Environment Bay of Plenty
REGIONAL COUNCIL




Dairy Shed Effluent Treatment and Disposal Guidelines

Prepared by Andy Bruere, Principal Compliance Officer and
Steve Pickles, Environmental Consents Officer

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Working with our communities for a better environment

Environment Bay of Plenty
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Chapter 1: Introduction

The Resource Management Act (RMA) requires that a resource consent is held to authorise the discharge of contaminants to land or water, unless the discharge is authorised by a rule in a regional plan. As Environment Bay of Plenty has no regional plan authorising the discharge of dairy shed effluent to land or water, resource consent is required for any discharge of this kind.

In the early 1990's Environment Bay of Plenty commenced a programme of obtaining resource consent applications from dairy farmers and granting consents accordingly. Our experience at that time was that in general farmers were uncertain of the legal requirements regarding effluent disposal and unaware of the potential environmental effects of dairy effluent on the environment.

After embarking on the programme staff decided it would be of assistance to the farming community to provide some guidance as to what types of treatment and disposal systems would be appropriate. These varied according to the general sensitivity of the receiving environment.

The guidelines generally classified catchments or specific parts of catchments into "sensitive" or "less sensitive" environments.

More restrictive requirements were placed on discharges in the "more sensitive" environment. Discharges to land were encouraged, and the volumes of effluent discharged to "soakage" systems was limited, to minimise impacts on groundwater.

In today's environment these guidelines could be considered "basic". However they provided a transition from a time when effluent ponds were mostly undersized and discharge to the nearest local watercourse was the norm; to proper consideration of the effects of discharge to surface waters and widespread utilisation of effluent for irrigation.

The main effects of dairy shed effluent disposal on the aquatic environment relate to nutrients and bacteria in the discharge:

Effects are:

(i) Eutrophication of water particularly lakes;

(ii) Rendering of groundwater unsuitable for consumption;

(iii) Rendering of water unsuitable for bathing;

(iv) Rendering of shellfish unsuitable for consumption;

(v) Rendering of water unsuitable for aquatic life.

Evidence from environmental monitoring of Bay of Plenty waters shows that eutrophication of lakes and bacterial contamination of bathing sites in rivers and streams are the two highest priority issues that need to be addressed. Dairy shed effluent can contribute to this and needs to be managed to minimise effects.

It is now considered appropriate after more than 10 years of monitoring and experience to re-evaluate these guidelines and make amendments where necessary to continue our environmental improvement.

The objective of this document is to re-evaluate the guidelines for the whole region. Where appropriate existing policies will be restated. However, where research and environmental indications/monitoring show progress is lacking new policies have been formulated.

Included in the guidelines are considerations of other activities on dairy farms, which have the potential to impact the environment. These are silage pits, calf-rearing facilities, and dairy feed pads/loafing pads.

Chapter 2: Background

Traditionally dairy farming has used simple but foolproof technologies to treat dairy wastes. In the 1970's two pond treatment systems became popular throughout the country. These could make significant improvements to the organic and the visual quality of dairy shed wastewater (Biochemical Oxygen Demand and Suspended Solids). However, they had limited ability to reduce nutrients and other chemical contaminants that cause eutrophication and toxicity, respectively (e.g. ammonia). The discharge from these ponds normally went into the local drain or stream.

In the Bay of Plenty due to local soil types many of these pond systems discharged to pond soakage. This has some benefits, in that direct discharge to surface waters is avoided. It can however, result in contamination of ground water per se, or where ground water exits to drains and streams causing contamination of these waterways.

More recently the focus of Regional Councils and the farming industry has been to encourage the controlled application of dairy wastewater onto land via irrigation systems. In the Bay of Plenty we have been successful in achieving significant conversion to land disposal. In 1989 35% of dairies in the Bay of Plenty region utilised land disposal of effluent. By 2000 80% of dairies utilise land disposal (approximately ¼ of those systems are currently combined with pond soakage).

Environmental concerns regarding the impact of dairy discharges on water quality continue to fuel the debate on the best options for effluent treatment and disposal. Questions which continue to be asked about the matter are:

- What do the present commonly utilised farm dairy treatment and disposal systems achieve in protecting the environment?
- Should treated effluent be allowed to discharge to surface waters?
- Is the discharge of effluent to pond soakage, with limited contaminant renovation, sustainable (protecting ground water)?
- What is a sustainable application rate for effluent to production land (e.g. nutrient uptake)?
- What options are available presently to improve effluent treatment and what are being researched?
- In areas where water quality is low should more stringent requirements be imposed to protect or improve water quality?

- With the improvements in farm effluent treatment and disposal in the Bay of Plenty over the past 10 years, where should the on-farm focus of environmental improvement for the future occur? Should we continue to refine dairy treatment and disposal or can better value in terms of environmental improvement be gained from a focus on other farm practices?

- Other point source discharges on the farm may have significant effects on water quality, such as feed pads, silage pits and calf rearing. Should these be considered in the overall treatment of on farm effluent?

The following outlines answers and their justification to the questions posed above.

- *What do the present commonly utilised farm dairy treatment and disposal systems achieve in protecting the environment?*

In the Bay of Plenty there are three commonly utilised farm dairy treatment/disposal systems. These are:

- Land irrigation using an irrigation system or muck wagon;

- Pond treatment and discharge to surface waters; and

- Land or pond soakage.

For the past 12 years Environment Bay of Plenty has encouraged land disposal by irrigation or muck wagon. This is seen as the most sustainable option as it utilises nutrients and water in the waste for production, soil is highly effective in removal of bacteria and viruses and the UV in sunlight is also instrumental in killing pathogens. In the early 1990's pond treatment followed by discharge to surface waters was the most common form of treatment/disposal. However pond treated effluent still contains nutrients, bacteria and organic contaminants (BOD) in concentrations that can impact the receiving water. The level of impact varies depending on the discharge and receiving environment.

Land or pond soakage is commonly utilised to dispose of dairy waste. This is where effluent soaks from the bottom of a treatment pond or land dedicated to soak dairy effluents. For smaller herds this can be acceptable, but it does have the potential to discharge contaminants to land where it can reach ground water. These systems however, generally reduce bacterial levels effectively.

- *Should treated effluent be allowed to discharge to surface waters?*

This has always been a concern to environmental and iwi groups. Our previous guidelines have reflected this by requiring an impact assessment to be provided with all applications for treated effluent discharge to surface waters. In addition in the "more sensitive" catchments a shorter-term consent was recommended (five years in previous guidelines).

Staff believe the requirement for an assessment of environmental effects report (AEE) be retained and point out that in recent times this requirement is being strictly applied. As part of the AEE, consultation with interested and affected parties is required. This includes iwi, who in the Bay of Plenty region have generally opposed surface discharges to water.

It may be agreed that in some locations, for example low lying land, land disposal is not the best option in terms of positive environmental outcomes. In all circumstances applicants for surface discharge will have to justify their reasons for selecting this option and level of treatment.

- *Is the discharge of effluent to pond soakage, with limited contaminant renovation, sustainable (protecting groundwater)?*

The impact of discharge to pond soakage is dependent on soil types and ground water flows in specific locations. Environment Bay of Plenty has undertaken groundwater monitoring in specific locations to determine the impact of pond soakage systems.

Environment Bay of Plenty scientists report that groundwater contamination (primarily nitrate) is not a widespread issue at this time in the dairying areas of the Bay of Plenty. Greatest groundwater contamination with nitrate was found in the Kaituna/Maketu area and limited areas of the Rangitaiki Plains. (MacIntosh and Gordon 2002).

In the catchments of Galatea and the Rotorua lakes there is concern that the discharge of effluent to pond soakage may potentially contaminate water feeding to streams and lakes. These areas can be dealt with separately. In the Galatea Dairy Farming Impact Report (July 2000) it was concluded that land disposal of dairy effluent is successful in reducing peak bacterial contamination in the local waterway. However, due to free draining soil of the areas, soakage systems are thought to be a source of continued flow of contamination to waterways.

A study is being done by Environment Bay of Plenty scientists to determine the reason for high bacterial contamination in Galatea streams. So far the results show that where ponds are located close to streams and drains (<20m) significant contamination of the watercourse can occur. As a result of this, it is recommended that the guidelines retain the requirement to locate ponds at least 20m from any watercourse. Additional monitoring may be required as a consent condition if ponds cannot be kept at least 20m from a watercourse.

In the Rerewhakaaitu area contamination of lake water is an issue, (McIntosh et al 2001). The discharge of effluent to land by irrigation is considered the best option. For Rerewhakaaitu and the other Rotorua lakes, pond soakage should be phased out over three years and replaced with irrigation to land. This practice is likely to be adding significantly to the contamination of groundwater and potential contamination of the lake. Although there is less intensive dairying in the other Rotorua lakes areas, pond soakage potentially results in the same problems and similar policies should be applied.

In the Rotorua Lakes catchments, where ponds are used to store wastewater before irrigation the consent holder will need to demonstrate to Environment Bay of Plenty in their consent application how they will, or have, sealed their ponds to prevent seepage to ground water.

It is recommended that where soakage systems are allowed, the land soakage areas and ponds, be located at least 20m from any watercourse.

- *What is a sustainable application rate for effluent to production land (e.g. nutrient uptake)?*

Presently, Environment Bay of Plenty Guidelines allow up to 300kg/N/ha to be applied to land annually, in the form of effluent. This application rate has received some criticism in the MFE publication "A Case Study of Farm Dairy Effluent Management" where other councils have tended to require lower application rates (150-200kg/N/ha/yr).

Environment Bay of Plenty's ground water study has shown that nitrate levels in some Bay of Plenty dairying areas are currently exceeding the drinking water standard, therefore staff recommend that this rate is reduced to 150-200kg/N/ha annually. This application range is recommended in many publications, including the "Dairying & the Environment Committee Manual "(1995) and Dexcel and Ag Research trials reported in the Dairy Exporter June 2002. Both publications recommend an application rate of 150kg/N/ha/yr but state that applications

should not exceed 200kgN/ha/yr. This is in line with a submission from Federated Farmers on the Guidelines for the Kaituna, Maketu Estuary, Waihi Estuary and Pukehina to Matata Catchments. In discussions with farmers, Environment Bay of Plenty staff believe that some flexibility in the guideline should be allowed depending on the farm fertiliser regime and whether the application area is being used to produce crops, silage or hay. A cropping regime will remove higher levels of nutrients and it is recommended that where effluent is applied to cropping land the nitrogen application may be allowed up to 250 kg/hectare.

It should be appreciated that dairy effluent has a nutrient value for production. Estimates from Environment Bay of Plenty monitor farms indicate that dairy effluent has a value of approximately $20/cow (Pers Comm Doug Edmeades, Acknowledge Limited).

- *What options are available presently to improve effluent treatment and what options are being researched?*

Over the past decade the use of wetlands has been researched and trialled for the treatment of all manner of waste streams. Wetlands have been seen as an "add on" to many treatment processes to "polish" or provide final treatment prior to discharge to waterways.

Environment Bay of Plenty undertook the first full-scale trial of wetlands on dairy shed wastewater (Bruere and Donald 1997). The wetlands were added to a conventional two pond dairy effluent system. Although improvements in effluent quality were achieved, the resulting effluent was not of suitable quality for staff to recommend widespread use to protect water quality in the region. In some circumstances wetlands may be an appropriate treatment option, however, Environment Bay of Plenty staff still consider land irrigation of effluent to provide a superior environmental outcome on the majority of soil types and topography's within the region.

Environment Bay of Plenty research into wetland treatment of dairy effluent indicated that one of the limiting factors to high nutrient removal was the reduced state of dairy effluent from two pond systems. Aeration of the effluent will convert ammonia to nitrate and further treatment in a wetland will allow for denitrification of this nitrate to the atmosphere (lowering N concentrations in effluent). One of the problems with this treatment is that it requires added capital and running costs to provide an aerator and electric supply.

Further information in wetland design and pre treatment requirement is contained in Guidelines for constructed Wetland Treatment of Farm Dairy Wastewaters in New Zealand (Tanner & V Kloosterman, 1997).

More recently several alternative treatment systems for dairy effluent have been trialled. The first of these is the Advanced Pond System (APS) which is being researched by NIWA on two Waikato dairy farms. The system consists of four ponds:

- The effluent is discharged to a deep facultative pond, similar to a conventional dairy anaerobic pond system.
- It then flows to a shallow high rate pond. This pond is mixed with a paddle wheel and allows sunlight penetration to kill bacteria and nutrient assimilation into algal biomass.
- The third pond is used for algal settling which then needs to be harvested regularly.
- The final pond is a maturation pond providing further disinfection.

This system is in a trial phase at present. Further information can be obtained from Rupert Craggs of NIWA, Hamilton.

Another recently researched treatment option is the Sequencing Batch Reactor (SBR). Harrison & Grierson Consultants Limited have trialed a process commonly used for municipal waste treatment on dairy effluent. The system firstly utilises a traditional dairy anaerobic pond. The effluent is then fed into the SBR system, which is a specific configuration and operating method for an activated sludge treatment system.

Effluent is simply treated in batches, where it is mixed and aerated for a period. Bacteria in the reaction tank breaks down the waste and incorporates nutrients into biomass. The batch is then settled and supernatant liquor is discharged.

The advantage of this type of system is that the resulting effluent is usually of a consistent and significantly higher quality than traditionally treated dairy effluent. The main disadvantages seem to be the capital cost and ongoing management required.

Further information on this system can be obtained from Mr S Couper of H & G Consultants Limited, Auckland.

A final option which has recently come to our attention for dairy effluent treatment is the "Integrated Systems Engineers Limited" (ISE) from Hamilton. This is an in vessel anaerobic digestion system to produce biogas and fertiliser for farm use. One issue with this system is that the effluent needs to be more concentrated than normal dairy shed wash water. To achieve this effluent scrapers in the dairy yard are necessary. However, a likely "spin-off" from reducing effluent volumes will be that it is more feasible to store effluent for application when soil conditions are most suitable, and it may be appropriate to consider the advantages of reducing effluent volume, whether the ISE system is used or not.

The biogas from the ISE system can then be used for other application such as electricity for dairy shed operation or water heating, etc.

It should also be appreciated that with all systems that discharge to surface waters, iwi issues need to be considered, even though more efficient technologies are being used.

- *In areas where water quality is low should more stringent requirements be imposed to protect or improve water quality?*

In all previous guidelines where "more sensitive" catchments or areas have been specified, more stringent requirements have been imposed. This has been reflected in previous guidelines by granting discharges to surface waters for a shorter period (5 years).

Staff believe this has been successful in encouraging significant numbers of farmers into land disposal of effluent. It is proposed now that the term "more sensitive" be dropped and, as already mentioned, all discharges to surface water be required to provide a full assessment of the effects on the receiving water of their discharge.

As already discussed, special focus should be placed on the Rerewhakaaitu and Galatea areas. The remaining Rotorua lakes areas have always been required to use land application. This policy should remain.

- *With the improvements in farm effluent treatment and disposal in the Bay of Plenty over the past 10 years, where should the on farm focus of environmental improvement for the future occur? Should we continue to refine dairy treatment and disposal or can better value in terms of environmental improvement be gained from a focus on other farm practices?*

This matter has become an issue in the Bay of Plenty region as well as other parts of the country. In the Pongakawa Catchment the practicality of effluent irrigation to lower lying land serviced by pump schemes and drains has been questioned. It is possible that some irrigation systems in this area may in fact provide little benefit over the discharge of treated

effluent to local waterways. It can then be asked is it better to spend the money saved from not having to install an irrigation system on other areas of environmental improvement on the farm.

This matter has been addressed in the 2002/03 financial year for the Pongakawa Catchment. Environment Bay of Plenty has set up a liaison group to scope the requirements of a report on the relative impacts of dairy discharge on local waterways, compared with the impact of other normal farm activities. The report has drawn on research and experience from other parts of the country. It has provided some further information to assist Environment Bay of Plenty and farmers in making decisions on resource consent applications for discharge to surface waters, particularly in areas where soils/topography are not suited to irrigation.

The Fonterra Research Centre has recently commenced a Dairy Catchment Study. This study is focussed on:

- Encouraging adoption of practices that meet industry and regulatory requirements and address local issues, and

- Then monitoring changes in farm practice, adoption of new practices and waterway conditions to establish the success of practices and identify where systems are not responding as expected.

To undertake this work they have 4 monitor farms throughout the country. The results from this monitoring are likely to be of use to identify farm practices, including effluent treatment and disposal options, which provide optimum environmental enhancement, cost effectively.

Environment Bay of Plenty has advocated diversion of roof water and stormwater away from effluent treatment systems for some time. This is to minimise effluent volumes and decrease the risk of overflow from ponds or effluent sumps. However, no advice on this has been included in previous guidelines. In this guideline it has been recommended that roof water be diverted where effluent discharges to soakage or surface water.

- *Other point source discharges of the farm may have significant effects on water quality, such as feed pads, silage pits and calf rearing. Should these be considered in the overall treatment of on-farm effluent?*

The application of silage pits has been addressed in the proposed Regional Water and Land Plan. The discharge of leachate from silage pits is a permitted activity subject to specific conditions. The main objective of this rule is to prevent the discharge of leachate to surface waters. Large-scale calf rearing facilities are becoming more commonplace. In general these comprise indoor calf rearing facilities for the first 2-3 weeks, followed by outdoor rearing of calves up to 12 weeks of age. The indoor rearing takes place on a sawdust bed, which is removed from time to time and replaced with new sawdust.

As long as the following matters are addressed then Environment Bay of Plenty does not require any resource consent application:

- There is no liquid effluent ponding or runoff from these facilities; and

- All sawdust is spread on land at appropriate application rates to prevent odour nuisance, and nutrient or bacterial runoff.

Feed pads and loafing pads are now commonly being constructed on farms to feed supplements and to stand cows during wet periods of the year. This reduces the pasture and soil damage and can have some animal health benefits.

From an environmental point of view, feed and loafing pads can have both a positive and a negative effect. On a positive note their use can minimise soil damage and potential erosion of pugged soils. In addition, heavy stocking rates during the winter can lead to concentrated stock effluent on areas, and lead to runoff to watercourses. By the use of feed pads the potential for these effects from pasture land is reduced. However, on the other hand, effluent deposition on feed pads is also concentrated and needs to be disposed of in an environmentally sensitive manner.

In general feed pads are used as the name suggests, to feed cows supplementary feed. They are used for shorter periods during the day, perhaps 1-2 hours, and effluent volumes are likely to be limited. On the other hand, loafing pads are used with the objective of keeping cows off pasture during wet periods and can be used for up to 20 hours per day. Construction can vary, but generally feeds pads are a hard surface pad where as loafing pads are constructed using a bed of wood waste. Some regional councils have included rules on the discharge of feed pad leachate/runoff in their regional plans. Environment Bay of Plenty has not and so the discharge from feed pads is subject to s15 of the Resource Management Act 1991. In effect, all discharges of contaminants to water or to land where they may get to water require resource consent.

In general, effluent from a feed pad is semi-solid and can be contained in a storage pit or channel for disposal at a later date. Overflow from the pad needs to be considered. This must be prevented from entering a watercourse and where possible should be fed into the dairy effluent disposal system. Where the effluent disposal is to land irrigation, it is likely that this may be handled adequately by the existing system if the feed pad is used when the herd is dry and the dairy shed is not contributing to the disposal system. An assessment of additional loading on the disposal system may be required where the feed pad is used at the same time as the dairy shed.

However, where the discharge is to surface waters from the dairy treatment system, further consideration of the environmental effects need to be made in the dairy discharge consent application.

On the other hand where loafing pads are constructed using wood waste/bark then the material absorbs much of the effluent and can be disposed of to land as a compost.

Staff suggest a practical approach to the use of silage pits, calf rearing facilities, loafing and feed pads, as outlined in Section 3.5.

Chapter 3: Region Wide Guidelines

The following details the region wide guidelines for new consent applications. They are broken into three main categories:

- Land disposal by irrigation system or muck wagon; and
- Land or pond soakage of effluent
- Surface water discharge

3.1 General Requirements

3.1.1 These guidelines do not form part of any regional plan. As such any consent applicant can apply to undertake an activity which is outside the scope of this document. Any such application will be considered in terms of the requirements of the Resource Management Act 1991.

3.1.2 Where the requirements of these guidelines cannot be met, further supporting information is likely to be required at the consent application stage and/or ongoing environmental monitoring, specified in the consent. For example, where the buffer zone of 20m for pond location from a watercourse cannot be met, further stream or drain monitoring may be required to support the application.

3.1.3 The disposal of treated dairy shed effluent to surface waters is discouraged. The disposal of untreated effluent to water shall be prohibited.

3.1.4 The disposal of dairy shed effluent to land is encouraged to utilise nutrients and water for production. However, in undertaking effluent disposal to land the farmer must be satisfied that this option is sustainable. In areas where groundwater levels are high or the likelihood of runoff to drains is high, an application for land disposal may require further detail of its sustainability prior to approval.

3.1.5 All effluent ponds should be located at least 20m from any watercourse except where consent for discharge to surface water has been granted. Existing ponds will be evaluated on a case by case basis.

3.1.6 In the Rotorua lakes catchments the consent applicant is required to show how their ponds will be, or have been, sealed to prevent seepage to ground water, except where the consent allows staged conversion from soakage to irrigation, (this is where ponds are used for soakage prior to conversion to irrigation) (section 3.3.1).

3.1.7 All new dairies (dairy conversions) should be required to consider land disposal at the outset of operation.

3.2 Requirements for Land Disposal by Irrigation or Muck Wagon

3.2.1 The rate of application should not exceed the infiltration capacity of the particular soil and topography; and

3.2.2 The annual nitrogen applications from effluent to any land area receiving the dairy shed effluent should be in the range of 150-200kg/per hectare. This equates to 3.0-4.0 ha required per 100 cows contributing if untreated, or 1.5-2.0 ha required per 100 cows for treated effluent being spread. In designing the irrigation system, consideration of fertiliser applications should also be taken into account.

Alternatively where the effluent application area is used for cropping, silage or hay making (annually) up to 250kgN/ha may be applied annually. This equates to 2.4 ha/100 cow (untreated) and 1.2 ha/100 cows (treated); and

3.2.3 The treatment and disposal system should be maintained and operated by the consent holder, as required by the regional council. In particular maintain free board and desludge as necessary when using a pond system; and

3.2.4 Effluent should not be applied to areas where it is likely to reach waters by over land flow or percolate rapidly to surface or ground water causing contamination; and

3.2.5 Any area receiving effluent by irrigation should be rested for a 14-day period between applications to prevent hydraulic inundation of the soil causing a breakdown in the soil treatment processes; and

3.2.6 A contingency plan must be available in the event of pump or irrigator failure to prevent overflow to water or land where it may reach water (see Appendix I); and

3.2.7 For an application meeting all of the requirements for land disposal by irrigation, the following terms should apply

(a) Up to 20 years for a reticulated irrigation system when pumping from a sump or at least a single holding pond;

(b) Up to 10-15 years for a muck wagon or portable irrigation system where:

- Sufficient buffer storage is available to hold at least one weeks effluent; and
- Pond or sump system has been demonstrated to be sealed to prevent seepage; and
- The term will be decided at the time of application with consideration given to the following:
  - A track record of regular maintenance and compliance has been achieved without problem for at least 5 years.
  - Herd size.
  - Suitability of land for alternative systems.
  - A record of pond desludging is maintained by the farmer.

(c) Up to 10 years for other systems. (For example where contractors are employed as required to desludge ponds).

3.3 Requirements for Land or Pond Soakage of Effluent

Land soakage is the discharge of effluent to a sacrifice area of land where it soaks into the soil. Pond soakage utilises a pond to retain some effluent contaminants prior to soakage through the pond bottom.

3.3.1 The discharge of effluent to land or pond soakage will not be allowed in the catchment of all Rotorua lakes. Where an existing land or pond soakage system requires a new consent, a sunset period of up to three years will be allowed to change to land disposal (effluent irrigation, or muck wagon).

3.3.2 All dairy sheds discharging to land or pond soakage should divert uncontaminated roof water away from effluent treatment or disposal systems, and where practical uncontaminated yard stormwater should also be diverted away from effluent treatment or disposal systems.

3.3.3 Untreated dairy shed effluent should be allowed to discharge to land soakage only if:

(a) The number of cows contributing to the discharge is less than 100 cows; and

(b) The soakage area is greater than 20 metres from a surface watercourse, including farm drains; and is not located in an ephemeral watercourse; and

(c) No effluent is likely to reach surface waters by overland flow; and

(d) It is unlikely that effluent will percolate rapidly to surface or ground waters causing contamination.

3.3.4 Treated dairy shed effluent should be allowed to discharge to pond soakage only if:

(a) The number of cows contributing to the discharge daily is less than 200. (Herds greater than 200 cows may be individually evaluated on a case by case basis); and

(b) Effluent is treated in at least a single treatment pond or barrier ditch, which is appropriately sized to Dairying in the Environment Guidelines specifications for anaerobic treatment to achieve approximately 50% reduction in nutrient concentrations; and

(c) The treatment pond is maintained to a standard acceptable to the regional council; in particular:

(i) Freeboard is maintained to prevent overflow to water; and

(ii) Ponds are desludged as necessary; and

(iii) The treatment pond and/or soakage area is at least 20 metres from surface water courses, including farm drains; and

(iv) It is unlikely that effluent will percolate rapidly to surface or ground waters causing contamination; and

(v) No overflow of effluent can reach land where it may flow to water.

3.4 Discharge of Treated Effluent to Surface Waters

3.4.1 All applications to discharge to surface waters are required to provide a full assessment of environmental effects to comply with s.88 of the Resource Management Act. Farmers also need to consider receiving water quality classifications under the Regional Water and Land Plan. These applications will normally be publicly notified. Farmers wishing to know more details about requirements of s.88 of the Resource Management Act, should contact Environment Bay of Plenty field staff or Federated Farmers.

3.4.2 The applicant shall consider other methods of treatment and disposal (including land application) and justify their reasons for selecting discharge to surface waters (as required by the Resource Management Act).

3.4.3 The term of consent will be dependent on local factors but be no longer than 10 years.

3.4.4 If the applicant agrees to go to land disposal by irrigation by implementing a system that meets the requirements of 3.2 within a maximum of 3 years, then a consent may be granted with the term specified in 3.2.7.

3.4.5 All dairy sheds discharging to surface water should divert uncontaminated roof water away from the effluent treatment system, and where practical uncontaminated yard stormwater should also be diverted away from the effluent treatment system.

3.5 Discharge from Silage Pits, Calf Rearing Areas and Dairy Loafing and Feed Pads

3.5.1 The main objective in all circumstances should be to prevent discharge of effluent and leachate to surface waters.

3.5.2 Silage pits should be constructed and located to prevent discharge to waterways or drains. (Rule 31 in the Proposed Regional Water and Land Plan provides a standard, but this may change as the plan is heard).

3.5.3 For calf rearing sheds and loafing pads where sawdust/bark or similar foundation is used, no consent is required as long as all effluent is contained in sawdust or other suitable material, and there is no potential for runoff to surface water from calf rearing sheds or sawdust storage areas. They need to be managed to prevent objectionable odour beyond the property boundary from the rearing activity or stored sawdust or other by-product.

3.5.4 For feed pads, solid effluent should be contained in a pit or channel, where runoff or leachate cannot reach surface or ground water. The overflow can be directed to the dairy effluent system where a land disposal system is used. In this situation the farmer must consult with Environment Bay of Plenty field staff so consideration can be given to any further consent requirements.

3.5.5 Where effluent from feed pads is directed to ponds that discharge to surface waters, this needs to be considered in the AEE accompanying the dairy effluent consent application. For farms discharging to surface water with an existing discharge consent, a change to consent application will be required.

For feed pads where effluent is directed to soakage remote from the dairy treatment system, consent requirements will be considered on a case-by-case basis, taking regard of the potential for contamination of ground or surface water from the specific feed pad.

Chapter 4: Summary and Conclusions

This document upgrades and collates all guidelines for dairy effluent disposal for the Bay of Plenty Region. All previous guidelines are withdrawn. These guidelines reinforce environmental policies to protect and enhance water quality, by encouraging and allowing for land disposal. Discharge to surface water is only allowed where it can be demonstrated that it meets the purpose of the Resource Management Act (Sustainable Management). Further research and experience has been drawn on to develop and justify changes to the guidelines. The guidelines have been simplified to four basic categories:

- Disposal by irrigation;
- Disposal by land or pond soakage;
- Discharge to surface waters; and
- Discharge from silage pits, calf rearing areas, loafing pads and dairy feed pads.

The reference to "sensitive catchments" has been removed and replaced with a region wide guideline. More restrictive requirements have been recommended for the Rotorua lakes catchment. The aim being to provide appropriate protection for these significant water bodies.

Land disposal areas have been increased due to the reduced loading from 300kg/N/ha/yr to 150-250kg/N/ha/yr.

A list of references for further reading is also provided to assist in further understanding of dairy treatment and disposal.

Chapter 5: References and Further Reading

Auckland Regional Council, Technical Publication No. 8, 1992. Critical Review of Techniques for the Reduction of Ammonium in Rural Point Source Discharges.

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Appendix I - Contingency Plans: Options available for land disposal of effluent by Irrigation or Muck Wagon

The guidelines require in section 3.2.6 that "A contingency plan must be available in the event of pump or irrigator failure to prevent overflow to water or land where it may reach water." To assist farmers in formulating a contingency plan as required, the following options are presented as possible alternatives. It should be noted that these options are not an extrusive list of alternatives and in any circumstance a farmer may wish to formulate their own individual contingency plan. The contingency plan needs to take account of various reasons for contingency measures and may include equipment failure and/or soil or weather conditions that preclude application of effluent to land for short periods.

Contingency Options:

1 Storage Sump Systems

Where effluent is contained in a storage sump adjacent to the dairy, as a minimum it is recommended that at least 2 days storage is provided in the event of pump failure.

2 Alternative Ponding

Alternative ponding may be used to protect against sump overflows. This can be provided in the form of:

(a) An additional pond which cannot overflow to water. This needs to be able to be pumped back to the irrigation sump or irrigation area.

(b) Additional free board in a storage pond. Consent normally requires 200mm free board. At least 2 days storage is required in addition to the 200mm free board.

(c) A bunded area of land where effluent cannot runoff to water.

3 Back up Equipment

As an alternative a back up pump system may be provided in the form of a secondary pump or some other equipment that can do the job temporarily, such as an effluent agitator. In this case at least 1 day's storage (2 milkings) needs to be catered for as power outage may still render secondary pumping equipment redundant.