PLATE 5
LIME STABILISATION:
RDP Envessel Pasteurisation

1. Suitable for the following sludge types:
- untreated primary
- lagoon stabilised
- anaerobically digested
- aerobically digested
- Dual digested

2. Dewatering requirements:
- minimum 15% dry solids content
- higher solids content preferred

3. Stabilisation requirements:
- none required
- anaerobic stabilisation preferred
- aerobic stabilisation for WAS from IDEA, CAS, BNR or EA preferred

4. Process description

4.1 Lime Stabilisation in General

Lime stabilisation is carried out by mixing lime (quick lime, CaO or hydrated lime, $Ca(OH)_2$) with dewatered sludge. The pathogenic micro-organisms in the sludge die off due to the high pH (12 or higher) assisted by the pasteurising temperatures achieved by the exothermic nature of the reaction of lime with the water in the sludge.

The advantage of lime stabilised biosolids is that it will not become septic as long as the high pH is maintained. The major cost for these processes are the cost of lime.

Lime stabilised biosolids are particularly suitable for application to agricultural land because of their liming value, although application rates may be limited by the lime content. The optimum application rate is site specific.

The optimum lime to biosolids ratio needs to be determined for each individual case. The lime requirement will depend on the type of sludge, organic composition and solids concentration of the sludge.

The table below provides a guide for typical lime requirements.

Sludge Type	Lime (Ca(OH)2 requirements (w/w)
Primary sludge (untreated)*	0.06 - 0.17kg/kg ds
WAS* from CAS	0.21 - 0.43 kg/kg ds sludge
Anaerobically digested mixed sludge 0.14 – 0.25 kg/kg ds	

*Dewatered to at least 15% dry solids

4.2 RDP Envessel Pasteurisation Process

In the DRP Envessel Pasteurisation process the feed biosolids cake is heated prior to addition of quicklime in proprietary equipment which mixes and heats the blended material. As a result of heating and quicklime addition the temperature rises to 70°C. The biosolids cake is then discharged to an enclosed, heated and insulated vessel, where its temperature is maintained at 70°C for approximately 30 minutes. No stockpiling is required to achieve pasteurisation because as it is achieved completely with this process.

The RDP process requires about 30 tonnes of lime per 100 tonnes of biosolids processed (30% w/w). Thus increasing the total solids to be disposed of by up to 30%.

Because of pasteurisation the product has unrestricted use.

5. Biosolids Classification **(EPA Victoria Draft (2002) Guidelines for Environmental Management)**

The biosolids classification is dependent on the process conditions, ie temperature and pH and the time for maintenance of these conditions:

Method	Class	EPA Victoria Draft (2002) Requirements
RDP Envesel Pasteurisation	T1	>52°C for >12 hours and pH > 12 for 3 days and air dried with >50% ds

6. Market for final product

Land application in mainly agriculture. With T1 classification, it will be suitable for unrestricted use. Application depends on classification.

7. Benefits
- unrestricted use of final product
- liming property of final product to agriculture

8. Limitations
- high capital cost
- high O&M cost

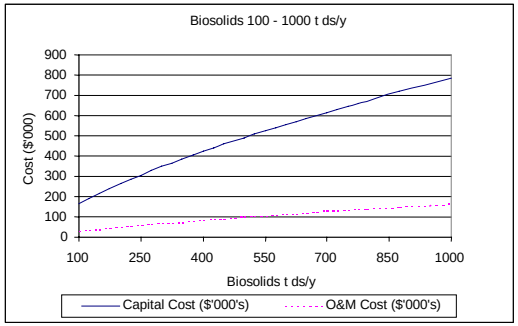
9. Costs (RDP Envessel Pasteurisation)

[Example: for 1 000 t/y capital cost is $800 000 and annual O&M cost is $180 000]

10. Product sale

The price of the biosolids produced is expected to be approximately $5 to $20/$m^3$ which is mainly due to the lime value contained. The sale of the biosolids can be used to off set part of the processing cost for the sludge.

Capital and O&M Costs ($'000)
[100 - 1 000 t ds/y]



Capital and O&M Costs ($'000)
[1 000 - 3 000 t ds/y]