ECO2 LINCS LTD

SLEAFORD RENEWABLE ENERGY PLANT

IPPC APPLICATION - NON TECHNICAL SUMMARY

s0906-0210-0010smo nts.doc

ISSUE NUMBER	1						
DATE	16/11/07						
AUTHOR	SMO						
CHECKED	TME						

s0906-0210-0010smo nts.doc

ISSUE NUMBER	1						
DATE	16/11/07						
AUTHOR	SMO						
CHECKED	TME						

TABLE OF CONTENTS

1 INTRODUCTION

1.1 The Application

This document is provided by Eco2 Lincs Ltd as the application for a new permit to operate the Sleaford Renewable Energy Plant for the generation of up to 40 MW of electrical power under the regime of Integrated Pollution Prevention and Control (IPPC).

The process falls within the Pollution Prevention and Control Regulations under the 1999 (PPC) Act and various EC Directives and is classified as a Part A(1) (a) process under section 1.1 of Schedule I of the Regulations.

The main process involves the controlled combustion of biomass fuel (predominantly straw plus some woodchip) with heat recovery via a boiler and power generation using a high efficiency turbine. In addition, the process includes fuel reception, storage and feed systems, emissions abatement equipment, onsite temporary storage of residues and all systems for controlling and monitoring combustion operations.

1.2 The Applicant

The Sleaford Renewable Energy Plant (REP) will be owned by Eco2 Lincs Ltd. It will be operated and maintained by a competent contractor under the terms of a Operating and Maintenance Contract. Eco2 Lincs Ltd will retain overall control of the plant and so are considered to be the Operator of the plant under the PPC Regulations.

1.3 Overview of the Facility

The facility is a power station with an electrical power output of up to 40 MW using straw or a mix of straw and wood chips as the primary fuel. Natural gas is used as secondary fuel for start-up. The rated thermal input of the plant is approximately 118 MW.

This will assist in contributing to the Government's target of providing 10% of electricity generation from renewable energy sources by the year 2010.

In outline, the process is as follows:

1) Straw is delivered to the plant by road in the form of Heston Bales. Wood is delivered in chipped form.
2) The straw is unloaded and stored in one of two identical straw barns. The wood chip is unloaded in a dedicated wood chip storage building.
3) The prepared fuel is transported from the storage area by a system of conveyers to the vibrating water-cooled grate combustor, where it is efficiently combusted.
4) Emissions of nitrogen oxides and carbon monoxide are controlled by the use of controlled combustion and the staged injection of air into the furnace.
5) Ash from the grate is removed by a system of conveyers to open containers.
6) Hot gases from the biomass combustion are passed through a boiler to raise steam. The steam is then passed to a steam turbine to generate electricity for export to the local electricity network, before being condensed in an air-cooled condenser and returned to the boiler.
7) The combustion gases are cleaned in a flue gas treatment plant using the injection of hydrated lime and a fabric filter.

8) The cleaned exhaust gases are released to atmosphere via a 60 metre stack.

2 TECHNIQUES FOR POLLUTION CONTROL

2.1 In-process controls

The processes have been designed against the background of a detailed assessment of the prevailing environmental conditions at the site location. Best Available Techniques are employed at the plant to minimise its impact on the local environment.

In particular:

1) All fuels and raw materials delivered to the plant will be handled and stored in a manner which avoids fugitive emissions. Fuel is delivered and handled in dedicated fuel reception and storage halls.
2) A vibrating water-cooled grate will be used for the combustion of biomass. The combustor design includes fully adjustable combustion air controls and automatic auxiliary burners and achieves good ash burnout.
3) The boiler is designed to maximise energy recovery and minimise boiler deposits.

2.2 Emissions Control

2.2.1 Emissions to Air

The combustion process is designed to achieve complete combustion, thus minimising emissions to the atmosphere. Best Available Techniques will be applied as follows:

1) Carbon monoxide and nitrogen oxides will be controlled by careful control of the combustion air flows and the recirculation of flue gases.
2) Hydrated lime will be injected to remove acid gases.
3) A multi-compartment fabric filter will be used to remove particulate matter.
4) A 60 metre stack will allow the flue gases to disperse effectively in the atmosphere.
5) Fugitive emissions to atmosphere will be avoided by the use of enclosed storage and delivery systems.

2.2.2 Odour

There are no unpleasant odours generated by the process. The only potential odour to arise would come from the storage of straw; this in itself is not considered unpleasant and would in any case be minimised by virtue of only allowing short term, indoor storage and also by limiting the moisture content of straw that is accepted at the plant.

2.3 Management

The plant will be operated by around 30 employees. The site will be operated under an Environmental Management System.

2.4 Raw Materials

The principal raw materials used on the site will be:

- Light Fuel Oil
- Water
- Hydrated Lime

The plant will process around 240,000 tonnes of straw per annum.

2.5 Energy

The facility generates electricity by conversion of heat recovered from the combustion process. After satisfying its own power needs the plant will export approximately 40 MWe of electricity to the local electricity network. This electricity is eligible for Renewable Obligation Certificates.

2.6 Monitoring

Continuous monitoring of particulates, carbon monoxide, oxygen, nitrogen oxides, sulphur dioxide and hydrogen chloride will be undertaken for the flue gases in the main stack. Other pollutants will be monitored by spot measurements at six monthly intervals. The data will be recorded and operators alerted if emissions to air approach authorised limits. The results of the monitoring will be reported to the Environment Agency.

Solid residues generated by the plant will be sampled on a regular basis to assess bottom ash burnout and to monitor the levels of specified pollutants.

3 ENVIRONMENTAL IMPACT

3.1 Releases to air

All combustion processes produce emissions to atmosphere of a range of substances. The Sleaford Renewable Energy Plant has been designed with emissions limits in accordance with the Environment Agency's Sector Guidance Note on Combustion Activities. In addition, the impact of the plant's emissions has been assessed using recognised dispersion modelling techniques.

Air quality monitoring data from the local area was assessed and it was concluded that national and international air quality standards and guidelines are met.

The principal source of emissions from the facility will be the 60 metre stack. The flue gases released from this stack will contain carbon dioxide, water vapour, oxides of nitrogen, sulphur dioxide, hydrogen chloride, particulates and carbon monoxide. The impact of these emissions on local air quality has been assessed using atmospheric dispersion modelling, taking account of local terrain, local buildings and local weather conditions. The assessment included an assessment of the impact on sensitive habitats.

The modelling predicted that the contribution of the emissions from the plant to concentrations in the atmosphere would be small and would not lead to any breaches of air quality objectives.

3.2 Noise

The Sleaford Renewable Energy Plant will be designed such that any noise impact will be minimised. The impact of noise from the proposed development has been assessed and is considered to have a negligible to slight effect at the nearest residential dwellings.