

3. PROJECT RATIONALE

This chapter outlines the rationale behind the development of the project as described in Chapter 5. It describes the:

- Commercial, environmental and social objectives Minemakers will use to guide the development of the project.
- Social and economic benefits predicted to result from the development of the project.
- Alternative ways considered to develop the project.

3.1 Project Objectives

The overarching objectives of this project are to effectively and efficiently mine and export direct shipping ore (DSO) from the Wonarah phosphate deposit on a profitable basis. This will be achieved in accordance with the project's commercial, environmental and social objectives, which are to:

- Maximise profits and returns on shareholder investment by ensuring a rapid response to strong global phosphate markets.
- Plan, operate and decommission the project in a manner that is consistent with industry good practice and in compliance with the conditions and standards prescribed by the Northern Territory and, where applicable, Australian governments.
- Develop the project in a climate of public participation and support, and in a manner that maximises its positive impacts and minimises its adverse impacts.

3.1.1 Commercial Objectives

Background

In late 2007 the world market for rock phosphate altered dramatically, leading to a six-fold increase in phosphate prices over the past 18 months. Contributing factors were:

- An increase in demand for general food production.
- An increase in crop production leading to an increased demand for fertilisers.
- Increased demand for phosphate within China.
- A restriction in supply of phosphate from Middle Eastern and North African mines due to capacity limitations.

These factors significantly increased the price of rock phosphate on the world market.

The Global Financial Crisis significantly impacted both the demand for and price of fertilizers leading to a collapse in rock phosphate prices. However, current phosphate prices are approximately US\$110/t (as at 11 November 2009), significantly above the long run average price of US\$50/t.

Timing

Given these conditions, Minemakers' primary commercial objective is to be the first Australian mine to supply the world market with rock phosphate. This will allow the company to build a strong and stable competitive advantage over other potential suppliers as well as taking advantage of market demand as it recovers.

The development of the Wonarah Phosphate Project provides this opportunity. Under the current timeframe DSO production will commence mid-2010 (see Figure 5.4, Chapter 5). The exact timing of project commencement will be determined by the time taken to obtain the required permitting, the procurement of goods and services and the prevailing rock phosphate price.

3.1.2 Environmental Objectives

Minemakers' environmental objectives are to minimise environmental impacts at every stage of the project and to do no long-term environmental harm. Minemakers will support these objectives through policy, environmental management systems and management plans. All employees and contractors of Minemakers will be responsible for maintaining company standards of environmental management and care.

3.1.3 Social Objectives

Minemakers' social objectives are to support the Traditional Owners, including the local Wunara community, and where possible, Tennant Creek, through delivering economic and social benefits to them, including the encouragement of Indigenous employment on the project, while minimising the adverse impacts of the project. Minemakers will develop the project with a culture of transparency with the Traditional Owners of the land and in a manner that maximises community support and participation.

3.2 Northern Territory Context

The Northern Territory Government has identified the mineral and resources industries as being vital to the Territory's growth and prosperity. Mining is the most significant contributor to the Northern Territory's gross state product, contributing \$2.5 billion in revenue per year and employing over 4,600 people (ABS, 2008).

To support the mining sector, the Northern Territory Government recently initiated the 'bringing forward discovery program'. Building on the previous initiative 'building the Territory's resource base' the latest initiative bringing forward discovery continues the push for mineral exploration and development projects in the Northern Territory. The program comprises three elements: geoscience programs; industry collaborations; and project facilitation and promotion.

The development of this project is consistent with the Northern Territory's bringing forward discovery program, particularly as the project will bring benefits to the regional, territory and national economies in the form of royalties and taxes, and will provide employment opportunities across a range of industries. In recognition of this, the project has been awarded 'major project status' by the Northern Territory Government.

3.3 Socio-economic Benefits of the Project

The project has the potential to result in economic benefits, such as expenditure during construction and operation, royalty payments and salaries, and employment, training and education benefits. These benefits are discussed below, with further detail provided in Section 6.11 and Appendix 4.

3.3.1 Economic Benefits

Minemakers predicts the following benefits when operating at full capacity (3 Mt/a):

- Total capital investment (e.g., project expenditure and investment in additional infrastructure) of approximately \$107 million.
- Total, unescalated revenues of approximately \$500 million.
- Annual operating expenditure of approximately \$450 million.
- Annual government royalties of approximately \$7 million per annum.
- Annual salaries for Minemakers employees of approximately \$3.5 million per annum (excluding on-costs) and for contractors, approximately \$24.3 million.
- Increased incomes for people elsewhere in the region due to flow on impacts, including local and peripheral communities of approximately \$11.9 million per annum (using the total ABS income multiplier 0.428) (Madden, 1994).

The economic benefits outlined above will be experienced at the local and peripheral community level, as well as the territory and national level.

Local Community

The local community, i.e., the residents of Wunara located 10 km east of the project, will receive direct financial benefit from the project. There is the provision for the payment of royalties to the residents of Wunara (Traditional Owners of the project area) within the mining exploration agreement and the mining land use agreement. The payment of royalties has been negotiated with and through the Central Land Council (CLC).

There is potential for employment of local community members. The Traditional Owners of the project area have shown interest in employment opportunities with the project, with six Traditional Owners currently employed in the mining of a bulk sample for the project. Further, there is possibility for the return of community members who have moved away from the area, to country for employment. There will also be some indirect employment benefits to the Wunara community as part of clearance programs where Traditional Owners and the CLC are paid for their role in the land clearance procedures outlined in the mining land use agreement.

Peripheral Communities

Tennant Creek

Minemakers will preferentially employ local people. An estimated 300 people are expected to be employed directly by the project during full scale operations at 3 Mt/a (see Section 3.3.2). Further indirect benefits including the provision of goods and services and sponsorships are expected.

The goods and services required for the operation of the workforce camps will be sourced locally where these are available at commercially competitive prices. The cost of these contracts is estimated to be approximately \$4 M per year when operating at 3 Mt/a.

Minemakers will contribute financially to local sporting communities and clubs, community based training providers and service groups.

Mount Isa

Although Minemakers will preferentially source labour and goods from Tennant Creek and the Northern Territory, where this is not possible or the goods are not available in Tennant Creek, Mount Isa will be the secondary source as it is the next closest regional centre to the project. The Mount Isa community is likely to consequently benefit from this.

3.3.2 Social Benefits

The project is predicted to result in a range of social benefits, including:

- Increased employment opportunities.
- Increased support for communities.
- Training and education.

Workforce

The project will increase the number and variety of employment opportunities at the local, peripheral, territory and possibly national level.

The construction phase of the project is expected to employ 50 to 100 people over a period of approximately eight months. During 3 Mt/a operations, the mine will accommodate a predominately fly-in-fly-out mine workforce of approximately 120 people, including project management, crushing and screening staff and contract mining workforce. A road haulage workforce of approximately 180 drivers and support staff are expected to be based at an accommodation village at the multi-user hub outside and north of Tennant Creek. It is expected that local people will be employed during the operation of the accommodation village in positions such as catering, cleaning and maintenance.

The Australian Bureau of Statistics (ABS) (Madden, 1994) expects that the employment flow-on from mining operations is generally a multiple of 1.588 for each position directly related to the running of the operations. Considering Minemakers expect to directly employ a total of 300 people, then the flow on employment benefits would be in the order of 475 people locally and regionally.

Sources of Labour

The workforce will be preferentially sourced from the local, regional, territory and then national level. Providing employment opportunities for the local community will be a priority and will be determined by the skills of people living in Wunara and Tennant Creek.

Sourcing labour from within the existing, local, labour market will increase local employment opportunities and may provide incentives for more skilled workers to move to the area and for skilled workers who have left the area to return to country. This type of structural adaptation in the

workforce is common to the entry of any new industry into an area and is likely to create opportunities for both the existing and future workforce.

Minemakers will preferentially source labour from Wunara and Tennant Creek; the secondary sources will be Mount Isa and Darwin (see Section 3.3.1).

Training and Education

Once employed, Minemakers' employees and contractors will receive job-related training and education. This will provide those trained with skills, experience and knowledge that should be able to be applied elsewhere after closure of the mine. Training opportunities offered directly by Minemakers will include occupational health and safety training and other associated on-site training and external accredited qualifications as required.

Minemakers is currently consulting with local training providers in Tennant Creek and Darwin about the training needs for the required workforce. It is anticipated that local training providers will tailor courses they offer to allow local residents seeking employment with the project to gain the required skills and qualifications prior to the project commencing.

3.4 Alternatives

Resource development projects are restricted in the manner of their development in the following ways:

- Physically, by the location of the ore body and the climatic, topographical and geotechnical constraints imposed by the surrounding landscape.
- Economically, by the need to extract and process the ore profitably.
- Environmentally, by the environmental sensitivities of the project setting.
- Socially, by the expectations and concerns of affected communities.

The current project design represents the optimisation of engineering, economic, environmental and social considerations. These will be further refined during detailed design; however, the rationale for the proposed development of the project, including examination of the option of not proceeding with the project, is presented below.

3.4.1 Not Proceeding with the Project

A fundamental constraint of all mineral resource developments is that they can only occur where a commercial deposit is found. Exploration of the Wonarah phosphate deposit has been undertaken since the late 1960s; however, further development of the deposit has not occurred previously because of the low price of phosphate and distance to port. Therefore, the most basic alternative to consider is that the project does not proceed.

The direct consequences of not proceeding with the project can be summarised as follows:

- The social and economic benefits described in Section 3.3 will be lost at all levels, i.e., local, regional, territory and national. In particular, the jobs created directly at the mine during construction and operations and indirectly through the infrastructure and services required at the mine and in Tennant Creek will not be available.

- The environmental (land, water, air and amenity) impacts associated with the development of an open pit mine discussed in Chapter 6 will not occur.

The world has a growing demand for phosphate, primarily due to increasing crop production and demand for food. If the project does not proceed, the opportunity for filling the widening gap between the existing global phosphate production and global demand by this project will be lost to the Northern Territory.

3.4.2 Alternative Locations for the Project and Infrastructure

Open Pits

There are no alternative locations available for the open pits; the location of the pits reflects the location of the economic portions of the deposit. The areas to be mined in Stage 1 have been selected based on accessing the areas of the deposit that will provide ore of sufficient grade (30% phosphorite) to allow the material to be shipped directly to market, i.e., no beneficiation of the ore will be necessary. Minemakers has designed the final pit dimensions to maximise the amount of ore to be retrieved while minimising waste and direct environmental impact from the pit.

Borefield

Groundwater offers the only source of reliable water within the region. The borefield location is based on providing the necessary groundwater yields as close as possible to the other project infrastructure. Initial testing of the availability of groundwater for the project indicated flows within the Mineral Lease as being inadequate for the ongoing operations of the project. Further testing was undertaken north of the Mineral Lease yielding much better results, and as such was identified as the most suitable area for water extraction. The final location of the borefield and the water supply infrastructure has been selected based on minimising the potential disturbance to flora and fauna and areas of cultural heritage significance.

Other Infrastructure

The location of the other project infrastructure has some flexibility within the Mineral Lease boundary and has been configured to reduce the carbon footprint of the project as much as possible (primarily by reducing haul distances and therefore diesel fuel consumption) and to support Minemakers' environmental policies and objectives. The location of infrastructure is based on the following principles:

- Main Zone is the larger and higher grade deposit and therefore over the life of the entire project will produce more tonnes of ore than Arruwurra. Therefore, to minimise cost and energy expenditure, the majority of infrastructure will be located as close to Main Zone as is reasonably possible.
- Placing infrastructure in low lying areas will pose an unacceptable risk of damage by flooding. Therefore, all infrastructure will be situated on high ground to avoid such risk.
- Topography will be used wherever possible to assist in minimising earthworks. The alternative of not using available topography will add unnecessary costs and increase the footprint of the project and its impacts and is not in keeping with Minemakers' economic and environmental objectives.
- Gravity will be used wherever possible to minimise pumping and/or the size of pumps required and therefore reducing power and equipment requirements.

- The prevailing wind direction is from the southeast. The accommodation village will be placed sufficiently far down-wind of the open pits and crushing and screening plant so as to avoid noise and dust becoming a nuisance to the village residents. An alternative location up-wind to the east was considered. However, it was determined that it would potentially require traffic moving to and from the village to cross active operating areas, it would be remote from all of the other infrastructure and services and would require power and potable water to be reticulated some distance to the village.
- Wherever elements can be placed in areas that will be disturbed by subsequent mining, the opportunity has been taken to do so; this will minimise the area of disturbance associated with the project. This applies to temporary stockpiles, haul roads and the crushing and screening plant.

Traditional Owner requirements have been accommodated in the location of infrastructure. For example, the access road has been located to avoid two Indigenous cultural exclusion zones specified by the CLC.

3.4.3 Alternative Mine Closure and Rehabilitation Options

The intent of mine closure and rehabilitation will be to return the land as close as is reasonably possible to its pre-mining condition, suitable for use by the Traditional Owners and as habitat for flora and fauna. The mine closure and rehabilitation plan (Appendix 5) has been developed considering the relevant aspects of the following codes and best practice guidelines:

- The Leading Practice Sustainable Development Program for the Mining Industry - Mine Closure and Completion guidelines (DITR, 2006).
- The 10 principles of 'Enduring Value', i.e., the Australian minerals industry framework for sustainable development (MCA, 2004).
- Strategic Framework for Mine Closure (ANZMEC, 2000).
- Team NT: Technologies for the Environmental Enhancement of Mining in the Northern Territory Toolkit (NTMC, 2004).

Overall the mine closure and rehabilitation plan has been developed to return the disturbed areas to pre-disturbed or other agreed conditions as soon as possible.

The majority of the pits will be progressively backfilled to some degree; however, final voids will remain when operations cease.

The mining sequence, size and relative locations of pits will determine the extent to which each can be backfilled. It has been estimated that were the remaining voids to be backfilled, post the cessation of mining, that the cost would be in excess of \$250 M. This would impose a significant cost impost on the project that would severely impact its economics to the point where it may well not proceed.

The final configuration of waste rock storages has been designed to minimise visual impacts, minimise erosion, minimise clearance of vegetation and maximise the likelihood of long term rehabilitation success. The waste rock storages that remain will be 20 m in height. Lower elevations for these waste rock storages were considered; however, reducing the elevation

significantly increases the disturbance area. As such, a 20 m elevation was considered an appropriate compromise between disturbance area and visual/landscape impact.

3.4.4 Alternative Sources of Raw Materials

Goods and Services

Raw materials and services for the project will be sourced preferably from Tennant Creek or Darwin. Where items are not competitively available, alternative sources for raw materials and services may be Mount Isa, Queensland, or Adelaide, South Australia. However, Minemakers' preferred option is to source goods and services locally.

Water

Supply of water from groundwater bores is the only commercially viable means of providing the required amount of water to the project. Other options for water supply that have been considered include water delivered via a pipeline or trucked from Tennant Creek. These have been discounted due to impracticalities, limited availability and prohibitive expense.

Power

Power will be sourced from an on site power station developed specifically for the project. The station will be fuelled by both diesel and natural gas; however, where possible natural gas will be used to minimise carbon dioxide release. Natural gas burns more cleanly than other fossil fuels, such as oil and coal, and produces less carbon dioxide per unit energy released. For an equivalent amount of heat, burning natural gas produces about 30% less carbon dioxide than burning petroleum and about 45% less than burning coal (NaturalGas, 2004). Combined cycle power generation using natural gas is thus the cleanest source of power available using fossil fuels.

Sourcing power from the closest power grid, at Tennant Creek, is not practical due to the prohibitive cost required to construct the transmission lines. Minemakers is currently investigating the potential for incorporating solar power into the energy supply for the project. Initial discussions with a potential supplier has indicated that, depending on the demand curve, a nominal 0.8 to 1.7 MW class photovoltaic array field with some short term storage capacity is achievable in the Tennant Creek region and could supply 20 to 30% of the energy required. The economic viability of this is currently being assessed.

The photovoltaic cells could be deployed at a central generation site adjacent the prime generator facility or they could be decentralised to the points of highest load on ground-based or rooftop mounted arrays.

3.4.5 Alternative Transport Options

Ore will be transported by road trains to the multi-user hub outside and north of Tennant Creek. A rail link between the project area and Tennant Creek has been considered; however, for Stage 1 of the project the cost of design, construction and operation of the rail link is economically prohibitive (estimated to be in excess of \$500M).

From Tennant Creek, ore will be transported by rail to the East Arm Port in Darwin. Minemakers considered transporting ore by rail to Port Adelaide. However, given the location of likely

phosphate markets and the ease of access to these areas from Darwin and the longer rail haulage distance, Port Adelaide was not considered to be a preferable distribution point.

Transport of ore by truck to Mount Isa, Queensland, has been considered by Minemakers for distribution of ore to the market. The company's investigations have revealed that the railway from Mount Isa to Townsville has limited capacity to accept additional freight and this alternative was discounted.

3.4.6 Alternative Extraction and Treatment Technologies

The Arruwurra and Main Zone deposits will be developed using a combination of conventional shallow open pit and strip mining methods, which allow for progressive rehabilitation to occur. Shallow open pit mining techniques utilising hydraulic excavators and off highway trucks are the best option for the mining of this particular ore resource. Drag line mining has been considered for the project; however, the size and depth of the ore body is much more suited to extraction by shallow open pit mining. Drag line mining is generally used for much more extensive ore bodies with deeper overburden.

Extracted ore will be crushed and screened on site before transport. At this stage further refined processing on site is not required as the project is viable with the export of DSO only. The minimal treatment required for DSO also allows for rapid development of the project and export of ore.

3.4.7 Alternative Environmental Management Technologies

In keeping with its environmental objectives, Minemakers will use environmentally-sensitive technologies where practical. The use of alternate fuels (e.g., compressed natural gas or bio-diesel) will be considered as the technology advances and becomes readily available. However, at this stage the availability in Australia, and therefore the costs of alternate fuels, are prohibitive to large projects such as this. Similarly for solar power, as discussed above (see Section 3.4.4), available technology and prohibitive costs prevent its use as a sole power supply.

Minemakers will use readily available power-efficient lighting and infrastructure design to reduce costs and greenhouse gas emissions from power generation.

On site, used water will be treated in aerobic and anaerobic treatment and clarification systems and then reused where possible. For example, treated and clarified effluent will be used for the bio-remediation of some soils. The alternative of using only bore water for the entire project will require an increase in water extracted from bores and the need for alternative arrangements for the disposal of treated water. Reusing water supports both Minemakers' social and environmental objectives.

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Wonarah Phosphate Project