



Murphy Environmental Hollywood Ltd

Hollywood Great, Nag's Head, Naul, County Dublin
T: 01-8433744 F: 01-8433747 W: www.mehl.ie
EPA Waste Licence W0129-02

For the Attention of
Administration
Environmental Licensing Programme
Office of Climate, Licensing & Resource Use
Environmental Protection Agency
Headquarters
PO Box 3000
Johnstown Castle Estate
Co. Wexford

Our Ref.: W0129-03/AI_Art16_200813
Direct Dial: 01 8433744
Direct Fax: 01 8433747
Date: 20th August 2012

Dear Mr. Meaney,

**Re.: Murphy Environmental Hollywood Ltd. (MEHL), EPA Ref. W0129-03
Response to Notice in accordance with Article 16(1) of the Waste Management (Licensing) Regulations**

1. We refer to the Agency's notice in accordance with Article 16(1) of the Waste Management (Licensing) Regulations on 11th July 2012. MEHL hereby responds to queries relating to Waste Acceptance Criteria (WAC) (Item#2).
2. Section H.2.31 of the Waste Licence Application refers to higher limit values for inert waste [provision for which is made under Council Decision 2003/33/EC]. Under the W0129-03 proposal, the MEHL facility will offer co-located landfill disposal capacity for inert, non-hazardous and hazardous wastes, subject to strict Waste Acceptance Criteria. In light of this, MEHL **will no longer seek** to retain higher limit values for inert waste for future incoming wastes^{1 2}.
3. It is anticipated, based on international experience, that up to three times the limit values specified under 2003/33/EC may be required for certain parameters for solidified flue-gas treatment (FGT) residues.

¹ Limit value for 17-PAHs for inert waste (Soil & Stones, EWC Code 17 05 04) to be retained at 100mg/kg, as agreed under W0129-02 [Council Decision 2003/33/EC requires Member States to set limit value for PAHs for inert waste].

² Limit values agreed with the Agency to be retained for previously-deposited waste.



Directors: Seamus Murphy (Managing Director), Patricia Rooney, Rory Murphy, Emma Murphy
Reg. Office: Hollywood Great, Nag's Head, Naul, County Dublin
Reg. No. 448931 VAT No. IE 9677893C



Murphy Environmental Hollywood Ltd

4. As stated in Section H.1.16 of the Waste Licence Application (December 2010), the main environmental concern³ with respect to FGT residues is leaching of:
- Easily soluble salts such as Cl and Na. Although not toxic for humans in typical concentration levels these components may significantly affect ecosystems and spoil drinking water resources.
 - Heavy metals such as Cd, Cr, Cu, Ni, Pb, and Zn. Heavy metals and trace elements can potentially be present in concentrations harmful for humans as well as for ecosystems. As such, leaching of these components has generally been the primary concern and has also received the greatest research focus.
 - Dioxins. Although dioxins and furans do not easily leach, release of these contaminants is of major concern because of their toxicity.
5. Recent analysis results for FGT residue generated at the Carranstown waste-to-energy plant, Duleek, Co. Meath (EPA Licence W0167-01) are attached in **Appendix 1**.
6. As H.3.4-H.3.6 of the Waste Licence Application, stabilisation and solidification processes are commonly used for the treatment of combustion ashes and flue-gas cleaning residues. Cement solidification involves the mixing of wastes with cement (or alternative materials) and additives (to control the properties of the cement), and enough water to ensure that hydration reactions will take place to bind the cement. Both stabilisation and solidification processes take place. The wastes are thereby incorporated into the cement matrix.
7. Post-solidification, it is proposed to cure the solidified material. It is anticipated that, post-curing, higher WAC limits may be required for certain parameters. There is a lack of published WAC data for **solidified** FGT residue; however it is anticipated that WAC values up to 'three times' limits may be required for Lead, Chloride, Zinc, Sulphate and Total Dissolved Solids.
8. Due to uncertainties surrounding the nature and characteristics of the wastes to be presented at the MEHL integrated waste facility at this point in time, higher WAC limits are sought for all hazardous wastes and for all WAC parameters, as permissible under Council Decision 2003/33/EC (as described in H.2.27-H.2.33 of the Waste Licence Application).
9. Higher WAC limits **for hazardous waste only** are sought on the basis of a lack of published WAC analysis data for the targeted waste streams; and potential changes in waste characteristics over time, associated with different waste streams, waste processes and waste management techniques. The site is proven to be suitable [no additional risk to the environment associated with 'three times' WAC limit values] in terms of the Quantitative Risk Assessment hydrogeological model.

³ ISWA-WG/Thomas Astrup, Technical University of Denmark (2008) Management of APC residues from W-t-E Plants: An overview of management options and treatment methods



Murphy Environmental Hollywood Ltd

10. The following criteria will be applied to determine that incoming wastes are non-biodegradable:

- Waste Acceptance Procedure documentation will include a 'Query Questionnaire' form, which the waste producer/holder will be required to complete. The form will require a description of the type, source and origin of the waste and the EWC code. The form will also require the applicant user to confirm that the proposed waste may be described as a non-biodegradable waste.
- EWC codes with known biodegradable content will be refused, e.g. food waste, mixed municipal waste, wastes from municipal wastewater treatment facilities.
- Incoming wastes will be subject to laboratory testing for Total Organic Carbon (TOC) and Dissolved Organic Carbon (DOC), in line with WAC requirements. WAC limit values will apply. In addition, hazardous wastes will be subject to Loss on Ignition (LoI) testing.

The information contained herein is deemed not to impinge on the non-technical summary of the Waste Licence Application or EIS; no revisions to drawings arise from the information contained herein. The content of the electronic files on the accompanying CD-ROM is a true copy of the original.

If you have any further queries in relation to this matter please do not hesitate to contact us.

Yours sincerely,

Patricia Rooney
Director & General Manager, MEHL

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Appendix 1:

**FGT residue analysis results (pre-treated, unsolidified) for
Carranstown Waste-to-energy Facility
(EPA Licence W0167-01)**

Quarter 3, 2011

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Aflever/bezoek adres
Spoorstraat 12
Postbus 78
4430 AB 's-Gravenpolder
Nederland
Tel (0113)-319 200
Fax (0113)-319 299

Indaver Ireland Limited
Attn. Mrs. G. McCormack
Carranstown
DULEEK, COUNTY MEATH
IRELAND

's-Gravenpolder, 17/10/2011

ANALYTICAL REPORT 201110000330

Customer : Indaver Ireland Limited
Description : Flue gas residue


Sampled by : Derden

Sample descriptions : 1 : Flue gas residue 2011-09-28-2 (UK-Vaste afvals)

Sample code : 1
Date of sampling : 28/09/2011

Parameter	Unit	method	
PHYSICO-CHEMICAL ANALYSIS			
Total Organic Carbon	wt%db	[Contracted out external]	2.7

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K.J. Vuurmans
Laboratory manager

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In Appendix 1 information is given about the sample preservation and preservation times of the received samples. Technical information about any in the report with * marked results is given in appendix 2. The reports from possible external subcontracted analyses are attached as addendum in this report.

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APPENDIX 1

's-Gravenpolder, 17/10/2011

ANALYTICAL REPORT 201110000330

Customer : Indaver Ireland Limited
Description : Flue gas residue
Sampled by : Derden

Preservation & conservation remarks

All samples have been preserved in a correct way and have been transported to the lab within the maximum recommended preservation time.

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AL-West B.V.

Handelskade 39, 7417 DE Deventer
Postbus 693, 7400 AR Deventer
Tel. +31(0)570 788110, Fax +31(0)570 788108
e-Mail: info@al-west.nl, www.al-west.nl

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SGS NEDERLAND BV
Saridin Guillian
POSTBUS 200
3200 AE SPIJKENISSE

Datum 17.10.2011
Relatienr 35004018
Opdrachtnr. 272654
Blad 1 van 2

ANALYSERAPPORT

Opdracht 272654 Bodem / Eluaat

Opdrachtgever 35004018 SGS NEDERLAND BV
Referentie Offerte afspraken SGS
Opdrachtacceptatie 11.10.11
Monsternemer Opdrachtgever

Geachte heer, mevrouw,

Hierbij zenden wij u de resultaten van het door u aangevraagde laboratoriumonderzoek.
De analyses zijn erkend door de OVAM, tenzij aangegeven met een n (niet geaccrediteerd) bij toegepaste methoden. Wanneer een analyse niet erkend is door de OVAM, dan kan deze wel EN-ISO/IEC 17025 geaccrediteerd zijn. Of een analyse geaccrediteerd is, kunt u vinden in onze lijst van verrichtingen behorend tot ons accreditatiecertificaat nummer L005 van de Raad voor Accreditatie. Deze kunt u opvragen bij Klantenservice.

Indien u gegevens wenst over de meetonzekerheden van een methode, kunnen wij u deze op verzoek verstrekken.

Dit rapport mag alleen in zijn geheel worden gereproduceerd. Indien u nog vragen heeft of aanvullende informatie wenst, verzoeken wij u om contact op te nemen met Klantenservice.

Wij vertrouwen erop u met de toegezonden informatie van dienst te zijn.

Met vriendelijke groet,

AL-West B.V. Dhr. Rudie Leuverink, Tel. +31/570788112
Klantenservice

Distributeur

SGS NEDERLAND BV , Guillian Saridin

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AL-West B.V.

Handelskade 39, 7417 DE Deventer
Postbus 693, 7400 AR Deventer
Tel. +31(0)570 788110, Fax +31(0)570 788108
e-Mail: info@al-west.nl, www.al-west.nl

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Opdracht 272654 Bodem / Eluaat

Monsternr.	Monstername	Monsteromschrijving
534925	11.10.2011	201110000330-1

Eenheid 534925
201110000330-1

Algemene monstervoorbehandeling

Droge stof	%	99,6
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Klassiek Chemische Analyses

Totaal Organisch Koolstof (TOC)	% Ds	2,7
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Begin van de analyses: 11.10.11

Einde van de analyses: 17.10.11

De onderzoeksresultaten hebben alleen betrekking op het aangeleverde monstermateriaal. Monsters met onbekende herkomst, kunnen slechts beperkt gecontroleerd worden op plausibiliteit.

AL-West B.V. Dhr. Rudie Leuverink, Tel. +31/570788112

Klantenservice

Dit elektronisch gegenereerde rapport is gecontroleerd en vrijgegeven. In overeenstemming met de vereisten van NEN EN ISO/IEC 17025:2005 voor eenvoudige rapportage is dit rapport zonder handtekening rechtsgeldig.

Distributeur

SGS NEDERLAND BV, Guillian Saridin

Toegepaste methoden

Grond

conform ISO 10694 en conform NEN-EN 13137 (afval):Totaal Organisch Koolstof (TOC)

Glw. NEN-ISO 11465;cf. NEN-EN 12880; cf. AS3000:Droge stof

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Sporstraat 12
Postbus 78
4430 AB 's-Gravenpolder
Nederland
Tel (0113)-319 200
Fax (0113)-319 299

Indaver Ireland Limited
Attn. Mrs. G. McCormack
Carranstown
DULEEK, COUNTY MEATH
IRELAND

's-Gravenpolder, 19/10/2011

ANALYTICAL REPORT 201110000030

Customer : Indaver Ireland Limited
Description : Flue gas residue

Sampled by : Derden

Sample descriptions : 1 : Flue gas residue 2011-09-28-2 (UK-Vaste afvals)
2 : Flue gas residue 2011-09-28-2 (Eluates)

Sample code			1	2
Date of sampling			28/09/2011	28/09/2011
Parameter	Unit	method		
PHYSICO-CHEMICAL ANALYSIS				
Q Dry substance	wt%	[acc. to CMA/2/II/A.1]	99.9	
WET CHEMICAL MEASUREMENTS				
Phenol index	µg/l	[acc. to NEN-EN ISO 14402]		670
HEAVY METALS				
Aluminium	µg/l	[acc. to NEN 6966/C1]		94
Beryllium	µg/l	[acc. to NEN 6966/C1]		< 1.0
Borium	µg/l	[acc. to NEN 6966/C1]		< 100
Iron	µg/l	[acc. to NEN 6966/C1]		< 10
Manganese	µg/l	[acc. to NEN 6966/C1]		< 10
ION SELECTIVE MEASUREMENTS				
Q Fluoride	same as F	mg/l [Equivalent to NEN 6483]		3.4 *
ION CHROMATOGRAPHIC MEASUREMENTS				
Q Chloride	same as Cl	mg/l [acc. to ISO 10304-1/2]		4600
Q Sulphate	same as SO4	mg/l [acc. to ISO 10304-1/2]		1100
LEACH TEST				
L/S-ratio	l/kgdb			10.0
Q Shake test		[acc. to CMA/2/II/A.12]	X	
Q L/S-ratio	l/kgdb		10.0	
PHYSICO-CHEMICAL ANALYSIS				
Q pH		[acc. to ISO 10523]		12.7
Temperature pH-measurement	°C			18.0
WET CHEMICAL MEASUREMENTS (ELUATE)				
Chrome (VI) as Cr	mg/l	[acc. to CMA/2/II/C.7]		< 0.05
Q Total cyanide	µg/l	[acc. to NEN-ISO 14403]		65
HEAVY METALS (ELUATE)				
Q Arsenic	µg/l	[acc. to NVN 7322]		< 10
Q Barium	µg/l	[acc. to NVN 7322]		930
Q Cadmium	µg/l	[acc. to NVN 7322]		< 0.70
Q Chrome	µg/l	[acc. to NVN 7322]		79
Q Cobalt	µg/l	[acc. to NVN 7322]		< 5.0
Q Copper	µg/l	[acc. to NVN 7322]		62
Q Lead	µg/l	[acc. to NVN 7322]		3300
Molybdene	µg/l	[acc. to NVN 7322]		68
Q Nickel	µg/l	[acc. to NVN 7322]		< 20
Thallium	µg/l	[acc. to NVN 7322]		< 10
Q Vanadium	µg/l	[acc. to NVN 7322]		< 10

(page: 1, see following page)



's-Gravenpolder, 19/10/2011

ANALYTICAL REPORT 201110000030

Customer : Indaver Ireland Limited
Description : Flue gas residue

Sampled by : Derden

Sample descriptions : 1 : Flue gas residue 2011-09-28-2 (UK-Vaste afvals)
2 : Flue gas residue 2011-09-28-2 (Eluates)

Sample code	1	2
Date of sampling	28/09/2011	28/09/2011

Parameter	Unit	method	
Q Zinc	µg/l	[acc. to NVN 7322]	3400
Q Mercury	µg/l	[acc. to NVN 7324]	0.23
Q Tin	µg/l	[Equivalent to NVN 7322]	< 2.0
Antimony	µg/l	[Equivalent to NVN 7323]	2.0
Selene	µg/l	[Equivalent to NVN 7323]	9.0

K.J. Vuurmans
Laboratory manager

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Tests marked with a "Q" are performed under RvA Accreditation (092)

In Appendix 1 information is given about the sample preservation and preservation times of the received samples. Technical information about any in the report with * marked results is given in appendix 2. The reports from possible external subcontracted analyses are attached as addendum in this report.

(page: 2, last page)



APPENDIX 1

's-Gravenpolder, 19/10/2011

ANALYTICAL REPORT 201110000030

Customer : Indaver Ireland Limited
Description : Flue gas residue
Sampled by : Derden

Preservation & conservation remarks

All samples have been preserved in a correct way and have been transported to the lab within the maximum recommended preservation time.

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APPENDIX 2

ANALYTICAL REPORT 201110000030

's Gravenpolder, 19/10/2011

Customer : Indaver Ireland Limited
Description : Flue gas residue
Sampled by : Derden

Explanation of results of analysis

Sample description: 2 : Flue gas residue 2011-09-28-2

ION SELECTIVE MEASUREMENTS (ELUATE)

- In contrast to the above norm the analysis was carried out in compliance with NEN-EN-ISO 10304

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Aflever/bezoek adres
Spoorstraat 12
Postbus 78
4430 AB 's-Gravenpolder
Nederland
Tel (0113)-319 200
Fax (0113)-319 299

Indaver Ireland Limited
Attn. Mrs. G. McCormack
Carranstown
DULEEK, COUNTY MEATH
IRELAND

's-Gravenpolder, 13/10/2011

ANALYTICAL REPORT 201110000329

Customer : Indaver Ireland Limited
Description : Flue gas residue

Sampled by : Derden

Sample descriptions : 1 : Flue gas residue 2011-09-28-2 (UK-Vaste afvals)

Sample code : 1
Date of sampling : 28/09/2011

Parameter	Unit	method	
PHYSICO-CHEMICAL ANALYSIS			
Dry substance	wt%	[acc. to NEN-ISO 11465]	99.4
SULPHUR COMPOUNDS			
Sulphur same as S	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	13000
HEAVY METALS			
Aluminium	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	4100
Antimony	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	140
Arsene	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	7.6
Barium	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	120
Cadmium	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	46
Calcium	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	410000
Chrome	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	19
Cobalt	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	< 4.0
Iron	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	2600
Potassium	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	11000
Copper	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	130
Lead	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	390
Manganese	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	140
Molybdene	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	2.2
Nickel	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	13
Selene	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	< 10
Tin	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	95
Vanadium	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	12
Zinc	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	2300
Mercury	mg/kgdb	[acc. to NEN6961/NEN-ISO16772]	2.5
Thallium	mg/kgdb	[SGS 2005-26]	< 6.0
Silicium	mg/kgdb	[subcontracted]	560
ION SELECTIVE MEASUREMENTS			
Fluoride same as F	mg/kgdb	[acc. VPR C88-03/NEN 6589]	33
ION CHROMATOGRAPHIC MEASUREMENTS			
Bromide same as Br	mg/kgdb	[acc. VPR C85-06/ISO 10304-2]	610
Sulphate same as SO4	mg/kgdb	[acc. VPR C85-06/ISO 10304-2]	11000
Chloride same as Cl	mg/kgdb	[cons. SIKB3001 ana. AS3040 pb.2]	260000

(page: 1, see following page)



's-Gravenpolder, 13/10/2011

ANALYTICAL REPORT 201110000329

Customer : Indaver Ireland Limited
Description : Flue gas residue

Sampled by : Derden

Sample descriptions : 1 : Flue gas residue 2011-09-28-2 (UK-Vaste afvals)

Sample code : 1
Date of sampling : 28/09/2011

Parameter	Unit	method
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K.J. Vuurmans
Laboratory manager

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In Appendix 1 information is given about the sample preservation and preservation times of the received samples. Technical information about any in the report with * marked results is given in appendix 2. The reports from possible external subcontracted analyses are attached as addendum in this report.

Consent of SGS might only be used for inspection purposes only. Not to be used for any other use.

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APPENDIX 1

's-Gravenpolder, 13/10/2011

ANALYTICAL REPORT 201110000329

Customer : Indaver Ireland Limited
Description : Flue gas residue
Sampled by : Derden

Preservation & conservation remarks

Differences with the guidelines for the preservation and handling of samples have been observed and these may have influenced the reported analytical results.

Sample number: 1 Sample description: Flue gas residue 2011-09-28-2
- Dry substance
 The maximum recommended preservation time has been exceeded

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Appendix 2:

**FGT residue analysis results (pre-treated, unsolidified) for
Carranstown Waste-to-energy Facility
(EPA Licence W0167-01)**

Quarter 1, 2012

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Spoorstraat 12
Postbus 78
4430 AB 's-Gravenpolder
Nederland
Tel (0113)-319 200
Fax (0113)-319 299

Indaver Ireland Limited
Attn. Mrs. G. McCormack
Carranstown
DULEEK, COUNTY MEATH
IRELAND

's-Gravenpolder, 23/01/2012

ANALYTICAL REPORT 201201000477

Customer : Indaver Ireland Limited
Description : Flue gas residue

Sampled by : Derden

Sample descriptions : 1 : 2012-01-09-02

(UK-Vaste afvals)

Sample code : 1
Date of sampling : 09/01/2012
Laboratory receival date : 11/01/2012

Parameter	Unit	method	
PHYSICO-CHEMICAL ANALYSIS			
Total Organic Carbon	wt%db	[Contracted out externally]	1.7

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K.J. Vuurmans
Laboratory manager

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(page: 1, last page)



APPENDIX 1

ANALYTICAL REPORT 201201000477

's-Gravenpolder, 23/01/2012

Customer : Indaver Ireland Limited
Description : Flue gas residue
Sampled by : Derden

Preservation & conservation remarks

All samples have been preserved in a correct way and have been transported to the lab within the maximum recommended preservation time.

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Handelskade 39, 7417 DE Deventer
Postbus 693, 7400 AR Deventer
Tel. +31(0)570 788110, Fax +31(0)570 788108
e-Mail: info@al-west.nl, www.al-west.nl

Blad 2 van 2

Opdracht 287857 Overig afval

Monsternr.	Monstername	Monsteromschrijving
623181	09.01.2012	201201000477-1

Eenheid 623181
201201000477-1

Algemene monstervoorbehandeling

Droge stof	%	99,6
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Klassiek Chemische Analyses

Totaal Organisch Koolstof (TOC)	% Ds	1,7
---------------------------------	------	-----

Begin van de analyses: 16.01.12

Einde van de analyses: 19.01.12

De onderzoeksresultaten hebben alleen betrekking op het aangeleverde monstermateriaal. Monsters met onbekende herkomst, kunnen slechts beperkt gecontroleerd worden op plausibiliteit.

AL-West B.V. Dhr. Rudie Leuverink, Tel. +31/570788112
Klantenservice

Dit elektronisch gegenereerde rapport is gecontroleerd en vrijgegeven. In overeenstemming met de vereisten van NEN EN ISO/IEC 17025:2005 voor eenvoudige rapportage is dit rapport zonder handtekening rechtsgeldig.

Distributeur

SGS NEDERLAND BV , Guillian Saridin

Toegepaste methoden**Grond**

conform ISO 10694 en conform NEN-EN 13137 (afval):Totaal Organisch Koolstof (TOC)

Glw. NEN-ISO 11465;cf. NEN-EN 12880; cf. AS3000:Droge stof

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Handelskade 39, 7417 DE Deventer
Postbus 693, 7400 AR Deventer
Tel. +31(0)570 788110, Fax +31(0)570 788108
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Bijlage bij Opdrachtnr. 287857

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CONSERVERING, CONSERVERINGSTERMIJN EN VERPAKKING

Er zijn verschillen met de richtlijnen geconstateerd die mogelijk de betrouwbaarheid van de analyseresultaten beïnvloeden. De conserveringstermijn is voor volgende analyse overschreden:

Droge stof 623181

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 Spoorstraat 12
 Postbus 78
 4430 AB 's-Gravenpolder
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 Tel (0113)-319 200
 Fax (0113)-319 299

Indaver Ireland Limited
 Attn. Mrs. G. McCormack
 Carranstown
 DULEEK, COUNTY MEATH
 IRELAND

's-Gravenpolder, 26/01/2012

ANALYTICAL REPORT 201201000478

Customer : Indaver Ireland Limited
 Description : Flue gas residue

Sampled by : Derden

Sample descriptions : 1 : 2012-01-09-02 (UK-Vaste afvals)
 2 : 2012-01-09-02 (0)

	1	2
Sample code		
Date of sampling	09/01/2012	09/01/2012
Laboratory receival date	11/01/2012	11/01/2012

Parameter	Unit	method		
PHYSICO-CHEMICAL ANALYSIS				
Q Dry substance	wt%	[acc. to CMA/2/II/A.1]	99.4	
WET CHEMICAL MEASUREMENTS				
Phenol index	µg/l	[acc. to NEN-EN-ISO 14402]		< 5.0
HEAVY METALS				
Aluminium	µg/l	[acc. to NEN 6966/C1]		< 10
Beryllium	µg/l	[acc. to NEN 6966/C1]		< 1.0
Borium	µg/l	[acc. to NEN 6966/C1]		430
Iron	µg/l	[acc. to NEN 6966/C1]		< 10
Manganese	µg/l	[acc. to NEN 6966/C1]		< 10
ION SELECTIVE MEASUREMENTS				
Fluoride same as F	mg/l	[Equivalent to NEN 6483]		2.9
ION CHROMATOGRAPHIC MEASUREMENTS				
Chloride same as Cl	mg/l	[acc. to ISO 10304-1/2]		17000
Sulphate same as SO4	mg/l	[acc. to ISO 10304-1/2]		2000
LEACH TEST				
L/S-ratio	l/kgdb			10.0
Q Shake test		[acc. to CMA/2/II/A.12]	X	
Q L/S-ratio	l/kgdb		10.0	
PHYSICO-CHEMICAL ANALYSIS				
pH		[acc. to ISO 10523]		12.1
Temperature pH-measurement	°C			21.5
WET CHEMICAL MEASUREMENTS (ELUATE)				
Chrome (VI) as Cr	mg/l	[acc. to CMA/2/II/C.7]		< 0.05
Total cyanide same as CN	µg/l	[acc. to NEN-ISO 14403]		< 1.0
HEAVY METALS (ELUATE)				
Tin	µg/l	[Acc. to AP04.E-XI]		< 2.0
Antimony	µg/l	[Acc. To AP04.E-XII]		1.3
Selene	µg/l	[Acc. to AP04.E-XIV]		14
Arsene	µg/l	[acc. to NVN 7322]		< 10
Barium	µg/l	[acc. to NVN 7322]		5600
Cadmium	µg/l	[acc. to NVN 7322]		< 0.70
Chrome	µg/l	[acc. to NVN 7322]		19
Cobalt	µg/l	[acc. to NVN 7322]		< 5.0
Copper	µg/l	[acc. to NVN 7322]		230
Lead	µg/l	[acc. to NVN 7322]		43000

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's-Gravenpolder, 26/01/2012

ANALYTICAL REPORT 201201000478

Customer : Indaver Ireland Limited
Description : Flue gas residue

Sampled by : Derden

Sample descriptions : 1 : 2012-01-09-02 (UK-Vaste afvals)
2 : 2012-01-09-02 ()

	1	2
Sample code		
Date of sampling	09/01/2012	09/01/2012
Laboratory receival date	11/01/2012	11/01/2012

Parameter	Unit	method	
Molybdene	µg/l	[acc. to NVN 7322]	220
Nickel	µg/l	[acc. to NVN 7322]	< 20
Thallium	µg/l	[acc. to NVN 7322]	< 10
Vanadium	µg/l	[acc. to NVN 7322]	< 10
Zinc	µg/l	[acc. to NVN 7322]	8500
Mercury	µg/l	[acc. to NVN 7324]	< 0.20

NON ROUTINE TEST

non-routine test

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[Subcontracted]

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K.J. Vuurmans
Laboratory manager

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Tests marked with a "Q" are performed under RvA Accreditation (L092)

In Appendix 1 information is given about the sample preservation and preservation times of the received samples. Technical information about any in the report with * marked results is given in appendix 2. The reports from possible external subcontracted analyses are attached as addendum in this report.

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APPENDIX 1

ANALYTICAL REPORT 201201000478

's-Gravenpolder, 26/01/2012

Customer : Indaver Ireland Limited
Description : Flue gas residue
Sampled by : Derden

Preservation & conservation remarks

All samples have been preserved in a correct way and have been transported to the lab within the maximum recommended preservation time.

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SGS NEDERLAND BV
Attn: afdeling Customer Services
Spoorstraat 12, 4431 NK
Postbus 78
4430AB S'GRAVENPOLDER
Nederland

ANALYSERAPPORT : IAC12-00246

Uw referentie: 'S Gravenpolder - 201201000478-1
Aantal monsters: 1
Datum van ontvangst: 16/01/2012
Monsteridentificatie:
201201000478-1

Analyseresultaten:

Determination of 2,3,7,8 substituted PCDF's and PCDD's
(HRGC/HRMS; ECO/AV/IAC/012)

^B Determination of Dioxin-like Polychlorinated Biphenyls (PCB)
(HRGC/HRMS; ECO/AV/IAC/015)

De analyses gemarkeerd met een B zijn Belac ISO17025 geaccrediteerd (N.005-TEST)

ANTWERPEN, 25/01/2012

I.A.C.
Een divisie van SGS Belgium NV

Marc Van Ryckeghem
Division Manager



ISO17025 (N.005-TEST)

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Het analyserapport kan enkel en alleen aangewend worden binnen de specifieke context van de opdracht en is enkel geldig voor de geanalyseerde monsters.

Alle opdrachten worden opgesteld op naam en voor rekening van de opdrachtgever, die uitdrukkelijk aanvaardt dat deze rapporten slechts een momentopname vertegenwoordigen en steeds in hun geheel en in de context ervan dienen te worden voorgelegd en/of vermeld. Een beschrijving van de gebruikte analysemethoden, de identiteit van de externe laboratoria voor de gemerkte (E) analyses en de meetonzekerheid van de analyses zijn op aanvraag beschikbaar. Mogelijks vermelde normen of criteria zijn opgesteld en vermeld in samenspraak met de opdrachtgever.

SGS Belgium NV, opsteller van deze rapporten, kan niet aansprakelijk gesteld worden voor fouten of wijzigingen van resultaten ontstaan gedurende of n.a.v. elektronische of faxtransmissie. Enkel en uitsluitend het origineel getekend rapport is bindend.

SGS Belgium NV Institute for Applied Chromatography Haven 407 Polderdijkweg 16 B-2030 Antwerpen
t +32 (0)3 545 85 90 f +32 (0)3 545 85 99 e be.iac@sgs.com url www.sgs.be

Determination of 2,3,7,8 substituted PCDF's and PCDD's			
Monsteridentificatie : IAC12-00246.001 Uw referentie: 201201000478-1			
Component	Concentratie (ng/kg)	I-TEF	I-TEQ (ng/kg)
2,3,7,8-TCDF	170	0,1	17
2,3,7,8-TCDD	36	1	36
1,2,3,7,8-PeCDF	290	0,05	14
2,3,4,7,8-PeCDF	400	0,5	200
1,2,3,7,8-PeCDD	110	0,5	56
1,2,3,4,7,8-HxCDF	370	0,1	37
1,2,3,6,7,8-HxCDF	470	0,1	47
2,3,4,6,7,8-HxCDF	1100 (*)	0,1	110
1,2,3,7,8,9-HxCDF	30	0,1	3,0
1,2,3,4,7,8-HxCDD	110	0,1	11
1,2,3,6,7,8-HxCDD	260	0,1	26
1,2,3,7,8,9-HxCDD	190	0,1	19
1,2,3,4,6,7,8-HpCDF	2000 (*)	0,01	20
1,2,3,4,7,8,9-HpCDF	470	0,01	4,7
1,2,3,4,6,7,8-HpCDD	1700 (*)	0,01	17
OCDF	2300	0,001	2,3
OCDD	2700 (*)	0,001	2,7
Totaal			620

Voor de berekening van de TEQ-waarden voor PCDD/F werden de toxiciteits-equivalentfactoren gehanteerd volgens J.A. van Zorge et al. (Chemosphere 19 (1989), 1991-1895).

De meetonzekerheid werd bepaald en is beschikbaar in het laboratorium. Op eenvoudig verzoek kunnen deze gegevens overgemaakt worden. De RSD van het controlestaal is kleiner dan 10%.

(*) Resultaten vallen buiten het lineariteitsbereik van de analysemethode

ANALYSERAPPORT : IAC12-00246

Determination of Dioxin-like Polychlorinated Biphenyls (PCB)			
Monsteridentificatie : IAC12-00246.001 Uw referentie: 201201000478-1			
Component	Concentratie (ng/kgds)	WHO-TEF	WHO-TEQ (ng/kgds)
Non-ortho PCBs			
3,4,4',5'-TeCB (PCB #81)	59	0,0001	0,0059
3,3',4,4'-TeCB (PCB #77)	140	0,0001	0,014
3,3',4,4',5'-PeCB (PCB #126)	170	0,1	17
3,3',4,4',5,5'-HxCB (PCB #169)	90	0,01	0,90
Mono-ortho PCBs			
2',3,4,4',5'-PeCB (PCB #123)	20	0,0001	0,0020
2,3',4,4',5'-PeCB (PCB #118)	<110	0,0001	< 0,011
2,3,4,4',5'-PeCB (PCB #114)	19	0,0005	0,0096
2,3,3',4,4'-PeCB (PCB #105)	8	0,0001	0,0087
2,3',4,4',5,5'-HxCB (PCB #167)	<50	0,00001	< 0,00050
2,3,3',4,4',5'-HxCB (PCB #156)	<95	0,0005	< 0,048
2,3,3',4,4',5'-HxCB (PCB #157)	63	0,0005	0,031
2,3,3',4,4',5,5'-HxCB (PCB #189)	98	0,0001	0,0098
Totaal			18,2 - 18,3
Measurement Uncertainty			
Voor de berekening van de TEQ-waarden voor PCDD/F werden de toxiciteits-equivalentfactoren gehanteerd volgens J.A. van Zorge et al. (Chemosphere 19 (1989), 1991-1895). De meetonzekerheid werd bepaald en is beschikbaar in het laboratorium. Op eenvoudig verzoek kunnen deze gegevens overgemaakt worden. De RSD van het controlestaal is kleiner dan 10%.			

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ANALYSERAPPORT : IAC12-00246

Recovery standaarden - 2,3,7,8 substituted PCDF's and PCDD's	
Monsteridentificatie : IAC12-00246.001 Uw referentie: 201201000478-1	
Recovery extractie standaarden	
Component	Recovery 13C-extractie standaarden (%)
13C-2,3,7,8-TCDF	113
13C-2,3,7,8-TCDD	87,8
13C-1,2,3,7,8-PeCDF	106
13C-2,3,4,7,8-PeCDF	110
13C-1,2,3,7,8-PeCDD	98,0
13C-1,2,3,4,7,8-HxCDF	89,2
13C-1,2,3,6,7,8-HxCDF	88,7
13C-2,3,4,6,7,8-HxCDF	99,0
13C-1,2,3,7,8,9-HxCDF	98,4
13C-1,2,3,4,7,8-HxCDD	89,2
13C-1,2,3,6,7,8-HxCDD	92,1
13C-1,2,3,4,6,7,8-HpCDF	111
13C-1,2,3,4,7,8,9-HpCDF	96,7
13C-1,2,3,4,6,7,8-HpCDD	102
13C-OCDF	101
13C-OCDD	104

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Recovery standaarden - Dioxin-like Polychlorinated Biphenyls (PCB)	
Monsteridentificatie : IAC12-00246.001 Uw referentie: 201201000478-1	
Recovery extractie standaarden	
Component	Recovery 13C-extractie standaarden (%)
Non-ortho PCBs	
13C-3,4,4',5'-TeCB (PCB #81)	104
13C-3,3',4,4'-TeCB (PCB #77)	105
13C-3,3',4,4',5'-PeCB (PCB #126)	79,2
13C-3,3',4,4',5,5'-HxCB (PCB #169)	91,6
Mono-ortho PCBs	
13C-2',3,4,4',5'-PeCB (PCB #123)	87,3
13C-2,3',4,4',5'-PeCB (PCB #118)	82,9
13C-2,3,4,4',5'-PeCB (PCB #114)	84,1
13C-2,3,3',4,4'-PeCB (PCB #105)	90,4
13C-2,3',4,4',5,5'-HxCB (PCB #167)	75,5
13C-2,3,3',4,4',5'-HxCB (PCB #156)	80,2
13C-2,3,3',4,4',5'-HxCB (PCB #157)	82,6
13C-2,3,3',4,4',5,5'-HxCB (PCB #189)	94,9

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Aflever/bezoek adres
Sporstraat 12
Postbus 78
4430 AB 's-Gravenpolder
Nederland
Tel (0113)-319 200
Fax (0113)-319 299

Indaver Ireland Limited
Attn. Mrs. G. McCormack
Carranstown
DULEEK, COUNTY MEATH
IRELAND

's-Gravenpolder, 17/01/2012

ANALYTICAL REPORT 201201000476

Customer : Indaver Ireland Limited
Description : Flue gas residue

Sampled by : Derden

Sample descriptions : 1 : 2012-01-09-02

(UK-Vaste afvals)

Sample code : 1
Date of sampling : 09/01/2012
Laboratory receival date : 11/01/2012

Parameter Unit method

PHYSICO-CHEMICAL ANALYSIS

Dry substance wt% [acc. to NEN-ISO 11465] 99.7

HEAVY METALS

Aluminium	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	9500
Antimony	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	280
Arsene	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	26
Barium	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	250
Cadmium	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	130
Calcium	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	310000
Chrome	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	32
Cobalt	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	8.3
Iron	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	5200
Potassium	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	32000
Copper	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	380
Lead	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	1700
Manganese	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	320
Molybdene	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	6.4
Nickel	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	32
Selene	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	< 10
Tin	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	400
Vanadium	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	47
Zinc	mg/kgdb	[acc. to NEN 6961/NEN 6966/C1]	6600
Mercury	mg/kgdb	[acc. to NEN6961/NEN-ISO16772]	6.2
Thallium	mg/kgdb	[SGS 2005-26]	< 6.0

ION SELECTIVE MEASUREMENTS

Fluoride same as F mg/kgdb [acc. VPR C88-03/NEN 6589] 12

ION CHROMATOGRAPHIC MEASUREMENTS

Bromide	same as Br	mg/kgdb	[acc. VPR C85-06/ISO 10304-2]	1500
Sulphate	same as SO4	mg/kgdb	[acc. VPR C85-06/ISO 10304-2]	17000
Chloride	same as Cl	mg/kgdb	[cons. SIKB3001 ana. AS3040 pb.2]	170000

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's-Gravenpolder, 17/01/2012

ANALYTICAL REPORT 201201000476

Customer : Indaver Ireland Limited
Description : Flue gas residue

Sampled by : Derden

Sample descriptions : 1 : 2012-01-09-02

(UK-Vaste afvals)

Sample code	1
Date of sampling	09/01/2012
Laboratory receival date	11/01/2012

Parameter	Unit	method
-----------	------	--------

K.J. Vuurmans
Laboratory manager

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APPENDIX 1

's-Gravenpolder, 17/01/2012

ANALYTICAL REPORT 201201000476

Customer : Indaver Ireland Limited
Description : Flue gas residue
Sampled by : Derden

Preservation & conservation remarks

All samples have been preserved in a correct way and have been transported to the lab within the maximum recommended preservation time.

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APPENDIX 2

ANALYTICAL REPORT 201201000476

's Gravenpolder, 17/01/2012

Customer : Indaver Ireland Limited
Description : Flue gas residue
Sampled by : Derden

Explanation of results of analysis

Sample description: 1 : 2012-01-09-02

ION CHROMATOGRAPHIC MEASUREMENTS

Fluoride

- In contrast to the above norm the analysis was carried out in compliance with NEN-EN-ISO 10304

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