

# Dairy Effluent: Maintenance Schedules and Contingency Planning

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The purpose of this note is to firstly identify likely risks associated with managing dairy effluent and establish potential contingency measures to minimise adverse impact to either the farm or environment.

Secondly identify the aspects of a dairy effluent system that requires ongoing maintenance and monitoring and to provide a potential schedule that can be undertaken periodically

## Contingency planning

No matter how well an effluent system is designed and managed, breakdowns are almost guaranteed given the reliance on equipment and the foreign material and debris likely to enter the effluent stream. Contingency plans and procedures for emergency breakdowns are essential.

A contingency plan should enable procedures to be put in place immediately when failures occur with minimum impact to facility operations and the environment. All staff members should be familiar with contingency plans and procedures.

Planning should take into account: power disruptions, human error, pump breakdowns, pond overflows, breaches and conveyance blockages.

The following are potential scenarios common to effluent management.

## Potential risks:

### **1. Pond wall breach/Overflow**

#### **Contingency plan**

- Construct a temporary levy bank to contain the spill.
- Install a temporary spoon drains to direct uncontrolled overflows and seepage to a designated area away from waterways and lighter soil.
- Instigate a pond emptying procedure to lower existing volumes until walls can be reconstructed.
- Repair walls and banks by removing topsoil and vegetative growth before reconstructing the area with more clay or other impermeable material.
- Redirect effluent inflows from dairy shed and feedpads to other storage or irrigation systems until repairs are completed.

## **2. Pump failure**

### **Contingency plan**

- Maintain a current list of local trades people and have accessible to all staff
- Maintain a backup pump to install temporarily while the other is being repaired.
- Establish a contingency storage area within close proximity, which has bunding or levy banks to contain the effluent until pump repairs are completed.
- Minimise facility water use (without compromising milk quality) to reduce wash down volumes entering the effluent stream.

## **3. Emergency disposal of milk**

### **Contingency plan**

- Identify areas on farm for emergency disposals that will not have impacts on the environment and community.
- Schedule an irrigation event to dilute the milk (1:10) and return to appropriate paddocks well ahead of grazing.
- Explore opportunities to supply nearby calf rearing enterprises.
- Note: Milk should not be disposed of into the effluent stream as it will have adverse impacts on the pond performance and cause odour. Further information in Agnote AGO428.

## **4. Effluent discharge to waterway**

### **Contingency plan**

- Notify appropriate authorities immediately in the event effluent discharges into a waterway or leaves the property to enable authorities to contain spills and notify down-stream users.
- Redirect and contain discharge to farm paddocks.

## **5. Significant storm event**

### **Contingency plan**

- Offload a proportion of the pond onto a large area of the farm well away from waterways.
- Divert rainwater off shedding and yarding away from the effluent stream.

## **6. Increased incidences of metabolic disorders**

### **Contingency plan**

- Remove herd from paddock.
- Cease effluent applications.
- Conduct soil fertility testing.
- Seek veterinary advice.
- Revise fertiliser applications.
- Explore alternative paddocks more suitable for effluent applications.

## **7. Significant odour emissions from pond**

### **Contingency plan**

- Minimise spreading and irrigation of effluent on windy warm days.
- Avoid infrequent shock loadings of effluent to the pond.

- Monitor the pH within the anaerobic pond. The pH should be slightly alkaline. The addition of hydrated lime to acidic ponds can improve both pH and odour.
- Products for reducing odour or improving anaerobic digestion may be added to the ponds.
- Plant trees and shrubs between neighboring residences. These can cause a disturbance in the wind pattern, forcing odour to rise upwards and away from sensitive areas.
- Remove manure stockpiles from sensitive areas more frequently.
- Avoid irrigation methods that lead to surface pooling.

## Maintenance Schedules

Effluent systems are only effective when well managed and maintained. Effective management involves regular maintenance of system infrastructure, regularly utilising effluent on pastures and crops to achieve productivity gains and avoiding effluent application in unsuitable weather or soil conditions.

An ongoing maintenance and monitoring program is important for assessing potential problems and enabling them to be rectified before they eventuate.

A maintenance program should include the following key components:

### ***Pond management***

Ponds are designed for a specific function and therefore need to be maintained periodically to ensure they continue to function. Accumulating solids and nutrients overtime may begin to impact on the pond(s) performance, hence the reason for a sound maintenance schedule.

Key indicators of ponds under performing may include:

- Heavy surface crusting and silting
- Odour emissions
- Excessive weed growth
- Dark brown discoloration

### ***Pump maintenance***

Almost all effluent systems require some type of pump to convey effluent either from the dairy to the pond or the pond to the irrigation system.

Pump fails on traps and sump can easily lead to effluent backing up into dairy pits.

Use only a qualified electrician to install all electrical requirements such as wiring, switches etc

### ***Conveyance pipes***

The conveyance of effluent around the farm by either gravity or pumping systems is a necessity to move effluent from traps and ponds to irrigation channels or sprinkler systems. Inadequate management will cause unnecessary blockages and pipe damage.

Breakdown in convey pipe is a tedious and time consuming job that can be avoided by regular cleaning of traps and ponds.

The overall layout and correct sizing of piping can also minimise unnecessary blockages. Minimising bends and joins are general principles of a good layout.

### ***Sumps and traps***

Most problems associated with traps and sump result from irregular cleaning schedules and the foreign debris that is allowed to wash into the collection point. These include: cow horns, wire, baling twine, dry cow syringes and stones

## ***Irrigation systems***

The method in which effluent is conveyed and applied to pastures and crops is a vital component of any effluent system and therefore requires regular monitoring and maintenance. Irrespective of whether effluent is distributed via an irrigation channel network or a sprinkler type approach such as irrigation pivots, it is important to avoid delays to enable effluent applications to fit into paddock rotations.

## ***Slurry and solid spreaders***

Farm safety and accident prevention should be the highest priority on the farm, ensuring the farm surrounds are as safe as possible; for workers, children, visitors, livestock and pets.

The management of effluent also requires the regular use of a range of equipment and machinery, which requires operator training and regular maintenance programs.

Regular maintenance will minimise costly repairs and wasted downtimes with the equipment out of operation.

## **Dairy Effluent Maintenance Checklist**

The following is a checklist to assist farmers implement a regular maintenance program.

### ***Pond management***

- Annually review the pond effective storage to ensure it has sufficient capacity for the wetter months.
- Inspect pond banks for signs of cracking or deterioration and instigate repairs.
- Inspect pond surroundings for wet area which may indicate pond seepage.
- Periodically sample and analysis the pond to determine levels of nutrients, salts and organic content before land application. Use this information to match with soil nutrient profiles and fertility targets.
- Develop a schedule to empty the pond prior to the onset of the wetter months.
- Develop a regular desludging program to remove solids and nutrients in conjunction with pasture requirements.
- Annually check ponds outlet pipes for seepage and replace damaged rubber seals.
- Check fencing around ponds is adequately tensioned and secured.
- Remove accumulating sludge and solids crusting on pond surfaces on a regular basis to maintain storage capacity and system functioning.
- Regularly agitate ponds prior to conveyance and application to turnover accumulating nutrients and salts in the sludge layers.
- Check sludge levels annually using a long pole to probe and remove sludge before two-thirds of the pond capacity has been consumed.
- Ensure yarding and storage surroundings are free of rubbish, foreign debris and plastic waste.

### ***Pump maintenance***

- Ensure electrical wiring and switchers on pumps are covered and serviced by qualified electricians.
- Ensure any pontoons on the pond have adequate buoyancy and are securely fixed to banks.
- Check waterproof switches for cracks.
- Periodically, listen to pump while running for out-of-the-ordinary sounds and/or vibrations.
- Check bearings for excessive noise.
- Check bearings for excessive heat.
- Grease all grease points 6 monthly periods (Use correct grease as per manufactures instructions).
- Check belts are tight and check for wear.

- Check all belts or coupling covers are replaced and secured.
- Check pump and motor coupling for wear (if applicable).
- Check impeller, bowl and faceplate for wear.
- Check for blockages.
- Check all pump-securing bolts for corrosion and are tight.
- Check pump gland packing for excessive leaking, adjust or replace when needed.
- Check mechanical seal for leaking (if applicable).
- Check all pipe connections for integrity.
- Check area around electric motor and/or generator clean and clear.

### ***Conveyance pipes***

- Review joins and inspection points. Remove fibrous and solid build ups and ensure joints are secure.
- Ensure exposed conveyance pipes are protected from machinery and cattle.

### ***Sumps and traps***

- Remove solids and sediment every few months.
- Use a rake or high pressure hose to clean weeping walls/screens and adjust spacing accordingly.
- Repair any damage to walls and screens.
- Remove fibrous build up from float switchers.
- Ensure fencing and railing around the sumps and traps are secure.

### ***Irrigation equipment***

- Check all gearing, teeth and pawls for wear.
- Check cable connections.
- Check cable length for kinks and/or fraying.
- Check cable guide for wear.
- Check cams and cam followers for wear and ensure free running.
- Check nozzles and clear solid and fibrous build ups.

### ***Slurry and solid spreaders***

- Ensure all guards and safety systems are in place on all machinery and equipment.
- Ensure farm implements are secured and mounted correctly to tractors.
- Thoroughly clean all equipment used to handle effluent before using it on other farms to reduce the likelihood of microbial transfer to other properties.
- Ensure all hydraulic and power take off drive systems are disengaged before undertaking repairs.
- Ensure spares parts are readily available, especially if effluent management is a direct application system which relies heavily on the operation of the slurry tanker.

## **Further information**

Further advice can be obtained from your nearest DPI or EPA offices.

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