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/Art16_070612
Direct Dial:	01 8433744
Direct Fax:	01 8433747
Date:	7th June 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

Please find enclosed our response to the Article 16(1) notice (one original, one copy and 16 CD-ROM copies. 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 at 01-8433744.

Yours sincerely,

Patricia Rooney
Director & General Manager, MEHL

Waste Licence Application for MEHL Integrated Waste Management Facility (W0129-03) - RESPONSE TO ARTICLE 16(1)

7th June 2012

Contents

Appendices

1. Article 16(1) – Further Information, Particulars and Evidence

1.0 Background and Introduction

1.0.1 This document is prepared in response to EPA correspondence of 23rd March 2012 (ref. W0129-03), Notice in accordance with Article 16(1) of the Waste Management (Licensing) Regulations.

1.1 HSA Correspondence

1.1.1 Please find attached in **Appendix 1** copies of all correspondence to/from the HSA post the application to the EPA for a Waste Licence (December 2010).

2. Waste Acceptance

2.1 Total waste input over lifetime of site

2.1.1 The total (over life of site) of 1,511,000 tonnes of Construction & Demolition waste as per Table H. 1 (c) of the application excludes waste already deposited in the landfill.

2.1.2 This figure of 1,511,000 tonnes is based on void calculations completed as part of design proposals included in the Waste Licence Application W0129-03. The inert void capacity was calculated to be 755,500m^3; a bulk density conversion factor of 2 tonnes per m^3 was applied.

2.1.3 The W0129-02 Annual Environmental Report 2010 reported that, since the commencement of operations at the facility in 2003, a total of 1,596,944 tonnes of inert material had been accepted at the facility as at year-end 2010.

2.1.4 Similarly, we clarify that the total waste acceptance in Table H. I(c), 6,865,125 tonnes excludes waste already deposited.

3. Leachate and Rainwater Management

3.1 Recirculation of leachate

3.1.1 Firstly, it is proposed that leachate is used in the solidification process, as a replacement for process water. The balancing of the requirement for leachate in the solidification process with rainfall and storage, may, at times, require excess leachate to be tankered off-site to an EPA-licensed waste water treatment plant. A modular system of watertight storage tanks is proposed at the MEHL site.

3.1.2 Leachate recirculation within the cells is proposed to minimise the requirement for removal of leachate off-site. Leachate, which is pumped to the cell surface, will be subject to evapotranspiration, thereby minimising leachate volumes. In-cell leachate levels shall not exceed prescribed maximum values.

3.1.3 Leachate recirculation may also have operational benefits, as a replacement for water, for dust control and to mitigate against potential so-called 'exothermic reactions' within the landfill.

3.1.4 A leachate collection system comprising leachate drains and collection sumps will be installed. It is anticipated that leachate levels will be monitored and controlled via a telemetry system; submersible pumps will be activated either automatically by a level control mechanism, or manually. The leachate management system pipework will permit diversion of leachate to the appropriate leachate holding tank, or, if it is to be recirculated, to a network of distribution pipes at the surface of the appropriate cell(s).

3.1.5 The recirculation of leachate at any given time will depend on: (i) the leachate level or leachate 'head' at the base of the cell, (ii) weather conditions (precipitation, evapo-transpiration), (iii) leachate requirements for the solidification process, and (iv) the volume of stored leachate in the holding tanks.

3.1.6 It is proposed that further details on the engineering design of the leachate management system will be submitted for the Agency's approval as a Specified Engineering Work, post-licensing.

3.2 Leachate generation potential

3.2.1 No liquid wastes will be accepted at the facility. It is proposed to accept sludges with a minimum dry matter content of 14%.

3.2.2 Due to the nature of the proposed waste types [non-biodegradable], it is anticipated that any hazardous waste proposed for deposition will have very limited leachate generation potential. In that sense, the rate of leachate generation will be governed by precipitation infiltration.

3.3 Surplus leachate from the hazardous cells

3.3.1 As detailed above, it is proposed that leachate from the hazardous cells will be used in the solidification plant, or may be recirculated within the hazardous cells. Alternatively, where excess leachate volumes are generated, it will be tankered off-site to an EPA-licensed waste water treatment plant.

3.4 Leak detection system

3.4.1 The proposed leachate detection pipework is comprised of a 250mm HDPE pipe located beneath the DAC lining system. The pipework will rise from the leachate detection sump following the same gradient as the landfill side walls (1:2). The pipe will be installed in 12m lengths and will be fusion welded at each joint.

3.4.2 The leak detection system can be monitored on a regular basis by using a dip meter (the pipework diameter specified would also facility a CCTV survey (similar to that used in the drain services industry)). In the unlikely event that a leak should occur, it would confine in the 200mm granular stabilisation layer, which sits below the DAC system and above the 500mm engineered clay layer. The 200mm granular stabilization layer will follow the same gradient as the landfill base (1:50), which would allow any potential leakage to flow in the direction of the leachate detection sump.

3.4.3 In the unlikely event that a leak should occur, there would be two potential methods of extraction from the leachate detection system for sampling, intermediate storage (in the on-site leachate holding tank) or off-site disposal: (i) use of a submersible pump system (with a pump maximum external diameter of 180mm), or (ii) use of a vacuum tanker (similar to that used in the drain services industry).

3.4.4 It is proposed that further details on the engineering design of the leak detection system will be submitted for the Agency's approval as a Specified Engineering Work, post-licensing.

3.5 Temporary covers

3.5.1 "As required" will largely relate to rainfall events and intensities: temporary covers will be deployed during periods of heavy and/or prolonged rainfall. Use of the temporary covers will consider the volume of leachate in the holding tanks at any given time – if holdings tanks are nearing full capacity, use of temporary covers will be intensified in an effort to minimise rainfall infiltration/leachate generation.

3.5.2 The objective of the temporary covers is to divert rainfall away from the cell surface, thereby minimising rainfall infiltration and leachate generation.

3.5.3 The cover system would be a type of waterproof retractable cover (e.g. heavy-duty tarpaulin), portable in nature, which can be rolled out and retracted quickly.

3.5.4 Covers will be dispatched for recovery/recycling at their end-of-life, in line with appropriate waste classification/Waste Acceptance Criteria of the recipient waste management facility.

3.5.5 It is not expected that covers would be a permanent fixture; their use would be on an 'as required' basis, as discussed in **3.5.1**.

3.5.6 In addition, it is intended to use rainwater deflectors on the sidewall. These are temporary stainless steel channels fitted at falls. The deflectors will catch rainfall on the sidewall and divert it away from the waste into an inactive cell or temporary sump.

3.5.7 A covered temporary storage area and a temporary cover are mentioned on pages 6 and 46 respectively of the Hydrogeological Quantitative Risk Assessment (QRA). It is anticipated that solidified material will move directly from the storage building to the final destination in the hazardous landfill; however if the storage building is full to capacity, solidified material may be moved to a temporary storage area in the landfill cell. This temporary storage area would be covered in a manner similar to that described above (**3.5.1** to **3.5.5**). With respect to page 46 of the QRA, we clarify that the temporary covers (as described above, **3.5.1** to **3.5.5**) will be deployed on an 'as required' basis, as described in **3.5.1**.

3.6 Leachate levels

3.6.1 An increased head of leachate in the landfill cells could follow an extreme rainfall event. This will be mitigated by employing the temporary covers.

3.6.2 A leachate collection system comprising leachate drains and collection sumps will be installed. It is anticipated that leachate levels will be monitored and controlled via a telemetry system; submersible pumps will be activated either automatically by a level control mechanism, or manually. The leachate management system pipework will permit diversion of leachate to the appropriate leachate holding tank, or, if it is to be recirculated, to a network of distribution pipes at the surface of the appropriate cell(s).

3.6.3 Appropriate back-up procedures will be put in place to include back-up pumps and power supply.

4. Solidification Process

4.1 Operational experiences at reference plant

4.1.1 The following information is sourced from Indaver, with reference to their existing operations in Europe.

Mixing ratios, materials and curing periods

4.1.2 The optimum mixing ratios and materials requirements depends on

- the properties of flue gas treatment (FGT) residues and
- the landfill acceptance criteria.

4.1.3 Using this information, it is possible through experimental data and experience to determine the best mix to ensure that the acceptance criteria are met.

4.1.4 Indaver has conducted a large number of experiments to determine the most appropriate mix of residues, water, cement and additives based on the properties of Belgian residues and the acceptance criteria for landfill in Flanders (see **Table 4.1** below). An example of this experimental data is shown below. This demonstrates leaching results from 7-day old solidified flue gas treatment residue with different cement quantities. One of the objectives of this testing is to determine how to reduce the quantity of cement that is required, since this has a high carbon footprint and high material value.

Table 4.1: FGT analysis results

Results of DIN extraction tests (mg/kg dry matter) of a fly ash compared to limit values in Flanders, Germany and the EU

	Experiment					Flanders	Germany	EU
	No cement[a]	+10% cement	+20% cement	+30% cement	+40% cement	Cat. I landfill	Z_5	Hazardous waste
As	4	2	03	0.4	0.2	10	10	25
Cd	**163**	**49**	0.1	0.1	<0.1	**5**	**5**	**5**
Cr	1	0.4	5	2	2	5[b]	5[b]	70
Cu	56	36	23	23	5	100	100	100
Hg	n.a.	n.a.	n.a.	n.a.	n.a.	1	1	2
Ni	14	2	<0.1	<0.1	<0.1	20	20	40
Pb	**32**	16	1	0.3	0.1	**20**	**20**	**50**
Zn	**22,000**	**420**	64	63	26	**100**	**100**	**200**
pH	6.8	8.1	11.6	12.1	12.4	4–13	4–13	–

n.a. = not analyzed.
[a] Average of 2 tests.
[b] This is Cr^{VI}.

4.1.5 This shows that (based on FGT residues from a facility in Flanders), 20% cement would be required to meet the acceptance criteria limits in Germany and Flanders. In this experiment acid was not used; other in-house experiments at Indaver (non-published) inform the acid / water mix that is added to meet the acceptance criteria.

4.1.6 As the properties of Irish flue gas treatment residue differ from those of Belgian residue, similar testing would be required in Ireland to determine the optimal mix, once the acceptance criteria are known; therefore, the actual results in the above are indicative but not necessarily meaningful in the Irish context.

Storage arrangements

4.1.7 In Belgium, the solidified residues are sent directly to landfill while still in liquid form, so that they solidify *in-situ*.

Testing

4.1.8 The incoming waste (raw residues) are tested twice a year. This gives an indication of whether the input material is stable and whether the output will therefore also be stable and compliant with the landfill acceptance criteria.

4.1.9 Residues after solidification are not sampled on a regular basis because the tests on incoming waste are considered sufficient to establish that the process is working.

Analysis of flue-gas treatment residues

4.1.10 Please see above (**Table 4.1**) results of leachate tests showing scenarios with no cement (before treatment) and incremental cement mixes (after treatment).

Landfill leachate

4.1.11 The properties of leachate from solidified residues are given above (**Table 4.1**). The leachate collected from hazardous waste landfills containing solidified residues is not representative of the residues since such landfills typically contain many other hazardous waste streams. Indaver's hazardous waste landfill in Antwerp is one such landfill. Therefore, it is not possible to utilise such information in any meaningful way.

4.1.12 As long as the leachate from solidified residues complies with landfill acceptance criteria as per above, the landfill should be designed to handle any such leachate.

4.2 Process tests - FGT residues generated in Ireland

4.2.1 Indaver has only one set of FGT residue results in line with its waste licence. Until more data is available, it is not possible to draw any parallels between the Belgian experience and the proposed activity.

4.3 Current guidance

4.3.1 In relation to 'curing' of concrete, the Irish Concrete Society references:
Concrete strength increases with time where moisture is available. However, it is accepted that around 80% of the strength is reached at an age of 28 days and so this is the length of time a concrete cube is stored, in controlled conditions before testing.

5. LandSim Model

5.0.1 Related details are included in information provided by the geology/hydrogeology EIS team[1], attached in **Appendix 2**.

[1] Presented by Eugene Daly, Jenny Lightfoot, Gareth Ll Jones and Catherine Buckley to An Bord Pleanála Oral Hearing (Ref. 06F.PA0018), March 2011

6. Conceptual Site Model

6.0.1 Related details are included in information provided by the geology/hydrogeology EIS team[2], attached in **Appendix 2**.

6.0.2 A detailed geological log for BH-4A does not exist; rather a drilling log for this location is available. BH-4A was drilled as an alternative monitoring location for BH-4, as per agreements with the Agency under W0129-02. BH-4A is located approximately 168m to the east of the location of BH-4. The available borehole drilling records/logs for both BH-4 and BH-4A are included in **Appendix 3**.

6.0.3 Boreholes BH1, BH2, BH3 and BH4 were drilled in 1998; BH10 and BH11 were drilled in 2001. Borehole logs are included in **Appendix 3**.

6.0.4 **Appendix 4** contains location maps to show current and historic groundwater boreholes.

[2] Presented by Eugene Daly, Jenny Lightfoot, Gareth Ll Jones and Catherine Buckley to An Bord Pleanála Oral Hearing (Ref. 06F.PA0018), March 2011

7. Geology, Hydrology and Hydrogeology

7.0.1 Related details are included in information provided by the geology/hydrogeology EIS team[3], attached in **Appendix 2**.

7.0.2 The report entitled 'Groundwater Monitoring of the Bog of the Ring, Final Hydrogeological Assessment Report'[4] (TES, January 2007) is attached in **Appendix 5**.

[3] Presented by Eugene Daly, Jenny Lightfoot, Gareth Ll Jones and Catherine Buckley to An Bord Pleanála Oral Hearing (Ref. 06F.PA0018), March 2011

[4] Source: www.epa.ie. Submitted as unsolicited additional information by Fingal County Council to the Agency on 26th January 2007

8. Additional Site Investigations

8.0.1 It is proposed that this item will be discussed at a meeting with the Agency and MEHL's hydrogeology EIS team, including a time extension to the stated 12-week response time to the Agency's notice of the 23rd March 2012.

9. Other Matters

9.1 Works carried on at the facility

9.1.1 The site has been subject to ongoing filling and restoration works, under EPA licence W0129-02, since the making of the application ref. W0129-03 in December 2010. Capping works have progressed at Cells 1-2.

9.2 Additional environmental monitoring information

9.2.1 The site has been subject to routine ongoing monitoring, under EPA licence W0129-02, since the making of the application ref. W0129-03 in December 2010. Full quarterly monitoring reports were submitted to the Enforcement section of the EPA. Summary information is provided in **Appendix 6** for the following:

- Rainfall and evapotranspiration
- Groundwater levels
- Groundwater quality

9.3 Revised non-technical summary

9.3.1 **Appendix 7** contains a revised non-technical summary for the Waste Licence Application (ref. W0129-03), submitted in December 2010.