W0232-01.

W0232-01
Unsolicited Additional Info

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19th July 2007

EPA Reference: W0232-01

Re: Dublin Waste to Energy Project, Pigeon House Road, Poolbeg Peninsula, Dublin 4.

Dear Ms Kehoe,

Following the conclusion of the Planning oral hearing relating to the above referenced project, Dublin City Council would like to take this opportunity to volunteer additional information from these proceedings to the EPA file (Ref W0232-01).

Please find enclosed a CD and hard copy of the following documents:

Updated Brief of Evidence – Air Quality
Updated Brief of Evidence – Climate
Closing Submission on Behalf of Dublin City Council

If you require any additional information or clarification we will be happy to provide it. Please do not hesitate to contact me.

Yours sincerely,

M. Twomey
Assistant City Manager

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ORAL HEARING INTO THE

DUBLIN WASTE TO ENERGY FACILITY

BRIEF OF EVIDENCE

AIR QUALITY

DR EDWARD PORTER

AWN CONSULTING

Response To Submission From Dr. Shanahan

Appropriateness of AERMOD Modelling

Emissions from the proposed site were modelled using the AERMOD dispersion model which has been developed by the U.S. Environmental Protection Agency (USEPA)[1]. The model is a steady-state Gaussian plume model used to assess pollutant concentrations associated with industrial sources. The model has been designated the regulatory model by the USEPA for modelling emissions from industrial sources in both flat and complex terrain[2] since 12/09/2005.

AERMOD has undergone extensive developmental and independent performance evaluation involving four short-term tracer studies and six conventional long-term SO_2 monitoring databases in a variety of settings[3,4]. A summary of the range of databases and their agreement with observed results is outlined in Table 1. Results are also given for the previous regulatory model, ISCST3.

The purpose of the evaluation studies was to be sure that AERMOD had been tested in a variety of types of environments for which it will be used. The types of studies ranged from non-buoyancy releases in flat terrain, buoyant releases in flat terrain, buoyant releases in complex terrain and buoyant releases in mountainous terrain. For example, the Tracy Power Plant (Nevada) study, is in a rural river valley completely surrounded by mountainous terrain with emissions taking place from a 91m moderately buoyant stack. The Martins Creek study is characterised by complex terrain rising above the stacks (stacks varying from 122 – 183m). Monitoring was carried out on a mountain 2.5 – 8 km from the facility. The Lovett power plant study again is a buoyant release study carried out in complex terrain (rising to nearly 200 m above stack height).

The overall evaluation for AERMOD indicated that:

- 1.03 is the overall predicted-to-observed ratio for short-term averages (with a range among sites from 0.76 to 1.35)
- 0.73 is the overall pre predicted-to-observed ratio for short-term averages (with a range among sites from 0.30 to 1.64)

The predicted-to-observed ratio did not vary substantially between simple and complex terrain sites. However, for ISCST3, a large change in the average ratio was evident (0.96 for simple terrain and 6.4 for complex terrain).

An additional evaluation was conducted for AERMOD after the incorporation of the PRIME building downwash algorithm into the formulation[4]. This evaluation included the Millstone Nuclear Power Station which is situated on the Connecticut coastline. The overall evaluation for AERMOD, incorporating PRIME, indicated that:

- 0.97 is the overall predicted-to-observed ratio for short-term averages using AERMOD.

Thus, extensive evaluation exercises have found that AERMOD gives good agreement with observed results regardless of terrain or specific location.

Table 1 Database Used In The Evaluation of AERMOD[4].

Database	Ratio of Modelled / Observed Robust Highest Concentration[1]	
	AERMOD	ISCST3
Prairie Grass (SO_2) Flat field (Nebraska, USA)	0.89 (1-hr average)	1.50 (1-hr average)
Kincaid (SO_2) Flat, rural (Illinois, USA)	0.98 (3-hr average) 0.94 (24-hr average) 0.30 (annual average)	0.56 (3-hr average) 0.45 (24-hr average) 0.14 (annual average)
Baldwin (SO_2) Flat, rural (Illinois, USA)	1.24 (3-hr average) 0.97 (24-hr average) 0.97 (annual average)	1.43 (3-hr average) 1.14 (24-hr average) 0.63 (annual average)
Indianapolis (SF_6) Flat, urban-suburban area (Indiana, USA)	1.11 (1-hr average)	1.30 (1-hr average)
Clifty Creek (SO_2) Moderately hilly terrain, rural (Indiana, USA)	1.05 (3-hr average) 0.67 (24-hr average) 0.54 (annual average)	0.98 (3-hr average) 0.67 (24-hr average) 0.31 (annual average)
Tracy (SF_6) Mountainous terrain, rural (Nevada, USA)	1.04 (1-hr average)	2.81 (1-hr average)
Martins Creek (SO_2) Hilly terrain, rural (Pennsylvania, USA)	1.12 (3-hr average) 1.78 (24-hr average) 0.78 (annual average)	7.25 (3-hr average) 8.88 (24-hr average) 3.37 (annual average)
Lovett (SO_2) Complex terrain, rural (New York State, USA)	1.03 (3-hr average) 1.01 (24-hr average) 0.85 (annual average)	8.20 (3-hr average) 9.11 (24-hr average) 7.49 (annual average)
Westvaco (SO_2) Hilly terrain, rural (Maryland, USA)	1.06 (3-hr average) 1.07 (24-hr average) 1.59 (annual average)	8.50 (3-hr average)

(1) Robust Highest Concentration (RHC) is a statistical estimator for the highest concentration. It is determined from a tail exponential fit to the high end of the frequency distribution of observed and predicted values.

AERMOD also has the ability to take into account the varying surface characteristics across the modelling domain[1,5]. The meteorological pre-processor for AERMOD (termed AERMET) uses meteorological data and surface characteristics to calculate important parameters which are used in the model to determine dispersion. The changes in surface roughness, albedo and surface moisture are taken into account (with a weighted average every 30° arc out to 3km from the source) and are used to calculate a range of parameters including friction velocity, Monin-Obukhov length and convective velocity scale. These calculated parameters are then used to determine vertical profiles of the key variables of wind speed, temperature and both lateral and vertical turbulence. Thus, AERMOD is capable of using the site-specific surface characteristics of the Poolbeg area in the calculation of dispersion from the site including the surface roughness, bowen ratio and albedo over water.

A recent study was conducted in the UK at a coastal location to validate the AERMOD and ADMS models[6]. The study using tracer data from Sellafield along the Cumbria coastline evaluated both local and regional dispersion. The study found that AERMOD gave the best performance with mean bias results not significantly different from unity.

A second study compared AERMOD with monitoring data from a refinery in a complex coastal area of Italy which included valleys, hills urban areas and industrial areas[7]. The area also experiences a high frequency of sea breezes. The results from this study concluded that AERMOD predicted short-term average results in agreement with observed data.

It should be highlighted that using ISCST3 to compare to modelled results produced from AERMOD is not valid for a number of reasons. Firstly, AERMOD has replaced ISCST3 as the regulatory model and thus this comparison is obsolete. Secondly, ISCST3 has been found to be very conservative especially in complex terrain (see Table 1) where predictions have in some cases overestimated actual concentrations by up to 900%. Thirdly, as no deposition studies were conducted by Dr. Shanahan, deposition arguments are inappropriate. In relation to gaseous deposition, dry gaseous deposition, although considered in the AERMOD model, has not been calibrated for the estimation of the deposition flux of dioxin-like compounds into vegetation and thus the USEPA has recommended that this algorithm should not be used for site-specific applications[8]. In relation to wet gaseous deposition, the guidance document indicates that it not yet well understood and does not address this pathway[8] in its own guidance document. From a previous study in Ringaskiddy, wet gaseous deposition was typically only 1% of the particulate deposition pathway. It should also be highlighted that wet and dry particulate deposition was modelled in detail using the USEPA methodology as outlined in detail in Appendix 8.1 of the EIS.

Figures 1-3 which Dr. Shanahan produced in her Brief of Evidence are not fair representations of reality for the following reasons:

In relation to Figure 1 of Dr. Shanahan's evidence (these points will also refer to Figures 2 and 3) the assumptions used were very pessimistic:

- In relation to the background concentration, the 99.8th%ile of process emissions was added to the 99.8th%ile of background NO_2 levels. However, guidance from the Environment Agency in the UK indicates that the 99.8th%ile of process emissions should be added to twice the annual background concentration[9]. It would be expected that maximum predicted concentrations from a tall stack would occur under very difference conditions from background (traffic-derived) sources. Tall stacks usually give highest concentrations under unstable conditions when the plume is subjected to significant updrafts and downdrafts which can rapidly transport the plume to ground level. In contrast, under very calm conditions, ground level concentrations from tall stacks are usually very low. The air quality impact from traffic sources are typically inversely proportional to wind speed and thus very low wind speeds usually lead to the highest ground level concentrations.
- Secondly, the use of a NO_2:NO_X ratio of 0.73 is appropriate for the annual average concentration. It is not however appropriate for the 99.8th%ile of one hour concentrations. A site specific ratio based on three years of monitoring data indicated that the existing ratio at the predicted 99.8th%ile of process NO_X concentration was of the order of 0.50. Shown in Appendix 2 is the UK methodology for determining the relevant NO_X ratio[10]. It should be highlighted that this methodology is appropriate both for a screening analysis and for a more detailed refined analysis. Appendix 3 also show This ratio is also supported by the UK approved methodology for NO_2:NO_X ratios (see Appendix 2) and the recently developed Plume Volume Molar Ratio Method (PVMRM) which the USEPA has stated gives a more realistic estimate of the NO_2:NO_X ratio than the OLM (see Appendix 3)[11,12]. Taking guidance directly from the USEPA for the 99.8th%ile of 1-hour concentrations for NO_2 would not be appropriate as the USA air quality standard fro NO_2 is solely an annual averaging period and thus the guidance does not concern itself with this averaging period.
- As ISCST3 was used, it is likely that results are higher than would be the case if AERMOD had been used. It is also important to bear in mind that the contour pattern

produced using ISCST3 is not appropriate and that the (different) contour pattern produced using AERMOD is the appropriate dispersion pattern to reference. In terms of the modelling, a grid of 20km by 20km was used. However, for presentation purposes, a significantly smaller grid was used to highlighted the highest ground level concentrations.

- Results using ISCST3 predicted an exceedence at 95m. As part of the preparation for the oral hearing and in response to a specific objection, AERMOD was modelled at the proposed Fabrizia South Bank Rd residential development at roof levels and concentrations were found too be significantly below the ambient air quality standards.

In relation to Figure 2 of Dr. Shanahan's evidence, the assumptions used were again widely pessimistic. In addition to the pessimistic assumptions outlined above the following assumptions were made:

- The maximum emissions limits allowable in the WID were modelled for the full year even though these are only allowed to be exceeded for 3% of the time. As shown in Table 2, when the AERMOD modelling analysis is updated to allow for this very scenario, no exceedences of any air quality standards occurs.

30 Minute Peak Emission Scenario

The scenario has been undertaken which assumes that the peak 30 minute emissions for NO_2, SO_2, HCl and HF occur for every hour of the year. In reality these emissions are only allowable for 3% of the time. Thus, for example, the 99.8th%ile of maximum hourly NO_2 results have been reported for this scenario. In order for the reported concentration to occur in reality, the meteorological conditions which lead to the highest 0.2% of hourly NO_2 concentrations will need to coincide with the occurrence of the 30 minute peak which again is only allowable for 3% of the time. As these two very infrequent occurrences are independent of one another, the likelihood of simultaneous occurrence is remote. Dioxins, heavy metals and particulates are not affected by this condition as they do not have short-term (less than 24 hours) limit values with the annual average being of concern only.

In any event, as shown in Table 2, the levels of all four pollutants under this scenario are all well below the ambient air quality standards with process emissions peaking at 39% of the ambient air quality standards.

Table 2 Dispersion Model Results – Assuming Emissions At 30 Minute Peak Concentration For The Full Year

Pollutant / Scenario	Averaging Period	Process Contribution ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)(1)	Predicted Emission Concentration ($\mu g/Nm^3$)	Standard ($\mu g/Nm^3$)	Dublin WTE emissions as a % of ambient limit value
NO_2 / 30 Minute Peak	99.8th%ile of 1-hr means(4)	77.6	58.0	136	200(2)	39%
SO_2 / 30 Minute Peak	99.7th%ile of 1-hr means	76.1	30	106.1	350(2)	22%
HCl / 30 Minute Peak	98th%ile of 1-hr means	15.9	1.24	17.1	100(3)	16%
HF / 30 Minute Peak	98th%ile of 1-hr means	1.06	0.02	1.08	3(3)	35%

(1) Includes contribution from traffic and background sources and incorporating the cumulative assessment results.
(2) Directive 1999/30/EC
(3) TA Luft Immission Standard
(4) Conversion factor, following guidance from USEPA (Tier 3 analysis), based on empirically derived site-specific maximum 1-hour value for NO_2 / NO_X of 0.50 (see Figure 1)

Again in relation to Figure 3 of Dr. Shanahan's evidence, the assumptions are widely pessimistic with the same issues raised for Figure 1 also relevant to this analysis. Additionally:

- Figure 3 of Dr. Shanahan's evidence has assumed that, on the basis of the WID, that these are emitted for 60 hours each year. This scenario is not credible due to the unlikelihood of the plant emitting raw flue gas for 60 hours per year because raw flue gas will only be emitted if all abatement systems fail simultaneously. This is extremely unlikely. In the event that WID standards are exceeded, Article 13(3) of the Directive requires that "the line shall under no circumstances continue to incinerate waste for a period of more than four hours uninterrupted where emission limit values are exceeded". This suggests that emission concentrations would never in practice reach the levels predicted for total loss of flue gas containment (because the line would be shut down before they reached this level), and even if they did, they could not do so for more than 4 hours. Dr. Shanahan's scenario seems to require 15 separate incidents of total loss of flue gas containment in a year, each one of which lasts for four hours. This is simply not credible. Even a single such incident would be very unlikely.
- As part of the Air Quality Impact assessment, abnormal operating conditions were investigated using AERMOD and no exceedence of the air quality standards occurred.

This section of Dr. Shanahan's brief also indicated some dissatisfaction with the assessment of SAC /SPA /NHAs near the facility. As outlined in Appendix 8.1 of the EIS, the impact of NO_X and SO_2 was modeled in detail in these areas and as shown Figures 8.20 and 8.23 of the EIS. The results indicate that no air quality standards will be exceeded in these areas.

Shoreline Fumigation

Frequency of Occurrence of Shoreline Fumigation

SCREEN3[13] models fumigation using "F" stability which occurs typically for only 5% of the time in Ireland whilst urban areas have greater night-time turbulence and even lower levels of "F" stability. This also needs to coincide with an easterly wind which has a frequency of less than 25%. The screening guidance[14] for use with SCREEN3 indicates that shoreline fumigation should last no more than a few hours and assumes that it will last for 90 minutes. In order to extrapolate from a one-hour concentration to a 3-hr, 8-hr and 24-hr, the following relationship is used (Section 4.5.3, Step 5 of the guidance document[14]):

Averaging Time	**Adjustment of X_1 for Fumigation**
3 Hours	$X_1' = (X_1 + X_F) / 2$
8 Hours	$X_1' = (13X_1 + 3X_F) / 16$
24 Hours	$X_1' = (15X_1 + X_F) / 16$

X_1' = Adjusted maximum ground level concentration
X_1 = Maximum ground level concentration from SCREEN3 for normal dispersion conditions
X_f = Maximum concentration under fumigation conditions.

Note: No conversion is provided to extrapolate to an annual average.

Thus, using the results from SCREEN3 for normal operation (simple terrain), the Dublin WTE facility conversion factor from 1 hour to 24 hours would be 0.29 (see Appendix 1 for full output file) rather than the indicated ratio of 0.6 which was used by Dr. Shanahan. By inference, the screening procedure is indicating that shoreline fumigation will only occur once in any one day.

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	175.7	963.	0.
INV BREAKUP FUMI	92.26	13341.	--
SHORELINE FUMI	711.3	1031.	--

Averaging Time	**Adjustment of X_1 for Fumigation From Dublin WTE**
3 Hours	$X_1' = (X_1 + X_F) / 2 = 0.62$
8 Hours	$X_1' = (13X_1 + 3X_F) / 16 = 0.39$
24 Hours	$X_1' = (15X_1 + X_F) / 16 = 0.29$

In one of the original papers which presented the theory of shoreline fumigation[15], the conditions which may give rise to shoreline fumigation are further explored. The need for a stably stratified layer on the water surface next to the coastline is highlighted as is the growth in the TIBL during the day due to convective heating. ADMS also has a coastal module[16] which indicates the conditions which may give rise to shoreline fumigation, which are:

- an onshore wind
- the land is warmer than the sea
- the air over the sea is stably stratified.

Thus, it is clear that stable conditions along the approach to the coastline are required for shoreline fumigation.

The AERMOD modelling formulation determines the minimum urban mixing height which can occur. For a population of 1 million, the urban mixing height, using Equations (104) and (105) in the AERMOD model formulation document[1], is a minimum height of 336m. Thus, the urban mixing layer will always be greater than this height and thus the opportunity for shoreline fumigation to occur may be limited as the effective stack height will be 172m under "F" stability and stack height wind speed of 2.5 m/s.

Empirical evidence also supports the assertion that shoreline fumigation is very infrequent in the Poolbeg area. From three years of continuous NO_X monitoring at the Irish Glass Bottling site, only 2 of the over 26,000 hourly values have exceeded the maximum 1-hour ambient air quality standard (the 99.95% of hourly values is 136 $\mu g/m^3$ or 68% of the limit value) for NO_2 despite the presence of three significant Power Plants (Poolbeg Power Plant, North Wall Power Plant and Synergen Power Plant). It should be noted that all three facilities are permitted to emit NO_X at levels which are 8 times, 6 times and 2.5 times greater than that which permission is sought for the Dublin WTE facility. Furthermore, these three facilities have stack height both taller and shorter than the proposed facility and are both closer and further away from the shoreline.

If it is suggested that this facility will experience shoreline fumigation, then the meteorological conditions which give rise to shoreline fumigation must already be in place. We can therefore investigate where or not this phenomenon does occur by looking at the three existing major point sources in the area (Poolbeg Power Plant has been modelled as two separate facilities) and modelling their air emissions under the shoreline fumigation scenario. Shown in Appendix 1 are the results from modelling these sources (assuming 1 g/s) using SCREEN 3 under shoreline fumigation. These have been converted into the mass emissions of NO_x from each of the facilities as shown in Table 3 and results are compared to the two Dublin City Council monitoring stations at Winetavern Street (near Dublin City Council's offices) and Coleraine Street as shown in Table 3 with data over the period 2003 - 2006. It should be noted that the location of these air monitoring stations is quite close to the predicted downwind maximum for these emission sources.

Table 3 Shoreline Fumigation Dispersion Model Results – Existing Power Stations Emissions of NO_X

Power Station	Predicted Emission Concentration (g/s)	Predicted Ambient Concentration NO_X ($\mu g/Nm^3$)	Downwind Distance To Maximum Concentration (km)	Distance From Winetavern Street (km)	Distance From Coleraine Street (km)
Poolbeg A& B	187	**230**	7.15	6.1	6.2
Poolbeg CCGT 1 & 2	101	**335**	3.24	6.2	6.3
North Wall	87	**411**	2.93	4.0	4.2
Synergen	174	**622**	2.30	4.5	4.7

Table 4 Air Monitoring Data for NO_2 - Coleraine St and Winetavern Street 2003 - 2006

Monitoring Station	Year	Predicted 1-Hour Maximum Concentration NO_2 ($\mu g/Nm^3$)	Predicted 99.8th%ile of 1-hour NO_2 ($\mu g/Nm^3$)	Predicted Annual Average Concentration NO_2 ($\mu g/Nm^3$)
Winetavern Street	**2006**	190	134	34.5
	2005	231	120	32.6
	2004	151	100	29.7
	2003	215	150	38.2
Coleraine Street	**2006**	183	126	31.0
	2005	192	135	28.2
	2004	170	110	31.8
	2003	167	117	36.6

The modelled results indicate that levels from individual facilities should reach up to 622 µg/m^3 of NO_X and cumulative levels could well be much higher. It has been asserted that it is likely that at least 75% (if not all) of the NO_X in the plume is likely to have been converted to NO_2 and thus levels of the order of at least 500 µg/m^3 of NO_2 would be expected on an on-going basis. However there is no evidence that these levels are occurring at all (as outlined in Table 4 highest recorded levels over a four year period at the two monitoring stations is 231 µg/m^3 of NO_2 and the 99.8th%ile peaking at 150 µg/m^3). Indeed the measured levels are in line with what would be expected from urban areas subject to heavy traffic.

Although NO_2 is complicated by the issue of the NO_2:NO_X ratio and the influence of other sources particularly traffic, SO_2 does not suffer from these drawbacks. SO_2 from road traffic is low and urban areas will typically have low levels of SO_2. Therefore, if high levels of SO_2 are being recorded at both Coleraine St and Winetavern St on an on-going basis then it may support Dr. Shanahan's assertion that shoreline fumigation is occurring and on a frequent basis. Therefore, the exercise conducted for NO_2 has been repeated for SO_2 from each of the facilities as shown in Table 5 and results are compared to the two Dublin City Council monitoring stations at Winetavern Street and Coleraine Street as shown in Table 6 with data over the period 2003 - 2006:

Table 5 Shoreline Fumigation Dispersion Model Results – Existing Power Stations Emissions of SO_2.

Power Station	Predicted Emission Concentration (g/s)	Predicted Ambient Concentration SO_2 ($\mu g/Nm^3$)	Downwind Distance To Maximum Concentration (km)	Distance From Winetavern Street (km)	Distance From Coleraine Street (km)
Poolbeg A& B	643	**791**	7.15	6.1	6.2
Poolbeg CCGT 1 & 2	88.4	**293**	3.24	6.2	6.3
North Wall	87	**411**	2.93	4.0	4.2
Synergen	31.3	**112**	2.30	4.5	4.7

Table 6 Air Monitoring Data SO_2 - Coleraine St and Winetavern Street 2003 - 2006

Monitoring Station	Year	Measured 1-Hour Maximum Concentration SO_2 ($\mu g/Nm^3$)	99.7th%ile of 1-hour SO_2 ($\mu g/Nm^3$)	99.2th%ile of 24-hour SO_2 ($\mu g/Nm^3$)	Annual Average Concentration SO_2 ($\mu g/Nm^3$)
Winetavern Street	**2006**	65.9	33.7	16.5	5.1
	2005	42.1	28.3	19.7	5.1
	2004	53.1	29.1	15.4	3.3
	2003	95.2	51.2	23.9	6.6
Coleraine Street	**2006**	74.7	29.5	12.2	3.8
	2005	60.1	27.1	15.5	3.4
	2004	113	49.1	23.1	4.1
	2003	86.0	41.4	18.9	3.0

The modelled results indicate that levels from individual stations should reach up to 791 µg/m^3 of SO_2 and cumulative levels could well be much higher thus cumulative levels of the order of at least 600 µg/m^3 would be expected on an on-going basis near the two monitoring stations (as shown in Table 5). However there is no evidence that these levels are occurring at all (as shown in Table 6 highest recorded levels over a four year period at the two monitoring stations is 113 µg/m^3 of SO_2 and the 99.7th%ile peaking at 51 µg/m^3. Thus, 68,000 hourly monitoring records over the last four years has detected no sign of shoreline fumigation.

Shoreline Fumigation Results Presented By Dr, Shanahan

Similar to the ISCST3 assessments, many unrealistically pessimistic assumptions were included:

- Again, in relation to the background concentration, the 99.8th%ile of process emissions was added to the 99.8th%ile of background NO_2 levels. However, guidance from the Environment Agency in the UK indicates that the 99.8th%ile of process emissions should be added to twice the annual background[9].
- As previously, the use of a NO_2:NO_X ratio of 0.73 is appropriate for the annual average concentration. However, as shown in Appendix 2 the UK methodology for determining the relevant NO_X ratio[10] is appropriate both for a screening analysis and for a more detailed refined analysis.
- The use of the averaging period is incorrect. When modelling shoreline fumigation, the extrapolation to varying averaging periods is as outlined above rather than using the extrapolation under normal dispersion conditions (simple terrain). This will overestimate the 24-hour concentration by 100% and grossly over-estimate the annual average. The USEPA screening methodology[14] does not provide an extrapolation to the annual average and thus is suggestive that this is not a relevant averaging period for shoreline fumigation.
- The frequency of shoreline fumigation suggested by Dr. Shanahan is high. It has been suggested that the only necessary condition for shoreline fumigation is a sea breeze. Indeed, in the modelling conducted by Dr. Shanahan, the assumption is made that it is continuous and occurs under all stability categories and meteorological conditions. Again, this is a gross over-estimation when the conditions required for the condition to occur are investigated and the fact that the screening methodology only allows for an episode of 90 minutes duration in any one day. If we therefore assume an easterly wind occurs for 25% of the year and assume that shoreline fumigation occurs for 90 minutes on each of these days, this equates to a frequency of 137 hours or 1.5% of the time.

30 Minute Peak Emission Scenario Coinciding With Shoreline Fumigation

Despite evidence to the contrary, we may assume that shoreline fumigation does occur. If it does occur, then the frequency of Shoreline Fumigation may be assumed to be either 1.25% (i.e. both "F" stability (5%) and wind direction from east (25%) are required simultaneously leading to a frequency of 1.25% or as shown above using the screening methodology to be 1.5% (assumed 1.5% frequency in the analysis below)). Again, dioxins, heavy metals and particulates are not affected by this scenario as they do not have short-term (less than 24 hours) limit values with the annual average being of concern only.

If we accept that shoreline fumigation occurs and we assume that on each occurrence the facility happens to be emitting NO_X at the 30 minute maximum (which is only allowable for 3% of the time), the air quality impact under this occurrence is outlined in Table 7 (this scenario has a probability of 1 hour in every 2220 hours (once every three months) if we make the assertion that shoreline fumigation occurs). The NO_2:NO_X ratio is again determined from the site-specific ratio as shown in Figure 1 an approach that has been successfully accepted by the EPA in recent IPPC applications. This ratio is also supported

by the UK approved methodology for NO_2:NO_X ratios (see Appendix 2) and the recently developed Plume Volume Molar Ratio Method (PVMRM) which the USEPA has stated gives a more realistic estimate of the NO_2:NO_X ratio than the OLM (see Appendix 3)[11,12].

The peak concentration under this very unusual scenario does not exceed the ambient air quality standard for NO_2. Indeed based on the evidence of Appendices 1 and 2 the adopted ratio of 0.20 under abnormal operation for the NO_2:NO_X conversion is similar to that obtained from the approaches in Appendices 2 & 3.

In relation to HCl and HF, no exceedence of the relevant limit values will occur either. Shown in Table 8 are the relevant 98th%ile concentration (for HCl and HF) and the maximum concentration for SO_2.

It is predicted that the maximum SO_2 concentration will be about 10% above the limit value for the worst-case fumigation episode using this very conservative screening model. However, the ambient air quality standard for SO_2 can be exceeded on 24 occasions in any one year and thus it is extremely unlikely that the 99.7th%ile of 1-hour concentrations for SO_2 will be exceeded as the statistical frequency of this event will be no more than once every three months.

Thus, in summary, the ambient air quality standards will not be exceeded under shoreline fumigation conditions even under maximum 30 minute emission levels.

Abnormal Operation Emission Scenario Coinciding With Shoreline Fumigation

The likelihood of this scenario (two very infrequent independent events) is estimated below for each relevant parameter. Only parameters with short-term limit values are relevant. Again, dioxins and heavy metals (with the exception of Vanadium) are not affected by this scenario as they do not have short-term (less than 24 hours) limit values with the annual average being of concern only. It should be noted that in terms of the metal assessment undertaken by Dr. Shanahan, a worst-case assumption was made that the Sum of Metals emission limit was in each case emitted solely from one individual metal. However, a detailed breakdown of the metal fraction is available from a similar incinerator in Belgium and the use of this breakdown does not lead to any long-term air quality exceedences.

Statistical Frequency of Occurrence of Shoreline Fumigation & Abnormal Operation

As outlined above via two approaches, the frequency of Shoreline Fumigation is likely to no more than 1.25 - 1.5% (assumed 1.5% below).

Frequency of abnormal operation has been formulated by Dong A/S:

- NO_X - 500 mg/m^3 for 4 hours, 10 times over a five-year period (assumed 2 times per annum)
- Total Dust - 4000 mg/m^3 for 4 hours, 5 times over a five-year period (assumed once per annum)
- HCl - 2000 mg/m^3 for 4 hours, once over a five-year period
- SO_2 - 600 mg/m^3 for 4 hours, once over a five-year period
- HF - 30 mg/m^3 for 4 hours, once over a five-year period
- Cd - 6 mg/m^3 for 4 hours, five times over a five-year period
- As - 0.21 mg/m^3 for 4 hours, five times over a five-year period
- Ni - 0.42 mg/m^3 for 4 hours, five times over a five-year period
- V - 0.76 mg/m^3 for 4 hours, five times over a five-year period.

Overall Statistical Probability for these 2 independent events:

- NO_X - 1 in 73,000 (one hour every 8 years)
- Total Dust - 1 in 146,000 (one hour every 17 years)
- HCl - 1 in 730,000 (one hour every 83 years)
- SO_2 - 1 in 730,000 (one hour every 83 years)
- HF - 1 in 730,000 (one hour every 83 years)
- Cd - 1 in 146,000 (one hour every 17 years)
- As - 1 in 146,000 (one hour every 17 years)
- Ni - 1 in 146,000 (one hour every 17 years)
- V - 1 in 146,000 (one hour every 17 years)
- Co - 1 in 146,000 (one hour every 17 years)
- Cr (IV) - 1 in 146,000 (one hour every 17 years).

If we accept that shoreline fumigation and abnormal operation are likely to overlap then the peak concentration under this very unrealistic scenario still does not exceed the ambient air quality standard for NO_2, SO_2, HCl, PM_{10} or HF based on the relevant average periods and thresholds as shown in Table 8. Although it is predicted that some results will be high (particularly for HCl and HF) the likelihood of occurrence is one hour in every 83 years whilst the frequency of this occurrence is insufficient for the actual standards to be exceeded.

Although Cd is predicted to exceed the annual limit value by 41% this is statistically extremely rare whereas As and Ni are not predicted to exceeded even under this scenario. Vanadium has a short-term guidance value recommended by WHO whilst the UK IPPC H1[(9)] document has outlined the short-term guidance values for As, Co, Cr(IV) and Ni. It is predicted that under this unlikely scenario the guideline values for V, Cr(IV) (assuming all chromium is present as Cr(IV)) and Co will be exceeded. However, this exceedence is only predicted to occur for one hour every 17 years.

Thus, in summary, the ambient air quality standards (with the exception of Cd by a small amount and Vanadium, Cobalt and Chromium for one hour every 17 years) will not be exceeded under shoreline fumigation conditions even when overlapping with the abnormal operation scenario.

References

(1) USEPA (2004) AERMOD Description of Model Formulation
(2) USEPA (2005) Guidelines on Air Quality Models, Appendix W to Part 51, 40 CFR Ch.1.
(3) USEPA (1999) Comparison of Regulatory Design Concentrations: AERMOD vs. ISCST3 vs. CTDM PLUS
(4) USEPA (2003) AERMOD: Latest Features & Evaluations
(5) USEPA (1998) User's Guide to the AERMOD Meteorological Preprocessor (AERMET)
(6) Hill et al (2004) A New Model Validation Kit for Evaluating AERMOD, NRPB R91and ADMS using Krypton-85 Data from BFNL Sellafield - *Proceedings of the 9th International Conference of Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes*.
(7) Latini et al (2002) Application of a New Generation Model over Complex Coastal Areas *Proceedings of Coastal Environments Conference*
(8) USEPA (2003) Estimating Exposure to Dioxin-Like Compounds Volume IV, Chapter 3 Evaluating Atmospheric Releases of Dioxin-Like Compounds from Combustion Sources (Draft)
(9) Environmental Agency (2003) "IPPC H1 - Environmental Assessment & Appraisal of BAT"
(10) DEFRA (2003) Local Air Quality Management - Technical Guidance
(11) Mactec (2004) Sensitivity Analysis of PVMRM and OLM In AERMOD
(12) Mactec (2005) Evaluation of Bias In AERMOD - PVMRM
(13) USEPA (1995) SCREEN Model Formulation
(14) USEPA (1992) Screening Procedures for Estimating the Air Quality Impact of Stationary Sources
(15) Van Dop et al (1979) Revised Estimates for Continuous Shoreline Fumigation *J. Appl. Met* **18** 133 - 137
(16) Carruthers et al (2003) Coastline Model - The Thermal Internal Boundary Layer *ADMS Model Guidance Document*
(17) Hanrahan, P The Plume Volume Molar Ratio Method for Determining NO2/NOX Ratios in Modeling – Part 1: Methodology J. Air & Waste Management Assoc. **49** 1324-1331 (1999).

(18) Hanrahan, P The Plume Volume Molar Ratio Method for Determining NO2/NOX Ratios in Modeling – Part 21: Evaluation Studies J. Air & Waste Management Assoc. **49** 1332-1338 (1999).

Table 7 SCREEN3 Dispersion Model Results for NO_2 – Assuming Emissions At 30 Minute Peak Concentration Coincides With Shoreline Fumigation

Scenario	Annual Mean Background (µg/m^3)	Averaging Period	Process Contribution (µg/m^3)(1)	Predicted Emission Concentration (µg/Nm^3)	Standard(2) (µg/Nm^3)
Simple Terrain	29.0	Maximum 1-hr	79(1)	137	200
Inversion Break-Up Fumigation	29.0	Maximum 1-hr	55.4(2)	113	200
Shoreline Fumigation	29.0	Maximum 1-hr	142(3)	200	200

(1) Conversion factor, following guidance from USEPA (Tier 3 analysis), based on empirically derived site-specific maximum 1-hour value for NO_2 / NO_X of 0.45 (see Figure 1 and Appendices 1 & 2)
(2) Conversion factor, following guidance from USEPA (Tier 3 analysis), based on empirically derived site-specific maximum 1-hour value for NO_2 / NO_X of 0.60 (see Figure 1 and Appendices 1 & 2)
(3) Conversion factor, following guidance from USEPA (Tier 3 analysis), based on empirically derived site-specific maximum 1-hour value for NO_2 / NO_X of 0.20 (see Figure 1 and Appendices 1 & 2)
(4) Directive 1999/30/EC.

Table 8 Dispersion Model Results – Assuming Emissions Under Abnormal Operation Overlapping With The Shoreline Fumigation Scenario.

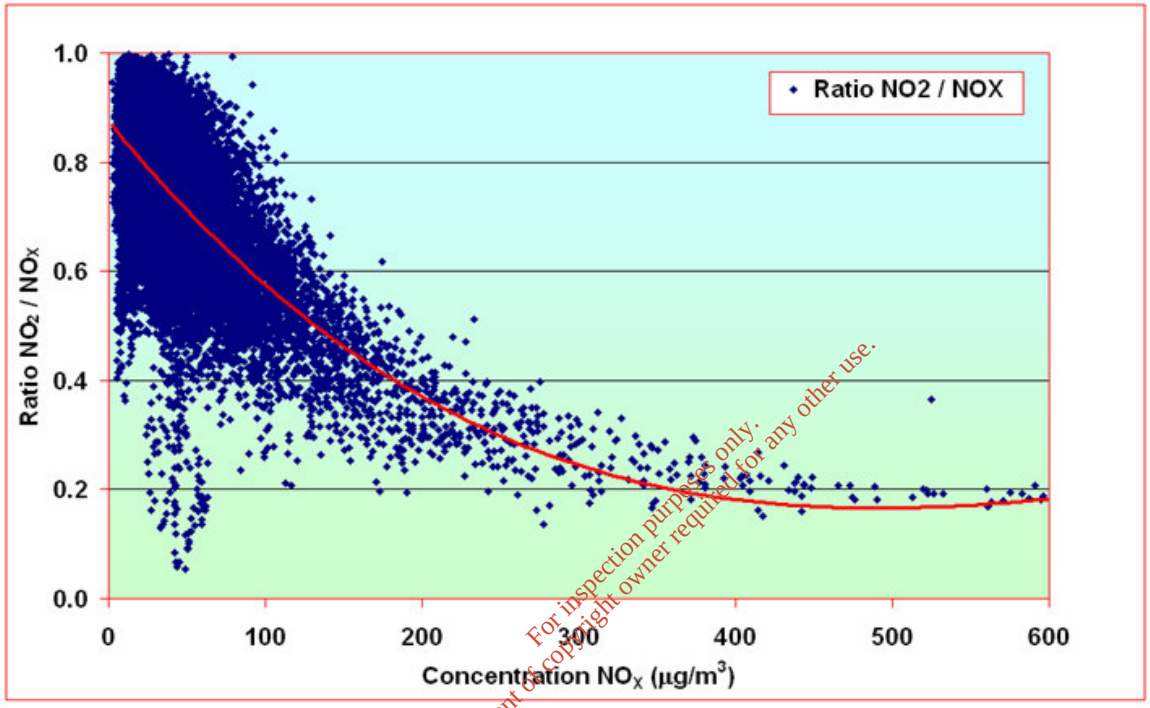
Pollutant / Scenario	Averaging Period	Process Contribution (µg/m^3)	Background Concentration (µg/m^3)(1)	Predicted Emission Concentration (µg/Nm^3)	Standard (µg/Nm^3)
NO_2 / Shoreline Fumigation & Abnormal Operation	Maximum One-Hour	178	58.0	236	No Standard
	99.8th%ile of 1-hr means(4)	142(5)	58.0	200	200(2)
SO_2 / Shoreline Fumigation & Abnormal Operation	Maximum One-Hour	1067	30	1107	No Standard
	99.7th%ile of 1-hr means	355(6)	30	385	350(2)
PM_{10} / Shoreline Fumigation & Abnormal Operation	Maximum 24-Hour	1230	29.7	1258.7	No Standard
	90th%ile of 24-hr means	0.64(7)	29.7	30.3	50(2)
	Annual Average	3.49	29.7	33.2	40(2)
HCl / Shoreline Fumigation & Abnormal Operation	Maximum One-Hour	3557	1.24	3558	No Standard
	98th%ile of 1-hr means	15.9(8)	1.24	17.1	100(3)
HF / Shoreline Fumigation & Abnormal Operation	Maximum One-Hour	53.4	0.02	53.4	No Standard
	98th%ile of 1-hr means	1.06(8)	0.02	1.1	3(3)
Cd / Shoreline Fumigation & Abnormal Operation	Annual Mean	0.006	0.001	0.007	0.005
As / Shoreline Fumigation & Abnormal Operation	Maximum 1-Hour	8.8	0.002	8.8	15
	Annual Mean	0.0023	0.001	0.0033	0.006
Ni / Shoreline Fumigation & Abnormal Operation	Maximum 1-Hour	15.8	0.002	15.8	30
	Annual Mean	0.0014	0.001	0.0015	0.020
V / Shoreline Fumigation & Abnormal Operation	Maximum 1-Hour	8.89	0.002	8.89	1.00
Cr(IV) / Shoreline Fumigation & Abnormal Operation	Maximum 1-Hour	5.4	0.002	5.4	3.0
Co / Shoreline Fumigation & Abnormal Operation	Maximum 1-Hour	17.6	0.002	17.6	6.0

(1) Includes contribution from traffic and background sources and incorporating the cumulative assessment results.
(2) Directive 1999/30/EC
(3) TA Luft Immission Standard
(4) Conversion factor, following guidance from USEPA (Tier 3 analysis), based on empirically derived site-specific maximum 1-hour value for NO_2 / NO_X of 0.20 (see Figure 1 and Appendices 1 & 2)
(5) Abnormal operation will only occur on average 8 hours every year. Therefore the relevant scenario for the 19th hour is shoreline fumigation only under maximum 100% hourly emissions.

(6) Abnormal operation will only occur on average less than 1 hour every year. Therefore the relevant scenario for the 25th hour is shoreline fumigation only under maximum 100% hourly emissions.

(7) Abnormal operation will only occur on average less than 1 hour every year whereas shoreline fumigation will occur no more than 131 hours per annum. Therefore the relevant scenario for the 90th%ile of daily means is normal dispersion only under maximum daily emissions.

(8) Abnormal operation will only occur on average less than 1 hour every year whereas shoreline fumigation will occur no more than 131 hours per annum. Therefore the relevant scenario for the 175th hour is normal dispersion only under maximum 100% hourly emissions.



Project
Poolbeg WTE – Baseline Air Monitoring

Reference
03_1744AR02

Figure 1
Ratio of NO_2 to NO_x 1-Hour Concentrations, Fixed Station, Poolbeg

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Appendix 1

SCREEN3 MODELLING RESULTS

Poolbeg WTE 30min peak

```
SIMPLE TERRAIN INPUTS:
   SOURCE TYPE          =       POINT
   EMISSION RATE (G/S)    =     61.1000
   STACK HEIGHT (M)       =    100.0000
   STK INSIDE DIAM (M)    =      3.4000
   STK EXIT VELOCITY (M/S)=     20.3000
   STK GAS EXIT TEMP (K)  =    328.1500
   AMBIENT AIR TEMP (K)   =    293.1500
   RECEPTOR HEIGHT (M)    =      1.8000
   URBAN/RURAL OPTION     =       RURAL
   BUILDING HEIGHT (M)    =     52.7300
   MIN HORIZ BLDG DIM (M) =     85.1600
   MAX HORIZ BLDG DIM (M) =    169.1400

 THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

 BUOY. FLUX =   61.360 M**4/S**3;  MOM. FLUX = 1063.916 M**4/S**2.

 *** FULL METEOROLOGY ***

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND   10. M:
   963.   175.7       1     1.0    1.2   490.5  489.54  230.69  434.46    NO


  *** INVERSION BREAK-UP FUMIGATION CALC. ***
  CONC (UG/M**3)   =    92.26
  DIST TO MAX (M)  = 13341.06

  *** SHORELINE FUMIGATION CALC. ***
  CONC (UG/M**3)   =    711.3
  DIST TO MAX (M)  =  1030.66
  DIST TO SHORE (M)=   332.00

     ****************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ****************************************

  CALCULATION       MAX CONC    DIST TO   TERRAIN
   PROCEDURE       (UG/M**3)    MAX (M)    HT (M)
--------------    -----------  -------   -------
SIMPLE TERRAIN      175.7         963.         0.

INV BREAKUP FUMI    92.26        13341.       --

SHORELINE FUMI      711.3        1031.        --
```

POOLBEG POWER STATION STACK A & B

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = POINT
EMISSION RATE (G/S) = 1.00000
STACK HEIGHT (M) = 207.0000
STK INSIDE DIAM (M) = 7.3900
STK EXIT VELOCITY (M/S)= 23.5000
STK GAS EXIT TEMP (K) = 409.0000
AMBIENT AIR TEMP (K) = 293.0000
RECEPTOR HEIGHT (M) = 1.8000
URBAN/RURAL OPTION = RURAL
BUILDING HEIGHT (M) = .0000
MIN HORIZ BLDG DIM (M) = .0000
MAX HORIZ BLDG DIM (M) = .0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 892.340 M**4/S**3; MOM. FLUX = 5401.432 M**4/S**2.

*** FULL METEOROLOGY ***

*** INVERSION BREAK-UP FUMIGATION CALC. ***
CONC (UG/M**3) = .2255
DIST TO MAX (M) = 53681.24

*** SHORELINE FUMIGATION CALC. ***
CONC (UG/M**3) = 1.227
DIST TO MAX (M) = 7152.72
DIST TO SHORE (M)= 85.00

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	.4124	1304.	0.
INV BREAKUP FUMI	.2255	53681.	--
SHORELINE FUMI	**1.227**	**7153.**	--

POOLBEG POWER PLANT CCGT 1 & 2

```
 SIMPLE TERRAIN INPUTS:
   SOURCE TYPE          =       POINT
   EMISSION RATE (G/S)    =     1.00000
   STACK HEIGHT (M)       =     75.0000
   STK INSIDE DIAM (M)    =      7.3500
   STK EXIT VELOCITY (M/S)=     26.7000
   STK GAS EXIT TEMP (K)  =    368.0000
   AMBIENT AIR TEMP (K)   =    293.0000
   RECEPTOR HEIGHT (M)    =      1.8000
   URBAN/RURAL OPTION     =       RURAL
   BUILDING HEIGHT (M)    =       .0000
   MIN HORIZ BLDG DIM (M) =       .0000
   MAX HORIZ BLDG DIM (M) =       .0000

 THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.


 BUOY. FLUX =  720.673 M**4/S**3;  MOM. FLUX = 7665.792 M**4/S**2.

 *** FULL METEOROLOGY ***

 **********************************
MAXIMUM 1-HR CONCENTRATION AT OR BEYOND   100 M:
  1200.   .5601       1     2.5    2.9   800.0  772.06  293.09  686.67    NO

  *** INVERSION BREAK-UP FUMIGATION CALC: ***
  CONC (UG/M**3)   =    .5331
  DIST TO MAX (M)  = 29732.79

  *** SHORELINE FUMIGATION CALC: ***
  CONC (UG/M**3)   =    3.322
  DIST TO MAX (M)  =  3235.31
  DIST TO SHORE (M)=   100.00

     ***********************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***********************************

  CALCULATION        MAX CONC    DIST TO   TERRAIN
   PROCEDURE        (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   -------   -------
SIMPLE TERRAIN      .5601        1200.       0.

INV BREAKUP FUMI    .5331        29733.      --

SHORELINE FUMI     3.322        3235.       --
```

SYNERGEN POWER STATION - 1 G/S

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = POINT
EMISSION RATE (G/S) = 1.00000
STACK HEIGHT (M) = 70.0000
STK INSIDE DIAM (M) = 6.5000
STK EXIT VELOCITY (M/S)= 28.3000
STK GAS EXIT TEMP (K) = 353.1500
AMBIENT AIR TEMP (K) = 293.1500
RECEPTOR HEIGHT (M) = 1.8000
URBAN/RURAL OPTION = RURAL
BUILDING HEIGHT (M) = .0000
MIN HORIZ BLDG DIM (M) = .0000
MAX HORIZ BLDG DIM (M) = .0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 498.017 M**4/S**3; MOM. FLUX = 7022.152 M**4/S**2.

*** FULL METEOROLOGY ***

*** INVERSION BREAK-UP FUMIGATION CALC. ***
CONC (UG/M**3) = .6930
DIST TO MAX (M) = 24512.56

*** SHORELINE FUMIGATION CALC. ***
CONC (UG/M**3) = 4.718
DIST TO MAX (M) = 2285.88
DIST TO SHORE (M)= 360.00

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
INV BREAKUP FUMI	.6930	24513.	--
SHORELINE FUMI	**4.718**	**2286.**	**--**

NORTH WALL POWER PLANT

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = POINT
EMISSION RATE (G/S) = 1.00000
STACK HEIGHT (M) = 67.5000
STK INSIDE DIAM (M) = 7.7900
STK EXIT VELOCITY (M/S)= 13.4000
STK GAS EXIT TEMP (K) = 473.0000
AMBIENT AIR TEMP (K) = 293.0000
RECEPTOR HEIGHT (M) = 1.8000
URBAN/RURAL OPTION = RURAL
BUILDING HEIGHT (M) = .0000
MIN HORIZ BLDG DIM (M) = .0000
MAX HORIZ BLDG DIM (M) = .0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 758.630 M**4/S**3; MOM. FLUX = 1687.450 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 100. M:
1200. .5601 1 2.5 2.9 800.0 791.69 295.30 687.62 NO

*** INVERSION BREAK-UP FUMIGATION CALC. ***
CONC (UG/M**3) = .5464
DIST TO MAX (M) = 29274.33

*** SHORELINE FUMIGATION CALC. ***
CONC (UG/M**3) = 3.570
DIST TO MAX (M) = 2926.73
DIST TO SHORE (M)= 320.00

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	.5601	1200.	0.
INV BREAKUP FUMI	.5464	29274.	--
SHORELINE FUMI	**3.570**	**2927.**	**--**

Appendix 2

DEFRA (2003) UK Local Air Quality Management - Technical Guidance

Box 6.11 - Industrial & Other Point Sources

The following procedure is provided for converting NO_X to NO_2 concentrations arising from industrial or other point sources:

Step 1 - Predict the 99.8th%ile of NO_X concentration [PNO_X].

Step 2 - Derive the annual mean background concentration of NO_2 [BNO_2]

Step 3 - Derived total oxidant concentration ((O_3 + NO_2) as NO_2) as a 99.8th%ile.

Step 4 - If [PNO_X] is less than [TO_X] then total predicted NO2 [PNO_2] = [PNO_X] + [2 X BNO_2].

Step 5 - If [PNO_X] is greater than [TO_X] then the total predicted NO_2 concentrations [PNO_2] may be assumed to be [PNO_2] = [TO_X] + [0.05 x PNO_X].

For the present case during a shoreline fumigation episode:

Step 1 - 99.8th%ile of NO_X concentration [PNO_X] = **711 µg/m^3**

Step 2 - Annual mean background concentration of NO_2 [BNO_2] = **29 µg/m^3** in 2012

Step 3 - Derived total oxidant concentration ((O_3 + NO_2) as NO_2) as a 99.8th%ile. We have on-site NO_2 data for 2004 and ozone data from the nearest EPA station for the same year. The total oxidant concentration [TO_X] as a 99.8th%ile = **134.9 µg/m^3** as NO_2.

Step 4 - If [PNO_X] is less than [TO_X] then total predicted NO2 [PNO_2] = [PNO_X] + [2 X BNO_2].

This is not the case as [PNOX] = 711 µg/m^3 whereas [TO_X] = 134.9 µg/m^3.

Step 5 - If [PNO_X] is greater than [TO_X] then the total predicted NO_2 concentrations [PNO_2] may be assumed to be [PNO_2] = [TO_X] + [0.05 x PNO_X].

This is the case. Thus

$$[PNO_2] = [TO_X] + [0.05 \times PNO_X].$$

$$[PNO_2] = 134.9 + [0.05 \times 711].$$

$[PNO_2] = 170$ µg/m^3

(i.e. Total NO_2 concentration under shoreline fumigation assuming emissions at the 100% of 30 min averages for the full year (even though it is only allowable for 3% of the time).

Ratio of NO_2:NO_X = 134.9 / 711 = 0.190

We can also repeat this exercise at an emission rate of 30.56 g/sec which is the 97% of 30 minute averages and also the daily mean. The ratio is then:

Step 1 - 99.8th%ile of NO_X concentration [PNO_X] = 355 µg/m^3

Step 2, 3, 4 as above.

Step 5 $[PNO_2] = 134.9 + [0.05 \times 355].$

$[PNO_2] = 152.7$ µg/m^3

Ratio of process NO_2: process NO_X = 134.9 / 355 = 0.38

Appendix 3

Shoreline Fumigation - Plume Volume Molar Ratio Method (Hanrahan, JAWA (1999)[17,18]

The PVMRM method better simulates the NO-to-NO_2 conversion chemistry during the plume expansion. Importantly for the present case, it is particularly well suited for the near receptor area where the maximum modelled NO_X concentrations are usually predicted.

The method uses the same chemistry as OLM (Ozone Limiting Method) but additionally uses both plume size and O_3 concentration to derive the amount of O_3 available for the reaction. The OLM ignores plume size. The full details of the methodology are given below.

NO_X moles are determined by emission rate and travel time through the plume segment. The number of O_3 moles is determined by the size of the plume segment and the measured background ambient O_3 concentration. The PVMRM method is detailed below:

1)Calculate the plume segment volume at the receptor.
2)Calculate the NO_X moles that have been released into this volume.
3)Calculate the O_3 moles contained in this volume.
4)Calculate the ration of O_3 moles to NO_X moles to get the ratio of NO_2 thereby formed.
5)Multiply this ratio by the modelled ground-level NO_X concentration.

Plume Volume Calculation At The Point Of Maximum Impact[16-17] For A 100m Stack Under Conditions Which Give Rise To Shoreline Fumigation

In the screening air dispersion modelling carried out for Poolbeg, the worst case receptor under conditions of shoreline fumigation, for the 100m stack, was approximately 1031 m inland from the stack. The weather conditions which are assumed for a fumigation episode to occur are **"F" Stability** and a **wind speed of 2.5 m/s** at the stack height is the set of conditions which give worst-case concentrations[14]. This equates to a 10m wind speed of 1.25 m/s based on F stability.

The Plume Volume calculation is based on the volume of an elliptical segment of air at the receptor. It's size is based on the Pasquell-Gifford sigmas representing dispersion in the horizontal (σ_y) and the vertical (σ_z) directions. The volume is calculated by:

$$\text{Volume} = \pi * a * b * \Delta x$$

a = radius of plume segment in the horizontal ($=n_z*\sigma_y$, where $n_z = 1.282$)
a = σ_y using Pasquill-Gifford equation for F stability at 1.031km (σ_y = 39.3m)
b = radius of plume segment in the vertical ($=n_z*\sigma_Z$, where $n_z = 1.282$)
b = σ_z using Pasquill-Gifford equation for F stability at 1.031km (σ_z = 23.1m)
Δx = plume segment thickness of the plume at the receptor (arbitrary as it will cancel out of a later equation).

$$\text{Volume} = \pi * 49.6 * 28.3 * 1$$
$$\text{Volume} = 4417\ m^3$$

Notes: σ_Z and σ_y calculated using the USEPA model SCREEN3 at a distance of 1031m.

NO_X Moles Released Into This Volume

The emission rate times the travel time that it takes for the plume to travel across the plume segment at the receptor determines the moles of NO_X in the volume. The mass within the Gaussian plume segment is:

$$\text{Moles } NO_X = [Q/MW] * \Delta x / u * A$$

Q = NO_X emissions in g/sec from stack (61.11 g/s) i.e 100% of 30 minute emissions
MW = 46g/mol

Δx = plume segment thickness at the receptor (arbitrary assumed to be 1m)
u = stack height wind speed in m/sec (worst-case of 2.5m/s)
A = area under the normal curve within $\pm n_z$ standard deviations (=80%).

In the present case:

$$\text{Moles } NO_X = [61.11/46]*1/2.5*0.80$$
$$\text{Moles } NO_X = 0.664 \text{ mols}$$

O_3 Moles Released Into This Volume

This calculation is based on measured background O_3 levels and the calculated plume segment volume. The plume segment volume is corrected for temperature and pressure (correction for P_C and T_C combined = 0.99). The number of moles of O_3 can be calculated by (assuming a background ozone concentration of 50ppb (compared with the 99.8th%ile of hourly O_3 concentrations for Rathmines in 2004 of 48 ppb)):

$$\text{Moles } O_3 = \text{Volume}*PC*TC*10^3 L/m^3*O_3 ppb/[(22.4L/mol)*10^9]$$

$$\text{Moles } O_3 = 4417*0.99*10^3 L/m^3*50/[(22.4L/mol)*10^9]$$

$$\text{Moles } O_3 = 0.0098 \text{ mols}$$

Final Calculation: Ratio O_3 Moles to NO_X Moles

The concentration is usually limited by the amount of ambient O_3 that is entrained in the plume. Thus, the ratio of the moles of O_3 to the moles of NO_X gives the ratio of NO_2/NO_X that is formed after the NO_X leaves the stack. In addition, we assume 10% of the NO_X in the stack gas is already in the form of NO_2 before the gas leaves the stack. Thus, the final equation giving the ratio of NO_2/NO_X is:

$$NO_2/NO_X = (\text{moles } O_3/ \text{ moles } NO_X) + 0.10$$
$$NO_2/NO_X = (0.0098/0.664) + 0.10$$

NO_2/NO_X = 0.114 at 61.11 g/sec NO_X

Thus a comparison between the predicted ratio of 0.11 and the ambient ratio used in the dispersion model of 0.20, indicates that the modelled ratio is conservative at the point of maximum impact.

We can also repeat this exercise at an emission rate of 30.56 g/sec which is the 97% of 30 minute averages and also the daily mean. The ratio is then:

In the present case:

$$\text{Moles } NO_X = [30.56/46]*1/2.5*0.80$$
$$\text{Moles } NO_X = 0.332 \text{ mols}$$

$$NO_2/NO_X = (\text{moles } O_3/ \text{ moles } NO_X) + 0.10$$
$$NO_2/NO_X = (0.0098/0.332) + 0.10$$

NO_2/NO_X = 0.130 at 30.56 g/sec NO_X

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ORAL HEARING INTO THE

DUBLIN WASTE TO ENERGY FACILITY

UPDATED BRIEF OF EVIDENCE

CLIMATE

DR EDWARD PORTER

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1.0 UPDATED CLIMATE BRIEF OF EVIDENCE

1.1 Waste Stream & Fossil Fraction of Waste Stream

Table 1 outlines the anthropogenic CO_2 emissions from Incineration of 600,000 tonnes of MSW.

Table 1: Anthropogenic CO_2 Emissions From Incineration of 600,000 tonnes of MSW (tonnes CO_2 eq).

Waste Type	Tonnage of Waste (based on 600,000 tonne facility)[1]	Carbon Content %C (Dry)	% Fossil Carbon	Fossil CO_2 tonne/tonne	Tonnes CO_2 eq / 600,000 Tonnes of Waste
	a	b	c	=a*b*c*44/12	
Plastics	87,600	51%[2]	100%	0.51*1.0*44/12	163,812
Textiles	41,400	50%	50%	0.50*0.50*44/12	37,950
Others	62,400	50%[3]	50%[3]	0.50*0.50*44/12	57,200
Total CO_2 Emissions					**259,539**
Total GHG Emissions					**267,483**

(1) Data from National Waste Database 2005 & Dublin Waste Management Strategy and corrected for 165,000 tonnes of organic / paper waste (90:10) which will be biologically treated.

(2) Fossil fuel fraction recommended in the UK. Retained in the recent publication by ERM for DEFRA (Dec 2006) "Carbon Balances & Energy Impacts of the Management of UK Wastes".

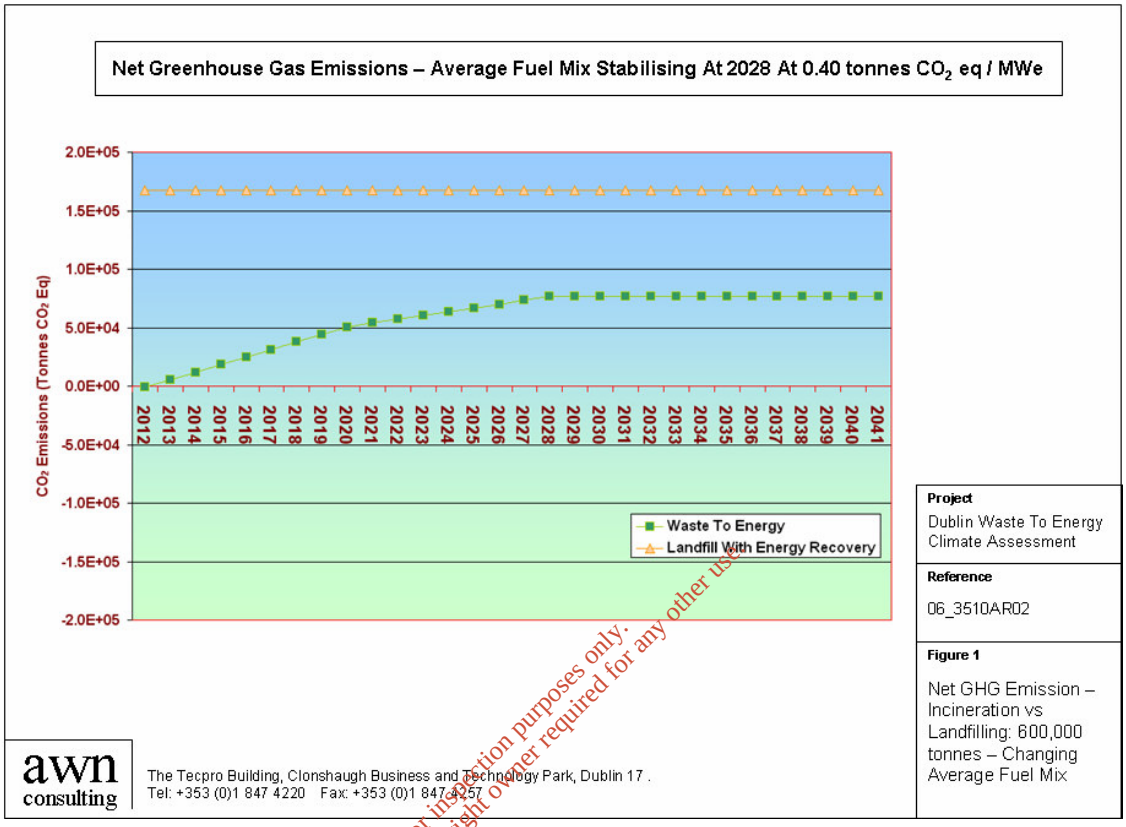
(3) In the absence of a detailed breakdown of the "Others" waste, 50% carbon fraction and 50% fossil fuel content is deemed reasonable.

Energy Generation - During the incineration of waste at the facility the thermal energy generated by the burning of waste will be recovered and will give an electrical output of about 65-66MW. As approximately 6MW is required for electrical demand within the plant, the net electrical output from the plant for export to the national grid will be 59.2MW. The plant is assumed to be in operation for 8000 hours/annum.

Fuel Displacement The displaced fuel is the 2012 average fuel mix as a starting point in the calculations and with the fuel mix decreasing up to 2028 and stabilising in this year at 0.40 tonnes CO eq / MWe which is equivalent to the emissions from a CCGT power plant. As the energy generation from landfilling and AD is much smaller, for simplicity, no adjustment in future years is made for the displaced energy from landfilling and AD. This assumption will benefit the landfill and AD options.

1.2 Net Emissions from 600,000 Tonnes of Waste: Incineration vs Landfilling

Figure 1 outlines the anthropogenic CO_2 emissions from Incineration of 600,000 tonnes of MSW compared to the landfilling of the waste (assuming 75% landfill gas capture rate).



Result - Assuming the displaced fuel is the 2012 average fuel mix as a starting point and with the fuel mix decreasing up to 2028 and stabilising in this year at 0.40 tonnes CO eq / MWe which is equivalent to the emissions from a CCGT, the time series indicates that incineration is more favourable than landfilling in all years. The results are summarised in Table 2:

Table 2: Anthropogenic CO_2 Emissions From Incineration of 600,000 tonnes of MSW vs Landfilling (tonnes CO_2 eq).

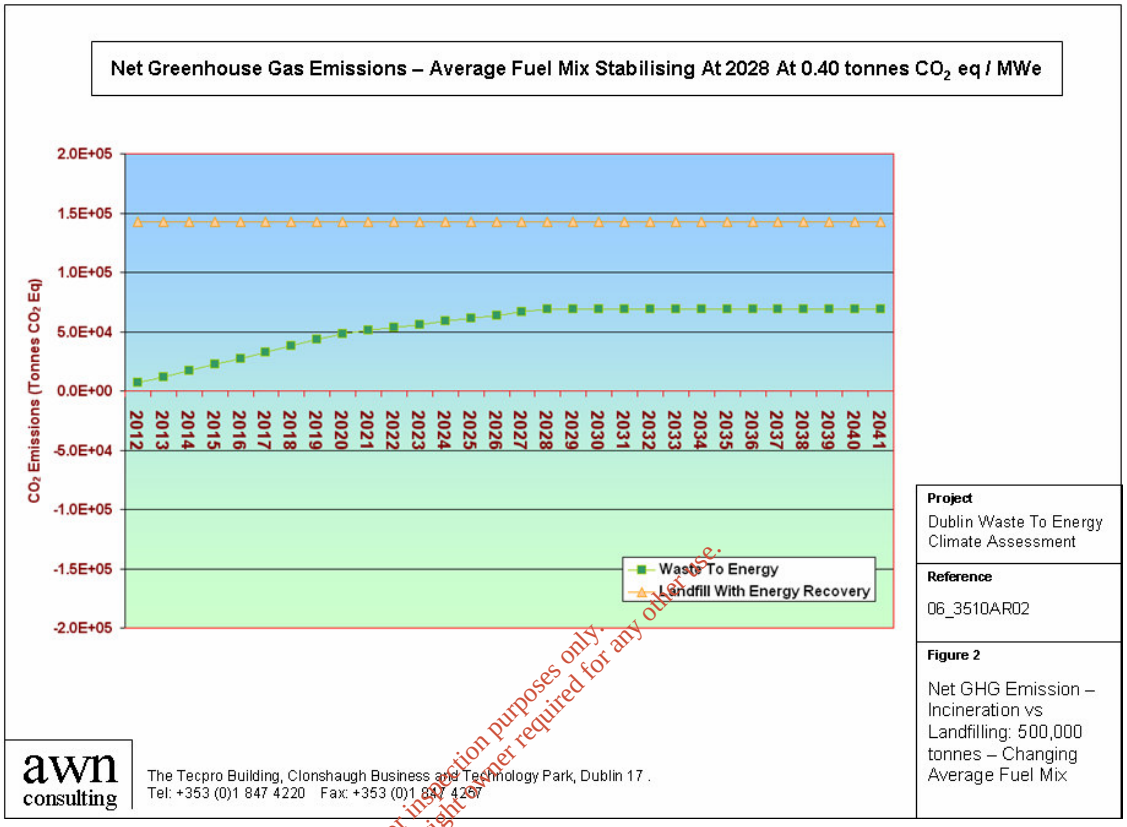
	2012	2041	Overall
Incineration	-1,048	76,599	1,741,507
Landfilling	167,367	167,367	5,021,000
Balance	-168,415	-90,767	-3,279,493
% of Kyoto Target(1)	-0.27%	-0.14%	-0.17%(2)

(1) Kyoto Target is 63.032 Mt CO2 Eq.
(2) On an annualised basis.

Summary - The results indicate that incineration is more favourable than landfilling over the lifetime of the facility by 0.17% of the Kyoto target.

1.3 Net Emissions from 500,000 Tonnes of Waste: Incineration vs Landfilling

Figure 2 outlines the anthropogenic CO_2 emissions from Incineration of 500,000 tonnes of MSW compared to the landfilling of the waste (assuming 75% landfill gas capture rate).



Result - The time series indicates that incineration is more favourable than landfilling in all years. The results are summarised in Table 3.

Table 3: Anthropogenic CO_2 Emissions From Incineration of 500,000 tonnes of MSW vs Landfilling (tonnes CO_2 eq).

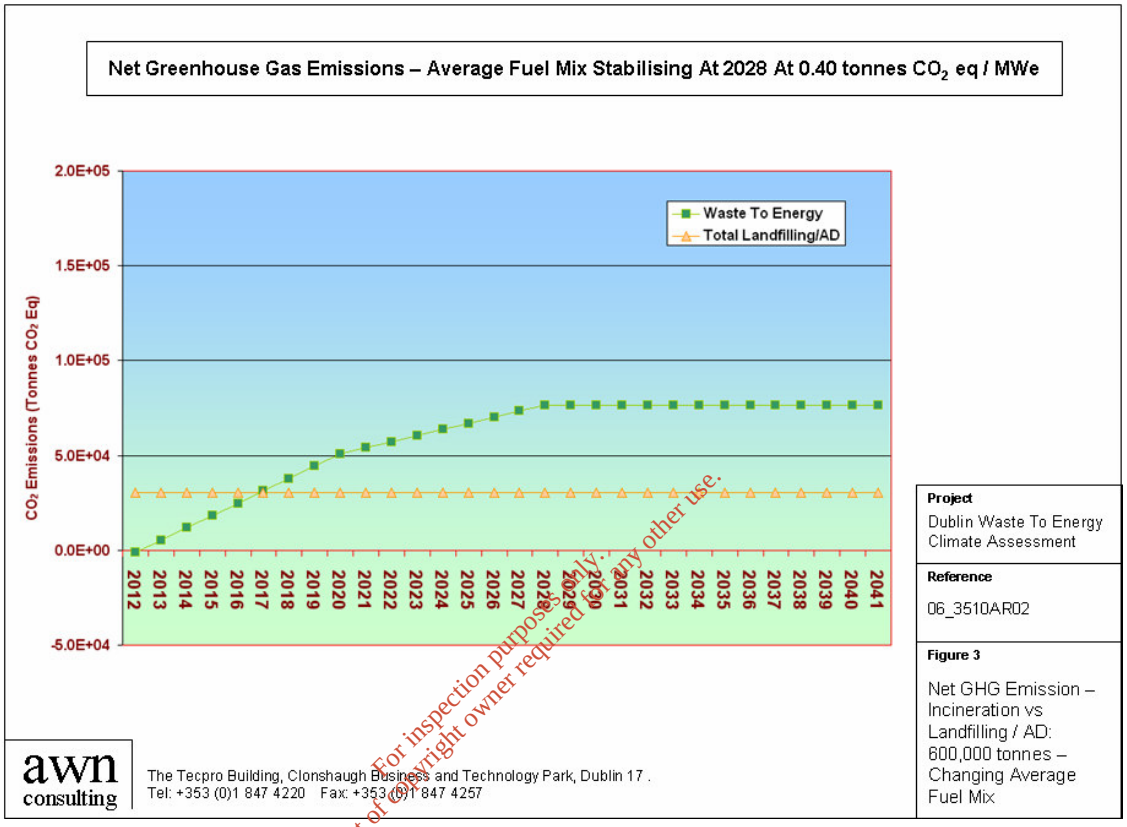
	2012	2041	Overall
Incineration	6,598	69,070	1,624,381
Landfilling	142,500	142,500	4,275,000
Balance	-135,902	-73,430	-2,650,619
% of Kyoto Target(1)	-0.22%	-0.12%	-0.14%(2)

(1) Kyoto Target is 63.032 Mt CO2 Eq.
(2) On an annualised basis.

Summary - The results indicate that incineration is more favourable than landfilling over the lifetime of the facility by 0.14% of the Kyoto target.

1.4 Net Emissions from 600,000 Tonnes of Waste: Incineration vs Landfilling With AD of Organic Waste

Figure 3 outlines the anthropogenic CO_2 emissions from Incineration of 600,000 tonnes of MSW compared to the AD of the organic waste (assumed to be 242,220 tonnes) and the landfilling of the remaining waste (assuming 75% landfill gas capture rate).



Result - The time series indicates that incineration is more favourable than landfilling with AD over the period 20012 - 2016 but by 2017, landfilling (assuming 75% landfill gas capture rate) with AD becomes more favourable. The results are summarised in Table 4:

Table 4: Anthropogenic CO_2 Emissions From Incineration of 600,000 tonnes of MSW (tonnes CO_2 eq) Compared To AD / Landfilling alternative.

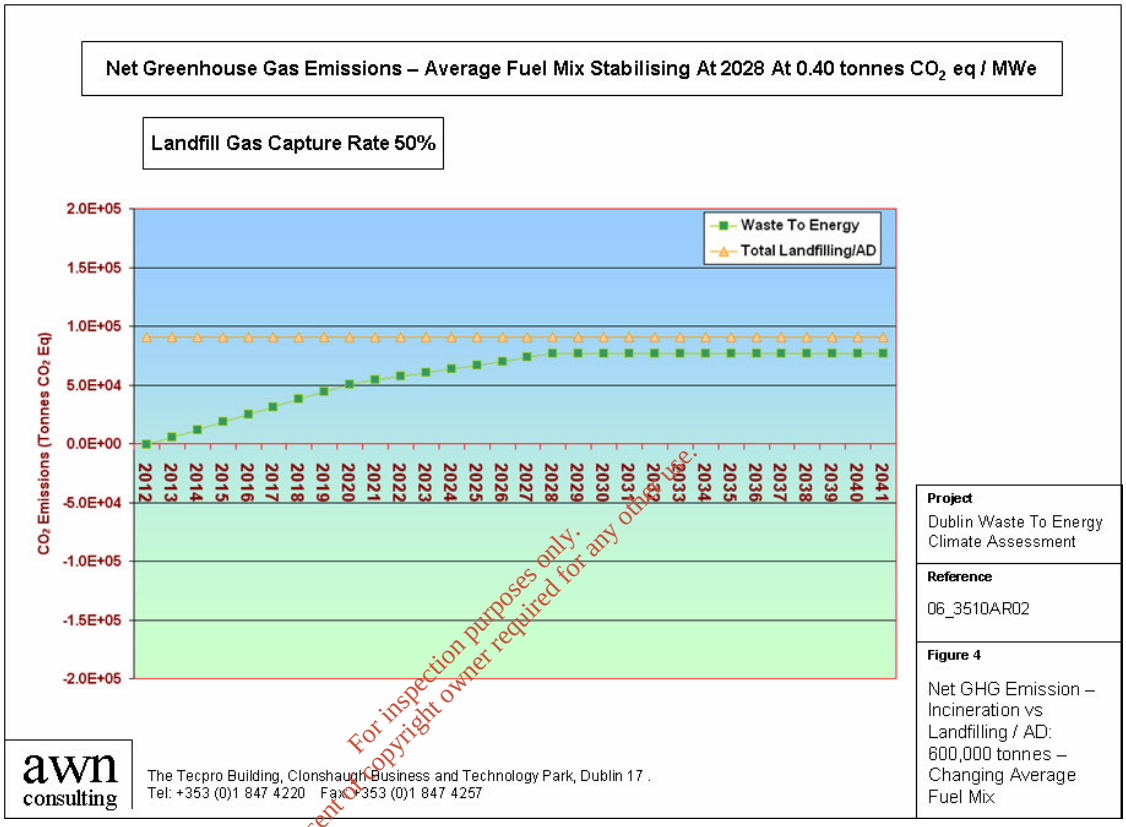
	2012	2041	Overall
Incineration	-1,048	76,599	1,741,507
Landfilling	30,214	30,214	906,431
Balance	-31,263	46,385	835,076
% of Kyoto Target(1)	-0.05%	0.07%	0.04%(2)

(1) Kyoto Target is 63.032 Mt CO2 Eq.
(2) On an annualised basis.

Summary - The results indicate that landfilling (assuming 75% landfill gas capture rate) with AD is more favourable than incineration over the lifetime of the facility by 0.04% of the Kyoto target.

1.5 Net Emissions from 600,000 Tonnes of Waste: Incineration vs Landfilling With AD of Organic Waste (50% Landfill Gas Capture Rate)

Figure 4 outlines the anthropogenic CO_2 emissions from Incineration of 600,000 tonnes of MSW compared to the AD of the organic waste (assumed to be 242,220 tonnes) and the landfilling of the remaining waste (with a landfill gas capture rate of 50%).



Result - The time series indicates that incineration is more favourable than landfilling (50% gas capture rate) with AD. The results are summarised in Table 5:

Table 5: Anthropogenic CO_2 Emissions From Incineration of 600,000 tonnes of MSW (tonnes CO_2 eq) Compared To AD / Landfilling alternative.

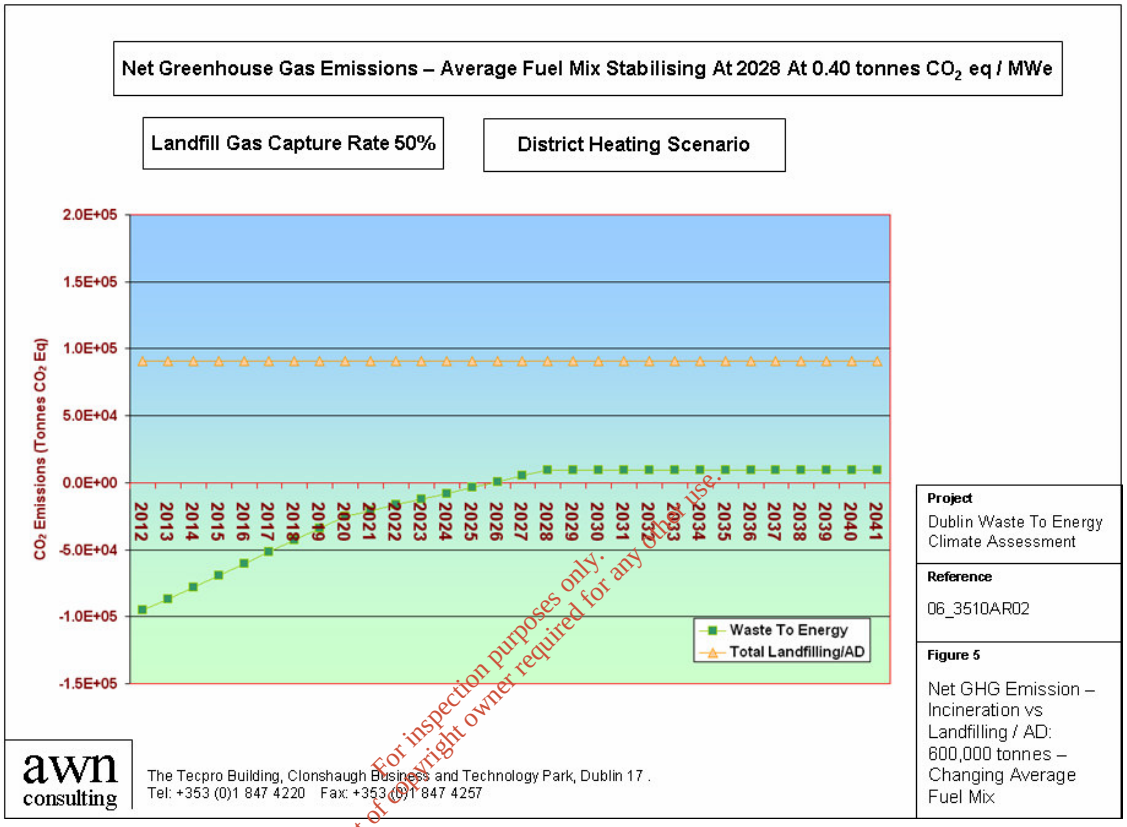
	2012	2041	Overall
Incineration	-1,048	76,599	1,741,507
Landfilling	90,681	90,681	2,720,431
Balance	-91,729	-14,082	-978,924
% of Kyoto Target(1)	-0.15%	-0.02%	-0.05%(2)

(1) Kyoto Target is 63.032 Mt CO2 Eq.
(2) On an annualised basis.

Summary - The results indicate that incineration is more favourable than landfilling (50% gas capture rate) with AD over the lifetime of the facility by 0.05% of the Kyoto target.

1.6 Net Emissions from 600,000 Tonnes of Waste: Incineration With District Heating vs Landfilling With AD of Organic Waste (50% Landfill Gas Capture Rate)

Figure 5 outlines the anthropogenic CO_2 emissions from Incineration of 600,000 tonnes of MSW (with district heating) compared to the AD of the organic waste (assumed to be 242,220 tonnes) and the landfilling of the remaining waste (with a landfill gas capture rate of 50%).



Result - The time series indicates that incineration with district heating is more favourable than landfilling (50% gas capture rate) with AD. The results are summarised in Table 6:

Table 6: Anthropogenic CO_2 Emissions From Incineration of 600,000 tonnes of MSW (with district heating) (tonnes CO_2 eq) compared To AD / Landfilling alternative.

	2012	2041	Overall
Incineration	-95,397	9,532	-466,027
Landfilling	90,681	90,681	2,720,431
Balance	-186,078	-81,149	-3,186,459
% of Kyoto Target(1)	-0.30%	-0.13%	-0.17%(2)

(1) Kyoto Target is 63.032 Mt CO2 Eq.
(2) On an annualised basis.

Summary - The results indicate that incineration with district heating is more favourable than landfilling (50% gas capture rate) with AD over the lifetime of the facility by 0.17% of the Kyoto target.

1.7 Summary

Using the 2006 IPCC methodology rules[1] (as shown in Appendix 1), incineration of waste at the Dublin WTE facility is a better climatic option than the alternative landfilling of this waste. The incineration of waste at the Dublin WTE facility is also a better option than AD with the remaining waste landfilled using a realistic landfill gas capture rate of 50% which is a rate more typical of the real world[1,2]. The incineration of waste at the Dublin WTE facility becomes even more favourable when district heating is taken into account.

In summary, incineration of mixed MSW is a more favourable option from a climate perspective, under the IPCC rules, both currently and into the foreseeable future than either landfilling alone or the option of landfilling of inert material with the AD of biogenic material.

1.8 REFERENCES

(1) IPCC 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006)
(2) Eunomia Consulting A Changing Climate For Energy From Waste? (2006)

Appendix 1

IPCC Guidelines For National Greenhouse Gas Inventories

The Intergovernmental Panel on Climate Change (IPCC) has recently published updated detailed guidelines on compiling National Greenhouse Gas Inventories. The guidelines are designed to estimate and report on national inventories of anthropogenic greenhouse gas emissions and removals in order to ensure compliance with the Kyoto Protocol. Anthropogenic refers to greenhouse gas emissions and removals that are a direct result of human activities or are a result of natural processes that have been affected by human activities[(1)]. The quantity of carbon from natural cycles through the earth's atmosphere, waters, soils and biota is much greater than the quantity added by anthropogenic GHG sources. However, the focus of the UNFCCC and the IPCC is on anthropogenic emissions because it is these emissions that have the potential to alter the climate by disrupting the natural balances in carbon's biogeochemical cycle, and altering the atmosphere's heat-trapping ability. The carbon from biogenic sources such as paper and food waste was originally removed from the atmosphere by photosynthesis, and under natural conditions, it would eventually cycle back to the atmosphere as CO_2 due to degradation processes. Thus, these sources of carbon are not considered anthropogenic sources and do not contribute to emission totals considered in the Kyoto Protocol[(1)].

In relation to solid waste disposal sites (SWDSs) including municipal landfills, detailed guidelines have been outlined for the calculation of GHG emissions[(1)]. The main GHG emission from SWDSs is methane. Even though the source of carbon is primarily biogenic, CH_4 would not be emitted were it not for the human activity of landfilling the waste, which creates anaerobic conditions conducive to CH_4 formation. Although CO_2 is also produced in substantial amounts, the primary source of CO_2 derives from the decomposition of organic material derived from biomass sources (crops, forests) which are re-grown on an annual basis. Hence, these CO_2 emissions are not treated as net emissions from waste in the IPCC Methodology[(1)].

Similarly, in relation to incineration, a large fraction of the carbon in waste combusted (paper, food waste) is derived from biomass raw materials which are replaced by re-growth on an annual basis. Thus, these emissions should not be considered as net anthropogenic CO_2 emissions in the IPCC Methodology[(1)]. On the other hand, some carbon in waste is in the form of plastics or other products based on fossil fuel. Combustion of these products, like fossil fuel combustion, releases net CO_2 emissions. Thus, in estimating emissions from waste incineration, the desired approach is to separate carbon in the incinerated waste into biomass and fossil fuel based fractions and thereafter to use only the fossil fuel fraction in calculating net carbon emissions[(1)]. Other relevant gases released from combustion are net GHG emissions including CH_4 and N_2O.

Greenhouse gases have different efficiencies in retaining solar energy in the atmosphere and different lifetimes in the atmosphere. In order to compare different greenhouse gases, emissions are calculated on the basis of their Global Warming Potential (GWPs) over a 100-year period, giving a measure of their relative heating effect in the atmosphere. The GWP100 for CO_2 is the basic unit (GWP = 1) whereas CH_4 has a global warming potential equivalent to 21 units of CO_2 and N_2O has a GWP100 of 310. Thus the issue of the lifetime of gases in the atmosphere has already been taken into account in the calculation of the GWP100.

In line with IPCC methodology, all greenhouse gas fluxes are treated as though they take place instantaneously. Although landfill emissions occur over decades the total emissions are what is important so the phasing of emissions within the 100-year time horizon can be ignored[(1)].

IN THE MATTER OF THE PLANNING AND DEVELOPMENT ACTS, 2000 TO 2006

AND IN THE MATTER OF AN APPLICATION BY DUBLIN CITY COUNCIL PURSUANT TO SECTIONS 226 AND 175 OF THE PLANNING AND DEVELOPMENT ACT, 2000

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AND IN THE MATTER OF THE LOCAL GOVERNMENT (NO. 2) ACT, 1960

AND IN THE MATTER OF THE HOUSING ACT, 1966

AND IN THE MATTER OF THE PIGEON HOUSE ROAD / SHELLYBANKS ROAD AREA COMPULSORY PURCHASE (WASTE MANAGEMENT FACILITY) ORDER, 2002

—

CLOSING SUBMISSIONS ON BEHALF OF DUBLIN CITY COUNCIL

Introduction

1. In these closing submissions on behalf of Dublin City Council (hereinafter "the Council") it is intended to provide an overview of the procedures that have led to this oral hearing, in the hope that this will assist the Inspector appointed by An Bord Pleanála (hereinafter "the Board") in his task of making a recommendation to the Board. It is not proposed to attempt to revisit in detail the evidence that has been adduced. Rather, it is intended to set the evidence in its legislative context; to outline the main legal principles which, it is respectfully submitted, ought to be applied; to consider certain issues where there has been significant controversy; and to address the queries of a legal nature raised by the Inspector in the course of the hearing.

Procedure

2. This is a conjoined application to the Board, for confirmation of a compulsory purchase order, namely the Pigeon House Road / Shellybanks Road Area Compulsory Purchase (Waste Management Facility) Order, 2002 (hereinafter "the CPO"), and for approval of the proposed development that is the underlying reason for the making of the CPO. That proposed development is the development by the Council, on its own behalf and on behalf of the three other local authorities in the Dublin region,[1] of a Waste to Energy ("WTE") facility on the Poolbeg Peninsula, Dublin 4.

3. It should be noted that the Council has also made an application to the Environmental Protection Agency (hereinafter "the Agency") for a waste licence to operate the proposed WTE facility.[2] No decision has yet been made in respect of this application. It will also be necessary to apply to the Commission for Energy Regulation for permission to link the facility to the national grid.[3] In this connection, the Council accepts that it will be required to comply with the legislation as in force when that application is made. Specifically, the Council will have to apply to the Board for approval under section 182A of the Planning and Development Act, 2000, as inserted by section 4 of the Planning and Development (Strategic Infrastructure) Act, 2006. It is not likely that this application will require a further EIS, since the particular development in question does not appear to be identified for the purposes of section 176 of the Act of 2000.

Application for approval of proposed development

4. Turning first to the application for approval, certain elements of the proposed development (specifically the pumphouse and cooling water system) are located on the foreshore. Section 226 of the Planning and Development Act, 2000 provides that where development is proposed to be carried out wholly or partly on the foreshore by a local authority that is a planning authority, the

[1] Dún Laoghaire – Rathdown County Council; Fingal County Council; and South Dublin County Council.
[2] This application was made on 10 July 2006 (EPA Reg. No. W0232-01).
[3] EIS, §1.1.1, §2.5.5.

authority must apply to the Board for approval of the proposed development. Hence the instant application.

5. The proposed development is also of a class that requires environmental impact assessment ("EIA") within the meaning of Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment (hereinafter "the EIA Directive").[4] The EIA Directive is implemented in Ireland by (*inter alia*) the Act of 2000 and the regulations made thereunder.

6. Section 175 of the Act of 2000 requires an Environmental Impact Statement ("EIS") to be prepared in respect of development belonging to a class identified for the purpose of section 176 of the Act, which a local authority that is a planning authority proposes to carry out. It also provides that such development shall not be carried out unless the approval of the Board is obtained, although in the case of development that is carried out partly on the foreshore, this approval is given under section 226 rather than section 175.

7. Section 226(3) of the Act of 2000 provides that section 175 applies (subject to certain modifications) to proposed development (*i.e.* development wholly or partly on the foreshore) that belongs to a class of development identified for the purpose of section 176.

8. Article 93 of the Planning and Development Regulations, 2001[5] prescribes the development identified for the purpose of section 176 of the Act of 2000 as that falling within the classes set out in Schedule 5 to the Regulations. The proposed development with which the Board is concerned falls within paragraph 10 of Schedule 5.[6]

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[4] As amended by Council Directive 97/11/EC of 3 March 1997 and Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003. See Article 4(1) and Annex I, paragraph 10: "*Waste disposal installations for the incineration or chemical treatment as defined in Annex IIA to Directive 75/442/EEC under heading D9 of non-hazardous waste with a capacity exceeding 100 tonnes per day.*"

[5] S.I. No. 600 of 2001. Article 93 falls within Part 10 of the Regulations, which is amended in parts by the Planning and Development Regulations, 2006 (S.I. No. 685 of 2006). The Regulations of 2006 came fully into force only on 31 March 2007.

[6] This class is the same as paragraph 10 of Annex I to the EIA Directive (as amended); see above, n. 4.

9. An EIS has been submitted to the Board, comprising three volumes. Certain additional information has also been submitted to the Board as part of the assessment process. Where appropriate, this additional information has been advertised pursuant to directions of the Board. In addition, the hearing has been adjourned to allow members of the public to consider and evaluate evidence adduced by the Council in response to objections.

The CPO

10. Section 227 of the Act of 2000 makes provision for the acquisition by a local authority of land comprising part of the foreshore adjoining its functional area. However, in the instant case the Council does not propose to acquire foreshore land under the CPO, so this section does not apply. Rather, if the approval for the proposed development is granted, the Council proposes to apply to the Minister for the Marine and Natural Resources for a lease or licence over those (relatively small) sections of land upon the foreshore that will be required. Negotiations have already been opened in this regard. This issue is revisited below.

11. The application for confirmation of the CPO therefore comes before the Board pursuant to section 76 of the Housing Act, 1966 and the Third Schedule thereto, as amended by the Planning and Development Act, 2000 (section 214 of which transfers ministerial functions in relation to the confirmation of compulsory purchase orders to the Board, and section 218 of which requires the Board to hold an oral hearing where before the Minister would have been required to hold a public local inquiry). In the instant case, because landowners affected by the CPO have objected, the holding of an oral hearing became mandatory.

12. Section 220 of the Act of 2000 encourages the Board to deal in parallel with an application for confirmation of a CPO and an application for approval of development where the CPO is for the purpose of effecting development that is required to comply with section 175 or any other statutory provision to comply with procedures for giving effect to the EIA Directive. It follows that

it is quite appropriate that an oral hearing should have been convened to deal with both applications.

13. The CPO itself was made on 25 July 2002, pursuant to powers conferred on the applicant local authority by section 10 of the Local Government (No. 2) Act, 1960 (as substituted by section 86 of the Housing Act, 1966), section 76 of the Housing Act, 1966, and the Planning and Development Act, 2000. From the outset, the Council requested the Board to defer confirmation of the CPO until after the submission of the EIS.[7]

14. Although it is possible to distinguish between the application for confirmation of the CPO and the application for development approval for certain purposes, a watertight division cannot be maintained. Section 220(1) of the Act of 2000 provides that:

> "*The person holding an oral hearing in relation to the compulsory acquisition of land, which relates wholly or in part to proposed development by a local authority which is required to comply with section 175 or any other statutory provision to comply with procedures for giving effect to the Council Directive, shall be entitled to hear evidence in relation to the likely effects on the environment of such development.*"

It seems to follow that the Board, in reaching its decision on whether or not to approve the CPO, is entitled to take into account evidence relating to the likely effects on the environment of the proposed development that constitutes the reason for the making of the CPO. Indeed, from the perspective of the Council, the two applications are inextricably linked. The development approval is inoperable without the compulsory purchase confirmation, and the CPO is redundant in the absence of development approval.

Adequacy of description on face of the CPO

15. The CPO was made for the stated purpose of "*the provision of a waste management facility*". The Inspector has raised the question of whether or not

[7] Brief of Evidence of John Murphy, p. 1.

this description is adequate. It is submitted that it is, for the following reasons.

16. Section 213(1) of the Act of 2000 requires that the power conferred on a local authority under any enactment to acquire land shall be construed in accordance with that section. Section 213(2)(a) goes on to provide that:

> "*A local authority may, for the purposes of performing any of its functions (whether conferred by or under this Act, or any other enactment passed before or after the passing of this Act), including giving effect to or facilitating the implementation of its development plan… do all or any of the following:*
>
> *(i) acquire land, permanently or temporarily, by agreement or compulsorily…*"

17. Section 38(1) of the Waste Management Act, 1996 provides that:

> "*A local authority shall provide and operate, or arrange for the provision and operation of, such facilities as may be necessary for the recovery and disposal of household waste arising within its functional area.*"

18. It follows from this that it is a statutory function of the Council to provide facilities for the recovery and disposal of household waste. It may also be observed that section 22(12) of the Act of 1996 provides that:

> "*A local authority shall take such steps as are appropriate and necessary to attain in relation to its functional area the objectives in a waste management plan made by the authority (whether such plan has been made by the authority or jointly by the authority with another local authority or other local authorities).*"

19. As the evidence has shown, it was also an objective of the Dublin Waste Management Plan, 1998 that there should be thermal treatment of waste.[8]

[8] See p. 6, and p. 90 (paragraph 13.4).

There can be no doubt but that the Council made the CPO in the proper exercise of one of its statutory functions.

20. The courts have consistently held that it is not necessary for a compulsory purchase order to bear on its face an elaborate statement of the purpose for which it is made. In *Clinton v. An Bord Pleanála* [2005] IEHC 54; [2007] IESC 19 the High Court and the Supreme Court upheld a compulsory purchase order that was stated on its face to be made for "*development purposes*". Even though it is difficult to imagine a broader statement of purpose, the Supreme Court held that no substantive objection could be raised. Geoghegan J. (who delivered the judgment of the Court) said: "*In reality in this case, the appellant, at all material times, well knew the purpose which the council was asserting*", specifically the regeneration of O'Connell Street in Dublin.

21. The *Clinton* case appears to establish two propositions. The first is that a very broad statement of purpose on the face of a compulsory purchase order is not itself objectionable, provided it corresponds substantially to a statutory purpose of the acquiring authority. The second is that, in deciding whether or not the purpose of a compulsory purchase order is adequately elucidated, the Board should take into account the evidence and information presented to the oral hearing. In the instant case, the specific proposals for the use of the site are set forth and explained in great detail in the EIS that accompanies the application, and have been further explained in the course of this oral hearing. These proposals are four-square within and fully consistent with the statutory purpose invoked on the face of the CPO. No landowner affected by the CPO can be in any doubt as to what the purpose of the compulsory acquisition is. It is, therefore, respectfully submitted, that the statement of purpose on the face of the CPO is no impediment to the Board confirming the order.

Areas not included in the CPO

22. There are three areas affected by the application for development approval that are not included in the CPO. These are: (i) the area to the south of the site of the proposed WTE facility designated on the plans submitted to the Board as a

construction and storage compound; (ii) the area of the foreshore through which the cooling water intake is proposed to run, and upon which the proposed pumphouse will be located; and (iii) another area of the foreshore and the Pigeon House Road, over which it is proposed to run pipes. The third area is of no concern, because the Council is already the owner. However, the Inspector has raised queries concerning the other two areas.

23. The area to the south of the site of the proposed facility is in the ownership of Dublin Port Company. Mr. Matt Twomey gave evidence to the hearing[9] that he had had discussions with the Chief Executive Officer of the Company. The Chief Executive had said that if the CPO were confirmed, the Company would deal with the Council in the normal commercial way in relation to the grant of a short term lease. Mr. Twomey also noted that the same land had previously been leased to the Council.

24. It may be noted that it is not proposed to locate any permanent part of the facility on these lands. They are required only during the construction phase, for the storage of materials and for other construction related reasons. In this connection, there is no requirement in relation to a normal application for planning permission that the applicant should enjoy a legal interest (or even consent from the landowner) in relation to land that he does not propose to develop, but to which he may require access in order to carry out development on his own lands. For example, in a tight urban site, where it is proposed to build a wall hard up to the boundary of the site, it may be necessary for an applicant for permission to obtain the consent of the neighbouring landowner to enter upon his land for the purpose of constructing or rendering the wall. However, it would not be necessary for the applicant to demonstrate any interest in the neighbouring property. The grant of planning permission does not entitle him to enter upon that property; that will be a matter for private bargaining with the neighbouring landowner, and the planning authorities and the Board quite properly do not concern themselves with such matters. The same approach should be taken here.

[9] Day 3.

25. In relation to the foreshore, the intention of the Council is not to seek to acquire the necessary lands compulsorily, but rather to apply for a foreshore lease or licence. In this connection, sections 226 and 227 of the Act of 2000 have been heavily amended by sections 43 and 44 respectively of the Planning and Development (Strategic Infrastructure) Act, 2006. Section 227(8) formerly provided that: "*The Foreshore Acts, 1933 to 1998, shall not apply in relation to any application to the Board under section 226*". However, this has been modified by section 44 of the Act of 2006 and subsection (8) now provides:

> "*(8)(a) Subject to paragraph (b), the Foreshore Acts 1933 to 2005 shall not apply in relation to any application to the Board under section 226…*
>
> *(b) In any case where a local authority that is a planning authority applies for an approval for proposed development under section 226 or has been granted such an approval by the Board, but has not sought the compulsory acquisition of any foreshore on which the proposed development would be carried out under an enactment specified in section 214, the authority may apply for a lease or licence under section 2 or 3 of the Foreshore Act 1933 in respect of that proposed development; in such cases, it shall not, notwithstanding the provisions of any other enactment, be necessary for—*
>
> *(i) the local authority to submit an environmental impact statement in connection with its application for such lease or licence, or*
>
> *(ii) the Minister for Communications, Marine and Natural Resources to consider the likely effects on the environment of the proposed development.*"

26. This is precisely the position that obtains here. Although the Council seeks approval from the Board for development which, it is proposed, will take place partly on the foreshore, that foreshore land is not included in the CPO.

If approval is granted and the CPO is confirmed, the Council will seek a foreshore lease or licence in order to allow it to carry out the development.

27. More broadly, it is respectfully submitted that it is not relevant to the issues that must be considered by the Board that the Council has not yet acquired (and is not at this time seeking confirmation for the compulsory acquisition of) legal interests in these two areas.

28. This is not, of course, an application for planning permission in the normal sense, and it is submitted in the first instance that an application from a local authority possessing powers of compulsory purchase stands on a different footing from an application for planning permission made by a private person who does not enjoy such powers. If the Board were to approve the proposed development and it proved impossible to agree upon commercial terms with Dublin Port Company for the lease of the lands to the south, it would always be open to the Council as a last resort to exercise its compulsory purchase powers. To this extent, the decision to forego the use of those powers is in ease of, rather than an imposition upon, the current landowner. However, even if the same principles that apply to an application for planning permission apply here, it is submitted that the application for approval is still perfectly valid.

29. At the outset, it should be noted that the Planning and Development Act, 2000 does not contain any express requirement that an applicant for planning permission should enjoy any interest in the land the subject of the application. Indeed, the legislation seems to envisage an application being made by a person who is not so interested, since section 33(2)(g) provides that the Minister may make regulations requiring applicants to submit further information with respect to their applications, including "*any information as to any estate or interest in or right over land*". Although article 22(1)(d) of the Regulations of 2001 does seem to suggest that an applicant should have some sort of interest, it is well settled that the Act cannot be interpreted by reference to the Regulations made under its auspices. To do so would be to put the cart before the horse (*Lawson v. Fox* [1974] A.C. 803 at 809 *per* Lord

Diplock; approved in *Frescati Estates Ltd v. Walker* [1975] I.R. 177 at 187-188).

30. It is the decision of the Supreme Court in *Frescati Estates Ltd v. Walker* [1975] I.R. 177 that has been interpreted as requiring that an application for planning permission must be made by or with the approval of a person with sufficient interest in the subject lands to allow the proposed development to be carried out.

31. The *Frescati Estates* case arose out of a rather extreme factual scenario. The plaintiff owned certain lands and had been refused permission for development, which would have involved the demolition of an historic structure. A claim for compensation was made on foot of this refusal and the planning authority sought to avoid liability by giving the plaintiff an undertaking to grant permission for development, subject to certain conditions. The defendant was a conservationist who was alarmed at the prospect that the structure might be demolished. Despite having no interest, or hope of acquiring any interest in the land, and no intention to develop it, she applied for outline permission for development of a kind quite at odds with that contemplated by the plaintiff. This application was made as part of a campaign to prevent the plaintiff from developing the land, with a view to restraining the plaintiff from carrying out any development inconsistent with her outline permission. That outline permission was granted by the planning authority and the plaintiff, in tandem with bringing an appeal, sought to restrain the defendant from persisting with her application, on the grounds that it was a nullity.

32. In the Supreme Court it was argued on behalf of the defendant that there was no limit to the class of persons who might validly make an application for planning permission. This was rejected by Henchy J. (who delivered the judgment of the Court). The critical passage in his judgment was as follows.

> "*To sum up, while the intention of the Act is that persons with no legal interest (such as would-be purchasers) may apply for development permission, the operation of the Act within the scope of its objects and*

the limits of constitutional requirements would be exceeded if the word 'applicant' in the relevant sections is not given a restricted connotation. The extent of that restriction must be determined by the need to avoid unnecessary or vexatious applications, with consequent intrusions into property rights and demands on the statutory functions of planning authorities beyond what could reasonably be said to be required, in the interests of the common good, for proper planning and development.

Applying that criterion, I consider that an application for development permission, to be valid, must be made either by or with the approval of a person who is able to assert sufficient legal estate or interest to enable him to carry out the proposed development, or so much of the proposed development as relates to the property in question. There will thus be sufficient privity between the applicant (if he is not a person entitled) and the person entitled to enable the applicant to be treated, for practical purposes, as a person entitled."

33. On this basis it was held that the defendant's application was void and should not have been entertained by the planning authority. The Court's conclusion was stated in broad terms, but it must be understood in its context. In particular, it is notable that the principle on which Henchy J. founded his judgment was that a statute should not be construed in such a way as to allow persons generally rights in respect of another's property (such as the right to apply for planning permission) in order to gratify "*an idle or perverse whim*" (at 187).

34. Although the *Frescati Estates* case has not been explicitly overruled, there have been more recent developments in the area. In *Schwestermann v. An Bord Pleanála* [1994] 3 I.R. 437; [1995] 1 I.L.R.M. 301 O'Hanlon J. reviewed a number of authorities in which a more flexible approach to the question of sufficient interest was demonstrated (see also *Frank Dunne Ltd v. Dublin County Council* [1974] I.R. 45 at 50; *Scott v. An Bord Pleanála* [1995] 1 I.L.R.M. 424 at 429). In *Grange Developments Ltd v. Dublin County Council*

(No. 2) [1989] I.R. 296 Murphy J. commented, in part of a passage approved by O'Hanlon J., that:

> "*The only purpose of inferring any restriction on the range of persons by whom an application for permission may be sought is to prevent an abuse of the planning procedures by persons who have neither an interest in the property or any prospect of obtaining it.*"

35. However, the most important decision in point is that of the Supreme Court in *Keane v. An Bord Pleanála* [1998] 2 I.L.R.M. 241. It concerned a grant of planning permission to the Commissioners of Irish Lights for the construction of a radio mast. In other proceedings it was held that the Commissioners lacked the power to erect such a structure, and the question for determination by the Supreme Court was whether a planning application could validly be made in respect of development which the applicant was incapable of carrying out. The applicants, who were seeking to challenge the grant of planning permission, drew an analogy with the position in *Frescati Estates*.

36. Keane J. (as he then was) delivered the judgment of the Court. He rejected the applicants' arguments and in the course of so doing made certain comments which cast doubt on the continued authority of the *Frescati Estates* decision, which he said must be understood in the context of its particular facts (at 247). He stated (at 246-247):

> "*In many cases, including the present, a person who has been granted planning permission will be unable to proceed with the development until he has obtained a relevant permission. This may arise either as a matter of public law or private law… Where the land is leasehold, there may be covenants affecting the proposed development which may require the consent of the lessor to be obtained.*
>
> *The fact that such permissions or consents may be required before the development may lawfully commence does not preclude the planning authority, or An Bord Pleanála, from granting the permission, provided all the relevant requirements of the planning legislation are met.*" (emphasis added)

37. Having quoted the critical passage from the judgment of Henchy J. in *Frescati Estates* (set out above), Keane J. commented at follows (at 248-249).

> "*It may be that the ratio of this decision is to be found in the first paragraph of this passage and that the second paragraph, to the extent that it suggests that an application for planning permission can only be made by or with the consent of a person entitled to a legal estate or interest sufficient to enable him to carry out the proposed development, should properly be regarded as obiter. One could readily envisage circumstances in which an application could be made by some other person which could not possibly be described as either 'unnecessary' or 'vexatious'.*"

38. It must be conceded that Keane J.'s comments on the wider issue were themselves probably *obiter*. However, they show that the courts, and in particular the Supreme Court, is now willing to take a more flexible approach to the requirement of sufficient interest. It seems that Keane J. would be prepared to permit a planning authority (or An Bord Pleanála) to adjudicate on a planning application provided the same was neither "*unnecessary*" nor "*vexatious*". This is a less rigid standard than that suggested by Henchy J., which could conceivably be satisfied by applications in respect of which the consent mentioned in *Frescati Estates* is absent.

39. The decision in *Keane v. An Bord Pleanála* has proved to be influential[10] and represents, it is submitted, both good sense and good law. For this reason, it is respectfully submitted that it is not relevant to the Board's deliberations that the Council has not sought to acquire all the land that it proposes to use during the construction phase, and on which it proposes to locate part of the development.

Environmental Impact Assessment

40. Several objectors have repeatedly criticised the proposal before the Board on the basis that there is insufficient detail to allow the Board to satisfy itself that

[10] See *Boyne Valley & Newgrange Environmental Protection League Ltd v. Environmental Protection Agency* [2002] IEHC 24; [2002] W.J.S.C.-H.C. 1173.

the proposed development will not give rise to significant adverse environmental effects, and will not be inconsistent with the proper planning and sustainable development of the area. It is respectfully submitted that these criticisms are misplaced.

41. This objection can take two forms: a technical objection to the effect that the Council has failed to submit some essential document or information, and a more substantive objection, the gist of which is that the Board does not have enough information to allow it to grant approval with confidence. Neither form is well founded in this case.

42. Dealing first with the formal objection, it has already been noted that this is not an application for planning permission under Part III of the Planning and Development Act, 2000. The provisions of Part IV of the Planning and Development Regulations, 2001 are not, therefore, applicable to this application. As the estimated cost of the proposed development is more than €126,000, it falls within paragraph (k) of article 80 of the Regulations of 2001 and, as such, is *prima facie* prescribed for the purpose of section 179 of the Act of 2000, which is concerned with local authority own development. However, it section 179(6)(d) provides that the section does not apply to "*development in respect of which an environmental impact statement is required under section 175 or under any other enactment*". Since the proposed WTE facility is development in respect of which an environmental impact statement is required, it seems to follow that the requirements of Part 8 of the Regulations of 2001 (which includes article 80) do not apply.

43. As Prof. Scannell has commented in her leading work:

> "*An application for approval under section 175, although somewhat similar to an application for planning permission, is not a planning application. Local authority projects tend to be larger than most private sector projects and applications for approvals are not, and cannot usually be, as detailed.*"[11]

[11] Scannell, *Environmental and Land Use Law* (Thomson Round Hall, 2006), para. 5-147.

44. Chapter 4 of Part 10 of the Regulations of 2001 is concerned with the Environmental Impact Assessment of local authority own development. Article 118 requires the local authority to send to the Board, together with three copies of the EIS, three copies of "*the plans and particulars of the proposed development*". There is no indication in the Regulations of what those plans and particulars must include. By inference from the requirements of section 175 of the Act of 2000, the information submitted to the Board must be sufficient to allow it to evaluate: "*(i) the likely effects on the environment of the proposed development, and (ii) the likely consequences for proper planning and sustainable development in the area in which it is proposed to situate the said development of such development*".[12] There can be no hard and fast rule as to the level of information that will satisfy this requirement in different cases.

45. It is not a requirement of Irish or EU legislation that the proposal for which approval is sought must be final and complete in every detail. The Sixth recital of the EIA Directive provides that:

> "*…development consent for public and private projects which are likely to have significant effects on the environment should be granted only after prior assessment of the likely significant environmental effects of these projects has been carried out; whereas this assessment must be conducted on the basis of the appropriate information supplied by the developer…*"

46. Article 5(3) of the EIA Directive prescribes the minimum information to be provided by the developer. It is transposed in Schedule 6, paragraph 1 of the Regulations of 2001, which requires the developer to submit:

> "*(a) A description of the proposed development comprising information on the site, design and size of the proposed development.*
>
> *(b) A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.*

[12] PDA 2000, s. 175(6).

(c) The data required to identify and assess the main effects which the proposed development is likely to have on the environment.

(d) An outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment."

47. It is respectfully submitted that, in deciding whether or not the information furnished to it is adequate, the crucial question for the Board is whether or not that information is sufficient to allow it to form a view on the likely significant environmental effects of the proposal, and on the likely effect of the proposal on the proper planning and sustainable development of the area. It is submitted that the information before the Board more than satisfies this test.

48. The Inspector has invited submissions in relation to the provision by the Council, during the hearing, of drawings of the proposed pump house and security buildings. In the context of the proposal as a whole, these are minor elements. The documents submitted as part of the EIS showed the location of these buildings, and their respective footprints. The EIS also contains a description of the two buildings.[13] The approximate size of the pump house is specified,[14] and the EIS also includes a cross-sectional drawing of this building.[15] The security building is not regarded as likely to have any significant effect on the environment; nor, in the context of the proposed development as a whole, is it regarded as likely to have any implications for the proper planning or sustainable development of the area. It is therefore submitted that the information contained in the initial application relating to these two elements was sufficient, under the governing legislation.

49. Even if Part 8 of the Regulations of 2001 did apply, it is respectfully submitted that there has been compliance with its requirements. Article 83 requires the local authority to make available for inspection: (i) a document describing the nature and extent of the proposed development and the principal features thereof; (ii) a location map, drawn to a scale of not less than 1:1000 in built up

[13] EIS, §5.5.8 and §5.5.9.
[14] EIS, §5.5.13.
[15] EIS, Chap. 22, Drawing BE041A.

areas and 1:1250 in all other areas (which shall be identified thereon) and marked or coloured so as to identify clearly the land on which it is proposed to carry out the proposed development; (iii) a site layout plan, drawn to a scale of not less than 1:500, showing the boundary of the site on which it is proposed to carry out the proposed development and the buildings or other structures, and roads or other features, in the vicinity of the site; and (iv) such other plans and drawings, drawn to a scale of not less than 1:100, as are necessary to describe the proposed development. All of these documents have been provided. There is no clear elucidation of what is meant by "*such other plans and drawings… as are necessary to describe the proposed development*". However, for the reasons already alluded to, it is submitted that the plans and drawings submitted with the initial application were more than adequate to describe the proposed development.

50. At the Inspector's request, further detail has been provided in the form of more detailed drawings. These may be of assistance to the Board, but it is the position of the Council that they were not required in order for the Board to discharge its function.

51. This analysis is, it is submitted, fully consistent with that of the High Court of England and Wales (upheld on appeal) in *R. v. Rochdale Metropolitan Borough Council, ex parte Milne* [2001] J.P.L. 470. Sullivan J. said:

> "*[104] If one asks the question how much information about the site, design, size or scale of the development is required to fall within 'a description of the development proposed' for the purposes of [the English regulations implementing the EIA procedure]?, the answer must be: sufficient information to enable 'the main', or the 'likely significant' effects on the environment to be assessed… and the mitigation measures to be described…*"

52. The substantive objection that has been made by a number of objectors (most notably Mr. Bryan) is that there is over-reliance by the Council on the licensing regime, and compliance by the developer and operator with conditions that may be imposed by the Board or by the Agency, for example in

relation to adherence to best practice during construction and the monitoring and control of air emissions and biocides during operation. In this connection, the Council again adopts the comments of Sullivan J. in *R. v. Rochdale Metropolitan Borough Council, ex parte Milne*, where he said:

> "*[128] Any major development project will be subject to a number of detailed controls, not all of them included within the planning permission. Emissions to air, discharges into water, disposal of the waste produced by the project, will all be subject to controls under legislation dealing with environmental protection. In assessing the likely significant environmental effects of a project the authors of the environmental statement and the local planning authority are entitled to rely on the operation of those controls with a reasonable degree of competence on the part of the responsible authority… Mistakes may occur in any system of detailed controls, but one is identifying and mitigating the 'likely significant effects', not every conceivable effect, however minor or unlikely, of a major project.*"

53. The information that has been provided to the Board, both in the EIS and in the course of the oral hearing, is more than adequate, having regard to the stage of the consent process that the project has reached,[16] to allow the Board to adjudicate on the matters within its remit. The Board does not need to know every detail, because it is not required to consider every conceivable effect. Provided the likely significant effects on both the environment and the proper planning and sustainable development of the area can be addressed, the information is adequate. It is submitted that this is the case.

54. In this connection, it is important to bear in mind that Environmental Impact Assessment is a dynamic process, rather than a single event. As Prof. Scannell puts it:

> "*A distinction must be drawn between an EIS and an EIA. The EIS is a document or documents and other information supplied by the developer or promoter of the project. The EIA is the procedure or*

[16] See EIA Directive, Art. 5(1)(a).

process by which the significant environmental impacts of the project are assessed taking into account the EIS and other inputs into the EIA procedure, including further information provided by the developer, the comments of members of the public and other bodies concerned with the project by virtue of their specific environmental responsibilities…"[17] (emphasis in the original)

55. This understanding of the dynamic nature of Environmental Impact Assessment is also to be found in *R. (Blewett) v. Derbyshire County Council* [2003] EWHC 2775 (Admin); [2005] J.P.L. 751, where Sullivan J. warned against unrealistic and unduly legalistic expectations by objectors as to the comprehensiveness of an EIS. He accepted that an EIS may be deficient in some respects and that the publicity and consultation processes exist to allow such deficiencies to be identified and rectified, so that the decision-maker is presented with as full a picture as possible.

56. It is now proposed to deal, very briefly, with the issues that have been considered in the context of the Environmental Impact Assessment of the proposed development.

Plans and policies

57. Under section 175(6) of the Planning and Development Act, 2000, the Board is required to consider the likely effects on the environment of the proposed development, and the likely consequences for proper planning and sustainable development in the area in which it is proposed to situate the said development of such development. Section 175(12) provides that:

> "*In considering under subsection (6) information furnished relating to the likely consequences for proper planning and sustainable development of a proposed development in the area in which it is proposed to situate such development, the Board shall have regard to—*
>
> *(a) the provisions of the development plan for the area,*

[17] Scannell, *op. cit.*, para. 5-86.

…

(d) where relevant, the policies of the Government, the Minister or any other Minister of the Government…"

58. The effect of this provision is that the Board is required to have regard to policies that are expressed in the local development plan, and also to governmental policies. These policies are dealt with in detail in the evidence of a number of witnesses, in particular Bernard McHugh, Matt Twomey, P. J. Rudden and John Murphy. It is submitted that, when their evidence is considered, it is clear that the policy statements all pull in the same direction: in favour of the thermal treatment of waste and in favour of a WTE facility being located on the Poolbeg peninsula.

59. It should also be noted in this connection that the prevailing development plan is deemed by law to include the objectives of the relevant waste management plan. Section 22(10A) of the Waste Management Act, 1996 (as amended by section 26 of the Protection of the Environment Act, 2003) provides that:

"*(a) The development plan for the time being in force in relation to the functional area of a local authority shall be deemed to include the objectives for the time being contained in the waste management plan in force in relation to that area.*

(b) (i) In the event of there being a conflict between an objective deemed to be included in a development plan by virtue of paragraph (a) (the 'first-mentioned objective') and an objective otherwise included in the development plan (the 'second-mentioned objective'), the first-mentioned objective shall override the second-mentioned objective, irrespective of whether or not the development plan is subsequent to the waste management plan referred to in that paragraph."

60. It is respectfully submitted that the attempts of certain objectors (notably Mr. Joe McCarthy and Mr. John Gormley) to reopen these policy statements cannot be entertained by the Board. Mr. McCarthy has devoted considerable

energy to attempting to show that the Dublin Waste Strategy and Regional Plan of 1998 is flawed, and Mr. Gormley has suggested that the Board should set aside the 2005 Waste Management Plan. As a matter of law, the Board has no such power and must, it is respectfully submitted, take the relevant plans as it finds them. The Oireachtas has – for good or ill – conferred the power to make and change such plans on bodies other than the Board. If the Board were required, in the course of every oral hearing, to reconsider the validity of the policy objectives laid down by relevant plans, it could not possibly discharge its functions. The plan is the plan, as adopted, and it is to the plan that the Board must have regard.

61. Lest there should be any doubt, the Council contends that it is appropriate for the Board to have particular regard to the development plan and the waste management plan that are now in force. As it happens, both were adopted before the EIS was lodged with the Board, but in any event, it is submitted that the plans to which the Board must have regard in its deliberations are those currently in force, since they state the current objectives and policies of the Council and the other authorities.[18]

Need for the project

62. The need for the project is dealt with in detail in Chapter 3 of the EIS and in the evidence of Mr. Matt Twomey and Mr. P. J. Rudden.

63. The evidence demonstrates that at every level of the policy hierarchy, the necessity of developing an adequate infrastructure for the thermal treatment of waste is accepted. The more specific policy documents, the 2005 Waste Management Plan and the Dublin City Development Plan 2005 (which is deemed to include the objectives for the time being contained in the waste management plan in force in relation to the area) make express provision for the development of that infrastructure on the Poolbeg peninsula. The Waste Management Plan for the Dublin Region made on 11 November 2005 states:

[18] See in this regard *Boyne Valley & Newgrange Environmental Protection League Ltd v. Environmental Protection Agency* [2002] IEHC 24; [2002] W.J.S.C.-H.C. 1173 at 1192.

"*The Plan policy is to develop a Waste to Energy (incineration) plant at the preferred location of Poolbeg Peninsula, Dublin 4.*"[19]

64. At the higher level, it is sufficient for the purpose of these submissions to refer to the National Strategy on Biodegradable Waste April 2006, which provides:[20]

> "*Thermal treatment with energy recovery in accordance with the internationally- accepted waste management hierarch is a key element of Irish waste management policy. The 10 Waste Management Plans for the regions/counties of Ireland recognise this integrated policy role of thermal treatment and facilities have been proposed by local authorities for the treatment of residual waste within 6 of the regions. This method provides a robust technology for dealing with mixed residual waste, and forms a necessary element in the integrated Waste Management Plans of the six regions, similar to models from other EU countries such as Germany, Belgium, Holland, Austria and Denmark.*"

65. Both Mr. Rudden and Mr. Twomey point to practical imperatives that require the urgent development of an adequate thermal treatment infrastructure. This infrastructure is higher on the waste hierarchy than landfill, and it is required to enable the four Dublin authorities to meet targets under the Landfill Directive to divert waste from landfill. Although some objectors have suggested that a zero waste policy should be implemented instead, the evidence is that, under all conditions, there is likely to be a very significant amount of residual waste that must be dealt with. Thermal treatment provides the most satisfactory solution. It is a proven and safe technology, in widespread use across the EU.

66. As for the capacity of the proposed facility, Mr. Twomey has given evidence that this is required to cater for future waste arisings in the Dublin region.

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[19] Waste Management Plan for the Dublin Region, 2005, p. xvii; see also paragraphs 11.5 (p. 85), 18.8 (p. 144); Map 12; and Appendix F
[20] §9.5.1.

Planning and land use

67. Evidence has been given in relation to planning and land use issues by John Murphy and Bernard McHugh.

68. It has been established that the site is appropriately zoned for the proposed development. In this connection, it is submitted that the attempt of the elected members to block the development by imposing a special zoning (Z7A) for the site should be disregarded, since it conflicts with the provisions of the Waste Management Plan for the Dublin Region made on 11 November 2005.

69. In any event, as Mr. Murphy has shown, even under Z7A zoning, development of a WTE facility or incinerator falls to be considered on its merits.

70. The planning and land use issues fall to be considered generally, and also with specific reference to the situation of Dublin Port Company.

71. Looking first at the general picture, this is an in-fill site, located between a sewage treatment plant and a power station, with another power station in close proximity. These three land uses are established and are likely to continue for the long term. The proposed use of the site is fully consistent with these uses, and there is no realistic likelihood in the short or medium term of the use character of the area changing dramatically away from industrial type uses. It is respectfully submitted that it is unrealistic (as some objectors seem to suggest) that this site might be left in an undeveloped state, or transformed into a managed wildlife area. Even if approval for the proposed development is refused, this is most unlikely. The site is currently in use as a scrap metal yard and for molasses importing. Compared to the existing uses, WTE is highly regulated. The proposal is to construct a state-of-the-art facility that will set a new standard for the area in terms of its architectural quality. The proposed development is in fact likely to be the cleanest industrial use on the peninsula.

72. It has been suggested by Dublin Port Company that the use of the site for a WTE facility is inconsistent with the Company's stated policy of attempting to preserve lands for port related use. It has been shown, however, that the

Company's land use policy is far less consistent. It parted with its interest in the nearby Irish Glass Bottle site for a mixed use residential development, and sought to have the area to the south and south-west of the site zoned Z6, for enterprise, rather than for port use proper (which would require a zoning of Z7). More importantly, however, Dublin Port Company has not demonstrated that the site is required for the proposed Berth 47A, or even gone so far as to suggest that Berth 47A will not go ahead if the WTE facility is approved. In truth, the port company has furnished the Board with no information concerning real proposals for what it intends to do with the land. Rather, it seeks to rely on generalised aspiration, speculation and conjecture. None of these is an adequate basis for suggesting that the proposal is in any way flawed in land use or planning terms.

Site selection

73. The site selection procedure is addressed in detail in Chapter 4 and Appendix 4.1 of the EIS, and in the evidence of Mr. Rudden.

74. A detailed site selection study was carried out in 1999, which resulted in the selection of Poolbeg as the preferred location for a WTE facility. That recommendation was formally acted upon by the making of the CPO and the adoption of the 2005 Waste Mangement Plan, which named Poolbeg as the preferred location.

75. Factors telling in favour of the selected location include the fact that (as has just been discussed) the zoning and land use characteristics of the site are appropriate. The site is near the centre of gravity of waste in the Dublin region. In this connection, criticism from objectors to the effect that the use of the strategic road network for deliveries of waste alters the position is misplaced. It would be possible to allow for direct deliveries from all locations to the facility, in which case there could be no sensible argument but that the facility is located at or near the centre of gravity of waste. However, requiring deliveries from certain (less proximate) areas to be made via transfer stations along the strategic road network is a measure that mitigates the

possible adverse traffic effect that could result from universal direct deliveries. As Mr. Christy O'Sullivan stated in his evidence relating to traffic:

> "*the proposed strategy remains the more optimal strategy as it seeks to achieve a balance between the need to reduce the traffic impact on the local road network while also ensuring that the overall waste collection and management strategy is efficient and has the least overall city wide traffic and environmental impact*". [21]

76. The selected site also has the advantage of having a source of water available for cooling, thus increasing the efficiency of the facility. The port is nearby, which facilitates the export of bottom ash and fly ash. Furthermore, the likelihood of large scale commercial and residential development taking place in the vicinity means that there is good potential for district heating schemes in the future.

77. Mr. Rudden has also given evidence that the site selection was revisited in 2006 (although the process was not repeated in full). He expressed his satisfaction with the choice of site and indicated that, if anything, the merits of the location had been underplayed in the 1999 study.

Landscape and visual impact

78. The visual impact of the proposed development is one of the more subjective assessments that must be made and is a difficult issue to address in submissions. However, the Council believes that the evidence adduced by Mr. Jan Fritsdal and Thomas Burns, along with the information in Chapter 6 of the EIS is more than adequate to allay any concerns in this regard.

79. In any event, visual impact objections to the project exaggerate the potential adverse impacts. Dublin Port Company's critique was not logical. It was suggested that some of the revised photomontages were accurate, but that others were not. The methodology of preparation of photomontages is a precise one, which relies on the construction using a computer of a three-dimensional wire frame image of the development. The computer model then

[21] Evidence of Christy O'Sullivan, slide 21.

inserts the image in the photograph. If all of the photmontages were objected to, there might be some basis for the argument, but it is not possible that some are correct and others are not, since once the 3D model is prepared it is constant to all photomontages.

80. There has been no attempt on the part of the Council to hide the potential visual impact of the facility. The proposal is a bold step, but a positive one, it is respectfully submitted.

Traffic

81. Traffic is addressed in Chapter 7 of the EIS and in the evidence of Mr. Christy O'Sullivan. The evidence, which has not been contradicted, suggests that there will be a very minimal impact on traffic as a result of the facility. Indeed, the only peer review of the traffic study, which was carried out on behalf of Dublin Port Company, supports the analysis.

Air quality

82. Air quality is dealt with in considerable detail in Chapter 8 of the EIS and the associated Appendix. The area has also been the subject of considerable controversy, with conflicting evidence given by Dr. Edward Porter on behalf of the Council and Dr. Imelda Shanahan on behalf of Dublin Port Company. The criticisms of Dr. Shanahan's approach have been thoroughly explored in cross-examination, and in Dr. Porter's response. However, it is fair to say that the Council believes that Dr. Shanahan has made excessively pessimistic assumptions upon which she based her evidence, and that in conjunction with questionable methodology these have skewed her results.

83. The methodology and assumptions of Dr. Shanahan that are particularly criticised include the following.

(a) Modelling of dispersion using the ICTSC model, which Dr. Shanahan has acknowledged in another EIS prepared by her office tends to overstate concentrations. Dr. Porter has shown that the error can be of the order of many hundreds of per cent.

(b) Measuring the 99.8th%ile of 1 hour process emissions against short term air standards by adding it to the 99.8th%ile of background concentrations; in other words, by assuming that two rare events are likely to coincide, despite the lack of any link between them.

(c) Constant use of very high NO/NO_2 conversion ratios, even in relation to short term averages under high concentrations.

(d) Insistence that shoreline fumigation is a more or less continuous phenomenon, without any clear basis for the assertion, and in the teeth of both the standard screening assumptions and local empirical evidence to the contrary.

(e) Insistence that it is likely that the facility will operate with 15 separate incidents annually of total loss of flue gas containment, each of which lasts for the maximum period of 4 hours prescribed by the Waste Incineration Directive.

(f) Assumption that the facility will operate at the 97% limits prescribed by the Waste Incineration Directive for 97% of the time (less 60 hours), at 100% limits for 3% of the time, and emitting raw flue gas for the remaining 60 hours each year.

(g) Deriving long term averages from short term averages by the application of a factor. This is wrong in principle under shoreline fumigation conditions. Furthermore, the factor is wrong. And in any event, even if the factor were correct, the very highest factor has been used, in every case by adding the margin of error to the baseline factor.

(h) Assuming that abnormal outputs are likely to coincide with shoreline fumigation conditions.

84. It is respectfully submitted that in the light of her questionable methodology and unrealistic assumptions, the Board should attach far less weight to Dr. Shanahan's evidence than to that of Dr. Porter.

85. It is important to note that Dr. Porter has carried out modelling at upper levels at the site of the proposed Fabrizia development, and has found that there will be no exceedences, and that the levels are significantly below those of the worst case receptor.

86. It is accepted that some of the modeling carried out by Dr. Porter shows that there may be exceedences in relation to certain short term standards for certain metals. However, Dr. Porter has stated that these exceedences are extremely unlikely to occur. In this connection, the Council relies upon the Canadian case of *Residents Against Company Pollution Inc., Re Section 38 of the Environmental Bill of Rights, 1993* (1996) 20 C.E.L.R. (n.s.) 97,[22] where the court stated:

> "*Because of the inherent subjectivity of the concept of 'significant harm', the Board should attempt to use a test which does not rely on the individual views of its members. Where possible, significance should be determined by reference to scientific principles and evidence or legal criteria. 'Significant harm' means primarily an emission, likely to cause an adverse effect, an emission likely to exceed a numerical standard or an emission likely to violate some other legal requirement.*" (emphasis added)

The focus of the Board, it is respectfully submitted, should remain on whether the exceedence of a standard is *likely*. Given very conservative modeling assumptions, it is possible to predict exceedences. That they will occur in practice is, however, most unlikely.

87. The same passage may also be relied upon in connection with the objections raised by Mr. McCarthy concerning ultra-fine particulates. It is accepted that there are no environmental standards by reference to which these particles can be measured. The proposal complies with the requirements in relation to PM_{10} and $PM_{2.5}$. Prof. Schrenk has suggested that it is reasonable to assume that the incidence of ultra-fine particles is reduced by the scrubbing technology in the same way as for larger particles, and has also pointed out that there are no

[22] Quoted in Scannell, *op. cit.*, para. 5.71.

studies to suggest that such particles emitted from incinerators have any adverse health consequences. Mr. McCarthy's submission is based on speculation and conjecture, and it is not an appropriate basis for the Board to refuse approval for the proposed development.

88. In any event, it is clear that the Board has a limited function in relation to emissions, such as those to air. By virtue of section 175(10)(a), the Board cannot impose conditions for the control of emissions, because the WTE facility will also require a waste licence from the EPA. Section 175(10)(b) provides that the Board may refuse approval "*where the Board considers that the development, notwithstanding the licensing of the activity, is unacceptable on environmental grounds, having regard to the proper planning and sustainable development of the area in which the development is or will be situate*". It is respectfully submitted that, even if the Board is not fully persuaded by the criticisms made of Dr. Shanahan's evidence, what it is faced with is a difference of opinion between experts. The Board cannot possibly be satisfied, on this basis alone, that the proposal is unacceptable on environmental grounds. Rather, this is an issue that will have to be addressed by the EPA in the context of the waste licence application.

Climate

89. Chapter 8 of the EIS and the evidence of Dr. Porter show that thermal treatment of waste is a better option from a climate perspective than landfill under almost all modelling conditions. If it is less favourable, the difference is marginal and is certainly not enough to allow the Board to reach the conclusion that thermal treatment of waste is unsustainable.

90. In any event, there is a fundamental objection to the arguments that have been pressed – notably by Mr. McCarthy – on this issue. While the Council has not yet heard Mr. McCarthy's submission in its entirety, the criticisms that are made of thermal treatment are not specific to this proposed facility. They would apply to a WTE facility, wherever it was located. However, the key policy decisions to proceed with thermal treatment of waste have already been taken. Under the guise of climate, Mr. McCarthy is in reality seeking once

again to reopen old arguments concerning the policy direction adopted by Government and the local authorities. The Board has no jurisdiction to allow this, and since the arguments from climate against thermal treatment are in flat contradiction of the waste management policies to which the Board is obliged to have regard, it is submitted that they carry little or no weight.

Noise and vibration

91. There is no predicted significant adverse impact in relation to either noise or vibration from the construction or operation of the proposed facility, taking into account the mitigation measures that are proposed.

Residues

92. The treatment of residues from the process is dealt with in Chapter 10 of the EIS.

93. It has been suggested that the proposal to export bottom ash is incapable of application because it involves the transfrontier shipment of waste. This argument is wrong. The evidence is that bottom ash can successfully be used in applications such as road building. This is a recovery operation. In Case C-203/96 *Chemisiche Afvalstoffen Dusseldorp BV v. Minister von Volkshuisvesting* [1998] E.C.R. I-4075 the Court of Justice held that waste for recovery should be able to move freely throughout the Community for processing provided that the transport did not pose a threat to the environment. It was also held that the principles of proximity and self-sufficiency did not apply to waste intended for recovery. The operator of the facility will of course be required to comply with any conditions imposed by law in relation to the shipment of waste.

Soils, geology and groundwater

94. No significant issue arises in relation to these matters.

Water

95. The effect of the proposed facility on water has been extensively considered and modelled. The prediction is that there will be no significant impact on aquatic life as a result of either the thermal plume from the cooling water discharge or the release of biocides into the channel.

Human beings

96. Although there has been considerable speculation at the hearing concerning the possible effects on human health of the proposed development, it has been entirely based on speculation and fear, rather than on evidence. The evidence of Prof. Schrenk and Mr. Buroni is that there is no significant risk of adverse effects. Seveso issues have been considered by Dr. Menzies, and again it is not predicted that there will be any significant adverse effect. It is not predicted that the development will have any effect on property prices in the area.

Ecology

97. Issues in relation to ecology have received very extensive treatment in the EIS and in the evidence of Dr. Madden, Dr. Callagahan, Mr. Vested, Dr. Rasmussen, Mr. Emblow and Mr. Brophy, and Ms. Mayes.

98. It is accepted that the site is located in relatively close proximity to Special Areas of Conservation under the Habitats Directive[23] and Special Protection Areas designated under the Wild Birds Directive.[24] It is also accepted that the proposed development can be approved only if the Board ascertains that it will not adversely affect the integrity of the sites concerned.[25] However, the clear evidence is that there will be no adverse effect on the sites. Ms. Mayes in particular has addressed the position of the protected areas at length, and has stated that there will be no adverse impact.

[23] Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.
[24] Directive 79/409/EEC on the conservation of wild birds.
[25] See Habitats Directive, art. 6(3).

99. In this connection, it should be noted that her evidence is that Brent geese do not in fact use the site of the proposed facility, and that there will be no loss of habitat from its construction. If this proposal were refused, it is most unlikely that the site would be devoted to a use more compatible with the requirements of wild birds. Given its location it is far more likely that it would, consistently with its zoning, be put to some other kind of industrial use.

100. There appears to be some confusion regarding the specific area in which the proposed development will be carried out. There is no evidence that the site itself or the proposed temporary construction compound constitute a habitat of conservation significance.

101. No significant adverse effects are predicted in relation to terrestrial, acquatic or estuarine ecology and there is no real evidence to suggest that this prediction is badly founded.

Archaeology, architectural and cultural heritage

102. The proposed development has little or no impact in relation to these issues.

Community gain

103. It is proposed that a community gain fund will be established. The Inspector raised the question of whether section 175(9)(b) of the Act of 2000 would apply, as amended. As originally enacted, section 175(9) provided:

> "*(9) The Board may—*
>
> *(a) approve,*
>
> *(b) approve, subject to conditions, or*
>
> *(c) refuse to approve,*
>
> *a proposed development under this section.*"

104. This subsection is substantially amended by section 34 of the Planning and Development (Strategic Infrastructure) Act, 2006. The amended subsection now provides:

"*(9) (a) The Board may, in respect of an application for approval under this section of proposed development—*

(i) approve the proposed development,

(ii) make such modifications to the proposed development as it specifies in the approval and approve the proposed development as so modified,

(iii) approve, in part only, the proposed development (with or without specified modifications of it of the foregoing kind), or

(iv) refuse to approve the proposed development, and may attach to an approval under subparagraph (i), (ii) or (iii) such conditions as it considers appropriate.

(b) Without prejudice to the generality of the foregoing power to attach conditions, the Board may attach to an approval under paragraph (a)(i), (ii) or (iii) a condition requiring—

(i) the construction or the financing, in whole or in part, of the construction of a facility, or

(ii) the provision or the financing, in whole or in part, of the provision of a service, in the area in which the proposed development would be situated, being a facility or service that, in the opinion of the Board, would constitute a substantial gain to the community.

(c) A condition attached pursuant to paragraph (b) shall not require such an amount of financial resources to be committed for the purposes of the condition being complied with as would substantially deprive the person in whose favour the approval operates of the benefits likely to accrue from the grant of the approval."

105. The Council has no formal position in relation to the application of this subsection, as amended. The amendment appears to have become operative

after the application to the Board was lodged, and the law in relation to the question of whether or not such an amendment should be applied is unclear. There is something to be said for the proposition that an application should be determined under the law as it was when the application was lodged. However, there is equally merit in the argument that the Board should apply the law as it finds it when it comes to make its decision. The Council leaves this issue in the hands of the Board, but will in any event consent to a condition requiring the establishment of a community gain fund and procedures as outlined in the evidence of Mr. Coll.

Cumulative impacts

106. The cumulative impacts of the proposed developments have been considered, primarily by the authors of the individual chapters of the EIS, but also by Ms Ria Lyden. No significant adverse cumulative impact is predicted.

Sustainability

107. The issue of economic sustainability has been raised by certain objectors. It is submitted that this is not an issue with which the Board should properly concern itself. If the facility is not economically sustainable, it will not be built. The argument that the Board should seek to investigate in detail the likelihood that a development proposal would be profitable or economically viable is entirely novel and unsupported.

108. Arguments in relation to climate are misguided, for the reasons already explained.

109. It is submitted that the focus of the Board should be on the issue of "sustainable development". In this context, for the reasons already given above, this proposed development is eminently sustainable in land use planning terms. It is also sustainable in terms of the waste strategy for the country and the Dublin region. There is nothing to suggest that the proposal is unsustainable.

Conclusion

110. It is the respectful submission of the Council that the proposed development is fully consistent with the proper planning and sustainable development of the area, and that it has been demonstrated that the proposal will not cause any significant adverse environmental effects. For these reasons, the Council requests the Board to approve the proposed development.

111. The public need for the project is clear. If the proposal is approved, it is submitted that it must follow that the Board should also confirm the CPO.