

INSPECTORS REPORT

WASTE LICENCE REGISTER NUMBER: 121-1

Applicant: Kabeyun Limited, Tyholland, Co. Monaghan.

Facility: Kabeyun Limited, Gibraltar, Castleshane, County Monaghan.

Recommendation: The Recommended Decision as submitted to the Board is approved.

(1) Introduction:

Kabeyun Ltd. produces compost for the mushroom industry at a facility in a rural agricultural setting about 6 kilometres east from the town of Monaghan. There are a significant number of houses within one mile of the facility. There are two residential properties along the road to the west of the facility at distances of between approximately 450 and 550 meters from the facility. A facility location map and site layout map are provided in Appendix 1. The facility has been operating since the mid 80's and it supplies compost to a large number of mushroom producers around the country. The waste materials being accepted at the facility include poultry litter (c.14,000 tpa) and approximately 1,500 tpa of waste gypsum is used in the process as a conditioning agent. Approximately 25,000 tonnes of wheaten straw is also used in the process. As with all of the mushroom compost production facilities the production of the compost has been a "low-tech" process in the past and the operation has given rise to a number of complaints and submissions primarily in relation to odours and disease control.

The production process for mushroom growing substrate is divided into three phases:

Phase I – Composting of the raw mix of bulk materials (poultry manure, gypsum, straw, and water) in clamps and windrows in the open.

Phase II – Pasteurisation and conditioning of the compost in 10 purpose built tunnels on site.

At this facility the Phase II process is followed by spawning for the growing of the *Agaricus bisporus* mycelium (button mushroom) and bagging prior to dispatch as Phase II compost.

The facility currently produces approximately 52,000 tonnes per annum of Phase II compost which is dispatched to mushroom growers as bags or blocks.

There are a number of environmental issues pertaining to the operation of the facility including odour, noise emissions, discharges to surface water, groundwater protection, the potential for the spread of disease and dust emissions from the facility. Each of these issues is addressed in the relevant sections below.

The facility is required to hold a waste licence as $>1000\text{m}^3$ of waste and composted material is being composted and stored at the facility at any one time. The facility will be licensed under Class 2 of the Fourth Schedule of the Waste Management Acts, 1996-2003:

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

EIS Required	No
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Number of valid submissions received	Thirteen
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FACILITY VISITS:

DATE	PURPOSE	PERSONNEL
28/10/99	Site Notice check	Brendan Wall
01/06/01	Site Inspection	Damien Masterson,
11/12/01	Site Visit with Odournet	Damien Masterson - EPA, Toon Van Elst – Senior Consultant, Odournet UK, Jennie Preen – Junior Consultant, Odournet UK
November 2003	General site inspection	Dr Tom Mc Loughlin K. Reynolds

(2) Facility Development

Infrastructure

The Recommended Decision (RD) requires that a significant level of infrastructure be provided at the facility. The required infrastructure is primarily for the control of emissions to the atmosphere, to groundwater and to surface water. The applicant will be required to expand their existing telemetry system at the facility to provide for the process and water storage monitoring requirements as per Condition 3.16 of the RD.

i) Control of Emissions to Air:

Condition 3.11 of the RD outlines the infrastructure required for the control of odours from the facility.

In the case where the specified measures are not successful in sufficiently reducing the odours, the licensee will be required to enclose the composting process and to install odour control technologies at the facility over a specified timeframe as set out in the RD.

There are also a number of additional infrastructural requirements included in the RD that pertain to odour control. Condition 3.13.2 requires that all process/goodie water storage tanks be enclosed within twelve months of the date of grant of the licence and Condition 3.11.1 requires that an odour filtration system be installed at all of the outlet vents on the process water storage tanks. Condition 4 of the RD sets out conditions to control the operation of the facility in a manner such that odour emissions shall be minimised.

ii) Control of Emissions to Surface Water:

Emissions from the facility are from clean roof-water and yard water and contaminated run-off. The licensee is required to provide for effective segregation of clean roof-water and contaminated surface water from the yards and to collect and store the contaminated surface water (Condition 3.12).

Condition 3.5.4 of the RD requires the applicant to provide a 150mm high bund wall (of suitable construction) around the dirty yard area (yard used for the production of compost). Contaminated surface water from these areas is collected to a 500,000 gallon (2,250 m³) retention tank in the south-eastern corner of the site. This is required to prevent run-off of contaminated surface water onto adjacent land and into surface water ditches or the nearby Cor River which is a tributary of the Ulster Blackwater.

An engineer's report providing details of the integrity of the composting yard and a water balance for the site submitted by the applicant in response to an Agency request for further information states that it is not clear where the water from the lorry wash is going and recommends that its destination be ascertained to ensure that it does not enter the clean water system but rather goes to a separate sump or the retention tank. The RD (Condition 3.12.2) requires that the licensee carry out such investigations as are required to determine the destination of water from the lorry wash and carry out such works as are required to ensure that this water is not entering the clean surface water system. The condition also requires a report to be compiled by a suitably qualified engineer on completion of this work and that the report be submitted to the Agency.

The RD also requires the applicant to assess the integrity of all tanks and pipelines at the facility to ensure that there are no fugitive emissions to surface/ground water from the process. Condition 3.12 provides for a system for the management of surface water at the facility. This condition also provides for the design of the clean surface water drainage system such that where possible rainwater may be diverted to on-site water storage tanks (other than the goodie water tanks) for use in the process. Condition 5.5 requires that all emissions to surface water from the facility flow through the surface water management system.

iii) Control of Emissions to Groundwater:

The main composting process takes place out in the open on concrete yards. The *Dames & Moore* Hydrogeological Assessment submitted by the applicant states that the drainage and containment system at the site does not have 100% integrity and that water will not be totally contained by the concrete composting yard (leakage from the concreted floor into underlying fill) and yard water storage tank (tank overflow). Condition 3.5 of the RD requires an assessment of the integrity of all hardstanding areas within three months of the date of the grant of the licence and that the licensee ensure that all surfaced areas where contaminated surface water or process water arise are impermeable within twelve months.

The RD also requires the bunding of all tank and drum storage areas (e.g. for the storage of fuel) and that the integrity and water tightness of these storage areas is confirmed by the licensee (Condition 3.10).

Condition 3.13 of the RD also requires the installation of high level alarms on all process water storage tanks in order to minimise the risk of overflow.

(3) Odour Control

The primary source of odours in this process arises from the Phase I activities. There are minimal odour emissions from the Phase II process.

Odour Assessment Supplied by Applicant

The applicant submitted the results from their odour impact modelling study, which was based on four on-site specific odour sources (clamps and windrow samples). They concluded that odour concentrations of a magnitude likely to result in a community nuisance are predicted to occur within the locality of the facility. They predicted that based on 99.5%ile odour isopleth that short-term odours of 200 ou/m³ would be predicted to occur about 0.5km from the facility boundary with levels of over 750 ou/m³ close to the site boundary. They suggested that short-term_(15min) odour concentrations of 10-20 ou/m³ on a 98%ile and 50 ou/m³ on a 99.5%ile would be a more realistic target for reduction of odours from the facility. They indicated in general terms that improvements in aeration technique would reduce the formation of sulphur and nitrogen-containing compounds at the facility.

Odour Assessment carried out on behalf of Agency

OdourNet UK Ltd. (Leading International Odour Experts) completed an assessment of the odour emissions from this facility (and a number of other facilities) on behalf of the Agency and a copy of this report is included in Appendix 2.

The study modelled the estimated odour emissions from the facility in its current state of operation and also modelled the odour emissions in the case where the process had been enclosed and abatement technologies had been installed and commissioned. The report estimates that 64% and 22% of total odour emissions from the facility are from the Phase I composting process (Phase I clamps – 37% and Phase I windrows – 27%) and the process water storage tank respectively. The odour modelling completed by OdourNet UK Ltd. provided isopleth figures modelled on the basis of 98 percentile for a 1-hour average limit concentration of 6ou/m³. The contours therefore represent the area where the maximum hourly average ground level concentration will be greater than 6 ou/m³ for more than 2% of the hours in the year. The report concludes that the current area of impact, where annoyance is likely to occur at a probability that is considered excessive, includes a significant number of residential dwellings and extends to distances between approx. 1,500m and 2,500m from the centre of the production site (Scenario 0 of the OdourNET report). The contours show that the enclosure and application of odour abatement to the air emissions from the composting process would ensure that the area of excess impact would be significantly reduced but would still reach far enough to include a number of residential dwellings along the road to the west of the site at distances of between 450 and 550m.

Professor Ralph Noble Recommendations:

Prof. Ralph Noble, Horticulture Research International, Wellesbourne, Warwick, UK, a leading technical expert in mushroom composting pertaining to odour control compiled an “*Index of Measures for the Reduction of Odours from Mushroom Composting Sites in Ireland*” at the request of the mushroom compost production sector as an alternative to the enclosure and abatement measures recommended by the Odournet Report and also prepared a review of the Odournet Report. The “*Index of*

Measures” was submitted to the Agency by the applicant to be considered in the course of the Waste Licensing process. A copy of the “*Index of Measures*” is included as Appendix 3.

The applicant stated in a letter of 06/07/04, received 09/07/04 that as a result of a merger between Monaghan Middlebrook Mushrooms Ltd (MMML) and Carbury Mushrooms Ltd, there are now three Irish Compost yards in the group. They also stated that MMML accepts in full the directions set out by Prof. Noble for the preparation of mushroom substrate and that “*the company furthermore plans a major investment in substrate production which will see the following happen;*

- *The closure of the Foxfield Phase 1 yard (Reg. 120-1, withdrawn application) and the construction of Phase 3 tunnels. Phase 2 and 3 do not create significant odour issues.*
- *The construction at Carbury (WL 124-1) of a fully aerated bunker process incorporating the latest technology and observing the Noble directions.*
- *The implementation of the Noble Directions in the Kabeyun yard (121-1, Kabeyun, Castleshane).*

These developments are estimated to cost as much as Euro 15 million.

The applicant did not indicate a timescale for carrying out this programme of work in this correspondence. However, an earlier correspondence of 23/04/03 from the company referred to a 10 year plan for the company’s development which would include addressing odour issues.

It is my opinion that the implementation of the Noble Measures and if required the subsequent enclosure of the process and treatment of the odorous emissions as provided for in the RD will give rise to a very significant reduction in the odour emissions from this facility and to a sizeable reduction in the zone of odour nuisance impact on the wider community. However, as identified in the Odournet report, the area of excess impact will still extend far enough to include a number of residential dwellings along the road to the west of the site at distances of about 450 and 550 m although the exposure at these locations will be significantly reduced as a result of implementation of the identified mitigation measures, odours from the facility are likely to remain an issue there.

Boiler Emissions to Air

According to the applicant, there is one gas oil fired boiler on site. The RD requires that this boiler is tested for NO_x, SO_x and CO on an annual basis.

(4) Nuisance and Noise Control

- Dust:* The enclosure of the bale breaking and blending line is required as per Condition 3.11 of the Recommended Decision. The enclosure of this part of the process and the requirement to provide enclosed buildings or structures for the storage of poultry litter and gypsum (Condition 3.7.1) should mitigate against any significant dust emissions from the facility. Condition 7.1 and Schedule E of the RD provides for dust deposition monitoring at and around the facility.
- Vermin & Pests:* Condition 6.3 of the Recommended Decision requires the applicant to implement a vermin control programme at the facility.

- iii) *Noise:* The main noise sources are the aeration fans, the bagging plant and mobile plant around the site. No information on night-time noise levels from the facility was submitted to the Agency in the application. The RD sets out noise limits at noise sensitive locations. In order to ensure that noise levels from the facility are minimised Condition 3.15.1 requires that all air ventilation systems and outdoor motors are enclosed where possible.

(5) Waste Types and Facility Operation

Waste Types: The applicant will be restricted to the acceptance of 15,600 tonnes of poultry litter and 1,500 of waste gypsum per annum. These are the upper-limits indicated in the application form. The RD (Condition 4.8) requires the substitution of at least 15% of the poultry litter used at the facility with urea within six months of the date of grant of this licence as part of the implementation of the Noble measures at the facility. This is also incorporated in Schedule A of the RD.

Facility Operation: Condition 4 of the RD provides for the day to day operation of the facility. Condition 4.1 requires the development of waste acceptance procedures at the facility and these will ensure that all wastes arriving at the facility are inspected prior to use and handled in an acceptable manner.

Condition 1.4 specifies that on-site and off-site deliveries of wastes, raw materials or product shall be confined to the hours of 08:00 to 18:00 hours Monday to Friday, and between 08:00 to 13:00 hours on Saturday rather than 07:00 to 18:00 Monday to Friday and 07:00 to 13:00 on Saturday as applied for in order to minimise noise impact from heavy vehicle movements to/from and on-site before 08:00 (i.e. night-time). There shall be no on-site or off-site deliveries of wastes, raw materials or product on Sundays or Bank Holidays. Unless otherwise agreed by the Agency the use of noise generating mobile plant and equipment shall be restricted to the hours referred to in this Condition.

(6) Emissions to Groundwater

The applicant described the underlying bedrock as being Ordovician aged “Turbidite Deposits and Red Shales”. There is limited information on subsoils but a review of Geological Survey of Ireland (GSI) well records for a number of wells in the local area indicate an average depth to bedrock of 6.5m. With reference to the GSI Guidelines, the applicant states the bedrock aquifer would be classified as Pu/H (i.e. bedrock which is generally unproductive with a High Vulnerability). There are two groundwater abstraction wells on site. The applicant’s Hydrogeological Assessment indicates that the well-head of the second pumping well at the site requires some remedial work. Condition 3.17.1 of the RD requires that remedial works of the type recommended in the *Dames & Moore Report* submitted in the Waste Licence application are carried out on the well heads at the site within two months of the date of grant of the licence. It is also required that these remedial works are supervised and signed-off by a suitably qualified and experienced hydrogeologist and that a report on the completed works is submitted to the Agency.

Condition 7.1 of the RD requires the applicant to carry out monitoring of the groundwater as set out in Schedule E.

(7) Emissions to Surface Water

7.1 Surface Water Run-Off

Where possible all rainwater falling on the facility (except roof-water) and washdown water is stored in an on-site retention tank with a 500,000 gallon (2,250 m³) capacity and reused in the process. Requirements for infrastructure to provide for the protection of surface water as outlined in Section 2 of this report should ensure that the risk of contaminated run-off to surface water is minimised.

(8) Air, Water and Waste Management Plans

There is no Air Quality Management Plan in place for the area in question.

There does not appear to be a published Water Quality Management Plan for the Ulster Blackwater River. Emissions from the facility in accordance with the conditions of a waste licence should not impact on the water quality in the River.

The Waste Management Plan for the North East Waste Management Region as adopted makes reference to a number of permitable/licensable facilities and includes this facility in relation to the recycling of poultry litter.

(9) Recommendation

The Recommended Decision contains a number of conditions, which will significantly improve the environmental performance of this facility. In reaching a decision on the waste licence application for this facility, I have had regard to the following:

- The current state of the mushroom production process in operation at this facility which is, in principal, a 'low tech' operation with very limited controls on emissions to the environment.
- The current operation has given rise to a number of odour complaints in the vicinity of the facility and will continue to do so in its present state as is evident by the number of submissions received from local residents.
- The odour assessment report submitted by the applicant noted that odours from the facility were likely to result in a nuisance to the community within the locality of the facility.
- The OdourNet UK report that was produced on behalf of the Agency to assess the most significant issue with the mushroom compost production sector i.e. odour. The findings of this report are incorporated into the RD.
- The requirement that Best Available Technology be employed at the facility
- The technologies currently being used in other EU member states.
- The alternative proposals for odour reduction by Professor Ralph Noble submitted by the applicant.

(11) Submissions/Complaints

There were thirteen valid submissions (one with an attached petition containing 28 individual signatures) received in relation to this waste licence application. A summary of the issues raised in the submissions received is provided below. The contents of the submissions have been taken into account in drafting the RD.

1. Odour

The majority of the submissions relate to concerns regarding odours arising from the facility. They state that the odour causes a nuisance and that they are unable to keep windows in their homes open, have to block vents to try and keep the odour out, are unable to put out clothes to dry, can't enjoy walks in the area and fear that a high incidence of asthma in children in the area is associated with these emissions. A number of the submissions refer to the failure of the company to use technology or operational practices to prevent emissions of odours. One submission refers to emissions of extremely unpleasant smells, ammonia, methane, carbon monoxide and other gases & fumes which have made the submitter's and his family's premises uncomfortable and unhealthy and wrongly interfered with their ability to enjoy their home.

A submission from a Senior Environmental Health Officer in the Environmental Health Services section of the North Eastern Health Board states that his office has received complaints regarding odours from the facility and indicates that this matter should be adequately addressed in any licence being issued to the facility.

Inspector's Response:

The facility is currently giving rise to significant odours in its vicinity and the RD provides for the control of emissions from the facility over a phased time period. The RD provides for a number of waste handling and storage improvements and operational and process control changes in the short-term (i.e. Noble Index of Measures) to reduce the emissions of odours from the facility. If these measures do not achieve an adequate reduction in odours, the RD also provides for the enclosure of the composting process at the facility and the subsequent collection and treatment of air emissions from the facility (Condition 3.11). The applicant is also required to submit a report to the Agency following the completion of the works as required by Condition 3.11 and this shall assess the need for additional measures to be taken.

2. BATNEEC/BPM/BAT

A number of submissions refer to failure of the company to use Best Practical Means to suppress and control offensive odours from the facility and that the company have failed to install adequate technology for this purpose. One submission refers to the use of aerated bunkers and alternative raw materials at a compost site in Northern Ireland (Mc Geary's, Armagh) achieving a 90% reduction in odour emissions and also refers to composting in Holland being carried out completely indoors.

Inspector's Response:

The infrastructural improvements and changes of operational practices required over a specified timescale by the conditions of the Recommended Decision represent BAT for this sector.

3. Human and Animal Health, Disease Control and Animal Deaths

A number of submissions express concern regarding an adverse effect of emissions on human health stating that there are high levels of childhood asthma in the area. One submission states that Local GPs are keeping records due to the huge incidence of asthma and lung infections in the area. Another submitter states that his health is

being affected by emissions from the facility due to the humid conditions and being put off his food due to the smell.

Two farmers with land adjacent to the site have made submissions indicating that they have suffered a high number of cattle fatalities on their farms. Their vets have tentatively identified botulism as the cause of death in a number of cases but a confirmed diagnosis for this disease was not obtained in any of the cases. The submissions allege that dead baby chickens carried onto their land by vermin, magpies and grey crows from the poultry litter delivered in bulk and stored in the open on the site and dust blow from the storage and handling of this waste onto their land are the likely source of the botulism.

Inspector's Response:

No verifiable evidence has been submitted to the Agency regarding the negative impact of the activities at the facility on human or animal health. The RD contains a number of conditions that should minimise the impact that the facility will have on human and animal health over time. The enclosure of the poultry litter storage and bale breaking and blending lines should have a significant effect in minimising the potential for off-site movement of airborne microbes and dust and minimise the risk of waste being moved off-site as a result of scavenging by birds or vermin. Also, Condition 7 and Schedule E of the RD provides for the monitoring of airborne microbes at the facility.

See also response in Issue 1 above regarding odours.

4. Dust

Concern is raised in a number of submissions regarding dust emissions from the bulk delivery, storage in the open and mixing with straw of poultry litter at the facility. The concerns raised relate to subsequent water pollution resulting from run-off and the risk of it being a possible pathway for disease (e.g. botulism).

Inspector's Response:

The enclosure of the composting process and the enclosure of the chicken litter and gypsum storage areas should ensure that dust emissions are minimised at the facility. Given the high volume of water used in the process, dust emissions emanating from the compost material itself are generally not an issue.

5. Surface Water Pollution

Concern is raised that the applicant is failing to collect all soiled waters generated on site into water tight tanks to be recycled. An adjacent farmer alleges that effluent from the facility drains into his land due to sub-standard surface water drainage on the site. The concern is stated that this ultimately gives rise to pollution of the Cor Stream which is a tributary of the Ulster Blackwater.

Inspector's Response:

The risk of negative impacts on surface waters from this facility will be minimised if the conditions of the RD are complied with. The infrastructure required and the monitoring that will need to be undertaken with respect to surface water protection have been outlined in Sections 2 and 7 of this report.

6. Noise

One submitter raises complaints regarding excessive noise from the premises and alleges that the facility is generating in excess of 50 dB.

Inspector's Response:

The RD sets out noise limits at noise sensitive locations. In order to ensure that noise levels from the facility are minimised Condition 3.15.1 requires that all air ventilation systems and outdoor motors are enclosed where possible. Compliance with these conditions should ensure that noise does not give rise to nuisance at noise sensitive locations. Noise monitoring is required under Condition 7.1 and Schedule E.4 of the RD.

7. Airborne Micro-organisms and Spores

One submitter raises concerns regarding emissions of airborne sediments, spores and other deleterious matter.

Inspector's Response:

Requirements of the RD to store poultry litter and horse manure indoors and to enclose the bale breaking, mixing and blending line will greatly reduce the risk of dust, spores and airborne micro-organisms being released to the atmosphere in an uncontrolled manner and should minimise the potential for the off-site movement of airborne microbes. Bio-aerosol monitoring is also a requirement of Condition 7 and Schedule E of the RD.

8. Rodent and Fly Infestation

The North Eastern Health Board submission states that complaints have been received regarding rodent infestation in the area of the site and that this issue should be addressed adequately in any licence for the facility. Another submission refers to swarms of offensive flies being caused by activities at the facility.

Inspector's Response:

Under Conditions 6.1 and 6.3 of the RD, the licensee is required to ensure that vermin, birds and flies do not give rise to a nuisance at or in the immediate area of the facility and to implement a pest control programme for the control of birds, rats and insects and these requirements if complied with should adequately address any potential impact from rodent or fly infestation.

9. SMC – Spent Mushroom Compost

Monaghan County Council made a submission raising concerns regarding SMC. They state that about 70,000 tonnes of this waste arises in the County each year. They state that it causes a detrimental effect on water quality due to its NPK content and its use as “fill” on low-lying areas. They estimate that 10% of the waste is used as compost, 30% is spread on land and 60% is dumped in an unauthorised manner. They state that the associated plastic bags also pose a problem from the point of view of litter and that the plastic recyclers won't accept the type of plastic being used.

Monaghan Co. Council state that if “Polluter Pays Principle” is applied, then the composters must be held responsible for waste SMC from the product they produce. The industry should have a role in ensuring the collection and recycling of SMC and must be compelled to introduce a biodegradable form of packaging.

Another submission alleges failure to dispose of waste other than agricultural wastes in accordance with the EC Waste Regs, 1979.

Inspector's Response:

No mushrooms are cultivated at this facility and therefore no spent mushroom compost (SMC) arises at the site. Therefore the issue of management of SMC goes beyond the realms of this Recommended Decision. However, the RD does require the applicant to prepare an Environmental Management Plan and part of this plan will be targets and objectives through which the applicant will strive to improve the environmental performance of the facility, including the use of reusable packaging where possible. Condition 9 of the Recommended Decision requires the applicant to maintain a record of all wastes arriving at and departing the facility. The issue of all waste loads arriving into Monaghan requiring approval is a matter for the local authority.

10. Devaluation of Property (10)

One submission states that people cannot achieve market values for their homes due to the image associated with the odours from this site.

Inspector's Response:

The issue of the devaluation of property does not come within the scope of the Waste Licensing process.

11. Financial Loss

One farmer states that he has had to cease farming his land due to the financial loss incurred from animal deaths on his farms which he alleges are associated with activities on the site.

Inspector's Response:

Alleged loss of income due to the activities of the applicant is not an issue that can be addressed with the scope of the Waste Licensing process. However, issues raised as the alleged causes of the losses referred to are addressed by the conditions set out in the RD and are also discussed under Issue 3 above.

12. Court Action

A copy of a Civil Bill being moved against the company by one neighbouring resident and his family was submitted by their solicitors to be considered as a submission.

Inspector's Response:

The issues of concern raised in the bill are dealt with where relevant under the other Issue headings in this section.

Signed _____

Damien Masterson
Inspector
Office of Environmental Enforcement

Dated: _____

APPENDIX 1

Site Location (attached) and Site Plan (see application file)

APPENDIX 2

OdourNet UK Ltd. Report

APPENDIX 3

Prof. Ralph Noble's "*Index of Measures for the Reduction of Odours from Mushroom Composting Sites in Ireland*".