South East Dairy Effluent Guidelines

# Management of solids

*Guideline No 15.*

*Removing solids from your dairy effluent increases the flexibility of effluent treatment systems. It also reduces blockages, decreases sludge build-up in ponds and separates slowly degraded material from the more quickly degraded material.*

*This guideline reviews how separated solids can be handled and utilised as a useful fertiliser by-product.*

---

The solid components of dairy shed effluent include manure, gravel and sand. The gravel and sand can be removed at the dairy yard with a stone and sand trap from where it can be returned to the laneways or paddocks.

The manure solids can remain in the effluent or a proportion can be removed in a solids separation system. Removal of solids increases the flexibility of effluent treatment systems. Separation of the larger manure solids also reduces blockages, decreases sludge build-up in ponds and separates slowly degraded material from more quickly degraded material.

***Refer to South East Dairy Effluent Guideline No.8 : Solids Separation Systems for more details of the different systems which can be used.***

**Dairy effluent solids are a valuable source of nitrogen, phosphorus and potassium. A sample of stockpiled solids tested in April 2004 had 1.9% nitrogen, 0.27% phosphorus and 0.82% potassium, which is equivalent to a fertiliser value of more than $34 per tonne of dry matter.**

## Slurries

Solids separation tanks or ponds which lead into a secondary storage pond will most likely need to have their solids removed as a slurry. The tank or pond relies on gravity to separate the solids from the liquid effluent. Sludge will build up on the floor and a crust may develop on the surface.

The tank or pond will need to be agitated to re-suspend the solids before they can be removed by vacuum slurry tanker or manure pump. If the surface crust is too thick or stable to slurry it may need to be removed mechanically before the tank or pond is agitated. The slurry should not contain more than around 8% total solids. Slurries over this level may be difficult to remove by tanker due to their thickness or viscosity. Fresh water may need to be added to a thick slurry to enable it to be handled.

## Separated Solids

Solids separated using a solids separation system can contain a considerable amount of water (e.g. from trafficable solids trap) or be relatively dry (e.g. from a screw press separator). Both can be land spread in their current state but it is often better to allow the wet solids from the trafficable solids trap to drain so that they can be handled with conventional manure spreaders.

## Pond Sludge

Solids should be placed on a drainage pad (see below) for de-watering

Pond sludge is a stable, high strength fertiliser. It is normally removed from the pond when the sludge reaches half the depth of the pond, which is from 5–7 years for primary ponds receiving untreated effluent or 10-12 years for ponds receiving effluent after solids separation. Secondary ponds rarely need desludging.

Sludge may be applied directly to soils using a sludge tanker or de-watered and spread with a waste spreader.

***Sludge Injection Tanker***

Sludge may be de-watered by storing it on drainage pads and allowing the liquid to drain back into the pond.

### Drainage Pads

Drainage pads are used for de-watering pond sludge or solids removed from a solids trap.

Drainage pads must be constructed of impermeable material to prevent nutrient rich drainage water from soaking into the soil. All drainage must flow back into the pond or the solids separation system. Drainage pads must have external bunding.

### Storage

Solids may be stored until land spreading is possible. They should be stored with bunding and adequate drainage to prevent leaching of nutrients into the soil. Any drainage should be directed to the effluent system.

Stockpiles can be formed by spreading and compacting layers of moist solids. Compacting is necessary to reduce heating and the risk of spontaneous combustion. Several small stockpiles are preferable to one large one. Small, uncompacted stockpiles can be used to allow the moisture content to fall to 25-30% at which point the solids can be incorporated into the larger compacted stockpile.

The most convenient shape for a stockpile is often a windrow, which runs up and down the slope of the storage area to assist drainage.

### Composting

Composting involves the aeration of stockpiled solids to cause the organic materials to be converted by microbial action into stable humus. Aeration is usually achieved by mechanical turning of the stockpiled windrows.

Where management of solids involves composting, the compost site should be established on an area from which all runoff can be collected in a pond. Composting has the potential to cause environmental harm if it is not located, designed and operated properly.

**Composting Manure**

Depending on the annual amount of material composted the activity may require development approval from the local council and licensing by the Environment Protection Authority (EPA). A Guide for Applicants, Composting, organic fertiliser and soil conditioner works is available from Planning SA or the web site www.planning.sa.gov.au/guide_apps/index.html which identifies whether planning approval and licensing will be necessary and what information should be provided with a development application for a composting facility.

**Details of the composting process are beyond the scope of these guidelines**

**For more information contact your farm adviser or an environmental consultant.**

## Spreading

Spreading solids on land can enhance crop and pasture growth. Once spread there can be rapid losses of nitrogen to the atmosphere unless it can be ploughed in. Spreading solids on an area every few years is more compatible with pasture renovation and cropping than annual spreading. Inorganic nitrogen fertilisers can be used to supplement the nitrogen from the solids for the years between spreading of solids.

Spreading when the soil is dry minimises soil compaction problems.

## Spreader Distribution

Evenness of spreading is important where low application rates are required to match plant nutrient requirements. Poor spreading efficiency at low rates can cause very uneven growth and different crop maturity times.

There are four basic types of solid manure spreaders.

1. **Moving bed trays with horizontal beaters.** These spreaders can handle a wide range of manures and are best suited to high application rates. Manure is not spread much beyond the width of the beaters, so narrow run widths are necessary to achieve an even distribution.

2. **Side discharge spreaders** produce fine particles and generally give good distribution. Wind may affect the distribution of dry manures.

**Moving bed fed horizontal spinners** are suited to most manure types. Limited load capacity is a limitation when spreading higher rates.

3. **Moving bed fed vertical beaters** are suited to most manure types