



**OFFICE OF LICENSING &
GUIDANCE**

**REPORT OF THE TECHNICAL COMMITTEE ON OBJECTIONS
TO LICENCE CONDITIONS**

TO:	Directors	
FROM:	Technical Committee	- LICENSING UNIT
DATE:	3 rd August 2004	
RE:	Objection to Proposed Decision for CARBURY MUSHROOMS LIMITED , Waste Reg: 124-1	

Application Details	
Class(s) of activity:	Class 2 of the 4 th Schedule of the WMA, 1996- Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)
Location of activity:	Carbury, County Kildare
Licence application received:	29/10/1999
PD issued:	28 th July 2003
First party objection received:	25 th August 2003 (Applicant)
Third Party Objection received:	None received
Additional Information received:	The applicant sent in a paper by Prof R. Noble ¹ which included a review of the OdourNet UK report and gave alternative recommendations for the avoidance of nuisance odours from mushroom composting sites in Ireland. The chairperson describes the outcome of his visit to a UK mushroom composting facility that is using Prof Noble's measures.

Company

Carbury Mushrooms Ltd. produce compost for the mushroom industry at a facility close to the village of Derrinturn in County Kildare. The facility has been operating for over 35 years in its current location and it supplies compost to mushroom

¹ Prof Ralph Noble, Horticulture Research International, Wellesbourne, Warwick, UK, is a leading technical expert in mushroom composting pertaining to odour control

producers almost nationwide. The waste materials being accepted at the facility include horse manure (up to 41,600 tpa), poultry manure (c.15,000 tpa). Approximately 2,600 tpa of gypsum is used in the process.

Consideration of the Objection

The Technical Committee, comprising of Dr. T. Mc Loughlin (chair), K. Reynolds, Dr M. Henry and D. Masterson has considered all of the issues raised in the first party objection and this report details the Committee's comments and recommendations.

First Party Objection

This objection was submitted by Mr Cahal Mac Canna on behalf of Carbury Mushrooms Limited, Carbury, Co. Kildare who objected on a number of points citing that the company has outlined a development plan in its license application which would remove odour from the Cadbury area based on the research and expert advice of Prof. R. Noble, Horticulture Research International, Wellesbourne, Warwick, UK.

Part I: Grounds of the objection contained in the main part of the objection document.

Ground No 1 (Condition 3.7.1)

The applicant objects to the proposed enclosure of chicken litter and horse manure storage areas within 12 months of the date of grant of the licence. It states that horse manure is used within hours of arriving at the facility (< 60 tonnes) and it does not give rise to odours in its standing position. It is considered that the covering of horse manure at the facility would incur unnecessary expense and would hinder the smooth operation of the yard. The applicant also states that only small quantities of chicken litter are stored at the facility and whilst the applicant will provide a roofed area for the storage of the chicken litter this cannot be completed until 18 months from the date of grant of the licence.

Technical Committee's Evaluation:

The Technical Committee considers that the requirement to store poultry and horse manure in an enclosed building is necessary for a number of reasons, including odour, dust and disease control. It is also a specific area identified by Prof Noble as one that must be addressed in the context of odour abatement. For this reason it is considered necessary to reduce the timeframe if possible for enclosing the chicken litter and horse manure storage areas. It is also noted that all members of the Composters Association agreed to implement Prof Noble's recommendations immediately and in these circumstances the period for enclosing this element of the facility is not considered too short. The TC also considers that the source of the gypsum must be agreed in advance with the Agency

Recommendation: Change condition to read as follows: Within 9 months of the date of this licence, the licensee shall provide an enclosed building or structure for the dry storage of horse manure, poultry manure, and gypsum.

Add new condition 4.2.5

The source of the gypsum must be agreed in advance with the Agency.

Grounds No. 2-5 (Condition 3.11.1 (i)), Condition 3.11.1 (ii) & 3.13.2, (Condition 3.11.1 (iii)) & (Condition 3.11.1 (iv) & Condition 3.11.1 (v))

The applicant objects to the requirement to enclose the bale breaking line at the facility on the basis of health and safety grounds. The breaking line generates large quantities of steam (breakdown of partially fermented straw) that reduces visibility to very low levels. In addition the enclosed breaking line would be a risk to health due to the concentration of microorganisms that would be present in the enclosure. The applicant states that there is no practical ventilation system that can be installed that will provide adequate protection for workers. It claims that the bale breaking line does not give rise to odours or dust emissions beyond the facility boundary.

The applicant objects to the enclosure of the goodie water tanks at the facility. The applicant agrees that the aeration of the goodie water is beneficial for the reduction of odours however they consider that it is not possible to enclose the tanks and any such enclosure would hinder the management and maintenance of the aeration process. Also, the provision of odour filtration on outlet vents from the goodie tank(s) is extraneous. The applicant requests that Condition 3.13.2 be removed and that Condition 3.11.1 (ii) is amended to include the requirement for aeration only.

The applicant requests that the timeframe specified for the enclosure of Phase I of the process be extended from 18 months to 36 months for the following reasons:

- *The large capital expenditure needed to complete this structure*
- *The upset it will cause in the production area and processing system*
- *The large area involved*
- *The difficulty in getting planning permission and then contractors to commence the building works*
- *The research time needed to investigate appropriate structures for enclosure, for practical and health and safety purposes.*

For the reasons outlined above the applicant considers 36 months to be a more realistic timeframe for the completion of Phase I enclosure.

The applicant objects to the requirements to install an air collection system at the facility (24 months) and the provision of a suitable abatement system (36 months). The applicant claims that such technology has not proved to be successful at mushroom compost facilities and such technology does not represent BAT or BATNEEC. An alternative plan is proposed which is based on work and recommendations by Prof. Ralph Noble, Horticulture Research International, UK.

Technical Committees Evaluation:

The Technical Committee notes the applicants concerns in relation to health and safety issues which are matters for the Health and Safety Authority in the first instance. However, it considers that the enclosure of the bale breaking line is necessary as a means of controlling odour and also more importantly as a control to minimize dust and microbial emissions from the facility. The twelve-month timeframe specified in the PD should be sufficient for this work to be carried out.

The Technical Committee notes the findings of the Odournet UK reports which highlighted the goodie water storage tanks as a significant source of odour. Prof Noble is also in agreement. The enclosure of the goodie water tanks is essential as a means of odour control and it will also prevent rainwater entering the tanks thus reducing the volume of contaminated water to be handled at the facility. The requirement to provide an odour filtration unit at the outlet for the goodie tanks is seen as a necessary odour control measure.

The Technical Committee considers that the enclosure of Phase I of the process is a key component of the overall development of the facility in terms of odour reduction as highlighted in the Odournet UK reports, only if the Noble measures are not effective in reducing odours. The Technical Committee considers that the completion of the odour abatement measures as provided in the proposed decision is a priority and the enclosure should be completed within the 24-month timeframe specified in the proposed decision.

The Technical Committee notes the concerns of the applicant. However, it is considered that the proposed decision issued by the Agency represents BAT for this sector and specific timeframes have been incorporated into the proposed decision to allow for completion of key infrastructural projects at the facility. In determining BAT for this sector, the Agency has had regard to the Odournet UK reports which were commissioned on behalf of the Agency. The issue of Prof. Nobles report is addressed later in this report.

The TC considers that the licensee shall carry out an odour impact assessment study to assess the effectiveness of odour control measures at the facility. This study should be completed within 18 months of the date of grant of this license.

Recommendation:

Amend Condition 3.11 to read:

- 3.11.1 Within twelve months of the date of grant of this license, the bale breaking line and the blending line shall be enclosed.
- 3.11.2 Within twelve months of the date of grant of this license the licensee shall provide appropriate odour filtration systems placed at outlet vents on all process/goodie water storage tanks and a system of aeration shall be installed on each process/goodie water storage tank on-site.

3.11.3 Unless otherwise agreed by the Agency and subject to the determination of the study undertaken in accordance with condition 3.11.2 the licensee shall ensure that the following programme of works shall be carried out to minimise odour emissions from the facility. The programme of works shall proceed based on the following::

- (i) Within twenty four months of the date of grant of this license all of the Phase I production process shall be carried out in fully enclosed buildings.
- (ii) Within thirty months of the date of grant of this license, the licensee shall provide a system for the collection of all air emissions from the following sources: (i) process/goodie water storage tanks, (ii) bale breaking/blending line, (iii) manure storage and (iv) Phase 1 process. Negative pressure shall be maintained throughout all areas where the compost process occurs to ensure that there is no significant escape of fugitive odours.
- (v) Within forty two months of the date of grant of this license the licensee shall ensure that all air emissions from the composting process are passed through an appropriate abatement system to be agreed with the Agency.

Amend condition 3.11.2 to read:

Within 18 months of the date of grant of the license the licensee shall submit a report assessing the effectiveness of the odour control measures implemented at the facility.

Delete condition 3.11.3

No Change to Condition 3.11.4 and 3.11.5

Ground No. 6 (Condition 3.16.1)

As the facility is supervised 24 hours per day, the applicant objects to the provision of a telemetry system at the facility. The applicant states that monitoring and checks of significant parameters within the composting process are carried out on an ongoing basis (day & night) by site supervisors.

Technical Committees Evaluation:

A continuous monitoring system is required at the facility in order to ensure that the operator can adequately monitor key control parameters of the composting process (e.g. temperature, oxygen), liquid/DO levels in tanks and odour abatement control measures. By having a telemetry system in place, the applicant can react quickly to any unusual situations thereby reducing the risk of further potential problems (e.g.

odour nuisance due to poor aeration). The Technical Committee notes that process monitoring (temp. & oxygen) is already being carried out on a continuous basis at a number of the mushroom compost production facilities in Ireland and it is not considered to be an excessive requirement. Also, the control of goodie water levels is necessary to prevent any spills to the nearby Cushaling River. In this regard, the technical committee notes that the Southern Regional Fisheries Board and Kildare County Council had serious concerns (expressed in submissions received) in relation to the environmental management of the site and the negative impact the facility was having on the Cushaling River.

Recommendation:

Amend Condition 3.16.1 to read:

3.16 Continuous Monitoring System

3.16.1 Within twelve months of the date of grant of this licence a continuous monitoring system shall be installed and maintained at the facility. All facility operations linked to the continuous monitoring system shall also have a manual control, which will be reverted to in the event of break in power supply or during maintenance. As a minimum the system shall record and relay the following information:

- (iii) temperature and oxygen content of the compost at all stages during its production;
- (iv) the level of liquid in all of the on-site storage tanks/sumps;
- (v) dissolved oxygen levels in process water storage tanks; and

odour abatement control parameters to be agreed with the Agency to be measured following the installation of the odour abatement system.

Ground No. 7 (Condition 4.2.3)

The applicant objects to the requirement to turn all outdoor clamps of intermediate compost every 24 hours. The outdoor clamps are turned every 3 days and turning the clamps every 24 hours would destroy the structure of the compost and thus render the compost unusable.

Technical Committees Evaluation:

The technical committee considers that the turning of the clamps on a daily basis may be excessive and may also have a detrimental affect on the quality of the compost produced.

Recommendation:

Delete Condition 4.2.3

Ground No. 8 (Condition 7.8.1)

The applicant objects to the requirement for biological monitoring of the stream that passes through the facility. The stream is piped in from the site to the Cushaling River and therefore it is impossible to carry out a biological assessment of the stream as it is fully enclosed. In addition the applicant claims that a piped stream, which is not open to natural light, will contain little biological life.

Technical Committee's Evaluation:

The Technical Committee notes the applicant's comments in relation to the nature of the stream that flows through the site and agrees that the biological monitoring of the said stream would be of limited value. The Technical Committee considers that the biological monitoring of the "open" stream that runs adjacent to the facility would be a more useful requirement. The exact location of the monitoring point should be agreed in advance with the Agency.

Recommendation:

Amend Condition 7.8 to read:

7.8 Biological Assessment

7.8.1 A biological assessment of stream that flows adjacent to the facility shall be undertaken within six months of the date of grant of this licence and every two years thereafter. This assessment shall use appropriate biological methods such as the EPA Q-rating system for the assessment of rivers and streams. The location of monitoring points shall be agreed with the Agency.

Ground No 9 (Schedule E.2)

The applicant object to the frequency of dust monitoring that is required as per Schedule E.2 of the proposed decision (4 locations, three time per annum). The applicant suggests that dust emissions from mushroom composting facilities is not a significant issue and monitoring carried out at four mushroom composting facilities as part of the waste licence application has shown that dust deposition levels around such facilities is not an issue. Dust deposition monitoring should be carried out at 2 locations, once per annum. The applicant also notes that airborne microorganisms are to be monitored once per annum and these results will give an indication of dust emissions from the facility.

Technical Committee's Evaluation:

The Technical Committee considers that the requirement for dust monitoring as included in the proposed decision is necessary in order to see whether dust emissions are having a significant impact on the surrounding environment. Based on the results

of the monitoring, the applicant may request a reduction in the monitoring frequency as provided for in Condition 7.2 of the proposed decision.

Recommendation: No change.

Ground No. 10 (Schedule E.4)

The applicant considers that the requirement to carry out noise monitoring at one noise sensitive location twice per year is excessive as noise levels will not vary much within six months and that annual noise monitoring would be sufficient.

Technical Committee’s Evaluation:

The Technical Committee considers that the requirement for noise monitoring on a biannual basis is not excessive and is required to show whether the facility is complying with the noise emission limit values specified in the proposed decision. In the event that the applicant shows consistent compliance with the noise limits, the frequency of noise monitoring may be reduced under Condition 7.2.

Recommendation: No change.

Ground No. 11 (Schedule E.1)

The applicant considers that monitoring surface water upstream and downstream of the facility is inappropriate as there are numerous inputs along the length of the river which Carbury Mushrooms are not responsible for.

Technical Committee’s Evaluation:

The requirement to monitor surface water quality upstream and downstream of the facility is necessary to show whether the facility is impacting on the receiving surface waters at/in the vicinity of the facility. It is also noted that only one upstream and one downstream sample is to be taken and this is not considered excessive.

Recommendation: No change.

Ground No. 12 (Schedule E.5)

The applicant objects to the requirement to monitor COD of the surface water discharges from the facility on a weekly basis. A.6 above requests that two of the six locations be deleted and the applicant has the following comments to make in relation to the remaining four monitoring locations:

- *FMW-1, FMW-2 & ETP-1 –the COD monitoring frequency should be changed from weekly to monthly.*
- *SW-1 – This is the discharges from the stream that runs behind the facility into the Cushaling River and it represents all emissions from the facility. The applicant considers that the requirement to monitor at SW-1 is excessive given that FMW1, FMW2 and ETP-1 are already being monitored.*

Technical Committee's Evaluation:

The Technical Committee considers that the requirement to carry out weekly COD monitoring at 6 surface water locations is excessive and that monthly monitoring for COD would be more appropriate. The Technical Committee considers that the monitoring of SW-1 is not excessive as SW-1 represents all of the emissions from the facility.

Recommendation:

Amend Table E.5.1 by specifying monitoring frequency for Chemical Oxygen Demand as Monthly. Also, delete Note 2.

Ground No. 13 (Schedule E.5)

The applicant objects to the requirement to provide flow meters at FMW-1 and FMW-2, which are two surface water discharge points at the facility.

Technical Committee's Evaluation:

The Technical Committee considers that it is not necessary to undertake flow monitoring at FMW-1 and FMW-2 which are the monitoring locations for surface water run-off from the facility.

Recommendation:

Amend Table E.5.1 by removing 'Flow' and also delete Note 1.

Ground No. 14 (Schedule E.5)

The applicant considers that the weekly visual inspection of FMW-1, FMW-1 and ETP-1 is reasonable, however they consider that a weekly visual inspection of SW-1 is not practical as it located some distance from the facility.

Technical Committee's Evaluation:

The Technical Committee considers the requirement to undertake weekly visual inspections is a very effective and simple means of assessing water quality at/in the vicinity of the facility and therefore should remain.

Recommendation: No change.

Ground No. 15 (Schedule E.8)

The applicant objects to the requirement to monitor treated sewage on an annual basis. The applicant considers that any emissions from the sewage treatment system will discharge via ETP-1 and the monitoring requirement for this location is provided

for in the proposed decision. The applicant does not intend to get treated sewage samples from an additional location, as it would be unhygienic and beyond anyone's job description.

Technical Committee's Evaluation:

The technical committee considers that the applicant may have misunderstood the requirements of Table E.8 of the PD. Table E.8 requires the applicant to monitor discharges from the on-site Puraflo effluent treatment system on a bi-annual basis (not annually as referred to by applicant). This discharge is referred to in Table E.1.1 as ETP-1 (see Note 1) and discharges from the system will have to comply with the ELV's set out in Table D.5 Emissions to Water (Effluent treatment). In order to provide clarity, the technical committee recommends that specific reference is made to ETP-1 in Table D.5 and Table E.1.1 as outlined below. The monitoring specified should provide information on how the treatment system is performing and in the event that it performs consistently over a period of time, then the monitoring requirements may be amended accordingly under Condition 7.2.

Recommendation:

Amend Table D.5 as follows:

Location: ETP-1

Amend Heading to Table E.8 as follows:

Effluent Treatment Monitoring (as measured at ETP-1)

Ground No. 16 (Condition 11.1.1)

The applicant objects to the annual charge of €15,960 as provided for in the proposed decision. The applicant would like to see a breakdown of the costs prior to making any payments. In addition the applicant considers that the fee should be scaled down based on the fact that monitoring requirements would also be scaled down, based on the grounds outlined above.

Technical Committee's Evaluation:

The Technical Committee considers that the annual contribution to be paid to the Agency which is specified in Condition 11.1.1 is appropriate and should remain unchanged. It is noted that the present wording of this Condition allows the Agency to alter this sum from time to time as it determines.

Recommendation: No change.

Part II: Summary of the document prepared by Professor Ralph Noble submitted as an attachment to the main objection and a summary of how Prof Noble's measures to reduce odours are being implemented on a UK mushroom composting facility

This document provides a review of the report entitled 'Review of Odour Control Technologies in Mushroom Compost Production' prepared by Odournet UK Ltd., on behalf of the Agency. It also provides recommendations/operational measures for the control of odours at mushroom composting facilities. Prof. Noble considers that there are several serious technical, scientific and financial inaccuracies and omissions in the Odournet report. He states that he is not convinced that the total enclosure approach is the correct one for Irish mushroom composters either environmentally or economically. He states that the Odournet report acknowledges that aeration of the compost can reduce odour emissions by 90% and the review appears to have overlooked the latest research, in particular, with respect to maintaining minimum oxygen levels and using alternative nitrogen sources. This is the same figure quoted for by biofiltration which Odournet favours. In conclusion, Prof. Noble considers that his recommendations will lead to the avoidance of odour nuisance for those living in proximity to mushroom composting sites without the need for long-term developments and construction.

Visit of the Chairperson of the Technical Committee to a UK mushroom facility that is using Noble's recommendations and his A-Z measures

The chairperson of the Technical Committee visited a compost yard in the UK that was implementing all of the procedures outlined by Prof Noble to reduce odours at such facilities. Pond Chase Nurseries, Hockley, Essex, UK, a mushroom compost facility that is implementing Noble's measures for a number of years was visited. The Hockley facility is producing Phase 1-3 compost. They produce an estimated 100-150 tons of mushroom compost per week. This represents approximately one tenth (1/10) of the compost that is produced at the Carbury site. This site is situated near the town and there are numerous houses surrounding the yard. The facility manager advised that they get an occasional complaint (1-2 per year), particularly, if they miss-manage the chicken litter. The regulatory authority in Hockley was contacted to establish the environmental performance of the facility with particular reference to odour complaints at this facility. It was confirmed that they received one complaint relating to odour which may have originated from this facility during 2003. Regarding scale, Prof Noble informed the Agency that it was possible to make compost on any scale that would be very odourous, if the proper measures were not used.

It is the view of the chairperson of the Technical Committee that there is sufficient evidence that odours are being reduced at the UK mushroom composting facility that is using Noble's A-Z measures and that these measures if implemented at this facility will result in the reduction of odours.

Technical Committee's Evaluation:

The Technical Committee notes that Prof. Noble's report does not specifically refer to the consent conditions of the proposed decision (Reg. No. 124-1), which was issued by the Agency to Carbury Mushrooms Ltd. However, it does refer to certain measures that addresses the reduction of odours from the mushroom composting process, in particular, avoidance of anaerobic composting, use of alternative nitrogen sources, treatment, storage and use of 'goodie' water, management of poultry manure and the monitoring of oxygen in the compost. Prof. Noble's report was sent to Odournet UK for comment. They reverted and stated that *'Although the comments by Professor*

Noble certainly contained relevance to determining the way forward, they fall short of either invalidating the original report or providing a viable alternative for the mushroom growing substrate industry in the short term’.

Having reviewed the objection and also Professor Noble’s recommendations, the technical committee considers that the amendments to the PD outlined in Ground 2 above (specifically Condition 3.11.1) should be included in the final licence for this facility. Principal among the requirements is that the licensee will have to provide the infrastructure and abatement technology specified unless it can prove to the Agency that such requirements are not necessary. In addition, the technical committee also considers it necessary to amend the PD as recommended in Annex I below.

Some members of the technical committee have grave reservations about the ability of some of Noble’s recommendations to adequately control and minimise emissions arising from the mushroom composting sector. For example, some of the TC members consider it will be very difficult to implement adequate odour management at the facility by implementing Noble’s recommendations only.

The Technical Committee notes that according to the Noble measures that ‘goodie’ water can only be used during the ‘dunking’ process, hence there is a need for the licensee to ensure that any surplus ‘goodie water is managed in a precise fashion to ensure that it does not contaminate surface or groundwater. In order to circumvent any contamination we recommend that the following condition be inserted under 3.12.1:

(e) all goodie water not used in the process cannot be discharged or transported off-site without the prior agreement of the Agency

Finally, the Technical Committee wishes to point out that when transposing the measures outlined in Annex 1 great care will be required to ensure new conditions fit in well to revised PD and that no Conditions contradict each other.

Overall Recommendation

1. It is recommended that the Board of the Agency agree to the insertion of the attached conditions (Annex 1) together with the changes recommended in the specific grounds above.
2. The inspector will be given latitude when transposing the measures in Annex 1 in the FD to ensure clarity.

Signed

Dr Tom McLoughlin

Annex 1

Conditions for Mushroom Composting Procedures

1. Poultry manure must be pre-mixed with gypsum in an enclosed building or structure. This mixture must be kept dry prior to its addition to straw.
2. Poultry manure or horse manure with a moisture content of < 35% and < 70% (but not <40%) respectively shall only be accepted at the facility. Once accepted at the facility the manure must be stored in the enclosed building or structure referred to in condition (3.11). A monitoring programme to be agreed with the Agency must be out in place to measure the moisture content of animal manure.
3. All storage tanks and pits shall be fitted with submerged aeration/oxygenation facilities within one month of the date of grant of this licence.
4. Surface water and 'goody' water collected on-site shall be continuously aerated/oxygenated following the installation of the aeration/oxygenated facilities.
5. Goody water may only be applied to the composting process following aeration / oxygenation. No Goody water should be added to the process other than for the dunking of bales
6. Surface water from the site may only be used in the process following aeration / oxygenation.
7. Goody Water Storage Pit
 - 7.1 All liquid entering the storage pit shall be screened.
 - 7.2 The screens shall be cleaned on a daily basis and the material returned to the composting process.
 - 7.3 All solid matter shall be removed from the storage pit every 4 months or at such other intervals required by the Agency.
 - 7.4 Fresh water shall not be used to increase the volume of goody water in the storage pit.
 - 7.5 The volume of water in the storage pit shall be monitored on a continuous basis and shall be the minimum that is required for maintaining a consistent throughput of compost.
8. The licensee shall provide adequate aerated floor facilities, within nine months of the date of grant of this licence.
9. The pre-wetting of compost material and Phase I compost must be conducted on aerated floors (low or high pressure systems), within 9 months of the date of grant of this licence. The aerated floors shall be capable of maintaining a minimum oxygen concentration of 5% v/v in the entire compost. Where monitoring indicates that the oxygen level in the composting material is less than 5% v/v the licensee shall increase aeration and/or apply additional turns to the composting material.
 - 9.1 The minimum oxygen level of 5% maybe reviewed by the Agency in light of actual measurements and the environmental performance of the facility.
 - 9.2 Oxygen levels in the lower half of the compost stack shall be measured and recorded during Phase I and pre-wetting on a daily basis.

- 10 Within one month of the date of grant of this licence straw bales shall be 'dunked' in the recycled (aerated / oxygenated) goodie water. Fresh water should be added to the dunking pit if required, but not to the water storage tanks.
- 11 Recycled (aerated / oxygenated) goody water shall not be applied in a fine spray to the straw bales or pre-wet material.
- 12 All bales shall be broken open and material placed on aerated area within 3 days of dunking.
- 13 The moisture content of the materials at the end of pre-wetting and Phase 1 process shall be measured on a daily basis.
- 14 Where the monitoring results show the moisture content to be in excess of 75% at the end of either the pre-wet or phase 1 stages, the licensee shall reduce the quantity of water added at Phase 1 and adjust the subsequent pre-wet stage accordingly.
- 15 The licensee shall introduce a programme for the substitution of Urea for poultry manure. The Urea shall be added to the pre-wet stacks and mixed into the stacks, at the commencement of the composting process.
- 16 The Urea substitution programme shall achieve
 - 16.1 a 5% reduction in the amount of poultry added within 1 month of the date of grant of this licence and
 - 16.2 a substitution rate of at least 15% within 6 months of date of grant of this license.
- 17 The licensee shall report to the Agency within 9 months on the success in achieving the required level of urea substitution.
- 18 Poultry manure and/or horse manure shall not be applied as a single application during pre-wetting. No more than 75% of the total poultry or horse manure application (remaining following the substitution of fifteen percent by Urea), shall be applied in any three (3) day period. Records must be kept of the amounts of all animal manure and urea used at this facility.
- 19 All dirty yard areas shall be cleaned at least twice daily & records maintained.
- 20 The drainage system at the facility shall ensure that surface water run off liquid is drained by an effective drainage system to the 'goodie' water storage pit and surface water does not accumulate on the yard.
- 21 A programme of monitoring emissions from the facility (to be agreed with the Agency) shall be put in place within two month of the date of grant of this licence. The programme shall include
 - 21.1 Hydrogen sulphide (H₂S) and dimethyl sulphide (DMS) measurements must be taken during turning of pre-wet stacks and Phase I windrows, and in the vicinity of the goody water pit.
 - 21.2 Measurements shall be taken in the plume close to the compost.

- 21.3 Measurements should also be taken at different times of the day above static piles of compost.

- 22 The licensee shall maintain on-site a record of all
 - 22.1 dissolved oxygen concentration measurements taken in the goody water pit and in the pre-wet and Phase I composts must be done on a continuous monitoring system; and
 - 22.2 measurements of hydrogen sulphide and dimethyl sulphide sampling locations
 - 22.3 The records shall be made available for inspections at all times by Agency personnel and a summary of all measurements shall be included in the AER.

- 23 Samples of goody water must be analysed for dissolved oxygen concentration on a continuous monitoring system.

- 24 Monitoring shall be carried out using a computer control system or gas detector tubes or electronic hand-held meters.
 - 24.1 Gas detector tubes (hydrogen sulphide and dimethyl sulphide, capable of measuring 1 ppm) with appropriate sampling pumps (Draeger type accuro 2000 or Mod. 21/31 or Gas-tec/Anachem Model GV-100) must be used for detecting and measuring odorous emissions.