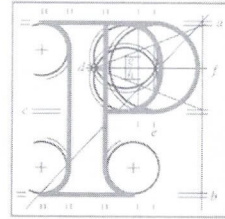


Our Case Number: ABP-318802-24



An
Coimisiún
Pleanála

Development Applications Unit
The Manager
Newtown Road
Wexford
Co. Wexford
Y35 AP90

Date: 30 December 2025

Re: Proposed development of a resource recovery centre (including waste-to-energy facility)
in Ringaskiddy, County Cork.

Dear Sir / Madam,

An Coimisiún Pleanála has received your recent submission in relation to the above mentioned proposed development and will take it into consideration in its determination of the matter.

The Commission will revert to you in due course with regard to the matter.

Please be advised that copies of all submissions / observations received in relation to the application will be made available for public inspection at the offices of the local authority and at the offices of An Coimisiún Pleanála when they have been processed by the Commission.

More detailed information in relation to strategic infrastructure development can be viewed on the Commission's website: www.pleanala.ie.

If you have any queries in the meantime please contact the undersigned officer of the Commission. Please quote the above mentioned An Coimisiún Pleanála reference number in any correspondence or telephone contact with the Commission.

Yours faithfully,

Kevin McGettigan

Kevin McGettigan
Executive Officer
Direct Line: 01-8737263

PA04

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64 Sráid Maoilbhríde
Baile Átha Cliath 1
D01 V902

64 Marlborough Street
Dublin 1
D01 V902

From: David OConnor (Housing) <David.OConnor@npws.gov.ie>
Sent: Monday 17 November 2025 17:10
To: LAPS <laps@pleanala.ie>
Subject: ABP-318802-24

Caution: This is an **External Email** and may have malicious content. Please take care when clicking links or opening attachments. When in doubt, contact the ICT Helpdesk.

A chara

Please find attached Archaeological and Nature Conservation observations/recommendations for the above mentioned planning application. Also attached EPA observations for reference. Please acknowledge receipt of same.

Regards,

David

David O'Connor
Executive Officer

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage
Aonad na nIarratas ar Fhorbairt
Development Applications Unit

Oifigí an Rialtais
Government Offices

Bóthar an Bhaile Nua, Loch Garman, Contae Loch Garman, Y35 AP90
Newtown Road, Wexford, County Wexford, Y35 AP90

—
David.oconnor@npws.gov.ie
Manager.DAU@npws.gov.ie



Ref: ABP-318802-24

17 November 2025

The Secretary
An Coimisiún Pleanála,
64 Marlborough Street,
Dublin 1
D01 V902

Via email: laps@pleanala.ie

Re: Notification to the Minister for Housing, Local Government and Heritage under the Planning and Development Act, 2000, as amended.

Development: Indaver Ireland Ltd- Ringaskiddy Resource Recovery Centre - Waste Incinerator and Energy Recovery. The proposed development will consist principally of a waste-to-energy facility for the treatment of up to 240,000 tonnes per annum of residual household, commercial, industrial, non-hazardous and suitable hazardous waste. Of the 240,000 tonnes of waste, up to 24,000 tonnes per annum of suitable hazardous waste will be treated at the facility.

A Chara,

I refer to correspondence received in connection with the above.

Outlined below are heritage-related observations/recommendations of the Department coordinated by the Development Applications Unit under the stated heading:

Nature Conservation

The Department refers to the notification from An Coimisiún, dated 25 September 2025, regarding the receipt of further information from the applicant regarding the above-mentioned proposed development, and the e-mail from ARUP on behalf of the applicant, dated 6 October 2025, relating to the availability of that further information.

It is noted from the ARUP e-mail, referred to above, that the development was “fully described in the original public notice” for the application, and it is therefore understood that no changes have been made to what was originally proposed in the PA0045 application. (Note: the following abbreviations will be used below: Waste-to-Energy incinerator - ‘WtE incinerator’;



Polychlorinated Dibenzop-Dioxins (PCDDs) – ‘dioxins’; Polychlorinated Dibenzofurans (PCDFs) – ‘furans’).

Submission to the EPA regarding Industrial Emissions Licence

On foot of a request for comments from the Environmental Protection Agency (EPA), dated 19 July 2019, regarding an application for an Industrial Emissions Licence (P1114-01) for the proposed development, the Department submitted comments to the EPA on 12 September 2019 (see attached).

Although this was publicly available on the EPA website, the issues raised in that submission appear to have been missed by the response to further information (revised NIS and EIAR). Rather than reiterating the points raised in that submission in the text here, the Department refers An Coimisiún to the attachment to be read before, and as part of, the remainder of this submission. Consequently, the following sections relate to changes since 2019.

Appropriate Assessment by the EPA

The Department has also received, on 6 November 2025, notification of receipt of unsolicited further information by the Environmental Protection Agency (EPA) in relation to an Industrial Emissions Licence (IEL ref. P1114-01) application for this same proposed development. The EPA notification states that the licence application is being processed by the Agency.

The Department has specific concerns relating to the impacts of dioxins (PCDDs) and furans (PCDFs), both persistent organic pollutants, emitted by the Waste-to-Energy incineration process (see attached comments to the EPA (12 September 2019)). Due to the highly technical nature of the technologies used in formation prevention and pollution reduction, the question of alternative processes to that proposed in this development may be perhaps more competently addressed in the Habitats Directive Appropriate Assessment carried out by the EPA. The possibility that alternative technologies (for instance, rapid quenching) may require a physical change in the development is a further consideration. It is therefore suggested to An Coimisiún that the Appropriate Assessment of this planning development should not be completed until the Appropriate Assessment of the IEL application is first completed by the EPA.

Changes to Cork Harbour SPA since 2019

Since the original application, Cork Harbour Special Protection Area (SPA no. 4030) has been re-classified under the European Union Conservation of Wild Birds (Cork Harbour



Special Protection Area 004030) Regulations, 2021 (S.I. No. 391 of 2021). This includes the extension to the SPA at Ringabella Estuary, which was advertised and notified on 11 March 2015. The Cork Harbour SPA Conservation Objectives¹, however, have not changed.

Changes in data relating to impacts of incinerator emissions within the EU since 2019

Elevated concentrations of dioxins and furans in chicken eggs in the vicinity of incinerators in developing countries are well-established². However, for WtE and waste incinerators operating under EU regulations, there are several recent monitoring studies reporting significantly elevated dioxin and furan concentrations in the Netherlands (Arkenbout and Bouman, 2025a³), France (Arkenbout and Bouman, 2025b⁴) and Belgium (Arkenbout and Bouman, 2023⁵). Other than an earlier methodological study published in 2017, this more recent data, however, does not appear to have been published in the peer-reviewed scientific literature. Nevertheless, the Paris data has been corroborated by the French public health authority (ARS); and the DR CALUX bioassay method used in these studies has recently been re-tested and found to be suitable and applicable as a routine method (Behnish *et al.*, 2025⁶). The results, assumed to be scientifically valid, indicate that, in practice, the operation of WtE incineration facilities may result in considerably higher emissions of PCDDs (dioxins) and PCDFs (furans) than would be suspected from regulatory monitoring, with a bioaccumulation potential in domestic terrestrial birds even to levels which are a health hazard for human consumption. However, the marine and intertidal environment, which is relevant to the bird species occurring in Cork Harbour SPA, is different in that the aerial plume reaches the sea surface layer, or intertidal mudflat surface, as opposed to the soil. Nevertheless, an assumption that pollutants landing on the sea surface simply sink, and

¹ NPWS (2014) Conservation Objectives: Cork Harbour SPA 004030. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004030.pdf

² Petrlik, J., Bell, L. Degangi, J., *et al.* (2022) Monitoring dioxins and PCBs in eggs as sensitive indicators for environmental pollution and global contaminated sites and recommendations for reducing and controlling releases and exposure. *Emerging Contaminants* **8**: 254-279.

³ Arkenbout, A. and Bouman, K.J.A.M. (2025) *Biomonitoring research on persistent organic pollutants (POPs) in the surrounding environment of the WtE waste incinerator REC, Harlingen, The Netherlands 2025*. Interim Report, Toxicowatch Foundation, Harlingen. [Published March 2025].

⁴ Arkenbout, A. and Bouman, K.J.A.M. (2025) *TW Biomonitoring research on persistent organic pollutants (POPs) in the surrounding environment of the waste incinerator IPXIII, Ivry-sur-Seine, Paris*. Interim Report, Toxicowatch Foundation, Harlingen. [Published March 2025].

⁵ Arkenbout, A. and Bouman, K.J.A.M. (2023) *Biomonitoringonderzoek dioxinen in kippeneieren Beringen, België, 2022*. Toxicowatch Foundation, Harlingen. (Report to Beringen City Council). https://toxicowatch.org/wp-content/uploads/2025/08/2023_BE_report_final_version.pdf

⁶ Behnish, P., Besselink, H., Suzuki, G., *et al.* (2025) Results of an international interlaboratory study on dioxin-like activities in drinking-, river-surface and wastewater using DR CALUX bioassay. *Science of the Total Environment* **920**, 170759.



further dilute in concentration in the sea water column, may not be correct (see next paragraph).

Pollutant accumulation on sea surface and intertidal mudflats

A recent scientific study by Enders *et al.* (2025⁷), detected particularly high concentrations of per- and polyfluoroalkyl substances (PFAS) in concentrated sea foam. While PFAS emissions in flue gas may be an issue in their own right⁸, nevertheless, it indicates a pathway (sea foam) which may not have received sufficient attention to-date. Sea foams can occur at the edge of the water during rising tides⁹.

Another consideration is that the microbial mucilages produced by algae and burrowing invertebrates on a healthy mudflat surface will increase adhesion of deposited particles by “reducing the probability of resuspension once a particle has come into contact with and stuck to the bed” (Mazik and Elliott, 2000¹⁰).

Dispersal modelling and bird use of adjacent harbour

The update (in 2024-25) of the baseline study of bird use of the area (pp. 44-48 of the NIS) adjacent to the proposed development is particularly welcome. It was noted that breeding common terns, one of the species listed for the SPA, forage in the Harbour east of the proposed development (p. 45 of the NIS). However, there appears to be no baseline data on bird use of areas where stack plume modelling would indicate maximum potential deposition on surface waters or intertidal mudflats, or where sea current modelling may indicate deposit accumulation on intertidal mudflats. I-Webs (Irish Wetland Birds Survey) data is available¹¹ on request from BirdWatch Ireland, and includes recent winter counts for at least some the count zones in Fig. 1 below, including Whitegate Bay and Monkstown Creek.

⁷ Enders, J.R., Weed, R.A., Donovan, E., Phelps, D., Campbell, G., May, K. and Baker, E.S. (2025). Detection and quantitation of per- and polyfluoroalkyl substances in North Carolina sea foam and the corresponding sea water. *Environmental Science & Technology* **59**: 18831-18845. [Published 27 August 2025].

⁸ Björklund, S., Weidemann, E. and Jansson, S. (2023) Emission of per- and polyfluoroalkyl substances from a waste-to-energy plant – occurrence in ashes, treated process water, and first observation in flue gas. *Environmental Science & Technology* **57**: 10089-10095.

⁹ Napolitano, G.E., Ackman, R.G. and Parrish, C.C. (1992) Lipids and lipophilic pollutants in three species of migratory shorebirds and their food in Shepody Bay (Bay of Fundy, New Brunswick). *Lipids* **27**: 785-790.

¹⁰ Mazik, K. and Elliott, M. (2000) The effects of chemical pollution on the bioturbation potential of estuarine intertidal mudflats. *Helgoland Marine Research* **54**: 99-109.

¹¹ <https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/i-webs-data-requests/>

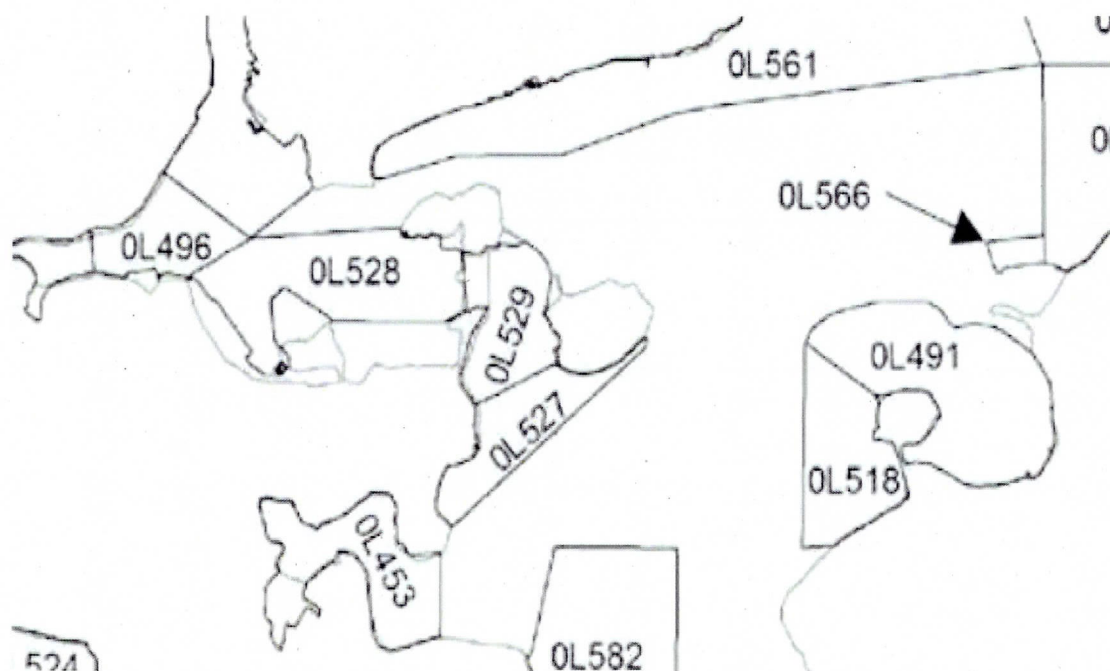


Fig. 1. I-Webs (Irish Wetland Bird Survey) count areas in vicinity of proposed WtE incinerator¹².

Alternative technologies which reduce dioxin and furan formation

Irrespective of the above potential pathways, as a general principle, the *formation* of toxic dioxins and furans should be avoided unless absolutely necessary and where there are no feasible alternatives, rather than relying on their subsequent removal from flue gas before discharges into the environment. This requires a thorough assessment of alternative technologies which results in less dioxin and furan formation.

For instance, regarding gasification (which reportedly can significantly reduce dioxin and furan formation), there is no change in the text paragraphs discussing the disadvantages of this technology for MSW treatment from the January 2016 EIS (Chap. 3, p. 33) to the August 2025 EIAR (p. 3.17). No updated references are cited on this comparison, despite their apparently being numerous studies published on this¹³. The issue is not that the conclusion of MSW incineration to Energy may be incorrect as the best available technology, but it is

¹² Source: NPWS (2014) *Cork Harbour Special Protection Area (Site Code 4030) – Conservation Objectives Supporting Document*. Version 1. P. 97.

[https://www.npws.ie/sites/default/files/publications/pdf/Cork%20Harbour%20SPA%20\(004030\)%20Conservation%20Objectives%20supporting%20document%20-%20\[Version%201\].pdf](https://www.npws.ie/sites/default/files/publications/pdf/Cork%20Harbour%20SPA%20(004030)%20Conservation%20Objectives%20supporting%20document%20-%20[Version%201].pdf)

¹³ E.g. see review by Safavi, A., Richter, C. and Unnthorsson, R. (2022) Dioxin formation in biomass gasification. *Energies* **15**, 700.



that it has not been sufficiently assessed in a reasoned manner based on up-to-date scientific and technology data.

It would also appear that there is insufficient consideration of updates in flue-gas quench technology, which can significantly reduce post-combustion dioxin and furan formation. These are highly technical issues, which the EPA are the competent authority to decide upon.

Summary

Dioxins and furans are persistent organic pollutants which bio accumulate and are toxic to birds at extremely low concentrations. The proposed WtE incinerator is located near to Cork Harbour Special Protection Area which is designated for a range of estuarine and wetland bird species. Dioxins and furans are formed during the WtE incineration process, especially where gases are allowed to linger at temperatures of 200 – 400°C and 500 – 800°C. As a general principle, the formation of these toxins should be avoided unless absolutely necessary where there are no alternatives, rather than relying on their subsequent removal from flue gas before its discharge into the environment. This Department has concerns relating to:

- (a) the apparent reliance on a WtE processes which increases dioxin and furan formation due to the lack of rapid quench;
- (b) an inadequate assessment of alternatives to avoid such formation;
- (c) the efficacy of dioxin and furan removal during the practical operation of the WtE incineration process as shown by chicken-egg monitoring in EU countries;
- (d) the potential for their accumulation on the harbour water surface and mudflats, and their availability to birds for which the SPA has been designated.

Given the expertise and competence of the EPA regarding emissions technology and assessment, it may be preferable for An Coimisiún not to complete the Appropriate Assessment for this application until the EPA have completed the Appropriate Assessment for the Industrial Emissions Licence for this proposed development.

Archaeology

It is noted that the Updated EIAR (2025) submitted as part of the planning application includes an updated desk-based Archaeological Impact Assessment (AIA) which was carried out in relation to the proposed development by Lane Purcell Archaeology (EIAR Chapter 14; date 29 August 2025).



The Department has reviewed the Updated EIAR and advises that the following should be included as a condition of any grant of permission. Note these recommended conditions align with Sample Conditions C3, C4, C5 and C6 as set out in *OPR Practice Note PN03: Planning Conditions* (October 2022), with appropriate site-specific additions/adaptations based on the particular characteristics of this development and informed by the findings of the EIAR.

Archaeological Requirements:

- 1) All mitigation measures in relation to archaeology and cultural heritage as set out in Chapter 14 of the EIAR (Lane Purcell Archaeology; date 29 August 2025) shall be implemented in full, except as may otherwise be required in order to comply with the conditions of this Order.
- 2) The developer shall engage a suitably qualified archaeologist (licensed under the National Monuments Acts) to carry out a pre-development Archaeological Geophysical Survey and a pre-development Archaeological Test Excavation at all areas of proposed ground disturbance (including temporary measures such as construction compounds or crane bases) and to submit an archaeological impact assessment report for the written agreement of the planning authority, following consultation with the Department, in advance of any site preparation works or groundworks, including site investigation works/topsoil stripping/site clearance and/or construction works:
 - a) The Archaeological Geophysical Survey must be carried out under licence from this Department and in accordance with an approved method statement. Having completed the work, the archaeologist shall submit a written report to the Department and the Planning Authority describing the results of the Archaeological Geophysical Survey.
 - b) The archaeologist shall liaise with the Department to establish—based on the results the Archaeological Geophysical Survey—the appropriate scope of the Archaeological Test Excavation to adequately characterise the character and extent of any potential sub-surface archaeological material within the development site.
 - c) The report on the Archaeological Test Excavation shall include an archaeological impact statement and mitigation strategy. Where archaeological material is shown to be present, avoidance, preservation in-situ, preservation by record (archaeological excavation) and/or monitoring may be required.
 - d) Any further archaeological mitigation requirements specified by the planning authority, following consultation with the Department, shall be complied with by the developer.
 - e) No site preparation and/or construction works shall be carried out on site until the archaeologist's report has been submitted to and approval to proceed is agreed in writing with the planning authority.



- 3) The developer shall engage a suitably qualified archaeologist to monitor (licensed under the National Monuments Acts) all site clearance works, topsoil stripping or groundworks associated with the development:
 - a) The use of appropriate machinery to ensure the preservation and recording of any surviving archaeological remains shall be necessary.
 - b) Should archaeological remains be identified during the course of archaeological monitoring, all works shall cease in the area of archaeological interest pending a decision of the planning authority, in consultation with the Department regarding appropriate mitigation.
 - c) The developer shall facilitate the archaeologist in recording any remains identified.
 - d) Any further archaeological mitigation requirements specified by the planning authority, following consultation with the Department, shall be complied with by the developer.

- 4) The Construction Environment Management Plan (CEMP) shall include the location of any and all archaeological or cultural heritage constraints relevant to the proposed development as set out in Chapter 14 of the EIAR and by any subsequent archaeological investigations associated with the project. The CEMP shall clearly describe all identified likely archaeological impacts, both direct and indirect, and all mitigation measures to be employed to protect the archaeological or cultural heritage environment during all phases of site preparation and construction activity.

- 5) The planning authority and the Department shall be furnished with a final archaeological report describing the results of all archaeological monitoring and any archaeological investigative work/excavation required, following the completion of all archaeological work on site and any necessary post-excavation specialist analysis. All resulting and associated archaeological costs shall be borne by the developer.

Reason: To ensure the continued preservation (either *in situ* or by record) of places, caves, sites, features or other objects of archaeological interest.

You are requested to send any further communications to this Department's Development Applications Unit (DAU) at manager.DAU@npws.gov.ie, where used, or to the following address:

The Manager
Development Applications Unit (DAU)
Government Offices



Newtown Road
Wexford
Y35 AP90

Is mise, le meas

David O'Connor
Development Applications Unit
Administration



Ref: P1114-01

(Please quote in all related correspondence)

12/09/19

Environmental Licensing Programme
Office of Environmental Sustainability

Via email info@epa.ie

Re: Notification to the Minister for Culture, Heritage and the Gaeltacht under Article 28 (Part 4) or Article 82 (Part 8) of the Planning and Development Regulations, 2001, as amended.

Proposed Development: Indaver Ireland Limited at Ringaskiddy Resource Recovery Centre, Ringaskiddy, Co Cork, Cork.

A chara

On behalf of the Department of Culture, Heritage and the Gaeltacht, I refer to correspondence received in relation to the above.

Outlined below are heritage-related observations/recommendations of the Department under the stated heading(s).

Nature Conservation

The Department refers to the notice of receipt of an application for an industrial emissions licence for a waste-to-energy incineration plant at Ringaskiddy, Co. Cork, and request for comments. The air emissions from the proposed installation have the potential to affect bird species wintering and breeding in Cork Harbour Special Protection Area (SPA (4030), designated under the European Communities (Conservation of Wild Birds (Cork Harbour Special Protection Area 004030)) Regulations 2010 (S.I. No. 237 of 2010). Leaching of bottom and filter ash (flue gas treatment residue) at one or more disposal sites also has the potential to affect aquatic life in a Special Area of Conservation (SAC), if the ash is disposed in catchments of such a site.

The Department of Culture, Heritage and the Gaeltacht has the following comments in relation to this licence application, regarding compliance with the requirements of the EU Habitats Directive (Council Directive 92/43/EEC (as amended)), EU Birds Directive (Council Directive 2009/147/EC (as amended)) and the European Union (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011) (as amended).

Habitats Directive appropriate assessment

In making these comments, the Department recognizes that the Environmental Protection Agency (EPA) is the competent authority regarding the Habitats Directive appropriate assessment of the emissions from this proposed installation, under Regulation 42 of the



above Regulations, and that the obligations of Regulation 27 of those Regulations apply to the EPA.

Under Regulation 42(21)(d) of the above Regulations, An Bord Pleanála and the Environmental Protection Agency (EPA) may carry out, following joint consultation, a joint appropriate assessment, with one of these public authorities leading the process. The following comments assume that this has not been the case regarding this application for an industrial emissions licence.

The comments below focus particularly on polychlorinated dibenzo-p-dioxins (PCDDs, referred to below as 'dioxins'), polychlorinated dibenzofurans (PCDFs, referred to below as 'furans') and mercury. These are recognized as highly toxic persistent pollutants which can bioaccumulate in food chains, and which regularly occur in emissions to air, and in flue gas treatment residue, from municipal waste and hazardous waste incinerators. Very small quantities (fractions of one ng/g¹ of tetrachlorodiphenyl-p-dioxin (TCDD) toxic equivalent (TEQ)) of some dioxins can have sub-lethal effects on piscivorous birds such as cormorants², grebes³, herons⁴ and terns⁵. However, this focus is not to ignore the in-combination effects of a wider range of other organic and heavy metal pollutants recorded from incinerator emissions.

There is a requirement for an appropriate assessment to be "complete, precise and definitive", and based on the "best scientific knowledge". (*Kelly v. An Bord Pleanála*⁶; *Connelly v. An Bord Pleanála*, Supreme Court, 2018, IESC 36). In the opinion of this Department, the following issues need to be adequately addressed before a complete, precise and definitive appropriate assessment can be completed.

(1) Formation of dioxins and furans by allowing gases to linger at formation temperature for waste heat recovery

As a general principle, permitting any avoidable production of persistent pollutants such as dioxins and furans adjacent to a protected wetland ecosystem such as Cork Harbour is not best ecological practice.

The *Stockholm Convention on Persistent Organic Pollutants*, and its implementing legislation in the European Union, *Regulation (EC) No 850/2004 of the European Parliament and Council of 29 April on persistent organic pollutants*,

¹ Nanograms per gram, i.e. one nanogram = one billionth of a gram.

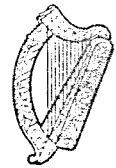
² Gatehouse, R. (2004) *Ecological risk assessment of dioxins in Australia*. National Dioxins Program Technical Report No. 11, Australian Government Department of the Environment and Heritage, Canberra.

³ Elliot, J.E. and Martin, P.A. (1998) Chlorinated hydrocarbon contaminants in grebes and seaducks wintering on the coast of British Columbia, Canada: 1988-93. *Environmental Monitoring and Assessment* **53**: 337-362.

⁴ Henshel, D.S., Martin, J.W., Norstrom, R., Whitehead, P., Steeves, J.D. and Cheng, K.M. (1995) Morphometric abnormalities in brains of great blue heron hatchlings exposed in the wild to PCDDs. *Environmental Health Perspectives* **103** (Suppl. 4): 61-66.

⁵ Mierzykowski, S.E., Welch, L.J., Hall, C.S., Kress, S.W. and Allen, R.B. (2008) *Contaminant assessment of common terns in the Gulf of Maine*. USFWS Special Project Report FY07-MEFO-2-EC. Maine Field Office, Old Town, Maine, U.S.

⁶ *Kelly v. An Bord Pleanála*, High Court, 2013 No. 802 J.R.; *Connelly v. An Bord Pleanála*, Supreme Court, 2018, IESC 36; Court of Justice of the European Union (CJEU), Case C-127/02; CJEU, Case 404/09.



as well as *Directive 2000/76/EC on the incineration of waste*, all refer to reduction or elimination of production of dioxins and furans. Although this arguably refers to the *deliberate* production of these pollutants, the general principle of reduction of their production including as *avoidable* by-products of industrial processes is clear.

A review of hazardous waste incineration in 1999⁷ stated: "Formation of these compounds can be minimized with good combustion of precursors in the incinerator, but proper operating conditions of the downstream equipment is critical to prevent formation of the tiny amounts that would cause problems in meeting the proposed standards. Thus, cooling of the gases in the downstream equipment is extremely important. ***A rapid (1 to 2 seconds) adiabatic quench is much preferred over waste heat recovery in a boiler that lets the gases linger at [dioxin and furan] formation temperatures⁸ for 5 to 10 seconds.***" [p. 17]. (Emphasis and Italics added).

This issue is still emphasized in the recent scientific literature. For instance, one recent 2016 study⁹ stated: "The economizer¹⁰ had been found [to be] the source of PCDD/F formations in the MSWI¹¹s, because its operational temperature falls within [the] PCDD/F window. Therefore, it is encouraged to improve the heat exchange efficiency of economizers in order to shorten the residence time of the flue gas so as to effectively reduce PCDD/F formation in the MSWIs."

Also, rapidly quenched ash may also be more condensed and, as a consequence lead to less leaching of toxic metals when disposed in landfill¹².

There is a question as to whether the Natura Impact Statement (NIS) has sufficiently investigated this issue. While the NIS refers to rapid cooling, it does not cite how many seconds the gases will linger for at dioxin-formation temperatures, or give the reasons why the rapid cooling system proposed is state-of-the-art in this area (i.e. no quantitative or comparative data on performance).

(2) Assessment of disposal of fly ash

According to an International Solid Waste Association review¹³: "Today solid residues from modern Waste-to-Energy facilities constitute the primary emission route to the surrounding environment." In a recent High Court case¹⁴, it has been established that, in the case of a wind-farm, the electricity cable through which the generated electricity is exported to the grid must be viewed as part of the project for

⁷ Roberts, S.M., Teaf, C.M. and Bean, J.A. (eds.) (1999) *Hazardous waste incineration: Evaluating the human health and environmental risks*. Lewis Publishers, Boca Raton, USA.

⁸ Formation temperatures are cited as being 500-800 °C (p. 33 of Roberts *et al.* (cited above).

⁹ Cheruiyot, N.K., Lee, E.-J., Yan, P., Mwangi, J.K., Wang, L.-C., Gao, X., Lin, N.-H. and Chang-Chien, G.-P. (2016) An overview of PCDD/F inventories and emission factors from stationary and mobile sources: What we know and what is missing. *Aerosol and Air Quality Research* **16**: 2965-2988.

¹⁰ Economizers capture heat from flue gas and transfer it to boiler feedwater.

¹¹ Municipal Solid Waste Incinerators.

¹² Zheng, G. and Koziński, J.A. (2000) Thermal events occurring during the combustion of biomass residue. *Fuel* **79**: 181-192.

¹³ Astrup, T. (2008) *Management of APC residues from W-t-E plants: An overview of management options and treatment methods*. International Solid Waste Association Working Group of Thermal Treatment of Waste.

¹⁴ O'Grianna & Ors. v An Bord Pleanála (2014, IEHC 632 23).



assessment (EIA and appropriate assessment) to be complete. The same argument may be valid for the assessment of the disposal of ash residues being necessary for a complete assessment of a proposed municipal waste and hazardous waste incinerator.

In this case, the flue gas cleaning residues should be a particularly important focus of ecological assessment, because of the elevated quantities of dioxins, furans, heavy metals and other pollutants extracted from the post-combustion process¹⁵. An estimated 9,100 tonnes would be produced annually¹⁶. The NIS states: "It will be exported abroad for recovery in a salt mine or for disposal to a hazardous waste landfill, until a suitable landfill for hazardous waste is developed in Ireland." In Appendix 18 to the NIS, the location of the facility currently being used and proposed is in underground mines at Hattorf and Wintershall in Germany. A likely site (National Difficult Waste Facility) has not yet been identified in Ireland¹⁵. The Hattorf and Wintershall sites are near the [River] Werra between Phillipsthal and Herleshausen Special Area of Conservation (SAC) (5125-350) designated in 2008. The NIS does not include a screening for appropriate assessment for the effects of flue gas cleaning residue disposal at the underground facility on this or other European sites in the vicinity.

Again, it is worth citing the International Solid Waste Association Review¹²: "Metal leaching from residues after final disposal may continue for thousands of years. Although the actual consequences cannot be determined today, the potential impacts from this long-term release should be assessed and accounted for." The NIS does not appear to refer to the likelihood of EU Member States being restricted in their ability to export waste in the future¹⁷. The maximum permitted lifetime of the proposed incinerator installation is 40 years (10 to complete construction, 30 for operation). If, during this period some or all bottom and filter ash will have to be disposed of within the State, then, as specific sites cannot be yet located, the generic types of location should be at least screened for assessment. If disposal could be within a cSAC catchment, or a river with significant populations of kingfisher (a species listed in Annex I of the EU Birds Directive), is a possibility, then the likely generic impacts and best available techniques for mitigation measures need to be completely assessed. Assessment of the disposal of bottom ash is also necessary, including the possibility of leaching of nanoparticles (see item 5 below) to groundwater in their disposal site¹⁸.

¹⁵ Dioxin concentration in fly ash "varies from 100-5000 ng/kg" (Kulkarni, P.S., Crespo, J.G. and Afonso, C.A.M. (2008) Dioxins sources and current remediation technologies – A review. *Environment International* 34: 139-153) [p. 145].

¹⁶ Natura Impact Statement, p. 16.

¹⁷ SKM Enviro (2010) *Technical and economic aspects of developing a National Difficult Waste Facility (NADWaf)*. Environmental Protection Agency.

¹⁸ Vejerano, E.P., Leon, E.C., Holder, A.L. and Marr, L.C. (2014) Characterization of particle emissions and fate of nanomaterials during incineration. *Environmental Science: Nano* 1: 133-143.



(3) Exceedance of dioxin and furan threshold concentrations in start-up emissions

It is well recognized that considerable exceedance of dioxin and furan emissions can occur during start-up^{19,20}.

In April 2018, the European Environmental Bureau (EEB) published the following document: *A wasted opportunity? EU environmental standards for waste incineration plants under review*²⁰. It specifically refers to the problem of bypass of part or all of the flue-gas cleaning system during start-up. In the event that the EPA decides to grant a licence, there should be a clearly specified condition which requires the technology to be installed which avoids bypassing the flue-gas cleaning system at all times.

The BAT no. 21²¹ requirement (“The use of auxillary burners for start-up and shut-down ...”) response by the applicant uses the term “autothermal”, which is difficult to interpret.

The above EEB document also recommended half-hourly, rather than daily, averages to be a requirement for emission level reporting, to avoid obscuring (by averaging) highly elevated emissions over fractions of a day.

(4) Effectiveness of control of mercury emissions

Mercury is a particularly important pollutant, and deposition occurs globally, affecting, for instance, Swedish freshwater fish and marine mammals in the north-east Atlantic²². There is variation in the mercury emissions performance of incinerators within the EU, and there is a question as to whether the proposed process would always be able to use activated carbon injection at start-up.

The NIS does not refer to the 2018 *Global Mercury Assessment*¹⁷, or consider mercury under the in-combination assessment. Also, there is no assessment in the NIS of comparative mercury emissions data from similar incinerators in the EU. At the 2009 planning Oral Hearing for this proposed installation, sets of data from selected incinerators (with similar furnace and flue gas cleaning systems) were produced (17 June 2009) as supplementary further information. Updated data from

¹⁹ E.g. Neuer-Etscheidt, K., Nordsieck, H.O., Liu, Y., Kettrup, A. and Zimmermann, R. (2006) PCDD/F and other micropollutants in MSWI crude gas and ashes during plant start-up and shut-down processes. *Environmental Science and Technology* **40**: 342-349; Tejima, H., Nishigaki, M., Fugita, Y., Matsumoto, A., Takeda, N. and Takaoka, M. (2007) Characteristics of dioxin emissions at startup and shutdown of MSW incinerators. *Chemosphere* **66**: 1123-1130; Wang, L.-C., His, H.-C., Chang, J.-E., Yang, X.-Y., Chang-Chien, G.-P. and Lee, W.-S. Influence of start-up on PCDD/F emission of incinerators. *Chemosphere* **67**: 1346-1353; Hung, P.-C., Chang, S.H., Buekens, A. and Chang, M.-B. (2016) Continuous sampling of MSWI dioxins. *Chemosphere* **145**: 119-124.

²⁰ <https://eeb.org/library/a-wasted-opportunity-eu-environmental-standards-for-waste-incineration-plants-under-review/>

²¹ Attachment 4-7-6 BAT waste incineration catalogue [BAT = Best Available Technique(s)]

²² UNEP (2019) Global Mercury Assessment. [c](#)



incinerators using the same processes as that proposed (e.g. from the Thaumaidé incinerator²³ (Belgium)), would provide a useful comparison on which to base the assessment.

The above EEB report²⁰ recommended that an emission limit of 10 µg/Nm³ (maximum daily average) should be applied to new incinerator emissions, and this could be recommended here too as it appears to have been achieved elsewhere in the EU.

(5) Effects of emissions of nanoparticles

The lack of assessment in the NIS of the effects of nanoparticles in incinerator emissions, on Cork Harbour SPA, was raised by Cllr. Marcia D'Alton at the Oral Hearing held by An Bord Pleanála on April 2016. The NIS for the licence application was up-dated (pp. 39-40) to include this, based on a review of the scientific literature included in Appendix 20. However, despite the claim that the above review is comprehensive (Appendix 20, p. 9), some recent scientific reviews are missing²⁴ as is a discussion of the necessity for electrostatic precipitators for nanoparticle removal in addition to fabric filters, and the importance of how filters are 'regenerated'²⁵. In particular, the issue raised in a very recent paper²⁶ concerning the role, during incineration of carbon nanomaterials, of fullerene "leading to the formation of high concentrations of PCDD/Fs" needs to be assessed.

(6) Ecotoxicological monitoring recommendation

A recommendation was given, by this Department, to An Bord Pleanála (ABP) during the 2016 Oral Hearing, for ecotoxicological monitoring. However, possibly because the ABP Inspector recommended refusal of planning permission, and therefore did not recommend conditions, when the Board inserted conditions, there

²³ <https://www.ipalle.be/wp-content/uploads/2019/07/2019-DE-2018-2019-2020-2018-BD.pdf>

²⁴Holder, A.L., Vejerano, E.P., Zhou, X. and Marr, L.C. (2013) Nanomaterial disposal by incineration. *Environmental Science: Processes Impacts* **15**: 1652-1664;
Vejerano, E.P., Leon, E.C., Holder, A.L. and Marr, L.C. (2014) Characterization of particle emissions and fate of nanomaterials during incineration. *Environmental Science: Nano* **1**: 133-143;

Jones, A. and Harrison, R. (2016) Emission of ultrafine particles from the incineration of municipal solid waste: A review. *Atmospheric Environment* **140**: 519-528;

Johnson, D.R. (2016) Nanometer-sized emissions from municipal waste incinerators: A qualitative risk assessment. *Journal of Hazardous Materials* **320**: 67-79;

Steyan, A., Patrick, M. and Wang, J. (2017) Very low emissions of airborne particulate pollutants measured from two municipal waste incineration plants in Switzerland. *Atmospheric Environment* **166**: 99-109;

Markus, A.A., Parsons, J.R., Roex, E.W.M., de Voogt, P. and Laane, R.W.P.M. (2016) Modelling the release, transport and fate of engineered nanoparticles in the aquatic environment – a review. *Reviews of Environmental Contamination and Toxicology* **243**: 53-87.

²⁵ Förster, H., Thajudeen, T., Funk, C. and Peukert, W. (2016) Separation of nanoparticles: Filtration and scavenging from waste incineration plants. *Waste Management* **52**: 346-352.

²⁶ Fujimori, T., Toda, A., Mukai, K. and Takaoka, M. (2020*) Incineration of carbon nanomaterials with sodium chloride as a potential source of PCDD/Fs and PCBs. *Journal of Hazardous Materials* **382**, 121030. (*available in 2019 at <https://www.sciencedirect.com/science/article/pii/S0304389419309847>).



was none for ecotoxicological monitoring. In the event that the EPA grants an industrial emissions licence to the proposed waste-to-energy facility, the following two licence conditions are therefore recommended by the Department.

(The EIS/NIS refer to monitoring of cow's milk as a suitable indicator for effects on Cork Harbour SPA. However, the main plume depositions from the stack are over marine ecosystem, by the nature of the geography of the prevailing wind and the Harbour. Also, a terrestrial food-chain is rarely used in ecotoxicology as a surrogate for a marine food-chain.)

Monitoring of PCDDs and PCDFs will be carried out in livers of fish which form part of the diet of piscivorous birds in Cork Harbour Special Protection Area. Monitoring methods will be based on standard methods, and in particular will be sufficient to be statistically robust. Fish samples will be collected in shallow waters (<5m depth) from Whitegate Bay and from Monkstown Creek (avoiding wastewater discharge areas), by competent aquatic ecologists and samples will be analysed in an accredited laboratory. Monitoring will be carried out every 5 years after commencement of operation, and a baseline data-set will be established prior to the commencement of the operation of the incinerator. Reports of the baseline and monitoring will be forwarded to the Environmental Protection Agency and the National Parks and Wildlife Service of the Department of Arts, Heritage and the Gaeltacht.

Reason: To monitor the predictions of no adverse effects of incinerator emissions on Cork Harbour Special Protection Area.

In the event that real-time PCDD/F monitoring, or acceptable indicator monitoring, techniques become effective and feasible, these will be installed at the Ringaskiddy waste-to-energy facility.

Reason: To monitor the predictions of no adverse effects of incinerator emissions on Cork Harbour Special Protection Area.

You are requested to send further communications to this Department's Development Applications Unit (DAU) via **eReferral**, where used, or to manager.dau@chg.gov.ie; if emailing is not possible, correspondence may alternatively be sent to:

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Is mise, le meas

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