Kabeyun
(W0121-01)
Gibralter
Castleshane
Co. Monaghan

Annual Environmental Report

2010

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CONTENTS

1.0 Reporting Period

For the Year 2010.

2.0 Waste Activities

Kabeyun is licensed by the Environmental Protection Agency in accordance with the Fourth Schedule of the Waste Management Act 1996 to 2003 for

Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes):

Kabeyun produces Phase 2 mushroom substrate at its facility.

3.0 Decommissioning and Aftercare

Section *2.5* of Kabeyun's Environmental Liabilities Risk Assessment, conducted by WYG Environmental in September 2007 outlines the *Provisions for Site Closure,* and is included below:

2.5 Provisions for Site Closure

Operations at the facility are ongoing with an open-ended lifespan. In the event of a decision to close the facility a closure plan will be developed. This plan will allow for removal of all raw materials, intermediate materials and compost from the site and cleaning of all surfaces where materials/compost were handled and/or stored. A monitoring programme will be carried out on environmental media including air and water to ensure that all emissions from the facility have ceased.

It is assumed that upon closure of the site, the premises will be suitable for industrial or other use and will have a re-sale value, which will cover the costs of removal of materials/compost, site cleaning and monitoring.

When operations cease at the site it is expected that the bulk of the site infrastructure will be sold on to a prospective buyer as an asset. This will include the site buildings, offices, compost tunnels, fencing, gates, lighting, fire alarms and drainage/sewage infrastructure. The potential buyer may also require other plant equipment. However, if not, these will be sold off to other potential buyers separately or dismantled and disposed off site at a licensed facility. Other plant equipment includes generator, site machinery, oil storage tanks and bunds.

When Operations cease at the site any residual compost/waste will be removed and disposed at relevant licensed recovery/disposal facilities. The entire site floors and walls will be power swept and washed to clear all debris and dust. Silt traps will be dislodged and interceptors cleaned out. The waste from the cleaning operations will be disposed to relevant licensed facilities. It is not anticipated that any specialist recovery or disposal will be required.

A monitoring programme of all potential emissions including surface water, foul waters and dust will be carried out after this process in order to ensure that emissions from the site have ceased. The monitoring programme will be designed to include at least two rounds of sampling carried out within two months of the decommissioning of the facility and within at least two weeks apart.

As stated above, operations at the facility are ongoing with an open-ended lifespan. To date, an aftercare management plan has not been developed. Potential nuisances at the site are limited to operational emissions such as odour, dust and noise. After closure and cleaning of the site as described above and when operations have ceased and assuming confirmation from the monitoring programme that all emissions have ceased, it is expected that there will be no requirement for long term aftercare management at the site.

For more details please refer to the ELRA submitted to the EPA on 1st October 2007.

4.0 Capacity of the Facility

In 2010 Kabeyun produced:

52, 928 Tonnes - Mushroom Substrate (Phase 2)

5.0 Waste

5.1 Waste Received:

Table 5.1.1 Type and quantity of Waste received in Kabeyun Limited 2010

Waste Type	EWC Code	Quantity (Tonnes)
Chicken Manure	02 01 06	12, 690
Gypsum*	17 08 02	2, 133

*Although not classified as a waste, gypsum has been included in this section following request by the EPA

5.2 Waste Recovered:

See **Table 5.1.1** above.

5.3 Waste Disposed:

See 'Onsite treatment & offsite transfers of waste' in Appendix A.

6.0 Water Usage

Water is provided for Kabeyun by two groundwater wells on site. A total of 66,671 m^3 of water was used in 2010 - an average of 5,556 m^3 of water per month, or 1,282 m^3 per week.

7.0 Emissions

7.1 *Water monitoring:*

Kabeyun is required to monitor two types of water i.e. surface water and groundwater. Surface water sampling locations include SW1. Two groundwater monitoring locations exist; GW1 and GW2.

Monitoring was carried out: - on ground waters in Jan, April, July and Oct 2010
- on SW1 in February 2010.

7.2 *Airborne Micro-Organism Monitoring:*

Four Airborne Micro-Organism monitoring locations exist on the Kabeyun site; AB1, AB2, AB3 and AB4. During sampling all four locations were monitored: AB1, located upwind of the facility, with AB2, AB3 and AB4 situated downwind of the facility.

Monitoring was carried out: - August 2010
- January 2011

7.3 *Dust Monitoring:*

Four dust monitoring locations exist on the Kabeyun site, D1, D2, D3 and D4. Time period required to complete dust monitoring is 30 (+/- 2) days.

Monitoring was carried out: - April 2010.
- May/June 2010.
- August 2010.

7.4 *Noise Monitoring:*

Monitoring was carried out: - June 2010.
- November 2010.

7.5 Biological Survey of the Cor River:

Survey was carried out: - September 2010.

8.0 Results and Interpretation

8.1 Water

Table 8.1.1 Groundwater Monitoring Results for Kabeyun 2010 – GW1

	GW1 (Top Well)			
	15.01.10	**23.04.10**	**06.07.10**	**15.10.10**
pH	7.1	7.19	7.47	7.19
COD (mg/l O2)	5.6	<4	<4	5.6
Ammonia (mg/l) NH4-N	0.186	0.219	0.429	0.383
Nitrates (mg/l) NO3-N	1	0.71	0.2	0.23
Sulphate	12	21	20	18
Total Coliforms (per 100ml)	0	0	0	0
E.Coli (per 100ml)	0	0	0	0

Table 8.1.2 Groundwater Monitoring Results for Kabeyun 2010 – GW2

	GW2 (Bottom Well)			
	15.01.10	**23.04.10**	**06.07.10**	**15.10.10**
pH	7.1	7.1	7.18	7.16
COD (mg/l O2)	4.8	<4	4.5	4.3
Ammonia (mg/l) NH4-N	0.175	0.25	0.428	0.39
Nitrates (mg/l) NO3-N	1.9	0.62	0.32	0.27
Sulphate	10	17	19	18
Total Coliforms (per 100ml)	0	0	0	0
E.Coli (per 100ml)	0	0	0	0

Groundwater monitoring was conducted on four occasions during 2010 at Kabeyun – in January, April, July and October by Bio-labs, Monaghan. Results are displayed in **Tables 8.1.1 and 8.1.2** above. All samples were found to have satisfactory results; not exceeding specified limits.

Table 8.1.3 Surface water Monitoring Results for Kabeyun 2010 – SW1

	SW1
	26.02.10
pH	6.85
COD (mg/l O2)	<4
BOD (mg/l)	<1
Ammonia (mg/l) NH4-N	<0.01
Nitrates (mg/l) NO3-N	2.8
Total Phosphorus (mg/l)	0.07
Suspended Solids (mg/l)	<1
Sulphate	104

SW1; the surface water pipe entering the Cor River, upstream of the Kabeyun facility was sampled in February 2010. All results fell within specified limits. No monitoring was conducted by the EPA on the Cor River during 2010. However previous results have consistently confirmed that the water quality downstream is consistent with the water quality upstream; indicating no adverse impact from the Kabeyun facility.

8.2 Airborne Micro-Organisms

Table 8.2.1 Airborne Micro-Organism Results for Kabeyun August 2010

Monitoring Location	Mesophillic Bacteria cfu/m^3		Aspergillus fumigatus cfu/m^3	
	Sample 1	Sample 2	Sample 1	Sample 2
AB1 u/w at boundary wall	134	848	0	7
AB2 d/w near Phase 2 tunnels	1,011	742	0	0
AB3 d/w of goodie water tank	424	353	14	14
AB4 d/w at nearest receptor	7951	120	0	0
Control Sample	0	-	0	-
Typical Reported Concentrations at Compost Facilities	10,000 - 10,000,000		0 - 10,000	

As per Schedule ***E.3 Airborne Microbes*** of our Waste Licence, Airborne Micro-Organism monitoring was conducted on 10/08/10 by QED Engineering Ltd. Results of which are displayed in **Table 8.2.1** above.

A Westerly wind was evident on the day and four sampling locations were chosen accordingly, one upwind of the facility (AB1), and three downwind of the facility (AB2, AB3 and AB4). AB1 was at a distance of approx. 10m from the site. AB2 was located on site, downwind of the Phase 2 tunnels. AB3 was located at the site boundary, downwind of the Phase 1 processing area. AB4 was located 400m from the site, at the nearest sensitive receptor. At each sample location two samples for Mesophillic Bacteria analysis and two samples for Aspergillus fumigatus analysis were taken. At location AB2, a control sample was also taken.

Concentrations of Mesophillic Bacteria and Aspergillus fumigatus at location AB1, upwind of the facility were recorded in the range of 134 - 848 cfu/m^3 and 0 - 7 cfu/m^3 respectively. These results act as an indicator of the background levels of bio-aerosols present naturally in the environment. A slightly higher concentration of Mesophillic Bacteria was recorded at AB2, with results measured as 742 – 1,011 cfu/m^3. No Aspergillus fumigatus was recorded at this location. Both Mesophillic Bacteria (424 – 353 cfu/m^3) and Aspergillus fumigatus (14 cfu/m^3) were recorded at AB3. At AB4, 400m from the site, no Aspergillus fumigates was recorded.

There was however a high concentration of Mesophillic Bacteria recorded in Sample 1; 7,951 cfu/m^3. The result from the second sample at AB4 however was very low; 120 cfu/m^3.
It is thought that the high result from Sample 1 is as a result of an error in the sampling or analytical process. Following request by the EPA however, a repeat bioaerosol survey was conducted on 24/01/11 by White Young & Green Environmental and Planning (Ireland) Ltd, results of which are displayed in Table 8.2.2 below.

Table 8.2.2 Airborne Micro-Organism Results for Kabeyun January 2011

		Bacteria (cfu/m^3)	**Aspergillus fumigatus (cfu/m^3)**
AB-101	**Upwind**	ND	1.2
AB-102		ND	2.3
AB-103		84.8	ND
AB-104		79.5	ND
AB-201	**Downwind**	ND	263.8
AB-202		ND	352.2
AB-203	5m d/w	ND	NA
AB-204	Eastern	268.6	ND
AB-205	Boundary	279.2	ND
AB-206		392.2	ND
AB-301	**Downwind**	ND	3.5
AB-302		ND	0
AB-303	300m d/w	ND	NA
AB-305	Nearest	141.3	ND
AB-306	Sensitive	120.1	ND
AB-307	Receptor	106	ND

A fluctuating Westerly / North-Westerly wind was evident on the day and three sampling locations were chosen accordingly, one upwind of the facility (AB-1), and two downwind of the facility (AB-2 and AB-3).

Two bacteriological samples were taken at AB-1 upwind, resulting in a mean concentration of 82.15 cfu/m^3. Three samples were taken at both the downwind location AB-2 site boundary, with a resulting mean concentration of 313.33 cfu/m^3 and AB-3 nearest sensitive receptor, with a resulting mean concentration of 122.46 cfu/m^3.

Two fungal samples were taken at all three locations. Resulting mean concentrations were as follows: AB-1 upwind 1.7 cfu/m^3, AB-2 downwind (site boundary) 308 cfu/m^3 and AB-3 downwind (nearest sensitive receptor) 1.7 cfu/m^3 .

Results show that concentrations of both bacteria and Aspergillus fumigatus increase immediately downwind of the processing area of the facility. However these higher levels are not impacting on downwind sensitive receptors. For more details please refer to monitoring report submitted to the EPA on 04 March 2011.

8.3 Dust

Table 8.3.1 Dust Monitoring Results Kabeyun – April 2010

Monitoring Location	Survey period 01/04/10 - 30/04/10	Dust Deposition (mg/m^2/day)
D1	29 Days	66.5
D2		11.1
D3		11.1
D4		33.3

Table 8.3.2 Dust Monitoring Results Kabeyun – May/June 2010

Monitoring Location	Survey period 17/05/10 - 14/06/10	Dust Deposition (mg/m^2/day)
D1	28 Days	155
D2		34.5
D3		86.1
D4		28.7

Table 8.3.3 Dust Monitoring Results Kabeyun – August 2010

Monitoring Location	Survey period 06/08/10 - 03/09/10	Dust Deposition ($mg/m^2/day$)
D1	28 Days	51.7
D2		74.6
D3		126.3
D4		114.8

Tables 8.3.1, 8.3.2 and 8.3.3 above display dust deposition results from monitoring conducted at Kabeyun in April 2010, May/June 2010 and August 2010 by White Young & Green Environmental and Planning (Ireland) Ltd. All results fell within licence limits of 350 $mg/m^2/day$. For more details please refer to the monitoring reports submitted to the EPA on 13 July 2010, 06 August 2010 and 15 October 2010.

8.4 Noise

Table 8.4.1 Day Time Noise Monitoring Results for Kabeyun; 10th June 2010

Noise Monitoring Location	Survey Start Time	$L(A)_{eq}$ dB	$L(A)_{10}$ dB	$L(A)_{90}$ dB	Notes
NSR1 Day	16.07	58.9	46.8	33.3	Noise sources were audible from the Kabeyun Ltd site, traffic from the nearbyroad and birds singing. Traffic noise from a nearby farm (possibly grass cutting) was also clearly audible. The Kabeyun Ltd site was only barely audible (sound of conveyors and intermittent noise from site traffic, reverse alarms sounds etc).
NSR2 Day	15.28	47.6	45.2	42.1	Dominant noise was from traffic on the main road and a tractor in a nearby field. The Kabeyun Ltd site was barely audible. Other noise sources included birds singing.

Table 8.4.2 Night Time Noise Monitoring Results for Kabeyun; 10th June 2010

Noise Monitoring Location	Survey Start Time	$L(A)_{eq}$ dB	$L(A)_{10}$ dB	$L(A)_{90}$ dB	Notes
NSR1 Night	22.13	51.2	46	32.9	Noise from the Kabeyun Ltd site was audible at this location and was noted as a 'fan-like' noise. The dominant noise was the birds singing and traffic on the nearby road.
NSR2 Night	22.51	48.3	52.5	34.7	Dominant noise source from traffic on the local road. Kabeyun Ltd site not audible. Birds singing were also clearly audible.

Table 8.4.3 Day Time Noise Monitoring Results for Kabeyun; 26th November 2010

Noise Monitoring Location	Survey Start Time	$L(A)_{eq}$ dB	$L(A)_{10}$ dB	$L(A)_{90}$ dB	Notes
NSR1 Day	10.32	60.7	61.1	44.3	Noise sources were audible from the Kabeyun Ltd site, traffic from the nearby main road, and flowing water. The Kabeyun Ltd site was only barely audible (sound of conveyors and intermittent noise from site traffic, reverse alarm sounds, etc).
NSR2 Day	11.13	51.0	53.5	40.7	Dominant noise was from traffic on the main road. The Kabeyun Ltd site was not audible. Other noise sources included birds singing.

Table 8.4.4 Night Time Noise Monitoring Results for Kabeyun; 26th November 2010

Noise Monitoring Location	Survey Start Time	$L(A)_{eq}$ dB	$L(A)_{10}$ dB	$L(A)_{90}$ dB	Notes
NSR1 Night	01.10	42.9	38.3	34.4	Noise from the Kabeyun Ltd site was audible at this location and was noted as a 'fan-like' noise. Distant traffic was occasionally audible.
NSR2 Night	00.32	41.4	41.6	24.6	Dominant noise source from traffic on local road. The Kabeyun Ltd site not audible.

Noise monitoring was carried out in June 2010, **Tables 8.4.1** and **8.4.2** and in November 2010, **Tables 8.4.3 and 8.4.4**, by White Young & Green Environmental and Planning (Ireland) Ltd. The L_{Aeq} results indicate the influence of non site related traffic on noise levels at NSR1 and NSR2. The L_{A90} is a good measure of background noise levels, without the influence of traffic. In June the day-time noise was measured at 33.3dB (NSR1) and 42.1 dB (NSR2); below the day-time limit of 55dB. The night-time noise was measured at 32.9dB (NSR1) and 34.7dB (NSR2); below the night-time limit of 45dB. In November the day-time noise was measured at 44.3dB (NSR1) and 40.7dB (NSR2). The night-time noise was measured at 34.4dB (NSR1) and 24.6dB (NSR2). All results therefore fell within licence limits. For more details please refer to the monitoring reports submitted to the EPA on 23 July 2010 and 07 January 2011.

8.5 Biological Survey of the Cor River

Table 8.5.1 Summary of Biological Monitoring Results 2000 – 2010

		2000	2006	2008	2010
Upstream of Kabeyun Site	**Site 1**	Q3-4	Q3	Q3	Q3
	Site 2	Q3-4	Q2-3	Q3	Q2-3
Downstream of Kabeyun Site	**Site 3**	Q3-4	Q3	Q3	Q3

Biological monitoring of water quality in the vicinity of the Kabeyun facility was conducted by Conservation Services, Ecological and Environmental Consultants on 09 September 2010. A summary of results are displayed in **Table 8.5.1** above. Results from Site 2 upstream are in line with 2006 results (Q2-3), showing a slight deterioration from 2008 results (Q3). Site 1 upstream and Site 3 downstream however still maintain a Q-Rating of Q3. The assessment

concluded that there is no evidence of a pollution impact from the Kabeyun facility on the Cor River. For more details please refer to the monitoring report submitted to the EPA on 14 October 2010.

9.0 Resource and Energy Consumption

Electricity consumption in 2010 was 2,326,098 kWh. This shows a decrease of 194,400 kWh in 2010 from the 2009 figure of 2,520,498 kWh (8% decrease).

Fuel consumption in 2010 was 2,724,083 kWh. There was a decrease of 232,935 kWh in 2010 from the 2009 figure of 2,957,018kWh (8% decrease).

To put these figures in context, the kWh/tonne of mushroom substrate produced in 2010 was 95 kWh/tonne, in comparison to 98 kWh/tonne in 2009 i.e. a decrease of 3 kWh/tonne of mushroom substrate produced (3% decrease).

10.0 Environmental Objectives and Targets for 2010

Targets completed during 2010 included;

- The required monitoring of water, dust, noise, airborne micro-organisms and biological survey of the Cor River.
- Good water management, completing regular checks on drainage systems, storage tanks and sumps.
- Reduction in use of electricity and oil resources compared to 2009.
- Reduction in volume of waste sent to landfill.

11.0 Environmental Objectives and Targets for 2011

Our environmental objectives form part of our Environmental Management System aiding the continual improvement of our environmental performance. Our objectives include:

- Prevent pollution of land and waterways
- Use natural resources efficiently
- Reduce odour from the site
- Reduce waste and handle waste responsibly

- Improve management of chemicals and oils on-site

In 2011 it is planned to:

- Carry out any monitoring required, ensuring no environmental pollution is being caused.
- Complete and maintain a record of all system checks and inspections.
- Further reduce the usage of electricity and oil.
- Further reduce the volume of waste sent to landfill.

12.0 Complaints

18 complaints relating to odour were received in 2010; **Table 12.1** below.

Table 12.1 Complaint details for Kabeyun 2010

Complainant	No. of complaints received
Suzanne Clinton	12
Jeannie McCleary	2
Ann Rooney	1
Pauline Hamill	1
PJ Maguire	1
Unknown	1

Ann Rooney's complaint also related to noise and to artificial light.

13.0 Nuisance Controls

A pest control system is in place in Kabeyun, run by Ecolab. Ecolab conduct regular checks on the vermin controls on the site, and a maintenance record is updated accordingly.

All Vehicles entering and leaving the site are inspected to ensure that they are appropriately covered.

Other nuisances are assessed and recorded daily.

14.0 Costs

Costs for environmental reports and monitoring completed in 2010 was c. €27,000 +VAT.

15.0 Staff Training

Staff training is on-going. Training is conducted to maintain awareness with employees of our environmental objectives and targets and how they can be achieved. Posters and procedures have been erected in target areas.