INDAVER

Waste Licence Review Application W0167-02

Unsolicited Information

August 2010

INDAVER

Ms Aoife Loughnane
Environmental Protection Agency
Regional Inspectorate. McCumiskey House
Richview, Clonskeagh Road
Dublin 14

Indaver Ireland
4 Haddington Terrace
Dun Laoghaire
Co Dublin

28th July 2010

Dear Ms Loughnane,

Further to our recent telephone conversation, please find below and attached, information relevant to the review of our Waste License. I would like to take this opportunity to thank you for your understanding regarding the submission of this information, particularly in regard to the timelines.

As previously explained, due to this being holiday season for many people, we have had some difficulties in getting this information to you prior to the completion of the License Review. Nonetheless, as promised, I am enclosing here the majority of information with the rest to follow before the end of the second week in August 2010.

If you have any queries in the regard, please don't hesitate to contact me on 01 2718713 or 086 0416366.

Kind regards

Sonia Dean
Compliance Manager
Indaver Ireland Ltd.

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
▪ Tolka Quay Road, Dublin Port, DUBLIN 1, IRELAND ▪ tel. + 353 1 280 4534 ▪ fax + 353 1 280 7865
▪ Unit 11, South Ring Business Park, Kinsale Road, CORK, IRELAND ▪ tel. + 353 21 470 4260 ▪ fax + 353 21 470 4250
VAT Reg. No. IE9F70712T ▪ IBAN IE61 BOFI9011 1668 4915 04 ▪ BIC BOFIIE2D
Directors: J. Ahern, C. Jones, J. Keaney, D. McGarry
Belgian Directors: R. Ansoms, M. Decorte, P. De Bruycker, B. Goethals

RECOVERED WATER FOR FGT SYSTEM

Introduction

Indaver is considering accepting recovered water from an offsite industrial facility for reuse in the Meath waste-to-energy plant. The water would otherwise be discharged to a local water course / waste water treatment plant and would be of high quality with very low inorganic or organic contaminant levels.

The Meath waste-to-energy plant is planned to use extracted groundwater for flue gas cleaning and hence there is an opportunity to re-use this off-site recovered water in the Flue Gas Treatment (FGT) System as an alternative. This would both reduce groundwater extraction by Indaver and reduce the volume of discharge to the relevant waste water treatment plant.

To avoid returning to the EPA in the near future to apply for a further review of our licence, we are submitting the following information about the use of recovered water in the FGT system for consideration and possible inclusion in the current review W0167-02.

We understand that the EPA is currently processing a high volume of licence applications. In order to facilitate the EPA's timelines and to avoid excess delay to our current review, we would be open to discussion on the most suitable route for this proposal to take.

Proposal

The proposal is to use recovered water, from an external process, for lime milk preparation in the Meath waste-to-energy FGT system. Based on the projected available volumes, it is anticipated that the substitution rate of off-site recovered water for groundwater would be initially in the region of 25% or (6,500 m^3/y).

In the longer term, there is nothing to prevent a higher substitution rate if the quality of the water from off-site processes is acceptable. The purpose of introducing recovered water to the process is to reduce groundwater extraction and energy usage in well water pumps.

We propose therefore that the recovered water is considered a substitute for groundwater volumes potentially reducing the extraction rate by 10% based on a 25% substitution rate initially.

Other Potential Sources of Water

There may be other opportunities in the future to reuse water recovered from offsite processes. There is no pretreatment envisaged of the recovered water. Any recovered water considered for direct reuse in the FGT system must be of a very high quality with only minor contamination due to Total Dissolved Salts (TDS). It may contain only low level naturally occurring organic contaminants. The level of TDS needs to be minimised to limit the potential for scaling.

Potential Benefits

The substitution of groundwater for recovered water would have the following benefits:

- Reduced groundwater consumption

Overall the amount of groundwater extraction from the Platin aquifer could be reduced by approximately 10% (if a 25% substitution rate was achieved) or 6,500m^3 over the operating

year. As previously stated, in the longer term there is nothing to prevent a higher substitution rate provided the quality of the water from off-site processes is acceptable and the quantity is available.

- Reduced energy consumption from pumping groundwater at the site

As set out in the Articles 12 and 13 compliance submission, the proposed groundwater extraction rate is 8.5m^3/h. It is anticipated that the production well will be 90m deep and will require a pump operating at approx. 7 kW for 3,900 hours per year (50% of the time). Substituting groundwater by 25% would reduce this pumping requirement by 6,800 kWh per year.

- Reduced discharge of recovered water to the local water course / WWTP

The recovered water would normally be sent to a wastewater treatment plant or possibly to a local watercourse. Diverting it from a wastewater treatment plant would reduce the overall loading of wastewater treatment plants, saving on both energy and raw material use in the form of reagents in the plant. Diverting it from a water course would reduce the potential for low level contamination from parameters in the recovered water like TDS.

Quality Control

The quality of the recovered water will be controlled to ensure that substituting groundwater with recovered water does not have any adverse impact on the operation of the plant or on the environment.

1. Blocking of FGT equipment: atomiser, baghouse filters

The main cause for potential blockages or scaling is TDS. Recovered water may contain TDS levels that are more elevated than levels naturally occurring in groundwater.

The quality of recovered water will be tightly controlled to prevent against blocking. In the initial testing period only very low substitution rates will be trialled in order to ensure there are no adverse impacts on the FGT system. The FGT technology suppliers LAB have confirmed that there is no difficulty in achieving high replacement rates as long as the scaling/blocking issue is addressed.

2. Exceeding TOC limits in stack

The FGT system is not designed to treat TOC since this is eliminated in the furnace. For this reason no recovered waters containing organic contaminants would be accepted.

3. Reduced acid gas removal potential

The potential for acid gas removal could be affected if the recovered water contains significant quantities of chlorine. This chlorine would react with the lime introduced to the spray drier reactor that was otherwise intended for chlorine in the flue gases. This would mean that more dry lime injection would be required in the FGT process. The quality of the recovered water will be tightly controlled to limit the chlorine levels.

4. Traffic

The overall volume of recovered water acceptable for substitution is low (at 25% substitution, an estimated 6,500 m^3) and it is therefore anticipated that traffic movements will be kept to a minimum.

Reference projects

The waste-to-energy facility in Avignon, equipped with a semi-dry system installed by LAB, currently uses recovered water for the semi-dry reactor in the same manner as proposed here. This is used to supplement freshwater and at low supplement levels has not impacted on the normal operations of the plant. Further information can be obtained from Christian Bessy of LAB, at cbessy@lab.fr.

In order to avoid having to return to the EPA for a further review of our License in the future, we wish to submit the following information at this stage, regarding the various conditions affected by the above proposal:

Condition 1.4 Previuosly in the License Review, we submitted a request and supporting information to increase the waste acceptance tonnage to 200,000T per annum. We would repspectfully request that this now be increased to 210,000T to include the recovered water stream.

Condition 1.5 The License Review application requested a number of changes to the EWC codes for waste acceptance. No further change is requested here.

Condition 1.6 The License Review application requested that liquids be included so no further change is requested here.

Condition 3.4.1- We propose to remove the last line of this condition; the base of the fence shall be set in the ground.

Evidence of Irish Hares on site was noted in the EIS. This species was noted as present on site previously. During the construction phase of the project, hares have been regularly seen on the site, in the landscaped areas and the grass area between the construction site and the site offices. The hares are accessing the site and the various landscaped areas within the site by getting under the stock-proof fencing. This chain-link fincing is supported by concrete posts which are set into the ground. The base of the chain-link itself is not set into the ground, leaving a gap of a few inches, enough to be exploited by the hares. The fencing, in its existing condition, provides adequate security to the site and is "stock-proof" in that no livestock can get through it or under it.

Suitable habitat is vital for the survival of the Irish hare. Recent research suggests that it may be the variety of grasses within the hare's diet that limit its distribution. It may be that the variety of grasses growing on site, as opposed to improved Suitable habitat is vital for the survival of the Irish hare. Recent research suggests that it may be the variety of grasses within agricultural grassland in the surrounding area, is providing the variation in diet required by this important species.

To date, the presence of hares on site has not affected the construction works as they seem to avoid these and any other noisy areas. We therefore propose to leave the small gap at the bottom of the fence to facilitate the movement of these protected mammals throughout the site, in the interest of improving biodiversity of the development and the local area.

Condition 3.4.2 Facility Security. CCTV is monitored from the Control Room only.

Condition 3.5.3 In reference to the drainage for the inspection area please note that the drainage will be sloped towards the bunker rather than into a dedicated storage tank. This water is mixed with the waste and helps to minimise the dust levels as well as aiding in the mixing process, ensuring a homogenous waste mixture to the incinerator from the bunker.

Condition 3.13.2 Please see updated version of A.1.8b of the review licence application.

A.1.8.b Surface Water Emissions

The process has been specifically designed to minimise the use of water and to ensure that there is no process effluent discharge. All drainage water from the main process building will be recirculated within the plant.

There will be one emission source from the drainage system, which will consist of non-contaminated surface water runoff collected from roofs and hardstand areas. This will discharge to a drainage ditch at the western corner of the site at a rate controlled by a hydrobrake system, which will mimic a discharge from agricultural land. One monitoring station will detect any contamination and divert it to a separate storage tank, or if this is full, shut off all discharge from the system. A second monitoring station will monitor the final discharge to the ditch. A Class I full retention separator for petrol like substances will also be installed before the discharge into the pond.

The undeveloped area of the site will continue to drain naturally to existing drainage ditches. Waters draining from these areas will not come into contact with any potential contamination from the plant.

Condition 3.16 Removal hours and hours of operation

We propose to have this condition removed. Current practices in the Waste Industry in Ireland mean that waste trucks are on the road early in the morning, usually having been loaded the night before. This practice allows the trucks to get back on the road quickly but can result in queues at waste facilities, waiting for the gates to open. Our potential customers have enquired if there is a way to avoid a backlog at site opening each morning. We would like to be in a position to facilitate this for a number of reasons:

Traffic Flow Counts carried out for the EIS show that the peak hour traffic period is 07:45 to 08:00 on the R152 Regional Road linking Drogheda and Duleek. This coincides with the opening hours in our current License, which may lead to possible congestion problems.

Because trucks may having been queuing to use the facility on opening rather than having the vehicle movements spread out, they will be condensed. This may cause further difficulties on the M1 motorway, which can get congested in certain sections during the morning commute.

The R152 already has a large number of trucks using it, 24 hours a day, to access Irish Cement at Platin, nextdoor to the site, as well as HGV traffic to and from Drogheda and the M1. This condition on opening hours is not included in IPPC Licence P0030-03 Irish Cement Limited Platin Works. Removing this condition will not increase the impact of vehicle movements or the number of vehicle using the R152, any more than what has been assessed in the EIS. It may decrease the impact as the vehicle movements will be more evenly spread, reducing congestion and hence its associated emissions.

Regarding noise levels, as the plant is operating 24 hours a day and number of vehicle movements to the site won't change as a result of the removal of this condition, there is no expected noise level increase. As such, we don't envisage any difficulty regarding either the day or nighttime noise limits.

Complaints Procedure
While we do not envisage waste trucks coming to the site during the night, this change is proposed to give us the flexibility for our customers while improving any congestion and traffic problems. Indaver does not believe that the removal of the existing condition will cause any difficulties regarding traffic volumes or noise, and as such, we do not envisage any complaints in this regard. Indaver does have a Complaints Procedure which will be implemented should the need arise, to quickly and satisfactorily resolve any issues.

Condition 3.22.10 The waste bunker shall be equipped with the following:-b)a detector for the presence of explosive gases.

It is the belief of Indaver Ireland Limited that this is not a requirement for the following reasons:

- Indaver will not be accepting hazardous waste
- Indaver will not be accepting large amounts of sludge
- The air above the bunker will be used to feed the grate-incinerator by a fan, the amount of air-intake is between 30000 and 40000 m^3/h.
- The explosion limits Methane/Air are between 5% and 15%, so the minimum amount of Methane production to form an explosive mixture would be around 1500 m^3/h, which is impossible.
- When there is an unplanned shut-down, the air will go directly to the stack, by means of forced draught, no fan or so required, and thus no built-up of an explosive atmosphere.
- During all shut-downs, the ID-fan will continue to run at very low speed in order to have some draught through the installation for cooling. This air will be taken from the bunker, so ventilation is ensured even during shut-downs.
- There are no recordable accidents in the bunker area due to the formation of methane in waste incinerator installations.

Condition 9.4.1(b) In the event of a complete breakdown of equipment or any other occurrence which results in the shutdown of the incineration plant or process line,

any waste stored or awaiting processing at the facilty shall, subject to the agreement of the agency, be transferred to an appropriate facility within 3 days of shutdown.

We have assumed that this does not include waste already in the bunker. It is not practicable to remove waste out of the bunker via any other route apart from via the waste to energy plant. The design of the bunker is to accept waste and remove via grab cranes towards the feeding hopper. The removal of waste out of the bunker into trucks is not possible without involving extraordinary measures and cost. There will be no issues in regards to odour with waste remaining in the bunker, as we will have an odour management system in place with negative pressure. All waste that is awaiting unloading into the tipping halls which is in trucks will be sent off site in accordance with the condition.

EPA Pre-Treatment Obligations

Roll out of a Three Bin System

Appendix 12.b of the Response to the Agency's Article 12 Compliance sets out Indaver's position on the EPA Pre-Treatment Guidance requirement that in urban areas (>1,500 population), the diversion or separate collection of biowaste (i.e. third bin) is expected for Waste-to-Energy (WtE) facilities.

In particular, the Appendix highlighted the concern that Indaver would be reliant on its own competitors (i.e. collectors who also operate treatment outlets) to roll out the third bin in order to comply with the obligations. This effectively provides Indaver's competitors with the advantage that they could limit source-separated collection systems to the extent necessary to deliver waste to their own facilities (e.g. MBT) to the exclusion of WtE facilities.
Since the Article 12 information was submitted in December 2009, the Department of Environment, Heritage and Local Government has published draft household food waste regulations (*Waste Management (Household Food Waste Collection) Regulations 2010)* for consultation. These propose to require that waste collectors provide or arrange for the provision of a separate collection service for food waste from households according to the following timetable:

- From 1 July 2011 for all households situated within agglomerations >50,000 population, and
- From 1 January 2012 for all households situated within agglomerations >1,500 population

Similar obligations have already been placed on commercial food waste producers through the *Waste Management (Food Waste) Regulations 2009,* which require source separation and treatment of all food waste arising.
If the draft food waste regulations for householders are published without modification, these developments will ensure all MSW collected from 1 January 2012 in population areas >1,500 will be provided with three bin systems. These regulations will also ensure that the onus on separate collection remains in the most appropriate place – with the waste collection service providers.

Similarly, it is likely that in order to take account of these new regulations, the Waste Framework Directive and other changes which may result from the Draft Statement of Waste Policy published recently by the Minister for Environment, Heritage & Local Government, the Waste Collection Permit Regulations, or at the very least, Collection Permits will be reviewed. This would provide the opportunity to re-enforce the provision of three-bin collection service.

Pre-Treatment Obligations and the Waste Hierarchy

It was also noted in Appendix 12.b that the pre-treatment obligations do not differentiate between options at different tiers of the waste hierarchy. That is, the same obligations are applied to WtE (as a recovery operation) and landfill (as a disposal option). As noted in the submission, while the requirement for pre-treatment prior to landfill is clear under the Landfill Directive and other national strategies, there is no such legal requirement for pre-treatment prior to WtE.

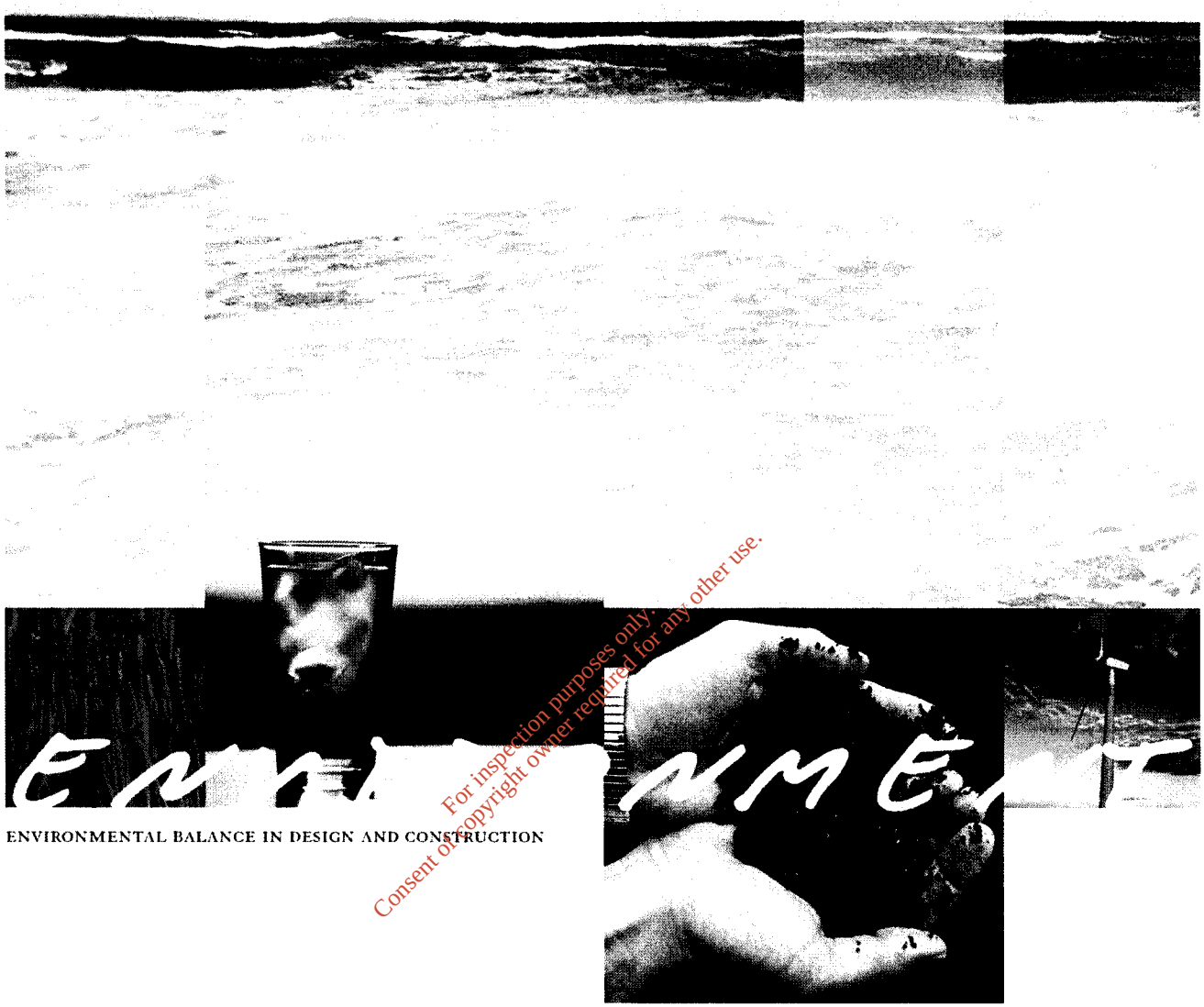
Furthermore, there is no apparent reason for applying these obligations to WtE, a residual waste treatment option, and not to MBT which also manages residual waste. This is particularly important where MBT can be considered on the same tier of the waste hierarchy as WtE (where the majority of residues go for energy recovery) or lower (where the majority of residues are sent to landfill).

Please find attached with this submission a WRATE modelling study commissioned by Indaver to compliment the *STRIVE* study *Critical Analysis of the Potential of MBT for Irish Waste Management* carried out by Fehily Timoney. This study indicated that 2 bin source separation may provide better greenhouse gas and other savings than 3 bin source separation where WtE is used for residual waste treatment, and these scenarios both perform better in most categories than MBT with either type of source separation.

In Indaver's view, this warrants further consideration in the context of pre-treatment obligations. At the very least, WtE and MBT should be treated on par in terms of residual waste source separation to ensure maximum materials recovery in line with the waste hierarchy. Indaver has been advised that any obligation affecting competition between different waste technologies should take this hierarchy into account. Measures that discriminate unfairly and disproportionately between technologies on the same tier of the hierarchy could be considered illegal as amounting to an anti-competitive measure and a breach of the fundamental principles of EU law and policy.

Pre-Treatment Conditions Summary

In light of these developments, it is submitted that it is not necessary or meaningful and likely to be in breach of EU law to include a pre-treatment condition similar to that proposed in the current EPA Pre-treatment Guidance document in the Waste Licence for Indaver's Waste-to-Energy Facility.



ENVIRONMENTAL BALANCE IN DESIGN AND CONSTRUCTION

INDAVER IRELAND LTD.

COMPARISON OF RESULTS OF 2-BIN vs. 3-BIN SYSTEMS AS PER 'MBT STUDY'

NOVEMBER 2009

INDAVER IRELAND

FEHILY TIMONEY & COMPANY

INDAVER IRELAND LTD.

COMPARISON OF RESULTS OF 2-BIN vs. 3-BIN SYSTEMS AS PER 'MBT STUDY'

User is Responsible for Checking the Revision Status of this Document

Rev. Nr.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
0	Draft to Client	DFM/MG	DFM		13.11.09

Client: Indaver Ireland Ltd.

Keywords: 2 bin, 3 bin, MBT Report

Abstract: This document presents a comparison of results observed when the LCA scenarios presented in the STRIVE study prepared by FTC i.e. the 'MBT' study are amended to account for a 2-bin based collection system

TABLE OF CONTENTS

PAGE

LIST OF TABLES

PAGE

LIST OF FIGURES

PAGE

1. INTRODUCTION

In 2008, FTC prepared a report under the EPA research programme STRIVE entitled 'Critical Analysis of the Potential of Mechanical Biological Treatment for Irish Waste Management', hereafter referred to as the 'MBT report'. An environmental impact appraisal was prepared during the study that utilised the WRATE model as a basis. A number of scenarios in terms of residual waste management options were presented which centred around thermal or MBT configurations. These residual waste management scenarios were considered as part of a wider integrated waste management system which was based on a 3 bin kerbside waste collection system and which was common to all scenarios examined.

Indaver Ireland Ltd. requested that FTC assess the environmental impact of the scenarios analysed in the MBT report using a 2 bin collection regime instead of a 3 bin collection system. This document presents a comparison of results in tabular and graphical form.

1.1 Results observed in MBT report

The results obtained for the default categories in the MBT report are present in the following table. It should be noted that this table was not presented in the published MBT report.

Table 1.1: Results of LCA based on 3 – bin collection regime

Impact Assessment	Unit	Baseline	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Abiotic Resource Depletion	*kg antimony eq.*	-178688	-322330	-353929	-445396	-368462
Global Warming	*kg CO2 eq.*	-652871	-3530090	-8439080	-24225854	-15438589
Human Toxicity	*kg 1,4-dichlorobenzene eq.*	-556639	-2299665	-4295639	-6213140	-6032870
Freshwater Aquatic Ecotoxicity	*kg 1,4-dichlorobenzene eq.*	-1316236	-4497029	-4706137	-3260593	-3206250
Acidification	*kg SO2 eq.*	-133754	-248146	-280514	-283675	-287531
Eutrophication	*kg PO4--- eq.*	-733	-5882	-7733	-8681	-8262

The results in the above table are graphically presented in the following. Note that these are the same graphs presented in the MBT report.

Figure 1.1: Abiotic Resource Depletion

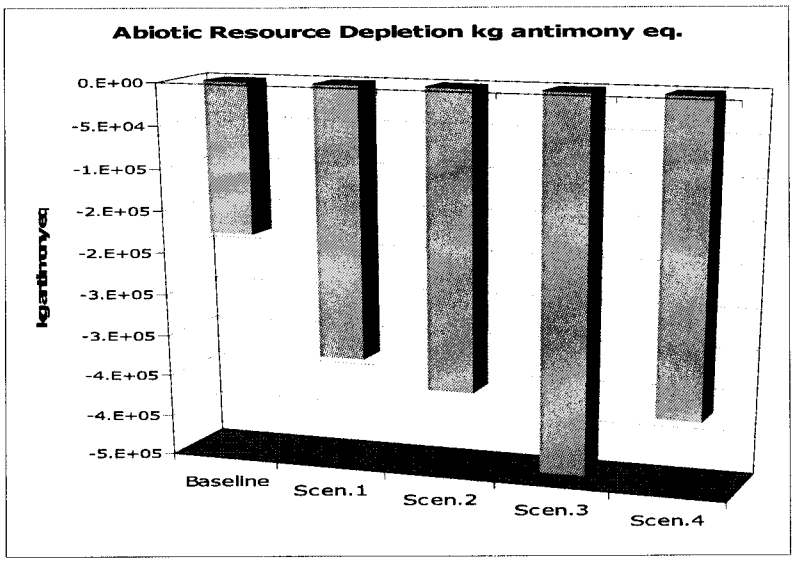


Figure 1.2: Global Warming Potential

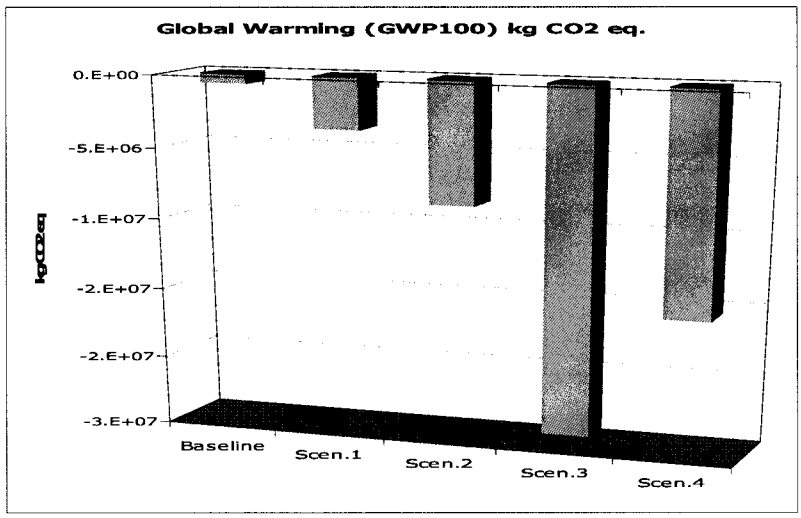


Figure 1.3 Human Toxicity Potential

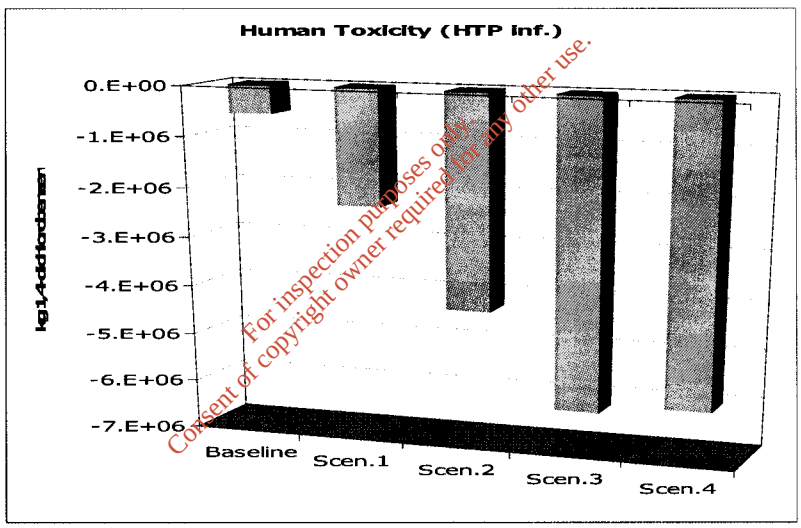


Figure 1.4: Freshwater Aquatic Ecotoxicity

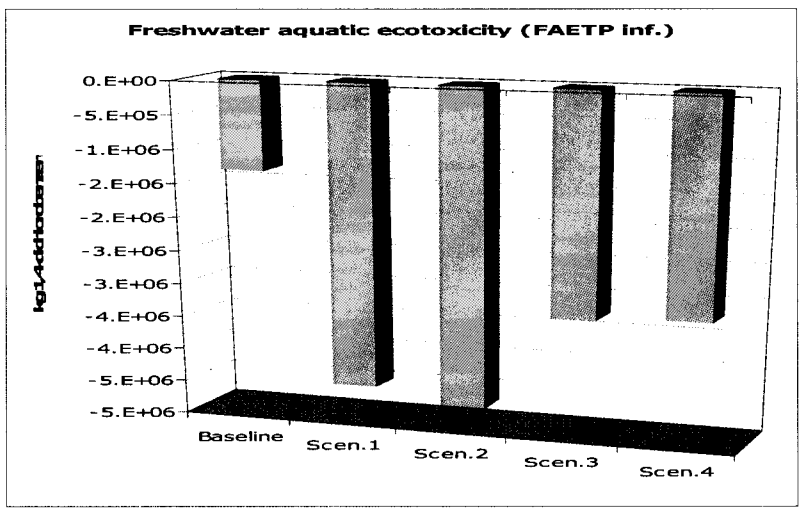


Figure 1.5: Acidification Potential

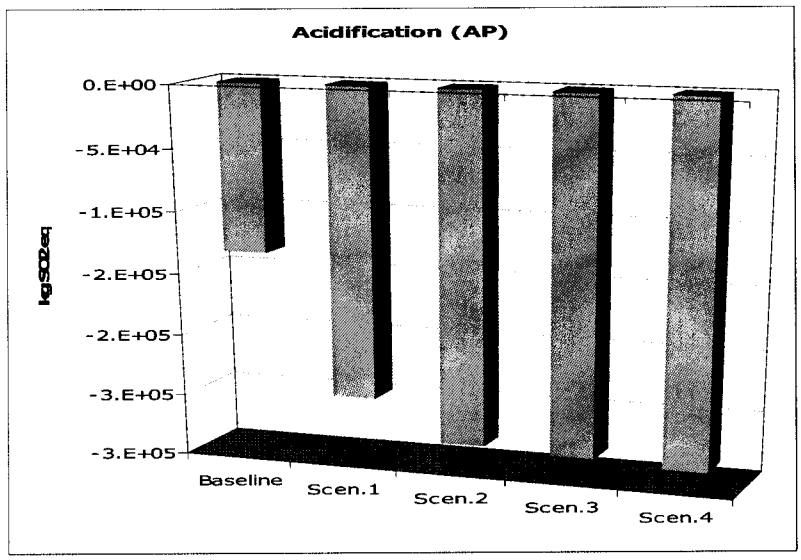
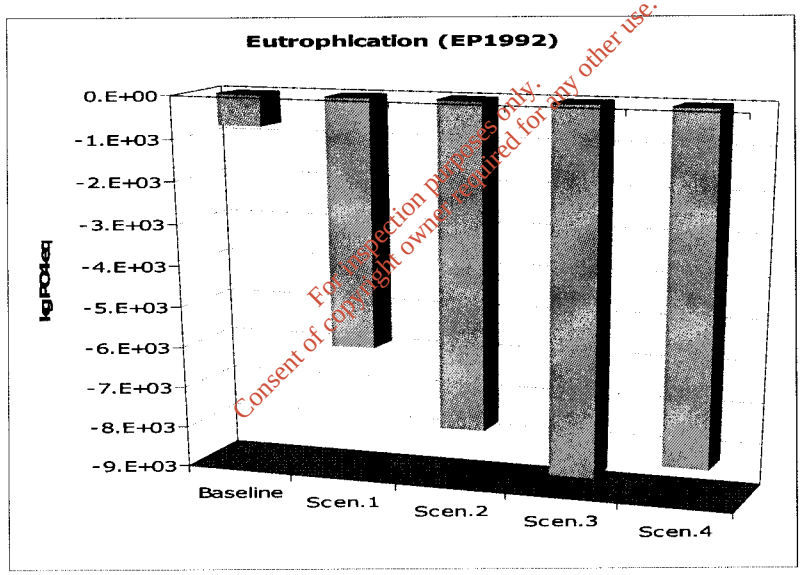


Figure 1.6: Eutrophication



2. SCENARIOS AMENDED FOR COMPARISON

The scenarios presented in the MBT report have been amended and are summarised in the following table and presented in following Sankey Diagrams:

Table 2.1: Amended Scenarios

Baseline	Landfill Centric	Two bin system where dry recyclables (paper, card, dense plastics, metals) are collected at the kerbside. Remaining waste is collected in a residual bin. The dry recyclables are sent to a MRF for sorting and sent for recycling. The residual bin is sent directly to landfill without further treatment.
Scenario 1	Aerobic MBT Centric	Two bin system where dry recyclables (paper, card, dense plastics, metals) are collected at the kerbside. Remaining waste is collected in a residual bin. The dry recyclables are sent to a MRF for sorting and sent for recycling. The residual bin is sent for MBT recovering ferrous metal, a recovered fuel and with an aerobic stabilisation step. Stabilised waste is sent to landfill. The high calorific value fraction is separated and sent for use as a fuel (SRF).
Scenario 2	Anaerobic MBT Centric	Two bin system where dry recyclables (paper, card, dense plastics, metals) are collected at the kerbside. Remaining waste is collected in a residual bin. The dry recyclables are sent to a MRF for sorting and sent for recycling. The residual bin is sent for MBT recovering ferrous metal, a recovered fuel and with an anaerobic stabilisation step yielding a biogas. Stabilised waste is sent to landfill. The high calorific value fraction is separated and sent for use as a fuel (SRF).
Scenario 3	Thermal (CHP) Centric	Two bin system where dry recyclables (paper, card, dense plastics, metals) are collected at the kerbside. Remaining waste is collected in a residual bin. The dry recyclables are sent to a MRF for sorting and sent for recycling. The residual bin is sent for treatment by incineration with energy recovery; combined heat and power with electricity and commercial heat generated. Incinerator fly ash (APC residue) is sent to landfill, and bottom ash is recycled as aggregate.
Scenario 4	Thermal-(Power only) Centric	Two bin system where dry recyclables (paper, card, dense plastics, metals) are collected at the kerbside. Remaining waste is collected in a residual bin. The dry recyclables are sent to a MRF for sorting and sent for recycling. The residual bin is sent for treatment by incineration with energy recovery as electricity exported to the national grid. Incinerator fly ash (APC residue) is sent to landfill, and bottom ash is recycled as aggregate.

Figure 2.1: Baseline Scenario Flowchart

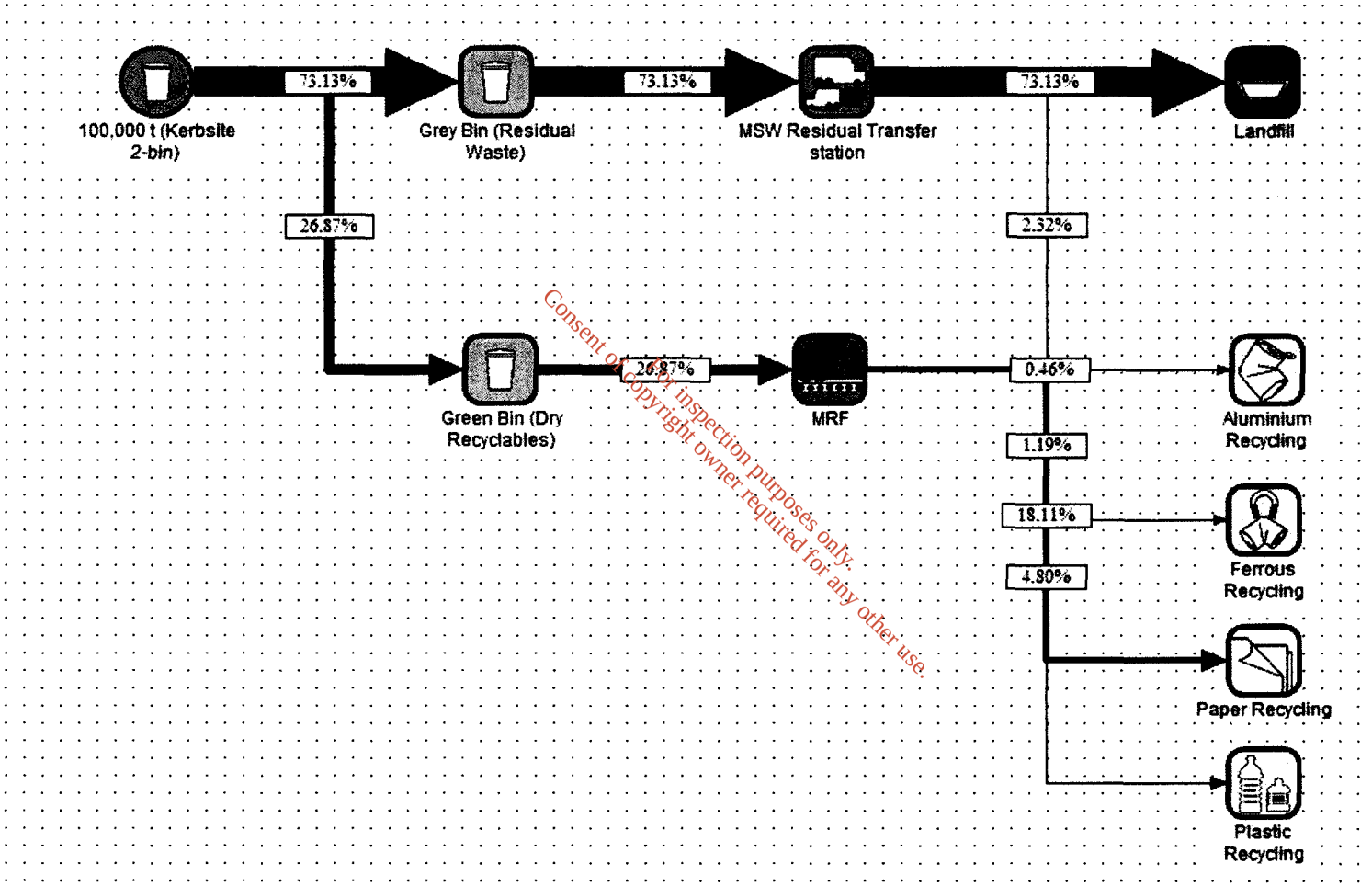


Figure 2.2: Scenario 1 Flowchart

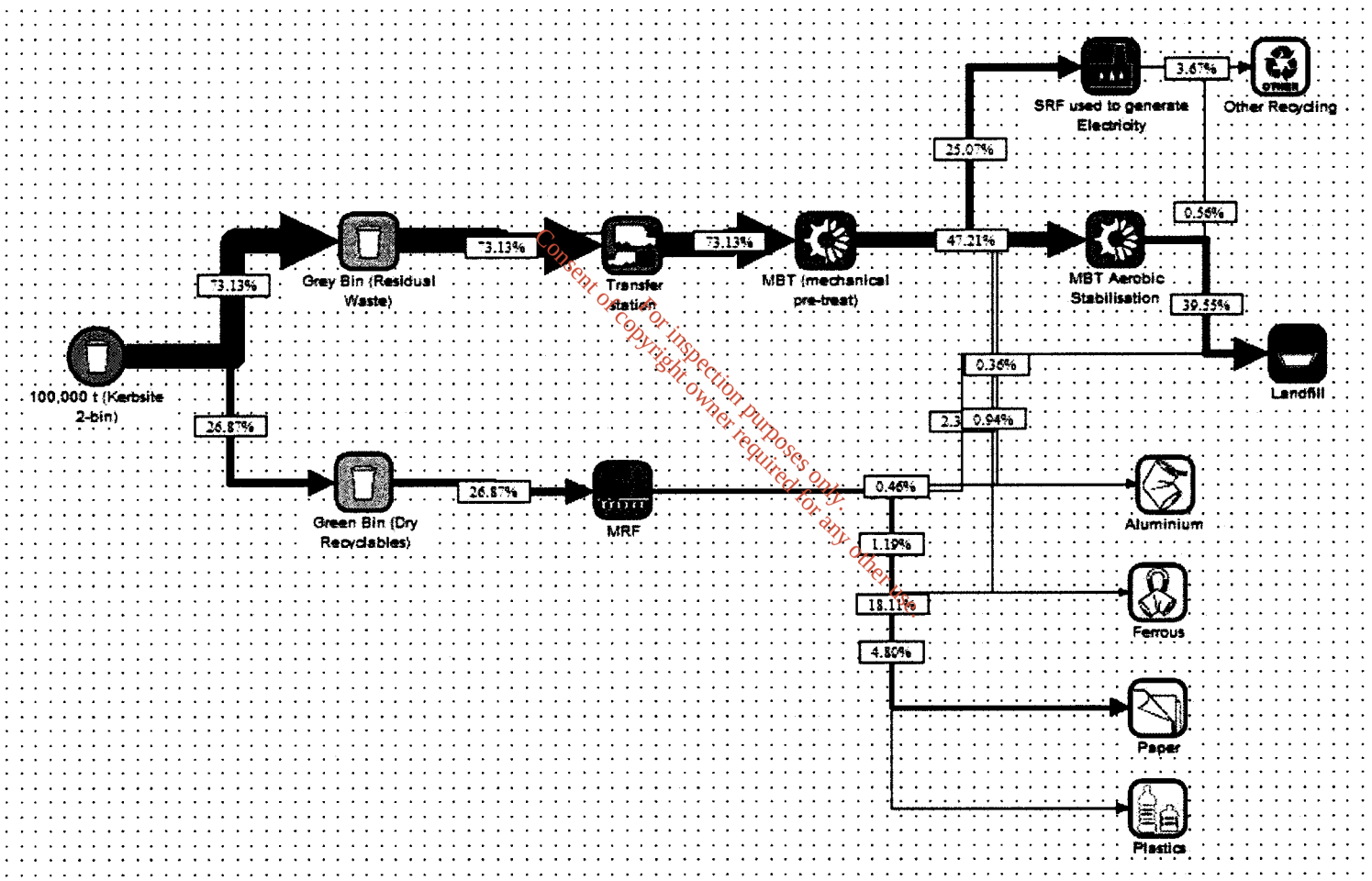
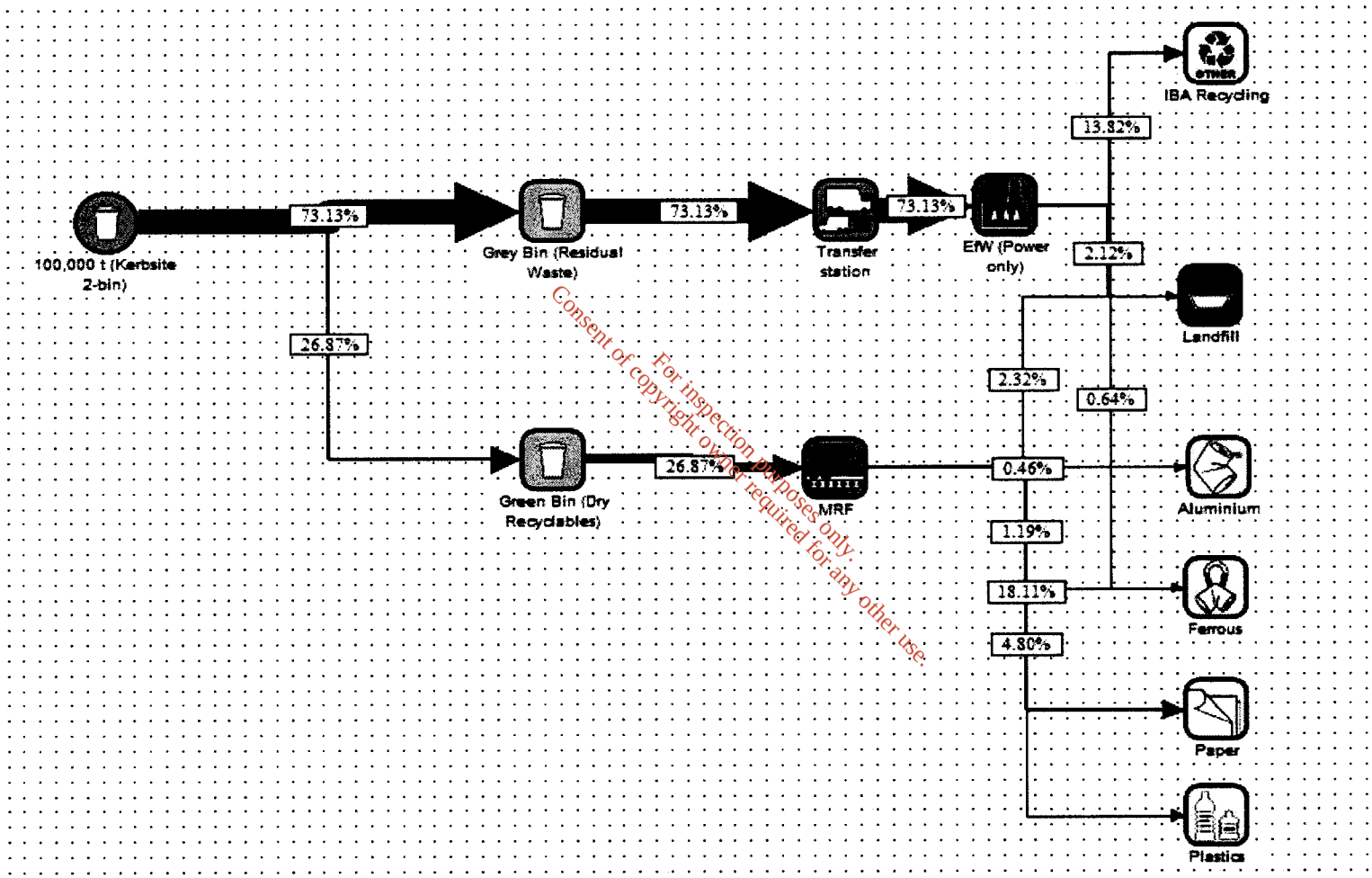


Figure 2.5: Scenario 4 Flowchart



3. AMENDED RESULTS

Table 2.2 presents the results observed for the default WRATE categories when the amended 2 bin based collection regimes are analysed.

Table 3.1: Results of LCA based on a 2- bin collection regime

Impact Assessment	Unit	Baseline	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Abiotic Resource Depletion	*kg antimony eq.*	-200117	-332591	-376496	-479155	-394201
Global Warming	*kg CO2 eq.*	2224729	-482591	-7393943	-28032895	-18324832
Human Toxicity	*kg 1,4-dichlorobenzene eq.*	-3593694	-4522494	-7021071	-9486661	-9282318
Freshwater Aquatic Ecotoxicity	*kg 1,4-dichlorobenzene eq.*	-1504267	-4575801	-4866445	-3518522	-3457176
Acidification	*kg SO2 eq.*	-151709	-253409	-298682	-301323	-305375
Eutrophication	*kg PO4--- eq.*	212	-5013	-7712	-10599	-10128

These results are presented graphically in the following figures.

Figure 3.1: Abiotic Resource Depletion

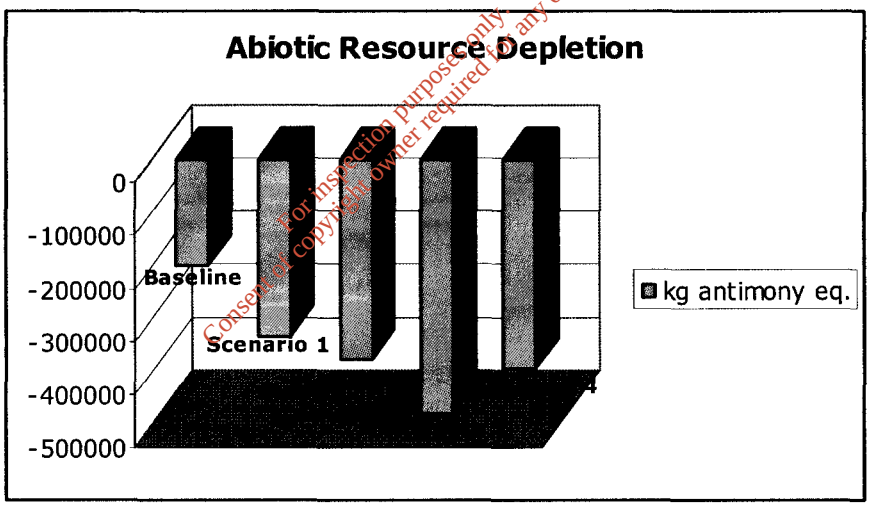


Figure 3.2: Global Warming Potential

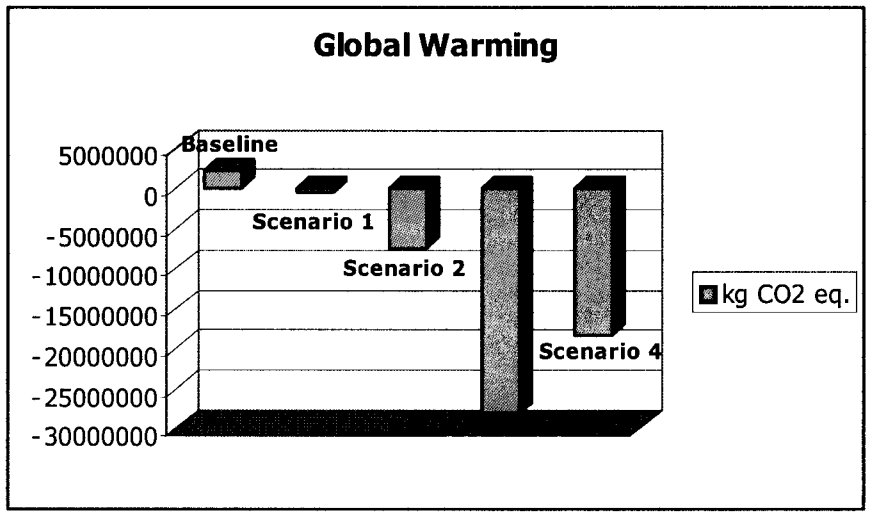


Figure 3.3: Human Toxicity

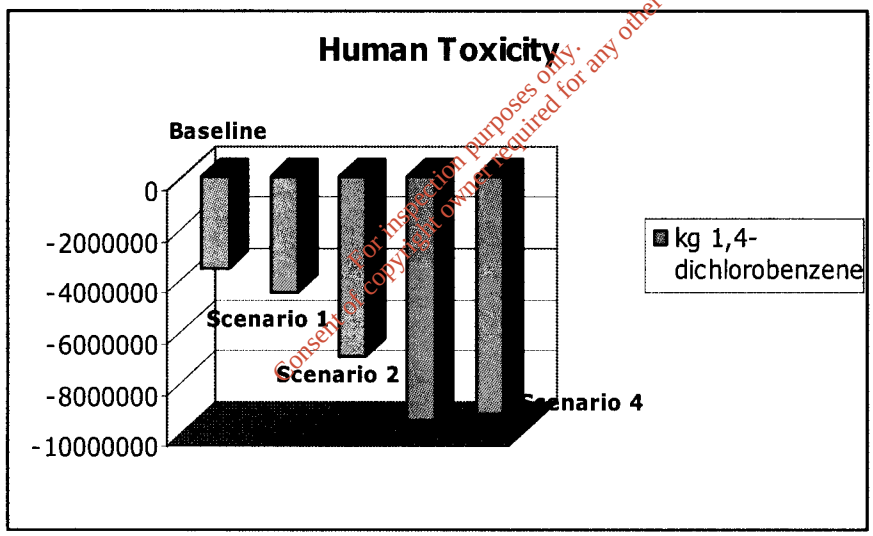


Figure 3.4: Freshwater Aquatic Ecotoxicity

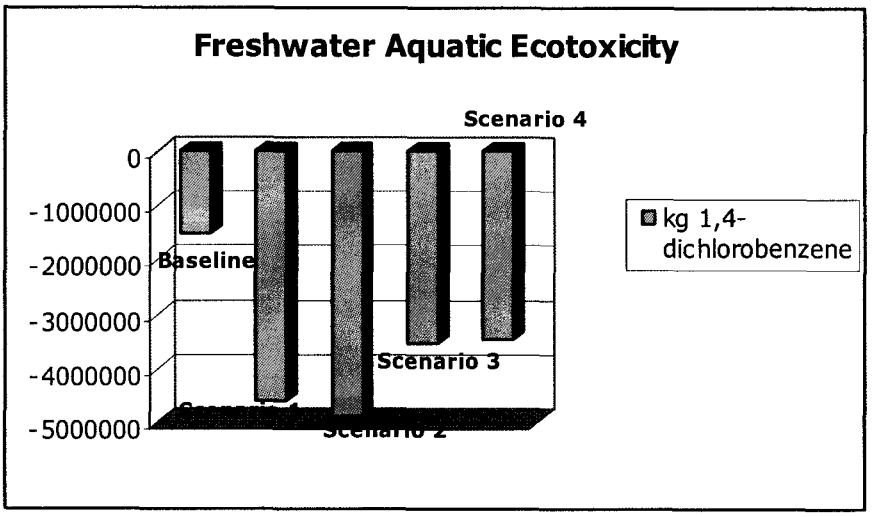


Figure 3.5: Acidification

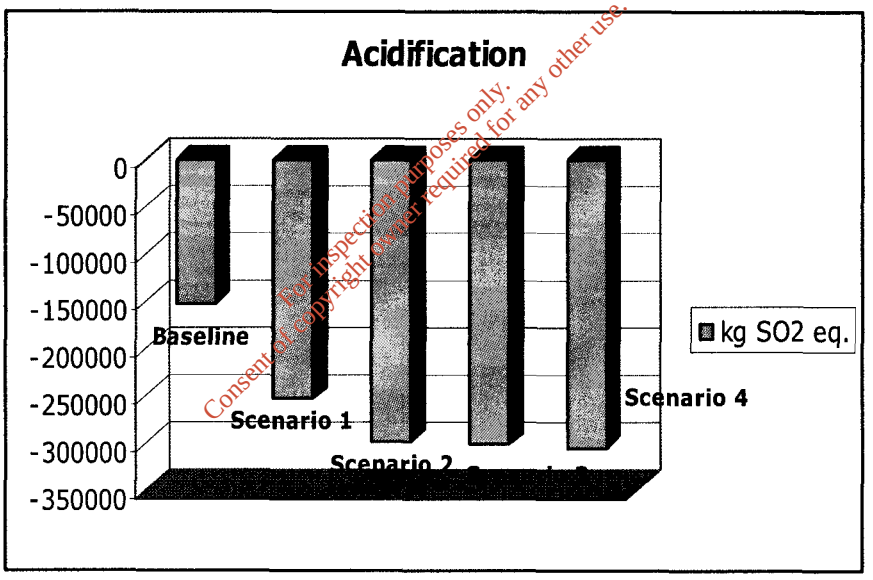
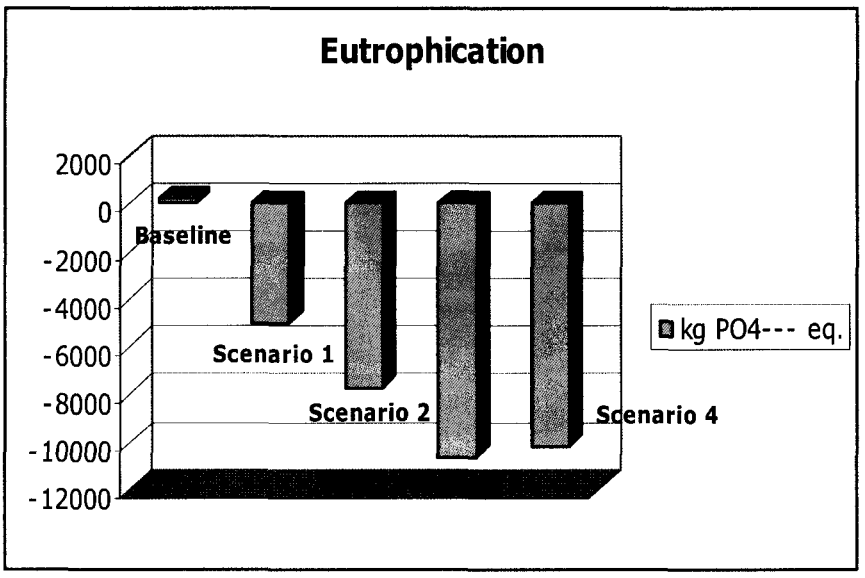


Figure 3.6: Eutrophication Potential



3.1 Summary

A comparison of the scenario (excluding the baseline scenario) results presented in Tables 1.1 and 2.2 generally indicate a better performance, in terms of the default environmental impacts within WRATE, of the 2 bin collection system versus the 3 bin collection system when considered as part of the overall integrated waste management systems explored.

In the categories of abiotic resource depletion, freshwater aquatic ecotoxicity, acidification and euthrophication, the greater environmental burden savings realised through the 2 bin system versus the 3 bin system are relatively small (10 – 15%) and may be attributed to the non-requirement for the separate collection of brown material and the burdens associated with the development of aerobic composting infrastructure.

In the category of human toxicity, a greater environmental saving (~ 35%) is attributable to the 2 bin regime as opposed to the 3 bin system, which may be attributable to emissions associated with collection.

The category of global warming presents interesting results. Scenarios 3 & 4 present a better performance for the 2 bin system (in the region of 15%) over the 3 bin system which, again, may be attributable to the savings associated with the lesser collection of the 2 bin system and the capture of a greater volume of residual waste for power/heat generation and offsetting fossil fuelled power generation.

However, in Scenarios 1 & 2, the separate collection of brown bin material i.e. 3 bin collection, performs better in terms of global warming savings than the 2 bin system, potentially down to the CO_2 savings associated with compost use versus artificial fertiliser production outweighing emissions associated with collection.

As a direct comparison, this exercise has been useful in comparing the impact of 2 vs. 3 bin based collection regimes as part of the wider integrated waste management system where variety in terms of the residual waste management technologies is introduced. However, for a more holistic comparison, it may be useful to compare a 2 bin collection approach to a 3 bin collection regime, where anaerobic digestion is the primary treatment employed for the separately collected organics, so that the benefits associated with the use of AD may be assessed and compared.

INDAVER

Ms Aoife Loughnane
Environmental Protection Agency
Regional Inspectorate. McCumiskey House
Richview, Clonskeagh Road
Dublin 14

Indaver Ireland Limited
Carranstown
Duleek
Co Meath

12th August 2010

Dear Ms Loughnane,

Further to our submission of unsolicited information last week please find enclosed documentation which we wish to add as part of the review process. We would like to thank you again for this opportunity to put forward these items for review.

Should you have any queries or clarifications please don't hesitate to contact me at our Carranstown address above or by the contact details below.

Kind regards

Grace McCormack
Quality and Environmental Manager MSW

Indaver Ireland Limited
Carranstown |Duleek |Co-Meath
Tel: +353 1 871 4610
Fax: +353 1 280 7865
E-Mail:grace.mccormack@indaver.ie

In reference to **Condition 2.1.1** of our current licence W0167-01 we would like to put forward our solution to the requirement for having the facility manager and deputy manager on site at all times during the operation process.

To have two persons working 12 hour shifts 7 days a week, is not in compliance with the *organisation of working time act 1997* whereby only 48 hours over a 4 month period can legally be worked. Therefore we have proposed that a manning level system is introduced. Here, supervisors or their deputies are deemed the competent person on site during operation, should the facility manager or his deputy be unavailable. There is also an on-call system whereby one of the 5 managers (facility manager, deputy manager, maintenance manager, quality and environmental manager and the process engineer) are on call 24 hours a day on a 5-week rotation basis.

We also refer to our letter, reference GEN001/W0167-01/051108 dated 05th November 2008 which was the result of a meeting with the Agency, when the discussion took place on the qualifications of the staff available to work at the plant.

Please see updated management structure for the facility-Appendix A. As per the condition, an updated management structure with names, responsibilities and education will be forwarded prior to commencement of waste activity.

In reference to **Condition 2.3.2.7 b**) whereby it states that real time data from the on-line process monitoring of the incinerator should be available on the internet we propose the following. Indaver Ireland Limited believes that real time data should not be required as this is not standard practice for similar facilities in Europe. This data will be monitored as per the conditions of the licence but we feel that having this information available to the public on the internet is of limited benefit. It also has the potential to cause unnecessary confusion due to lack of knowledge in interpreting the raw data. This may lead to unnecessary queries to the Agency. It is therefore our proposal that this condition be removed from our licence. We welcome any comments the agency might have on this issue.

In reference to **Condition 3.9.1** Indaver have not provided dust curtains. Dust curtains have proven to be troublesome in our plants in Belgium and have since been removed from the sites due to health and safety issues. Hauliers complained that they caused problems with visibility and that they can get caught in the trucks and cause damage.

We therefore propose that they are not required. We believe that the following measures will be satisfactory as they are equivalent to having dust curtains. The reception hall will have a tipping hall operator, who will ensure the area is kept tidy and clear of any litter that could potentially cause a nuisance. The building shall be maintained under negative pressure, induced by mechanical means. There will also be management procedures in place to deal with condition 3.9.1.

In reference to **Condition 3.9.2** we have proposed the following for the bottom ash hall: The building shall be a completely enclosed building separate from the main process hall. Access for trucks shall be through a sectional roller door located in the North West corner of the hall and they shall exit through a different sectional roller door located in the north east corner.

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
▪ Tolka Quay Road, Dublin Port, DUBLIN 1, IRELAND ▪ tel. + 353 1 280 4534 ▪ fax + 353 1 280 7865
▪ Unit 11, South Ring Business Park, Kinsale Road, CORK, IRELAND ▪ tel. + 353 21 470 4260 ▪ fax + 353 21 470 4250
VAT Reg. No. IE9F70712T ▪ IBAN IE61 BOFI9011 1668 4915 04 ▪ BIC BOFIIE2D
Directors: J. Ahern, C. Jones, J. Keaney, D. McGarry
Belgian Directors: R. Ansoms, M. Decorte, P. De Bruycker, B. Goethals

These doors shall remain closed at all times and shall only be opened to allow the movement of trucks in and out of the building.

The building shall be maintained under negative ventilation that shall be induced by mechanical means. The air handling unit shall be located on the roof of the building and it shall exchange the volume in the room 2 times in an hour in order to mitigate emissions from the building.

From experience it is known that emissions from the ash do not produce any odour but if for any reason during operation there is a discernible odour, there is a provision within the ventilation system to add a filter through which the odours will be extracted. Also the ashes are damp from the water in the process so dust shall be minimised.

In order to prevent any fugitive emissions from the trucks while exiting the building two actions shall take place;

- The trucks shall be covered with a tarpaulin that is firmly attached to the truck preventing dust from escaping through the top of the truck. It is important to remember that the ash shall be damp with water from the process thus reducing the dust.

- Before the roller door is opened and the trucks leave the building the wheels shall be washed down by a high pressure power washer that shall be located within the building.

This enclosed building is not equipped with any underground drainage and all water that shall be used in the building shall run back with the aid of a sloping floor (fall 1:100) into the ash thus preventing any ash residue escaping the building. The water used within the building will be minimal as it is maintained under high pressure. In addition, there will be a high rate of evaporation due to the heat from the ash and the building. Standard Operating Procedures will be in place for the cleaning of this area once the plant is in operation.

For the other wastes generated,as specified in condition 3.8, the boiler ash and flue gas residues are in dedicated enclosed silos.

In reference to **Condition 3.22.10 a)** it is stated that the bunker shall be equiped with a smoke detection system with alarm and water canon control. Indaver have installed a flame detection system. The reason for this difference is as follows.

Due to the height and design of the bunker, the best and most effective solution to detect fire are the UV / IR combined fire detectors. These systems are used in our plants in Belgium and have proven to have very effective results. They are also advised and approved by our insurance company (FM Global).

Smoke detectors would only detect a fire in the bunker when the smoke is really dense and the fire at an advanced stage. This would be much too late. Smoke detectors will be used in the office buildings and other areas where appropriate.

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
▪ Tolka Quay Road, Dublin Port, DUBLIN 1, IRELAND ▪ tel. + 353 1 280 4534 ▪ fax + 353 1 280 7865
▪ Unit 11, South Ring Business Park, Kinsale Road, CORK, IRELAND ▪ tel. + 353 21 470 4260 ▪ fax + 353 21 470 4250
VAT Reg. No. IE9F70712T ▪ IBAN IE61 BOFI9011 1668 4915 04 ▪ BIC BOFIIE2D
Directors: J. Ahern, C. Jones, J. Keaney, D. McGarry
Belgian Directors: R. Ansoms, M. Decorte, P. De Bruycker, B. Goethals

In addition, UV easily detects a flame with less smoke than conventional smoke detectors and IR detects the heat of the fire. Smoke detectors could miss the smoke when it is diluted in the large constant air stream, hence not detecting the fire in sufficient time. We therefore believe that this system is of a higher standard than the requirement and as this system has been approved by our insurance company we propose that this solution be accepted.

In reference to **Condition 3.23** it is required that in the case of abnormal operating conditions that we shall shut down as soon as practicable. Indaver requests that this be changed to the following, in accordance with the Waste Incineration Directive.

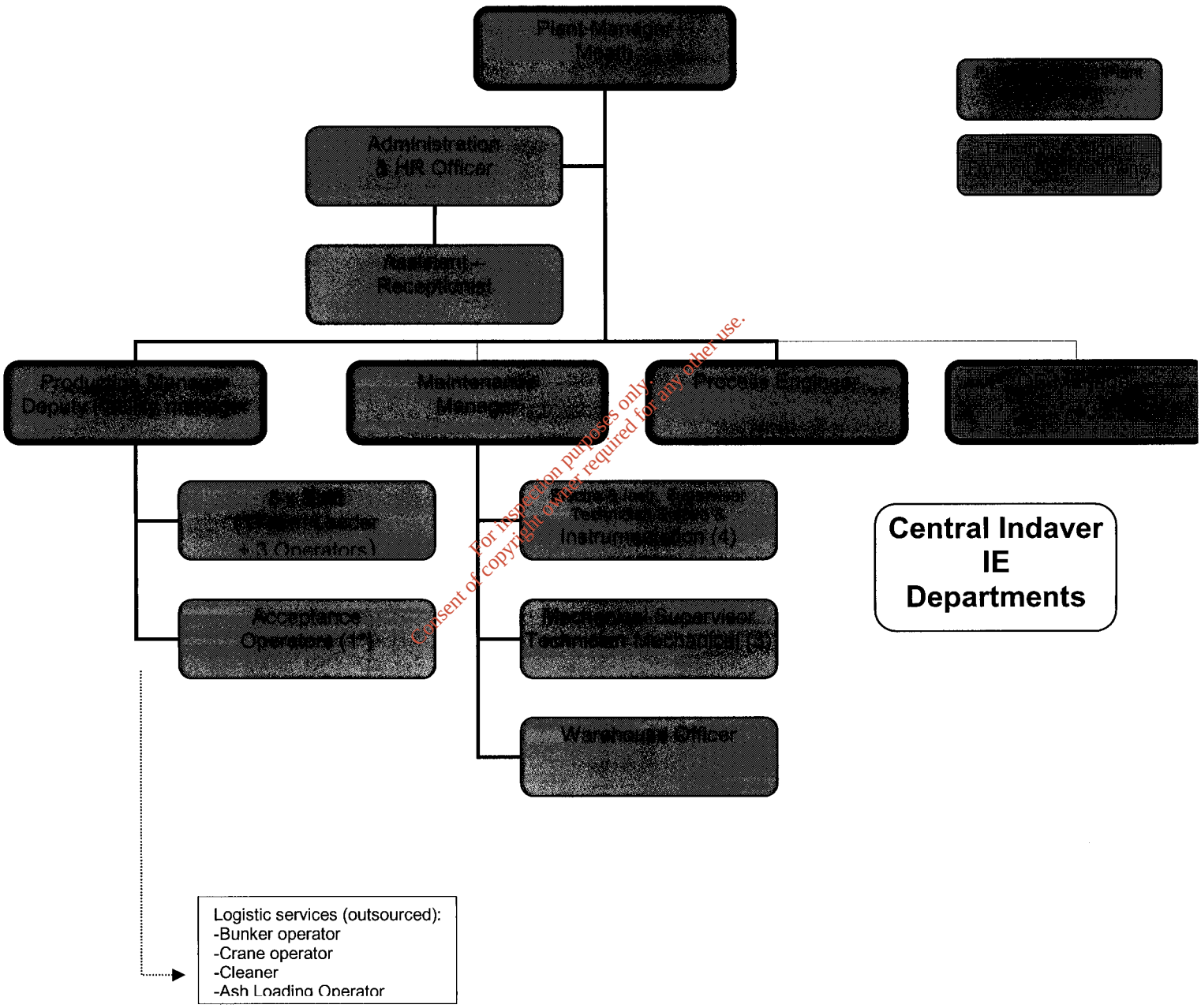
In the case of abnormal operations: (a) the licensee shall under no circumstances continue to incinerate waste in the process line for a period of more than four hours uninterrupted where emission limit values specified in Schedule B.1 of this licence are exceeded and (b) the cumulative duration of abnormal operation over one calendar year shall be less than 60 hours.

In reference to **Condition 3.29.2** Indaver Ireland requests that as-built drawings of the facility are not requested for the Independent Construction Quality Assurance Validation. Due to the volume of information it is not practicable to send them through to the Agency's office. Rather, they will be stored on site and if required they will be available to be viewed by the Agency. We would also request that all as-built drawings are treated as confidential information and are not available to be viewed by the public in the interest of security for the site and to comply with contractual agreements with the suppliers and contractors of the equipment and plant.

In relation to **Condition 8.2.3 (a)** Indaver wishes to clarify the point of inspection. In the review licence application it was stated that inspection of the waste occurs in the reception hall rather than at the entrance to the facility. This is still the case. On entry to the facility the truck is directed to the gate house where the documentation is checked to ensure that the load has been scheduled, is the correct waste load e.g. EWC code check, the haulier has a valid waste collection permit and is an authorised carrier. The driver will receive a badge to proceed to the weighbridge. The waste is then weighed and the truck proceeds to the reception hall. The physical inspection of the load, when required, is performed in the reception hall.

In reference to **Condition 8.2.3 (d)** where bunker management procedures are referred to please be advised that the bunker will not be periodically emptied. This is because of the design and function of the bunker. The bunker is designed to have an amount of waste present at all times so that a good mix of waste is available to produce a homogenous waste stream. This is important for the optimum and safe operation of the plant. Good bunker management procedures involve the mixing and turning of waste. Emptying the bunker would not ensure a constant stream of suitable waste available nor a good mix. The same would apply when the bunker was being filled. Continuous use of the bunker and regular mixing are the primary recommendations for good bunker management. It is therefore requested that emptying is removed from bunker management procedures as it is not good practice.

Appendix A:



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
▪ Tolka Quay Road, Dublin Port, DUBLIN 1, IRELAND ▪ tel. + 353 1 280 4534 ▪ fax + 353 1 280 7865
▪ Unit 11, South Ring Business Park, Kinsale Road, CORK, IRELAND ▪ tel. + 353 21 470 4260 ▪ fax + 353 21 470 4250
VAT Reg. No. IE9F70712T ▪ IBAN IE61 BOFI9011 1668 4915 04 ▪ BIC BOFIIE2D
Directors: J. Ahern, C. Jones, J. Keaney, D. McGarry
Belgian Directors: R. Ansoms, M. Decorte, P. De Bruycker, B. Goethals

Ms Aoife Loughnane
Environmental Protection Agency
Regional Inspectorate. McCumiskey House
Richview, Clonskeagh Road
Dublin 14

Indaver Ireland Limited
Carranstown
Duleek
Co Meath

13th August 2010

Dear Ms Loughnane,

Please find attached our final round of information which we would appreciate being taken into account in the review process.

Should you have any queries or clarifications please don't hesitate to contact me at our Carranstown address above or by the contact details below.

Kind Regards

Grace McCormack
Quality and Environmental Manager MSW

Indaver Ireland Limited
Carranstown |Duleek |Co-Meath
Tel: +353 1 871 4610
Fax: +353 1 280 7865
E-Mail:grace.mccormack@indaver.ie

CLASSIFICATION OF BOTTOM ASH

The Department recently issued a Draft Statement on Waste Policy for Consultation based on the outcome of the International Review of Waste Policy, published in November 2009.

One of the Proposed Policy Measures in the Draft Statement is:

"in line with the recommendation of the International Review, the classification of incinerator bottom ash as hazardous will be examined in conjunction with the EPA which is charged with the licensing of such facilities. In particular, the application of ecotoxicity testing to the material will be examined."

In the context of this current licence review, please find below further information regarding the ecotoxicity of bottom ash.

EU Position

The European Waste List classifies waste in hazardous and non-hazardous waste codes (EWCs). For this classification, 15 hazard criteria have been derived from the Council Directive 91/689/EEC on hazardous waste. One of these criteria, H14, identifies materials as "ecotoxic". The H14 criteria are designed to assess the impact of materials on the reproduction and growth of freshwater and terrestrial flora and fauna.

At present, this criterion lacks an assessment and testing strategy as well as any specific threshold values. Without appropriate thresholds or strategy, a wide range of materials including waste wood or cement could be classified as "ecotoxic".

Work is currently underway at an EU level to determine suitable test methods and thresholds. A preliminary report[1] published in 2005 identified several "critical issues" for the H14 criterion including, amongst other things,

- Whether the test should be applied to all potentially ecotoxic waste, to specific waste codes or only for waste in mirror entries
- Whether toxicity criteria could be developed for each test system and threshold values based on bioassays to classify waste as hazardous
- Whether the fate of the waste should be considered for classification

Therefore, it is not clear at this stage whether the H14 criterion should be applied to all wastes, or whether the likely destination and/or impacts of the wastes should be considered in the assessment. This reflects the previous assertion that apparently benign materials may be classified as "ecotoxic" if impractical thresholds or testing strategies are applied. This is elaborated further below.

---

[1] Workshop UBA and JRC, *Problems around Soil and Waste III: The H-14 Criterion and (Bio)analytical Approaches for Ecotoxicological Waste Characterisation*. 2005; available at http://ies.jrc.cec.eu.int/366.html

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
▪ Tolka Quay Road, Dublin Port, DUBLIN 1, IRELAND ▪ tel. + 353 1 280 4534 ▪ fax + 353 1 280 7865
▪ Unit 11, South Ring Business Park, Kinsale Road, CORK, IRELAND ▪ tel. + 353 21 470 4260 ▪ fax + 353 21 470 4250
VAT Reg. No. IE9F70712T ▪ IBAN IE61 BOFI9011 1668 4915 04 ▪ BIC BOFIIE2D
Directors: J. Ahern, C. Jones, J. Keaney, D. McGarry
Belgian Directors: R. Ansoms, M. Decorte, P. De Bruycker, B. Goethals

International Review Recommendation

The International Review asserted that *"there is an increasing body of evidence which suggests that bottom ash from incineration is eco-toxic."* To demonstrate this point, the report refers to a paper regarding the ecotoxicological characterization of waste by (Rombke, 2009).

CEWEP Ireland has been unable to find a body of evidence suggesting bottom ash is ecotoxic. The paper referred to above reports on the findings of an international ring test, which was conducted in order to assess the suitability of certain laboratory tests for assessing the H14 criteria.

The study explores the use of biological testing including three aquatic tests (algae test, Daphnia acute test, Microtox test) and two terrestrial (earthworm acute test and plant test with two species). This suite of tests is meaningful for waste materials that come into direct contact with the aquatic or terrestrial environment. However, they would not be representative of the impact of waste that is placed in or on a landfill, where contact with the aquatic environment is limited (if leachate is collected and treated) and where there is no direct contact with the terrestrial environment.

In general, the literature review in the paper explains that there has been very limited experience to date with testing wastes in ecotoxicology. One of the principle recommendations in the paper is that more experience with different types of waste materials is necessary for all ecotoxicological test systems, to define the range of materials which can be successfully tested.

As a case in point, only three waste materials were included in the study; contaminated soil, preserved wood waste and ash from an incineration plant. By comparison, the ecotoxicity of MSW or other derivatives thereof is not and has not been tested. Given that bottom ash derives from MSW, and that MSW is also deposited to landfill, it would not be consistent to apply conditions to bottom ash without also understanding the ecotoxic properties of MSW.

Nor have materials that do come in direct contact with the aquatic and terrestrial environments, like MSW sludge (currently landspread), rock salt (spread on roads every winter in large quantities) or cement made from a fuel mix including RDF (used in construction), been tested for ecotoxicity.

Finally, a number of questions have been raised regarding the testing methods adopted in the study with particular reference to the boundary conditions selected for pH and particle size. These parameters have an important impact on ecotoxicity results, but can vary widely depending on the nature and final application of different waste streams.

This demonstrates that a body of evidence on a range of different waste types, and a better understanding of testing methods and ecotoxicity limits, is required in order to apply a scientifically rigorous and consistent H14 classification regime.

Summary

It is submitted that, until more information has been gathered on different types of waste materials, and the EU has made a decision regarding testing methods or thresholds for different waste streams (possibly depending on their fate), any condition regarding H14 in the waste licence would be premature and would unfairly discriminate against incineration.

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
▪ Tolka Quay Road, Dublin Port, DUBLIN 1, IRELAND ▪ tel. + 353 1 280 4534 ▪ fax + 353 1 280 7865
▪ Unit 11, South Ring Business Park, Kinsale Road, CORK, IRELAND ▪ tel. + 353 21 470 4260 ▪ fax + 353 21 470 4250
VAT Reg. No. IE9F70712T ▪ IBAN IE61 BOFI9011 1668 4915 04 ▪ BIC BOFIIE2D
Directors: J. Ahern, C. Jones, J. Keaney, D. McGarry
Belgian Directors: R. Ansoms, M. Decorte, P. De Bruycker, B. Goethals

The risk phrases associated with ecotoxicity are divided into hazards to the aquatic community and hazards to the non-aquatic environment. As detailed criteria are still to be determined by the Commission for R54 to R58, the risk phrases associated with ecotoxicity to the non-aquatic environment cannot be applied to the assessment of H14.

Given that the bottom ash from the Plant at Carranstown, Co Meath is intended for landfill, it will not pose any threat to the aquatic environment. The landfill is designed to contain all waste put into it hence there is no risk of leaching to the environment. As a result, ecotoxicity testing for the aquatic environment is inappropriate.

In addition, the nature of the testing for ecotoxicity is such that it raises ethical questions, leading to the conclusion that unless there is a definite value to be had from the tesing and a confirmation of the relevance of the testing, it is best avoided. The testing involves exposing algae, daphnia and fish to the waste, to measure the effects and mortality rate against time and concentration. All three species must be used for the test to be valid.

"*ecotoxicity testing is not normally appropriate, apart from in exceptional circumstances where there is no other alternative…the scope for using animal testing to assess a waste for the hazardous property H14 is very limited. We would discourage its use*" Environment Agency UK.

Alternative calculation methods for this assessment have been proposed which can utilise the vast amount of historical data on the ecotoxicity of various elements and compounds on the environment. Chemical analyses of the bottom ash produced at Carranstown will be carried out as per the License and Waste Acceptance Criteria at the landfill in conjunction with their license.

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
▪ Tolka Quay Road, Dublin Port, DUBLIN 1, IRELAND ▪ tel. + 353 1 280 4534 ▪ fax + 353 1 280 7865
▪ Unit 11, South Ring Business Park, Kinsale Road, CORK, IRELAND ▪ tel. + 353 21 470 4260 ▪ fax + 353 21 470 4250
VAT Reg. No. IE9F70712T ▪ IBAN IE61 BOFI9011 1668 4915 04 ▪ BIC BOFIIE2D
Directors: J. Ahern, C. Jones, J. Keaney, D. McGarry
Belgian Directors: R. Ansoms, M. Decorte, P. De Bruycker, B. Goethals