



Licensing Administration,  
Environmental Licensing Programme,  
Office of Climate,  
Licensing & Resource Use,  
Environmental Protection Agency,  
Headquarters,  
PO Box 3000,  
Johnstown castle Estate,  
County Wexford

02 Mar 2015

Reg No: W0167-03

Re: Notice pursuant to Regulation 28 of the EPA (Industrial Emissions) (Licensing) Regulations 2013, in respect of the proposed determination on a licence review application by Indaver Ireland Limited, Reg. No W0167-03

Dear Ms. Collins,

Please find information below and attached as requested by the Agency.

#### Question 1

The reference to Line 4 is an Ekokem term used to describe their grate incinerator accepting municipal and hazardous waste. The following explanation comes from Petri Onikki of Ekokem,

*'WTE1 is our first grate and it was called line 4 earlier. WTE2 is our newest Volund grate. If you are wondering where the number 4 came the reason was that ten years ago we run three rotary kiln and the first grate was our fourth boiler.'*

However, the information submitted to the Agency by Indaver referred to Waste-to-Energy Plant 2, and should have detailed a plant of 160,000 tpa with an acceptance of 25,000 tpa of hazardous waste.

#### Question 2

The proposed amendments to the installation require no changes to the Seveso status of the site. Indaver's original correspondence with the Health & Safety Authority (HSA) was in 2006 on the classification of the flu gas

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Directors: J. Ahern, C. Jones, J. Keaney

Belgian Directors: P. De Bruycker, M. Decorte, B. Goethals

residues. In 2008 Indaver requested Byrne O’Cleirigh consultants to assess the classification of Carranstown under Seveso Regulations. The conclusion of this assessment was that the proposed Carranstown facility was not one to which the Seveso Regulations applied. The HSA was informed of Indavers intentions to introduce hazardous waste streams in 2012 as part of our consultation process. Please find a copy of the correspondence in Attachment A.

Indaver has operated the Carranstown facility for three years, in this time analysis of the actual flue gas residues has taken place, the results show that the heavy metals content is lower than was predicted in 2008, see Table 1. This confirms that the flue gas residues are not impacting on the current Seveso status of the facility.

**Table 1.** Comparison of predicted flue gas residues when compared to averaged actual results over three years show that the actual are lower than those reviewed in the Seveso Assessment.

Residue	Indaver Ireland's Flue Gas Residue Results (mg/kg)	Byrne O’Cleirigh 2008 study (mg/kg)
<i>Metals mg/kg</i>		
As	27.51	-
Cd	119.43	170
Co	8.65	-
Cu	361.43	1280
Cr	34.14	351
Ni	27.43	52
Pb	1827.14	4750
Sb	340.00	910
Sn	386.43	700
Zn	7142.86	7820
Hg	9.07	80

**Question 3**

Schedule C of our current licence W0167-02 deals with controls and monitoring, in particular C.4 deals with the monitoring of incineration residues. The results of the testing of the flue gas residues as per C.4 are summarised in Table 1. The interpretation of the relevance of these results to Seveso status has been described in answering Question 2 above. The proposed

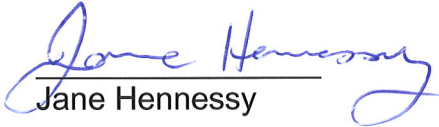


amendments to the installation require no changes to the Seveso status of the site.

The Carranstown facility will take in 235,000 tonnes per annum if the proposed decision is granted, only 4% of the waste accepted into the facility will be classified as hazardous. The suitable hazardous waste types for the facility are strictly limited and therefore we do not anticipate any changes to the chemical constituents of the flue gas residues.

However, Indaver is committed to fulfilling any Seveso requirement and will continue to assess the results from the flue gas residues in line with the new Seveso directive.

Kind regards,

  
Jane Hennessy

Project Development Manager

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# Attachment

# A

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Indaver Ireland,  
Haddington Terrace,  
Dún Laoghaire

9<sup>th</sup> July 2008

Ref: 08P0614  
FBS: 321.07.01.24

**Re: Classification of Carranstown under Seveso Regulations (SI 74 of 2006)**

Dear Sirs,

We have been requested by Indaver Ireland to provide a technical opinion as to whether, at a maximum throughput of 200,000 tonnes per year of municipal waste, the proposed Municipal Solid Waste Incineration Plant at Carranstown, Co. Meath would be classified as a 'Seveso' site under the relevant "Seveso" Directive and Regulations in force in Ireland as at June 2008.

A new development can only qualify as a "Seveso" site if it exceeds (or will exceed when operational) an inventory threshold for dangerous substances as set out in SI 74 of 2006. If the inventory of an establishment exceeds one or more of the thresholds in SI 74 then some or all of the regulations in the "*European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations*", (SI 74 of 2006) would apply to the site.

These Regulations, signed in February 2006, implement the EU Seveso II Directive 96/82/EC in Ireland as Amended by Directive 2003/105/EC. The latest rules regarding inventory thresholds for Seveso sites are contained in SI 74 of 2006 and have been applied in this assessment by Byrne Ó Cléirigh Limited.

At the time of preparing this letter (June 2008), the plant at Carranstown has not been built. The provisions in SI 74 relating to new establishments would thus be applicable to the Carranstown project if it were found to be a Seveso site on the basis of its projected inventory of substances covered by the Directive. The purpose of this letter is to establish whether the proposed development at Carranstown would be a Seveso site once operational, based on current legislation.

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In the First Schedule to the Regulations there are two parts which set out the threshold levels for dangerous substances above which sites are deemed to be covered by the Regulations. Part 1 of the First Schedule has thresholds (generally expressed in tonnes) for “named” substances. These substances are either listed as an individual chemical or in some cases as groups of “named” substances. The latter type includes the furans and dioxins family of chemicals and another “named” grouping lists certain specific carcinogens.

Part 2 of the First Schedule sets out threshold levels for a list of 13 ‘*categories of substances and preparations which are not specifically named in Part 1*’.

In order to determine if a site qualifies under Seveso, the inventory of all Seveso substances expected to be present on the site must be examined. Having applied the addition rules there are several possible outcomes.

- **The site is not a Seveso site** (a) if no individual named substance in Part 1 of the First Schedule exceeds its lower tier inventory threshold AND (b) if no combined inventory within the categories of dangerous substances covered by Part 2 is exceeded AND (c) having applied three addition rules in the First Schedule that no value of q/Q for either toxicity, flammability or eco toxicity exceeds 1.0. (The addition rules are set out in Note 4 to Part 2 of the First Schedule).
- **The site can be a Lower Tier Seveso site** under several circumstances (a) if any one of the named substances exceeds its Lower Tier Threshold in Part 1 of the First Schedule or (b) if the aggregated inventory of any category of dangerous substances exceeds the lower threshold for that category as set out in Column 2 of the Tables in Part 2 of the First Schedule. A site can also be a Lower Tier site if having applied three addition rules in the First Schedule the value of q/Q for either toxicity, flammability or eco toxicity exceeds 1.0.

In addition, in order to be considered as a lower tier site (and not an Upper Tier site) then no individual named substance or aggregated category inventory may be present at an inventory level which is above the threshold for upper tier sites. These are set out in Columns 3 in both Parts 1 and 2 of the First Schedule.

- **The site is an Upper Tier Seveso site** if (a) any named substance exceeds the Quantitative Threshold in Column 3 of Part 1 of the First Schedule or (b) if any of the aggregated inventories exceed the Upper Tier threshold values for a category of substances in Part 2 of the First Schedule as set out in Column 3 of Part 2.

In order to provide an opinion on whether the proposed operation at Carranstown would be a classified as a Seveso site we undertook the following actions.

- We reviewed the inventory threshold data from the First Schedule of the Regulations of SI 74 of 2006.



- We had previously requested Indaver Ireland to provide data indicating which of the 'named substances' and which of the generic categories of dangerous substances they expected to be present on their site.
- In June 2008 we sought information from Indaver in respect of their current best estimates of the substances likely to be present on the Carranstown site and we received data on the revised inventories which would apply to a maximum throughput of 200,000 tonnes per annum of municipal waste.
- There is a natural gas pipeline traversing the Carranstown site. Section 4.2.c. (v) of S.I. 74 of 2006 (and in the previous SI 476 of 2000 Regulations) states that the regulations do not apply to the transport of dangerous substances in pipelines and pumping stations. Notwithstanding that, we held clarification discussions with the HSA in 2001. Following that discussion we assessed the inventory of natural gas immediately under the Indaver site for the length of 200 mm diameter gas pipeline which traversed the site. We have included this quantity of natural gas in the inventory used to establish if the site was one to which S.I. 74 would apply. The inventory of natural gas in the pipeline under the site is based on the pipeline diameter (200 mm), maximum gas pressure (70 bar) and the estimated length of pipeline within the site boundary (300m).
- For dioxins, petroleum products and HCl solutions we estimated the inventories based on Indaver data on the maximum storage quantities and concentration data supplied by Indaver. The result of the inventory assessments are shown in the tables below.

Of the named substances in Part 1 of the First Schedule in SI 74 of 2006, Indaver predicts that only the four listed in Table 1 below will be present at the proposed facility in any predictable quantities.



**Table 1: Review of Inventory of ‘Named Substances’ (Part 1 of the First Schedule)**

Named Substance <sup>1</sup>	Max Quantity on Site (tonnes)	Lower Tier Threshold (tonnes)	Upper Tier Threshold (tonnes)	Factor by which Carranstown inventory is below Lower Tier Threshold
<p><b>Liquefied extremely flammable gases (including LPG) and natural gas.</b></p> <p>Natural Gas –present in a gas pipeline crossing the site.</p>	0.62	50	200	81
<p><b>Polychlorodibenzofurans and Polychlorodibenzodioxins (including TCDD) calculated in TCDD equivalent –</b></p> <p>Present in incoming domestic / municipal waste and also in 3 types of waste ash. (See Annex 1 for calculation of maximum dioxin inventory)</p>	0.00000070	-	0.001	1429
<p><b>Petroleum Products</b></p> <p>Automotive Petrol – present in fuel tanks of employees cars – based on 40 cars with 30 l/tank &amp; petrol density of 0.7 kg/l (0.84 tonnes) plus</p> <p>Diesel Oil (Defined in Directive as including diesel fuels, home heating oils, and gas oil blending streams). The oil fuel tank will be 40m<sup>3</sup>, but 50 tonnes are included in inventory assessment to be conservative. 5 tonnes other oils for machinery</p>	55.84	2500	25000	45
<p><b>Hydrogen Chloride<sup>2</sup> (liquefied gas)</b></p>	0.02	25	250	1250

Notes to Table 1:

1. It can be assumed that the above are the only named substances that Indaver expects on their site in a predictable quantity. However, small quantities of other named substances could enter the site via household waste streams e.g. minor LPG residues in aerosols, household cleaning agents in empty containers etc.
2. The HCl material present on the site will be in the form of aqueous Hydrogen Chloride in a 30% solution by weight. The maximum quantity of solution stored is 1 tonne and the material will be stored indoors. It should be noted that the aqueous HCl is not classified as a Seveso substance in its own right. However, we have included in the inventory a quantity of 20 kg of Hydrogen Chloride gas. HCl when present as a liquefied gas can evaporate if released and it is classed as a dangerous “named” substance in Part 1 of the





First Schedule). We estimate that a 20 kg quantity of HCl gas could be evolved over a 1 hour period in the event of a spill of the 30 % solution hence we include this quantity in the inventory.

As can be seen from the above table, the quantities of each of the individual ‘named substances’ or families of named substances that are expected to be present on the Indaver site at Carranstown at any one time are all very much below their respective minimum thresholds at which the site would qualify for regulation under SI 74 (either as a Lower or Upper Tier site).

In the case of the aggregate quantity of dioxins in the incoming waste and in the ash/residue streams, we have updated the projected dioxin inventory on the site using the latest dioxin concentration data from Indaver’s Beveren plant and on dioxin levels measured on that site in municipal waste, bottom ash (slag), boiler ash (fly ash) and gas cleaning residues. The concentration data were provided by Indaver based on analysis at their municipal waste incineration facilities in Beveren near Antwerp.

Based on the maximum projected tonnes of materials stored on the site we have calculated that the maximum site inventory of dioxins at any time will be ~ 0.685 grams. This is a factor of 1,459 (one thousand, four hundred and fifty nine) times lower than the 1 kg threshold quantity which would qualify a site as a Seveso site based solely on the threshold for dioxins in Part 1 of the First Schedule. (See also Tables 3, 4 and 5 for the effects of aggregation of named substances and categories of several substances.)

The named substance with the highest percentage of the Lower Tier Threshold limit is under the category of named substances entitled “Petroleum Products”. The inventory of this category of named substances is 55.8 tonnes<sup>1</sup> most of which is accounted for by 50 tonnes of gas oil used as a standby fuel. The factor by which this quantity is below the Lower Tier Threshold for petroleum products in the Regulations is 45.

In addition to checking the status by reference to the thresholds for the “Named” Seveso substances in Part 1 of the First Schedule, it is also necessary to compute inventory levels for substances under three other categories using the three addition rules in the Regulations. These categories are

- substances categorised as toxic or very toxic
- flammable substances
- substances which are Dangerous for the Environment

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<sup>1</sup> We have conservatively assumed that the light fuel oil proposed by Indaver is gas oil and that it falls under the new category of “Petroleum Products in the First Schedule of SI 74 of 2006.



**Table 2: Review of Categories of Substances not specifically named in Part 1 of First Schedule in SI 74**

Category of Substance	Max Quantity on Site (tonnes)	Lower Tier Threshold (tonnes)	Upper Tier Threshold (tonnes)	Expected Inventory as % of Lower Tier Threshold	Factor by which Carranstown inventory is below Lower Tier Threshold
<p><b><i>Dangerous for the environment in combination with the risk phrase R53 (may cause long term adverse effects in the aquatic environment):</i></b></p> <p>Indaver will store 5 tonnes of diesel fuel for machinery. It will also store 50 tonnes of light fuel oil to fuel the auxiliary burners. If this oil is in the diesel range then the Risk Phrase R51/53 would apply. As a named substance the appropriate threshold is that of “Petroleum Products” for which the lower tier threshold is 2500 tonnes.</p>	55.84	2500 <sup>2</sup>	25,000	2.03	45

In relation to other materials with the potential to be classified as “Dangerous for the environment” we have conducted a separate assessment of whether any of the ash residues produced would fall under this category due to their respective heavy metal contents. (See table in Appendix 2).

***Application of Addition Rules by combining Named Substances in Part 1 of the First Schedule with Categories of Substances in Part 2***

The addition rules involve the calculation of a value, commonly referred to as the  $q/Q$  value, for each Seveso substance, where:

$q$  = quantity of the substance present on the site;

$Q$  = threshold quantity for either Lower or Upper Tier site.

In accordance with Note 4 of Part 2 of the First Schedule SI 74 the  $q/Q$  values should be aggregated separately under three different categories:

- toxicity,
- flammability and
- eco toxicity.

<sup>2</sup> Revised threshold for named “Petroleum Products” per SI 74 of 2006



This is done by computing (a)  $q/Q$  for all toxic substances (b) for all flammable substances and (c)  $q/Q$  for substances dangerous to the aquatic environment present at the site. The results of these calculations are set out in Tables 3 and 4 and 5 below.

**Table 3: Application of Addition Rule for Toxic Substances - Carranstown**

Substance	$Q$ (tonnes)	$Q_{Lower Tier}$ (tonnes)	$q/Q$ <i>Lower Tier Basis</i>
Dioxins	0.00000070	0.001	0.00070
HCl gas	0.02	25	0.0008
Petroleum Products	55.84	2500	0.0223
<b>Sum <math>q/Q</math> for toxics</b>			<b>0.0238</b>
<b>Safety Factor below Seveso Lower Tier Threshold (<math>Q/q</math>)</b>			<b>42</b>

**Table 4: Application of Addition Rule for Flammable Substances - Carranstown**

Substance	$Q$ (tonnes)	$Q_{Lower Tier}$ (tonnes)	$q/Q$
Natural Gas – in pipeline on site (Named Substance)	0.62	50	0.0124
Automotive Petrol – in employees cars (Named Substance Petroleum Products)	0.84	2500	0.000168
<b>Sum <math>q/Q</math> for Flammables</b>			<b>0.0126</b>
<b>Safety Factor below Seveso Lower Tier Threshold (<math>Q/q</math>)</b>			<b>79</b>

Note: The petrol in employee cars is flammable and is included in the  $q/Q$  computation for flammability for completeness of the inventory of flammable substances in Table 4 above.

The gas-oil which Indaver will use as standby fuel is not classed as flammable but is classified as a Class 3 Petroleum liquid and so does not have the risk phrases which would render as a flammable material as defined under the Seveso Regulations. The gas oil/diesel is however included below under the analysis of materials which are dangerous for the environment. (See table 5)



**Table 5: Application of Addition Rule for Substances Dangerous to Environment - Carranstown**

<b>Substance</b>	<b>Q (tonnes)</b>	<b>Q<sub>Lower Tier</sub> (tonnes)</b>	<b>q/Q Lower Tier</b>
Petroleum Products (Named Substance – Gas Oil and automotive petrol)	55.84	2500	0.022
Sum q/Q for Dangerous to Environment			0.022
<b>Safety Factor Below the Seveso Lower Tier Threshold</b>			<b>45</b>

### **Classification of Ash/Residues**

We examined correspondence between the HSA and Indaver on the subject of the metal content of the ash and residue materials which will be generated by the incineration process. We have checked to see whether these residues are ones which are covered under Part 2 of the First Schedule under the category “Dangerous for the environment (either with risk phrases R50/53 or R51/53)”.

Based on the concentration values provided to us for the heavy metal content of residues at Indaver’s plant at Beveren near Antwerp, we consider that these materials would have the risk phrase R52-R53 (harmful to the aquatic environment) and as such are not Seveso Substances. The details of that calculation are included in Annex 2.

### **Outcome of q/Q Analysis**

As can be seen from the Tables above the aggregate values for q/Q under the three separate headings (a) toxic substances, (b) flammable substance, and (c) substances which are dangerous to the environment (based on the Lower Tier thresholds) are all significantly less than 1.0.

The factors by which the site is below the relevant threshold range from 42 to 79 for the three types of aggregation. In summary the projected site inventories in the three different categories are all over forty times lower than the inventory levels at which the site would become a Seveso site.

This result together with the fact that none of the named substances exceeds or even approaches its lower tier threshold means the proposed facility would not be classified as a Seveso Site under SI 74 of 2006 based on the inventories of dangerous substances associated with a plant of capacity of 200,000 tonnes per year.



Based on the information provided to us by Indaver Ireland, which has been updated to June 2008 it is our view that the proposed incineration facility at Carranstown, Co. Meath is **not** one to which the Regulation in S.I. 74 of 2006 (the Seveso Regulations) apply and the site is not a Seveso site.

Indaver may use this letter, when it is quoted in full, for the purpose of informing discussions with the HSA or the EPA.

Yours sincerely

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Thomas Cleary BE, C Eng, Eur Ing, FIChemE, FIEI  
Senior Partner  
Byrne Ó Cléirigh

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## Annex 1

### Estimation of Maximum Dioxin Inventory on Site

An estimate of the maximum dioxin inventory on the Carranstown site was conducted as set out below.

The dioxins on the site are associated with different waste streams including incoming municipal solid waste and by-product ash streams. In order to calculate the maximum combined inventory, the bunker sizes and maximum quantity of the different waste and residue streams to be stored were provided by Indaver and updated in June 2008. The dioxin concentrations in the individual waste streams were provided by Indaver based on their operating experience with Indaver's municipal waste incineration plant at Beveren near Antwerp, Belgium.

*Table A1: Derivation of Maximum Dioxin Inventory on Carranstown site*

Material Containing Dioxin	Max Bunker Capacity (m3)	Maximum Quantity <sup>1</sup> of waste expected to be on the site at any time (tonnes)	Dioxin <sup>2</sup> Concentrations (ng TEQ/kg)	Maximum Dioxin Inventory (g TEQ)
Incoming Municipal Waste	16,000	6,400	50	0.320
Bottom Ash (Slags)	1600	1,600	22	0.035
Boiler Ash (Fly Ash)	200	120	42	0.005
Residues from Gas Cleaning	420	252	1290	0.325
<b>Total</b>		-	-	<b>0.685</b>

Notes:

1. Based on proposed plant design philosophy, bunker sizes, inventories as of June 2008
2. Based on sampling at Indaver's Beveren facility in Belgium.

The total expected inventory of 0.685 grams is a factor of 1,459 (one thousand, four hundred and fifty nine) times lower than the quantity which would qualify the site as a Seveso site based on dioxins alone which is 1.0 kgs according to Part 1 of the First Schedule of SI 74 of 2006.

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## Annex 2

### Check on Risk Phrases for Incineration Residues Based on Heavy Metal Content

An check was made of the metal contents of the bottom ash (slag), boiler ash (fly ash) and the gas cleaning residues to establish what the appropriate risk phrases would be for the individual residues and whether the heavy metals content would render them as “Dangerous for the Environment” with risk phrase R50 or R51/53.

There are thresholds in the Seveso Regulations for materials with these risk phrases.

SI 74 cited threshold values for two categories of materials:

- R50: “Very toxic to aquatic organisms” (including R50/53) – with a threshold for Lower Tier Site of 100 tonnes
- R51/53: “Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment” – the threshold for a Lower Tier Sites is 200 tonnes.

**Table A2: Derivation of Risk Phrases for Ash Residues Based on Heavy Metal Content**

Material Containing Dioxin	Heavy Metals Concentration total (% by weight)	Risk Phrase based on concentrations of N,R50-R53 Heavy Metals In materials
Bottom Ash (Slags)	1.68%	R52-53
Boiler Ash (Fly Ash)	1.21%	R52-53
Residues from Gas Cleaning	1.61%	R52-53
<b>Total</b>		

The designation assigned in column 3 in the above table is based on the rules of the EC Dangerous Preparations Directive 1999/45/EC which provides the basis for classification of mixtures or preparations containing dangerous substances.

Based on the concentration of individual heavy metals in the residues in Indaver’s MSW incineration plant at Beveren (see detailed table overleaf), the total heavy metal concentrations in the ash/slag and gas cleaning residues from the incineration process are all lower than 2.5% w/w. This is below concentration at which the residue would be



classified either as R50-53 or as R51-53. Based on the Indaver analysis the ash, slags and gas cleaning residues would each be classified as R52-R53 and so are not included in the inventories as they are not deemed as Seveso substances under Part 2 of the First Schedule.

The individual metal concentrations are set out in the following table:

**Table A2-1: Heavy Metal Concentrations in Ash and Residues at Beveren**

Heavy Metal	Classification	Heavy Metal Concentration (mg/kg)		
		Residues from Gas Cleaning	Boiler Ash (Fly Ash)	Bottom Ash (Slags)
Cd	N - R50/53	170	23	-
Ti	N - R50/53	-	-	-
Hg	N - R50/53	80	-	9
As	N - R50/53	-	20	-
Co	N - R50/53	-	330	560
Cr	N - R50/53	351	1250	484
Cu	N - R50/53	1280	894	3500
Ni	N - R50/53 <sup>1</sup>	52	130	300
Pb	N - R50/53	4750	2160	2220
Sb	N - R50/53	910	480	140
Sn	N - R50/53 <sup>1</sup>	700	400	350
Zn	N - R50/53	7820	6380	9270
Total Heavy Metal Concentration (mg/kg)		16,113	12,067	16,833

Note 1: "Information Approved for the Classification and Labelling of Substances and Preparations Dangerous for Supply" (CHIP List) by Health and Safety Commission (HSC) UK indicates that some Nickel compounds and some Tin compounds are R50/53 while others are not. For the purposes of this calculation we have conservatively assumed that all Ni and Sn compounds present in the ash residues have this classification.

**Table A2-2: Preparation classification based on aquatic toxicity effects.**

Classification of the substance	Classification of the preparation		
	N, R50-53	N, R51-53	R52-53
N, R50-53	$C_n \geq 25\%$	$2.5\% \leq C_n < 25\%$	$0.25\% \leq C_n < 2.5\%$
N, R51-53		$C_n \geq 25\%$	$2.5\% \leq C_n < 25\%$
			$C_n \geq 25\%$

By comparing the Indaver concentrations in Table A2-1 with the ranges in Table A2-2 it can be seen that heavy metal concentrations in ash/residues fall in the range  $0.25\% \leq C_n < 2.5\%$ . On this basis it would appear that the appropriate designations is R52-53 which is not a Seveso category under the section Dangerous for the Environment in Part 2 of the First Schedule in SI 74.

\*\*\*\*\*



Mr. Conor Jones  
Construction Manager  
Indaver Ireland Limited  
4 Haddington Terrace  
Dun Laoighaire  
Co. Dublin

28 Jun 2006

Ref. 64640/1

**Re: Classification of incinerator waste at Carranstown and your letter of Jan 20<sup>th</sup>, 2006**

Dear Conor,

In relation to your previous submission to the Authority on the classification of waste (concerning the Carranstown Plant) on Jan 20<sup>th</sup> 2006, the Authority seeks your response to the following information, which has come to our attention.

### **Technical Report 38**

A report by the European Environment Agency (Technical report No 38 *Dangerous Substances in Waste*, February 2000), gives information on the composition of solid wastes from Municipal Solid Waste Incineration:

Substances	Contents mg/kg		
	Slags	Fly Ash	Residues from Gas Cleaning
Cd	<0,5 - 10	50-1000	300-500
Tl	< 2	0-50	0-2
Hg	<0,05-5	2-30	10-30
As	0,5-50	10-100	40-100
Co	15-35	30-100	5-20
Cr	50-1000	50-2000	50-200
Cu	500-1500	300-5000	500-1500
Ni	25-100	100-400	30-100
Pb	100-3500	1000-12000	4000-10000
Sb	20-200	300-1000	300-1000
Sn	100-250	500-3000	-
Zn	500-2500	5000-40000	20000-30000

Table 3.8: MSW-Incineration, heavy metal concentration<sup>25</sup> (MSW: municipal solid waste)



Substances	Slags	Fly Ash	Residues from Gas Cleaning
PCDD/F	4-25 ngTE/kg	100-10000 ngTE/kg	100-10000 ngTE/kg

Table 3.9: MSW-Incineration, typical dioxin and furan concentrations <sup>26</sup> (MSW: municipal solid waste)

The Report states that a high percentage of metals are gasified by the incineration process. These metals are transferred to the gas phase and partly condense before entering the gas cleaning unit.

The condensed metals are mostly adsorbed on the surface of small fly ash particles. The fly ash thus tends to concentrate metals. The remaining vaporised metals are transported to the wet gas cleaning unit where it is collected in the wash water. The concentrated wash water is then recirculated and injected to form part of the Gas Cleaning Residues.

### Consequent Classification of Waste

The EC Dangerous Preparations Directive 1999/45/EC gives the basis for classification of mixtures or preparations containing dangerous substances.

Annex II Part B sets out the concentration limits to be used in the Evaluation of Health Hazards, (for Non-Gaseous Preparations):

Classification of the substance	Classification of the preparation		
	$I^+$	I	$X_n$
$I^+$ with R26, R27, R28	$C_n \geq 25\%$	$1\% \leq C < 7\%$	$0.1\% \leq C < 1\%$
I with R23, T24, T25		$C \geq 25\%$	$3\% \leq C < 25\%$
$X_n$ with R20, R21, R22			$C \geq 25\%$

Table 1: preparation classification based on acute lethal effects

And for acute aquatic toxicity and long term effects:

Classification of the substance	Classification of the preparation		
	N, R50-53	N, R51-53	R52-53
N, R50-53	$C_n \geq 25\%$	$2.5\% \leq C_n < 25\%$	$0.25\% \leq C_n < 2.5\%$
N, R51-53		$C_n \geq 25\%$	$2.5\% \leq C_n < 25\%$
R52-53			$C_n \geq 25\%$

Table 2: preparation classification based on aquatic toxicity effects

On the basis of the above, and because of the metal concentration in gas cleaning residue as set out in table 3.8, a strong case can be made for classification as R50/53:

Substances	Classification	Concentration (mg/kg)		
Cd	N-R50/53	300	-	500
Tl	N-R50/53	0	-	2
Hg	N-R50/53	10	-	30
As	N-R50/53	40	-	100
Co	N-R50/53	5	-	20
Cr	N-R50/53	50	-	200
Pb	N-R50/53	4,000	-	10,000
Sb	N-R50/53	300	-	1,000
Zn	N-R50/53	20,000	-	30,000
<b>Total</b>		<b>24,705</b>	<b>-</b>	<b>41,852</b>

Table 3: upper and lower concentration limits for R50/53 metals

The total is equivalent to a concentration of 2.47% to 4.18%. Taking the average as being ~3%, this results in classification of the mixture as N-R51/53.

The conclusion to be taken from this approach is that: Residues should be classified as "N", "Dangerous to the aquatic environment" with Risk Phrase R51/53.

Yours sincerely,

  
 Patrick Conneely  
 Senior Inspector

Patrick Conneely  
Senior Inspector  
Health & Safety Authority

16<sup>th</sup> October 2006

Re: Classification of incinerator waste at Carranstown

Dear Patrick

The following comments are in response to your letter dated the 28<sup>th</sup> June 2006.

In our response to this approach to the classification of ash we will concentrate on the two major constituents of the residues, Lead and Zinc, which constitute greater than 95% of the concentration of the residues.

If the concentrations of metals in the residues at Carranstown were to fall within the typical ranges cited in Table 3.8 of the report by the European Environmental Agency then, as stated, there is a case that the residue from flue gas cleaning should be classified as "N" Dangerous for the environment with Risk Phrase R51/53 "Toxic to aquatic organisms; may cause long term adverse in the aquatic environment".

However this information on the composition of solid wastes from Municipal Solid Waste Incineration is based on an approximation of a range of results from facilities throughout Europe.

The composition of residues from different facilities and specifically the concentration of heavy metals in residues depend greatly on the chemical composition of the incoming waste.

The actual concentrations of Lead and Zinc experienced in the residues of the Indaver grate furnace incinerator in Doel are:

- Lead: 1000 – 5000 mg/kg dry matter, from which 50% soluble in water
- Zinc: 5000 – 10000 mg/kg dry matter, from which less than 1 % soluble in water



Reply to:

e-mail: [info@indaver.ie](mailto:info@indaver.ie)  
web: [www.indaver.ie](http://www.indaver.ie)

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Taking these concentrations and substituting them into Table 3.8 cited in your letter gives the following:

Substances	Classification	Concentration (mg/Kg)		
Cd	N-R50/53	300	-	500
Tl	N-R50/53	0	-	2
Hg	N-R50/53	10	-	30
As	N-R50/53	40	-	100
Co	N-R50/53	5	-	20
Cr	N-R50/53	50	-	200
Pb	<b>N-R50/53</b>	<b>1,000</b>	-	<b>5,000</b>
Sb	N-R50/53	300	-	1,000
Zn	<b>N-R50/53</b>	<b>5,000</b>	-	<b>10,000</b>
<b>Total</b>		<b>6,705</b>	-	<b>16,852</b>

The concentrations are now lower, 0.67% to 1.69%, than the 2.47% to 4.18% stated in your letter. Following the same reasoning the sum of the metals is <2.5% and hence the classification is R52-53 and not R 51-53.

Additionally, according to the EC Dangerous Substances Directive 67/548/EEC, only specific Zinc compounds such as Zn powder, ZnCl<sub>2</sub>, ZnSO<sub>4</sub> and ZnO are classified as dangerous and hence not all Zinc compounds should be considered when determining the classification of the residues. This would further decrease the concentration of heavy metals to be considered and further strengthen our argument for a classification of R52-53 instead of R 51-53.

#### Conclusion:

Based on actual concentrations experience by Indaver NV at the Doel facility the Indaver residues have a classification of R52-53.

Until Carranstown is in operation it is not possible to predict the actual composition of residues from the facility, however based on Indaver's experience in Belgium we believe that the classification will be R52-53.

Upon commencement of operation of the facility full analysis of the residues will be conducted to verify this assumption.

Please feel free to contact me if you require any additional information.

Kind Regards,

Conor Jones BE (Chem)  
Engineering Manager



COPY OF LETTER SENT TO HEALTH & SAFETY AUTHORITY 30 APR 2012

Health and Safety Authority,  
The Metropolitan Building,  
James Joyce Street,  
Dublin 1

30<sup>th</sup> April 2012

**Re:** Direct Application to An Bord Pleanála in respect of a strategic infrastructure development  
Indaver Ireland Waste-to-Energy facility at Carranstown, Duleek, Co Meath

Dear Sir/Madam,

Please be advised that Indaver Ireland Limited intends to apply to An Bord Pleanála for permission for the proposed development of:

- a) To increase the intake tonnage of waste from 200,000 tonnes to 220,000 tonnes per annum
- b) To allow the acceptance of some additional types of waste defined as hazardous & non-hazardous in the European Waste Catalogue
- c) A change in status of the temporary Spare Parts Warehouse Building (Single Storey Building 25m x 15m x 6.7m high) to a permanent Centralised Maintenance Depot.
- d) A change in status of the temporary Electrical Switchgear Building (associated with the above) 4m x 2.5m x 3.2m high from temporary to permanent
- e) A change in status of the temporary Construction Modular Office Building (Single Storey Building 33m x 12m x 3m high) from temporary to permanent
- f) A change in status of the temporary Electrical Switchgear Building (associated with the above) 3m x 2.7m x 3.2m high from temporary to permanent
- g) Construction of an access roadway to the Modular Office Building
- h) 22 new car parking spaces associated with the modular office building
- i) A new on-site effluent treatment system associated with the Modular Office Building
- j) Change in status from temporary to permanent for hardcored areas associated with the Spare Parts warehouse, construction offices and temporary site car park.
- k) An additional fuel storage tank (8.7m length x 2.7m dia)
- l) An ammonia storage tank (7.15m height x 3.5m dia)

An electronic copy of the application (including the EIS) is enclosed for your information.

Indaver Ireland Ltd ■ Registered in Ireland No. 59667

■ Registered Office: 4 Haddington Terrace, Dun Laoghaire, CO DUBLIN, IRELAND ■ tel. + 353 1 280 4534 ■ fax + 353 1 280 7865

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Directors: J. Ahern, C. Jones, J. Keaney, D. McGarry (Secretary)

Belgian Directors: R. Ansoms, M. Decorte, P. De Bruycker, B. Goethals



Please note that An Bord Pleanala following its consideration of the application can decide to:

- (a)
- (i) grant the permission/approval, or
  - (ii) make such modifications to the proposed development as it specifies in its decision and grant permission/approval in respect of the proposed development as so modified, or
  - (iii) grant permission/approval in respect of part of the proposed development (with or without specified modifications of it of the foregoing kind),

OR

- (b)
- Refuse to grant the permission/approval.
- Submissions or observations may be made only to An Bord Pleanala ('the Board') 64 Marlborough Street, Dublin 1 relation to-

- (i) The implications of the proposed development for proper planning and sustainable development, and
- (ii) The likely effects on the environment of the proposed development, if carried out.

Any submissions/observations must be received by the Board not later than 5.30p.m. on the 26<sup>th</sup> June 2012.

Yours sincerely,

Conor Jones  
Infrastructure Director

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