18 September 2002

Mr Gavan Dwyer
Great Barrier Reef Study
Productivity Commission
LB2 Collins Street
MELBOURNE VIC 8003

Dear Mr Dwyer,

Re: Industries in the Great Barrier Reef Catchment and Measures to Address Declining Water Quality

CK Life Sciences is a biotechnology company dedicated to developing products to improve the quality of life in two areas – environmental sustainability and human health. One of the products which we have developed is an eco-fertiliser named NutriSmart. NutriSmart has been trialed in over 65 locations across 12 countries, including the states of Queensland and South Australia in Australia. Results have proven that this eco-fertiliser produces yields similar, if not better, than chemical fertilisers, without causing nutrient leaching into the soil or nearby water bodies.

NutriSmart was launched in Queensland last December. Through the introduction of the product in Australia, we have gained considerable insights in the area of sustainable agriculture in Australia. Understanding that the Productivity Commission is preparing a study on the Great Barrier Reef water quality problem, we would like to share some of our views on the issue in this submission.

We believe that the key to successfully alleviating the water quality problem in the Great Barrier Reef is one which tackles the source - a solution that both generates productivity yields for farmers and protects the environment. The catalyst for the promotion of such a solution will be the Australian Government.

Judging from the current situation, the most effective remedy to resolve the chemical run-off problem is to locate alternative(s) to traditional chemical fertilizers, ascertain the effectiveness of such eco-fertiliser products (both in terms of yield productivity and environmental benefits), and adopt the usage of such eco-fertilisers. Any other methods, such as improved farming practices or codes of practice for precision fertiliser application, can at best minimise the problem, but not solve it.

Along this line, it is recommended that the government carry out the following initiatives:

1. Conduct research and verify effectiveness (yields and environmental benefits) of non-contaminating eco-fertiliser(s)
2. Introduce effective policies to encourage farmers to use such eco-fertilisers
3. Eliminate chemical run-off by introducing policies to discourage use of chemical fertilisers

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4. Provide assistance to eco-fertiliser manufacturers which are new market entrants in the form of subsidies, tax relief or other ways
5. Work with farmer associations, environmental groups and other related parties in communicating the win-win benefits of such solutions.

CK Life Sciences is prepared to take on any participatory role to work with the Australian government, the farmer associations and the environmental groups to bring this win-win solution into reality.

We have earlier commissioned The Rowland Company in Queensland to prepare a paper on the chemical run-off issue being faced by Great Barrier Reef issue and eco-fertilisers' role in solving the problem. Attached is the study for your reference.

We would like to express our compliments to the Federal and the Queensland governments for taking the lead in resolving the water quality issues which are affecting the Great Barrier Reef. It is a treasure to the world and we should all work together to preserve this natural wonder.

Yours faithfully,

H L Kam
President and CEO

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Prepared by The Rowland Company

Commissioned by

CK Life Sciences Int'l Inc

INTRODUCTION

Excessive use of chemical fertilisers causing run-off from agricultural enterprises into the Great Barrier Reef has the potential to damage this unique marine treasure beyond repair.

To solve this phenomenon, the most ideal scenario would be to adopt the usage of non-chemical fertilisers which can achieve improvements to agricultural productivity and be environmentally friendly to the Great Barrier Reef. No compromises should be made.

Farmers have found themselves at the heart of this issue through no fault of their own. Chemical fertilisers have been the norm for many years. But it is now time to take decisive action that will benefit all participants, the community and the environment, without requiring sacrifices from any party.

Government and farmers can become partners for change in a revolutionary initiative that could eliminate chemical run-off into water sources, with potential for application in other areas, such as in the environmentally troubled Murray Darling Basin.

While the government and the community in general acknowledge the issues, effective action must be taken as quickly as possible before the problem becomes insurmountable.

The Federal Government should be commended for its initiative and foresight in focusing on the issue through this Productivity Commission Review. Its focus on highlighting impacts on the Reef and finding solutions will be invaluable for the future health of this international treasure.

SUSTAINABILITY ISSUES IDENTIFIED

The key sustainability issues already identified in a wide range of information relating to chemical run-off into the Reef include:

- Nutrient management
- Chemical management
- Soil acidity
- Water quality
- Sustainability of soil resources.

These issues are further discussed in Attachment One.

THE PROBLEM

The problem with traditional agricultural chemicals is that they can accumulate in the soil and leach into nearby rivers, lakes and bays.

The damage they cause can be enormous, as we have seen with the problems in the Great Barrier Reef and accumulations of blue-green algae in rivers and lakes.

The majority of activities undertaken to deal with chemical run-off tend to focus on farm design mechanisms such as drainage and containment – at considerable expense to the farmer – rather than considering alternatives to traditional chemical agricultural products.

THE APPROACH

The approach must be to switch from traditional chemical fertilisers to environmentally friendly fertilisers and address the problem at the source.

To do this, the government must consider:

- Identifying the availability of non-chemical fertilisers which are both economically viable (ie produce good or better yields than existing fertilisers, at the same price) and environmentally friendly. (NutriSmart, an eco-fertiliser developed by CK Life Sciences is one such products - see attachment Two for further details.) Providing grants to conduct trials in such fertilisers to ensure they will meet the needs of farmers and the environment

- Providing incentives to farmers to use non-chemical fertilisers

- Introducing penalties for leaching over a certain limit.

RECOMMENDATIONS IN DETAIL

Recommendation one – Incentives for developing eco-fertilisers

Eco-fertilisers are critical in the rehabilitation of the environment and to support long-term agricultural development. Incentive schemes should be introduced to identify or develop eco-fertilisers in Australia or import the technology available to develop these environmentally friendly fertilisers.

Activities previously identified to deal with nutrient run-off focus on mechanisms such as drainage, containment, ponding and revegetation of riparian areas, however these changes can be costly and take some time to implement. To facilitate change quickly and cost effectively with minimum disruption to farm management, the focus must shift to alternative uses to chemical fertilisers.

Environmentally friendly fertilisers which eliminate pollution caused by the leaching of excess nutrients would clearly be of benefit to the environment and to farmers, as well as to other activities dependent on regular use of fertilisers. Australia's reputation as leaders of innovative technology could surely be brought to bear in this area.

Recommendation two – Incentives to use non-chemical products

The Hildebrand report, *An Independent Assessment of the Sugar Industry, 2002,* made reference to the possible use of incentives, shared funding and cost sharing to achieve a more sustainable future.

Incentives from Government must be implemented for farmers to use non-chemical fertilisers which do not impact on the environment. The incentives may apply in the form of a rebate on non-chemical fertilisers when purchased, or as part of an arrangement managed by industry associations. The incentives must be offered over a certain time frame to drive true change in the industry and achieve results as quickly as possible.

Recommendation three – Legislation to drive change

To demonstrate the commitment of the Government and to provide firm guidelines for industry, legislation could be produced to include standards for performance and use of non-chemical fertilisers.

The Government's incentive payments, as well as penalties for non-performance, could be linked to this legislation.

For example, if nutrient run-off standards are set at a certain level and a farmer achieves better than that standard through the use of non-chemical fertiliser, they may be eligible for an incentive payment from the Government. If a farmer does not achieve the set standard, they may be required to pay a penalty.

Standards for such legislation could be drawn from regional catchment monitoring systems, which would also provide the means to gauge compliance on an ongoing basis.

ATTACHMENT ONE

Nutrient management

Improper use of fertilisers has the potential to threaten the productivity and sustainability of cane land and the surrounding ecosystem.

On-farm impacts of fertiliser application include raising the pH of the soil, which can cause soil acidification and increase the amount of heavy metals in the soil, thereby preventing the plant from taking up certain nutrients. Soil acidification, combined with depletion of soil organic matter, reduces the soil's nutrient holding capacity. This can result in a reduction in the productivity of the soil, requiring a higher level of fertiliser application – which in turn can increase the likelihood of nutrients being leached from the soil profile. Nutrients move off the farm with water-run-off and drainage, entering groundwater and streams and potentially spreading to freshwater and marine ecosystems. The removal or degradation of filters such as wetland and riparian vegetation helps the transfer of nutrients to waterways and further exacerbates associated water quality problems.

The most recent estimate of increases in run-off of phosphorus and nitrogen from the land to Great Barrier Reef World Heritage Area (GBRWHA) compared to pre 1800 levels is a 6 to10-fold increase in phosphorus and a 2-fold increase in nitrogen. [1]

Information presented at a soil conference in Sydney in April 2002, by David Butcher of WWF, stated the use of huge quantities of chemical fertilisers over the past 50 years has decreased the natural organic content of the soil and caused a decline in nutrients. [2] Since 1991, the area of soil affected by acidification in Australia increased by an estimated 13 million hectares. Soil acidity is estimated to cost between $90 million and $225 million a year in lost production in New South Wales alone. [3]

Chemical Management

Herbicides and pesticides move off-farm through water run-off or leaching resulting in contaminated water bodies, riparian zones affecting aquatic organisms and seagrasses. The focus of management of chemical residues has largely been on containment of the problem, rather than investigating non-chemical, non-harming products.

Water Quality

Contamination of ground water and streams has occurred due to leaching of nitrates and phosphorus from agricultural land through inefficient use of fertilisers resulting in the reduction of the quality of drinking water. [4]

Acid Sulphate soils

As summarised earlier in the section on Nutrient Management, agricultural practices over the last 100 years has resulted in an increase in soil acidification. The flow on effects of these changes are detrimental to the environment. When waterlogged soil is exposed to the air through agricultural activities (eg. draining of wetlands for cane production) the sulphides oxides produce sulphuric acid, which is then released into aquatic and marine environments, increasing fish morbidity and mortality.

Sustainability of soil resources

The maintenance of soil health of land under cane production is also an issue. Soil integrity can be measured in terms of the level of soil biological activity and chemical and physical properties of the soil in relation to on-farm management practices. On-farm activities, including the use of chemical fertilisers, can lead to a decline in organic matter and a decrease in soil fertility and stability. Poor on-farm management of soil health can impact adversely on terrestrial and aquatic ecosystems, which in turn has flow-on effects as all components of the environment are inter-related and inter-connected.

The Federal Government's State of the Environment Report sounds alarm bells about the future of Australia's soil. The report indicates that if nothing changes, up to 10 per cent of soil suitable for agricultural production will be unusable in 20 years.

This poses a significant threat to agricultural production, the economy and the environment, including the Great Barrier Reef.

In a submission to the Hildebrand Report by CRC Reef, it was noted that run-off of sediment and nutrients to the Great Barrier Reef has increased several-fold as a result of past and current land use practices. Significant concern was expressed that coastal ecosystems in the Great Barrier Reef World Heritage Area are being adversely affected as a consequence of the increase. [5]

The statement noted that while improvements have been made in sustainable land use, other adverse practices continue, including increases in fertiliser application. If more effective action is not taken to reduce run-off of sediment, nutrients and other pollutants, the present threat to the World Heritage Area and adjacent freshwater systems will worsen.

1. Hildebrand, R. 2002, "Independent Assessment of the Sugar Industry, 2002"
2. Butcher, D. 2002, proceedings from "Sustaining our Future through Healthy Soils, Habitats and Biological Diversity Conference, April 2002."
3. Nature Conservation Soil Conference 2002, Fact Sheet
4. Hildebrand, R. 2002, "Independent Assessment of the Sugar Industry, 2002"
5. CRC Reef, Submission to the Hildebrand Report, 2002

ATTACHMENT TWO

NutriSmart developed by CK Life Sciences has the potential to replace chemical fertilisers – it generates similar if not better yield than chemical fertilisers and is environmentally friendly.

Combining six strains of yeast with selected natural ingredients, NutriSmart :

a) provides adequate supply of the key nutrients for plants (nitrogen, phosphorus and potassium) without containing the nutrients themselves in soluble form. This means that there is nothing in the product to pollute the environment.
b) Allows the right amount of nutrients for the plants to be released on a "nutrient-on demand" basis. As such, crops grown using NutriSmart as fertiliser can be healthier than otherwise.

Studies and trials involving 50 different varieties of crops have been conducted in over 65 locations across 12 countries spanning a wide range of soil and climatic conditions. Results have all confirmed NutriSmart's unique performance.

These tests include those carried out in cold countries such as Canada, warm countries such as Thailand, with crops and plants ranging from trees, oranges and turf in US, tulips and potatoes in the Netherlands, to lychees, tea leaves and rice in China, and vegetables in Australia.

Encouraging results were obtained in almost all tests conducted by research institutions and other partners, including:

- Universities and academic institutions, such as University of Hong Kong, University of California Riverside, and University of Bonn
- Scientific research institutes, such as the South Australia Research and Development Institute (SARDI)
- Commercial growers, such as those who participated in trials arranged by Primac Elders Ltd., one of Australia's largest agricultural companies.

Products of this nature have to form part of any response to fully address the problems facing the Great Barrier Reef and provide a true foundation for an environmentally sustainable future.