Cluff Natural Resources plc / Index: AIM / Epic: CLNR / Sector: Natural Resources 14 January 2013

# Cluff Natural Resources plc ('CNR' or 'the Company') Awarded Two UK Underground Coal Gasification Licences

Cluff Natural Resources plc, an investing company founded by natural reources entrepeneur Algy Cluff which focuses on investing in global oil & gas and mining assets, is pleased to announce that The Coal Authority, sponsored by the UK Department of Energy & Climate Change, has awarded the Company two Conditional Underground Coal Gasification ('UCG') Licences, Option for Lease and non-exclusive Exploration Licences for two UCG prospects in the UK. These acquisitions are part of CNR's strategy to build a portfolio of assets in the natural resources sector.

## **Overview:**

- Formal offer received from The Coal Authority for the award of 100% of two low cost UCG Licences totalling 111 hectares in the UK:
  - The Loughor Estuary Project, located in Carmarthenshire, Wales, covering 42 hectares
  - The Dee Estuary Project, located on the borders of Merseyside and Northern Wales, covering 69 hectares
- CNR to apply for relevant planning and environmental permits in order to develop the projects
- It is not anticipated that the permitting process will result in a a significant draw on the cash reserves of the Company for the short to medium term
- CNR intends to use Controlled Retracting Injection Point ('CRIP') method to extract the energy content of the coal
- Focus on supplying the resulting syngas to customers for a variety of uses and providing a carbon capture solution for carbon dioxide
- Experienced coal practitioner in place to lead development of licences
- CNR continuing to evaluate a number of oil, gas and mining investment opportunities which are in various stages of consideration to continue to build portfolio of natural resource projects

Mr Algy Cluff, Chairman and Chief Executive of Cluff Natural Resources, commented: "I am delighted to be able to announce the award of these licences which represent a low cost entry into underground coal gasification which is becoming a burgeoning industry. It is well known that coal seams extend into the offshore waters around the UK and with proven technology now available to utilse this energy source, we intend to embark on the process by extracting gas from these coal seams.

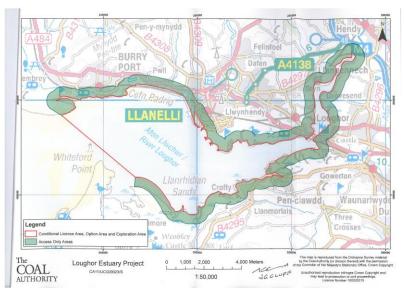
"It is our intention to seek the necessary planning and environmental permits to advance the two projects to production. UCG has the potential to do much to address the UK's future energy needs, avoids the use of fracking and enables the gas generated to be easily controlled by the supply of oxygen. I look forward to updating shareholders on the development of our first acquisition.

"These are the first of a series of projects we are looking to acquire. In line with our strategy we remain in discussions regarding a number of suitable natural resource projects, as we look to build a portfolio of highly prospective assets that we will look to develop and, in the process, generate considerable value for shareholders."

#### **Further Information**

Following a formal offer from The Coal Authority, sponsored by the UK Department of Energy & Climate Change, CNR has been awarded Conditional Underground Coal Gasification Licences ('UCG'), Option for Lease and non-exclusive Exploration Licence for two prospects in the UK. The Loughor Estuary Project, located in Carmarthenshire, Wales, consists of a 42 hectare licence area and The Dee Estuary Project, located on the borders of Merseyside and Northern Wales, consists of a 69 hectare licence area. CNR has a 100% working interest in the licences.

Once planning and environmental permits are in order the licences will be developed to production by a team led by Keith Leighfield, an experienced coal practitioner. Keith has 50 years' experience in mining at coal and metaliferous mines and has held various positions before becoming the Chief Surveyor and Minerals Manager for British Coal and the first Director of Licensing at the Coal Authority.



#### Map of the Loughor Estuary Project Licence Area, 42 hectares



Map of the Dee Estuary Project Licence Area, 69 hectares

## Underground Coal Gasification ('UCG'):

UCG is a commercially proven industrial process which enables coal, in situ, to be converted into syngas, which is brought to the surface via a production well.

Syngas has a number of commercial applications; feed for power generation plants, iron and steel manufacturing, gas-to-liquids processes and fertilizer / methanol production.

In addition, the carbon dioxide ('CO2') produced as a result of the UCG process can be sold to mature oil fields as part of Enhanced Oil Recovery ('EOR'). EOR is a technique used to increase the amount of crude oil that can be extracted from an oil field through injecting gas into the oil bearing stratum at high pressure.

While UCG has been researched and practiced for the past century, recent developments in directional drilling have been critical in enhancing the commercial viability of the extraction process. UCG technology has a commercial track record, with one facility in Uzbekistan supplying syngas to a power station for over 40 years. In addition, a number of projects in South Africa and Australia are moving into commercial production. The drilling techniques underpinning the development of UCG are not dissimilar to those currently used in the production of coal seam methane.

## CNR and UCG

UCG works best when exploiting coal at depths in excess of 400m. Cluff Natural Resources will focus on supplying syngas to customers for a variety of uses and providing a carbon capture solution for CO2, where appropriate. Although the process produces CO2 at a rate similar to the traditional use of coal, Cluff Natural Resources will seek a carbon solution in each of its projects.

This can be achieved through a variety of means but can include storage in deep saline aquifers and commercial use in partially exhausted oilfields, termed 'enhanced oil recovery' ('EOR'). EOR is attractive as it achieves more efficient oil recovery from existing fields in combination with deep storage of CO2.

#### Gasification

The conversion of the coal to syngas is achieved through a controlled underground gasification process initiated by the injection and ignition of oxidants into the coal seam. The coal seam is ignited and gasified, generating a syngas consisting of methane, hydrogen, carbon dioxide and carbon monoxide.

The rate of gasification is controlled by the injection rate of air or oxygen, but this is typically 0.5 tonnes of oxygen for each tonne of coal gasified.

There are two primary methods deployed to achieve gasification currently. Cluff Natural Resources plans to use the following method:

#### Controlled Retracting Injection Point (CRIP) Method:

The CRIP process allows for a borehole to be drilled from the surface and turned so that it can drill parallel with the dip of the coal seam, continuing for approximately 500m within the seam. Oxygen and steam can then be injected at the point where gasification will occur. This creates a gasification chamber that typically may be in the order of 20m wide. As the process continues, the chamber will fill with collapsed material from the overlying strata reducing the efficiency of the process. At a certain point, when the chamber is exhausted the process is temporarily shut down and the injection point retracted back along the coal seam, the gasification is then re-started.

All UCG processes are similar in that they require a minimum of two boreholes that have to be connected, or linked, together to form a complete circuit for the gases to flow through:

- one to inject the gasifying agents and start ignition, known as the injection well; and
- the other to recover the syngas produced, known as the production well.

Historical UCG technology varied from driving underground roadways, or drilling in seam boreholes from underground roadways to vertical boreholes. Thanks to the advancements made with drilling technology in the oil industry it is now possible to perform directional drilling from the surface and the application of this technology is vital to the future development of UCG.

#### \*\*ENDS\*\*

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