PLATE 10
CAKE SPREADING

1. Suitable for the following sludge types:
- lagoon stabilised
- anaerobically digested
- aerobically digested
- ATAD
- dual digested
- WAS from IDEA, CAS, BNR or EA (not preferred)
- Lime stabilised sludge

2. Dewatering requirements:
- minimum 15% dry solids content
- higher solids content will reduce volume and transportation and handling cost

3. Stabilisation requirements:
- anaerobic or aerobic stabilisation preferred
- ATAD and dual digestion process highly suitable
- aerobic stabilisation for WAS from IDEA, CAS, BNR or EA preferred

4. Process description
Spreading of dewatered biosolids is practiced worldwide. While dewatered biosolids has little saleable value, it is sought after for its soil conditioner and low quality fertiliser value with slow nutrient release characteristics.

Application of dewatered biosolids to land is similar to land application of semi-solid animal manure. The most common application method is the use of tractor mounted box spreaders or manure spreaders. The spreading in agricultural applications is usually followed by ploughing or discing the biosolids into the soil. If private farmers are allowed to spread dewatered solids to their lands it holds an advantage because they can use their own existing equipment. Land spreading of dewatered non-stabilised WAS has a potential to be odorous.

This method of application is also preferred for lime stabilised biosolids (see Conventional Lime Treatment, N-VIRO^{TM} Soil and RDP Envessel Pasteurisation).

The application rates to land is determined by factors which include:
- soil type and characteristics
- contaminants in the biosolids (mainly metals)
- concentration of nitrogen in biosolids (run-off into surface streams and percolation into groundwater is undesirable)
- origin and composition of the biosolids
- rainfall
- crop or vegetation nutrient requirements - specifically nitrogen

While application rates are site specific typical annual agricultural application rates are estimated between 12 and 22 dry tonnes/hectare.

Storage of dewatered biosolids at origin or at the application site is important during periods of wet weather.

5. Biosolids Classification **(EPA Victoria Draft (2002) Guidelines for Environmental Management)**
The biosolids classification is dependent on the stabilisation process used independent of the origin of the sludge. The higher degree of stabilisation and pathogen reduction is likely to be the preferred pre-treatment.

Method	Class	EPA Victoria Draft (2002) Requirements
Soil Injection ATAD Digested	T1	None specified
Soil Injection Anaerobically Digested	T3	None specified
Soil Injection Aerobically Digested	T3	None specified

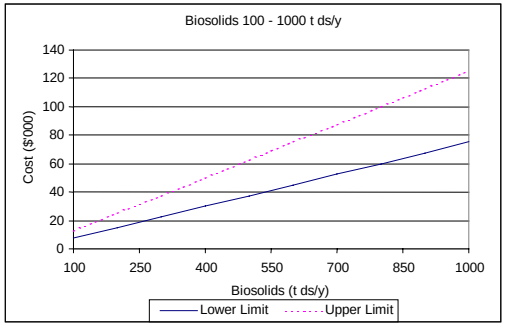
6. Market for final product
Land application in mainly agriculture, forestry and land rehabilitation. The application and application rate will depend on biosolids classification and soil structure and plant requirements.

7. Benefits
- low or no capital cost (operation can be contracted out)
- moderate operating cost
- valuable soil conditioner and low grade fertiliser

8. Limitations
- storage of dewatered biosolids required during wet seasons

9. Costs (Cake spreading)
Cake spreading is typically contracted out. Spreading onto agricultural land will be less costly than in forests mainly due to easier access. A typical contract cost, excluding transport cost to the application site (that is the cost of application only), would vary between $15 and $25/m^3. The basis for the cost curves is an agricultural application at 20% dry solids content.

Contract cost per annum. Costs ($'000)
[100 – 1 000 t ds/y]



10. Product sale
The price of the biosolids produced is expected to be relatively low compared to compost because the solid content is low which is a fraction of that of compost. Hence the price is estimated at approximately $10/m3. The sale of the product can be used to off set part of the processing cost for the sludge.

Contract cost per annum. Costs ($'000)
[1 000 – 3 000 t ds/y]