cré COMPOSTING ASSOCIATION of IRELAND

Newsletter 11 — December 2005

Updated Waste Plans - Good News for Composting

Conall Boland, RPS Consulting Engineers

The majority of Waste Management Plans in Ireland were under review during 2005. By now most plans are either adopted or undergoing public consultation. The updated Plans bring good news for the composting world.

Emphasis is placed on the roll-out of organics separate collection in most regions. For example, in the South East all towns with a population of >1,000 will have the system by end 2008, while in the North East region all household will be included. The separation of organic waste by businesses such as hotels, restaurants etc. is also proposed.

The capacity requirement for central organic waste treatment has been increased over and above the first series of Plans. For example, the Dublin region calls for up to 270,000 tpa capacity for biowaste and green waste treatment. Some regions have specified only a minimum capacity requirement.

The focus of waste prevention is shifting towards the commercial and industrial sector, with the appointment of 'Green Business Officers' by local authorities to support improved waste practices in SMEs. This will motivate companies to find either on-site or off-site treatment options for organic waste.

MBT is viewed in some regions as a possible mechanism to achieve the EU Landfill Directive targets, at least in the short term until thermal treatment capacity is available. In other regions where incineration capacity is closer to delivery (e.g. Dublin, the North East) there is little emphasis on MBT pre-treatment of waste.

Your local authority website should have a link to the latest Plan in your region. The regional boundaries can be seen on the composting map on www.compostireland.ie.

ERTDI programme applications

During 2005, Cré made application to the Environmental Protection Agency (EPA) for funding under the Environmental Research, Technological Development and Innovation (ERTDI) Programme. This scheme is intended to support R&D projects through grant-aid.
'Organic Waste Management' was identified as a priority research theme for this phase of funding. The programme aims are to inform policy development and implementation in relation to the environment and to anticipate issues arising from requirements to implement new legislation and policies.

Given the particular focus on organic waste management within the programme, Cré made a concerted effort to participate. Cré made application to participate in three projects, two desktop studies and one medium-scale project. The desktop projects are;

- "Capacity Building for Decentralized Organic Waste Management and Composting in Ireland" and the project partners are Florian Amlinger of Austria and Enzo Favoino of Italy.
- "Evaluation of Decision Trees and Model Procedures as Decision Support Tools for BMW Diversion" and the project partners are Paul Bardos, University of Reading and Greenstar.

The Medium scale project application is a development of the Compost Quality Standard project which Fiacra Quinn brought on while Chair of Cré. The project is titled;

- "To develop an industry led Quality Standard for Composted Materials produced in Ireland" and the project partners are Certification Europe Bord Na Mona and Greenstar.

All partners identified are leading players in their particular aspect of biowaste management and all have previously worked with Cré in the past and Cré is pleased to have such high-calibre partners. There was a substantial amount of work involved in developing the projects to application stage and I would like to thank everyone involved for help in completion of the three applications. I also hope that at least some of the three very worthy applications secure funding when evaluated.

Inside issue 11:	

Farm Conversion into State-of-Art Composting Facility

Celtic Composting Systems (CCS) has completed the construction of a new permit-sized in-vessel tunnel composting facility in Carlow for Waddock Compost Facility, Ltd. with the original planning permission obtained through RPS-MCOS.

Piping for the aerated static pile curing system

The facility consists of an enclosed tipping area where source separated feedstock materials are blended in an auger mixer. After the bulking materials are added for porosity and moisture adjustment, the blended feedstock is placed into one of four 120m³ tunnels for two weeks of composting. These tunnels are covered with removable tarpaulins and each tunnel is aerated with the use of twin stainless steel blowers. To minimise temperature stratification in the tunnels and assure pasteurisation, the aeration system is configured for airflow recirculation and reversal.

Cré members on a site visit to the Waddock site

After two weeks of tunnel composting, materials are removed and placed onto the adjoining ASP system for 8 weeks of curing. Negative aeration is used to pull air down through the composting piles so it can be collected and treated for odour control purposes.

When curing is completed, the materials is then screened and stored for testing. The immediate plan for the compost is to use it on Mr. Waddock's farm, but long term plans include selling the high-quality compost to landscapers, the local authority, contractors and gardeners.

The environmental management systems for leachate and odour represent state-of-the-art in Ireland. Leachate from the tipping area and the tunnels are collected separately and is recirculated into new batches of compost. Leachate from the ASP area is reused in the ASP system as piles are turned and moisture is required to sustain the composting process. All process air from the tunnels and ASP system are combined and forced through a wet scrubber to remove ammonia prior to treatment in a biofilter. Operations at the facility are controlled by a computer system with full HACCP enabled software for ABPR compliance.

Tarpaulin covered tunnels and aeration system

Currently, the facility is supplied with source separated commercial food collected from the Dublin area by Thornton's Recycling. As the volume collected only provides a portion of the facility's permitted capacity, Mr. Waddock is seeking additional source separated feedstock materials. The facility is permitted to take food, green waste, biosolids, food processing residue and animal manures. Tipping fees are €50-100/tonne depending of the type and quantity of material.
Please contact Mr. Waddock at 087 26 20002 or Craig Benton at 086 38 71548 for more details.

On-Farm Organic Waste Treatment Options

There is growing interest in composting and anaerobic digestion as an alternative source of income amongst farmers in Ireland. Organic waste facilities can potentially be located in rural areas where there is usually low-density housing. Changing farm practices can free up farm buildings and machinery with the potential for retro-fitting. Furthermore, farmers are familiar with handling organic materials, and in some cases have a ready-made land-bank for the compost produced.

However there are a number of concerns that have to be addressed in the choice of site, the facility design and the choice of process. In addition, the planning, environmental and agricultural authorisations all have to be secured, each of which has its own challenges.

RPS Consulting Engineers assisted Joe Waddock in the conversion of his farm buildings to a modern composting facility, by preparing planning and waste permit applications. This included baseline monitoring, outline facility designs and process flow diagrams, and considering issues such as access, traffic and environmental protection. Mr. Waddock intends to use the high quality end product on his farmland so Nutrient Management Plans were drawn up by Martin & Rea Agricultural Consultants in support of the applications.

For more information contact: Conall Boland, RPS Consulting Engineers 01 2020870 or E-mail conall.boland@rpsgroup.com

Cré to visit SRS In-Vessel Composting System

Cré have arranged a themed meeting on the theme of Mechanical Biological Treatment (MBT) on 26 January 2006. – see below. As part of this meeting, Cré have arranged for attendees to view an MBT facility in operation - at the Panda Waste facility near Navan. Details of the SRS Composting System at the Panda facility follow.

The SRS composting system uses two-zone, flow-through tunnels, which process biodegradable waste streams in 14 days. Waste streams can include source segregated food waste, green waste, sewage sludge, agri-waste and the biodegradable component of MSW (which can be extracted using SRS Waste Separation System).

The SRS installation that Cré will visit is at the Panda Waste facilities in Co. Meath in May 2004. Panda Waste, installed two in-vessel composting and bio-drying tunnels with a combined processing capacity of nearly 20,000 tonnes of biodegradable waste per annum. Initial plans by Panda Waste are to turn source segregated organic waste as well as the biodegradable fraction of municipal solid waste (MSW) into compost-like output (CLO) with a variety of applications and outlet markets. Commissioning of the technology took place in January 2005.

A1 Waste, Naas, Co. Kildare are currently completing an installation of three SRS in-vessel composting and bio-drying tunnels, due for commissioning in the near future. These tunnels have a combined processing capacity of 28,000+ tonnes and will process a mixture of mechanically separated biological waste and source segregated waste.

The SRS system can be designed to function solely as a 'composter' or solely as a 'biodryer' or, as with Panda Waste in Navan, it can be designed to interchange between both. This allows the operator to switch between bio-drying and composting to produce a product best suited to market conditions.

The main difference between the two functions is the level of biodegradation achieved and the moisture content of the output material. Output from both can be used for 'landfill' applications but bio-dried output is more highly calorific.

Key Features of both installations include:

- Two zones and temperature control, to meet Animal By-Product legislation requirements.
- Bio-filter treatment of exhaust air
- Leachate is recycled within the tunnel
- Automatic material/tray/floor advancement
- Automatic control of airflow, temperatures, moisture and oxygen.
- Mixing within the tunnels, to keep material porous and un-compacted.
- Horizontal design minimising height of the material and facilitating aeration.
- Minimal moving parts of corrosion resistant stainless steel.
- Modular tunnel design of different capacity.

For further information, contact Alan Fallon, General Manager, SRS Ireland on (046) 948 7171 or (086) 3223221.

Cré themed meetings - dates for the 2006 Calendar

Two themed meetings are planned for early 2006.

The Cré themed meeting of 26 January 2006 will address "Mechanical Biological Treatment (MBT) of waste". The venue for the meeting will be the Ashbourne House Hotel, in Ashbourne, Co. Meath. A hot lunch will be provided and the meeting will be followed up with a visit to an MBT facility – at the Panda facility Navan. At this facility, we will view the mechanical element where "fines" are removed from the waste stream and the SRS composting installation, described above, which stabilises the material.

The Cré themed meeting of 9 March 2006 will address the topic "Developing markets for waste derived compost material". This meeting will be held in Athy. Various stakeholders from the retail horticultural sector will attend in addition to producers of high grade composts.

Attendance at themed meetings is free for members and €50 to non-members. If you wish to attend a meeting, please inform Lorraine Herity at info@compostireland.ie.

Please also note the following dates;
4 May 2006 – Annual Seminar. (Venue TBC)
4 July 2006 – AGM. (Venue TBC)

MONITORING MOISTURE IN COMPOSTING

Craig Coker, Vice President Mountain Organic Materials and the Carolinas Composting Council

Moisture is one of the five key elements of good composting that must be managed (along with C/N ratio, porosity, time and temperature). Too much moisture and the composting pile can become anaerobic as water fills the pore spaces meant to convey air. Too little moisture and the micro organisms that make composting work become dehydrated and die off (if there is even enough moisture in the pile to encourage their growth to begin with).

Most references indicate that an initial moisture content of 50-60% is preferred, and the final product should have a moisture content of 35-40%. Moisture content is traditionally determined by the "squeeze test", a non-quantitative method of estimating moisture.

Squeeze test:

1. Reach into the pile and take a handful of material
2. Squeeze the handful of material firmly
3. Release grip and inspect the material in your hand.

Interpretation of results:

- If the material is crumbly and doesn't stick together, and your hand is dry, it is near 40% moisture or less.
- If the material sticks together, and your hand is moist, the material is around 50% moisture
- If the material sticks together and drips, and your hand is wet and dripping, the material is near or above 60% moisture. With practice you can distinguish 55% moisture, from 50% and 60% moisture

More accurate means of measuring moisture content exist. The most frequently used method is a "gravimetric" procedure of weighing samples before and after the water is removed. The basic concept of this procedure is: A sample of the material is weighed to determine its wet weight (minus the weight of the container). Then the sample is dried to the point where all or nearly all of the water is evaporated and the sample is weighed again. This weight (minus the weight of the container) is the dry weight. The difference between the wet and dry weights is the weight of the water that the sample originally contained. Dividing the water weight by the wet weight gives the moisture content as a fraction. This type of calculation is known as the "wet basis", or: % Moisture = [100% x water weight (g)] / wet weight (g)

Weight Test

Equipment: Weigh scale, Microwave oven, Paper plate

1. Weigh paper plate and adjust scale to tare out at zero.
2. Weigh out 100 grams (g) of sample.
3. Place sample on a paper disposable plate.
4. Put sample on plate in microwave oven. Turn power level down to 50%. Cook sample in microwave for four (4) minutes.
5. Take sample and weigh sample and plate. Record weight.
6. Place dish in microwave for 2 more minutes of heating.
7. Reweigh the sample.
8. Repeat Steps 6 and 7 until the weight of the sample and the plate stops changing.
9. Subtract final weight from 100g (the weight of the original sample). This is the weight of water evaporated.
10. Multiply by 100 to get moisture content percentage.

Example:

If following the procedures above, the final weight is 43.0 grams.
Weight of original sample = 100.0 g
Weight after drying = 43.0 g
Weight of water evaporated = 57.0 g
Moisture percentage: 57.0 g = 0.57 x 100 = 57.0%

The primary pitfall in this gravimetric procedure is the loss of volatile compounds in the compost during drying. This can be minimized by the drying procedure used. Drying methods include air drying, oven drying at various temperatures, and microwaves. Microwaves are the quickest and most convenient but also the least accurate. Air drying is slow but most accurate if the material is not actively decomposing. Oven drying is the middle ground and tends to be the standard.

The EPA standard method for determining moisture content is to dry the sample in a vented oven at 103 to 105° C (217 to 221°F) until the sample stops losing weight. The method adopted by the U.S. Composting Council's Test Methods for the Examination of Composting and Compost requires oven drying at 65 to 75° C (149 to 167° F) until no change in weight is observed. As the temperature range in the EPA method is above the boiling point of water, drying is relatively quick (1-2 hours). At the TMECC-recommended procedure, drying may take one or two days. The advantage of the lower drying temperature is to minimize the loss of volatile compounds.

Determining moisture content for the purpose of managing the composting process (as opposed to regulatory reporting of metals concentrations, for example) does not require great accuracy and precision. Therefore, drying samples in a microwave oven is usually good enough, in addition to being fast and convenient. Drying time depends on the power of the microwave, the size of the sample, and the initial moisture content. As an example, starting with a 600-watt microwave (or a more powerful one set at a lower "cooking" level) and a sample of 100 grams (3.5 ounces), heat wet samples (50-80% moisture) for six to eight minutes and dry samples (20-40% moisture) for four to six minutes. Remove the sample, weigh it and place it back in the microwave oven, rotating its position 90 degrees (unless the microwave has a rotating platform). Heat the sample again for two minutes, weigh it, and return it to the oven, rotating it another 90 degrees, in the same direction. Repeat the procedure at one-minute heating intervals until the weight change is less than one gram. Scales used for weighing samples should be accurate to 0.1 gram.

Moisture sensors are now available that measure some quickly-measurable property of the material, such as electrical conductivity, electrical resistance, or the dielectric constant. One drawback to these tools is the influence of soluble salt levels on electrical characteristics of the material (with the exception of Time Domain Reflectometry, which measures the dielectric constant). Another drawback is that precision and repeatability are not as good as they are with standard gravimetric procedures. The key advantage of these instruments is that they allow quick determination of moisture variation within and across a compost pile or stored finished compost product.

Many thanks to Craig Coker for permission to reproduce this article. If there is a topic that you would like the Cré newsletter to cover, please let us know at info@compostireland.ie. Also please use the same contact if you have a relevant article that you would like published eg new facility, facility developments, projects etc.