Environmental Permit – Extract from Document Titled Operational Techniques

Section 5.5.4 - Auxiliary Burners

There will be auxiliary burners fired by low sulphur, light fuel oil used during;

- Furnace system pre-heating during system start-up – a temperature controller will adjust both burner outputs to achieve a set point temperature in the combustion chamber of 850oC over a time period, before waste fuel feed can be commenced to the primary incineration chamber;
- Reflecting WID requirements, the temperature in the "2 second zone of the combustion chamber" must be maintained above 850°C – during normal operation a controller will start one of the burners when the temperature is falling and approaches a set point typically at 870°C, which ensures that the temperature remains above 850°C at all times when waste is being fed into the incinerator; and
- When the temperature rises above the set point temperature and burner heat is not needed, the burner will be shut down and temperature control is transferred back to the main control system.

Section 5.5.7 - Combustion Process Optimisation

The combustion diagram (Figure 5.4) depicts the thermal capacity of the grate which in turn determines the capacity of the steam generator, the air pollution control system and the power generation system. The combustion diagram is based on the following parameters:

- Total waste throughput 265,000 t/a (tonnes per annum);
- Design calorific value (CV) of waste 9.5 MJ/kg (heat content per kilogram)
- Number of incineration lines 1
- 7,884 h/a availability which corresponds to 90% full load availability

Please note that full load availability does not just include the time when the plant is available for operation, the definition of full load availability correlates the availability time with the thermal full load performance. The resulting nominal throughput of the plant is thus:

- 245,000 t/a: 7,884 h/a : 1 lines = 31.1 t/h.

The gross thermal input is calculated with the calorific value as follows:

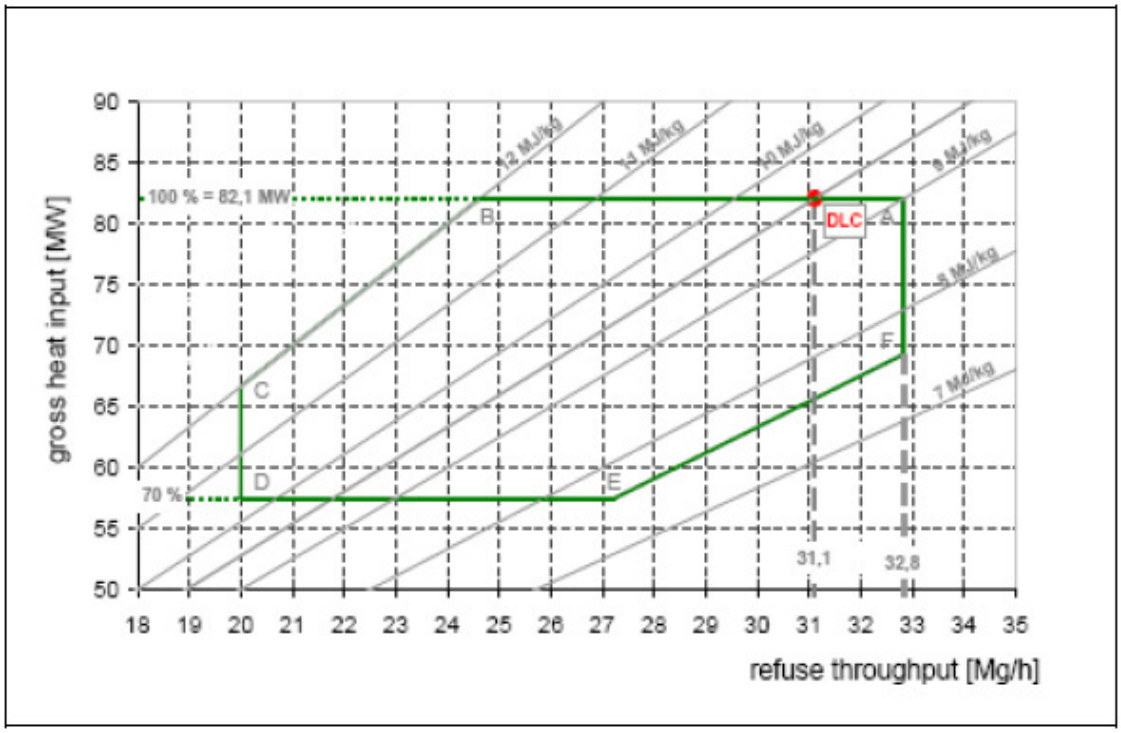
- 31.1 t/h x 9.5 MJ/kg x 1 h/3,600 s = 82.1 MWth.

This represents 100% thermal capacity of the boiler and it is to be noted that the throughput is a function of the calorific value. A lower CV will result in a higher throughput whilst the gross heat input remains unchanged. However there is also a technical limit on the mechanical throughput of the grate.

In the event that the waste has a lower than anticipated CV and the availability of the plant is optimised a maximum throughput of 265,000 t/a could be achieved without exceeding the 100% thermal load of the boiler.

The resulting firing diagram is illustrated in Figure 5.4 overleaf. As well as the Design Load Case (DLC) which represents the nominal heat input from waste, it identifies the flexibility with regard mechanical throughput and the calorific values are shown by the envelope A, B, C, D, E & F marked in green.

Figure 5.4: Firing Diagram Based on Design Load



In normal operation, the incineration process is set to 100% thermal load, which does not depend on the current calorific value of the waste. Rather the resulting steam flow is measured and serves as the controlled variable for the fully automatic combustion control. Keeping the steam flow constant stabilises the combustion process, independent of short and long-term changes in the fuel characteristics. The usual control peaks are allowed for, so the figures in the firing diagram represent the computed average. The design of the plant components throughout includes sufficient margins to cater for short-term peaks of at least +10%, which is required in everyday plant operation because of the variable nature of the fuel.

Operation at partial load, down to 70% of the nominal value, is possible whilst meeting all relevant incineration criteria such as combustion temperatures and completeness of the combustion process. However, the steam temperature may be marginally reduced, to a level hat can be tolerated by the turbine. Above 80% load, this is not the case. Operation below 70% load is very unlikely and a lower figure for the partial load capability would require additional heating surfaces that would be superfluous for normal operation.

The use of fossil-fuelled auxiliary burners is not anticipated under normal operations within the limits of the combustion diagram. These burners will be used for pre-heating while starting up and shutting down, and for maintaining minimum temperatures in the combustion chamber during disturbances.