

SOUTH ISLAND ORGANIC RECYCLERS TRAINING & DISCUSSION (SORT) GROUP –GETTING ORGANICS SORTED DOWN SOUTH

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Introduction:

One of the key points emerging from the 2003 WasteMINZ conference was that, “The way forward for organic diversion in New Zealand involves all stakeholders working in partnership to identify and remove roadblocks to the beneficial use of organic waste”¹ (Purchas, 2003 p.7). This proved to be prophetic in that shortly afterwards, South Island organic recyclers along with Zero Waste Academy (ZWA) began brainstorming on how the need for practical knowledge, skill development and support for existing (and prospective) organics recyclers could be facilitated. A steering group thrashed out the initial concept of a South Island Organic Recyclers Training and Discussion Group (known as the SORT group) and has now organised two gatherings of organic recyclers from across the South Island.

Central to this concept was the creation of a user friendly forum where practitioners can learn about the technical and managerial aspects of organic recycling, whilst providing an opportunity for questions, ideas sharing and discussion around the context of site visits to various operations.

A great deal was learned from the SORT group’s inaugural gathering, whose focus was the fully integrated putrescible and greenwaste collection and composting system (utilising VCU technology) located in Twizel. This event was hosted by the Mackenzie District Council. The subsequent discussion confirmed the need for ‘meaty’ technical information that is immediately applicable to the ‘real world’ and established plans for the next event.

The second SORT group meeting was held in Ashburton in association with the Winter Waste Festival and was hosted by the WasteBusters trust. In this instance the sites visited were:

1. Ashburton Meat Processors which utilises vermi-composting to treat paunch and other organic wastes.
2. WasteBusters composting operation at the Ashburton Resource Recovery Centre including practical demonstrations of temperature, pH and ammonium testing.

These visits were followed up by the following presentations:

1. Dave Hanan, (Delta Utilities, Dunedin) who presented an ‘Overview of Composting Technologies’. This focused upon the various commercially available systems and included coverage of key issues needing to be taken into account when designing an operation.
2. George Fietje, (Technical Manager at the Living Earth Company) who addressed the subject of compost labelling, branding and marketing.

Already planning is underway for a 2005 series of meetings, which will address a range of topics of priority interest to this group of South Island organic recyclers. As further meetings are held The SORT group strategy will continue to be developed by ongoing discussion. The core objectives are to assist (self-help) the industry to improve operational standards, through increased knowledge and practical skills and improve communication and cohesion over issues

¹ C. Purchas, MfE (2003)

of common concern. In as much as these initiatives represent the disassembly of the roadblocks for organic waste diversion sustained out of beneficial use, then it is hoped this will contribute to achieving the targets of the New Zealand Waste Strategy (NZWS) 2002.

SORT group meeting # 1:

Background Information: The site tour was at the Twizel Resource Recovery Park (RRP), which provided an overview of the composting operations of the Mackenzie District Council.

MACKENZIE DISTRICT	Existing	Proposed
Home Composting	Promotion through Education Programme aimed at schools and adult residents.	Continue as at present.
Kerbside Collection	Have 3 bag kerbside collection. Green bag is for compostables. Used by about 30% of residents.	Continue as at present and investigate possibility of using biodegradable bags.
Commercial Collection	All commercial collections of organic waste (garden greens and putrescibles) are delivered to the Resource Recovery Parks.	Maintain the status quo.
Resource Recovery Parks (RRPs)	600 tonnes/yr cleanly separated garden waste is accepted at the 3 RRP's within the district from both private and commercial sources at \$5-00/m ³ . 268 t/yr separated putrescibles are likewise accepted at \$90-00/t.	Ensure good separation is maintained and develop market for excess mulch (i.e. for shredded greens not required for composting).
Processing	360 tonnes of high grade screened compost produced annually using 25 m ³ vertical in-vessel composter from all putrescibles received plus approx 50% of green waste.	During the high summer season, VCU is running at capacity. Will have to assess how to cope with greater quantities of putrescibles especially if growth in tourism continues along current trends.
Markets	Compost currently sold in bulk and in bags from RRP's. Full extent of the existing market has not yet been established. Spring 2004 will reveal if demand exceeds supply or vice versa.	Promote sales, develop market and educate public in benefits of using compost, how to do so and the assessment of compost quality.
Research	Investigating the use of EM and topical deodorisers as well as variances in processing techniques. Assessing biodegradable plastic bags.	Continue current research if necessary and investigate ways of increasing efficiency.
Public Information	Dissemination of information and educational initiatives regarding home composting, worm farming, need to separate well, VCU composting and the wide benefits of using compost.	Continue with a variety of approaches and methods to keep the message fresh.
Strategies	Adopted Waste Management Plan in October 1999.	Continually review performance and adapt to changing circumstances.

Table 1: Overview of the Mackenzie District Council Composting System.

Overview of the Twizel RRP site tour:

The Twizel composting operations begin with greenwaste (GW) shredding using a 'RIPPER' which is contracted in from owner and operator Delta Utilities in Dunedin contact: www.4delta.co.nz Contracting in the RIPPER's services is a cost effective and efficient arrangement for small operations. The RIPPER copes with stumps and large branches as well as stockpiled mixed and dirty waste paper. One negative is the hazardous flying debris which erupts from the shredder rather unpredictably. The inclusion of waste paper as an input to the

shredding and ultimately the composting process, added desirable dewatering and bio-filtering properties to the ensuring mix and enables this commodity line (when the price falls and is uneconomic to send to market) to remain on the list of those diverted from the landfill. Whilst it has been said that “daily shredding and introduction of material into the composting process was biologically more desirable”, this was practically and financially impossible for the Twizel operation.

The positive of storing the material for periodic shredding was that the dry GW material shreds more efficiently and once shredded has improved dewatering and de-odourising properties as an amendment for putrescible composting. It was noted that the inflow of GW material was highly seasonal and had differing ebbs and flows to those of putrescible waste, so having a stockpile of shredded GW provides an element of resilience to process. The resulting mix of coarse and fine shredded material can be controlled by the insertion of screens in the shredder. In the instance of the VCU it was determined that coarse material was necessary to ensure the vertical air flow upon which the system relies. The negative of this was the high proportion of oversize material (approx 40%) screened out at the end of the composting process. In Twizel’s case this was stored and subsequently re-shredded and re-introduced into the process. This represents double handling and added expense.



Figure 1: The input hopper - Twizel VCU

Figure 2: The Ripper with VCU in background

The Twizel RRP acts as a depot for recyclables drop off, handling and storage (not featured) as well as garden greens and putrescibles. Up to 6 m³ of putrescibles can be temporarily stored in the hopper (Figure 1). From here the material is augured up into the macerator. This hopper is also the first stage venue for the contents of the green organic bags collected in the kerbside collection system. As noted above about 30% of residents utilise this service. The others use home composting, drop off garden waste and putrescibles directly at the RRP themselves or do not participate. At the RRP the green waste is simply stockpiled to await shredding. Of the bags collected only 2% are rejected, indicating an appreciation by the community how important it is to provide uncontaminated putrescibles. Mackenzie District Council has utilised the following media to communicate key messages regarding the need to separate waste: flyers in existing mail-outs (such as rates letters), community newsletters, seasonal postal drops (i.e. for holiday makers), newspaper notices and where necessary non-compliance visits by the Council Education Officer.

Odour is a critical issue at this first putrescible drop-off stage. Twizel’s operators work with both the key bulk users to ensure that the material is not too offensive when it arrives (i.e. this can be mitigated by layering it with bio-filter material such as sawdust) and is experimenting with Effective Micro-organisms (EM) which can be mixed into putrescible material to act as a deodorant. It was noted that in New Zealand odour is going to increasingly become a common issue as communities move beyond greenwaste to tackling putrescibles. As a contingency,

Twizel had at times simply layered extra putrescible material into stockpiles of shredded greenwaste on the concrete pad. This flexibility was deemed essential given that Twizel's population can multiply ten times in the summer season from its norm of 1100. This was an effective short term measure to overcome any immediate potential odour problem with putrescibles in excess of the hopper capacity. The issue of odour has real potential as a topic where research can assist in deriving solutions to this 'real world' problem.

It was noted that the storage of putrescible material can be problematic for reasons other than just odour. Some material liquefies rapidly and others have an extremely high angle of repose in the hopper. Additionally, it should be noted that the putrescible material can vary between extremes of starchiness to oiliness, depending on the foodwaste component. This can make moving the material problematic. This needs to be addressed by ongoing research and design improvements. The key point to emerge was the need for the developers of highly engineered solutions (such as the VCU) to be in close communication with those involved in day to day operations.

The next step is macerating the material which reduces it to a uniform particle size which increases its contact with the shredded green waste subsequently added and blended as an amendment. In this system the macerator was extremely robust and relatively problem free. (Figure 3, NB: augur tube feeding into small hopper which feeds the macerator)



Figure 3: Macerator & mixer

Figure 4: Mixer unit.

Figure 5: Discharge to VCU.

The blending hopper (Figure 4) is where the shredded greenwaste (NB: the coarse texture of this material) is added using a front end loader and batch mixed prior to discharge into the top of the VCU (Figure 5). At the top of the VCU a rotor spreads the mixed material (now a blend of shredded greenwaste and macerated putrescibles) into the top of the composting chamber.

Some further observations were:

- The mix ratio of the input blend is critical to ensure adequate upward ventilation of the chamber and the avoidance of excessive leachate. In practice the amount of greenwaste actually used per unit of putrescibles is higher than originally recommended.
- The rotor spreads the material in a circular pattern into the square chamber so disparities in density, hence airflow, and temperature may result.
- Lime is added in the blending process to increase the pH. Without this, the putrescibles produce an acidic compost.
- Operator training and knowledge is critical and can be the difference between successfully managing the many operational variables and avoid problems.
- The process time in the VCU is between 7-10 days up to 2 weeks (season dependant) after which, the material is discharged into static piles for a maturation phase.

- The site has been constructed to drain into a subterranean tank which can be pumped to replace lost moisture in the maturation piles, or if necessary discharged into the waste water treatment system.
- The maturation piles are periodically screened on a contract basis by a machine from Oamaru. As with the shredding, contracting in services is a cost effective approach that works well for MDC.
- The final product is sold both in 40 litre bags for \$4.50 (using recycled sacks) and in bulk.
- One of the biggest challenges to the operation is not technical, but from encroaching housing development, which has given rise to reverse sensitivity issues.

Overview of training and discussion phase:

1. David Hanan, (Delta Utilities, Dunedin) profiled quality management system resources that had been developed for use within Delta's composting operation. Delta have made this resource available for utilisation by SORT group members. This has since been followed up by further sharing of QMS resources in the form material circulated by Gill Pontin (previously CCC Compost Manager). It appears that there is significant potential for the development of a generic 'New Zealand Composting Manual.' This could include the code of practice incumbent upon those operations whose production seeks to meet the impending NZ compost standards.

2. Chris Purchas, Senior Advisor, Sustainable Industry Group, MfE.

Chris provided update material relating to the following areas of his focus: Namely; the development of standards for compost in NZ, research into the benefits of compost use, particularly for ag/hort applications, identifying appropriate treatment/processing options and recognition of NZ initiatives and explore ways to coordinate efforts.

3. A brief update was provided about the development and publication of a manual entitled "*Guidelines for the safe application of Biosolids to land in New Zealand*". This work is being coordinated by Charles Willmot of MfE / NZWWA in conjunction with a project management steering group.

4. A brief update was provided into the development of Industry Training relating to zero waste and organic recycling. 'EXITO' has been confirmed as the ITO with coverage for "*waste metal recovery, resource recovery, waste management (excluding water), recycling, and zero waste industry*".

5. Information was conveyed on behalf of Ian Mason, regarding the initiatives and research at the University of Canterbury. This is available on the UoC composting web site <http://www.canterbury.ac.nz/compost>

6. A number of valuable, web-base sources of information were outlined and demonstrated in the form of a 'virtual' tour. In particular the Cornell University website was explored, which contains a number of inbuilt management tools such as calculators which enable an operator to estimate (without having to do the complex calculations) things such as the resulting moisture content or C:N ratio.

http://compost.css.cornell.edu/Composting_homepage.html

Sort group meeting # 2:

This was hosted by Wastebusters Trust and was held in Ashburton in August 2004 in association with the Winter Waste Festival. It consisted of two site tours followed by two presentations

1st Site Visit - Ashburton Meat Processors Worm Farm

As part of working towards zero waste, Ashburton Meat Processors investigated alternative on-site treatment options for paunch, hair, various other meat processing wastes and blood contaminated paper and decided to set up a worm farm. The first step was the construction of worm beds (shallow windrows approximately 200 m long). These were excavated in the form of a shallow scrape with the associated spoil forming bunds along each side. The worm beds are covered with black plastic secured with tyres to give protection from wind and birds.

Initially ½ tonne of worms (mainly juvenile) were purchased from a commercial supplier in order to establish the first of the worm beds. The beds have been measured with a temperature as high as 35°C, but on the day of the visit were 8.1°C. It was noted that as the worms break down the material the volumes greatly decrease, which enables the beds to be replenished with further additions of waste material. The solid waste from the processing plant is separated from the waste waters via small milli-screen apparatus and stored in concrete bunkers on a daily basis (see figures 4 & 5). The waste water is irrigated into pastures adjacent to the worm farm.

Before being fed onto the beds, the waste solids are batch mixed with gypsum (from ground recycled Gib board) and horse manure and left for 24 hours. Horse manure is imported as a complimentary bulking agent. It contains large amounts of worms and worm eggs and helps dry the excess moisture from the paunch. Additionally, the operator is experimenting with shredded cardboard, paper and greenwaste and also sawdust as feedstocks. These materials present further recycling options which also manage excess moisture. It appears the worms readily consume the paper, cardboard, and in time the sawdust. Whole cardboard is placed between the rows to help suppress the weeds.



Figure 6: Examining the worm beds



Figure 7: Waste solids separation

A specialist machine (A Shelborne Reynolds 'Powermix'- pto trailer batch mix / discharger from the UK) has been purchased by Ashburton Meat Processors to batch mix the various waste materials. It has a discharge feeder which enables the final mix to be discharged onto the worm beds as the unit is towed behind a tractor. This will save considerable time and energy.

Currently, new beds are being added so that the facility will be able to handle 3-4 tonnes of food waste per day. In the long term the operation is aiming towards the construction of purpose built raised beds and selling vermicast compost. An interesting aspect of this operation is the utilisation of Effective Micro organisms (EM) for the suppression and control of odour on the site. This inoculum is brewed on site and is both administered via a backpack sprayer as well as being directly injected into the rinse water used in the milli-screen



Figure 8: Storage and mixing bunkers



Figure 9: Covered worm beds

2nd Site visit – WasteBusters Composting Facility

At the beginning of 2004, WasteBusters took over the administration and running of the Ashburton composting facility. Their top priority is to up-grade the site where green waste is currently composted in windrows. In-coming material is shredded by a contractor using a Willibald shredder, static piled for a short period, put out in windrows and regularly monitored as to its temperature and moisture content. Depending on progress, it is periodically turned and after about four months, is finally screened in batches by the same contractor. It is then sold either in bulk or in bags. With only eight months operation under their belts, WasteBusters have still to fully gauge volumes and seasonal variances.

While on site, Dave Hanan gave a practical demonstration of the use of a temperature probe, in-field pH measurement and testing ammonium levels using a Solvita kit. He emphasised the importance of using reliable scientific methods to measure these parameters, which indicate the extent to which the decomposition has progressed and the quality of the compost. Good process monitoring is necessary to produce a consistent and high quality product.



Figure 10: Dave demonstrating compost testing procedures. Figure 11: “Getting it SORT-ed”

Overview of training and discussion phase:

1. Dave Hanan presented an overview of composting technologies based on a desk top study undertaken for organic waste management in Dunedin. He pointed out the importance of first undertaking a waste analysis. In Dunedin, over half the total waste stream is compostable. If it is composted or digested, the capacity of the landfill is greatly extended and an income from the products is generated. In Dunedin, the compostable organic waste consists of sewage sludge, household putrescible waste, commercial putrescible waste and green waste. Of particular importance in the Dunedin context is; odour control, increasing sludge volumes and increasing volumes of meat processing waste and industrial organic waste. The current practice of composting green waste in windrows cannot be extended to include these putrescible wastes and in-vessel will have to be adopted. For more info contact: david.hanan@4delta.co.nz

The pros and cons of the following options were discussed:

- Horizontal in-vessel systems, e.g. Rotocom and HotRot.
- The in-building Air Lance System.
- Vertical in-vessel systems, e.g. VCU.
- In-bag systems, e.g. Ag-Bag's EcoPOD
- Co-mingled waste composting, e.g. the large scale Bedminster system.
- Anaerobic digestion to produce usable methane.

2. George Fietje is the Technical Manager of Living Earth Ltd (LEL) and he spoke on the branding and marketing of compost. LEL is NZ's most prominent organic recycling company and operates in Auckland, Wellington and Christchurch. Using biowaste (organic waste including greenwaste, biosolids from waste water treatment, food waste, bark and wood fibre) it produces high grade compost and potting soil. Of all the many issues facing organic recyclers, such as odour and not having control of the inputs, George rates marketing as the biggest challenge.

In 1994, Living Earth initiated a market research program, the result of which was the launch of the 'Living Earth' brand. Part of this program included funding an independent analysis of the KPI of the 13 leading compost brands available in the Auckland region. This demonstrated that not only were LEL products, derived from recycled greenwaste, of high quality but that unfortunately there were some extremely low quality composts on the market.

The company has since run numerous focus groups aimed at developing a deep insight into the market, both home gardeners and latterly the agricultural sector. One of the key outcomes was the commitment to production of verifiable 100% weed-free compost. George estimates that LEL has invested, through a combination of media and radio advertising, television sponsorship, and promotion at key events such as the Elleslie Flower show, point of sale 'guide to great gardens' leaflets, and an 0800COMPOST support line, over \$500,000 in the first 3-4 years to create the Living Earth brand. Additional amounts have been spent on research on issues such as clopyralid herbicide residue.

Living Earth pricing has been based on offering good quality at a realistic price of approximately \$65/m³ for compost, which directly contrasts to the short term cut price approach taken by other brands. Living Earth's considerable experience has shown that future home garden market development is 'population' based and hence intrinsically linked to the indicators such as the housing market and immigration.

Since 1994, Living Earth has achieved a market increase from 18,000 to 55,000 tonnes in Auckland, but predicts future growth will only be sustained by breaking into the rural market. There is considerable evidence, in terms of improving the physical (aeration, drainage, water holding and aggregation), chemical (nutrient availability and resistance to leaching) and biological (increases in beneficial micro fauna and natural organic disease suppressant properties) properties of compost to support its use as a supplement to soil low in organic matter. Agriculture and Horticulture have not traditionally used compost products and Living Earth has developed a specific strategy to promote a paradigm shift away from the norm of sole chemical fertiliser application to using their compost products.

This strategy includes identifying and building long-term working relationships with key growers, researching the business case for compost application and utilising authoritative industry publications to advance this cost benefit analysis. In every respect there appears to have been few shortcuts in the attainment of LEL's market experience nor much alternative to

the significant financial investment required to build and maintain their premium brand, which is based upon the creation of associated confidence, quality, value, credibility and trust in the minds of their consumers.

Where next for the SORT group? Conclusions:

The initial sort meetings have attracted solid attendance and received encouraging feedback and positive direction for future initiatives. The intention is that SORT will hold between 3 -5 meetings a year, choosing different venues around the South Island, enabling participants to see different operations and share in the hosting of meetings. The aim will be to keep the cost of events down so as to maintain a low threshold for participation. SORT will look to combine with other waste sector meetings such as the WasteMINZ conference and Ashburton Winter Waste Festival. Meetings in Kaikoura, Dunedin and Christchurch are planned but yet to be finalised.

The participants have jointly compiled a list of key subject areas they want to see addressed. These topics are being prioritised, linked to available expertise in New Zealand and moulded into a structured programme for future events. The key topics are:

- Programme design and development.
- Determining some generic NZ parameters for materials type and handling,
- Discussion of joint marketing cooperatives,
- Bag graphics and point of sale information,
- Quality standards and operational guidelines,
- Determination of generic testing and sampling procedures aimed at increasing accuracy and reducing cost,
- Planning strategies for odour control,
- Dealing with issues / conflict and the cultivation of community support,
- Financial parameters,
- Relevant overseas learning resources and related activities,
- Site development and consenting issues,
- The development of voluntary industry accords
- The development of feedback to government as to how they can best assist industry in the implementation of the NZ waste strategy
- Issues and opportunities related to biodegradable plastics.
- Registration along with the development brief operational description of all NZ organic recycling practitioners.

In as much as this list is representative of the collective immediate practical concerns of the South Island organic recycling industry, it confirms and expands upon previous findings,² which identified; source separation, odour control, disinfection of pathogens, the need for further research in the NZ context and noted a shift away from the treatment paradigm to one of production of environmentally beneficial products. Additionally this consensus provides further detail and insight to the so called “road-blocks”³ facing the industry and community attempting to address the targets of the NZWS.

The SORT group represents a quantum increase in the cohesion and cooperation within the organics sector and is an example of a classic Kiwi get-in and make-happen initiative. As an example of self motivated industry development, SORT’s evolving concept and communication may contribute answers to the; “question for the Ministry for the Environment

² I. G. Mason, M. W. .Milke (2003)

³ C. Purchas MfE (2003)

(MfE) and waste industry as a whole is how to get the best environmental outcome through effective management of waste?”. Additionally, SORT may well provide the genesis of a workable mechanism for MfE to outwork initiatives commensurate with its role. One opportunity being to assist the proliferation of knowledge, skill and professionalism of the industry who is in effect the ‘arms and legs’ of its strategy, in respect of organic waste.

At the WasteMINZ winter workshop this year, the ZWA, in conjunction with the MfE, facilitated a steering group meeting of North Island organic recyclers. The question posed at this meeting was, can the many positives emerging from the SORT experience find application in the more commercialised North Island scene? This drew somewhat of a mixed response. It is observable that the North island scene contains operators who are larger, more established and have an advanced experience of ‘getting down to business’.

Both MfE and WasteMINZ were identified as having the potential to play key roles in moderating a ‘common national industry-wide interest’ in development whilst bridging the disparities between strictly commercial and broader community imperatives. Respectively, this might be achieved by; WasteMINZ through its interest group structures, (with whom the SORT group has registered and identified itself) and MfE, through their activity alongside “compost producers and Standard New Zealand to look at the development of a New Zealand Standard for compost under the Standards New Zealand framework”⁴. Chris Purchas reports that the “key drivers for the development of a standard are: 1 -There is no existing, widely accepted standard for compost in New Zealand. 2 -The sale of sub-standard compost has the potential to adversely effect markets for all compost in New Zealand”. Notably this process includes the formation of an 'expert committee' to oversee the development of standards. It appears likely that this process would benefit from some form of representation and line of reporting to the SORT group. There is little doubt that the quality assurance provided by a 'NZ compost standard' is in the long term best interest of the 'consumer', and hence has the potential underwrite 'producer' (i.e. the NZ organic recycling industry) development and one hopes ultimately, progress on implementing the NZ Waste Strategy.

If the proposed NZ compost standards are to establish the goal-posts, then a significant additional challenge will be to invest equal effort and resources be put into a program of capacity building and professional development that will empower the achievement of these proficiencies. A balanced strategy which resources 'standards setting' alongside 'standards achievement' would appear to improve the opportunity for those currently least equipped (i.e. smaller / isolated communities and newer composting operations) to make the jump into a quality management systems (QMS) which in reality will be a pre-requisite to the achievement of resultant product standards.

References:

Purchas, C. (2003). Removing the Roadblocks to the beneficial use of Organic Waste. WasteMINZ conference proceedings.

Mason, I.G., Milke, M.W. (2003). Current Issues in Source Separation, Treatment and Utilisation of Food Residuals. WasteMINZ conference proceedings.

Purchas, C. (2004). WasteMINZ workshop presentation

⁴C. Purchas MfE (2004)