ABERPERGWM COLLIERY

PLANNING APPLICATION FOR A VAM THERMAL OXYDISER

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ENERGYBUILD ABERPERGWM COLLIERY
ENGINE COTTAGE SITE
GLYNNEATH
NEATH
NPTCB
SA11 5TY

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INTRODUCTION

Energybuild Ltd. is based in the Neath Valley, South Wales. We produce, process, and sell high quality Anthracite products, which are used mainly as a water filtration medium, and for high quality carbon products, which are used for the manufacture of carbon electrodes and carbon paste for battery manufacture and for use in electric arc furnaces etc.

The mine has been in operation for over 30 years. It currently employs 230 direct employees; this number will increase very shortly with the employment of a further 10 people. Of this number 28 are electrical and mechanical engineering apprentices. We also engage 10 full-time contractors on site. The site benefits from a full planning consent (P2014/0729) and full mining license until 2039.

SITE LOCATION AND DESCRIPTION

Energybuild's Aberpergwm Colliery site is located to the Southwest of the village of Glynneath and to the North of the village of Blaengwrach/Cwmgwrach in the Neath Valley. It is accessed via the B4242 highway which the site is located adjacent to.
We hold exceptionally good relationships with the local communities. We contribute to a community fund welfare scheme as well as providing funds outside the scope of the fund, for local worthy causes.

The business site is defined by the Planning Consent Boundary (consent number P20014/0729) as granted by Neath Port Talbot Borough Council in October 2018. All ongoing undertakings are conducted within this consented boundary and area. Please refer to Plan AC/VAMPLAN1/1125/1 – GLOBAL LOCATION

Operations carried out at the site consist of the mining of Anthracite mineral from the underground drift mine, processing of the mined material into saleable product and subsequent sale and distribution of the products to various customers.

A haul road passes through the site and winds to the top of the Hirfynydd mountain, which lies to the North of the Aberpergwm site, where a waste repository for mine waste is located.

Also contained on site is a four hundred tons per hour capacity, dense medium Anthracite processing plant which has the sophistication to refine the very specialist grade of products that is required by the specialist markets we serve. To accompany the processing plant, the site holds all the ancillary equipment and services required to pursue the undertaking e.g., product loading facilities, weighbridges, grading, and screening equipment etc.

WHAT IS ENERGYBUILD APPLYING FOR

Energybuild Ltd is applying to Neath Port Talbot CBC for Planning Consent to assemble/construct and operate on a trial basis of a VAM (Ventilated Air Methane) Regenerative Thermal Oxidizer (RTO) at its Aberpergwm Colliery site.

The VAM Oxidiser description, function and operation is described in the accompanying information and plans. We plan to achieve a state of total Carbon neutrality by 2035. The Vam Oxidiser project will play a major role in the company's de-carbon strategy.

The equipment and technology hail exclusively from the UK. We have engaged specialist engineers to assist with the design, construction and installation of the VAM Oxidiser unit.

The VAM Thermal Oxidiser is of a modular design and will be transported to the site for final assembly. Transportation will be by means of articulated trucks.

Assembly time for the unit will be approximately one week with a further week for commissioning.

Although the system is used widely throughout the world and indeed in manufacturing and waste recycling settings in the UK, its use in the Aberpergwm mine type of scenario is untried un the UK. Consequently the initial six months period is a trial where performance both operational and environmental is analysed. If the trial is successful the VAM (RTO) unit will be retained on site. If not, the VAM (RTO) unit will be removed. A successful result will precipitate a planning application for a further three VAM (RTO) units.

The VAM RTO will be constructed within the existing site boundary as consented by Planning Consent P2004/0729. The area occupied by the development will be 186.475m^2 the maximum height will be 8m. The structure will be Juniper green in colour to match the other site structures.

A further area totalling 1,209.323m2 has been cleared for the purpose of, in the main, the clearance of Rhododendrons, this area is also included in the application. Should the project not be pursued, the VAM will be removed and the area restored.

NEED FOR THE DEVELOPMENT

Energybuild has a policy which is discussed and agreed with the Welsh Government to decarbonise the operation by 2035. The decarbonisation plan has many facets which

range from the installation of solar panels on most roof structures, to ceasing any form of thermal fuel sales including the domestic market. As these markets are diminished the specialist markets such as water filtration and specialist carbons are expanded to fill the sales gap.

Aberpergwm Mine is an Underground Anthracite mine and as such emits volumes of methane gas. To achieve carbon neutrality it is crucial that the methane emissions must be neutralised, hence the provision of the VAM Regenerative Thermal Oxidiser. As mentioned earlier the single VAM installation is a trial and experimental basis during which its performance will be monitored. The project provides great benefits for the company, the locality and worldwide carbon reduction.

METHANE & VENTILATION

How Coal Formation Generates Methane

Methane gas in coal formations was generated at the same time the coal was formed approximately 250 million years ago. When plant debris (such as that found in swamps e.g. the Everglades in America) slowly decomposes it generate large volumes of methane gas. This rotting material could have been many tens of meters thick when it was laid. Due to changes in the sea level caused by tectonic and geological activity, the rotting material was covered by water and subsequently sediments which transform into sedimentary rocks over time. The rock covering the coal seams served to seal them off and trap the methane gas within the seam and the surrounding rock. Over millions of years of buildup of rock the material was compressed to a fraction of its original dimension and via the compression and the heat generated, the material was transformed by a process known as coalification. This process involves the transformation of organic material, reducing the oxygen and hydrogen content and increasing the carbon content, resulting in the formation of methane.

Methane Release During Mining

Underground mining, especially through methods like longwall and board mining, disrupts the coal seam by breaking it down and causing the surrounding rock to relax causing the trapped methane to be released into the ambient environment. Methane is primarily bonded to coal in a coal seam through adsorption, where gas molecules adhere to the surfaces of the coal. This process is influenced by factors like coal rank, reservoir pressure, and temperature. The methane molecules are held within the coal matrix, lining the inside of pores and within fractures called cleats. The in-situ coal seam intrinsic gas content at Aberpergwm Mine is 22m^3 per tonne. As the in–situ coal

is cut by machine the coal is broken down into various size factions to be loaded out of mine by belt conveyor. Because the coal is not ground to dust during the cutting operation only a proportion of the total gas content is released, by experience only approx. 8m^3 of the total gas content is released during cutting. The liberated gas mixes with the ambient air flow within the tunnel which is being worked and then flushed out by that airflow to the mine surface where it is discharged to the atmosphere.

Mine Ventilation

Underground mining, especially through methods like longwall mining, disrupts the coal seam and surrounding rock, causing the trapped methane to be released. In order to ensure the safety of the mining operations this methane must be flushed out and any residual must be kept below 1.25% in the general atmosphere of the underground mine. This is achieved by circulating large volumes of uncontaminated air throughout the mine workings. The air quantity required to dilute the methane gas is generated by two large ventilating fans which draw the stale air out of the mine, by means of a tunnel which is referred to as the Return Drift. The fresh air required to dilute the gasses etc is drawn down through the Intake Drift. Once it has circulated through the working areas it is discharged into the ambient atmosphere at the mine surface. Methane is a potent greenhouse gas, significantly more effective at trapping heat than carbon dioxide, contributing to global warming.

WHAT IS A VAM (VENTILATED AIR METHANE) REGENARITIVE THERMAL OXIDISER PROJECT

The Aberpergwm Mine in South Wales is the UK's only production source of anthracite, a very high carbon content (~95%) form of coal that can be used in high end environmental applications that are critical to Net Zero industries in South Wales by 2040 and industrial innovation and economic growth within the region. Example applications include for the production of water filters by Welsh Water (and other water utilities across the UK), the recycling of lead from car batteries with EnviroWales and potential critical reductant for the production of low carbon steel at the newly approved electric arc furnace facility proposed at Port Talbot.

Approximately 90% of Scope 1 emissions from the Aberpergwm mine come from fugitive methane emissions contained in the mine's ventilation air (~280kt CO2e per year) called Ventilation Air Methane (VAM). These ventilation air systems collect the methane generated from mining and maintain methane concentrations at low levels (<1% CH4)

to keep the mine safe. The total volume of methane emitted to atmosphere is very significant and has a powerful effect on climate change, with methane having an equivalent Global Warming Potential of 84 times that of CO2 on a 20 year basis.

Regenerative Thermal Oxidiser (RTO) technology has been used since 1971 to reduce emissions in industry, but has only had a limited number of applications at mines for VAM mitigation, where methane concentrations are above 0.5%. However, as per the UNECE's Best Practice Guidance on VAM mitigation, only around 10% of international VAM emissions are above 0.5% CH4 concentration, compared to 60% (or 300mtCO2e per annum) in the 0.2-0.5% range.

Energybuild therefore plan to build and test an innovative version of RTO technology at Aberpergwm Mine that can destroy low concentration methane (~0.2%) before it escapes to air. If successful this would unlock cost effective mitigation of VAM at mines around the world equivalent to 300 million tCO2e emissions reduction/yr.

What Will the Project Achieve

- Prove innovative design of RTO technology can work safely and effectively at 0.2% CH4 at a mining site.
- Reduce Aberpergwm mine emissions.
- Creating skilled jobs (25 x Construction Phase High Skill Jobs, 6 x Permanent Operational Positions and 8x Technology Innovation Jobs (as a result of the demonstration of the Technology)
- Supporting local manufacturing and service providers, and generating economic value through the potential commercialisation of the technology.
- Collaborating with local Industry in Wales and other innovation-driven organisations in the cluster to share knowledge, align on goals, and support the growth of a thriving decarbonisation ecosystem.

Impact of Project

- Climate Impact: This project will prevent ~1.46mtCO2e of methane from reaching the atmosphere over 20 years
- Local Scale-up: scope for fourfold scale up of emissions reductions at Aberpergwm mine and supply of power/heat/cooling to local community/industry
- Global Scale-up: first-of-its-kind UK cleantech innovation that could be used in mines all over the world to reduce up to 300mtCO2e per year
- Cleaner Industries: essential for industries critical to South Wales, such as waste water treatment and steel production, to meet the region's 2040 net zero industry target.

Outcomes

- A fully operational unit capable of sustained VAM destruction at O.2% CH_4
- Performance validation reports suitable for regulatory submission.
- A demonstration site for other prospective users of the technology

Timeline

Operational – 14 weeks from sign off and planning approval

TYPICAL (VAM) THERMAL OXIDISER SETUP

Typical VAM Oxidizer Setup.

CONSIDERATION OF POTENTIAL IMPACTS

Noise

The planned construction period for the structure is relatively brief at a maximum of seven days and will be carried out between the hours of 08:00 and 15:00. The building foundation has already been constructed. Consequently, it is considered that noise generated during construction will not present any adverse impact on the local communities or site adjacent environs. The operations to be carried are not inherently noisy.

The new structure will be screened by existing trees and surrounding site structures which will aid in the mitigation of any noise generated during its construction.

The site operates a comprehensive noise management policy which allows for the proactive investigation and the instigation of corrective measures in relation of any potential nuisance noise source.

Dust and other negligible residual emissions

The Company operates a comprehensive dust suppression policy and is constantly vigilant in its observations of changing weather conditions and site operations. The site is also equipped with a sophisticated dust suppression system, the use of water bowsers is also available to supplement this should the need arise.

The generation of dust or other form of emission is not considered to present a problem during the construction phase or operational phase of the development due in the main to its brevity and the lack of requirement for any heavy excavation works. Weather conditions and emissions are observed daily and recorded in a book provided for the purpose. Any complaints that may arise will also be recorded in the book.

Visibility

The building itself is obscured from any viewpoints external to the site by other structures and a tree screen. It is not visible from any footpath, bridleway or highway. Its structure and external cladding, coloured Juniper green, is designed to match and blend with all other such structures.

Lighting

It is not proposed to provide any lighting sources which are external to the structure.

Ecology

The proposed VAM erecting site has already been prepared in relation to groundworks by virtue of past activities. The area is currently utilised for storage etc. Cursory checks have indicated no adverse impacts to ecology by virtue of construction and operation of the VAM project.

The company employs Ecological Management and Monitoring Plan (EMMP) which covers all aspects of the ecological conditions outlined by NPTCBC including: The plan is managed and actioned by an independent consultant ecologist who carries out regular site inspections in tandem with NRW and NPTCBC ecologists.

• Details of ecological surveys undertaken and the results of these surveys.

• Measures to protect species and habitats during site preparation, construction and occupation.

• Measures to increase the ecological value of the site once the development is complete, to ensure a net gain for biodiversity.

• Measures to ensure the biodiversity value of the site is maintained for the long term (5 years +) after development is complete, including a monitoring programme. The developer and / or site manager will ensure the EMMP is handed over and explained to any operatives or staff responsible for works that might impact upon the conservation interest of the Site.

The construction and operational phases will be monitored by default as part of the EMMP also a watching brief will be maintained during the construction and trial operational phases.

Drainage

No foul water drainage is associated with this development. Rainfall will be channelled to the existing site drainage system prior to discharge via a consented discharge point.

Transport

A maximum of four articulated trucks will be required to transport the components.

CONCLUSION

Energybuild proposes to construct a new VAM Thermal Oxidiser on their Aberpergwm site. The dimensions are shown in the preceding paragraphs and on Plan Bundle Ref**: RTO LAYOUT 440-000rev c.**

The new structure is not a large construction it will be in character and appearance as some of the existing comparable site structures.

The construction phase will take no longer than fourteen days, this will be facilitated by the previous construction of ground works and foundations.

The building is not considered intrusive to the public in any way. It is well screened, not visible from any footpath or bridleway.

The site and construction of the VAM RTO, and subsequent use will be included in the periodic assessment of the EMMP watching brief. No adverse ecological impacts are anticipated.

The structure will provide an advanced technical solution to the global warming methane emissions from our mining operations. The scheme may be expanded to deal with all mine air methane emissions

INCLUSIONS

ON SITE LOCATION – PLAN REF. AC/VAMRTO/OSLP/1/25

GLOBAL LOCATION – PLAN REF. AC/VAMPLAN1/1125/1

BUILDING DETAIL AND SITE LAYOUT- DOC 44O-OOO REVC BUNDLE

ECOLOGICAL MANAGEMENT AND MONITORING PLAN (EMMP)

PROPOSED RESTORATION PLAN – EB001