12 Material Assets

12.1 Introduction

This chapter evaluates the impacts, if any, which the proposed development will have on existing services and material assets.

12.2 Electricity Supply

An electrical distribution line crosses the site in a north-south direction close to the Hammond Lane premises. The transformers on site will step the voltage down from 20kV to 400V and 220V. This will allow power from the electrical distribution system to be used to start up and shut down the plant if required.

When phase 1 is operational, the facility will generate approximately 10MW of electricity and will itself have a 2MW requirement. Space heating demand in the administration building may be met from the electricity generated on site, or by natural gas (refer to section 12.5). There will be approximately 8MW of electricity available for export to the national grid. This is enough electricity to power approximately 12,000 homes annually.

When phase 1 and 2 are both fully operational, the facility will generate approximately 18MW of electricity. There will be approximately 14MW of electricity available for export, which will provide enough electricity to power 20,000 homes annually.

The electricity will be generated on site at between 11kV and 15kV. This will be stepped up to the required export voltage using a series of transformers. The voltage at which the electricity is to be exported is the subject of a study being undertaken by the ESB but is expected to be 38kV or 110kV.

Connection to the National Grid maybe the subject of a separate application. This will be the responsibility of the ESB.

A licence to export electricity through the transmission network will be obtained from the Commission of Electricity Regulation.

12.3 Compressed Air

Compressed air will be required in the operation of the facility. The energy used by the air compressors forms part of the 2MW of electricity requirement of the facility (phase 1). The compressors and compressed air supply will be controlled by the plant's main control system, with local control at the MCC and at the compressors themselves.

12.4 Water Supply and Usage

Process Water Requirements

As the plant recycles water used in the flue gas cleaning process and uses air-cooled condensers rather than cooling towers, it has a significantly lower water requirement than would otherwise be the case. The major water requirement will be for flue gas cleaning. Process water for the steam cycle, domestic potable water and water for cleaning, account for the rest of the demand. The total water requirement will be in the order of $9m^3$/hr for the phase 1 and $7m^3$/hr for phase 2.

The water requirements of the process will be met in three ways; effluent from the process will be collected for reuse, rainwater run off from the roof areas of the waste to energy facility will be collected and the remainder will come from the County Council water main, in the road (N28), running adjacent to the site.

From the data available on annual rainfall in the Cork area, and taking into account the roof area from which surface water run off will be collected, it is anticipated that the amount of rainwater, which will be available for collection on an annual basis will be approximately $18,000m^3$. This is based on an annual average rain over 30 years (1951-1980) of 1229mm, as measured at Cork Airport, and a roof area of circa $15,000m^2$.

The annual estimated quantity of water required by the facility (with both phases operational) would be approximately $134,400m^3$. Therefore, with the collected rainwater calculated earlier ($18,000m^3$), the facility will require approximately $116,400m^3$ per annum from the County Council supply.

Firewater / Water Storage Tank

The site will have a dedicated water storage tank, which will also be used for the storage of fire-fighting water. This water will be used for the sanitary requirements of the site, and also to make up the short fall in process water that cannot be supplied by collecting the rainfall.

Boiler Make-Up Water

A small amount of demineralised water (about 1 m^3/hour) will be required for use as boiler make-up water. This wastewater stream will be recycled for use in the evaporating spray tower.

12.5 Gas Supply

The site is within a short distance to two natural gas mains (at 19 bar and 4 bar respectively). The 19 bar gas main runs along the southern boundary of the site, before changing to a northerly direction, traversing the site and entering the Irish ISPAT site. This gas main will have to be relocated as part of the site preparation works prior to the construction phase.

Natural gas will be used to heat the furnaces during start up and following a shutdown. Natural gas will also be used as an auxiliary fuel to maintain the furnace at the required temperature, in the event of waste of a lower calorific value being burnt.

Space heating demand in the administration building may be met by a gas fired boiler. The emissions are typical of those from a small gas fired boiler and are not considered significant.

12.6 Potential Reuse of Solid Residues

As mentioned previously in Chapter 3, the incineration process results in the generation of some residual materials, some of which have the potential for beneficial use as follows:

Bottom Ash

The waste to energy plant will generate approximately 2,000 tonnes of bottom ash in phase 1 and 21,000 tonnes (dry weight) of boiler ash in phase 2. It is the intention of Indaver Ireland to identify potential uses for the bottom ash. This material is suitable for use in road construction and such a use would be in accordance with government policy on reuse of materials and avoidance of waste. If no market can be found for the bottom ash, it will be disposed of to a suitably licensed non-hazardous landfill site.

Gypsum

Gypsum is removed in the purge from the wet flue gas cleaning system prior to the injection of the purge water into the evaporative spray tower. A total of about 2,600 tonnes of gypsum, that is approximately 1,600 tonnes from phase 1 with the remainder from phase 2, will be recovered from the purge each year. The gypsum can be used in the construction industry and is suitable for disposal to non-hazardous landfill, if no market can be found.

12.7 Waste Management

12.7.1 Construction Phase

Disposal of waste during the construction phase is described in Chapter 7 Construction Activities.

12.7.2 Operational Phase

Within the site as a whole, adequate provision will be made for the installation of refuse collection bins. Domestic waste generated on site will be recycled where appropriate or treated in the waste management facility. Laboratory chemicals may be sent for abroad for disposal.

From the waste to energy plant there will be circa 2,600 tonnes/annum of boiler ash and circa 5,000 tonnes/annum of cyclone/electrofilter ash from phase 1 and circa 600 tonnes/annum of boiler ash from phase 2, which may be solidified prior to disposal in a non-hazardous waste landfill. In addition, there will be approximately 4,400 tonnes/annum and 2,500 tonnes/annum of flue gas cleaning residues from phase 1 and 2, respectively, which will be solidified prior to disposal to a hazardous waste landfill.

12.8 Assessment of Site Utilities

Some site utilities will require upgrading for the development of the waste management facility. Among the changes that will be required will be the relocation of the gas main which crosses the site, connection to Cork County Council foul and storm sewers and connection to the electricity transmission network.

12.9 Mitigation Measures

It is intended to collect rainwater for use in the process and also to recycle the process effluent. In addition an air-cooled condenser is used to cool the steam from the turbine, and air cooling is used in the transformers. This will minimise the quantity of potable water that will be required.

Wastes arising on site, for example from the administration building, will be sent off site to be recycled if they are suitable, and treated in the waste to energy plant if not. A beneficial reuse will be sought for the boiler ash and gypsum.

12.10 Residual Impacts

When phase 1 is in operation, there will be a significant reduction in the quantity of hazardous waste being exported to the UK and Continental Europe for disposal. Both phase 1 and phase 2 will have a significant beneficial residual impact by reducing the quantity of non-hazardous industrial, commercial and municipal waste going to landfill.

The operation of the two phases of the waste to energy facility will have the following residual effects in relation to material assets:

- the consumption of lime or limestone, approximately 4,900 tonnes/annum
- a potable water requirement of circa 116,400m^3/annum
- the consumption of natural gas at start up and as an auxiliary fuel, circa 200,000Nm^3/annum
- the disposal of approximately 3m^3 per day of treated sanitary effluent to sewer
- the consumption of sand, circa of 200 tonnes/annum, and activated carbon, circa 120 tonnes/annum
- the landfilling of boiler and cyclone/electrofilter ash in a non-hazardous waste landfill
- the landfilling of solidified flue gas residues in a hazardous waste landfill. This will be exported for landfill, if no suitable facility has been developed in Ireland by the time the plant is commissioned.

The waste to energy facility will also have a number of other positive residual impacts on material assets. The gypsum and bottom ash that are generated as a result of the incineration process are reused in many EU countries in the plasterboard industry and for use in road construction respectively. It is Indaver's intention to source suitable outlets for the use of these materials. Landfilling of these solid residues will only take place, if no viable market can be found. If these residues can be successfully used, it will have a positive effect in that it will reduce the requirement for the use of virgin materials.

In addition, the plant with both phases operational will produce approximately 14MW of electricity for export to the National Grid. This is enough energy to power approximately 20,000 homes annually. Using residual waste to generate electricity also replaces non-renewable fossil fuels such as coal, oil and natural gas in the generation of electricity. This is seen as a very positive long term residual impact of the waste to energy facility.

12.11 References

Rohan P.K (1986) The Climate of Ireland, 2nd Edition, Meteorological Office, Dublin

LAGA, Technical Regulations on the Recycling of Mineral Residues/Waste