

02 July 2008

Department of Environment and Conservation
Resource Development - Environmental Impact Assessment
Environmental Management Branch
17 Dick Perry Avenue
Kensington WA 6151

Attention: Murray Baker

Re: Eneabba Mineral Sands Mine – Allied Tails Mining Proposal

Dear Murray

In response to the advice provided by the Environmental Management Branch, dated 10th December 2007, Iluka can provide the following supporting information;

Section 4.4 Rehabilitation, page 12

The reference to the 9 taxa was provided in error, and should read 24 taxa. The list of the 24 taxa was provided in Table 5, however, is presented in a more concise manner below.

Summary of Rehabilitation Blocks and Monitoring History, page 11

Not all rehabilitation blocks are monitored annually at Eneabba, in accordance with the methodology developed by Mattiske Consulting. Due to the number of rehabilitation blocks and the intensity of the monitoring conducted at each block a regime was developed that was reviewed and ratified by MSARCC. This involves monitoring all blocks in the first year following completion of rehabilitation, and then only monitoring a subset of these blocks as representative of that year's rehabilitation in subsequent years.

It is not until detailed mining plans and pit outlines have been finalised that a DRF survey can be conducted. The Allied Tails proposal outlined the internal procedures that are in place (page 17) to ensure DRF checks are completed prior to mining.

Iluka will conduct a DRF survey of the Allied Tails proposed mining areas in Spring 2008. A review of the schedule has delayed mining commencing in this area until 2009, which will allow a DRF survey to be undertaken prior to mining. Any DRF identified will be demarcated and avoided. If mining requires access to an area of DRF, a Permit to Take will be submitted prior to any ground disturbance, to authorise removal of any plants under the Wildlife Conservation Act 1950. Iluka is committed to ensuring that impacts from mining on DRF is minimised wherever possible.

Table 5, Priority Flora Species, page 12

The priority status of the 24 species was provided in Table 2 on page 5. However, it is agreed that this could have been presented in a more comprehensive manner. A revised table of priority species, including their conservation status, is included below.

Section 6.1 Land Clearing

The table below outlines the impact of the proposal on known populations of priority species, recorded at Eneabba (current as of February 2007). It is acknowledged that a

targeted survey of the Allied Tails rehabilitation areas has not been carried out, and the attached table is based on rehabilitation monitoring results to determine the impact on priority species. On advice from Woodman Environmental Consulting, Iluka considers that a targeted priority species survey may not be appropriate for rehabilitation in this instance based on the following;

- Conservation significance of priority flora in rehabilitation is not directly comparable to undisturbed native vegetation; as the long term survival and reproduction of any plants found in rehabilitation blocks is not assured at early stages of vegetation development.
- PF may be occurring in rehabilitated vegetation communities that may differ to the original distribution due to mulch or topsoil having been sourced from another area with the remaining environmental factors not supporting long term survival.
- Priority flora individuals located in rehabilitated areas do not directly contribute to the conservation status of the species and their removal will not negatively impact on the status of the species.

The conservation status and significance of the DRF and Priority taxa at Eneabba is being reviewed by Woodman Environmental currently and will be available later this year. This review will include recommendations for changes to priority status of taxa.

Species	Conservation Status	Within Rehab Blocks to be Cleared	All Records within Rehabilitation (Mattiske)	All Records within Undisturbed Areas (Woodman)	% of known population to be disturbed
<i>Hemiandra</i> sp. Eneabba (H. Demarz 3687)	P1	1	5	239	0.4
<i>Mesomelaena stygia</i> subsp. <i>deflexa</i>	P1	14	81	880	1.5
<i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> Cockleshell Gully variant (E.A. Griffin 2039)	P2	1	11	6	5.9
<i>Boronia ericifolia</i> *	P2	1	3	0	33.3
<i>Eremaea acutifolia</i> *	P2	2	173	0	1.2
<i>Hypocalymma gardneri</i>	P2	6	368	197	1.1
<i>Persoonia filiformis</i>	P2	1	15	50	1.5
<i>Schoenus griffinianus</i>	P2	29	267	15	10.3
<i>Verticordia argentea</i>	P2	3	10	66	3.9
<i>Beyeria similis</i> *	P3	4	12	0	33.3
<i>Calytrix chrysantha</i>	P3	2	6	28	5.9

Species	Conservation Status	Within Rehab Blocks to be Cleared	All Records within Rehabilitation (Mattiske)	All Records within Undisturbed Areas (Woodman)	% of known population to be disturbed
<i>Calytrix drummondii</i> *	P3	1	2	0	50.0
<i>Desmocladius elongatus</i>	P3	3	107	68	1.7
<i>Dryandra cypholoba</i>	P3	1	4	2	16.7
<i>Dryandra tortifolia</i>	P3	13	70	148	6.0
<i>Grevillea uniformis</i>	P3	3	6	11	17.6
<i>Isopogon tridens</i>	P3	23	229	492	3.2
<i>Lepidobolus quadratus</i>	P3	2	12	5	11.8
<i>Banksia scabrella</i>	P4	2	2	1	66.7
<i>Darwinia sanguinea</i>	P4	2	307	179	0.4
<i>Daviesia chapmanii</i>	P4	6	30	145	3.4
<i>Georgeantha hexandra</i>	P4	3	122	699	0.4
<i>Grevillea rudis</i>	P4	3	46	87	2.3
<i>Verticordia aurea</i>	P4	7	21	176	3.6

* species not found in undisturbed vegetation areas (Woodman Surveys)

Section 6.7 Rehabilitation, page 19

“Second Time” Rehabilitation Strategy

It is agreed that the successful reconstruction of the soil profile will be critical in achieving acceptable rehabilitation outcomes, particularly for “second time” rehabilitation in the Allied Tails area. The proposed strategy to blend fresh topsoil with reclaimed topsoil is believed to be successful, based on monitoring results on previous “second time” rehabilitation areas previously established at Eneabba.

The blending of fresh topsoil and reclaimed is known to increase the seed bank as evident from the findings of topsoil trials undertaken between 2000 and 2002 (Eneabba South, 2000 Rehabilitation Trials, Woodman Environmental Consulting, 2002). The key finding of the trial was that germination rates were the same in fresh topsoil applied at both 2.5cm and 5cm. As topsoil is generally applied at 5cm, halving the rate would help alleviate any deficit to other blocks being rehabilitated at a similar time.

As an example, rehabilitation block 05AS (rehabilitated in 2005) located in the South Mine was monitored in 2007 and indicated the following results for ‘reclaimed’ topsoil (i.e. unblended with fresh native soil):

- Higher than the Interim Completion Criteria (ICC) density of 12 plants/m² with a value of 19 plants, excludes *Acacia blakelyi*
- Higher than the ICC cover value of 32% with or without the inclusion of *A. blakelyi*. Value approaching 40%, not including *A. blakelyi*.

- The 70 species rehabilitated per/block and six species/m² ICC values were not yet met. Species density will be monitored in future and infill planting completed if required.

The two year old 05AS block, at the time of assessment, showed a reasonable level of revegetative success given the use of reclaimed topsoil. Additional seed would have been sourced via the mulch that was incorporated in the topsoil profile. The Priority 2 species *Thryptomene sp. Eneabba* (R.J.Cranfield 8433) was also identified in the 05AS rehabilitation area. The success of other “second time” rehabilitation, as assessed to date, is provided in the Table below.

	Interim Completion Criteria	Block Number		
		02AS	04CS	05AS
Year of Rehabilitation	-	2002	2004	2005
Year of Assessment		2004	2004	2007
Plant Density	12 plants / m2	48.65 plants / m2	16.32 plants / m2	19 plants/m2
% Alive Foliage Cover	> 32% (excluding <i>A.blakelyi</i>)	15.6%	3.37%	40%
Species Richness	Mean of 6 species / m2	17.4 spp/m2	5.4 spp/m2	2.2 spp/m2
	70 species per block > 10ha	49	67	45

The 2006 and 2007 Rehabilitation Monitoring reports, completed by Matiske, have now been received by Iluka, and the 2007 report is attached for review. Iluka acknowledges there has been a significant delay in providing these reports to the DEC and is working closely with Matiske to ensure all reporting remains up-to-date in future. The 2008 assessment will involve the initial monitoring of all 2008 rehabilitation blocks, with repeat monitoring for other selected areas. Iluka also intends to initiate a review of monitoring findings since the commencement of the program (2000), to establish any trends over time. This review should assist further with the issues of recalcitrancy and establishing more relevant completion criteria.

Rehabilitation Process Review

Iluka is currently undertaking an external review of rehabilitation practises at Eneabba. Recommendations of this review will be formalised in a Rehabilitation Management Plan, which is currently being developed as part of the ERMP. Although not yet complete, this has identified some process improvements that Iluka intends to implement. This includes the development of “Landform Restoration and Implementation Plans” (LRIP) for individual mining areas prior to the undertaking of any mining or rehabilitation activities. An LRIP document will serve as a concise set of field instructions including the pre-mining environment, requirements for effective landform restoration, vegetation community establishment and surface water control measures. The plans will address topsoil and mulch inventories, movement and application to ensure appropriate forward planning for all rehabilitation works.

The review has also included an audit of the topsoil database for the Eneabba site, including volumes, ages and locations of all topsoil stockpiles on the site with ongoing

updates to the database completed by June 30 each year. This information will be used as part of the Landform Restoration and Implementation Planning process, to ensure that topsoil is used efficiently and appropriately for re-establishing vegetation. The restoration plans have proved beneficial to the rehabilitation planning and implementation of Iluka's Southwest operations; however it is recognised that increased detail is required for vegetation community restoration at the Eneabba Operations.

Weed Management

It is acknowledged that the management of *Acacia blakelyi* requires appropriate planning to ensure measures are in place to minimise the impact of this species on rehabilitation success. Iluka has implemented a control strategy for *Acacia blakelyi* based on trials conducted by Greening Australia in 2007 (report attached). This will be implemented within infestation areas, as shown on the attached map. Control and monitoring strategies will be formalised in a Weed Management Plan, which is currently being developed as part of the ERMP.

For the purpose of this proposal, control of *Acacia blakelyi* within areas identified in the attached map, will be as follows;

Reclaimed topsoil from rehabilitation areas, including areas infested with *Acacia blakelyi* will be stockpiled for reuse. Topsoil stockpiles are marked and details on characteristics recorded in the topsoil database. Reclaimed topsoil will be re-used only on the rehabilitation areas in Allied Tails. Reclaimed topsoil will not be used on any native vegetation areas, currently free from *Acacia blakelyi*, to limit the spread of the weed.

In rehabilitation areas using reclaimed topsoil, plant germination will be closely monitored and acacia seedlings sprayed with herbicide at an early stage. Greening Australia trials have shown this to be the most successful method at controlling the weed. This is due to differing germination times, with the *Acacia blakelyi* germinating early in May - June (depending on rainfall), and native species not germinating until later in August - September.

Due to the limited inventory of topsoil on-site, it is not considered appropriate to completely disregard topsoil that may be infested with *Acacia blakelyi*. This possibility of a topsoil deficit will be addressed within the Landform Restoration Implementation Plan, to be developed for the Allied Tails area, explained above and where possible fresh native soil will be blended to compensate for any deficiency in reclaimed topsoils.

Mulch Management

It is proposed that mulch harvesting of vegetation within the mine path of the Allied Tails area be used for rehabilitation where the vegetation type and condition are deemed suitable. The application of mulch will be addressed in the Landform Restoration Implementation Plan for the Allied Tails area. This will include details of vegetation not to be mulched (ie. avoidance of *Acacia blakelyi* infestations). In accordance with current practise, direct seeding and infill planting will also be used, pending the outcomes of rehabilitation monitoring assessments, to ensure suitable rehabilitation development.

A commitment has been made and is in development regarding the recovery of historically mulched areas. It is envisaged that the program will assess a number of historically mulched areas looking at the parameters of plant cover, density and species diversity in comparison to similar un-impacted floristic community types in nearby areas.

The existing mulch monitoring program (trial commencement 2002), is limited to two broadly defined communities of Woodland and Heath. The next monitoring is scheduled for 2009.

I trust that this information provided is satisfactory in addressing the advice and recommendations raised by the Environmental Management Branch in response to the Allied Tails proposal.

Please advise if a meeting would be beneficial to ensure all issues have been addressed adequately, and enable the regulatory approvals for this proposal to progress. If you wish to discuss this matter in more detail, please don't hesitate to contact Sarah Barron on 0408 093 223 or sarah.barron@iluka.com

Yours sincerely



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Midwest Mining Manager

Cc: *Phil Knight, DoIR*
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