

# DAIRIES AND OTHER MILK HANDLING OPERATIONS: PPG17

## POLLUTION PREVENTION GUIDELINES

*These guidelines have been drawn up to assist all who design and operate dairies and other milk and milk product handling operations in the avoidance of water pollution and the minimisation of waste. They should be read with the Agencies' general guidance on preventing pollution on industrial sites (PPG11). They have been produced by the Environment Agency for England and Wales, the Scottish Environment Protection Agency and the Environment and Heritage Service in Northern Ireland, referred to as the Agency or the Agencies. Every site is different and will need to be considered accordingly. If a new operation or major alterations are planned, early consultation with the Agency is advisable. Contact details will be found at the end of these guidelines.*

### 1. INTRODUCTION

These guidelines focus on pollution risks which are specific to the dairy industry. They supplement the general guidance provided in the Agencies' document "Preventing pollution on industrial sites" (PPG11 - Reference 1) and should, therefore, be read in conjunction with it. They are not intended for small scale, farm based operations, although much of the content will be relevant. In addition to the existing legislation which applies to industrial sites, milk handling facilities producing more than 200 tonnes per day will come under the Integrated Pollution Prevention and Control regime as from 31st October 1999.

### 2. POLLUTING POTENTIAL OF DAIRY OPERATIONS

#### a. Milk and milk products

It is not often recognised that milk can have a significant polluting effect on water if allowed to reach rivers or streams. It can be as much as 400 times more polluting than untreated domestic sewage. Naturally occurring bacteria break down milk entering a watercourse, using up oxygen in the water more quickly than it can be replaced. As a result of falling oxygen levels, fish and other creatures can suffocate. The high fat content of milk and its products can also cause physical problems within drainage systems. Solidified fat can cause blockages, resulting in overflows from the system and possible pollution of watercourses.

#### b. Chemicals and cleaners

Sodium hydroxide (caustic soda), disinfectants, acids and cleaning agents all have the potential to cause serious pollution and to impair effluent treatment. In addition, cooling and refrigeration systems often contain ammonia or biocides which can be damaging to the water environment.

#### c. Fruit juices

Fruit juices, particularly when handled as concentrates, may have the same de-oxygenating effect on a watercourse as milk. In addition they are often highly acidic and may also contain preservatives.

### 3. SITE DRAINAGE

#### a. Surface water drainage

It should be remembered that surface water drainage discharges to a watercourse, which may be remote from the site, or to water contained in underground strata (groundwater) via a soakaway. Surface water should therefore be clean and uncontaminated. The spillage of milk products in yard areas connected to the surface water drain will result in pollution. Devices used to measure pH, turbidity or conductivity can be used to continuously monitor the quality of surface water in the system and trigger alarms. However, these are not a substitute for sound practices which will avoid spillages in the first place and should not be relied upon as the sole means of preventing pollution.

#### b. Trade effluent discharges to the foul sewer

Discharges of waste water should pass to the public foul sewer if available, or be treated, subject to the agreement of the sewerage undertaker. In most cases, a trade effluent consent will be required. Sewerage undertakers will normally wish to minimise the amount of rainwater entering the foul sewer and it may be necessary to provide a roof for loading bays, cleaning areas and waste compactors. Due to the high organic content of dairy effluents, discharges to sewer must be carefully controlled to prevent overloading of the sewage treatment plant. Trade effluent staff from the local sewerage undertaker should be able to give further, site-specific, advice.

### **c. Discharges to controlled waters**

Where no public foul sewer is available, the site will require effluent treatment facilities designed to deal with the anticipated strength, nature and volume of waste water generated from all site operations. Treatment plants must be closely monitored by a suitably qualified person and it is essential that maintenance is carried out regularly. Alarms should be provided to alert staff to plant failures.

The treatment required may include fat removal, flow and load balancing, biological treatment and pH correction. An Agency consent is required for any discharge of trade effluent into a controlled water (which includes all watercourses, lakes, lochs, coastal waters and groundwaters) and may also be required for discharges into or onto land. Such consents set out the quality and quantity of effluent that may be discharged. They are not granted automatically, and early consultation with the Agency is advised before any discharge is considered.

In some situations, an alternative to on site treatment may be to drain designated areas to a sealed tank for off site disposal by a licensed waste disposal contractor.

### **d. Drainage systems**

A high proportion of water pollution incidents from dairies occur as a result of problems with the site drainage system. These arise as a result of damage to the fabric of the drains, blockage due to fat accumulation or solid debris, wrong connections and failure of pumping systems. It is therefore vital that there is a clear management responsibility for site drainage and that adequate, up-to-date records are maintained. A regular programme of inspection and maintenance should be undertaken. Daily visual inspection of surface water drains at key points is a simple way to assess their condition and quickly identify faults.

Cleaning materials used in dairies are highly corrosive and drains must be constructed using suitably resistant materials.

Waste-water drainage systems should be equipped with appropriately designed grease traps and gratings to prevent sewer blockages. It is particularly important that these are regularly inspected, emptied and maintained, with cleaning taking place in an area draining to the foul sewer.

Gullies, grids and manhole covers should be identified as foul or surface systems using colour coded arrows indicating the direction of flow. Use blue for surface water, red for foul drains and ensure these are understood by staff.

Care should be taken to ensure that all drainage from welfare facilities such as toilets, sinks, showers and canteens is correctly connected into the site's foul drainage system. Such connections may require approval from the sewerage undertaker.

### **e. Pre-treatment, flow and load balancing**

Pre-treatment and flow and load balancing may be required whether foul drainage passes to on site treatment facilities or the public foul sewer. Sudden changes in volume and composition can affect the efficiency of a treatment plant and are likely to have a detrimental effect on the quality of effluent discharged. Pre-treatment will reduce the strength of the effluent passed forward for treatment and on-line balancing tanks will deal with normal daily fluctuations. An off-line tank may be used as a holding or dump tank in emergencies. pH, conductivity or turbidity measuring devices in the drainage system can be used to automatically divert effluent to such a tank.

### **f. Discharges from plant rooms, air conditioning and heating systems and chillers**

Under no circumstances should chemically treated water or condensate from any refrigeration, air conditioning or heating system be discharged into the surface water system. Particular care should be taken that discharges at roof level do not enter the surface water system via down pipes. Such waste waters should be discharged to the foul drainage system or collected and disposed of by a registered waste disposal contractor. Internal floor drainage systems for associated plant, chemical storage or dosing areas must not be connected to surface water drains.

## **4. CLEANING ACTIVITIES**

Large volumes of polluted water are produced in cleaning operations in dairies. All cleaning agents are potentially polluting and cleaning effluents must not be allowed to enter surface water drainage systems or soakaways. This is also the case for effluent arising from the use of pressure or steam cleaners. Guidance on these is available (PPG13 - Reference 2). In certain environmentally sensitive areas, phosphorous free detergents should be used.

### **a. Process area cleaning**

Waste waters from cleaning activities are polluting and must be discharged to the site's foul drainage system at a designated location. Ensure all staff and contractors working on site are aware of the disposal facilities for wash waters, and that surface water gullies should not be used for the disposal of wastes, by using clear signs.

## **b. Equipment and vehicle cleaning**

A designated and clearly marked washbay, discharging to the site foul drainage system, should be provided for the cleaning of dairy equipment and utensils. Similar facilities should be provided for any vehicle washing. Vehicle wash recycling systems are available.

## **c. Cleaning of loading and parking areas**

The cleaning of yard and parking areas is not encouraged by the Agencies. Cleaning should not be carried out unless the effluent generated can be contained by isolating the area from the surface water drainage system. Such waste waters must be discharged to the foul drainage system or collected for disposal by a licensed waste disposal contractor.

## **d. Roof areas**

Waste water produced when cleaning roofs should be collected for treatment. Care should be taken that it is not allowed to discharge to the surface water system via roofwater down pipes. Roofs in the proximity of spray driers must drain into the site's foul drainage system.

# **5. DELIVERY AND HANDLING OF MATERIALS**

## **a. Loading and unloading areas**

The risk of spillage and pollution is high in these areas and they should, therefore, be connected to the foul sewer and clearly marked. They should be isolated from the surface water system. This may be achieved using bunding in the form of "roll over" bunds, ramps or stepped access.

## **b. Deliveries**

All deliveries of milk, oil and potentially polluting materials such as chemicals and cleaners must be supervised by a responsible person. Tankers should discharge via a lockable fixed coupling within a bunded area. If a spillage does occur, it should be contained and reported immediately. **DO NOT HOSE IT DOWN.**

## **c. Pipelines**

Where possible pipelines should be sited above ground and protected from collision damage. If a pipeline is to be installed underground, it should be placed in a leak-tight protective sleeve or duct and subject to regular inspection and testing. Pipeline ducts should not be connected to the surface water drainage system.

# **6. STORAGE AND PLANT FACILITIES**

## **a. Above ground storage**

All above ground storage tanks, drums and containers, including those containing fruit juice, should be sited on an impermeable base within a bund. Particular care is needed for Intermediate Bulk Containers (IBCs) containing chemicals such as hypochlorite or acid. The bund should consist of a base and surrounding walls which must be constructed or lined with a material impermeable to the liquid stored and designed to contain a minimum of 110% of the tank capacity. Pipework should be constructed to pass over the bund rather than through it. Tanks should be clearly marked with their contents and volume. An eye glass or gauge should be fitted to indicate volume and prevent overfilling. Detailed guidelines on oil storage are available (PPG2 - Reference 3). Storage of potentially polluting liquids at or above roof level should be avoided.

## **b. Milk silos**

Milk silo areas should either be bunded as above or drained to the foul drainage system. The latter should only be adopted if holding or dump tanks are available to prevent overloading of downstream treatment facilities.

## **c. Boiler house**

Boiler house sumps should have high level alarms and should not be connected to the surface water system. Automatic pumps should not be used.

## **d. Refrigeration and air conditioning plant**

Refrigeration and air conditioning units often contain CFC coolants which must not be released to the atmosphere. Maintenance and repairs should be undertaken by a specialist contractor equipped to deal with these.

# **7. WASTE MANAGEMENT**

Waste management is a complex area of legislation which the Agencies are responsible for implementing. In addition to the guidance in PPG11, the following areas are particularly relevant to the dairy industry.

## a. Compactors

A number of serious incidents involving dairies have occurred as a result of dairy products such as milk and yogurt which have passed their "sell-by" date being put into compactors. A compactor is not suitable for disposal of food wastes or liquids, and any cartons should be fully drained before compaction. Even when used for solid refuse, compactors often leak polluting liquids. They should, therefore, be isolated from the surface water drainage system, using a spill tray, raised kerbs or "roll-over" bunds, preferably covered, to avoid rainwater accumulation, and connected to the foul sewer if possible. Any leakage should be cleaned up straight away, using sand or absorbent material. Compactors are exempt from the need for a waste management licence, but must be registered with the Agency.

## b. Treatment and pre-treatment plants

Adequate provision should be made for storage and handling of sludge produced from such plants. At times of adverse weather, discharge to land may be inappropriate and storage facilities should be sized to take this into account. The work of any contractors should be closely monitored, as you could be held responsible should they cause pollution. If sludge is to be spread beneficially on land, it may be exempt from waste management licencing. However, contractors should comply with relevant regulations (Reference 4) and codes of practice (Reference 5). The formulation and implementation of Farm Waste Management Plans at farms used for spreading will minimise the risk of pollution. Contact your local agricultural advisor for advice on Management Plans.

## 8. REFERENCES

1. PPG11: Preventing pollution on industrial sites
2. PPG13: High pressure water and steam cleaners
3. PPG2: Above ground oil storage tanks
4. Sludge (Use in agriculture) Regulations 1989: The Stationery Office: Telephone 08706 005522
5. Code of good agricultural practice for the protection of water: MAFF Publications, telephone: 0645 556000  
Code of good practice for the prevention of environmental pollution from agricultural activities: Scottish Executive Rural Affairs Department(SERAD): Telephone 0131 556 8400, Edinburgh  
Water - Preventing pollution, series of 11 leaflets: Department of Agriculture for Northern Ireland

References 1-3 are available free of charge from your local Agency office. The Agencies produce a number of further guidelines and leaflets to help industry to avoid pollution, including a video - Pollution Prevention Pays. For a full listing, contact your local Agency office.

All the Agencies' pollution prevention guidance notes are available on the web sites listed below.

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