

2.5 Bioaerosol assessment criteria

Table 2.3 illustrates the assessment criteria to be used for comparison of results during operations to ascertain ambient air quality in the vicinity of the Kilmainhamwood Composting facility located at Nobber, Co. Meath.

Table 2.3. Assessment criteria for the ambient bioaerosol air quality in the vicinity of Kilmainhamwood Composting facility.

Assessment criteria	Reference concentration range	Notes	Reference
Total fungi (includes <i>Aspergillus fumigatus</i>) ¹	1000 to 5,000 CFU m ⁻³	Environment Agency proposed concentration level, Reported concentration range in Swan, 2003 & Sheridan et al., 2004	McNeel et al., 1999 Wheeler et al., 2001, Swan et al., 2003 Sheridan et al., 2004
Mesophilic bacteria ¹	5,000 to 10,000 CFU m ⁻³	Environment Agency proposed concentration level, Reported concentration range in Swan, 2003 and Sheridan et al., 2004	Gorny and Dutkiewicz (2002) Wheeler et al., 2001 Swan et al., 2003 Dutch Occupational Health Association NWA 1989. Sheridan et al., 2004

Notes: ¹ denotes the values of CFU m⁻³ refers to Colony Forming Unit per cubic metre of air sampled.

3. Results

3.1 Ambient Bioaerosol air quality

Table 3.1 illustrates the results from bioaerosol air quality monitoring. Both *Aspergillus fumigatus* and Total Mesophilic bacteria were assessed on the day of sampling namely 16th December 2009.

Table 3.1. Bioaerosols concentration levels in the vicinity of the Kilmainhamwood facility on 16th December 2009.

Location ID	Average <i>Aspergillus fumigatus</i> concentration (CFU m ⁻³) ¹	Average Mesophilic bacteria concentration (CFU m ⁻³) ¹	Sample count ²
Loc 1	<7	11	3
Loc 2	42	78	3
Loc 3	35	145	3

Notes: ¹ denotes a total of 6 blanks (3 plate and 3 impactor blanks for the monitored bioaerosol) were incorporated into the sampling exercise. All blanks were negative CFU m⁻³.

² denote total number of sample counts for each parameter monitored at each location. The total number of sample plates was 24 plates.

Table 3.1 illustrates the ambient bioaerosol air quality within and in the vicinity of the Kilmainhamwood composting facility. As can be observed, *Aspergillus fumigatus* concentrations are low but increased downwind of the facility and next to the biofilter. Total Mesophilic bacteria concentration levels at monitored location Loc 2 and Loc 3 were elevated in comparison to monitoring location 1. International literature suggests that bioaerosol concentrations greatly dissipate with distance from the source (i.e. within 80 to 200 metres).

Following a review of literature, it is reported that concentration levels of bioaerosols in ambient environment range from 0 to 400 CFU m⁻³ for *Aspergillus fumigatus*, 0 to 15,673 CFU m⁻³ for Total fungi and 79 to 3204 CFU m⁻³ for Total bacteria. The data set measured is within the lower end of this range. Background monitoring of bioaerosols is important due to the complexities in monitoring once a facility is in operation. The main reasons for background monitoring include:

- Microbes are ubiquitous in the environment and air or surface samples will always contain some bacteria or fungi.
- Microbes grow and are released at irregular intervals and depend on some sort of air turbulence to be transported from their original source.
- Bioaerosols vary greatly in size and therefore some remain in ambient air for longer periods of time in comparison to larger, heavier particles that fall quickly to the ground. This is explained with Stokes law.
- Meteorological factors such as relative humidity, temperature and wind speed greatly effect ambient air concentrations.
- Due to the variety of size and sensitivity, the sampling methodology will greatly affect the measured concentration.
- Seasonal effects can increase or decrease ambient bioaerosol concentrations.

In accordance with the assessment criteria reported in Table 2.3, bioaerosol concentrations within lower range for *Aspergillus fumigatus* and Total Mesophilic bacteria.

4. Conclusions

The following conclusions may be drawn from the study;

1. The bioaerosol concentration levels were determined at each sampling location in triplicate. Three sampling locations were chosen including Loc 1, Loc 2 and Loc 3.
2. Currently, there are no significant bioaerosol impacts in the vicinity of Kilmainhamwood Composting facility located at Nobber, Co. Meath with all reported bioaerosol ambient air concentrations within the range of the proposed assessment criterion.

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5. Appendix I- Monitoring locations

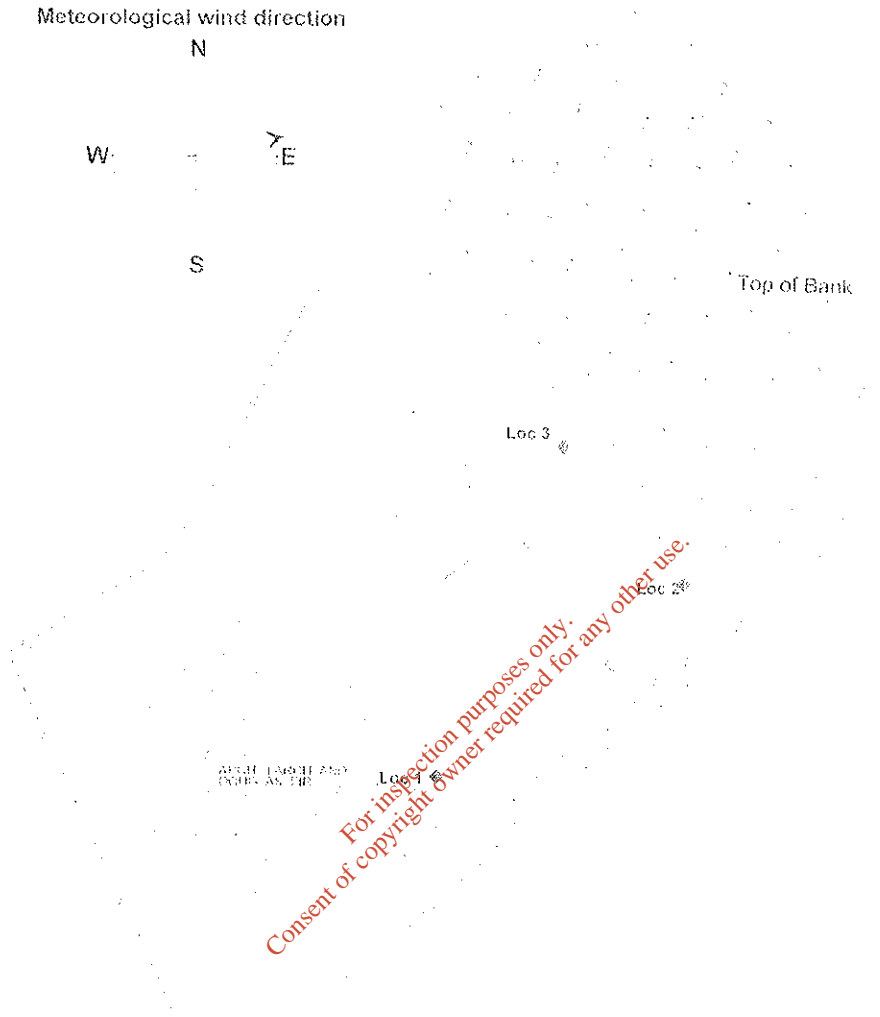


Figure 5.1. Schematic overview of Bioaerosol monitoring locations and wind direction on the day of monitoring.

APPENDIX 5

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KILMAINHAMWOOD COMPOST ENERGY REPORT

1.0 Introduction

Padraig Thornton Waste Disposal Ltd (PTWDL), T/A Thorntons Recycling own and operate Kilmainhamwood Compost, Ballynalurgan, Kilmainhamwood, Kells, Co Meath, Waste Licence W0195-01. In compliance with its waste licence as per condition 5.7.1 Kilmainhamwood Compost is required to carry out an "audit of the energy efficiency of the site". An audit programme was submitted to the Agency in relation to same on the 20th August 2008 and the Agency agreed to the submitted programme in later correspondence (EPA Reference W0195-01/AK06KF, dated the 11th September 2008).

In summary the programme agreed to the following;

Outcome of the Study

The outcome of this study will provide;

- A description of the company, the site, site operations and how energy is used at the site.
- An analysis of most significant contributors to energy consumption levels.
- Recommendations on measures the company can take to reduce their energy consumption
- Recommendations on how energy efficiency can be implemented into the company's environmental management system
- Longer term capital projects which will substantially help to decrease energy consumption.
- Targets and benchmarks the company may wish to introduce to control energy use.

Work Programme

- *Audit* – we will carry out a one day energy audit at Kilmainhamwood Compost, Nobber, Co Meath to identify measures that may reduce the energy consumption. We will interview a variety of staff, observe current behaviours and review management practices. Whilst undertaking the energy audits, we will also review cultural attitudes to energy on site.
- *Data Analysis/Evaluation* - We will evaluate all the data from the audit and all other supplied data to help compile an opportunities list on how energy can be used more effectively. The focus will be on practical and economic measures.



- *Renewable Energy* – We will briefly consider any potential opportunities from using renewable energy on site.
- *Report Writing and Presentation* – we will write a report summarising the findings from this study. A final report will be submitted to the EPA. The report will identify where existing controls/practices meet best practice as defined within the EPA guidance note.

This report will constitute all of the above as agreed with the Agency. Kilmainhamwood Compost is committed to a reduction in energy consumption; this study will be concerned with identifying resources used and costs associated with these namely Electricity and Fuel. All costs and figures will be based on information obtained through the Annual Environmental Report (AER) for 2007, invoices in 2007 and information collated for 2008 for Kilmainhamwood Compost and suggestions for improvement on energy efficiency will be recommended. A one day audit took place at Kilmainhamwood Compost on the 29th September 2008 by the Project Co-ordinator Mercedes Feely and the auditor Tom McDonnell. Information collated during this auditor will also be used within the body of this report.

2.0 Site Description and Activities

Kilmainhamwood Compost is located in Ballynalorgan, Kells, Co Meath. The facility has been in operation since September 2006, it received from the Environmental Protection Agency (EPA) its first waste licence and later amendment in July 2005 (WL0195-01). The waste intake is limited to 20,800 tonnes per annum of biodegradable waste for composting. All wastes are processed within the main compost buildings. The site is licensed to operate 6 days a week; Monday to Friday 08.00-18.00 and Monday to Saturday 08.00-13.00. In order to assess energy usage and how recommendations can be made to improve consumption on site it is necessary to examine the process in detail, the following section details a summary on site activities at Kilmainhamwood Compost.

2.1 Standard Operation procedures in the Composting Building

On arrival the transportation vehicle bringing material to the facility is inspected and directed towards the weighbridge. During which information particular to the customer is recorded on the computerised system.

Once weighed the vehicle is directed to the reception hall where it tips and the facility operator confirms if the material is suitable for processing at the facility. Inside the building the organic waste material suitable for composting is loaded into a batch mixer and is blended by weight with an amendment material. This mixer has capacity for a 12 tonne blend and delivers the blended material via a conveyor to a collection area where when a batch size of 120 tonnes is reached the materials are removed by a loading shovel



and placed into an aerated bay (controlled by fans). When the bay is full the operator places one temperature probe into the material. The aeration is switched on which is controlled by a plc that brings the temperature to the required level. The composting material stays in this bay for two weeks. After this period the material is taken out of the bay and placed over the wall into Zone 3 (Appendix 1). The material is then placed into another bay and moisture is amended to the required level. A temperature probe is placed into the material and the aeration switched on. The composting material will stay in this zone for 4 weeks and will get one turn using a machine and a moisture amendment if required.

After this period the material is placed is taken into Zone 4 (Appendix 1) and screened through a 12mm screen. The oversize material is sent back to the start of the process as seed compost and the screened material is placed into an enclosed tunnel for pasteurisation. The tunnel can hold up to 25 sub-batches and when full the total material will be given a unique Batch Number for traceability. Once inside the enclosed tunnel the aeration is switched on and the temperature is brought to over 70°C for 60 consecutive minutes to satisfy the Animal By-Product Regulations (ABPR). After Pasteurisation the material is sampled in situ and the samples sent to an approved Laboratory for analysis. Once the material has passed the ABPR requirements and E.P.A. standards it can be classified as compost and taken out of the tunnel by a clean machine and loaded for transport off site to the appropriate end user.

Any material not meeting ABPR and EPA standards can be reworked in the facility to produce higher grade compost or transported to an appropriate landfill site as cover.

There are currently 5 staff working on the site and the facility is manned from 08.00 to 18.00 Monday to Friday and 08.00 to 13.00 on a Saturday. In order to complete the composting process discussed there is a range of machinery used on site. Table 2.1a illustrates the main machinery used and the source of energy for the machine;



Table 2.1a – Types of machinery and source of energy

Machine	Source of Energy	Total Usage	Consumption Per Week	Consumption Year
Shredder Doppstadt AK 430	Diesel	10 hours p/wk @ 40 litres per hour	400 Litre of Diesel	20,800 litres diesel
Cat 318 C Used to load Shredder	Diesel	10 hours p/wk @15 litres per hour	150 litre of diesel	7,800 litres of diesel
Volvo Loading Shovel L90E X 2	Diesel	35 hours p/wk@ 13 litres per hour X 2	455 x 2 litres of diesel = 910	47,320 Litres of diesel
Forklift	Diesel	2 hours p/wk@ 5 litres per hour	10 litres	520 litres
Food Tractor	Diesel	5 hours p/wk @ 8 litres per hour	40 litres	2080 litres
Screener	Electricity	140Kw/h	14 hours per week	
3 x Fans 37.5 KW	Electricity	12 Kw/h	168 hours per week	
24 x Fans 3 KW	Electricity	92 Kw/h	100 hours per week	
44 x Lighting 400w	Electricity	17.60 Kw/h	44 hours per week	
Office -- Lighting, computer	Electricity	3kw per hour	40 hours per week	

3.0 Site Energy Analysis

There are two main energy sources used at Kilmainhamwood Compost i.e. Electricity from the Electricity Supply board and fuel in the form of diesel purchased from a third party supplier

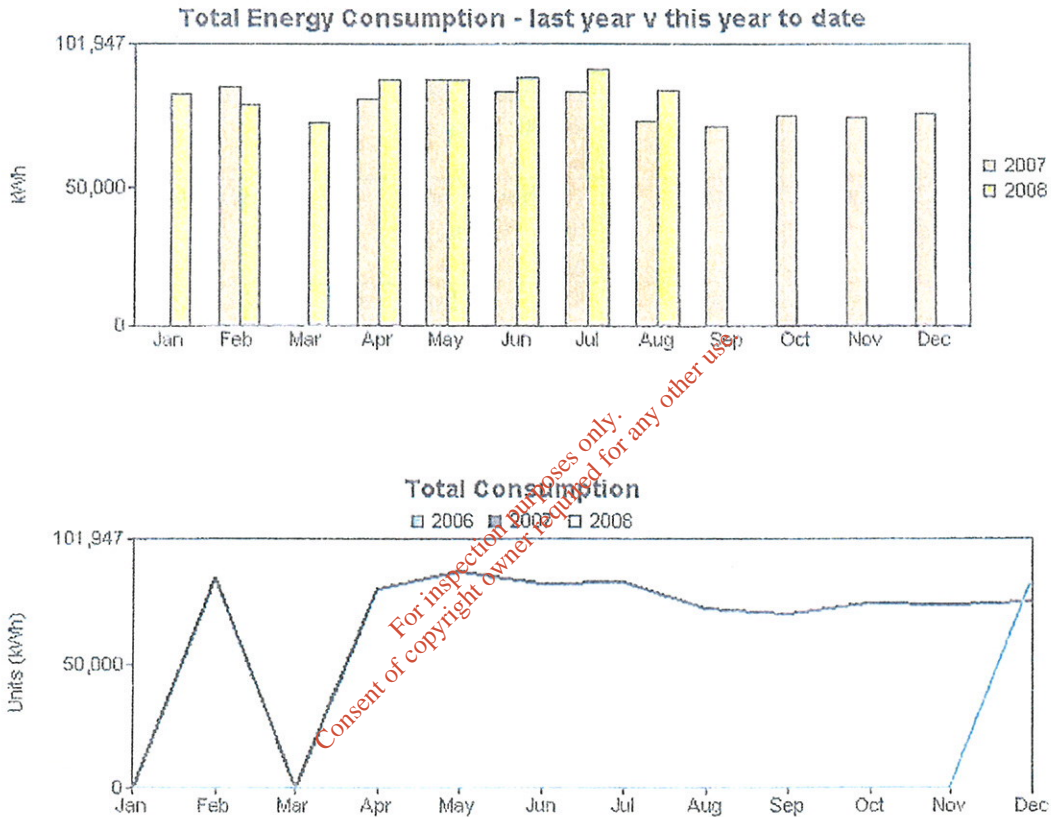
3.1 Electricity

Electricity is supplied to Kilmainhamwood Compost via the Electricity Supply Board (ESB), total consumption in 2007 at the facility was 792,943 (kWh) (Source ESB client account on line). In order to identify trends consumption figures for January – August 2007 were compared with consumption figures for January- August 2008. Electricity



consumption for 2008 did increase due to the necessary installation of a screener which is used approximately 10 hours per week. This screener improves the quality of the compost by removing any fine particles of residual such as plastics which may be present in the compost product.

Figure 3.1a – Total Electricity Consumption 2007 versus 2008



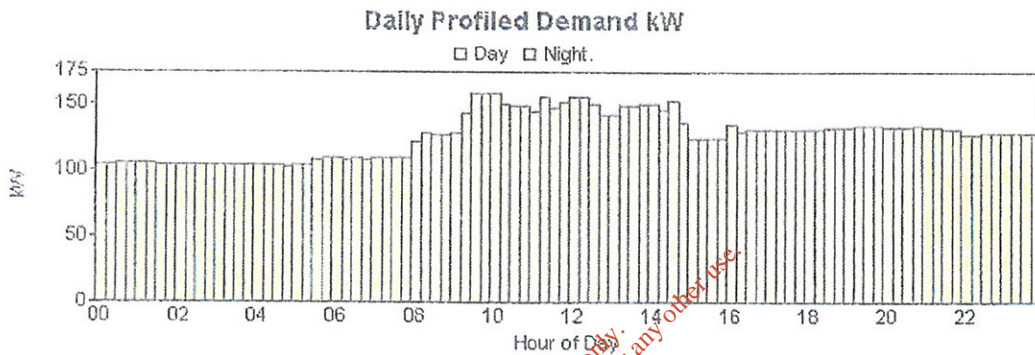
The area which currently uses the largest consumption of electricity is the extraction system for odour abatement.

Figure 3.1b displays a typical day's demand on electricity for the facility. As may be noted from the figure there is a constant demand of up to 100KW per hour no matter



what time of the day. This is largely due to the fact that the facility has to operate fans to assist in the composting process i.e. aeration fans.

Figure 3.1b - Daily Demand on Electricity for the 30th July 2008



Peak electricity consumption at the facility is between the hours of 09.00 and 10.00 as may be noted from a typical days demand above. This may be attributed to opening hours and a ramping up on machinery and lighting etc

A one day energy audit was carried out at Kilmainhamwood on the 29th September 2008 to identify measures that may reduce the energy consumption. The facility manager Tom McDonnell and supervisor Dermot Ward were interviewed and current behaviours and management practices were reviewed. A study was carried out on site to ascertain areas in which a significant savings on electricity could be obtained; we did this by examining key areas where electricity was consumed. We set a control where lights were off, bay fans off, screener off and extraction fans speed to 80%, we then turned the electricity on/off in areas to see how it affected power consumption, the following was observed;



Table 3.1c

Conditions	KW	KVA	Power Factor
Control - Lights off, bay fans off, screener off and extraction fans at 80% speed	62.4	68.84	0.89
Reception lights on and above conditions maintained	68	86	0.9
All lights on above conditions maintained	77	86	0.9
All lights on above conditions maintained and Extraction fans set at 98%	124	134	0.925
All lights on, bay fans on, screener off and extraction still at 98%	127	137	0.925
All lights on, bay fans on, screener on and extraction still at 98%	146	177	0.82

It may be noted from the above table that the screener would have the biggest affect on electricity consumption at the facility

Recommendations.

- Lighting at the facility is on only in areas of operation during the day time, there is only a necessity for security lighting in areas which are not in operation. The lighting in all the processing buildings consists of high bay fitting with luminaries estimated to be rated at 400W each. During Night time all lights are turned off. If we installed a centralised panel and all lighting at the facility could automatically default to night time position when machinery is not in operation or by pressing a switch. An alternative would be to appoint of members of staff i.e. supervisors for turning off and checking all lights at the facility during night time hours. All staff should make an effort to switch off lights in the areas that they are required. The possibility of placing in clear cladding in roof areas should be researched to maximise natural light and reduce electricity consumption and change lighting in administration building to CFL's.



recycling

- Odour Control System - This plant operates on full flow but has the ability to work on half flow during night time hours. The demand on the system is not as high during winter time as material is not as hot and odourous as in the summer time months. I propose the system is switched to half power during the cold months of December and January.
- Operation of all Machinery – A large part of the plant on site is turned off during break times. A consultation should be carried out with the manufacturers of all the machinery to ensure that this is the correct thing to do; often the largest part of electricity is during the power up process of machinery.
- Compressor – A compressor can have a significant contribution to energy consumption, a compressor was used at the facility for odour control but this has ceased since July 2008
- Administration of Electricity Usage – Going forward I propose that all electricity usage day (kWh), night (kWh) and cost should be entered in on receiving the invoice into a simple spreadsheet. This will allow us to track improvements and trends in the electricity consumption at the site.
- Hot water – There is always a supply of hot water from taps at the facility which may be fuelled by an electric switch. These should be all checked to ensure efficiency and if indeed the hot water is necessary in areas.

3.2 Water

Water consumption at the facility is extremely hard to define as it is not metered or connected to the local mains and water consumption is directly from the well on site. No water is used for processing as incoming material normally contains excess moisture from the natural degrading process. For emergency purposes there is an over ground tank that holds 90,000 litres of water and is supplied by Bore well number 3.

Some Water Uses at Kilmainhamwood Compost;

- Wash down of vehicles, processing machinery etc
- Fire Hoses/Hydrants
- Showers
- Canteen
- Toilets

Recommendations

- Recycle the washbay water
- Roof drainage could be diverted into a holding tank and used to top up the water reserves for the fire system.
- All dripping taps, hoses and hydrants to be repaired immediately and checked on a monthly basis
- Toilets to be adapted to only allowed a certain amount of water in per flush



3.3 Diesel

The main types of fuel used at Kilmainhamwood Compost includes plant diesel (Gas Oil). 76, 290 litres of diesel was consumed at the facility in 2007.

Table 3.3a below estimates the proposed quantity of diesel which will be consumed at the facility in 2008 totally 78290 litres. This is of a similar quantity of which was consumed in 2007.

Table 3.3a

Machine	Source of Energy	Consumption Year
Shredder Doppstadt AK 430	Diesel	20,800 litres diesel
Cat 318 C Used to load Shredder	Diesel	7,800 litres of diesel
Volvo Loading Shovel L90E X 2	Diesel	47,320 Litres of diesel
Forklift	Diesel	520 litres
Food Tractor	Diesel	2080 litres

Recommendations Diesel Consumption

- Carry out an investigation on compatibility of machinery on site to use of Bio Fuels (50% VRT refund available)
- Ensure fleet serviced regularly
- Drivers leave engines running whilst on site, turning off engines must be enforced at the facility

4.0 Long Term Capital Projects/ Renewable energy sources

Dry Anaerobic Digestion

We are currently investigating incorporating a dry anaerobic digester. Using this technology we can extract Methane gas from our feedstock and run a CHP plant which would supply enough electricity to run our composting facility and export excess electricity into the national grid.

The technology of "dry fermentation" can generate energy from municipal and agricultural organic matter and waste.



Until now, biogas technology mainly concentrated on “wet fermentation” of agricultural and municipal organic waste, while the recently patented BEKON dry fermentation process allows methane production from organic matter with a high content of dry matter. This kind of energy production is ecologically friendly and financially interesting, while also creating and securing jobs.

A great potential for energy generation from organic matter is found in agricultural by-products and waste, municipal organic waste and cuttings from coppicing and other countryside and forest maintenance work.

The dry fermentation process produces biogas with high energy content that can be converted into electricity, on the one hand, and into heat in block-type thermal power stations, on the other hand.

Instead of disposing organic matter from agriculture or municipal waste otherwise, dry fermentation offers a means of turning the waste into a valuable resource and extracting the highest possible benefit from it (in the form of biogas, electricity, heat, compost and fertilizer). The high quality compost resulting from the process of dry fermentation can be used as a valuable fertilizer for agricultural and horticultural purposes.

Combined Heat and Power (CHP) Deployment Programme

At present the Programme includes feasibility studies, to assist investigation into the application of CHP across all size ranges and technologies and investment grant support for small-scale fossil fired CHP with a capacity $\geq 50\text{kWe}$ and $< 1\text{MWe}$. The Programme will ultimately include biomass (anaerobic digestion (AD) and wood residue) CHP, and micro CHP, and these remaining technologies will be launched through specific calls.

5.0 Energy as part of the Environmental Management System

Kilmainhamwood Compost is certified to international standards for Quality ISO 9001, Health and Safety OHSAS 18001 and Environmental ISO 14001. As part of its Environmental Management Programme for its integrated management system (IMS)



alternative energy resources research has been defined as a clear objective and target for the facilities manager to investigate by the end of 2008. Simple procedures incorporating some of the recommendations detailed in this report can be adopted for the management of energy consumption at Kilmainhamwood Compost through its IMS.

Thorntons Recycling will strive to achieve an Irish Energy Management Standard i.e. IS 393 Energy Management System, which will drive energy efficiency and reduce costs. This is a national standard to ensure that energy management becomes integrated into the organisational business structure.

6.0 Summary

Energy Costs for Kilmainhamwood Compost are very high. Fuel spent in 2007 was €45,773 and electricity costs were approximately €99,796.

Energy consumption and costs are currently playing a large role in the financial operation of the Kilmainhamwood compost. No other sites owned by Thorntons Recycling were used as a benchmark as no other site incorporates the same processing and handles the same materials as Kilmainhamwood Compost so it was felt that another site would not be representative to draw comparisons. All recommendations listed above for reduction in consumption should be taken into account and a detailed summary should be produced for 2008 in order to identify trends.

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APPENDIX 6

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PM03- F01 Management Programme 2009

COMPLETED		DELAYED CARRY FORWARD TO 2010			ON HOLD			
Ref Number	Date	Type	Objective and Target	Location	Responsibility	Method	Time Frame	Status
ENVIRONMENTAL								
EP 01	Jan '09	Environmental	Site Expansion to 40,000 tonnes	Kilmaham	TMCD/MF	<ol style="list-style-type: none"> 1 Meeting with EPA 2 Meeting with MCC re planning 3 Appoint consultants 4 Lodge with EPA and MCC 	Planning - Started - Work in Progress. Planning lodged 01/07/2009 on the 1st July 2009 RFI Requested and Licence - TBC after lodged December 2009 Licence to be lodged RFI MCC after completion of RFI 09	
EP 02	Jan-09	Environmental	Landscape Plan to be completed at Kilmahamwood Compost/re conditions of the licence	Kilmaham	TMCD	<ol style="list-style-type: none"> 1 Kilmahamwood landscape plan to be completed as part of the new expansion 	Dec-09 Not Started - Plans previously drawn up from initial planning, awaiting new planning conditions from Meath CC before commence the landscape plan	
EP 03	Jan '09	Environmental	Upgrade of odour system - Investigate possibility of scrubber etc	Kilmaham	TMCD	<ol style="list-style-type: none"> 1. Quotes for consultants and assess same 2 Appoint Consultant 3 Tender out the installation of technology 4 Assess options available 5 Installation 	Dec-09 Started - Work in Progress. Tender submitted to five consultants and agreed contract with preferred supplier, work to commence in 2010	
EP 09	Feb'09	Environmental	Repak Revenue - waste characterisation on MDR	Company	MF/DD	<ol style="list-style-type: none"> 1 Contact repak to confirm details for characterisation survey 2. Obtain 3 quotes from consultants 3 Carry out survey's 4. Finalise reports and distribute 	Jun-09 Completed - Reports submitted to Repak and new claim figures being used	
EP 12	Jul'09	Environmental	RDF - Waste Characterisation Study so can claim repak subsidy	Company	MF	<ol style="list-style-type: none"> 1. Brief from Consultants 2. Discuss with Repak how best to do as study involves 96 tonnes of material to be sampled and processed 3 Organise bags and get certificates of Lagan to enable us to claim subsidy 	Sep-09 Completed claim with Repak Commenced September 2009	
EP 23	Jul'09	Environmental	Lighting in Kilmahamwood / Head Office	Kilmaham/ Head Offices	TMCD/MF/TR	<ol style="list-style-type: none"> 1 Kilmahamwood clean all lights generally and any bulbs to be replaced 2. Head Office - Remove sensors re around the atrium and adjust lighting switches 	Dec '09 Kilmahamwood completed - Head Office in progress. Completed before ISO audit in Nov	
EP 26	May '09	Environmental	Shredding - Monitor Resource Efficiency on sites	All Sites	DD	<ol style="list-style-type: none"> 1 Get Bills and log monthly resource consumption 2 Identify trends and plot graphs 3 Ensure we are covered in the aspects register for shredding facility 4 Track fuel usage on all site and compare with tonnages 	Nov-09 Completed. DD compiled and statistics are located within the KPI folder in the IMS. Resource information tracked against Tonnage where possible	
HEALTH AND SAFETY								
H&S 01	Dec-08	H&S	Ongoing site training for all Thornton's Recycling Personnel (Induction Training Manual Handling etc)	All Sites	H&S Manager	<ol style="list-style-type: none"> 1 Draft list & agree training dates for all sites 2. Schedule dates for same 3 Update and review quarterly 	Dec'09 WIP Management updated	
H&S 02	Apr-08	H&S	Additional / refresher training for first aiders in Thornton's Recycling Sites	All Sites	H&S Manager	<ol style="list-style-type: none"> 1 Identify how many require training 2 Liaison with H & S on training 3 Log training with certificates on personal files 	Jul-09 Completed - Nine employees trained	

H&S 03	Jan-09	H&S	Update all documents in the H & S system to CHSAS 2007 standard	All Sites	H&S Manager	1. Identify the classes to be amended 2. Implement same	Apr-09	Completed - All done before audit in May and then a compliance audit completed on General applications in June 2009 i.e. Legal Register
H&S 04	Jan 09	H&S	Annual H & S Review submit report to management	All Sites	H&S Manager	1. Report to be completed summarising all aspects of H & S system for 2008	Mar 09	Complete Circulated to management
H&S 05	April 09	H&S	Occupational Noise Monitoring All sites	All Sites	H&S Manager	1. Determine Sites to be carried out 2. Carried out TR 3. Results forwarded to Directors at management meeting	Dec 09	All sites
H&S 06	April 09	H&S	Occupational Dust Monitoring All sites	All Sites	H&S Manager	1. Determine Sites to be carried out 2. Carried out TR 3. Results forwarded to Directors at management meeting	Oct 09	All sites
H&S 08	May '09	H&S	Legal Register - Health and Safety	All Sites	EHS Managers	1. Compliance evaluation audit	June '09	Completed and forwarded to CE
H&S 09	May '09	H&S	Accident and incident reporting forms to be reviewed and redesigned due to too much information which may not be necessary for TR application statistics	All Sites	H&S Manager	1. Template to be designed 2. Quote off stationary for printing	Dec '09	All sites
H&S 11	Oct 09	H&S	Investigate the possibility of Thermal Imaging / electrical testing on all possible heat sources	All Sites	H&S Manager	1. Identify & List all items 2. Record & log all factual information	Dec 09	Consultants quotation finalised in November 09 and approval by Maintenance Manager

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PM03- F01 Management Programme 2010

COMPLETED		CARRY FORWARD FROM 2009				ON HOLD		
Ref Number	Date	Type	Objective and Target	Location	Responsibility	Method	Time Frame	Status
ENVIRONMENTAL								
EP 01	Jan '09	Environmental	Site Expansion to 40,000 tonnes	Kilmainham	TMCD/MF	1. Meeting with EPA 2. Meeting with MCC re planning 3. Appoint consultants 4. Lodge with EPA and MCC	Planning - 01/07/2009 Licence - Lodge after planning	Started - Work in Progress. Planning lodged on the 1st July 2009 RFI Requested and lodged December 2009. Licence to be lodged after completion of RFI 09
EP 02	Jan '09	Environmental	Landscape Plan to be completed at Kilmainhamwood Compost re conditions of the planning	Kilmainham	TMCD	1. Kilmainhamwood landscape plan to be completed as part of the new expansion	Dec-10	Not Started - Plans previously drawn up from initial planning, awaiting new planning conditions from Meath CC before commence the landscape plan
EP 03	Jan '09	Environmental	Upgrade of odour system - Investigate possibility of scrubber etc	Kilmainham	TMCD	1. Quotes for consultants and assess same 2. Appoint Consultant 3. Tender out the installation of technology 4. Assess options available 5. Installation	Apr-10	Work in Progress awaiting approval from EPA re preferred tenderer
EP 06	Jan '10	Environmental	Anaerobic Digestion Study	Kilmainhamwood	MK/TMCD	1. Obtain Quotes 2. Carry out Feasibility Study	Dec'10	Started - Team developed internally and tasks delegated. TMCD Project Manager
EP 07	Jan '10	Environmental	Energy Systems	All Sites	MK/DD	1. Energy study to see if we can reduce resource consumption on all sites	Dec'10	Commenced. Energy Team set up internally DD Project Manager
EP 10	Jan '10	Environmental	Waste Acceptance Procedures - Training Refresher for office staff	All Sites	MK/DD Killeen Road	1. Organise groups for tours of Killeen Road Training to incorporate the importance of attention to detail, show staff how errors affect business and end up as credit notes on software system	Dec'10	Started
EP 12	March '10	Environmental	Fleet audit	All Sites	DD/MK	1. Ensure new multi regional collection permit is rolled out to all fleet and conditions are applied to re paperwork	Dec'10	Awaiting multi regional collection permit
EP 13	March '10	Environmental	Environmental Drawings - Update all required	All Sites	Team	1 Update all drawings for all sites	Dec'10	Hire in Draughtsman - Started
EP 14	March '10	Environmental	EHS Newsletter	All Sites	Team	1 Communications Programme new newsletter to be developed for circulation to interested parties and customers	Dec'10	Not Started
HEALTH AND SAFETY								
H&S 01	Dec-09	H&S	Ongoing site training for all Thornton's Recycling Personnel (Induction Training, Manual Handling, etc)	All Sites	H&S Manager	1. Draft list & agree training dates for all sites 2. Schedule dates for same 3. Update and review quarterly	Dec'10	WIP
H&S 02	Jan'09	H&S	Annual H & S Review submit report to management	All Sites	H&S Manager	1. Report to be completed summarising all aspects of H & S system for 2008	Mar'10	Started
H&S 03	April'09	H&S	Occupational Noise Monitoring All sites	All Sites	H&S Manager	1. Determine Sites to be carried out 2. Carried out TR 3. Results forwarded to Directors at management meeting	Dec'10	All sites
H&S 04	April'09	H&S	Occupational Dust Monitoring All sites	All Sites	H&S Manager	1. Determine Sites to be carried out 2. Carried out TR 3. Results forwarded to Directors at management meeting	Dec'10	All sites
H&S 05	May '09	H&S	Accident and Incident reporting forms to be reviewed and redesigned due to too much information which may not be necessary for TR application statistis	All Sites	H&S Manager	1. Template to be designed. 2. Quote off stationary for printing	Dec'10	All sites

APPENDIX 7

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Ref. CE08014/DMcD/DM

Mr Tom McDonnell,
Kilmainhamwood Compost,
Kilmainhamwood,
Kells,
Co Meath

22nd January 2010

RE: Integrity Test on Underground Leachate tank

Dear Tom,

In December 2009, Padraig Thornton Waste Disposal Limited (PTWDL) requested WYG Environmental and Planning (Ireland) Ltd (WYG) to undertake integrity testing on the Underground Leachate Tank at its composting facility at Kilmainhamwood, Kells, Co Meath.

The test involved filling the tank with a known volume of water and monitoring any losses over a defined monitoring period. Where applicable the British Standard "BS 8007 - The British Standard Code of Practice for the Design of concrete structures for retaining aqueous liquids" was used as closely as possible in carrying out the test. However some amendments to the test were made to allow for operational constraints imposed by site processes.

1.0 Context of the Test

It is recommended by BS 8007 that integrity testing take place over a standard seven day period with a soakage period of the same order. However due to plant operational constraints, the test could only occur over a three day period. The tank was filled on the morning of the test for a period in the order of six hours prior to testing allowing any soakage effects from the concrete to be minimised. Under the British Standard it is also recommended that a visual inspection of the structure be undertaken for any defects prior to testing. For safety reasons, given the confined space risks involved, it was decided that the tank should only be visually inspected if the integrity test failed.

As the tank is located underground and all inputs and outputs were sealed for the duration of the test, climatic conditions i.e. rainfall, evaporation are unlikely to have had any significant effect on the water levels recorded and as such were not monitored.

2.0 Tank Capacity

The Leachate Processing Tank as shown on Figure 1 is constructed of precast concrete and has an internal diameter of 2.710m (2.996m externally) and a depth of 3.035m indicating a total capacity of 15.9m³ or 3500 gallons. For the test the tank was filled to an arbitrary level close to the top of the tank and 0.722m below the manhole cover. Therefore approximately 2.313m or 13.33m³ of water were pumped into the tank (or just over 83.8% of the tank capacity). It is reported by PTWDL that in normal operating conditions the tank is filled to a level of no greater than 75% of the capacity of the tank.

3.0 Results

Figure 1 shows the construction of the Leachate Processing tank. Test water was pumped into the tank on the morning of the 16th of December 2009 under PTWDL supervision. The test commenced at 15.30 on the 16th of December 2009.

The tank was monitored over a three day test period by a combination of WYG and PTWDL staff on a daily basis measuring from the top of the manhole to the water level at a fixed location. Table 1 below presents the levels recorded in the tank over this period.

Table 1 Integrity Test Results

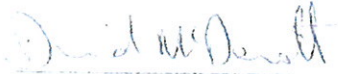
Date	Time	Monitored level
16/12/09	15:30	0.722
16/12/09	15:45	0.722
16/12/09	16:00	0.722
16/12/09	16:15	0.722
17/12/09	09:00	0.722
17/12/09	11:00	0.722
17/12/09	13:00	0.722
17/12/09	15:30	0.722
18/12/09	09:05	0.722
18/12/09	13:20	0.722
18/12/09	15:40	0.722
19/12/09	12:35	0.722
19/12/09	13:15	0.722
19/12/09	15:30	0.722

As can be seen on the table a steady water level of 0.722m below the measuring point was recorded over the three day period. This confirms there were no losses from the tank and it is concluded that the tank has passed the integrity test.

4.0 Summary and Recommendations

The Leachate Process Tank is deemed to have passed the integrity test. All tanks require testing every 3 years.

Yours Sincerely,



David McDermott
Principal Environmental Scientist
For and on behalf of WYG



Donal Marron
Regional Director
For and on behalf of WYG

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APPENDIX 8

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Environmental Procedures Manual		Reference	EP01
Title: Environmental Communications Programme		Date issued	05-01-09
		Revision	06

Relevant to:-	Killeen Road	Kilmainhamwood	Shredding	Dunboyne	PDM	ELV	HQ	Tankering
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PURPOSE AND SCOPE

The purpose of this communications programme will ensure that effective and responsive communication measures are in place at Thorntons Recycling to allow any local community groups, key interest groups, local residents, customers and members of the public to obtain information concerning the environmental performance of the facility, as required under the conditions of each sites waste Licence.

Procedure only relates to licensed facilities by the Environmental Protection Agency (EPA).

RESPONSIBILITY

The Environmental Manager for each site is responsible for ensuring that all requests from members of the public or customers on environmental information relating to the facility are dealt with in a quick and professional manner.

Associated Documentation

[EP01-F01 request for Environmental Information](#)
[Environmental Guidance](#)

COMMUNICATION TEAM AND OBJECTIVES

The Public Relations Department will be the main channel of information between Thorntons Recycling Centre and local residents, businesses and interest groups/organizations.

The Environmental Department will perform the following objectives;

- Manage consultation with local residents, businesses and local interest/representative groups
- Investigate complaints in relation to the Thorntons Recycling (and provide report to PR team to deal with)
- Encourage liaison between Thorntons Recycling and local residents
- Ensure the general public is aware of how to contact the facility
- Make available Environmental Performance data relating to waste transfer and recycling information available to members of the public and customers at all reasonable times

Environmental Procedures Manual		Reference	EP01
Title: Environmental Communications Programme		Date issued	05-01-09
		Revision	06

Relevant to:-	Killeen Road	Kilmainhamwood	Shredding	Dunboyne	PDM	ELV	HQ	Tankering
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PROGRAMME IMPLEMENTATION

The communication programme will consist of the following elements:

(a) Site Notice Board

A site notice board has been erected at the entrance of all Thorntons Recycling Licensed sites. This clearly displays:

1. Name and telephone number of the facility
2. The normal hours of opening
3. Name of licence holder
4. An emergency out of hours contact telephone number
5. The licence reference number
6. Location of environmental information relating to the facility.

(b) Queries or Requests for Environmental Information

Environmental information including annual environmental reports, quarterly reports, environmental policy and waste licence, in relation to Thorntons Recycling can be viewed at;

- The Main Reception of Thorntons Recycling facility offices at Killeen Road, Dunboyne and Kilmainhamwood, between the hours of 09:00 and 17:00 only. All visitors must sign a visitor's book at reception at site offices.
- Office of Environmental Enforcement, EPA, McCuminskey House, Richview, Clonskeagh, Dublin 14 on request between the hours of 09:00 and 17:00 only.

(c) Main Contacts

Local resident groups and businesses can contact the PR Manager or Environmental Manager or Deputy Manager of the facility. If issues arise local residents may contact the PR manager to ensure that issues are dealt with effectively and efficiently by Thorntons Recycling.

(d) Site Visits

Thorntons Recycling maintain an "open door" policy to neighbors' and customers that may wish visit the facility at reasonable times. Site visits and tours can be arranged by writing to the Environmental Department of the site which you wish to visit. The written request must detail the date and time of the proposed visit, number of visitors and the purpose of such a visit.

(e) Complaints Register

1. All complaints concerning the performance of the facility will be logged in the [environmental complaints recording form](#) completed for record tracking purposes.
2. The Environmental Department will have regard to the [corrective action procedure](#) and liaise with the complainant to ensure that impacts have been alleviated.
3. The environmental department will respond to all written complaints within ten days.

(f) Meetings with Interested parties/organisations

Controlled document on day of print.
Printed on xx on xxxxxx

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Interested parties/organizations can submit a written request for a member of Thorntons Recycling management to attend meetings. The written request must detail the date and time of the proposed meeting and the purpose of the meeting. Thorntons Recycling management will do their best to honour such requests.

(g) Newsletters

Thorntons Recycling Centre will continue to submit newsletters to local residents and interested parties.

(h) Thorntons Recycling Website

Information in relation to the company including the companies' EHS policy is available to download from Thorntons Recycling Website at <http://www.thorntons-recycling.ie/>

(i) Internal Communications

Information in relation to common environmental queries can be obtained for internal use at the following link [Environmental Guidance](#). Should you require more detailed information please contact the environmental department.

COMMUNICATION POLICY

“Thorntons Recycling is committed to maintaining open and clear channels of communication with local residents and other interested parties with regards to the environmental performance of all of Thorntons Recycling facilities. It is intended that the communication programme will help address any concerns and certainly help avoid any misunderstandings about the operation of Thorntons Recycling”.

All original completed records of request for information or any complaints received in relation to Thorntons Recycling will be filed in the communications file or the complaints file in the Environmental department, of each Thorntons Recycling site and will be available for inspection by the EPA at all reasonable times.

Procedures Manual		Reference	PM04
Title: Communications		Date issued	01/01/2009
		Revision	01

Relevant to:-	Killeen Road	Kilmainhamwood	Shredding	Dunboyne	PDM	ELV	HQ	Tankering
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Purpose and Scope

The purpose of this procedure is to ensure effective and timely communication of information related to Environment, Health & Safety and Quality affairs. This procedure describes processes for internal communications and reporting to relevant regulatory bodies, interested parties and safety representatives.

The communications procedure also applies to contractors.

Environmental aspects will not be reported to any third party.

When to use this procedure

1. Communicating non-compliances to regulatory bodies
2. Communicating accident reports to regulatory bodies
3. Communicating new legislation
4. Communicating on performance

Responsibility

It is the responsibility of all employees who are engaging in regulatory reporting.

It is the responsibility of the employees who are communicating information relating to changes or new activities.

Associated Documents

[EP01 Communications Programme](#)

[PM08. Complaints](#)

Procedure

1. The Management Representatives are responsible for communicating the organisation's [environment, health & safety](#) and [quality](#) policies and procedures to all employees.
2. Department Managers are responsible for communicating procedures (and any changes to the procedures), results of accident and "near miss" investigations in their areas, and other significant information related to environment, health and safety and quality issues.
3. The selection of the most appropriate mechanism(s) used for internal communication is left to the discretion of the Department Manager. Mechanisms that are used for various types of communications include, but are not limited to:

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- All employee meetings, Daily Weekly and monthly.
 - Area environment, health and safety meetings,
 - Bulletin boards and posters,
 - Memoranda and employee letters.
 - Email, company Intranet
4. All employees are responsible for reporting environment, health and safety incidents or emergencies (including spills and fires), and quality issues immediately upon discovery. Such incidents are reported to the Department manager or any of the Management Representatives.
 5. Environmental or Health & Safety issues, such as incidents should also be reported to the appropriate emergency contacts as identified in the site specific emergency response plans.
 6. Consultation with employees is carried out on an ongoing basis. Employees are informed on changes to the management system, polices and procedures via their Department Manager.

External Communications

Health and Safety

7. External communications of a Health and Safety nature must be sent to:

Health and Safety Authority,
10 Hogan Place,
Dublin 2.

8. Reporting accidents and dangerous occurrences is the responsibility of the Health and Safety Manager.
 - a. Accidents are reported to the HSA online at www.hsa.ie. All previous accidents and incidents are recorded online.

Environmental Regulatory reporting

9. Sites that operate and maintain a waste licence or waste permit are subject to reporting procedures detailed in the particular licence or permit.
10. Each site Environmental Manager must be aware of the reporting protocol.

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Third Party Environmental Communications

11. This refers to Environmental communications between Thorntons Recycling and local community groups, key interest groups, local residents and members of the public. The means for communication is detailed in [EP01, Communications Programme](#).

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Procedures Manual		Reference	PM08
Title: Complaints		Date issued	05/01/2009
		Revision	03

Relevant to:-	Killeen Road	Kilmainhamwood	Shredding	Dunboyne	PDM	ELV	HQ	Tankering
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Purpose and Scope

The purpose of this procedure is to ensure that all complaints are recorded and actions initiated. The important function of this procedure is to justify the complaint. This will ensure that only legitimate and justifiable complaints are dealt with and corrected.

Complaints refer to third parties raising issues of environmental, health and Safety or customer services.

Environmental complaints are recorded separately by the environmental team.

Responsibility

It is the responsibility of all persons that receive a complaint to document it and forward it to the appropriate Department Manager and the relevant Mrep that the complaints refer to. The department manager must ensure that the complaint is solved and logged in the relevant folders on the IMS Drive. All complaints must be acted on.

Environmental Complaints are the responsibility of each Site Environmental Manager. The Managing Director, or his nominated representative, is ultimately responsible for ensuring appropriate actions are taken to investigate all environmental complaints documented in accordance with this procedure, and that where necessary, communications are held with the relevant interested parties (in compliance with the appropriate procedure).

The Environmental Manager is responsible for ensuring that environmental complaints are documented and resolutions forwarded to the complainant as soon as practicably possible and within 5 working days.

All employees are responsible for contributing to the planned resolution of complaints, in so far as they relate to matters within their control.

Associated Documentation

[PM08- F01, General Complaints Form](#)

[PM08- F02, Environmental Complaints Form](#)

[PM09, Non conformance, corrective and Preventive action procedure](#)

[PM08-F03 Environmental Complaint Recording Form.doc](#)

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Relevant to:-	Killeen Road	Kilmainhamwood	Shredding	Dunboyne	PDM	ELV	HQ	Tankering
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Procedure

General complaints

1. Complaints can be received by fax, email, letter and verbal (telephone, meeting). All faxed, email, letter and minutes of meetings must be sent to the department manager. Verbal complaints must be recorded and emailed to the Department Manager.
2. If a complaint is received by phone the following must be recorded in the email to the Department Manager;
 - a. Contact details
 - b. Description of complaint
 - c. Date of complaint
3. The information above must be sent to the department manager with the word 'Complaint' in the subject bar of the email.
4. Each Department Manager is responsible for recording the complaint in the complaints spreadsheet [PM08.10](#). All the required information must be placed into the spreadsheet.
5. Complaints must be justified. It is the responsibility of the Department Manager to determine the relevance of a complaint.
6. When entering complaints into the Spreadsheet the following information must be included;
 - a. **Date** - date complaint received
 - b. **Dept/Area** - the complaint relates to
 - c. **Category** - (see explanation below)
 - d. **Description** - all details of the complaint, (If the complaint is received by post or fax, it is not necessary to enter all details into the spreadsheet. However there must be a reference to the letter/ fax and it must easily retrievable)
 - e. **Corrective action required (Y/N)** - if the problem is deemed significant and it requires time, money or persons to solve or it is a reoccurrence then documented corrective action is required this is carried out using PM09, Corrective action procedure. All complaints may require some form of corrective actions, minor complaints that have 'quick fixes' do not have to be formally documented in the corrective action procedure.

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Title: Complaints		Date issued	05/01/2009
		Revision	03

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f. **Comments**, if the person filling in the spread sheet wants to add additional notes they can enter into the comments section.

7. The categorisation of complaints is carried out to determine if there are any trends developing and to help in the justification of the complaint. the following categories are used;

- i. Financial(inc pricing/inv error, a/c's on stop etc)
- ii. Delivery / Collection Service
- iii. Property Damage
- iv. Personnel
- v. Data Input Error
- vi. Other

8. All complaints will be discussed once a month at the Interdepartmental meeting and also included in the Management Review.

Environmental Complaints

9. All environmental complaints are recorded in the Environmental Complaints Spreadsheet [PM08-F02](#).

10. Complaints can be received by fax, email, letter and verbal (telephone, meeting). All faxes, emails, letters and minutes of meetings must be sent to the Environmental Manager. Verbal complaints must be recorded and emailed to the Environmental Manager.

11. If a complaint is received by phone the following must be recorded in the email to the Environmental Manager;

- a. Contact details
- b. Description of complaint
- c. Date of complaint

12. The information above must be sent to the Environmental Manager with the word 'Complaint' in the subject of the email.

13. Each Environmental Manager is responsible for recording the complaint in the complaints spreadsheet [PM08-F02](#). All the required information must be placed into the spreadsheet.

14. The Environmental Complaints Spreadsheet [PM08-F02](#) is self explanatory. All the headings in the spreadsheet must be completed.

15. **Corrective action.** If the problem is deemed significant and it requires time, money or persons to solve or it is a reoccurrence then documented corrective

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		Revision	03

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action is required. This is carried out using [PM09](#), Corrective action procedure. All complaints may require some form of corrective actions, minor complaints that have 'quick fixes' do not have to be formally documented in the corrective action procedure.

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