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## PROPOSED FINGAL LANDFILL

### EPA ORAL HEARING

### STATEMENT OF EVIDENCE OF PAUL CHADWICK

### AIR QUALITY AND NOISE

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## 1.1 INTRODUCTION

I hold an honours degree in Chemistry from Trinity College, Dublin. I also hold a Masters Degree for research in the field of Atmospheric Chemistry from the Dublin Institute of Technology. I have been active in the field of air quality and climate for the past 11 years, the last 9 as an Environmental Consultant. I have considerable experience in the areas of ambient air quality monitoring, point source monitoring, indoor air quality, predictive air quality dispersion modelling, climate impact assessment and odour assessment. I have carried out numerous Air Quality and Climate Impact Assessments for a range of developments from infrastructural, industrial, residential and commercial.

RPS Group were commissioned to conduct an appraisal of the impacts to atmosphere associated with both the construction and operation phases of the proposed Fingal Landfill. These impacts include those from landfill gas, dusts, odours, impacts to climate from greenhouse gases and noise.

## 1.2 EMISSIONS TO ATMOSPHERE

As part of the planned infrastructure for the proposed landfill there is a gas compound containing gas flaring and utilisation facilities in accordance with the Landfill Directive. Emissions from the proposed plant have been modelled using an air dispersion model. The model was employed to determine the resultant ground level concentrations of pollutants as a result of dispersion of the combustion emissions at the site boundary.

The Air Quality Standards Regulations (S.I. 271 of 2002) have been used as the relevant assessment criteria for the protection of human health. Where there are no statutory limits for pollutants, the World Health Organisation Guidelines have been referenced. Site-specific emission source data has been derived from Schedule B.1 of the Proposed Decision to represent the source characteristics of the proposed combustion units. Monitoring of these units is required biannually under Schedule C.1.2 of the Proposed Decision to ensure that emission levels remain below these limits.

The results expressed in the EIS represent the highest predicted ground level concentrations from the operation of the proposed combustion units at the landfill boundary. The emission prediction model indicates that even with the combustion units operating at the emission limit values specified in the Proposed Decision, the ground level concentrations of pollutants at the site boundary will be below all relevant statutory or guideline values. Furthermore, the ground level concentrations beyond the site boundary, at the nearest sensitive receptors, will be considerably lower than those predicted for the worst case boundary receptor. As such, it is predicted that the operation of the flare units or gas utilisation plant will only have a negligible impact on air quality beyond the site boundary.

## 1.3 DUST IMPACTS

There is the potential for generation of dust during the construction and operation of the proposed landfill. As it is generally best practice to mitigate these dusts at source and in order to ensure that any dust nuisance is minimised, a series of mitigation measures have been proposed in the EIS. These measures are based upon the construction industry guidelines in the Building Research Establishment document entitled 'Control of Dust from Construction and Demolition Activities' and will form the basis of the site dust minimisation plan. While these are construction industry guidelines, they provide a comprehensive and thorough list of potential dust sources and mitigation. In addition, a number of mitigation measures are conditions of the Proposed Decision (Conditions 6.7, 6.8 and 6.9).

Dispersion modelling has been carried out to specifically determine the potential risk to human health of the bottom ash storage area in the proposed landfill. This modelling was carried out using a number of conservative assumptions to determine a worst case impact. The results of the modelling

indicates that dispersion of these low risk dusts will lead to a maximum boundary concentration that is less than one third of the relevant guideline for dust concentrations.

Condition 4.6 of the Proposed Decision requires the landfill operator to maintain monthly dust levels below the guideline of  $350\text{mg}/\text{m}^2/\text{day}$  at a series of EPA designated locations. Dust levels must be monitored on a quarterly basis under Schedule C.6 of the Proposed Decision.

The dust minimisation plan, including the mitigation measures listed in Conditions 6.7, 6.8 and 6.9, ensures that the potential for dust nuisance to occur will be mitigated and will not cause a significant impact.

## 1.4 ODOUR IMPACTS

There is the potential for odours from the proposed landfill due to a number of sources such as fugitive odour emission from the active face, uncontrolled landfill gas leakages, volatilisation and air flow stripping of odourous gases from active face/active cell, odour emissions from tipping of waste and fugitive emissions from the landfill flaring system and leachate treatment facility. Each of these potential sources has been included in a detailed odour dispersion model that has been employed to determine the potential odour nuisance from the proposed landfill. The odour emission rates from each source have been derived from a database of measurements undertaken at Irish landfills. As a conservative assumption, the model simulates all potential sources of odour emitting simultaneously. This would not be the case in reality and is a deliberate overestimation to generate a worst-case odour emission scenario.

Condition 5.2 of the Proposed Decision requires that odours from the site do not result in an impairment of amenities beyond the site boundary. While it is accepted that landfill operations may generate odours, the potential odours from the proposed landfill have been suitably mitigated through a series of detailed discussions and model iterations with the landfill engineering design team. These mitigation measures are presented in Section 3.4.5.2 of Volume 2 of the EIS and represent best available technology in terms of odour mitigation. A number of these mitigation measures relating to landfill gas management, pre-treatment of biological sludge, covering of leachate structures are also requirements of Condition 6.6 of the Proposed Decision.

In addition to the significant engineering mitigation proposed for odour control, there are also odour mitigation measures proposed for the management of odours through good working practices on the site. The implementation of an odour management plan is a mitigation measure listed in the EIS and is required under Condition 6.6.5 of the Proposed Decision.

With these source mitigation measures engineered in the landfill design and management of odours during operations, the potential impact of odours will be within the appropriate odour annoyance criteria at all sensitive receptors beyond the site boundary. The assessment indicates that the operation of the proposed landfill with these measures will not result in impairment of amenities at sensitive receptors beyond the site boundary.

## 1.5 CLIMATE IMPACTS

GasSim, a landfill gas modelling software package, which has been developed by the UK Environment Agency, was used to simulate the production of landfill gas from the proposed landfill. A simulation was carried out for the planned operations at the proposed landfill both with and without the implementation of the biodegradable waste diversion targets. The profile of annual generation of landfill gas throughout the lifetime of the landfill indicates a maximum flow of gas from the landfill is likely to occur in 2011 at  $3000\text{m}^3/\text{hr}$  with the introduction of the biodegradable waste diversion targets.

Without the introduction of these targets the annual generation of landfill gas will peak 5000m<sup>3</sup>/hr in 2039.

The production of landfill gas may be mitigated initially when the biodegradable waste diversion targets are achieved in line with the Landfill Directive. This will reduce the organic fraction of the waste and therefore the volume of landfill gas generated as presented in the GasSim analysis.

It is proposed to utilise the landfill gas collected in the landfill through combustion engines to generate energy if possible, which can substitute the combustion of fossil fuels for energy. If it is not possible to utilise the gas, it will be flared in accordance with the Landfill Directive.

There have been two third-party objections relating to the operation of the proposed landfill in relation to national climate policy. In the Government's "National Climate Change Strategy 2007 – 2012" the two principle targets for greenhouse gas emissions reductions from the Waste sector are through the introduction of the biodegradable waste targets and the increased rate of landfill gas capture through implementation of the technical requirements of the Landfill Directive. The measures outlined above for the reduction of greenhouse gases from the proposed landfill comply with the targets of Strategy to reduce greenhouse gases from the waste sector and do not conflict with national climate policy.

## 1.6 NOISE IMPACTS

A noise impact assessment has been undertaken to determine the potential impact from the on-site operations of the proposed landfill. Predicted noise levels from plant machinery operating on the site have been estimated using the methodology described in British Standard 5228 "Noise and control on construction and open sites". Predictions are based on a  $L_{Aeq1hour}$  value with all plant machinery operating continuously and simultaneously. The results of this assessment indicate that noise levels at the nearest sensitive receptors will be below the limits specified in Schedule B.4 of the Proposed Decision and this is without the inclusion of the significant noise screening that will be provided by the 7 metre earthen berms around the site.

Throughout the life of the proposed landfill facility, excavated backfill material will be built up along the perimeter of the site, which will provide considerable screening and thus act as a noise mitigation measure. On completion, these berms are predicted to reduce the noise levels at the nearest noise sensitive receptors by 10-15dB(A). Noise monitoring will be carried out at the site on a quarterly basis as per Condition 6.29 of the Proposed Decision.