

Effluent and Irrigation Management Procedures

Livingstone Beef



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Purpose

This document lists procedures to be followed by Australian Agricultural Company Limited (AACo) management, staff and contractors to ensure that the reuse of treated effluent via land irrigation is managed appropriately at the Livingstone Abattoir.

Sustainable irrigation of effluent involves matching effluent applications to the water and nutrient requirements of the crop whilst controlling runoff and maintaining or enhancing the quality of the soil resource on the property.



Procedure 1: Suitability of effluent used for irrigation

Aim:

The aim of this procedure is to check that the effluent quality is compliant with the release limits stated for irrigation in Environmental Protection Licence (EPL219) and to take appropriate action if this is not the case.

Procedure:

- When irrigation of effluent is necessary, check that recent external monitoring results confirm that parameters are within the EPL release limits:
 - BOD₅ is <20 mg/L (median), BOD₅ <30 mg/L (90 percentile)
 - Total Suspended Solids is <50 mg/L (90 percentile)
 - Conductivity is <2500 us/cm (median) <3000 us/cm (90 percentile)
 - E. Coli <10,000 MPN/100ml (90th percentile)
 - Dissolved oxygen is >2 mg/L; and
 - pH is between 6.5 and 8.5.
- If dissolved oxygen or pH exceed the release limits, where possible, wastewater should be held in the Decant Basin or directed to the WWS for short term storage while it is determined what corrective action can be taken.
- If the other parameters (BOD₅, TSS, EC and E.coli) exceed the 90 percentile limits, irrigation may proceed, but the following weekly results must be checked to ensure that the out-of-limit parameter(s) have returned to below 90 percentile values. If this is not the case, the ENVIRONMENTAL MANAGER must be informed to ensure that corrective action can be taken.
- Significantly out of compliance wastewater in the Decant Basin should be pumped to Cell 1 of the WWS Dam only during the dry season when the dam is empty and may be returned to the CAL Feed Tank for reprocessing during the next weekend.
- In the event that a parameter(s) exceed the 90 percentile limit more than two weeks in a row, a risk assessment of potential environmental damage should be carried out prior to the release of treated wastewater. Urgent action to remedy the cause(s) of treatment failure must be instituted..
- Notify NTEPA of any release limit exceedance. Note that for the median and 90 percentile limits, the calculation is based on a rolling 10 week assessment and not any single result. Condition's 68 and 69 of EPL219 requires the holder of the approval to keep records of all non-compliances with the licence and to notify the NT EPA of any non-compliance with this licence, as soon as practicable after (and in any case within 24 hours after) first becoming aware of the non-compliance vis NT EPA Online or by emailing waste@nt.gov.au.
- Additional effluent sampling and analysis will be required to confirm that the implemented corrective actions have been effective and parameters now meet the specified release limit(s).

Responsible Person:

Environmental Officer



Procedure 2: Selection of area to be irrigated

Aim:

The aim of this procedure is to ensure that the decision as to which irrigation areas are selected for effluent application takes into account the factors important in minimising impact on neighbours and the protection of the environment from harm.

Procedure:

- Check the wind speed and direction.
- If possible, avoid areas where the prevailing wind direction will carry any odours or spray drift towards close neighbouring residences or people.
- Do not select an area that has been recently irrigated before checks are made to determine if the area can adsorb the volume applied. This can be achieved through digging a small hole and checking moisture content or through soil moisture monitoring equipment such as a tensiometer.
- During the wet season, daily checks of soil moisture are required to determine that soil moisture is not greater than 30mm below the saturation point. This is to be carried out using an appropriate soil moisture probe or tensiometer across representative sections of the area to be irrigated.
- Select an appropriate area for irrigation or if all available irrigation areas do not meet soil moisture criteria, divert treated wastewater to the Wet Weather Storage Dam until soil moisture conditions permit irrigation to resume.

NOTE: The Centre Pivot irrigation area is the primary preferred irrigation area. The use of other irrigation areas may be required when the Centre Pivot is unavailable for reasons including hay cutting or other management practices.

Responsible Person:

Irrigation Supervisor



Procedure 3: Wet Season Irrigation Timing

Aim:

The aim of this procedure is to ensure that irrigation occurs does not occur when soil moisture levels are above the trigger limit and that irrigation does not result in runoff from the area, protecting the environment from harm.

This procedure is for Wet Season months and is to be put in place between 1 of October and 30 April each year.

Procedure:

- During the wet season, daily checks of planned irrigation areas are required to determine that soil moisture is not greater than 30mm below the saturation point. This is to be carried out using an appropriate soil moisture probe or tensiometer across representative sections of the area to be irrigated.
- Check weather forecast and if rain is predicted within the following 24 hours, ensure soil moisture receiving capacity is such that it can receive both the irrigation water and the rainfall predicted without exceeding the above soil moisture trigger. If it is likely that rainfall within the next 24 hour period will lead to the soil moisture trigger being exceeded, divert treated wastewater to the Wet Weather Storage Dam until soil moisture conditions permit irrigation to resume.
- If heavy rainfall that is likely to generate runoff occurs while irrigation is taking place, immediately cease irrigation and divert treated wastewater to the Wet Weather Storage Dam until the rain has stopped and soil moisture conditions permit irrigation to resume.

Responsible Person:

Irrigation Supervisor

Environmental Officer



Procedure 4: Application of irrigation

Aim:

The aim of this procedure is to ensure that the application of irrigation is controlled, does not cause runoff or excessive deep drainage losses to protect the environment from harm.

Procedure:

- Only apply irrigation water at full irrigation rates when the soil is sufficiently dry to absorb the irrigation volume being applied without surface ponding or runoff occurring. A buffer should be maintained below the saturation point to allow for infiltration or unpredicted rainfall.
- If soil is determined to be saturated, store treated effluent in the Wet Weather Storage Dam until soil conditions are suitable.
- Monitor the soil during irrigation to ensure that surface ponding of treated effluent does not occur.
- Commence irrigation again only once ponding or runoff is controlled.
- Check the irrigator periodically to ensure it is operating correctly.
- Record the following for each irrigation event (see attached record sheet):
 - Soil conditions (e.g. soil moisture status)
 - Date of application
 - Approx area of application (ha)
 - Time period of application (hours)
 - Application rate (mm) (calculate)

Responsible Person:

Irrigation Supervisor



Irrigation Recording Sheet

DATE	INITIAL	PADDOCK IRRIGATED	APPROX AREA (m2)	PUMPING TIME (mins)	VOLUME PUMPED (kL)	APPLICATION RATE (mm)	SOIL MOISTURE READING	SOIL MOISUTRE COMPLIANT Y/N	CHECKS FOR RUNOFF OR PONDING	WEATHER OBSERVATIONS