TECHNICAL NOTE

Job Name: Docksway Disposal Site – Area 2 Environmental Permit Revision Application

Job No: 14739

Note No: PR001

Date: March 2015

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Subject: **Review of Gas Risk Assessment**

Background

This technical note has been prepared in support of the application to revise the Environmental Permit (EP), number EPRDP3733BK, for Area 2 of Docksway Disposal Site.

The application to revise the EP is being submitted due to the proposals to include a Stable Non Reactive Hazardous Waste (SNRHW) cell for acceptance of asbestos, within the next already permitted phase of cell development at the site. In addition to this, it is also proposed to increase the side slopes and final height of the whole Area 2 landfill (where the stability assessment allows) to maximise the potential void space available.

At the current time, Cell 1 in Area 2 has been partially filled and temporarily capped, and Cell 2 in Area 2 is the current active cell. The remaining permitted cells (3, 4 and 5) are yet to be developed. It is proposed to include the SNRHW cell within part of Cell 3, as shown on FIGURE 14739/155/001.

Gas Risk Assessment

A 'Landfill Gas Generation and Quantitative Risk Assessment' was carried out for the proposed extension of Docksway Disposal Site in 2004, for the original IPPC submission. The risk assessment utilised the GasSim modelling software to estimate the likely quantity of landfill gas that would be generated by Area 2 of the landfill, together with predictions of emissions, short and long term air quality impacts and an assessment of the best combination of control measures.

As part of the application to revise the EP, the Landfill Gas Risk Assessment has been reviewed to determine whether the proposed changes will fundamentally affect the existing gas risk assessment and input parameters and therefore whether it is appropriate to update the gas risk assessment or whether it can be considered that the existing gas risk assessment is still appropriate without amendment.

Conceptual Site Model

The conceptual landfill gas model that was previously developed for the GasSim modelling utilised the following characteristics to define the input parameters;

- Source – waste input and breakdown;

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- Infiltration – rainwater and surface water that enters the waste;
- Engineering Characteristics – properties of both the liner and the cap;
- Geology – physical characteristics of the local geology;
- Dispersion Pathways – lateral migration and atmospheric dispersion;
- Receptors – the nature, characteristics and distance to local receptors.

These characteristics have all been individually reviewed to determine whether the current proposals fundamentally affect the original conceptual landfill gas model and therefore whether the landfill gas risk assessment requires amendment.

Source

The current waste inputs do not exceed the total yearly limit of 103,500 tonnes (combined non hazardous and inert), and the site operator (NCC) has confirmed that there are no proposals to increase this limit. The previous waste breakdown was as follows;

- Domestic/household = 54%
- Commercial = 35%
- Inert = 11%

The composition of the waste input to the new cells at Docksway will be different to previously due to the opening of Trident Park incinerator, where the domestic/household waste from NCC is now dealt with. Therefore with the inclusion of the asbestos waste proposed, and an increase in the other permitted wastes at the site, the likely composition will be as follows;

- Commercial = 50%
- Inert = 40%
- SNRHW = 10%

The composition in the new cells comprises a lower percentage of the more biodegradable material such as domestic and commercial, and therefore there will be less landfill gas produced overall, than predicted during the original landfill gas risk assessment.

Infiltration

The water balance calculations that were carried out to determine the potential infiltration for the original IPPC submission have been reviewed. The average monthly temperature (Rhoose weather station) and average annual rainfall (Station: Usk) data (1981 – 2010) have been compared to the values used in the original water balance. Whilst there are minor differences, these are not considered significant enough to affect the previously calculated potential infiltration (678 mm).

Engineering Characteristics

The engineering characteristics of the proposed clay liner will not change from the characteristics proposed in the original Engineering Design Philosophy. The proposed clay liner will be 1.2m thick of engineered clay with a permeability of less than 5×10^{-10} m/s.

In the Engineering Design Philosophy, it was proposed to provide a 1m thick engineered clay cap with a permeability of less than 5×10^{-10} m/s. However, since the design philosophy was first produced, the capping design has, in agreement with the Environment Agency (now Natural Resources Wales), been amended to comprise a 1mm thickness Linear Low Density PolyEthylene geomembrane instead of engineered clay. The LLDPE geomembrane is designed and manufactured to be virtually impermeable, and therefore can be considered to have permeability characteristics at least as good as the clay capping previously used in the GasSim model.

Geology

The geological model used in the original Landfill Gas Risk Assessment has not changed and is considered appropriate.

Dispersion Pathways

The dispersion pathways modelled by the GasSim software in the original Landfill Gas Risk Assessment were created using MET Office meteorological data (wind speeds and directions, atmospheric temperature) input into the model. This wind rose data has been compared to data from the on-site meteorological station obtained during 2014 and has been found to be very similar. Therefore it is considered that the dispersion pathways previously modelled remain applicable and do not require remodelling.

Receptors

The receptors considered in the original Landfill Gas Risk Assessment are considered to be applicable at the current time. The receptors considered are people, services, buildings, ecology and the atmosphere (global impact).

Engineering Details

The GasSim model requires other input parameters relating to the geometry of the cells at the landfill, such as the cell areas, waste density, waste inputs and leachate head above the base of the landfill. All of these parameters have been reviewed and remain unchanged as follows;

Cell layout: Unchanged - See Figure 2
Waste Density: 1 tonne/m^3
Leachate head: 2m
Waste Inputs: Originally predicted to be about 54,000 tonnes by 2015 (based on reducing inputs). The current forecast going forwards is 55,000 tonnes per year (information estimated by NCC).

Conclusions

The GasSim model in the original Landfill Gas Risk Assessment for Area 2, indicated that the peak gas generation would be in 2021 with a maximum of 600m^3/hr of gas produced (95% confidence limit). The Landfill Gas Risk Assessment concluded that with reference to landfill gas, Area 2 of Docksway Disposal Site would comply with the Landfill (England and Wales) Regulations 2002.

This technical note has reviewed the input parameters for the original GasSim model and has concluded that the main change to the model is the waste composition as part of the waste input is now proposed to be SNRHW. However – it is known that asbestos is non-biodegradable and will not produce the quantities of landfill gas that an equal amount of non hazardous waste would. On this basis it is considered appropriate not to amend the GasSim model as the worst case conditions have already been modelled and therefore the maximum gas predicted to be produced by the model can still be considered to be the conservative worst case.

The current gas utilisation plant comprises one 1MW Jenbacher (320) engine together with one 1250m^3/hr flare.

It is concluded that the current gas utilisation and management is sufficient to manage fugitive emissions and minimise the risk to the environment and human health, and that the conclusions of the original Landfill Gas Risk Assessment remain valid.