



## ASSESSMENT REPORT

### PROPOSED MODIFICATION GINKGO MINERAL SANDS PROJECT

#### 1. BACKGROUND

On 30 January 2002, the Minister for Planning approved a development application (DA) from BeMaX Resources NL (the Applicant) for a mineral sands mine with associated facilities, known as the Ginkgo Minerals Sands Project (the Project).

The Project is located approximately 40 kilometres west of Pooncarie in Western NSW, within the Wentworth local government area (see Figure 1). The mine commenced partial operations in December 2005.

The Project as approved involves a dredge mining operation that will produce approximately 12 million tonnes of ore per year. Floating plant behind the dredge would concentrate the ore to produce 576,000 tonnes a year of heavy mineral concentrate (HMC). The HMC would then be transported via road trains to a Mineral Separation Plant (MSP) in Broken Hill for further processing. The MSP operates under a separate development consent, granted by the Minister on 27 May 2002.

The Project will generate approximately 100 jobs for the people of Western NSW.



## 2. PROPOSED MODIFICATION

The Applicant is seeking to modify its consent for the Project. The proposal involves two unrelated components:

- (i) modifying the overburden replacement method; and
- (ii) revising the classification of waste materials to be transported from the MSP to the mine for disposal.

### **Overburden Replacement**

The consent allows the replacement of overburden via an overland conveyor system. Overburden is excavated from in front of the advancing dredge mining operation, and transported via conveyor to behind the mined area, which is progressively rehabilitated (concept shown on Figure 2). Overburden removed during the first months, when there is insufficient area behind the dredge pond, would be deposited in an overburden emplacement on the northern side of the mining area (see Figure 3).

The modification proposes to slurry the sandy overburden, and transport the slurry via pipeline to the overburden replacement area or the northern initial emplacement. The northern emplacement would need to be expanded by about 15 hectares to cater for the revised method.

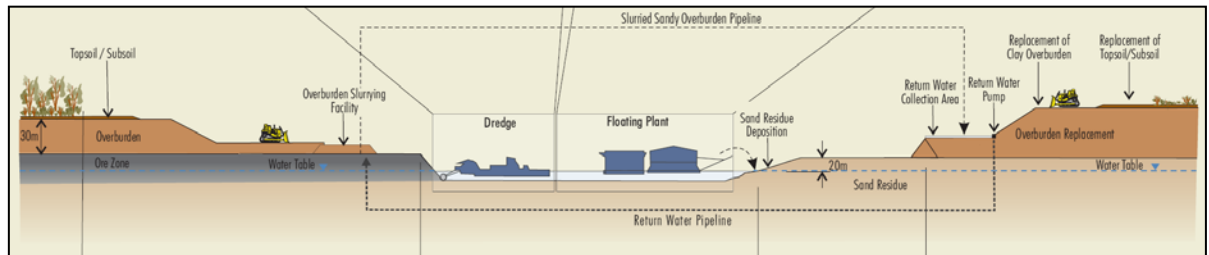


Figure 2: Section showing modified overburden replacement method

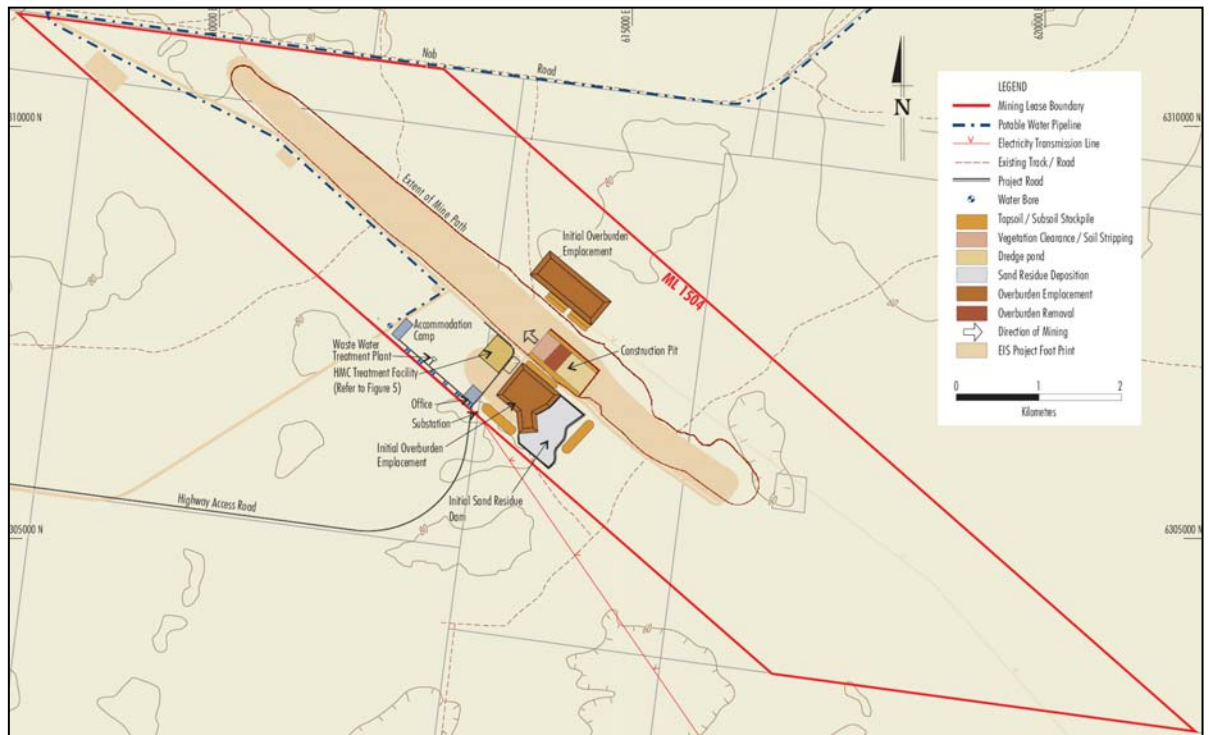


Figure 3: Modified site layout, Year 1 (showing enlarged northern initial overburden emplacement)

### **Waste Reclassification**

The consent allows the transport of waste material (mainly sand) from the MSP back to the mine, for disposal in the dredge mining void. This waste material includes monazite, which is a radioactive material and is a source of the radioactive element thorium.

At the time of the DA, the Applicant considered that the diluted monazite waste material would be classified as 'industrial' or 'inert' waste under the EPA's *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes*. The EIS recognised that further assessment would be required to confirm radioactivity levels.

These further assessments have now been undertaken and indicate that the MSP waste would be classified as 'hazardous' waste under the EPA guidelines. Approval is sought to amend the consent in this regard. The application also seeks to include some ash waste from the MSP operations in this waste stream, which is classified as 'inert' waste.

### **3. STATUTORY FRAMEWORK**

On 6 January 2006, the Applicant submitted an application under section 96(1A) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the proposed modification. The application was accompanied by a Statement of Environmental Effects (SEE) in support of the proposal.

Under Section 96(1A) of the EP&A Act the consent authority may modify a development consent if:

- (a) *'it is satisfied that the proposed modification is of minimal environmental impact, and*
- (b) *it is satisfied that the development to which the consent relates is substantially the same development as the development for which consent was originally granted...; and*
- (c) *it has notified the application in accordance with*
  - i) *the regulations, if the regulations so require,...*

The Minister was the consent authority for the original DA, and is therefore the consent authority for this application. In accordance with the Minister's Instrument of Delegation dated 5 April 2006, the A/Executive Director, Sustainable Development Assessments may determine this application under delegated authority.

### **4. CONSULTATION**

The *Environmental Planning and Assessment Regulation 2000* does not require the application to be notified.

Notwithstanding, the Department has notified Wentworth Shire Council and the relevant State government agencies (DEC, DNR, DPI and RTA).

The **Department of Environment and Conservation** does not object to the proposal and, following the provision of additional information from the Applicant, has provided revised General Terms of Approval for the proposal.

The **Department of Natural Resources** does not object to the proposal, but raised concerns regarding the potential for salinity-related impacts associated with the proposed slurry overburden replacement method, and particularly the potential for salinity to affect the success of rehabilitation, especially trees. This issue is discussed in Section 5 below.

Notwithstanding the concerns, the DNR has provided revised General Terms of Approval for the proposal.

The **Department of Primary Industries** does not object to the proposal.

No response was received from **Wentworth Shire Council** or the **Roads and Traffic Authority**.

## **5. CONSIDERATION**

The Department has assessed the proposal, SEE and submissions on the proposal, and additional information provided by the Applicant, and believes that the following are the key issues.

### ***Land and Water***

#### Overburden Replacement Method

Water for the proposed slurry overburden replacement method would be sourced from the dredge pit, and from water captured and recycled from the deposited slurry. The proposal would not require any water in addition to the Project's existing groundwater licence entitlements.

The water in the dredge pit, which is sourced mainly from the underlying aquifer, is highly saline. This saline water, if not controlled properly, has the potential to impact upon land and water resources by increasing soil salinity.

The SEE states that, because the saline slurried overburden material would be generally unsuitable for use as revegetation material, the material would be covered with at least 3 metres of non-slurried material upon completion of overburden replacement. The Applicant has further advised that the areas subject to 3 metre capping would include the northern initial overburden emplacement, and parts of the mining path. The remainder of the mine path would be covered with significantly greater depth of capping layer.

The Department and the DNR raised a number of concerns regarding the potential for salinity-related impact, including:

- the potential for saline water to leak from the slurried material deposited in the aboveground overburden emplacement to the surrounding environment;
- the adequacy of the proposed 3 metre (minimum) capping layer, particularly given the potential for salts to rise up through the capping layer via 'capillary rise', and therefore affect the likely success of rehabilitation;
- the potential for salts in deposited slurry material to become airborne (via wind erosion) and therefore affect the surrounding environment by raising salinity levels.

With regard to saline water leakage from the northern initial overburden emplacement, the Applicant provided additional information on how it would control saline water infiltration from the emplacement. The control measures to be employed would include:

- a compacted 360mm clay liner at the base of the emplacement to minimise infiltration, with the liner covered with 200mm of sand to prevent cracking of the liner;
- a low permeability embankment surrounding the emplacement to prevent lateral leakage;
- a toe drain(s) to collect seepage water for recycling back to the dredge pit; and
- a groundwater monitoring network surrounding the emplacement to monitor potential leakage.

In consideration of these mitigation measures, and recognising that the nearest off-site groundwater user is located some 12 kilometres from the mining lease area, the Department and the DNR are satisfied that the proposal is unlikely to result in any

significant land and water impacts through infiltration of saline water, subject to adequate mitigation measures.

With regard to the adequacy of the 3 metre (minimum) capping layer, the Applicant provided additional assessment from its specialist rehabilitation consultant, Dr Darren Brearley. Dr Brearley cites research conducted on mineral sands mining rehabilitation projects in WA which suggests that capillary rise can occur up to 2 metres above a saturated zone (ie. a groundwater table or perched aquifer). Dr Brearley suggests that capillary rise at Ginkgo, where the final emplacement is well above a saturated zone, is likely to be much less than 2 metres.

The Applicant further states that the primary root zone (PRZ) for plants along the mine path are predominantly shallow, extending only 15 to 20 centimetres below the topsoil (although the report notes that PRZ depths along the mine path vary considerably). Accordingly, the Applicant considers that the proposed 3 metre capping layer would be adequate for successful rehabilitation of the site.

The DNR considers that, over time, some of the deeper rooted perennial species in the area (particularly native trees) would potentially be affected by saline overburden placement to within 3 metres of the surface. The DNR considers that a buffer in the order of 6-7 metres would be more appropriate, given uncertainties associated with:

- the response of native woodlands to increased salt loading higher up in the soil profile;
- the potential for capillary rise of salts (which is highly variable and dependent on number of factors including clay content and heat); and
- the leaching fraction of salts over time.

The Department notes that the existing consent includes a requirement on the Applicant to reconstruct the native bushland removed by the project with the *'principal [rehabilitation] goal to replace each community type to be removed on site, with communities of same or similar dominant species composition'*. Most of the area subject to disturbance by the project comprises native Belah Woodland.

Given this rehabilitation goal, and the uncertainty associated with the likely long term success of woodland rehabilitation, the Department believes that a precautionary approach should be adopted to ensure that the proposal would result in a minimal environmental impact. In this regard, the Department believes that the Applicant should be required to establish a compensatory vegetation offset area that is equivalent to the area that may be affected by the saline overburden placement. The Department considers that a conservatively reasonable threshold for the potentially affected area is the area subject to a capping layer of 5 metres or less, which equates to a total area of 245 hectares.

The compensatory vegetation would need to be established and managed in accordance with the project's existing *Southern Mallee Offset Strategy*. If the Applicant is able to demonstrate the long term success of native woodland rehabilitation in those areas subject to a capping layer of 5 metres or less (based on agreed criteria), to the satisfaction of the relevant authorities, then the Applicant may release the precautionary offset area.

As noted above, the proposal also has the potential to increase soil salinity in the surrounding area through wind erosion of the emplaced overburden material. This issue is not restricted to the proposed modification and the Department notes that the existing Integrated Erosion and Sediment Control Plan contains measures to minimise, monitor and manage this risk, including vegetation monitoring of surrounding areas. The Department believes that, with amendment of the IESCP to accommodate the changes, the proposal is unlikely to significantly increase salinity levels in the surrounding area.

In summary, the Department believes that the proposed change to the overburden replacement method can be conducted in a manner that would ensure a minimal environmental impact to land and water resources, subject to requiring the Applicant to:

- update its existing management plans – including the Integrated Erosion and Sediment Control Plan, Site Water Management Plan and Land Management Plan – in consultation with the DNR and other relevant agencies, to accommodate saline overburden placement; and
- establish an additional compensatory vegetation area of 245 hectares as a precaution against the potential failure of rehabilitation above areas of saline overburden placement.

#### Waste Reclassification

The existing consent allows waste material from the MSP to be disposed with the sand residues behind the advancing dredge pit. The waste is to be trucked from the MSP to the mine and stockpiled before being mixed with sand residue and deposited in the pit above the groundwater table and covered by a minimum of 10 metres (and up to 35 metres) of overburden. The consent requires that the waste is landfilled in a manner that ensures the average concentration of radioactive material does not exceed the average concentration in the original orebody, and that there is no detectable change in background levels at the ground surface.

The SEE states that the proposal would be managed to comply with these existing requirements.

The consent also requires the Applicant to monitor radiation levels in stockpiles and in dust gauges, and to maintain a Landfill Environmental Management Plan that includes procedures and a monitoring program to ensure compliance with the requirements of the Commonwealth's *Code of Practice on The Management of Radioactive Wastes From the Mining And Milling of Radioactive Ores 1982* (nb. this code has since been updated).

The Department and the DEC are satisfied that the reclassification waste from 'industrial' to 'hazardous' is unlikely to result in any significant impact to land and water resources. The Department notes that the radiation criteria are occupational health and safety based, and that threshold levels for environmental impact are significantly higher than the OH&S based criteria. Notwithstanding, the Department believes the Applicant should be required to:

- update its Landfill Environmental Management Plan to reflect the revised classification of waste, including procedures and a monitoring program to comply with the Commonwealth's *Code of Practice and Safety Guide Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing, 2005*; and
- comply with the existing conditions of consent with regard to maintaining average concentrations for radiation similar to background levels, along with an additional, more specific criterion that radiation concentrations are below 0.7 microGray per hour measured 1 metre vertically above the surface of the material being deposited.

#### **Hazards and Risk / Waste Management**

The reclassification of monazite waste from 'industrial' to 'hazardous' has the potential to present a hazard to employees, the public and the environment, associated with the transport of waste from the MSP, and the handling and disposal of the waste at the mine site.

The SEE states that the total activity of the waste would be approximately 125 Becquerels per gram (Bq/g) during Stage 1 of the Project, rising to 190 Bq/g during Stage 3. The threshold for 'industrial' waste classification is 100 Bq/g.

The risk associated with the classification change has been assessed by the Department's Hazards Branch and the DEC's Hazardous Waste Regulation Unit. Following their assessment both Departments are satisfied that the proposal can be managed such that the Project would not present a significant risk to employees, the public or the environment, subject to the Applicant:

- transporting all material in accordance with the *Code of Practice for the Safe Transport of Radioactive Material*, published by the Australian Radiation Protection And Nuclear Safety Agency, and managing all material in accordance with the Commonwealth's *Code of Practice and Safety Guide Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing*;
- preparing a Hazardous Materials Transport Safety Plan, in consultation with the DEC, to manage transport in accordance with the Codes of Practice and *NSW Radiation Control Regulation 2003*; and
- reviewing and updating the project's Safety Management System, Emergency Services Cooperation Agreement, Traffic Code of Conduct and Landfill Environmental Management Plan, in consultation with the relevant agencies.

The Department has recommended conditions to reflect these requirements, and has also expanded monitoring requirements to require regular monitoring of waste stockpiles.

In addition to the change to the monazite waste classification, the application also seeks to introduce some ash into the waste stream from the MSP. The ash waste introduction follows recent modifications to the MSP consent to allow the use of coal as a fuel type at the MSP. The SEE states that the ash would be classified as 'inert' under the EPA waste classification guidelines. The Department and the DEC are satisfied that introduction of the ash into the waste stream would not result in any significant environmental impact.

### **Flora and Fauna**

The proposed modification would require the direct removal of approximately 15 hectares of Belah (Casuarina) Woodland, associated with the expansion of the northern initial emplacement. The approved Project requires disturbance to some 600 hectares in total.

The Department is satisfied that the proposed modification would not significantly increase the direct impact of the development on flora and fauna, including threatened species. However, the Department recognises that the proposal would require the clearing of an additional area of native Southern Mallee vegetation. Although this area would be progressively rehabilitated, the Department believes the Applicant should be required to compensate for the loss of vegetation through the conservation of a similar area of Southern Mallee vegetation.

The existing consent requires the Applicant to develop and implement a Southern Mallee Offset Strategy that provides for the conservation and management of Southern Mallee vegetation removed by the Project. Accordingly, the Department has recommended increasing the required offset by 15 hectares to compensate for the area disturbed by the proposal. This offset area could be established in a variety of ways (such as acquiring and conserving an area of similar Southern Mallee vegetation and habitat value, or rehabilitating and conserving an area of degraded habitat), with the detail to be provided in the approved offset strategy.

In addition to direct impacts on flora and fauna, the Department and the DNR believe that there is some uncertainty whether the proposed slurry overburden replacement method would affect the ability of part of the site to be rehabilitated to support native woodlands over the long term (as discussed above under 'Land and Water').

Given the uncertainty regarding the success of woodland rehabilitation, and the principal rehabilitation goal of the consent, the Department believes the Applicant should be required to establish a further offset area of 230 hectares (net), to mitigate the uncertainty. This area equates to the area subject to slurried overburden capping of less than 5 metres (ie. the area subject to uncertainty regarding the viability of long term woodland rehabilitation), minus the 15 hectares that would be directly affected by the increased size of the northern initial emplacement. As detailed above, the Applicant would be allowed to release this precautionary offset area if it can demonstrate the long term success of woodland rehabilitation. Rehabilitation success would be based on agreed rehabilitation criteria, including vegetation condition and soil salinity levels.

The Department believes that other impacts of the proposal would be adequately managed through the existing conditions of consent, which include requirements to:

- progressively rehabilitate the site with native bushland, and monitor the revegetation works;
- maintain a Flora and Fauna Management Plan, including protocols for vegetation clearing and managing occurrences of threatened species; and
- maintain a Painted Burrowing Frog Management Plan (a threatened species of the area).

### ***Other Issues***

The Department has assessed other environmental issues associated with the proposal, including air quality, noise, archaeology and heritage, traffic, and visual amenity. Following its assessment the Department is satisfied that the impacts associated with these aspects would be similar to the approved Project, and would be adequately managed through the existing conditions of consent.

## **6. SECTION 79C CONSIDERATION**

Section 96 of the EP&A Act requires a consent authority to have consideration for the matters under section 79C when it determines a modification application.

The Department has assessed the proposal against these matters, and is satisfied that:

- the proposal is consistent with the provisions of the relevant planning instruments;
- the potential impacts of the proposal can either be mitigated or managed;
- the site is suitable for the development; and
- the proposal is in the public interest.

## **7. RECOMMENDED CONDITIONS**

The Department is satisfied that the existing conditions of consent for the project are generally adequate to manage the development as modified by the application. The Department has recommended additional conditions, including a requirement to update its various environmental management plans to encompass the proposed modification. The Department has also included conditions requiring the Applicant to compensate for the clearing of southern mallee vegetation on the site and vegetation potentially affected by saline overburden replacement, and to develop a Hazardous Materials Transport Safety Plan. The Applicant does not object to the proposed conditions.

## **8. CONCLUSION**

Following its assessment of the proposal the Department considers that:

- the impacts associated with the proposed modification would be generally similar to those of the existing approved development;
- the impacts can be effectively mitigated and/or managed; and
- the proposed modification is in the public interest because it would facilitate the significant socio-economic benefits of the Ginkgo Mineral Sands Project to the people of Western NSW, which includes the generation of at least 100 jobs in the region.

For these reasons, the Department believes that the proposed modification should be approved, subject to conditions.

## **9. RECOMMENDATION**

It is RECOMMENDED that the A/Executive Director exercise the powers and functions delegated to him in the Instrument of Delegation, dated 5 April 2006, and:

- consider the findings and recommendations of this report;
- determine that the development consent, as modified, would relate to substantially the same development to which consent was originally granted;
- approve the proposed modification under section 96(1A) of the EP&A Act; and
- sign the attached notice of modification (tag A).

David Kitto  
**A/Director**  
**Major Development Assessments**

Chris Wilson  
**A/Executive Director**  
**Sustainable Development Assessments**