Weaverthorpe Wellsite

Odour Sampling and Analysis Plan

Environmental Permitting (England and Wales) Regulations 2016

- **Application for a Bespoke Mining Waste Operation with Flare**
- **Application for a Bespoke Installation**

ISSUE No.	Description
250530	Draft for Client Review
250814	Initial issue for an application for a Mining Waste Operation with Flare >10 Tonnes per day

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1. PURPOSE AND CONTEXT

This Odour Sampling and Analysis Plan forms part of an application to the Environment Agency to authorise the undertaking of specific 'permitted activities' at the proposed Weaverthorpe Wellsite (herein referred to as the 'Wellsite'). In the context of 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 Odour Sampling and Analysis 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 Odour Sampling and Analysis Plan is to present and outline the odour sampling and analysis arrangements for the Wellsite and has been compiled in accordance with the requirements of the Environment Agency guidance for H4 Odour Management: *how to comply with your environmental permit* [Ref.2].

Egdon Resources U.K. Limited is the 'Operator' as defined under EPR2016 and shall herein be referred to as the 'Operator' within this Odour Management Plan.

The Operator is proposing to construct a wellsite ~850m to the east of the village of Foxholes located within the administrative boundary of North Yorkshire Council and within Foxholes with Butterwick parish. The boundary with the East Riding of Yorkshire lies approximately 350m to the east.

The Wellsite is located ~2 Km to the west of Wold Newton, ~15 Km south of Scarborough and ~16 Km northwest of Bridlington.

The Wellsite will be constructed to accommodate the drilling of an exploratory borehole to evaluate the potential for natural gas accumulations within the Sherwood Sandstone target formation.

An application to the Environment Agency is being proposed under EPR2016 to apply for a 'Mining Waste Operation with Flare', as defined by reference 1.8.6 of the Environment Agency (Environmental Permitting and Abstraction Licensing) (England) Charging Scheme [Ref.3].

For clarity, domestic legislation derived from European Union legislation such as the Mining Waste Directive (MWD) [Ref.4] and Industrial Emissions Directive (IED) [Ref.5] continue to have an effect in domestic law following the UK's withdrawal from the European Union in accordance with the European Union (Withdrawal) Act 2018 [Ref.6]. European Directives are therefore still applicable to both this Odour Management Plan and the activities performed by the Operator.

In advance of the proposed Weaverthorpe exploratory drilling and well testing operations, Egdon Resources U.K. Limited have taken the provision to prepare an Odour Sampling and Analysis Plan in the event unidentified odours become apparent. The sampling and analysis of unidentified odours will assist Egdon Resources U.K. Limited in deciding the most suitable control measures to eliminate the odour once identified.

Sampling and analysis is only proposed in the event an unidentified odour is apparent. Control measures will be implemented for any odours anticipated with the proposed forthcoming Weaverthorpe drilling and well testing operations.

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2. SCOPE

This Odour Sampling and Analysis Plan is applicable to the Weaverthorpe 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 Odour Sampling and Analysis Plan.

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3. Abbreviations and Definitions

ATD:	Automated thermal desorption
BTEX:	Benzene, Toluene, Ethylbenzene and Xylene
EPR2016:	The Environmental Permitting (England and Wales) Regulations 2016, as amended
GC-FID:	Gas chromatography with downstream flame ionisation detector
GC-MS:	Gas chromatography/mass spectrometry
Groundwater Activity:	Has the meaning given within Regulation 2 of EPR2016
Groundwater Discharge Activity:	Has the meaning given within Regulation 2 of EPR2016
H_2S:	Hydrogen Sulphide
IED:	Industrial Emissions Directive
km:	Kilometre
m:	Metre
MCERTS:	The Environment Agency's Monitoring Certification Scheme for environmental permit holders
Mining Waste Facility:	Has the meaning given within Regulation 2 of EPR2016
Mining Waste Operation:	Has the meaning given within Regulation 2 of EPR2016
$ml.min^{-1}$:	Millilitres per minute
MWD:	Mining Waste Directive.
Operating Technique:	Documents approved by the regulator to ensure compliance with the issued permit
Operator:	Has the meaning given within Regulation 7 of EPR2016
Permitted Activities:	Any activity or operation defined within Schedule 1 to 29 of EPR2016
Regulated Facility:	Has the meaning given within Regulation 8 of EPR2016
UK:	United Kingdom
UKAS:	United Kingdom Accreditation Service

Table 1: Abbreviations and Definitions

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4. REGULATED FACILITY

The 'regulated facility' is located in the countryside in the county of North Yorkshire. It is centred on National Grid Reference (NGR) TA 02308 73142 and is located at the following address.

Weaverthorpe Wellsite

Land North of Butt Lane

Foxholes

North Yorkshire

YO25 3HY

Figure 1: Weaverthorpe Wellsite – Current (Source: Google Earth 17/12/2024)

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.

A copy of the following plans are provided within the Site Plans document (04 – Site Plans).

- 04A - ZG-ER-WRP1-FH-EPR-04-01 Location Plan 2500 Scale A2
- 04B - ZG-ER-WRP1-FH-EPR-04-02 Location Plan 10000 Scale A3
- 04C - ZG-ER-WRP1-FH-EPR-04-03 Indicative Site Layout Plan - Construction Phase 500 Scale A2
- 04D - ZG-ER-WRP1-FH-EPR-04-04 Indicative Site Layout Plan - Drilling Phase 500 Scale A3
- 04E - ZG-ER-WRP1-FH-EPR-04-05 Indicative Site Layout Plan - Well Testing Phase 500 Scale A3
- 04F - ZG-ER-WRP1-FH-EPR-04-06 Indicative Site Layout Plan - Retention Phase 500 Scale A2
- 04G - ZG-ER-WRP1-FH-EPR-04-07 Indicative Site Layout Plan - Well Abandonment Phase 500 Scale A3
- 04H - ZG-ER-WRP1-FH-EPR-04-08 Indicative Section Plan - Covered Ditch Construction 25 Scale A3

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5. ODOUR SAMPLING

5.1 Sampling Parameters

This document describes the methodology and analytical methods to be employed to monitor for the following substances:

- 1,3 Butadiene
- Benzene
- Carbon Disulphide
- Carbonyl Sulphide
- Diethyl Sulphide
- Ethyl Benzene
- Hydrogen Sulphide
- m-p Xylene
- Methylcyclohexane
- Methylcyclopentane
- Sulphur Dioxide
- Toluene
- Volatile Suite including C1 - C8

All samples collected will display details such as the location, time, and any additional pertinent information that may affect the result.

5.2 Sampling Locations

Sampling will be undertaken both within the Wellsite and the surrounding area.

Internal Locations:

- Within 5m of the combustion unit(s);
- Within 1m of any scrubbers;
- Nearby of any 'identified' sources of odour; and
- The Perimeter of the Wellsite, (dependant on wind direction).

External Locations:

- To be confirmed.

External sample locations may change dependant on wind direction. Prior to sampling, an assessment of the wind direction and identification of the nearest sensitive receptor is to be established by the Wellsite Supervisor.

5.3 Sampling Frequency

In the event odour sampling is required, the Operator will adopt a sampling frequency agreed with the Environment Agency.

Where practicable, odour sampling will be undertaken to enable sufficient time for the transportation and analysis of the collected sample to an MCERTs, or where this is not feasible, UKAS accredited laboratory.

5.4 Transport and Analysis

Samples will be transported from the Wellsite to the laboratory in packaging / carriage agreed by the appointed laboratory to ensure that sample integrity is maintained. The samples will be collected and delivered by an approved courier.

Upon receipt at the laboratory, the samples will be logged as received by the laboratory and the relevant laboratory staff will be informed of their arrival.

Samples taken using personal sampling pumps will undergo a post sampling flow rate check before the sample tubes are removed for booking in; the average flow rate calculated from the pre and post sampling flow checks will be used to calculate the sample volume for each individual sample.

The samples will then be stored in ambient conditions in a solvent free environment prior to being booked in via the laboratory system and submitted for analysis as appropriate.

The agreed turnaround time will be up to 10 working days from receipt of the samples at the laboratory depending on the parameters being monitored.

The Operator will request that the results be reported as factual tabulated data on MCERTS and/or UKAS Test Reports with accredited results indicated accordingly. The test reports will be forwarded as pdf documents by e-mail to an agreed distribution list.

6. SAMPLING METHODOLOGY

It is proposed that odour sampling is undertaken using a personal sampling pump (Casella APEX, Casella TUF or SKC Sidekick) connected to an SKC triple sorbent tube holder. The sampling system will incorporate a low flow pressure controller and tygon tubing with suitable tube covers provided to protect each sampling tube.

The sampling system proposed is illustrated in Figure 2.

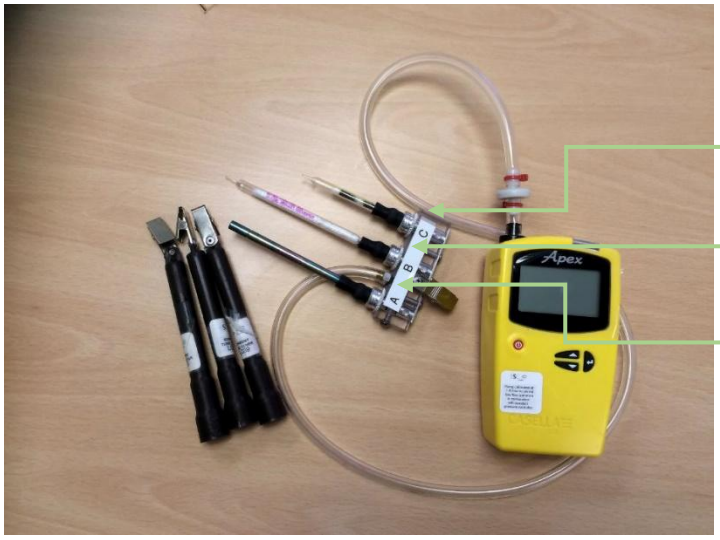

Figure 2: Personal Sampling Pump

The sampling system will provide for the sampling of the following parameters:

1. BTEX Compounds, Diethyl Sulphide, Methycyclohexane, Methylcyclopentane, Carbon Disulphide and 1,3-Butadiene;
2. Hydrogen Sulphide;
3. Sulphur Dioxide; and
4. Carbonyl Sulphide

The sampling methodology for each parameter is presented in Table 2, Table 3, Table 4 and Table 5.

BTEX Compounds, Diethyl Sulphide, Methycyclohexane, Methylcyclopentane, Carbon Disulphide, 1,3-Butadiene	
Analytical Method	ATD-GC-MS
Sample Media	Dual Bed Sulfinert (Tenax TA/Spherocarb) ATD Tube
Analysis Preparation	1.5 litre dry nitrogen purge
Instrument Calibration	5 level calibration for all compounds reported
Analytical Instrument(s)	Perkin Elmer Turbo Matrix ATD/Agilent 6890/5973N GC-MS (Scan Mode)
Reference Method(s)	In house method ASC/SOP/210
Expected Analysis Laboratory	Socotec Specialist Chemistry, Bretby
Accreditation	UKAS for mass BTEX
Sampling	Low flow sorbent tube holder, flow set @ 25 $ml.min^{-1}$
Sample Duration	240 minutes

Table 2: Point Source Sampling Parameters

Hydrogen Sulphide	
Analytical Method	Ion Chromatography
Sample Media	Orbo 34 Specially Treated Activated Charcoal Tube
Analysis Preparation	Ammonium Hydroxide/Hydrogen Peroxide Extraction
Instrument Calibration	5 level calibration
Analytical Instrument(s)	Dionex IC20 Ion Chromatograph
Reference Method(s)	In House method ASC/SOP/110 (NIOSH 6013)
Expected Analysis Laboratory	Socotec Specialist Chemistry, Bretby
Accreditation	UKAS for mass of Sulphate
Sampling	Low flow sorbent tube holder, flow set @ 100 $ml.min^{-1}$
Sample Duration	240 minutes

Table 3: Point Source Sampling Parameters

Sulphur Dioxide	
Analytical Method	Ion Chromatography
Sample Media	SKC 226-80 KOH treated Anasorb Tube
Analysis Preparation	Alkalised Hydrogen Peroxide
Instrument Calibration	5 level calibration
Analytical Instrument(s)	Dionex IC20 Ion Chromatograph
Reference Method(s)	Reference Method(s) In House method ASC/SOP/110 (OSHA ID 200)
Expected Analysis Laboratory	Socotec Specialist Chemistry, Bretby
Accreditation	UKAS for mass of Sulphate
Sampling	Low flow sorbent tube holder, flow set @ 100 $ml.min^{-1}$
Sample Duration	240 minutes

Table 4: Point Source Sampling Parameters

Carbonyl Sulphide	
Analytical Method	ATD-GC-MS
Sample Media	Triple bed (Tenax/Carbon/Molecular Sieve) ATD tube
Analysis Preparation	-
Instrument Calibration	-
Analytical Instrument(s)	-
Reference Method(s)	-
Expected Analysis Laboratory	Socotec Specialist Chemistry, Bretby
Accreditation	None
Sampling	Low flow sorbent tube holder, flow set @ 50 $ml.min^{-1}$
Sample Duration	240 minutes

Table 5: Point Source Sampling Parameters

6.1 Bulk Gas and C1 – C8 Compounds

Air samples will be collected into Tedlar bags by means of a hand aspirator / lung box device as illustrated in Figure 3.

Analysis will be undertaken in the laboratory using the technique of GC-FID; in accordance with in house UKAS accredited methods.

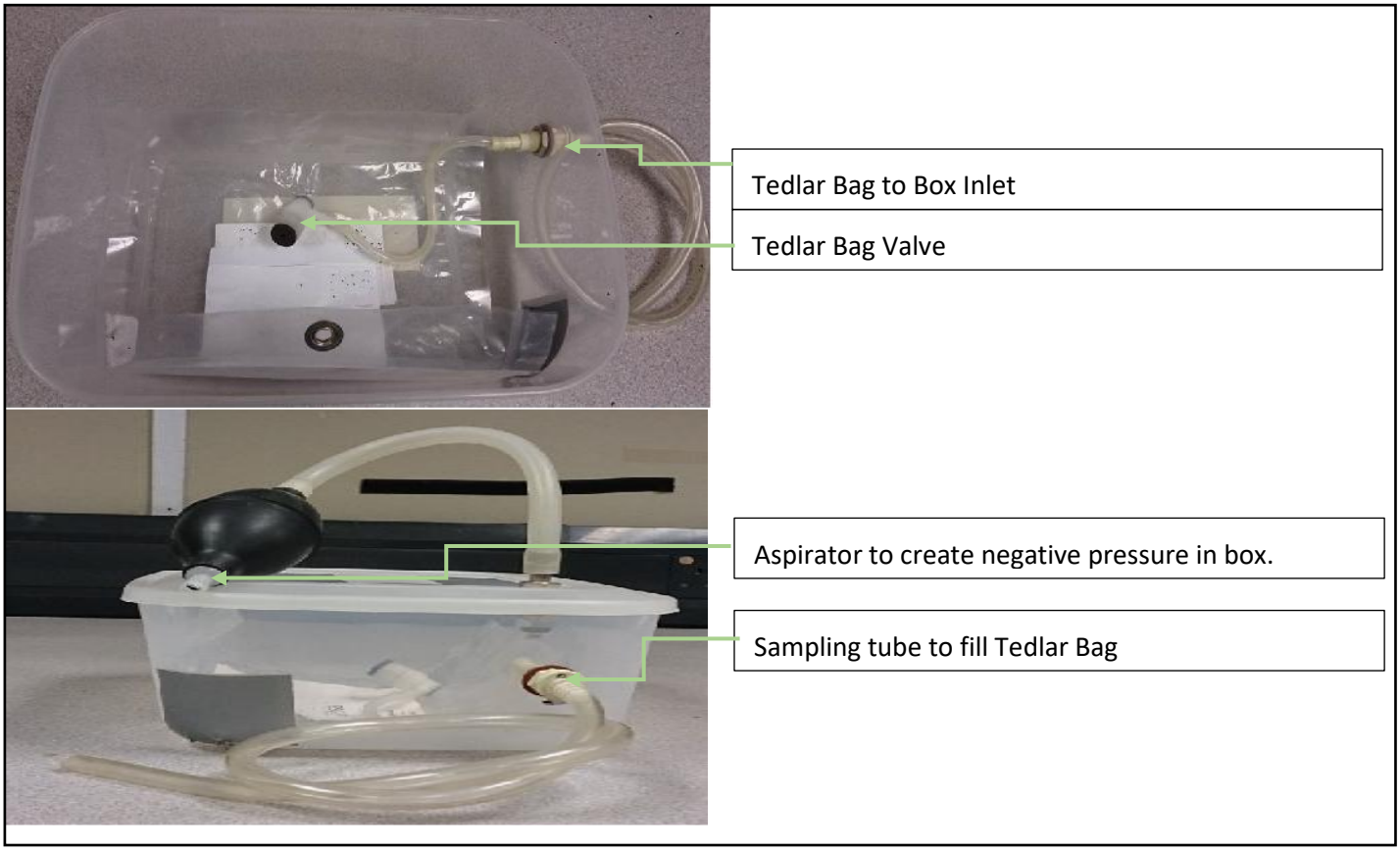

Figure 3: Tedlar bags and a hand aspirator/lung box device

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7. APPOINTMENT OF SERVICE PROVIDER

At the time of writing this document, the Operator has not appointed a service provider to undertake odour monitoring at the Wellsite.

Should it be deemed necessary by the Operator or the Environment Agency to undertake odour monitoring then SOCOTEC UK Limited (formally ESG) would most likely be appointed to ensure a consistent approach to odour monitoring as SOCOTEC UK Limited has previously undertaken odour monitoring within onshore oil and gas wellsite's.

SOCOTEC UK Limited field staff will initially conduct baseline monitoring at the agreed sampling locations identified above.

During baseline monitoring, SOCOTEC will train the Wellsite Supervisor and other site personnel to operate sampling equipment and advise on, as a minimum, the operation of the odour sampling equipment, suitable odour sampling locations, time duration required for odour sampling and requirements for safe handling, packaging and transportation of samples.

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REFERENCES

1. The Environmental Permitting (England and Wales) Regulations 2016

   Available at: https://www.legislation.gov.uk/uksi/2016/1154/contents/made

2. Environment Agency Guidance for H4 Odour Management: *how to comply with your environmental permit*

   Available at: https://www.gov.uk/government/publications/environmental-permitting-h4-odour-management

3. Environment Agency (Environmental Permitting and Abstraction Licensing) (England) Charging Scheme

   Available at: https://www.gov.uk/government/publications/environmental-permits-and-abstraction-licences-tables-of-charges

4. Council Directive 2006/21/EC on the management of waste from extractive industries and amending Directive 2004/35/EC

   Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02006L0021-20090807&from=EN

5. Council Directive 2010/75/EU on the industrial emissions (integrated pollution prevention and control)

   Available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0075&from=EN

6. European Union (Withdrawal) Act 2018

   Available at: https://www.legislation.gov.uk/ukpga/2018/16/contents/enacted