

## Operational Procedures – HotRot Composting Facility

The following generic procedures are offered for guidance only; site specific operating procedures should be developed based on the type of waste being processed, collection and handling procedures and requirements to maintain or determine compost quality. The following procedures are a recommended minimum and should be adhered to so as to ensure efficient composting is maintained and that compost produced is safe for use.

### **Waste/Product Segregation**

Waste and product (compost) must be segregated. Waste may not be stored in close proximity to product. The general design of a HotRot composting facilities has waste entering an area where it can be inspected and shredded as appropriate. Waste should be stored in closed containers (skips or wheelie bins) or the fully enclosed feed hopper/s.

The HotRot unit is a horizontal, flow-through system, waste enters one end of the unit via the enclosed feed hopper and feed auger's (or bin-lifter) and is discharged from the opposite end of the vessel as compost. In-feed and out-feed are spatially separated; this separation is further enhanced through the inclusion of a temporary product storage bunker or shed.

### **Health and Safety**

Health and safety procedures relating to plant operation are detailed in the operational and maintenance manuals provided with the equipment.

Certain wastes, especially sewage sludge, nappies and incontinence products and animal wastes may contain bio-hazardous materials. Operators must have up-to-date tetanus and hepatitis vaccinations as a minimum. Visitors must be restricted from the shredding area during shredding periods (see also cleaning).

Operators must practice good personal hygiene, making sure to wash hands before handling food. Any cuts and abrasions must be cleaned and bandaged immediately. Aerosol masks and disposable coveralls should be available to wear.

Material must not be left on the floor or create a tripping or slippage hazard. Wet food, sludge and other materials may be slippery, any spilt material should be cleaned up immediately.

### **Cleaning**

As indicated above, floors should be kept clean and tidy and any material spilt on the floor should be cleaned up using a brush and shovel; minimise the use of wash-water and do not use a hose a broom!

Waste conveyors and shredders should be kept clean and tidy. Shredders can be cleared of waste materials by passing through a quantity of paper or cardboard (old phonebooks are ideal). It is also recommended that the conveyors and shredders used with corrosive materials are sprayed with a mild alkali detergent periodically to aid cleaning and minimise any potential corrosion.

## ***Product Handling***

While the HotRot composting system is a continuous process, product should be handled or considered in batches. A product batch will normally consist of 1 week's production from the composting system.

Product discharged from the HotRot system should be transferred from the temporary product bunker or skip to a batch storage pile. This initial storage pile will be made up of product produced over a 7 day period. A batch will remain segregated until testing or monitoring has proved it safe for release for screening and/or use.

## **Process Monitoring**

Process monitoring is used to ensure the composting process is stable and product safe for use. HotRot is a high efficiency composting system where the focus is on the composting process not the attainment of excessive temperatures; which in themselves may be detrimental to efficient composting. By default, efficient composting will result in a safe product as has been demonstrated by independent testing.

### ***Daily Testing and Recording***

The following tests should be carried out or data recorded.

#### **1 Waste materials:**

- Record quantity of all waste products received on site. Note source of any new or unusual wastes.
- Record quantity of waste added to the HotRot feed system; and dewatering system if supplied.

#### **2 Amendment/Bulker:**

- Record the quantity of any additional bulker/amendment added to the composting or dewatering process.

#### **3 General Process:**

- Record the total mass of material added to the HotRot feed system.
- Test, using a "hand-squeeze", the moisture content and structure of a representative sample of material in the feed system.
- Test, using a "hand-squeeze" the moisture content of material taken from the first hatch of the HotRot unit/s.
- If either of these tests highlights a concern, repeat the test using a moisture balance and adjust the feed mix as necessary.
- Record the temperatures from all six temperature probes and the exhaust air probes for all HotRot units in operation. It is recommended that this is done on one sheet of paper with a new line for each day so that the current day's temperatures can easily be checked against previous day's values.

By recording moisture contents and quantities of wastes and amendments the operator will be able to determine quickly if any changes in the amount of amendment is required to ensure a suitable mix for efficient composting.

Daily manual recording of temperatures encourages the operator to review temperatures from previous days, allowing early detection of potential problems. While these temperatures are recorded by the system automatically the manual act of writing the numbers down forces the

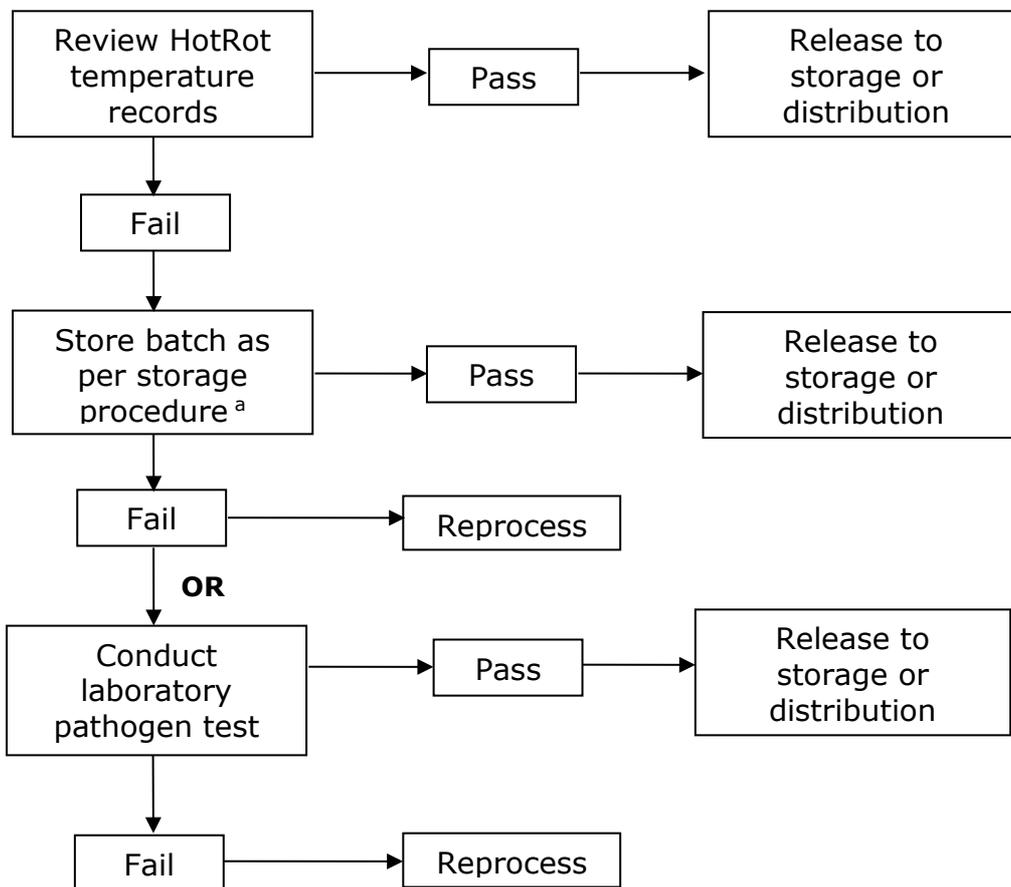
operator's attention. It is stressed that temperatures are an indicator and trends rather than absolute values are most important.

### **Weekly/Batch testing**

In addition to a review of compliance testing (see below), it is also recommended that a representative sample of each batch is assessed for moisture content using a moisture balance. This information is used to assess the materials suitability for screening and may also provide added information on process performance.

### **Compliance Monitoring**

The HotRot composting system is fitted with a series of temperature probes along the length of the unit. However, due to the systems efficiency and focus on composting performance traditional time-at-temperature guidelines do not apply. Independent testing has shown that as long as any 2 of the HotRot unit's adjacent temperature probes<sup>1</sup> are above 50°C (122°F) then the product can be expected to meet the pathogen limit standards contained in the "Guidelines for the safe application of Biosolids to land in New Zealand", AS/NZS 4454 or USEPA rule 503D.



<sup>a</sup> See "Storage Procedure" below

Product that is discharged from the HotRot system is kept as a separate batch (see above) until the assessment outlined above has been complete.

<sup>1</sup> This means probes 2 and 3, or 3 and 4, or 4 and 5, etc.

## ***Storage Procedure***

The storage procedure to be used for a batch that fails to meet the temperature standard within the HotRot system shall consist of the following:

- Temperatures within the storage pile shall be monitored in at least four positions using a hand-insertion probe.
- After three successive days where the average temperature of the four readings is 55°C or greater the pile shall be turned using a loader.
- Temperatures will be again monitored and after a further 3 days at 55°C or greater the pile shall be turned once again.
- Temperatures are then recorded and if the pile achieves 55°C or greater for a further 3 days the product shall be deemed to meet the requirements for pathogen elimination.

If the batch fails to comply with the above procedure the product can be tested by a laboratory for pathogens or reprocessed through the composting system.