Monitoring Consultant during the initial baseline monitoring visit.

The monitoring locations will be documented within the Air Monitoring Report and within Table 3 of this Air Quality Monitoring Plan.

6.2 Sampling Parameters

Each stand will house the required diffusion tubes for each parameter. For clarity, the full list of parameters to be monitored together with the sampling period, sampling and analysis method and the detection limit of the equipment has been provided below in Table 3.

Parameter	Sampling Method	Sampling Period	Analysis Method	Detection Limit
Methane (CH_4)	Grab Sample	1 minute	GC-FID GAS 03	5ppm
Methane (CH_4)	Continuous Monitoring	30 Minutes	GC / IR	1ppm
BTEX	Diffusion Tubes	4 weekly	Thermal Desorption & GC/FID or GC/MS	0.4mg m^3
VOC's (Top 10)	Diffusion Tubes	4 weekly	Thermal Desorption & GC/FID or GC/MS	Varied depending on VOC.

Parameter	Sampling Method	Sampling Period	Analysis Method	Detection Limit
Nitrogen Dioxide (NO_2) & Nitric Oxide (NO)	Diffusion Tubes	4 weekly	GC/FID or GC/MS	<1.5µg m^{-3}
Nitrogen Oxides (NO_x)	Diffusion Tubes	4 weekly	Calculated from Nitrogen Dioxide (NO_2) & Nitric Oxide (NO)	
Hydrogen Sulphide (H_2S)	Diffusion Tubes	4 weekly	UV/Visible Spectrophotometry	1ppmv
Sulphur Dioxide (SO_2)	Diffusion Tubes	4 weekly	GC/FID or GC/MS	<1.5µg m^{-3}
Ozone (O_3)	Diffusion Tubes	4 weekly	GC/FID or GC/MS	<1ppm
Carbon Monoxide (CO)	Grab Sample	1 minute	GC-FID GAS 03	5ppm
Fugitive dust (dust deposition and direction)	Frisbee deposition gauge	4 weekly	Gravimetric	<1mg.$m^{-2}d^{-1}$

Table 4: Sampling Parameters and Methodology

6.2.1 Methane

6.2.1.1 Grab Sampling Monitoring

Methane (CH_4) monitoring will also be taken in the form of 'grab sampling' by the appointed air monitoring engineer when they visit the Wellsite. The 'grab samples' are taken using a CRE pump and Gresham sampling tube or Tedlar bags. Methane (CH_4) concentrations from grab samples are determined by GC-FID with a detection limit of 0.0005%V/V (5ppm).

6.2.1.2 Continuous Monitoring

Continuous Methane (CH_4) monitoring will take place for a period of 30 minutes around the Wellsite. An Inficon Irwin SXT device, or similar, will be used. The Irwin Mobile Methane Detector is a mobile unit with an inbuilt GPS, it gives an instantaneous reading which is then recorded on a data logger with the GPS position. This would mean that the perimeter can be walked, and the Methane (CH_4) levels recorded. This is also intrinsically safe and so can be used to gather readings whilst the Wellsite is operational.

6.2.2 BTEX

For the sampling of BTEX, stainless steel tubes are filled with a solid polymer absorbent. Concentrations absorbed by the tubes are measured by thermal desorption and analysis by GC/FID or GC/MS.

6.2.3 Volatile Organic Compounds

For the sampling of Volatile Organic Compounds (Top 10 VOC's) the tubes are designed for passive and active monitoring of volatile and semi volatile organic compounds.

The tubes can be used passively for time weighted average concentrations or pumped (active) for workplace monitoring.

For the Wellsite these shall be conducted to collect time weighted average concentrations.

6.2.4 Nitrogen Dioxide and Nitric Oxide

Nitrogen Dioxide (NO_2) and Nitric Oxide (NO) will be sampled using a diffusion tube designed for passively monitoring gaseous airborne Nitrogen Dioxide, Nitric Oxide and total NO_x. The acrylic tube is fitted with coloured and white

thermoplastic rubber caps which contain the absorbent. The concentration of nitrate ions is chemically absorbed and are quantitatively determined by GC/FID or GC/MS.

6.2.5 Hydrogen Sulphide

The tube for measuring Hydrogen Sulphide (H_2S) is designed for passively monitoring airborne Hydrogen Sulphide (H_2S). Hydrogen Sulphide (H_2S) is chemically absorbed and transformed into a stable compound, which will be quantitatively determined by UV/Visible Spectrophotometry with reference to a calibration curve derived from the analysis of standard sulphide solutions.

6.2.6 Sulphur Dioxide

For passively monitoring gaseous airborne Sulphur Dioxide (SO_2), a fluorinated ethylene polymer tube fitted with purple and white thermoplastic rubber caps is required. The coloured cap contains the absorbent. A one-micron porosity filter is fitted to prevent the ingress of particulates loaded with sulphur i.e. diesel fumes. The concentrations of sulphate ions chemically adsorbed are quantitatively determined by Ion Chromatography with reference to a calibration curve derived from the analysis of standard sulphate solutions (U.K.A.S. Accredited Methods).

6.2.7 Ozone

A passive Ozone (O_3) diffusion tube will be placed at each of the onsite locations for the 4 week monitoring period. An unexposed 'blank' tube will also be retained and returned to the laboratory with the exposed samples. The tube is fitted with two caps. One contains a one-micron porosity filter to prevent the ingress of airborne particulate matter and the other contains an absorbent. In the laboratory, nitrate ions are chemically adsorbed the concentration is quantitatively determined by Ion Chromatography with reference to a calibration curve derived from the analysis of standard nitrate solutions.

6.2.8 Fugitive Dust

Fugitive dust (dust deposition and direction) will be monitored using a Frisbee Deposition Gauge.

6.3 Duration and Frequency

6.3.1 Baseline Monitoring

To establish baseline air quality at the location of the proposed wellsite, tripod stands and Frisbee Deposition Gauge will be present installed at the proposed wellsite location for approximately four (4) weeks per baseline sampling round to allow for an accurate measurement of ambient air quality.

The duration of the baseline monitoring shall commence prior to the commencement of the construction activities to ensure that the baseline is reflective of the air quality prior to the proposed operations commencing.

6.3.2 Flare Monitoring

The Tripod stands and Frisbee Deposition Gauge will be present onsite for approximately four (4) weeks per sampling round to allow for an accurate measurement of ambient air quality during periods of flaring.

The duration of the monitoring shall commence immediately prior to the gas flaring activities are proposed to take place, so as to acquire ambient air quality samples during and after the gas flaring activity. Sampling will continue to take place every 4 weeks throughout the gas flaring activities and will be in place until four (4) weeks after the cessation of the gas flaring activities. The monitoring stands will remain onsite for one (1) sampling round (four (4) weeks) to establish ambient air quality for periods where no gas flare emissions shall be present.

A weather station, including a wind speed and direction sensor, shall be installed during sampling.

6.4 Reporting

Upon retrieval of each sample, the appointed engineers will deliver the samples to either an internal laboratory or to a subcontracted laboratory to ascertain the results of the samples. Once the samples have been analysed the appointed engineer will provide the Operator with a data table recording all results within an active document, where it shall be continuously updated for each round so trends can be analysed.

The reports are expected to be completed within 20 working days of the collection of the samples and data from the records shall be submitted to the Environment Agency as required by any conditions laid out within the sites environmental permit.

The Operator will forward the results of each sampling round to the Environment Agency when they arrive in accordance with the environmental permit.

REFERENCES

1. The Environmental Permitting (England and Wales) Regulations 2016
   Available at: https://www.legislation.gov.uk/uksi/2016/1154/contents/made