FURTHER INFORMATION

1. Introduction

1.1 Following the evidence of Mr Andrews, I have been asked to provide further evidence on two points:

1) The energy efficiency of the current plant and the new plant; and

2) The reasons for the decision to reduce the capacity of the third line.

2. Energy Efficiency

2.1 NAIL have submitted a Supplementary Note on Paul Andrews' Evidence, in which they dispute some figures in Mr Andrews evidence. I have been asked to investigate the energy efficiency of the current lines 1 and 2 in more detail because I have some understanding of the plant operations.

2.2 It is important to understand how the energy recovery system is set up. The Eastcroft plant exports heat to the London Road heat station in two forms. Steam is generated in the boiler and sent to London Road to be used in the turbines. In addition, hot water is generated in the economiser by recovering heat from the flue gases.

2.3 At the London Road heat station, heat is exported to the district heating scheme and electricity is generated. In addition, natural gas is used to provide additional steam when required. WRG have no control over this aspect of the operation.

2.4 Firstly, I can present some theoretical calculations. As I mentioned in my main proof of evidence, I was responsible for preparing the PPC application for the Eastcroft site. In this application, I stated that the existing two lines were capable of exporting 19 MWth per line of steam and 2 MWth per line of hot water, giving a total potential heat export of 42 MWth for the whole plant. If the two lines burn a total of 21 tonnes per hour of waste with a net CV of 9.5 MJ/kg, then the energy input is 21 tph x 9.5 MJ/kg x 1000 kg/te ÷ 3600 s/hr = 55.4 MW. Hence, the energy efficiency of lines 1 and 2 would be 42/55.4 = 75.8%.

2.5 Secondly, I have reviewed the statistics for the operation of the Eastcroft plant and the London Road heat station for 2007, which have been provided to me by WRG and Enviroenergy. These are summarised below. I have repeated and restated some of NAIL's calculations, for convenience. I have also had access to some figures which NAIL did not have access to.

1) The plant burned 154,069 tonnes (Mr Andrews proof, paragraph 3.21). The typical Net CV of MSW is around 9.5 MJ/kg, so the total heat into the incinerator was 1464 TJ or 406.5 GWh.

2) The plant supplied 994 TJ (276 GWh) of steam to the London Road heat station. (Mr Andrews stated 944 TJ, but this was a typographical error.) The plant also supplied 31.7 GWh (114 TJ) of hot water. (This confirms Mr Andrews' statement in paragraph 7.6 of his proof that the plant can supply more than 300 GWh of heat to the London Road heat station.) Hence, 75.7% of the energy in the waste was converted to heat which was supplied to the heat station. This is very close to the theoretical figure which I calculated earlier.

3) The heat was used to generate 65.2 GWh of power, of which 9.8 GWh was exported back to the Eastcroft plant and 8.9 GWh was used at the heat station itself. Hence, 46.4 GWh of electricity was exported, which is 11.4% of the heat in the waste.

4) The heat exported to the district heating scheme was 161.1 GWh (580 TJ). However, in 2007, about 11% of the heat supplied to the heat station was from natural gas. As an approximation, I have assumed that 11% of the heat exported to the district heating system was derived from natural gas, so that 143.4 GWh (516 GWh) of heat was derived from the heat supplied from the Eastcroft plant. This is 35.3% of the heat in the waste.

5) Therefore, the overall efficiency of the plant was 46.7%. Applying the formula for Recovery Operation R1 in Annex II in the draft Waste Framework Directive, the efficiency coefficient can be calculated as follows:

$$\frac{2.6 \times 46.3 + 1.1 \times 143.4}{406.6 \times 0.97} = 0.705$$

This is larger than the target of 0.6 for plants commissioned before 1 January 2009, and actually higher than the target of 0.65 for new plants. Hence, the current plant would be defined as Recovery under the draft Directive.

2.6 In paragraph 2.11 of my Supplementary Information on Air Quality Impacts (WRG7), I stated that the net efficiency of the third line was expected to be 23.9%. Again, applying the formula in the draft Waste Framework Directive, the efficiency coefficient can be calculated as follows:

$$\frac{2.6 \times 0.239}{0.97} = 0.64$$

2.7 This does not meet the target for recovery. However, it would only require a small amount of heat to be exported from the third line for the recovery target to be met. If the plant were to export only 0.35 MWth, giving a heat efficiency of 1%, then the coefficient would be 0.652.

3. Capacity of the Third Line

3.1 Mr Andrews was asked why the capacity of the third line was planned to be 100,000 tpa, whereas the original plan was for two lines to be built, each with a capacity of 75,000 tpa.

3.2 As shown on the layout drawing in Appendix PA1, the plant was originally designed with two lines, each with electrostatic precipitators. When the plant was upgraded in 1995, the new flue gas treatment plant was built on the area left empty for the construction of electrostatic precipitators for Lines 3 and 4, as described by Mr Andrews in paragraph 3.10 of his proof of evidence. The effect of this is that there is no longer sufficient space within the site for two lines along with flue gas treatment plants which would comply with the Waste Incineration Directive. Therefore, a single line of 100,000 tpa is now planned.