MINE LAKE AQUACULTURE PROPOSAL

Working together to create local community assets, employment and enterprise from final mining voids.
# NGALANG BOODJA ENTERPRISE PROJECT PROSPECTUS

## TABLE OF CONTENTS

- NBE Chairperson letter ................................................................. 5

## PROJECT PROPOSAL

- Executive summary ............................................................................. 6
- NBE’s objectives in Africa ................................................................. 8
- Benefits to mining company .............................................................. 8
- Proposed feasibility study ................................................................. 9
- Proposed management structure ...................................................... 9
- NBE personnel .................................................................................. 10

## NGALANG BOODJA MINE LAKE AQUACULTURE PROJECT

- Overview of Ngalang Boodja Mine Lake Aquaculture project .......... 11
- Project governance ............................................................................ 12
- Capacity-building activities ............................................................. 13
- VET training courses ........................................................................ 13
- Native plant propagation and revegetation activities ...................... 14
- Achievements ................................................................................... 15
Dear Sir or Madam,

Re: Proposal to conduct a mine lake aquaculture project at a final mine void site in Africa

An award-winning mine void rehabilitation business model delivering significant benefits to the Western Australian community of Collie is now available to Africa.

This innovative business - the first of its kind in the world - provided a cost-effective and proven means of transforming a liability into an asset, at the same time offering training, education and job opportunities to Indigenous people in an area of high unemployment and socio-economic deprivation. It also created a legacy enterprise for the community.

The project showcased how aquaculture can successfully link with mining operations to deliver tangible benefits to communities by implementing leading water treatment technologies for the rehabilitation and future commercial use of mine voids.

Such a venture has potential to attract substantial international interest and build sustainable relationships that could underpin your mining operation’s social licence to operate.

As we progress into the twenty first century, there are increasing pressures and awareness of the need to provide “sustainability” of environmental and social settings in which mine pits are closed. Legislation governing mine-pit closure and subsequent liability and maintenance of mine lakes require careful mitigation of both socio-economic and environmental impacts. The closure process and rehabilitation expenses represent sizable costs and long term liabilities for mining companies and there could be realizable savings from avoided closure expenditure by adopting innovative post-closure initiatives.

The Collie mine lake aquaculture business has already attracted widespread interest in Australia where environmental issues are at the forefront in today’s industry practices. Such was the success of the Collie project, Wesfarmers Premier Coal was awarded the Western Australia Department of Environment Award for Corporate Business Leading by Example in 2009.

With 10 years of research, over a $1million in funding and experienced professionals in the key positions, Ngalang Boodja Enterprises (NBE) has a proven track record in large-scale mine rehabilitation.

The unique system is ideally suited to mine lakes which are located in low socio-economic areas, especially in locations where over fishing may have occurred or in areas where water is the limiting factor in the development of aquaculture.

The benefits by way of international recognition, prestige and foreign interest that will accrue to the first mining company in Africa to implement this visionary initiative are vast - and there is now an opportunity to embrace this tried and tested technology in Africa.

Norman Hayward
Board Chair
Ngalang Boodja Enterprises Pty Ltd
Ngangal Boodja Enterprises (NBE) has formed a development arm that is looking to introduce a now proven technology, mine lake aquaculture, and a successful community engagement model to Africa. NBE aims to form a partnership with a mining company operating in Africa and the local community and start Africa’s first commercial mine lake aquaculture project culturing tilapia, one of the fastest growing and economically important aquaculture species in the world.

There is an increasing need for companies to engage with communities in the areas they are conducting mining operations and actively contribute to economic growth, capacity development and social capital of these communities as well as minimise the environmental impacts of their mining operations. The proposed project described in this prospectus is one way to achieve these goals.

NBE’s approach, used with significant success in Western Australia, is the creation of fish farming and plant propagation infrastructure as part of the rehabilitation process and building the capacity of the local Indigenous community to manage the fish farming and plant production operations. The infrastructure can then be used to generate employment and profits for community development projects as a training pathway resource for staff.

The technology proposed in this prospectus was developed through a five-year project conducted in Collie, Western Australia by a consortium of organisations including the mining company on which the farm was built, Premier Coal, the WA aquaculture peak industry body, ACWA, a local fish processor and the local Indigenous corporation representing the Collie Noongar community, Ngangal Boodja Council Aboriginal Corporation. The project provided a cost-effective and proven means of transforming a liability into an asset, while at the same time offering training, education and job opportunities to Indigenous people in an area of high unemployment and socio-economic deprivation. It also created a sustainable enterprise for the community.

The venture demonstrated how aquaculture can successfully link with mining operations to deliver tangible benefits to remote communities by implementing leading water treatment technologies.
for the rehabilitation and future commercial use of mine voids.

From the results of our several years of silver perch and freshwater crayfish (marron) culture trials in treated mine lake water and our two-year commercial production of marron (www.premiercoal.com.au/TrainingandEducation/AquacultureProject.aspx), we believe there is significant potential to develop a tilapia farm to showcase mine lake aquaculture in Africa.

According to the United Nations Food and Agriculture Organization (FAO) statistics, aquaculture continues to grow more rapidly than all other food production sectors. Worldwide, the industry has grown at a rate of 8.9% per year since 1970. Over the same period, wild fisheries have only increased by 1.2%, while land-based meat production farming has risen by 2.8%. The aquaculture industry has grown more rapidly in developing countries, (10.4% pa) than in developed countries (4%).

Tilapia is the most widely-grown of any farmed fish. They are a close second to carp as the most important farmed fish in the world. The reasons for this are their ease of breeding, fast growth, general hardiness, tolerance of a wide range of environmental conditions, ability to convert organic feed into high quality protein, resistance to diseases, tolerance of activity and handling and their sought-after flavour.

The proposed farm will produce tilapia and also provide resources for the development of community based subsistence farming operations for food production and a community co-operative for growing native plants and engaging in minesite rehabilitation.
NBE’S OBJECTIVES IN AFRICA

The objectives of NBE in conducting the proposed project are as follows:

1. Engage with the mining company, government agencies and the local community to build an integrated aquaculture business that would produce tilapia using the latest and best farming practices currently in Africa as well as provide facilities for subsistence farming by local community members or a native plant cultivation and minesite rehabilitation enterprise by a local co-operative;

2. Build the capacity of local community members for employment and enterprise through education, training and cultural/technical exchange visits with Ngalang Boodja Enterprise staff and community members in Collie, Western Australia;

3. Develop a successful tilapia business that is a stand-alone enterprise after three years, owned and operated by the local community;

4. Evaluate the opportunity and potential for diversification of the fish farm business into minesite rehabilitation and subsistence farming.

The project will be conducted by NBE personnel based in Africa (Richard Clark) and Western Australia (Dan Machin, Louis Evans, Stuart Milne) and governed by an Advisory Board comprising representatives from NBE, the sponsoring mining company, local community and relevant African government agencies.

After three to four years and having trained the local community to operate the farm, the assets and operational management of such will be handed over to the community.

BENEFITS TO MINING COMPANY

In addition to the benefits to the local community, this project will deliver significant advantage to the mining company. The project will provide the opportunity for the mining company to:

1. Pioneer this technology in Africa and be able to position the company as leading innovators of mine lake rehabilitation;

2. Increase their social commitment to the area by way of training, employment and food production;

3. Include this project in the annual sustainability report and benefit from free media opportunities (NBE estimated that it received over $100,000 of free media);

4. Enhance the company’s image through a demonstration of innovative capabilities to problem solving and social responsibility;

5. Avoid high closure costs for part of the site;

6. Improve labor and government relations that could lead to more scope for managing the closure process for other sites;

7. Enjoy international recognition and prestige for initiating a long-sighted, visionary project which takes a waste product from a mining operation and turns it into a commercial asset.
PROPOSED FEASIBILITY STUDY
Upon enquiry we will carry out feasibility studies which will include an assessment on the following:

- Zoo-technical;
- Market survey and analysis;
- Logistics and human and social;
- Financial;
- Government response/ laws and regulations.

PROPOSED MANAGEMENT STRUCTURE
A management structure comprising a farm manager, business consultant and social enterprise entrepreneur will conduct the project in partnership with an advisory group made up of the management team and representatives from the mining company, government agencies and the local community. An Advisory Board will be formed to oversee the project activities and a most appropriate business structure will be formed with the Board of Directors comprising local community members. Governance training will be provided to local community participants, mainly through membership of the Advisory Board. This approach will ensure the farm is a viable, well-managed and productive business delivering benefits to the local community.
The following NBE personnel will be involved in the proposed project:

**Richard Clark**  
*Project Manager*

Richard Clark will be based in Africa and will oversee the construction of the farm and associated subsistence farming lots, provide training in fish production, processing and marketing and manage all of the farming operations.

Richard completed a Diploma in Business from the International College of Management, Sydney, and a Degree in Aquaculture at James Cook University in 2008. He was appointed as farm manager in January 2009 and assisted in the farm construction which was finished in November 2009. Following the completion of farm construction and commencement of farming operations, the farm manager took over responsibility for the day-to-day operation of the farm and provided regular reports to the NBE Board. In 2011 Richard Clark led the creation of the trading arm of NBE – Collie Valley Marron – and achieved the first successful harvest of farmed marron.

**Dan Machin**  
*Aquaculture and Business Consultant*

Dan Machin has over two decades of experience in aquaculture and seafood industry development. Dan has worked along the continuum of roles from Public Company Director, Ministerial Advisory Committees, in senior and middle management positions in businesses (Ireland & Greece); and aquaculture industry development and extension. Dan currently is a member of National Aquaculture Council, Seafood Services Australian and Department of Fisheries FARM Act aquaculture industry reference group, and Executive officer of Aquaculture Council of WA, Australian Abalone Growers Association, and WA Mussel Producers Association. Dan has a BSc. (zoology and botany), Diploma in Business, and a MSc. in Aquaculture.

Dan’s expertise covers a number of areas including:  
- Parliamentary and government relations;  
- Trade and market access;  
- Environmental sustainability accreditation;  
- Managing industry associations;  
- The aquaculture of key freshwater and marine species;  
- Mine related aquaculture projects;  
- Indigenous aquaculture and social enterprise development;  
- Corporate governance;  
- Securing government funding;  
- Mathematical modeling of production data;  
- Reviewing of the published scientific literature to inform business decision.

**Dr Louis Evans**  
*Community Engagement Consultant*

Dr Evans will be responsible for community engagement and government liaison and will coordinate the exchange visits between the Indigenous mining communities in Africa and Collie, Western Australia.

Dr Evans was previously the Professor of Aquatic Science at Curtin University. She established aquaculture as a study discipline at Curtin in the early 1990s before going on to her role prior to retirement as the Executive Director of a State Government Centre of Excellence, the Centre for Sustainable Mine Lakes, based in Collie. Dr Evans has a wealth of experience in managing complex integrated projects and has worked with Aboriginal people on community development projects since 2001. Dr Evans has a Technical and Further Education (TAFE) Certificate IV in Training and Assessment, brings over 30 years of knowledge and experience in education and training and has strong people skills. Her present role is that of CEO of the Ngalang Boodja Council, the parent corporation that is the sole shareholder of NBE, as well as the Finance and Operations Manager for NBE.

**Stuart Milne**  
*Engineering Consultant*

Stuart Milne is an electronic engineer with previous experience in constructing and commissioning aquaculture systems, in particular a recirculating research aquaculture facility at the Curtin University Bentley campus and a 7 pond flow through mine lake aquaculture facility at the Premier Coal mine site in Collie. His research company, Eaglerise Holdings, led the research project on treating acidified mine lake water for the Centre for Sustainable Mine Lakes and designed and installed an innovative limestone treatment system for remediating the mine lake water used in aquaculture operations at the Premier Coal minesite.

Stuart will provide advice and assistance to Richard Clark during the construction phase of the project and, if a mine lake water treatment system is required, design and install this system.
OVERVIEW OF NGALANG BOODJA MINE LAKE AQUACULTURE PROJECT

The aim of the project was to create an asset for the Collie Indigenous community that would act as both a source of income for community projects as well as a facility for training. The major objectives of the project were to:

- Assess the commercial viability of mine lake aquaculture by undertaking a 2.5 ha commercial pilot project;
- Build the capacity of the Ngalang Boodja Council Aboriginal Corporation (NBC) to self-govern the commercial entity within five years;
- Develop long-term “value to community” solutions for existing mine voids; and
- Build the capacity of local people to participate in an emerging aquaculture industry development cluster in the region.

The project had its genesis in a series of Australian Coal Association Research Programme (ACARP)-funded projects conducted in the late 1990s and early 2000s that were aimed at identifying the major source of the acidity in mine lakes in Collie, Western Australia and conducting pilot projects to assess different treatment technologies. Six farm ponds were used to demonstrate the biological feasibility of using the treated water to grow a local freshwater crustacean, marron, and a freshwater table fish, silver perch. Following the success of this project the water treatment system was upscaled and a commercial-sized marron farm comprising 22 marron ponds was constructed on rehabilitated land leased to NBC. The first harvest was successfully completed in 2011 and the second harvest in 2012.

The project has been managed using a co-governance model in which senior members of the local Indigenous community worked with a team of non-Aboriginal
Perhaps the greatest achievement of the project has been the social capital generated through project activities. Advisors to plan and carry out the project. The chairperson of NBC and a non-Aboriginal business advisor acted as co-chairs of Ngalang Boodja Enterprises, the NBC-owned proprietary limited company formed to conduct the project.

In 2012 the inaugural farm manager – an aquaculture graduate with experience in fish farming resigned – and two previous students and employees of NBE, one Aboriginal and one non-Aboriginal, took over management of the farm. The business advisor from the NBE board handed over responsibility and the Aboriginal board members now manage the business.

Perhaps the greatest achievement of the project has been the social capital generated through project activities. The farm has been used as a resource for a series of VET training programmes. Students who were enrolled in twelve different VET courses have since obtained full or part-time employment. The project has been a source of immense pride for the local community and has made a significant contribution to the increasing engagement of Aboriginal people in Collie in civic affairs. It is hard to put a value on this factor – this project succeeded where so many others have failed.

PROJECT GOVERNANCE

The first phase of the project was governed by a leadership group comprising members of the NBC, Wesfarmers Premier Coal, Aquaculture Council of WA and two advisors with expertise in marron farming, seafood processing and Aboriginal capacity building and training. This group had oversight of the construction phase of the project and the establishment of a proprietary limited company, Ngalang Boodja Enterprises Pty Ltd (NBE) with NBC as sole shareholder.

The NBE Board of Management, comprising four senior members of the Aboriginal community and the NBC Chief Executive Officer, was formed with Dan Machin as independent co-chair. Board operations and governance procedures were based on an operations manual developed for the leadership group. The NBE Board took over responsibility for management of the aquafarm project in late 2008 and other members of the original leadership group continued to contribute in an advisory capacity. The board ensured that there were clear links between strategic and operational objectives and risk management strategies.

The project’s governance had three distinct phases:

- Project development;
- Project steering;
- Business development oversight.

The key to each phase required that the company’s governance standards were maintained in accordance with operating guidelines developed for the leadership group and subsequently adopted by the NBE.

Over the period of the project, the NBE board conducted its business in accordance with the Australian Standard of good governance principles (AS 8000—2003).

The key metrics for the board’s performance were:

- To formulate, implement and monitor a clear strategy and internal controls and delegations;
- Monitor solvency stress;
- Monitor compliance with delegation authority;
- Monitor staff retention and satisfaction;
- Review board culture, governance standards and policies;
- Review board governance structures and charters;
- Review board composition to ensure it has the necessary experience, skills and expertise.
**VET TRAINING COURSES**

A total of twelve VET certificate courses, or parts thereof, were conducted from 2007 to 2010 including Certificate I in Leadership Development (3), Certificate II in Rural Operations (4), Certificate III in Rural Operations (1), Certificate III in Aquaculture (1), Certificate II in Tourism (1), Certificate III in Tourism (1) and Certificate II in Business Administration (1). Topics covered in these courses included integrated aquaculture, aquaculture stock and water quality management, marron farming, native plant production, written and oral communication, leadership development, tourism and business administration.
NATIVE PLANT PROPAGATION AND REVEGETATION ACTIVITIES

Two projects funded through DAFF were conducted, each one year in duration, as follows:

1. The Integrated Aquaculture Pilot Project provided opportunities for project participants to engage with experts in integrated aquaculture, food technology and seed production industry and develop knowledge and understanding of how to manage and operate aquaculture, farm forestry and other farming enterprises.

2. The Native Plant Propagation Project developed awareness of challenges of climate change and provided opportunities for Indigenous youths and others to develop native plant propagation skills. A business plan for an Aboriginal-managed native plant cultivation venture involving the local community was also developed and later implemented.
This pioneering initiative - the first of its kind in the world - provided a cost-effective and proven means of transforming a liability into an asset, at the same time offering training, education and job opportunities to Indigenous people in an area of high unemployment and socio-economic deprivation. It also created a sustainable enterprise for the community.

The project showcased how aquaculture could successfully link with mining operations to deliver tangible benefits to remote communities by implementing leading water treatment technologies for the rehabilitation and future commercial use of mine voids.

Such a venture has potential to attract substantial international interest and ticks all the right boxes for mining companies seeking to lead the way in the fields of environmental and social responsibility.
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