

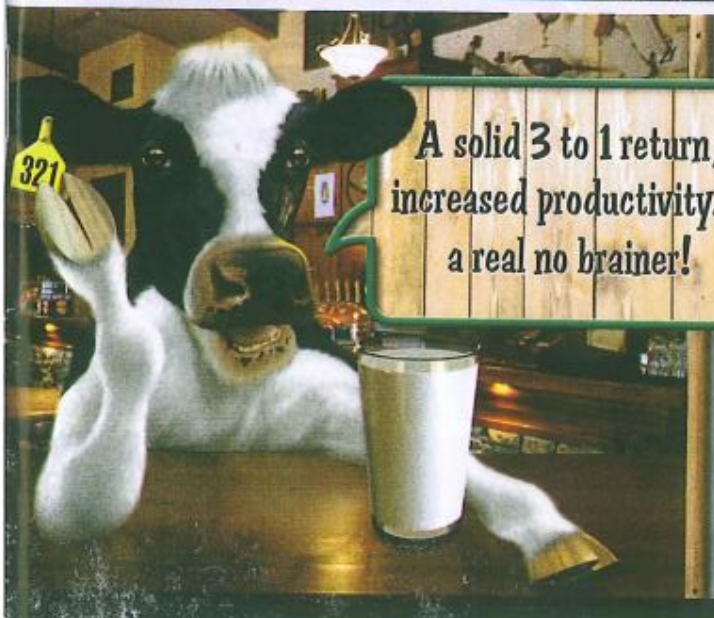
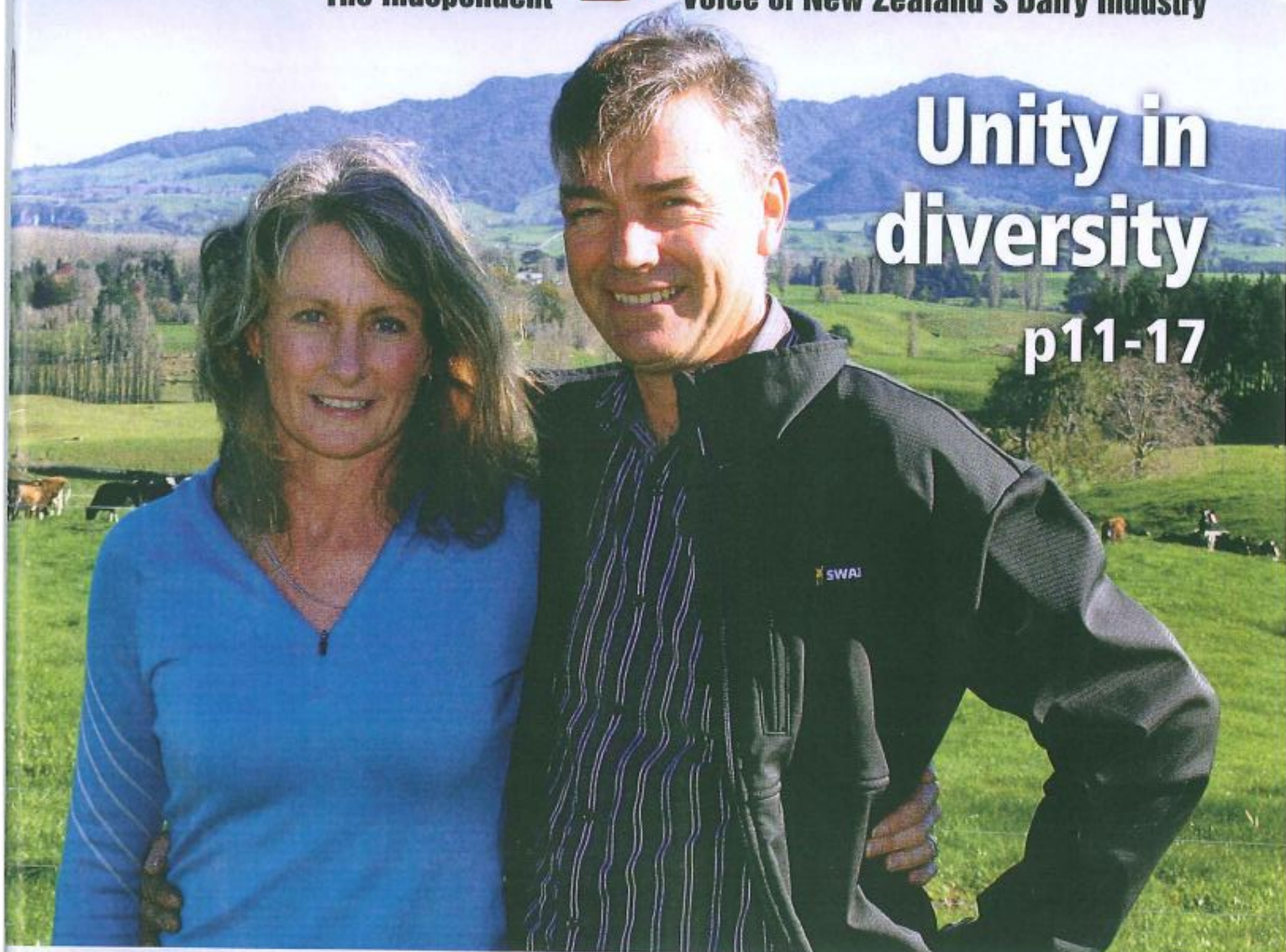
The Dairyman

The Independent Voice of New Zealand's Dairy Industry

July 2010

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p11-17



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Constructing lined effluent ponds

By VAUGHAN PODBIELSKI

GAS drainage is the responsibility of the main contractor, effluent consultant or project engineer to determine the type and design; this can be installed by most lining installation contractors during the installation of the liner.

Gas can occur from either decomposition of existing organic matter in the sub grade, a rising water table displacing inter particle gas in-between the water table and base of the pond or decomposing effluent. Effluent can either be pre existing in the soil, if it was once a clay/earth effluent pond (EP), or even in a Greenfield site if a liner gets damaged (by a stirring or agitating device/stock etc).

The breakdown of organic substances during the storage of effluent emits ammonia (NH₃), carbon dioxide, methane and, in anaerobic conditions, hydrogen sulphide (a toxic gas). To avoid the production of H₂S, it is necessary to agitate (aerate) the stored material frequently.

If a gas drainage system has not been installed and gas hippos develop (result of rising gas bubbles), in most cases, a new liner will need to be reinstalled from scratch which will be very costly. Since accidents do



Gas hippos can develop if a drainage system has not been installed.

happen, it is recommended to plan for a gas drainage system in every EP, even if pre-existing gas is not evident. For a gas drainage system to operate effectively, there should be a minimum fall in the base of 2 per cent to allow for positive gas movement.

Gas can be drained using a variety of products, provided they don't clog, crush or impact on the Geomembrane. The preferred

method is using a thin flat drainage strip (geospacer wrapped with a geotextile) like Wavin Solpac, which is then laid into a grid pattern spaced roughly 4m apart. This should ensure any gas generated under the liner is captured by the gas drainage network and vented out correctly. Approximate cost is 3 per cent of overall lining installation.

• continued page 52

Gas drainage being installed.



Inspection Well

As previously mentioned, the water drainage network under all lining membranes should lead to an inspection or witness well which allows for ongoing immediate leak detection. This allows for any liquid collected under the Geomembrane to be inspected and tested if required. If the liner is leaking due faulty workmanship, damage caused by stirrers or cracked welds, this will become apparent in the liquid drained from under the pond.

In future, it is likely the cost and responsibility to prove annually that one's effluent pond is not leaking will be a cost incurred by the farmer. Therefore, this relatively easy and inexpensive system to install during construction

will be very cost effective long term and should more than satisfy most council requirements as well as providing peace of mind to the farmer that his pond has been installed correctly and is performing as intended by containing all liquids.

The concrete, or PVC, inspection well should have a minimum diameter of 400mm and should be a little deeper than the deepest part of the pond to allow for gravity fed drainage of the captured water, or effluent in the event of a leak.

The effluent consultant/project designer should then allow for an outlet from the well to a suitable point, which should include a shut off valve, in the event that a leak is discovered.

Geotextile Underliners

Most, if not all, leading lining manufacturers recommend the use of a geotextile underliner in conjunction with their Geomembrane, applied to the sub grade before the membrane is installed.

This is similar to a carpet underlay and adds protection to the all important Geomembrane from puncturing, once the dam starts filling.

The thickness of underliner is site specific according to the sub grade condition and depth of pond, but should have certain minimum puncture resistance greater than or equal to 2kN and a weight greater than or equal to 300g per square metre.

Next month, will cover off the final aspects to be considered for lined effluent pond construction.

Note: These guidelines are only a summary of some of the design and construction issues which need to be considered when constructing and lining a pond. A design professional should be consulted for specialist site specific advice. A more in depth design manual called "Firestone Installation Guideline" is available at www.cosio.co.nz or available as a summarised "Pocket Guide", from Cosio Industries.

• *Vaughan Podbielski is product manager for Cosio Industries - New Zealand distributors for Firestone EPDM Liners*

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